

**Wastewater Treatment Plant
Screw Pump Improvements – Phase 1**

City of Orrville, OH

OPWC Funded Project CP11AD

October 2026



0000040948PH1

CITY OF ORRVILLE OFFICIALS

ADMINISTRATION

Matt Plybon, Mayor
Janet Strimlan, Finance Director
Cheryl Kirkbride, Law Director
Steve Wheeler, Service Director
Dave Filippi, Utilities Director
Steve Carathers, WWTP Superintendent

COUNCIL

Paul Vance, President
Rick Aspiras Jr, At-Large
Morgan Mace, At-Large
Rees Davies, At-Large
C. J. Handwerk, 1st Ward
Jason Lax, 2nd Ward
Patty Carr, 3rd Ward
Beverly Squirrell, 4th Ward
Jeanne Gault, Clerk of Council

ADVERTISEMENT FOR BIDS/PUBLIC NOTICE TO BIDDERS

Sealed bids will be received at City Hall at the City of Orrville, 207 North Main Street, Orrville, OH 44667 until 3:00 p.m. on October 27, 2026 and will be opened and read immediately thereafter for the

WASTEWATER TREATMENT PLANT SCREW PUMP IMPROVEMENTS – PHASE 1

OPWC FUNDED PROJECT

OPINION OF PROBABLE CONSTRUCTION COST: \$1,710,000.00

COMPLETION DATES:

SUBSTANTIAL COMPLETION DATE - 400 DAYS FROM NOTICE TO PROCEED

FINAL COMPLETION DATE - 30 DAYS FROM SUBSTANTIAL COMPLETION

The bid specifications, drawings, plan holders list, addenda, and other bid information (**but not the bid forms**) may be viewed and/or downloaded for free via the internet at <https://bids.verdantas.com>. The bidder shall be responsible to check for Addenda and obtain same from the web site.

Bids must be in accordance with drawings and specifications and on forms available from Verdantas LLC at a non-refundable cost of One Hundred Twenty-Five Dollars (\$125.00) for hard copies and Forty-Five Dollars (\$45.00) for electronic files. Documents may be ordered by registering and paying online at <https://bids.verdantas.com>. Please contact planroom@verdantas.com or call (440) 530-2351 if you encounter any problems viewing, registering, or paying for the documents.

OHIO PREFERENCE: In accordance with Ohio Rev. Code §164.05 (A)(6), to the extent practicable, the Prime Contractor and subcontractor shall use Ohio products, materials, services, and labor in connection with this project.

STEEL PRODUCTS MADE IN THE UNITED STATES:

Domestic steel use requirements as specified in Ohio Rev. Code §153.011, <https://codes.ohio.gov/ohio-revised-code/section-153.011>, apply to this project.

(Load-bearing structural purposes only)

Publish: The Daily Record
October 6, 2026
October 13, 2026

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SECTION 1
BID DOCUMENTS

INSTRUCTIONS TO BIDDERS

PART 1 GENERAL

- 1.1 Sealed bids shall be received by the Owner at the location specified and until the time and date specified in the Advertisement for Bids/Public Notice to Bidders.
- 1.2 Each bid shall contain the full name and address of each person or company interested in said bid. If no other person be so interested, the Bidder shall distinctly so state the fact.
- 1.3 Bid forms must be completed in ink or by typewriter. Any corrections to the bid forms prior to submission must be initialed by the person signing the bid. Failure to submit any bid form(s) or other required document(s) may be cause for rejection of the bidder's bid at the sole discretion of the Owner.
- 1.4 Bids by Corporations must be executed in the corporate name by the President, Vice President, or other officer accompanied by evidence of authority to sign and the corporate seal must be affixed and attested by the Secretary on the Corporate Resolution form.
- 1.5 Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature.
- 1.6 All names must be typed or printed below the signature.
- 1.7 The bid shall contain an acknowledgment of receipt of all Addenda.
- 1.8 If a Bidder wishes to withdraw their bid prior to the opening of bids, they shall state their purpose in writing to the Owner before the time fixed for the opening, and when reached it shall be handed to them unread.
- 1.9 After the opening of bids, no Bidder may withdraw their bid for a period of 60 days.

PART 2 EXAMINATION OF CONTRACT DOCUMENTS AND SITE

- 2.1 Before submitting a bid, each Bidder must
 - A. Examine the Contract Documents thoroughly.
 - B. Visit the site to familiarize themselves with local conditions that may in any manner affect cost, progress, or performance of the work.
 - C. Familiarize themselves with Federal, State, and local laws, ordinances, rules, and regulations that may in any manner affect cost, progress, or performance of the work.
 - D. Study and carefully correlate Bidder's observations with the Contract Documents.

- 2.2 Reference is made to the Specific Project Requirements for the identification of any reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the work which have been relied upon by the Engineer in preparing the drawings and specifications. Owner will make copies of such reports available to any Bidder requesting them if not made available with the bid documents. These reports are not guaranteed as to accuracy or completeness; nor are they part of the Contract Documents. Before submitting their bid each Bidder will, at their own expense, make such additional investigations and tests as the Bidder may deem necessary to determine their bid for performance of the work in accordance with the time, price and other terms and conditions of the Contract Documents.
- 2.3 Upon request, the Owner will provide each Bidder access to the site to conduct such reasonable investigations and tests as each Bidder deems necessary for submission for their bid.
- 2.4 The lands upon which the work is to be performed, rights-of-way for access thereto, and other lands designated for use by Bidder in performing the work are identified on the Drawings.
- 2.5 The submission of a bid will constitute an incontrovertible representation by the Bidder that they have complied with every requirement of this section and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the work.

PART 3 ESTIMATED QUANTITIES

- 3.1 In Unit Price Contracts, the quantities of the work itemized in the bid are approximate only and the bidders are hereby notified that the estimated quantities made by the Engineer are merely for the guidance of the Owner in comparing on a uniform basis all bids received for the work.
- 3.2 The contract quantities, where itemized, are based on plan horizontal and vertical dimensions unless otherwise specified. It is the Contractor's responsibility to verify and determine actual quantities of materials such as pipe, pavement, subgrade, etc. in their ordering materials.
- 3.3 Payments, except for lump sum contracts and except for lump sum items in unit price contracts, will be made to the Contractor only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications.
- 3.4 The successful Bidder will be required to furnish the Owner with a complete breakdown of the lump sum bid items, to the satisfaction of the Engineer/Architect, before signing the Contract documents.

PART 4 CONTRACTOR'S QUALIFICATION

- 4.1 Bidder shall provide detailed information relating to similar projects completed within the past 5 years which demonstrates the bidder's capability, responsibility, experience, skill, and financial standing to undertake this type of project and shall include a list of all projects currently under construction including status and contact person.
- 4.2 Bidder shall own, have rental or lease agreements for, or otherwise have readily available any and all equipment and tools necessary for proper execution of the work. The Owner reserves the right to request lists of equipment or tools available for the project including sources.
- 4.3 Bidder shall provide pertinent information to the Owner relative to any pending suits or outstanding liens. If no information is provided by the Bidder, the Owner shall assume that any such suits or liens do not exist.
- 4.4 The Owner may require similar information on any or all subcontractors proposed by the Bidder.
- 4.5 Bids of corporations not chartered in the state in which the work will take place must be accompanied by proper certification that the corporation is authorized to do business in that state.

PART 5 SUBCONTRACTORS

- 5.1 The Bidder shall state on the appropriate bid form the names of all Subcontractors, Sub Consultants and other professional service providers proposed and the items of work they are to be assigned. All work not assigned to a Subcontractor shall be assumed by the Owner to be performed by the Bidder.
- 5.2 The Owner reserves the right to approve all subcontractors proposed by the Bidder. If the Owner, after due investigation, rejects the use of a proposed subcontractor, the apparent successful Bidder may either submit an acceptable substitution without increase in bid price or decline substitution and withdraw their bid without sacrificing their bid security. Any listed subcontractor to whom the Owner does not make written objection prior to award of contract, shall be deemed acceptable to the Owner.
- 5.3 Requests for changes of Subcontractor(s) by the Bidder after the award shall be subject to the Owner's approval and shall not change the contract bid prices. Contractor shall make all requests to add, delete or substitute a subcontractor in writing.
- 5.4 No contractor shall be required to employ any Subcontractor, person or organization against whom they have reasonable objection.

PART 6 BID REVIEW BY OWNER

- 6.1 The Owner reserves the right to reject any and all bids, to waive as an informality any and all irregularities, and to disregard all nonconforming, nonresponsive or conditional bids.

- 6.2 All extensions and totals of unit prices and quantities submitted as part of the bid shall be considered informal until verified by the Owner. All bids must be made on the forms contained herein and the bid prices must be written therein, in figures only. Unit prices shall be separately written for "Unit Price Labor," "Unit Price Material," and "Total Unit Price" for each item listed. Should an error in addition and/or multiplication be determined while checking the Contractor's math and verifying their total bid, the "Unit Price Labor" and the "Unit Price Material" figures shall govern in determining the correct "Total Unit Price" and the correct "Item Total."
- 6.3 Each bidder must bid on all Items, Alternates, Deductions, and Additions contained in the Bidding Forms. All bids not in conformity with this notice may be considered non-responsive and may be rejected.
- 6.4 More than one bid for the same work from an individual or entity under the same of different names will not be considered. Reasonable grounds for believing that any bidder has an interest in more than one bid for the work may be cause for disqualification of that bidder and the rejection of all bids in which the bidder has an interest. A subcontractor or supplier is not a bidder, and may submit prices to multiple bidders.
- 6.5 In evaluating bids, the Owner may consider:
- A. The qualifications and experience of the Bidder, proposed subcontractors, and principal material suppliers as outlined in the plans and specifications.
 - B. Financial ability and soundness of the Bidder and proposed subcontractors.
 - C. Completeness of all bid forms and bid requirements.
 - D. Alternates and unit prices requested in the Bid Forms.
 - E. Unit prices or schedules of values that are or appear to be unbalanced.
 - F. Previous contractual experience with the Owner.
 - G. Whether or not the bid package complies with the prescribed requirements.
 - H. The proposed completion date, if applicable.
 - I. Any other matter allowed by law or local ordinance or resolution.
- 6.6 Owner may conduct further investigations as they deem necessary to assist in the evaluation of any bid and to establish the responsibility, qualifications, and financial ability of the Bidder, proposed Subcontractors, and other persons and organizations to do the work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.
- 6.7 Owner reserves the right to reject the bid of any Bidder who does not pass any such evaluation to Owner's satisfaction.

- 6.8 The Contract award shall be based on the lowest and best bid or lowest responsive and responsible bid (as applicable for the public contracting agency receiving bids) for the base bid and selected alternate items (if any) for this project.

PART 7 BID SECURITY

- 7.1 Each bid must be accompanied by a certified or cashier's check in the amount of 10% of the amount bid, an irrevocable letter of credit in the amount of 10% of the amount bid or an original bond in the amount of 100% of the amount bid per O.R.C. Sections 153.54 and 153.571. The certified or cashier's check, or irrevocable letter of credit shall be from a financial institution authorized to transact business in the State of Ohio and acceptable to the Owner. The bond shall be underwritten by a Surety Company authorized to transact business in the State of Ohio having an Ohio agent and listed on the most current Department of the Treasury Circular 570, "Surety Companies Acceptable on Federal Bonds." The bond shall be a "Bid Guarantee and Contract Bond" ("rollover bond") per O.R.C. Sections 153.54 and 153.571 submitted for the full amount of the bid **including all alternates**, if any.

If bid security is made by bond, the Bidder and their Surety shall sign the Supplemental Bond Acknowledgement form and submit with their bid.

- 7.2 The certified or cashier's check, irrevocable letter of credit, or bond shall be made payable to the Owner and shall serve as a guarantee that in the event the bid is accepted and a contract is awarded to the successful Bidder, the contract will be executed by the bidder including any certifications, certificates or additional bonds required by the contract.
- 7.3 Failure on the part of the successful Bidder to execute the contract documents will cause the certified or cashier's check, irrevocable letter of credit, or bond to be forfeited to the Owner as damages.
- A. If the Owner awards the contract without rebidding, the Bidder (and the Surety on their bond if a bond was submitted) shall be liable to the Owner for a penal sum not to exceed the difference between the low bid and the next lowest bidder or 10% of the amount of the bid, whichever is less.
- B. If the Owner does not award the Contract to the next lowest Bidder, but resubmits the project for bidding; the Bidder (and the Surety on their bond if a bond was submitted) shall be liable to the Owner for a penal sum not to exceed the costs in connection with the resubmission of bids or 10% of the amount of the bid, whichever is less.
- 7.4 Checks or letters of credit for bid security of all bidders will be returned in the manner and timeframe stipulated in the O.R.C. Section 153.54 Bid guaranty to be filed with bid.

PART 8 CONTRACT BOND

- 8.1 As security for faithful performance and payment of all obligations under the Contract, the Owner shall require and the successful Bidder shall furnish either:
- A. *If submitted as Bid Security at time of bid:* "Bid Guarantee and Contract Bond" (AKA "rollover bond") per O.R.C. Sections 153.54 and 153.571.
 - B. *If a cashier's check or irrevocable letter of credit is submitted as Bid Security at time of bid:* Contract Bond per O.R.C. Sections 153.54 and 153.57, in the amount of 100% of the Contract Price. The Contractor and their Surety shall sign the Supplemental Bond Acknowledgement form and submit with the Contract forms
- 8.2 The bond shall be underwritten by a Surety Company authorized to transact business in the State of Ohio having an Ohio agent and listed on the most current Department of the Treasury Circular 570, "Surety Companies Acceptable on Federal Bonds."
- 8.3 The contract bond shall cover correction of the work for the period stated in the specifications and the correction period shall start upon Final Acceptance of the entire project and final payment by the Owner.
- 8.4 Nothing in the performance of the Engineer's service to the Owner in connection with this project shall in any way imply any undertaking for the benefit of the successful Bidder, its subcontractor(s), or the surety of any of them.

PART 9 AWARD AND EXECUTION OF CONTRACT

- 9.1 After the Owner's legislative body awards the project, the successful bidder will receive the unsigned contract documents. Within 10 days after their receipt, the successful Bidder shall sign and deliver to the Owner said contract documents including any certifications, certificates, or additional bonds required by the contract.
- 9.2 The Owner shall execute the Contract within 60 days after the day of the bid opening. When necessary and by mutual consent between the Owner and the Successful Bidder, this 60 day period may be extended.
- 9.3 The date of the Owner's signature on the Contract Agreement shall be the effective contract date.
- 9.4 The Owner shall execute and deliver to the successful Bidder one set of fully executed contract documents.

PART 10 INSURANCE

- 10.1 Verification of limits for public liability, property damage, automobile, Worker's Compensation, or any other insurance required by the provisions of this Contract must be submitted to the Owner prior to execution of the Contract.
- 10.2 All insurance shall be endorsed so that it cannot be cancelled for non-payment of premium for 10 days or cancelled or non-renewed for any other reason in less than 30 days after a written notice of such proposed action by the insurer is given to the Owner. The cancellation clause on the Certificate(s) of Insurance shall read as specified in the Supplementary Conditions and failure to submit an insurance certificate and/or policy endorsement verifying same shall be reason for the Owner to consider the Contractor non-responsive in complying with the requirements for contract execution and may be cause for forfeiture of the Bid Security to Owner.
- 10.3 The Insurer's affording coverage shall be authorized to transact business in the State of Ohio and be listed on the most current Ohio Department of Insurance list of Ohio Licensed Companies.
- 10.4 The Contractor's Liability Insurance policy(s) shall be endorsed such that limits are on a Per Project basis.
- 10.5 The Contractor shall also provide an Owner's and Contractor's Protective Policy.

PART 11 NON-COLLUSION AFFIDAVIT

- 11.1 Collusion between bidders will be cause for rejection of affected bids and may be cause for rejection of all bids. Multiple bids submitted by one bidder under the same name or different names, whether as an individual, firm, partnership, corporation, profit or non-profit, affiliate, or association will be cause for rejection of bids. A subcontractor is not a bidder, and may submit prices to multiple bidders.
- 11.2 All bidders shall submit an affidavit that their bid is genuine and not collusive or sham; that such bidder has not colluded, conspired, connived, or agreed, directly or indirectly, with any bidder or person, to put in a sham bid, or that such other bidder or person shall refrain from bidding; that such bidder has not in any manner, directly or indirectly sought by agreement or collusion, or communication or conference, with any person, to fix the bid price of affiant or any other bidder, or to fix any overhead, profit or cost element of said bid price, or of that of any other bidder, or to secure any advantage against the Owner or any person or persons interested in the proposed contract; that such bidder is the only party (or parties) who has an interest with the bidder in the profits of any contract which may result from the herein contained proposal; that no individual affiliated with the Owner, including but not limited to the head of any department, any employee, or any other official or officer of the Owner, is or will be directly or indirectly interested in this bid, and/or the profits from this bid if successful; that no individual affiliated with the Owner, including but not limited to the head of any department, any employee, or any other official or officer of the Owner, has or will receive anything of value as a result of the submission of this bid or its award; that no individual affiliated with the Owner, including but not limited to the

head of any department, any employee, or any other official or officer of the Owner, has been solicited to provide assistance and/or provided assistance to the bidder which might give the bidder a competitive advantage or circumvent the competitive bidding process; and that all statements contained in said proposal are true; and further, that such bidder has not, directly or indirectly submitted this bid, or the contents thereof, or divulged information or data relative thereto to any association or to any member or agent thereof.

- 11.3 Each bid must be accompanied by a completed Noncollusion Affidavit provided within the contract documents.
- 11.4 Where there is reason to believe collusion or combination among bidders exists, the Owner reserves the right to reject the bid of those concerned.

PART 12 DELINQUENT PERSONAL PROPERTY STATEMENT

- 12.1 Included with the contract documents is a Delinquent Personal Property Statement to be filled out by the successful Bidder.
- 12.2 The statement shall be sent to both the County Auditor and the County Treasurer. A signed copy shall remain in the contract documents as well.

PART 13 ORIGINAL DOCUMENTS

- 13.1 All bid forms, contract forms, bonds and any other bid documents or contract documents requiring signatures shall be submitted with original signatures. No photo copies or faxed copies of signed documents shall be accepted.

PART 14 ADDENDA

- 14.1 The bidder shall be responsible to obtain Addenda from the web at <https://bids.verdantas.com>.

END OF SECTION 08/06/26

PRICES TO INCLUDE

PART 1 - GENERAL

Any work shown on the plans or required in the specifications but not paid for separately as a bid item shall be included in the cost of other bid items. The amount bid for each Bid Item shall include the following:

- 1.1 All labor, materials, tools, equipment, and transportation necessary for the proper execution of the work in accordance with the Contract Documents.
- 1.2 All assistance required by the Engineer to verify compliance with the Contract Documents, including measuring for final pay quantities.
- 1.3 Project coordination and scheduling.
- 1.4 Detailed breakdown of lump sum bid items as requested by the Engineer.
- 1.5 All provisions necessary to protect workers, the general public, and property along the work in accordance with the Contract Documents.
- 1.6 Protection and/or replacement of existing property corner monuments.
- 1.7 Record drawings of the installed location of all underground electrical conduit, sewers, tees, wyes, laterals, etc.
- 1.8 Materials testing as required in contract documents.
- 1.9 Operational demonstration of each installed pump.
- 1.10 Reimbursement to Owner for costs of re-inspection or re-testing of any work not installed in compliance with the Contract Documents.
- 1.11 All erosion control measures in accordance with the Contract Documents.
- 1.12 Mobilization.

PART 2 - ITEMS

All work proposed by this contract shall be quantified and paid for in accordance with the pertinent O.D.O.T. specification except as specifically altered by other provisions of this contract. ODOT 104.02 D., 611.04, 611.12, and 611.13 shall not apply to this project.

2.1 PATCHING CONCRETE STRUCTURE, AS PER PLAN [CONCRETE SURFACE REPAIR]

Method of Measurement

The quantity to be paid shall be the number of square feet of concrete surface repair completed in accordance with the plans, specifications, and as directed by the Engineer. Measurement shall be based on the actual surface area repaired, regardless of repair depth. Repairs that are not directed and approved by the Engineer shall not be paid for.

Basis of Payment

The unit price shall include removal and disposal of unsound concrete, surface preparation, cleaning and treatment of exposed reinforcing steel, furnishing and placing repair materials, finishing, curing, and the furnishing of all labor, materials, equipment, tools, and incidentals necessary to complete the work as specified or as shown. No separate payment shall be made for saw cutting, reinforcing steel treatment, concrete removal, disposal, surface preparation, curing, or other incidental work required to complete the repair.

2.2 PUMP STATION NO. 01

Basis of Payment

The unit price shall include all labor, materials, equipment, tools, and incidentals required to replace the specified screw pumps located within the 2nd Stage Influent Pump Station per the specifications and plans including: the screw pump motors, flights, electrical controls, concrete foundation improvements, all associated accessories, spare parts as indicated, other appurtenances, and all necessary furnishings and installing, disposal of undesirable and excess material; shall include circuit breakers, wiring, and conduit as necessary to connect to the electrical panel; electrical modifications as specified and included in the plans, protection of all existing structures and equipment, and the furnishing of all labor, materials and appurtenances necessary to complete the work as specified or as shown.

2.3 PUMP STATION NO. 02

Basis of Payment

The unit price shall include all labor, materials, equipment, tools, and incidentals required to replace the specified screw pumps located within the 2nd Stage Activated Sludge Pump Station per the specifications and plans including: the screw pump motors, flights, electrical controls, concrete foundation improvements, all associated accessories, spare parts as indicated, other appurtenances, and all necessary furnishings and installing, disposal of undesirable and excess material; shall include circuit breakers, wiring, and conduit as necessary to connect to the electrical panel; electrical modifications as specified and included in the plans, protection of all existing structures and equipment, and the furnishing of all labor, materials and appurtenances necessary to complete the work as specified or as shown.

2.4 PUMP STATION NO. 03

Basis of Payment

The unit price shall include all labor, materials, equipment, tools, and incidentals required to replace the specified screw pumps located within the 2nd Stage Effluent Pump Station per the specifications and plans including: the screw pump motors, flights, electrical controls, concrete foundation improvements, all associated accessories, spare parts as indicated, other appurtenances, and all necessary furnishings and installing, disposal of undesirable and excess material; shall include circuit breakers, wiring, and conduit as necessary to connect to the electrical panel; electrical modifications as specified and included in the plans, protection of all existing structures and equipment, and the furnishing of all labor, materials and appurtenances necessary to complete the work as specified or as shown.

2.5 PUMP STATION – ALTERNATE A - ADDITIONAL MATERIAL COST TO INSTALL SS FLIGHTS IN LIEU OF CARBON STEEL

Basis of Payment

The alternative shall include the material cost associated with the cost additive in installing all six new pumps (Two at each station outlined under 2.1, 2.2, and 2.3) with stainless steel flights in replacement of the base carbon steel construction.

2.6 PUMP STATION – ALTERNATE B - ADDITIONAL MATERIAL COST TO INSTALL SS
PUMPS IN LIEU OF CARBON STEEL

Basis of Payment

The alternative shall include the material cost associated with the cost additive in installing all six new pumps (Two at each station outlined under 2.1, 2.2, and 2.3) with all stainless steel in replacement of the base carbon steel construction.

BID FORMS

The bid forms are not available online. The bid forms are available only by purchasing a set of plans and specifications at the location indicated in the Advertisement for Bids/Public Notice to Bidders.

SECTION 2
CONTRACT FORMS

NOTICE OF AWARD

TO: «ContractName»
«ContractAddr»
«ContractCity», «ContractState» «ContractZip»

DATE: _____

PROJECT: «TitleCaps»

You are notified that your Bid which was opened on «Bidopening» has been accepted for items in the amount of «ContractDollars» at the unit bid prices as reflected in the bid tabulation contained herein for the *(fill in awarded parts, i.e. for Base Bid and Alternate C, ... or delete)*.

You are required by the Instructions to Bidders to execute the Agreement and furnish the required Bonds, Certificates of Insurance, and other documents within 10 calendar days from the date of receipt of this Notice.

Failure to comply with these conditions within the time specified will entitle Owner to consider your Bid in default, to annul this Notice and to declare your Bid Security forfeited.

The Owner will return to you one (1) fully signed set of the contract documents.

ACKNOWLEDGMENT

«ContractCAPName»

«ContractFirst» «ContractLast», «ContractTitle»

CONTRACT

FOR «TitleCaps»

THIS CONTRACT, made and entered into at «OwnerCity», «OwnerState», this _____ day of _____, 20____, by and between the «OwnerMuni» (“OWNER”), «OwnerState» and «ContractName» (“CONTRACTOR”).

WITNESSETH: That the said CONTRACTOR has agreed and by this presents does agree with the OWNER for the consideration hereinafter mentioned and contained, and under penalty expressed in a bond given with these presents, and herein contained or hereunto annexed, to furnish at its own cost and expense, all the necessary tools, equipment, materials, labor, and tests in an expeditious, substantial and workmanlike manner, the equipment and appurtenances herein contemplated, commencing work within 20 days from the date of the Notice to Proceed and executing the work within the time and in the manner specified and in conformity with the requirements set forth in this Contract.

The following form essential parts of the Contract (may vary with project).

1. Advertisement for Bids/Public Notice to Bidders
2. Instruction to Bidders
3. Bid Forms and Proposal
4. Contract Forms and Exhibits
5. Contract Bond – ORC 153.571 or ORC 153.57
6. Contract Provisions
7. General Conditions
8. Supplementary Conditions
9. Specifications
10. Specific Project Requirements
11. Prevailing Wage Rate Schedule
12. Contract Drawings; if any.
13. Addenda; if any.

The CONTRACTOR agrees and understands that the work on this contract shall be subject to the acceptance of the OWNER based upon and in accordance with the contract specifications and contract plans and drawings on file in the office of the OWNER.

The CONTRACTOR agrees that each individual employed by the CONTRACTOR or any Subcontractor and engaged in work on the project under this contract shall be paid by prevailing wage established by the Department of Industrial Relations of the State of Ohio or the U.S. Department of Labor (Davis-Bacon Act) as detailed in the section titled "Wage Rates." This shall occur regardless of any contractual relationship which may be said to exist between the Contractor or any Subcontractor and such individual. ***(if a School District, delete this paragraph)***

The CONTRACTOR shall proceed with the said work in a prompt and diligent manner and shall do the several parts thereof. Further the CONTRACTOR shall complete the whole of said work in accordance with the specifications and contract drawings to the satisfaction of the OWNER on or before the time stated, and in default of completion within the time as fixed, the CONTRACTOR shall pay to the OWNER as liquidated damages, an amount equal to «Liquidated», for each and every day (Sundays and legal holidays excepted) the completion of the work may be delayed beyond the date fixed in the manner and as stipulated.

It is hereby mutually agreed that the OWNER is to pay and the CONTRACTOR is to receive, as full compensation for furnishing all materials and labor in building, constructing and testing and in all respect completing the herein described work and appurtenances in the manner and under the conditions herein specified, the prices stipulated in the proposal herein contained or hereto annexed and the total contract sum is «ContractDollars».

This Contract shall be in full force and effect from the date of execution by the OWNER and CONTRACTOR.

IN WITNESS WHEREOF: The OWNER and CONTRACTOR hereunto affixed their signature the day and year first mentioned above.

«ContractCAPName»

«ContractFirst» «ContractLast», «ContractTitle»

«OwnerCaps»

«OwnerCEOFirst» «OwnerCEOLast», «OwnerCEOTitle»

I hereby certify that funds in the amount of «ContractAmtwords» Dollars («ContractDollars») necessary for the foregoing Contract have been appropriated and are in the Treasury, or are in the process of collection, or are available through grants and/or loans from other funding sources.

«OwnerFiscalFirst» «OwnerFiscalLast», «OwnerFiscalTitle»

APPROVED AS TO FORM:

«OwnerLegalName», «OwnerLegalTitle»

**THE CONTRACTOR SHALL FURNISH THE FOLLOWING ITEMS
WITHIN 10 DAYS OF NOTIFICATION OF AWARD:**

- A) **CERTIFICATE OF INSURANCE FOR
CONTRACTOR'S PUBLIC LIABILITY INSURANCE POLICY
AND AUTOMOTIVE INSURANCE POLICY**
Owner, Verdantas LLC, CT Consultants, Inc., Named as Additional Insured

- B) **CERTIFICATE OF INSURANCE FOR
OWNER'S AND CONTRACTOR'S PROTECTIVE POLICY**
Owner Named as Insured (No Additional Insured)

- C) **CERTIFICATE OF WORKER'S COMPENSATION**

- D) **CONTRACT BOND THAT COMPLIES WITH ORC 153.54 AND 153.57**

* D above is not required if a bond complying with ORC 153.54 and 153.571 (rollover bond) was submitted at time of bid.

DELINQUENT PERSONAL PROPERTY STATEMENT

STATE OF _____)
) SS
COUNTY OF _____)

«ContractName», having been awarded a contract by the «OwnerMuni», «OwnerState», hereby affirms under oath, pursuant to Ohio Revised Code Section 5719.042, that at the time the bid was submitted, my company **was / was not (CIRCLE ONE)** charged with delinquent personal property taxes on the General Tax List of Personal Property for «OwnerCounty» County, Ohio.

If such charge for delinquent personal property tax exists on the General Tax List of Personal Property for «OwnerCounty» County, Ohio, the amount of such due and unpaid delinquent taxes, including due and unpaid penalties and interest shall be set forth below.

A copy of this statement shall be transmitted by the Taxing District's Fiscal Officer to the County Treasurer within thirty days of the date it is submitted. A copy of this statement shall also be incorporated into the Contract made between «OwnerMuni», «OwnerState», and «ContractName», and no payment shall be made with respect to any Contract unless such statement has been so incorporated as a part thereof.

Delinquent Personal Property Tax	\$ _____
Penalties	\$ _____
Interest	\$ _____

«ContractCAPName»

«ContractFirst» «ContractLast», «ContractTitle»

Subscribed and sworn to before me this _____ day of _____, 20____.

Notary Public

My Commission Expires: _____

AFFIDAVIT
OF COMPLIANCE WITH OHIO REVISED CODE SECTION 3517.13

STATE OF _____)
) SS
COUNTY OF _____)

_____ being duly sworn deposes and states as follows:

1. I am duly authorized to make the statements contained herein on behalf of _____ (“the Contracting Party”).
2. The Contracting Party is a/an (select one):
 - ☐ Individual, partnership, or other unincorporated business association (including without limitation, a professional association organized under Ohio Revised Code Chapter 1787), estate, or trust
 - ☐ Corporation organized and existing under the laws of the State of _____
 - ☐ Labor organization
3. I hereby affirm that the Contracting Party and each of the individuals specified in R.C. 3517.13(I) (with respect to non-corporate entities and labor organizations) or R.C. 3517.13(J) (with respect to corporations) are in full compliance with the political contribution limitations set forth in R.C. 3517.13(I) and (J), as applicable.
4. I understand that a false representation on this certification will incur penalties pursuant to 3517.992(R).

Affiant further sayeth naught.

By: _____

Title: _____

SWORN TO BEFORE ME and subscribed in my presence this _____ day of _____, 20_____.

Notary Public

My commission expires: _____

APPROVED SUBCONTRACTORS

PROJECT: «TitleCaps»

PRIME CONTRACTOR: «ContractCAPName»

1. Name: _____
 Address: _____
 City/State/Zip: _____
 Description of Work
 to be Performed: _____
 Phone: _____ Amount: _____ % of Contract: _____
 EIN# _____ Unique Entity ID# _____

2. Name: _____
 Address: _____
 City/State/Zip: _____
 Description of Work
 to be Performed: _____
 Phone: _____ Amount: _____ % of Contract: _____
 EIN# _____ Unique Entity ID# _____

3. Name: _____
 Address: _____
 City/State/Zip: _____
 Description of Work
 to be Performed: _____
 Phone: _____ Amount: _____ % of Contract: _____
 EIN# _____ Unique Entity ID# _____

4. Name: _____
 Address: _____
 City/State/Zip: _____
 Description of Work
 to be Performed: _____
 Phone: _____ Amount: _____ % of Contract: _____
 EIN# _____ Unique Entity ID# _____

«OwnerCaps»

«OwnerCEOFIRST» «OwnerCEOLast», «OwnerCEOTitle»

NOTICE TO PROCEED

Project: «Title»

Owner: «OwnerMuni»
«OwnerAddr»
«OwnerCity», «OwnerState» «OwnerZip»

To: «ContractName»
«ContractAddr»
«ContractCity», «ContractState» «ContractZip»

Date: _____

You are hereby notified to commence work in accordance with the Contract. All work shall be completed by «Completion_Date».

«OwnerCaps»

«OwnerCEOFirst» «OwnerCEOLast», «OwnerCEOTitle»

THE OWNER OR THEIR AUTHORIZED REPRESENTATIVE SHALL INSERT THE FOLLOWING CONTRACT DOCUMENTATION IN THE EXECUTED CONTRACT:

A) FINDINGS FOR RECOVERY – ORC 9.24
(<http://ffr.ohioauditor.gov/>)

B1) CHECK FOR DEBARRED CONTRACTORS IN THE STATE OF OHIO
(<https://www.sos.state.oh.us/records/debarred-contractors/>)

**B2) CHECK FEDERAL SAM (System for Award Management) for
FEDERAL FUNDING (including sub-contractors), (if applicable)**
(<https://www.sam.gov/SAM/>)

**C) NOTIFICATION OF SURETY AND AGENT OF CONSTRUCTION
CONTRACT AWARD – ORC 9.32 (if applicable)**

**D) NOTIFICATION TO UTILITY COMPANIES OF COMMENCEMENT
OF CONTRACT EXECUTION – ORC 153.64 (if applicable)**

SECTION 3
GENERAL CONDITIONS

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by



AMERICAN COUNCIL OF ENGINEERING COMPANIES

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AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
 7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
 9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
 4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of

the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

- A. Standards, Specifications, Codes, Laws, and Regulations
 1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

- A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. Resolving Discrepancies:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 Amending and Supplementing Contract Documents

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
 1. A Field Order;
 2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
 2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the

Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

- 1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
- 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

- 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
- 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
- 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

- 1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
- 2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other

professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents;
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price

or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by

Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
 - 5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 - 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
 2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property

insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:
 - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery

against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner’s written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and “Or-Equals”*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or “or-equal” item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
 - 1. *“Or-Equal” Items:* If in Engineer’s sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an “or-equal” item, in which case review and approval of the proposed item may, in Engineer’s sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
 - 3) it has a proven record of performance and availability of responsive service.
 - b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
 - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
 - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
 - 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services; and

- 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.
- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or

other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
 - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
 - 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all

court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 Taxes

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 Use of Site and Other Areas

A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor

shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
1. all persons on the Site or who may be affected by the Work;
 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*
 - a. Submit number of copies specified in the General Requirements.
 - b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.
 2. *Samples:*
 - a. Submit number of Samples specified in the Specifications.
 - b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.
- B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Submittal Procedures:*
1. Before submitting each Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
 2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
 3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop

Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. Engineer's Review:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. Resubmittal Procedures:

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
1. observations by Engineer;
 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 4. use or occupancy of the Work or any part thereof by Owner;
 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
 6. any inspection, test, or approval by others; or
 7. any correction of defective Work by Owner.

6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor,

Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
 - 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
 - 1. written notice thereof will be given to Contractor prior to starting any such other work; and
 - 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
 - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 - 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 - 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits

and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The

opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. deny the Claim in whole or in part;
 2. approve the Claim; or
 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on

Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
 - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
- 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances:*

1. Contractor agrees that:

- a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
- b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance:*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 2. there is no corresponding adjustment with respect to any other item of Work; and
 3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

- c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
- d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
- e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
- f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.
- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the

control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
 - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
 - 3. as otherwise specifically provided in the Contract Documents.

- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. repair such defective land or areas; or
 - 2. correct such defective Work; or
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute

resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and

equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments:*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the

Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. Review of Applications:

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or

- b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
 - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due:

- 1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment:

- 1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. there are other items entitling Owner to a set-off against the amount recommended; or

- d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities

pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.
 - 2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
 - 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due:*

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

- A. The making and acceptance of final payment will constitute:
 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 3. Contractor's repeated disregard of the authority of Engineer; or
 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);
 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

- A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
 - 1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or
 - 2. agrees with the other party to submit the Claim to another dispute resolution process; or
 - 3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 - 1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
 - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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SECTION 4
SUPPLEMENTARY CONDITIONS

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (EJCDC C-700, 2007 ed.) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented herein or in the Specific Project Requirements remain in full force and effect.

SC-1.01 The terms used in these Supplementary Conditions which are defined in the General Conditions have the meaning assigned to them in the General Conditions.

SC-2.02 Delete paragraph 2.02(A) in its entirety and insert the following in its place:

Owner shall furnish one (1) printed/hard copy of the drawings and Project Manual which shall be an executed contract set and one set in electronic format (.pdf), if requested.

SC-2.03(A) In the last sentence of 2.03A, change "sixtieth day" to "ninetieth day."

SC-4.02(A) Change "Supplementary Conditions" to read "Specific Project Requirements."

SC-4.06(G) Delete paragraph 4.06(G) in its entirety.

SC-5.03(A)(1) The required Certificate of Insurance shall be in a form satisfactory to the Owner (most current version of ACORD 25 or approved equal). If the Contractor fails to procure and maintain any specified and/or required insurance, the Owner shall have the right to procure and maintain the said insurance for and in the name of the Contractor and the Contractor shall pay the cost thereof and shall furnish all necessary information to make effective and maintain such insurance.

SC-5.04(B)(1) Change "Supplementary Conditions" to read "Specific Project Requirements."

SC-5.04(B)(2) The limits of liability for the insurance required by paragraph 5.04(A) of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

All of the limits below may be satisfied with an Umbrella/Excess Liability as needed to increase the Primary Policy to required limits.

5.04(A)(1) and (2) Workers' Compensation, etc., under paragraphs 5.04(A)(1) and 5.04(A)(2) of the General Conditions:

(a) State	Statutory
(b) Applicable Federal (e.g., Longshoreman's):	Statutory
(c) Employer's Liability:	\$1,000,000

5.04(A)(3), (4) and (5). Contractor's Liability Insurance under paragraphs 5.04(A)(3) through 5.04(A)(5) of the General Conditions which shall also include completed operations and product liability coverage.

- (a) Bodily Injury and Property Damage, Combined Single Limit (CSL) (Except Products and Completed Operations) Property Damage liability insurance will provide Explosion, Collapse, and Underground coverage where applicable.

Each Occurrence	\$2,000,000
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General Aggregate	\$4,000,000
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- (b) Products and Completed Operations Aggregate \$1,000,000

Products and Completed Operations to be maintained for two (2) years after final payment and Contractor shall continue to provide evidence of such coverage to the Owner on an annual basis during the aforementioned period.

- (c) Personal and Advertising Injury (Per Person/Organization and per occurrence). \$1,000,000

- (d) Fire Damage \$100,000

- (e) If the General Liability Policy includes a General Aggregate, such policy shall be endorsed to have the General Aggregate Per Project Aggregate Limit.

5.04(A)(6) Automobile Liability - (Owned, Non-Owned, Hired)
Contractor may provide split limits or combined single limit.

- (a) Split Limits:

Bodily Injury,	Each Person:	\$2,000,000
	Each Occurrence	\$2,000,000

Property Damage,	Each Occurrence	\$1,000,000
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or

- (b) Combined Single Limit

Bodily Injury and Property Damage,	Each Occurrence	\$2,000,000
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SC-5.04(B)(3) Add the following to the end of the paragraph: “to the extent available in the insurance industry with industry standard exclusions and as allowed under the laws and regulations in the State of Ohio;”

SC-5.04(B)(4) Add the following:

Written notice of cancellation for non-payment of premium shall be at least 10 days.

Add the following section:

SC-5.04(C) Unless otherwise stated in Specific Project Requirements, the Contractor shall purchase and provide an "Owner's and Contractor's Protective Policy" with an immediate Effective Date and the **Owner listed as the Insured (No additional insureds)** for the following limits:

Each Occurrence	\$1,000,000
General Aggregate	\$2,000,000

Add the following section:

SC-5.04(D) Unless otherwise stated in Specific Project Requirements the Contractor shall purchase and maintain during the Contract Time "All Risk Builders' Risk Insurance," and/or "Installation Floater Insurance," and/or "Boiler and Machinery Insurance," and any and all insurance requirements of section GC-5.06 of the General Conditions as applicable for the type of work to be performed upon the Project to the full insurable value thereof for the benefit of the Owner, the Contractor, Subcontractors and Suppliers as their interest may appear. This insurance shall cover the work until final acceptance and final payment by the Owner. This provision shall in no way release the Contractor or Contractor's Surety from obligations under the Contract Documents to fully complete the Project. The original policy(s) shall be filed with the Owner or his designated representative.

SC-5.05 *Owner's Liability Insurance*

See SC-5.04(C) above.

SC-5.06 *Property Insurance*

Unless otherwise stated in Specific Project Requirements, the Contractor, not the Owner, shall purchase and maintain during the Contract Time all property insurance required in section GC-5.06 of the General Conditions and as outlined in SC-5.04(D) above.

Add the following section:

SC-6.02(C) The Contractor shall be responsible for the Owner and/or Engineer's additional inspection and administrative costs for work performed beyond regular working hours as defined in this Section.

SC-6.07(B) Delete paragraph 6.07(B) in its entirety.

SC-6.09 (D) Add the following:
D. The contractor agrees to the requirements of RC 153.59, RC 153.591, and RC 153.60.

Add the following section:

SC-6.10(B) Add the following:

Should the Owner be exempt from Ohio State Sales and Use Taxes on materials and equipment to be incorporated in the Project, the Contractor may obtain a waiver and said taxes shall not be included in the Contract Price.

1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the work
2. Owner's exemption to Contractor does not apply to construction tools, machinery, equipment, or other property by or leased by Contractor, or to supplies or materials not incorporated into the work.

The Contractor shall withhold and/or pay all consumer, use, property, employment, income and other taxes in accordance with the laws and regulations of the United States, State of Ohio, Owner and other applicable agencies which are applicable during the performance of the work.

SC-6.17 *Shop Drawings and Samples*

Add the following new paragraphs immediately after paragraph 6.17(E):

- F. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than three (3) submittals. Engineer will record Engineer's time for reviewing subsequent materials of shop drawings, samples, or other items requiring approval and Contractor shall reimburse Owner for Engineer's charges for such time.
- G. In the event that Contractor requests a substitution for a previously approved item, Contractor shall reimburse Owner for Engineer's charges for such time unless the need for such substitution is beyond the control of the Contractor.

SC-7.02 Delete Section 7.02 of the General Conditions in its entirety and insert the following:

SC-7.02(A) The General Construction Contractor shall be referred to and defined as the Construction Coordinator.

SC-7.02(B) Duties of the Construction Coordinator include the following:

1. Scheduling and coordinating the work of the Prime Contractors including submission and periodic updating of project schedule.
2. Establishing and administrating the site safety program and procedures for the project.
3. See that permits are applied for and obtained on a timely basis. Advise the Engineer of any problems related to permit approval.
4. Monitoring compliance with Laws and Regulations.
5. Maintain project site for dust, sedimentation, debris, waste, and general site cleanliness.
6. Coordinate location and use of temporary construction facilities including but not limited to sanitary, water, power, telephone, and parking.
7. Coordinate Owner interface for utility tie-ins/shut downs.
8. Monitor shop drawing submittal and coordination of submittal information between Prime Contractors.

SC-10.01 (A) Add the following:
The Owner may request from the Contractor and the Contractor shall provide within ten days of the request, a quote for all ordered changes in the work or work the Owner may be considering to be ordered. The quote shall be a line item, detailed, itemized breakdown of the work.

SC-11.01(A) For purposes of "Cost of the Work" delete Section 11.01(A), (B), and (C) of the General Conditions in their entirety and insert ODOT 109.05, in its place.

SC-13.07(A) In the First sentence of Section 13.07(A) remove "Substantial Completion" and insert "Final Acceptance of the entire project and final payment by the Owner."

SC-13.07(C) Remove 13.07(C) and replace with the following:

All materials and equipment shall be warranted by the respective material supplier or equipment manufacturer until the end of the Contractor's "correction period" (or longer if specified elsewhere in the contract) regardless of date of initial installation or operation of the material or equipment. The cost of such extended warranties as needed from material suppliers or equipment manufacturers to provide warranty coverage until the end of the "correction period" or other period as specified in the contract shall be the responsibility of the prime contractor and shall be assumed to have been included in his bid.

SC-14.02(A) (3) Delete Section 14.02(A) (3) of the General Conditions in its entirety and insert the following:

Until the job is Substantially Complete, the Contractor will be paid 96% of the estimated value of labor and 100% of the estimated value of material installed and completed in acceptable form. Upon the Owner's agreement that the project is Substantially Complete, the 4% Retainage on labor may be reduced to the value needed to assure completion of the remaining punch list work subject to the recommendation of the Engineer and the approval by the Owner.

Add the following section:

SC-14.02(A) (4)

Payment for stored materials at invoice prices or at the unit price bid for materials, or the lesser value of the two, will be made for accepted nonperishable equipment and materials which are to be incorporated into the work, when accepted, delivered, properly stored, and protected upon the site and verified to the Engineer by a copy of the invoice. For materials and equipment meeting the foregoing conditions, the Owner will pay, when properly included in an approved estimate, 92% of the invoice value of the same. Subsequent to the inclusion of a payment for delivered materials in a progress payment, Contractor shall submit no later than the next payment submission, a partial waiver of lien from each and every supplier for whom delivered materials were paid. If no such waiver is submitted prior to or along with the next payment, the amount of delivered materials paid commensurate with that particular item will be deducted from future payments. No payment for delivered materials shall be made for any items that are scheduled to be incorporated in the work within 30 days of submission of the pay estimate. Delivered materials will not be paid in any given month for a total amount less than \$5,000.00. Payment for delivered materials for such items as pipe backfill and roadway subbase will not be routinely considered.

SC-16.01 Delete Article 16 in its entirety and replace with the following:

10/17

ARTICLE 16 - DISPUTE RESOLUTION AGREEMENT - JUDICIAL SYSTEM

OWNER and CONTRACTOR hereby agree that Article 16 of the General Conditions to the Agreement between OWNER and CONTRACTOR is amended to include the following agreement of the parties:

16.01 All claims, disputes and other matters in question between Owner and Contractor arising out of or relating to the Contract Documents or the breach thereof (except for claims which have been waived by the making or acceptance of final payment as provided by Paragraph 14.09) will be decided through the Wayne County Court of Common Pleas. Arbitration will be entered into only if agreed upon in writing by both parties.

END OF SECTION

09/25

SECTION 5
SPECIFICATIONS

SECTION 011100 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 LOCATION OF THE PROJECT

- A. The project is located in Orrville, Ohio at the Village of Orrville Waste Water Treatment Plant.

1.2 PROJECT DESCRIPTION

- A. The project consists of the replacement of five (5) existing screw pumps, installation of one (1) new screw pump, associated Motor Control Center, and structural modifications.

1.3 COORDINATION/WORK BY OTHERS

- A. The Owner shall furnish and install a new MCC and VFD controllers for the 2nd Stage Influent Pump Station. The Owner shall furnish, relocate, and install a new MCC and VFD controllers for the 2nd Stage Activated Sludge Pump Station.
- B. System Integrator
Rovysis
Christian Pionke
919-520-9088
christian.pionke@rovisys.com
- C. The contractor shall coordinate with the System Integrator and Owner for work.

1.4 SPECIFICATIONS

- A. In general, these Specifications describe the work to be performed by the various trades, other than work specifically excluded. It shall be the responsibility of the Contractor and Subcontractors to perform all work incidental to their trade, whether or not specific mention is made of each item, unless such incidentals are included under another Item.
- B. It is advised that the Contractor and all Subcontractors familiarize themselves with the contents of the complete Specifications, particularly for the trades preceding, following, related or adjacent to their work.

1.5 DRAWING SCHEDULE

- A. The work to be done under this Contract as shown in the Drawings – Sheets 1 -23

END OF SECTION 011100

SECTION 011419 – USE OF SITE

PART 1 - GENERAL

1.1 GENERAL

- A. The Contractor will be allowed the use of as much of the site designated for the improvements as is necessary for his operation.

1.2 USE OF STREETS

- A. During the progress of the work, the Contractor shall make ample provisions for both vehicle and pedestrian traffic on any public street and shall indemnify and save harmless the Owner from any expense whatsoever due to their operations over said streets. The Contractor shall also provide free access to all the fire hydrants, water, and gas valves located along the line of his work. Gutters and waterways must be kept open or other provisions made for the removal of storm water. Street intersections may be blocked only one-half at a time, and the Contractor shall lay and maintain temporary driveways, bridges and crossings, such as in the opinion of the Engineer are necessary to reasonably accommodate the public.
- B. In the event of the Contractor's failure to comply with these provisions, the Owner may cause the same to be done, and may deduct the cost of such work from any monies due the Contractor under this Agreement, but the performance of such work by the Owner at its instance shall serve in no way to release the Contractor from his general or particular liability for the safety of the public or the work.
- C. The Contractor shall repair at no cost to the Owner, all existing roads, parking areas, grassed areas that are damaged due to the execution of his work. The Contractor shall remove daily all mud, soil and debris that may be tracked onto existing streets, drives, or walks by his equipment or that of subcontractors or suppliers.

1.6 PROTECTING EXISTING BUILDINGS, STRUCTURES AND ROADWAYS

- A. The Contractor shall, at his own expense, shore up and protect any buildings, roadways, utilities or other public or private structures which may be encountered or endangered in the prosecution of the work, and that may not be otherwise provided for, and he shall repair and make good any damages caused to any such property by reason of his operations. All existing fences removed due to the prosecution of the work shall be replaced by the Contractor. No extra payment will be made for said work or material, but the cost of this work must be included in the price stipulated for the work to be done under this contract.

1.7 SITE FACILITIES

- A. The Contractor shall furnish and place sufficient quantities of portable toilet facilities at locations convenient for use by the Contractor's personnel, Subcontractors, the Engineer, and the Owner.

1.8 RESTORATION

- A. The contractor shall restore all areas per the plans and specifications and if not specified, at least to the condition existing prior to the start of work.

END OF SECTION 011419

SECTION 011423 - ADDITIONAL WORK, OVERTIME

PART 1 - GENERAL

1.1 NIGHT, SUNDAY AND HOLIDAY WORK

- A. No work will be permitted at night, Sunday or legal holidays except as noted on the plans or in the case of emergency and then only upon written authorization of the Engineer. Where no emergency exists, but the Contractor feels it advantageous to work at night, Sunday or legal holidays, the Contractor shall notify the Engineer at least two (2) days in advance, requesting written permission. Any work performed during the absence of the Engineer will be done at the Contractor's risk and responsibility and may be subject to rejection upon later inspection.

END OF SECTION 011423

SECTION 012513 – PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 MATERIALS AND EQUIPMENT

- A. In the specifications and on the Engineer's drawings, are specified and shown certain pieces of equipment and materials deemed most suitable for the service anticipated. This is not done to eliminate other equipment and materials equally as good and efficient. The Contractor shall prepare his bid on the particular materials and equipment specified. Following the award of the contract, should the Contractor desire to use other equipment and materials, he shall submit to the Owner a written request for such change and state the advantage to the Owner and the savings or additional cost involved by the proposed substitution. The determination as to whether or not such change will be permitted rests with the Owner and the Engineer.
- B. Each major item of equipment shall be inspected by a manufacturer's representative during installation and upon completion of the work. The Contractor shall supply the Engineer with a certificate of such inspection.

END OF SECTION 012513

SECTION 013119 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 PRECONSTRUCTION MEETING

- A. Prior to the Contractor beginning any work on the project, the Owner will schedule and hold a preconstruction meeting to discuss all aspects of the contract work.
- B. The Contractor shall be present and be prepared to comment in detail on all aspects of his work.
- C. The Contractor shall bring to the preconstruction meeting a proposed construction progress schedule, erosion control plan, quality control program, concrete mix designs, asphalt mix designs (JMF), etc. Approval of each by the Engineer is required prior to the start of any work.
- D. Included in the construction progress schedule shall be an implementation sequence of the proposed erosion control efforts required by the contract.

1.2 PROGRESS MEETINGS

- A. Monthly progress meetings will be held at a location to be determined by the Owner on a regularly scheduled day mutually convenient to the Owner, Contractor, and Engineer.
- B. The Contractor shall provide an updated construction progress schedule and be prepared to comment in detail on all aspects of his work.

END OF SECTION 013119

SECTION 013216 – CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 PROGRESS SCHEDULE

- A. Immediately after signing the Contract, the General Construction Contractor shall prepare a graphic progress schedule, indicating the work to be executed during each month and the rate of expected progress to secure completion on the agreed-upon completion date. The progress schedule shall be approved by the Engineer and Owner prior to starting work on the site. Copies of such graphic progress charts, upon which has been indicated the actual progress, shall be furnished to the Engineer with each requisition for payment.
- B. Should the rate of progress fall materially behind the scheduled rate of progress, and unless the delay is authorized by the Engineer, each offending Contractor shall furnish additional labor, work overtime, or take other necessary means required for completion of the work on the scheduled date. No additional compensation beyond the set Contract price shall be paid for action taken or overtime expense incurred in maintaining scheduled progress.

END OF SECTION 013216

SECTION 013223 – SURVEY AND LAYOUT DATA

PART 1 - GENERAL

1.1 STAKING

- A. The Contractor shall hire a surveyor licensed in the state the work is to be installed to provide all reference points not already established and staking. The Contractor shall protect and preserve the established staking and reference points as long as required for installation of the work and field verifications by any party. The Contractor's surveyor shall replace and accurately relocate all staking and reference points so lost, destroyed or moved.

1.2 LAYOUT OF WORK

- A. The Contractor shall lay out his work and be responsible for correct locations, elevations and dimensions of all work executed by him under this Contract. The Contractor must exercise proper precautions to verify the figures shown on the Drawings before laying out the work and will be held responsible for any error resulting from his failure to exercise such precaution. The Contractor shall insure the new construction aligns with any existing work.

END OF SECTION 013223

SECTION 013236 – VIDEO MONITORING AND DOCUMENTATION

PART 1 - GENERAL

1.1 SCOPE

- A. Provide all labor, materials, equipment, and services, and perform all operations necessary to furnish to the Owner a complete color audio-video record on a USB Flash Drive of the surface features within the proposed construction zone of influence. This record shall include, but not be limited to, all audio-video USB Flash Drives, storage cases, video logs, and indexes. The purpose of this coverage shall be to accurately document the pre-construction condition of these surface features.

1.2 QUALIFICATIONS

- A. The color audio-video documentation shall be done by a responsible commercial firm known to be skilled and regularly engaged in the business of pre-construction color audio-video documentation. The firm shall furnish such information as the Owner deems necessary to determine the ability of that firm to perform the work in accordance with the Contract specifications.

1.3 PRODUCTS

- A. The color audio-video recording delivered to the Owner shall be on a high-quality USB Flash Drive.

END OF SECTION 013236

SECTION 013319 - FIELD TEST REPORTING

PART 1 - GENERAL

SUMMARY

- A. The Contractor shall be responsible for the quality of all materials incorporated into the project work and shall be responsible for all costs of testing and certification of same. The Contractor shall provide the City Engineer a list of three (3) local qualified firms for the City to select from to be the Contractor's testing firm.
- B. The Contractor shall provide the engineer with a Quality Control Plan in which his testing methods/procedures are defined. Said Plan shall meet with the approval of the Engineer and include identification of laboratories, types of testing, and the tentative amount and scheduling of each.

All certification of tests and/or gradations for material to be utilized in the work and all quality control testing shall be performed by an independent laboratory (not affiliated with, owned by, or managed by the Contractor). The laboratory shall be accredited by the AASHTO Materials Reference Laboratory for the type of testing performed.

- C. The Owner may perform field Quality Assurance testing; however, such testing shall not relieve the Contractor from the responsibility of Quality Control testing or from supplying certificates from manufacturers or suppliers to demonstrate compliance with the specifications. It is intended that the testing by the Contractor and the Owner be complimentary toward a quality project; however, the Contractor may not assume the Owner will test or that any tests will be done in lieu of the Contractor's own Quality Control testing. In the same sense, the Contractor may not rely on Owner Quality Assurance testing as a basis of acceptance or approval of his work nor may any Owner-performed testing be reflected in his submitted plan.

1.2 TEST CRITERIA

- A. The following tests at a minimum shall be included with the Contractor's Quality Control Plan in accordance with the specifications:
 - 1. Aggregates
 - a. For each material and/or different source, the laboratory shall perform soundness, gradation, and other tests for all parameters

specified. Aggregates incorporated into concrete or asphalt mixes shall also be tested for moisture content daily.

2. Compaction Tests

a. Compaction tests or field density tests shall be taken on all embankment, trench backfill, subgrade, and subbase materials.

b. Minimum testing shall be as follows:

Embankment testing shall be at least one (1) test/5,000 SF of each lift; Trench backfill testing shall be at least one (1) test/50 LF of each lift; Subgrade and/or subbase testing shall be at least one (1) test/200 LF of pavement or 5,000 SF of slabs; subject to greater frequency due to soil conditions or Engineer's direction.

c. Proctors or relative density tests shall be performed as often as necessary for the differing soils or granular materials utilized. Proctors shall be run with a minimum of 5 points. Test reports shall show the wet (bulk) weight, dry weight, wet (bulk) density, dry density, moisture content weight and moisture content percentage. Both the dry curve and the wet curve shall be plotted.

3. Concrete Mix Design

a. For each type of concrete, the laboratory shall perform the necessary mix design providing all test data as required by the specifications.

4. Concrete Field and Laboratory Tests

a. The laboratory shall cast concrete cylinders and test beams:

1. One set of four cylinders per 50 CY with a minimum of two sets per day. The cylinders shall be broken: one at 7 days, two at 28 days, one at 56 days, unless otherwise directed by the Engineer.

2. One beam per 50 CY with a minimum of two beams per day.

b. Temperature and unit weight shall be run on fresh concrete at intervals sufficient for the type of structure being placed and a minimum of once per day. Bulk weight, bucket weight, (tare), net weight, bucket factor (bucket volume) and unit weight shall be recorded on the fresh concrete report. Show all batch weights for yield calculations. Slump and air content tests shall be taken a minimum of one test per 20 CY and at least once per day.

- c. All field and laboratory testing shall be performed by technicians certified by the American Concrete Institute (ACI) for the type of testing performed.
- d. Initial cure of all cylinders shall be in a temperature controlled cure box or temperature controlled water tank with a hi-low thermometer. Hi-low temperature readings shall be recorded on the fresh concrete report.

5. Asphalt Mix Design

- a. For each type of asphalt mix, submit job mix formula (JMF) prepared by an ODOT pre-qualified laboratory from tests performed on the aggregates proposed for use.
- b. Sample and test for gradation and bitumen content per ODOT 441.

1.3 LABORATORY REPORTS

- A. Reports of laboratory and field tests will be distributed to the Engineer, Owner, and Suppliers within 24 hours of completion.

END OF SECTION 013319.01

SECTION 013323 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 - GENERAL

1.1 GENERAL

- A. The Contractor shall submit detailed drawings, acceptable catalog data, specifications and material certifications for all equipment and materials specified or required for the proper completion of the work.
- B. The intent of these items is to demonstrate compliance with the design concept of the work and to provide the detailed information necessary for the fabrication, assembly and installation of the work specified. It is not intended that every detail of all parts of manufactured equipment be submitted, however sufficient detail will be required to ascertain compliance with the specifications and establish the quality of the equipment proposed.

Shop Drawings shall be sufficiently clear and complete to enable the Engineer/Architect and Owner to determine that items proposed to be furnished conform to the specifications and that items delivered to the site are actually those that have been reviewed.

- C. It is emphasized that the Engineer/Architect's review of Contractor's submitted data is for general conformance to the contract drawings and specifications but subject to the detailed requirements of drawings and specifications. Although the Engineer/Architect may review submitted data in detail, such review is an effort to discover errors and omissions in Contractor's drawings. The Engineer/Architect's review shall in no way relieve the Contractor of his obligation to properly coordinate the work and to Engineer/Architect the details of the work in such manner that the purposes and intent of the contract will be achieved. Such review by the Engineer/Architect shall not be construed as placing on him or on the Owner any responsibility for the accuracy and for proper fit, functioning or performance of any phase of the work included in the contract.
- D. Shop Drawings shall be submitted in proper sequence and with due regard to the time required for checking, transmittal and review so as to cause no delay in the work. The Contractor's failure to transmit appropriate submittals to the Engineer/Architect sufficiently in advance of the work shall not be grounds for time extension.
- E. The Contractor shall submit Shop Drawings for all fabricated work and for all manufactured items required to be furnished in the Contract in accordance with the General Provisions and as specified herein. Shop Drawings shall be submitted in sufficient time to allow at least twenty-one (21) calendar days after receipt of the Shop Drawings from the Contractor for checking and processing by the Engineer/Architect.
- F. It is the responsibility of each Prime Contractor to furnish to all other Prime Contractors and especially the General Construction Contractor reviewed Shop Drawings for guidance in interfacing the various trades; i.e., sleeves, inserts, anchor bolts, terminations, and space requirements.

- G. No work shall be performed requiring Shop Drawings until same have been reviewed by Engineer/Architect.
- H. Accepted and reviewed Shop Drawings shall not be construed as approval of changes from Contract plan and specification requirements.
- I. The Engineer/Architect will review the first and second Shop Drawing item submittals at no cost to the Contractor. Review of the third submittal and any subsequent submittal will be at the Contractor's expense. Payment will be deducted from the Contract amount at a rate of 2.8 times direct labor cost plus expenses.

1.2 SUBMITTAL PROCEDURE

- A. All required submissions shall be made to the Engineer/Architect by the Prime Contractor(s) only. Any data prepared by subcontractors and suppliers and all correspondence originating with subcontractors, suppliers, etc., shall be submitted through the Contractor.
- B. Contractor shall review and approve all Shop Drawings prior to submission. Contractor's approval shall constitute a representation to Owner and Engineer/Architect that Contractor has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data or assumes full responsibility for doing so, and that Contractor has reviewed or coordinated each Shop Drawing or sample with the requirements of the work and the Contract Documents.
- C. Submittal Preparation: Mark each submittal with a permanent label or page for identification. Provide the following information on the label for proper processing and recording of action taken:
 - 1. Location
 - 2. Project Name
 - 3. Contract
 - 4. Name and Address of Engineer/Architect
 - 5. Name and Address of Contractor
 - 6. Name and Address of Subcontractor
 - 7. Name and Address of Supplier
 - 8. Name of Manufacturer
 - 9. Number and Title of appropriate Specification Section
 - 10. Drawing Number and Detail References, as appropriate.
 - 11. Submittal Sequence or Log Reference Number.
 - a. Provide a space on the label for the Contractor's review and approval markings and a space for the Engineer/Architect's "Action Stamp".
- D. Each Shop Drawing, sample and product data submitted by the Contractor shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor:

Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog

numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

Signature

Date

Company

- E. Shop Drawings shall be submitted in not less than six (6) copies to the Engineer/Architect at the address specified at the Preconstruction Conference. Single mylar or sepia reproducible copies of simple Shop Drawings may be submitted with prior approval of the Engineer/Architect.
- F. At the time of each submission, Contractor shall in writing identify any deviations that the Shop Drawings or samples may have from the requirements of the Contract Documents.
- G. Drawings shall be clean, legible and shall show necessary working dimensions, arrangement, material finish, erection data, and like information needed to define what is to be furnished and to establish its suitability for the intended use. Specifications may be required for equipment or materials to establish any characteristics of performance where such are pertinent. Suitable catalog data sheets showing all options and marked with complete model numbers may, in certain instances, be sufficient to define the articles which it is proposed to furnish.
- H. SAMPLES: For product which require submittal of samples, furnish samples so as not to delay fabrication, allowing the Engineer reasonable time for the consideration of the samples submitted. Properly label samples, indicating the material or product represented, its place of origin, the names of the vendor and Contractor and the name of the project for which it is intended. Ship samples prepaid. Accompany samples with pertinent data required to judge the quality and acceptability of the sample, such as certified test records and, where required for proper evaluation, certified chemical analyses.

1.3 REVIEW PROCEDURE

- A. Engineer/Architect will review with reasonable promptness all properly submitted Shop Drawings. Such review shall be only for conformance with the design concept of the Project and for compliance with the information given in the plans and specifications and shall not extend to means, methods, sequences, techniques or procedures of construction or to safety precautions or programs incident thereto.
- B. The review of a separate item as such will not constitute the review of the assembly in which the item functions. The Contractor shall submit entire systems as a package.
- C. All Shop Drawings submitted for review shall be stamped with the Engineer/Architect's action and associated comments.
- D. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Engineer/Architect will review each submittal, mark to

indicate action taken, and return accordingly. Compliance with specified characteristics is the Contractor's responsibility.

Action Stamp: The Engineer/Architect will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

1. If Shop Drawings are found to be in general compliance, such review will be indicated by marking the first statement.
 2. If only minor notes in reasonable number are needed, the Engineer/Architect will make same on all copies and mark the second statement. Shop Drawings so marked need not be resubmitted.
 3. If the submitted Shop Drawings are incomplete or inadequate, the Engineer/Architect will mark the third statement, request such additional information as required, and explain the reasons for revision. The Contractor shall be responsible for revisions, and/or providing needed information, without undue delay, until such Shop Drawings are acceptable. Shop Drawings marked with No. 3 shall be completed resubmitted.
 4. If the submitted Shop Drawings are not in compliance with the Contract Documents, the Engineer/Architect will mark the fourth statement. The Contractor will be responsible to submit a new offering conforming to specific products specified herein and/or as directed per review citations.
- E. No submittal requiring a Change Order for either value or substitution or both, will be returned until the Change Order is approved or otherwise directed by the Owner.

APPLICATION FOR USE OF SUBSTITUTE ITEM

TO: _____

PROJECT: _____

SPECIFIED ITEM:

Page	Paragraph	Description
A.		The undersigned requests consideration of the following as a substitute item in accordance with Article 6.05 of the General Conditions.
B.		Change in Contract Price (indicate + or -) \$ _____
C.		Attached data includes product description, specifications, drawings, photographs, references, past problems and remedies, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified. For consideration of the attached data as SHOP DRAWINGS, submittal shall be in accordance with requirements of Section 013323.
D.		Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The undersigned certifies that the following paragraphs, unless modified by attachments are correct:

1. The proposed substitute does not affect dimensions shown on Drawings.
2. The undersigned will pay for changes to the building design, including engineering design, detailing, and construction costs caused by the requested substitution.
3. The proposed substitution will have no adverse affect on other contractors, the construction schedule, or specified warranty requirements. (If proposed substitution affects construction schedule, indicate below using + or -)

_____ CONSECUTIVE CALENDAR DAYS

4. Maintenance and service parts will be locally available for the proposed substitution.

The undersigned further states that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified item, and agrees to reimburse the OWNER for the charges of the ENGINEER for evaluating this proposed substitute item.

E. Signature:

Firm:

Address:

Telephone:

Date:

Attachments:

For use by ENGINEER:

_____ Accepted as evidenced by affixed SHOP DRAWING REVIEW stamp.

_____ Accepted as evidenced by included CHANGE ORDER.

_____ Not accepted as submitted. See Remarks.

_____ Acceptance requires completion of submittal as required for SHOP DRAWINGS.

_____ Not accepted. Do not resubmit.

By:

Date:

Remarks:

APPLICATION FOR USE OF "OR-EQUAL" ITEM

TO: _____

PROJECT: _____

SPECIFIED ITEM:

Page	Paragraph	Description
A.		The undersigned requests consideration of the following as an "or-equal" item in accordance with Article 6.05 of the General Conditions. _____
B.		Change in Contract Price (indicate + or -) \$ _____
C.		Attached data includes product description, specifications, drawings, photographs, references, past problems and remedies, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified. For consideration of the attached data as SHOP DRAWINGS, submittal shall be in accordance with requirements of Section 013323.
D.		Signature: _____ Firm: _____ Address: _____ _____ _____ Telephone: _____ Date: _____ Attachments: _____ _____ _____

For use by ENGINEER:

- _____
Accepted as evidenced by affixed SHOP DRAWING REVIEW stamp.

Accepted as evidenced by included CHANGE ORDER.

Not accepted as submitted. See Remarks.

Acceptance requires completion of submittal as required for SHOP DRAWINGS.

Not accepted. Do not resubmit.

By: _____ Date: _____

Remarks: _____

END OF SECTION 013323

SECTION 013326.01 - QUALITY CONTROL PLAN

PART 1 - GENERAL

1.1 QUALITY CONTROL

- A. The Contractor shall be responsible for the quality of all materials incorporated into the project work and shall be responsible for all costs of testing and certification of same. The Contractor shall provide the City Engineer a list of three (3) local qualified firms for the City to select from to be the Contractor's testing firm.
- B. The Contractor shall provide the Engineer with a Quality Control Plan in which his testing methods/procedures are defined. Said Plan shall meet with the approval of the Engineer and include identification of laboratories, types of testing, and the tentative amount and scheduling of each.

All certifications of tests and/or gradations for materials to be utilized in the work and all quality control testing shall be performed by an independent laboratory (not affiliated with, owned by, or managed by the Contractor). The laboratory shall be accredited by the AASHTO Materials Reference Laboratory for the type of testing performed.

- C. The Owner may perform field Quality Assurance testing; however, such testing shall not relieve the Contractor from the responsibility of Quality Control testing or from supplying certificates from manufacturers or suppliers to demonstrate compliance with the specifications. It is intended that the testing by the Contractor and the Owner be complimentary toward a quality project; however, the Contractor may not assume the Owner will test or that any tests will be done in lieu of the Contractor's own Quality Control testing. In the same sense, the Contractor may not rely on Owner Quality Assurance testing as a basis of acceptance or approval of his work nor may any Owner performed testing be reflected in his submitted plan.

1.2 TEST CRITERIA

- A. The following tests at a minimum shall be included with the Contractor's Quality Control Plan in accordance with the specifications:
 - 1. Concrete Mix Design
 - a. For each type of concrete, the laboratory shall perform the necessary mix design providing all test data as required by the specifications.
 - 2. Concrete Field and Laboratory Tests
 - a. The laboratory shall cast concrete cylinders and test beams:
 - 1) One set of four cylinders per 50 C.Y. with a minimum of two sets per day. The cylinders shall be broken: one at 7 days, two at 28 days, one at 56 days, unless otherwise directed by the Engineer.

- 2) One beam per 50 C.Y. with a minimum of two beams per day.
- b. Temperature and unit weight shall be run on fresh concrete at intervals sufficient for the type of structure being placed and a minimum of once per day. Bulk weight, bucket weight, (tare), net weight, bucket factor (bucket volume) and unit weight shall be recorded on the fresh concrete report. Show all batch weights for yield calculations. Slump and air content tests shall be taken a minimum of one test per 20 C.Y. and at least once per day.
- c. All field and laboratory testing shall be performed by technicians certified by the American Concrete Institute (ACI) for the type of testing performed.
- d. Initial cure of all cylinders shall be in a temperature controlled cure box or temperature controlled water tank with a hi-low thermometer. Hi-low temperature readings shall be recorded on the fresh concrete report.

1.3 LABORATORY REPORTS

- A. Reports of laboratory and field tests will be distributed to the Engineer, Owner, and Suppliers within 24 hours of completion.

END OF SECTION 013326.01

SECTION 013543 - ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.1 UNNECESSARY NOISE, DUST AND ODORS

- A. The Contractor's performance of this contract shall be conducted so as to eliminate all unnecessary noise, dust and odors.

1.2 SEWAGE, SURFACE AND FLOOD FLOWS

- A. The Contractor shall take whatever action is necessary to provide all necessary tools, equipment and machinery to adequately handle all sewage, surface flows and flood flows which may be encountered during the performance of the work. The entire cost of and liability for handling such flows is the responsibility of the Contractor and shall be included in the price for the appropriate item.

1.3 WORK IN FREEZING WEATHER

- A. Written permission from the Engineer shall be obtained before any work is performed which, in the judgment of the Engineer, may be affected by frost, cold, or snow. When work is performed under such conditions, the Contractor shall provide facilities for heating the materials and for protecting the finished work.

1.4 POLLUTION CONTROL

- A. It shall be the responsibility of the Contractor to prevent or limit pollution of air and water resulting from his operations.
- B. The Contractor shall perform work required to prevent soil from eroding or otherwise entering onto all paved areas and into natural watercourses, ditches, and public sewer systems. This work shall conform to all local ordinances and/or regulations, if any, and if not otherwise regulated by local ordinances or regulations shall at a minimum conform to the Ohio EPA General Storm Water NPDES Permit for Construction Activities and the Ohio Department of Natural Resources Rainwater and Land Development manual. This work may consist of but not be limited to construction and continual maintenance of silt fence, bio bag filters, sedimentation traps, stilling basins, check dams, temporary seeding, temporary mulching, erosion mats and other means to clarify waters containing suspended materials from excavations, embankments, cleared and grubbed or stripped areas, stockpiles, well points, and disposal sites and shall be commensurate with the contractor's schedule, sequence of work, means and methods. If a SWPPP plan is not required for the project, the contractor shall at a minimum submit a plan of his proposed erosion control prevention methods for approval by the Owner and/or other regulatory authorities having jurisdiction prior to starting any construction activities which may cause erosion.

- C. The Contractor shall perform work required to prevent dust attributable to his operations from entering the atmosphere. Dust on unsurfaced streets or parking areas and any remaining dust on surfaced streets shall be controlled with water and/or calcium chloride dust palliative as needed.
- D. Any material removed from sanitary or storm sewers shall be disposed in accordance with all applicable regulations.

END OF SECTION 013543

SECTION 014126 - GENERAL REGULATIONS AND PERMITS

PART 1 - GENERAL

1.1 REGISTRATION

All Contractors and subcontractors shall be registered with the Building Department having jurisdiction. Contact the Building Department for additional registration information.

1.2 PERMITS

The Contractor shall apply for all permits from the Owner and/or other authorities having jurisdiction. The Owner will waive all permit and inspection fees for permits under their jurisdiction; however, the Contractor must pay all permit and inspection fees for permits issued by other authorities having jurisdiction.

1.3 ARCHAEOLOGICAL DISCOVERIES

Contractors and subcontractors are required under Ohio Revised Code (O.R.C.) Section 149.53, to notify Ohio's State Historic Preservation Office (SHPO), and to cooperate with that office in archaeological and historic surveys and mitigation efforts if such discoveries are uncovered within the project area.

Contact: Ohio's State Historic Preservation Office
Diana Welling, Resource Protection & Review Department Manager
Phone: 1-614-298-2000
Email: dwelling@ohiohistory.org

Should archaeological discoveries or other activities delay progress of the work, an adjustment in contract time will be made.

END OF SECTION 014126

SECTION 014223 - INDUSTRY STANDARDS

PART 1 - GENERAL

1.1 ABBREVIATIONS

- A. Abbreviations, as used, designate the following:

AASHTO	-	American Association of State Highway and Transportation Officials
ACI	-	American Concrete Institute
AIEE	-	American Institute of Electrical Engineers
AISC	-	American Institute of Steel Construction
ANSI	-	American National Standards Institute
ASTM	-	American Society of Testing and Materials
AWWA	-	American Water Works Association
CMS	-	Construction and Material Specifications
NEMA	-	National Electrical Manufacturers Association
ODOT	-	Ohio Department of Transportation
ORC	-	Ohio Revised Code
UL	-	Underwriters Laboratories, Inc.

1.2 REFERENCE TO OTHER SPECIFICATIONS

- A. Where reference is made to specifications such as ASTM, AWWA or AASHTO, the latest edition shall be used, unless otherwise noted on the plans or in the specifications.

1.3 CODES AND STANDARDS

- A. All work provided for by these specifications must be installed according to the provisions of the State and local building codes, subject to inspection and acceptance by the State and local inspectors.

END OF SECTION 014223

SECTION 014323 – QUALIFICATIONS OF TRADESMEN

PART 1 - GENERAL

1.1 CHARACTER OF WORKMEN AND EQUIPMENT

- A. The Contractor shall employ competent and efficient workmen for every kind of work. Any person employed on the work who shall refuse or neglect to obey directions of the Owner or his representative, or who shall be deemed incompetent or disorderly, or who shall commit trespass upon public or private property in the vicinity of the work, shall be dismissed when the Owner so orders, and shall not be re-employed unless express permission be given by the Owner. The methods, equipment and appliances used on the work and the labor employed shall be such as will produce a satisfactory quality of work, and shall be adequate to complete the contract within the specified time limit.
- B. In hiring of employees for the performance of work under this Contract, or any Subcontract hereunder, no Contractor or Subcontractor, nor any person acting on behalf of such Contractor or Subcontractor, shall, by reason of race, sex, creed or color, discriminate against any citizen of the State of Ohio in the work to which the employment relates. No Contractor, Subcontractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this contract on account of race, creed, sex or color.

END OF SECTION 014323

SECTION 015136 - TEMPORARY WATER AND DISTRIBUTION

PART 1 - GENERAL

1.1 WATER

- A. The Contractor shall be responsible for an adequate supply of water suitable for his use for construction and drinking. At his own expense, he shall provide and maintain adequate supplies and supply lines in such locations and installed in such a manner as may be satisfactory to the Engineer.

END OF SECTION 015136

SECTION 016600 - PRODUCT HANDLING AND PROTECTION

PART 1 - GENERAL

1.1 DELIVERY AND STORAGE OF MATERIALS

- A. The Contractor shall be responsible for delivery and storage of all materials.
- B. The Contractor shall coordinate with the Engineer on the arrangement for storing construction materials and equipment. Deliveries of all construction materials and equipment should be made at suitable times.
- C. The Contractor shall store all materials required for the performance of this contract at sites designated by the Engineer.
- D. All stockpiles shall be neat, compact, completely safe, and barricaded with warning lights if necessary.
- E. Precautions shall be taken so that no shade trees, shrubs, flowers, sidewalks, driveways or other facilities will be damaged by the storage of materials. The Contractor shall be responsible for the restoration of all stockpile sites to their original condition.
- F. Materials, tools and machinery shall not be piled or placed against shade trees, unless they shall be amply protected against injury therefrom. All materials, tools, machinery, etc. stored upon public thoroughfares must be provided with red lights at night time so as to warn the traffic of such obstruction.
- G. Materials shall be so stored as to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, shall again be inspected prior to their use in the work. Stored materials shall be located so as to facilitate their prompt inspection. Approved portions of the construction site may be used for storage purposes and for the placing of the Contractor's plant and equipment, but any additional space required therefore must be provided by the Contractor at his expense. Private property shall not be used for storage purposes without written permission of the property owner or lessee, and copies of such written permission shall be furnished the Engineer. All storage sites shall be restored to their original condition by the Contractor at his expense.

END OF SECTION 016600

SECTION 016617 - MAINTENANCE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section provides general requirements for the maintenance of equipment in the field. Storage maintenance requirements are provided by Section 016600, Product Handling and Protection. Specific maintenance requirements are provided by manufacturers per individual Sections in the Project Manual.
- B. Maintenance is performed to ensure delivery to the Owner of equipment in an undeteriorated and fully serviceable condition.
- C. This Section also includes requirements for preventive and corrective maintenance during operation of the equipment prior to the commencement of the Warranty period.

1.2 RELATED SECTIONS

- A. Section 016600, Product Handling and Protection.

1.3 DEFINITIONS

- A. Storage maintenance consists of establishing and maintaining the environment required by the stored materials and performing periodic servicing.
- B. Preventive maintenance consists of activities performed on a periodic basis to maintain operating or operational items or equipment.
- C. Corrective maintenance consists of correcting faults or failures in an item or equipment. This may include adjustments or replacement of defective parts.

1.4 SUBMITTALS

- A. The Maintenance Log shall be submitted to the Owner upon completion of the Operational Demonstration and before the start of the Warranty period.
- B. No submittals are required by this Section, except as noted above. Maintenance schedules and practices shall conform to approved submittals required by individual Sections in the Project Manual.

PART 2 – PRODUCTS

2.1 COMPONENTS, ACCESSORIES AND REPAIR PARTS

- A. All components, accessories and repair parts used in maintenance shall be supplied by or approved by the equipment manufacturer for use on the equipment.

2.2 SOURCE QUALITY CONTROL

- A. All parts and materials used in maintenance shall meet the quality control requirements provided for the item or equipment. These are specified in individual Sections of the Project Manual.

PART 3 – EXECUTION

3.1 EXAMINATION AND VERIFICATION OF CONDITION

- A. The Contractor shall prepare a Maintenance Log for all equipment.
 - 1. This log shall include a list of required maintenance services and inspections, as provided by the manufacturer and submitted under individual Sections of the Project Manual.
 - 2. The Maintenance Log shall include checklists for the periodic services and inspections required.
 - 3. The Contractor shall initial and date the requisite log entries upon completion of the individual servicing or inspection.
 - 4. The Maintenance Log shall be located in the Contractor's Field Office and shall be available for review by the Owner until it is submitted for record purposes upon completion of the Operational Demonstration and the start of the Warranty period.

3.2 PREPARATION

- A. Before removing an item from storage per Section 016600, the Contractor shall review the installed location. Protection and services at the installed location must meet the equipment storage requirements.
- B. Before moving equipment to the installed location, the Contractor shall have available materials for temporary shelter or services required to establish the proper storage environment after the equipment is installed until it is placed in service in its final operating environment.

3.3 PERFORMANCE OF MAINTENANCE

- A. The Contractor shall perform all storage and preventive maintenance and inspections required by the manufacturer at the specified intervals.
- B. When notified by the Owner, the Contractor will perform corrective maintenance. This will be performed at no cost to the Owner. Corrective maintenance will be performed per manufacturer's written instructions or by direction of the approved representative of the manufacturer.
- C. The Contractor shall restore equipment to its operating condition before start-up.
- D. The Contractor shall re-establish storage maintenance in the event an item or equipment is removed from service.
- E. When the equipment warranty becomes effective, the Owner will assume responsibility for its maintenance.

END OF SECTION 016617

SECTION 017517 - STARTING OF SYSTEMS/COMMISSIONING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes general requirements for the commissioning of the Work and start-up and operation of systems and equipment.

1.2 SUMMARY

- A. Starting, testing, and operating the completed Work including systems and equipment until Substantial Completion is achieved and operation of the completed Work including systems or equipment are accepted by the Owner. Contractor shall cooperate and coordinate with the Owner in the operation, maintenance, and adjustment of the Work.

1.4 DEFINITIONS

- A. Commissioning: Commissioning is the series of activities, or process, necessary to ensure that systems and equipment are designed, installed, functionally tested, started up and capable of being operated and maintained to perform in conformity with the design intent for the facility improvements. Commissioning includes, but is not limited to factory testing, field testing, dry testing, wet testing, performance testing, manufacturer's checkout, start-up, and Operational Demonstration.

- B. Factory Testing: Factory Testing is performance testing, operation testing, or documentation verification conducted in the production facilities, or specialized test facilities, of the equipment supplier. Such testing shall conform to the requirements of the individual sections of the Contract Documents.

"Witnessed" Factory Testing shall mean that the testing is witnessed by the Owner or his designated representative.

- C. Field Testing: Field Testing is performance testing, operation testing, or documentation verification conducted in the field after installation, to provide comparison with the results obtained in the Factory Testing.

- D. Dry Testing: Dry Testing is performed by the Contractor without introducing either process material or other test material into the component, system, or unit process.

- E. Wet Testing: Wet Testing is testing performed by the Contractor utilizing test material in the component, system, or unit process. Tankage shall be filled with test material to operating level.

- F. Performance Testing: Performance Testing is performed by the Contractor to

demonstrate system performance in accordance with the Project Manual requirements.

- G. Manufacturer's Check-Out: Field inspection, testing, adjustments, and sign off by the approved representative of the Manufacturer, indicating that the component, system, or unit process meets the manufacturer's requirements.
- H. Start-Up: Narrowly defined as placing a component, system, or unit process on-line. Start-up can be a commissioning activity or a normal operating activity.
- I. Operational Demonstration: A commissioning activity performed by the Contractor wherein the Contractor operates and maintains a fully functional component, system, or unit process for a period of time after stable operation has been achieved.

1.5 SUBMITTALS

A. Quality Control Submittals:

- 1. Field Installation Reports – Submit reports by Manufacturer's Representative in accordance with Paragraph 3.4 of this Section.

B. Commissioning Documentation: Contractor shall prepare and submit all documentation for review and approval. The documentation shall include, but not be limited to, the following:

- 1. Certification by the preparer that he/she is the person responsible for the data, and that the data is authentic and accurate.
- 2. Certification by the Contractor or equipment or unit process systems supplier that the equipment or the unit process systems were operated continuously for the specified period and that the equipment or unit process systems operated in compliance with the specified operating conditions, parameters and performance: and that the equipment or unit process systems are suitable for Performance Testing.
- 3. Pertinent background information shall include, but not be limited to, the following:
 - a. Equipment or unit process systems Started-Up and Commissioned
 - b. Start-Up and Commissioning dates
 - c. Items or performance criteria tested clearly showing requirements and field data that verify requirements were met.
 - d. Names of witnesses for Start-Up and Commissioning.
 - e. Any repairs, corrections, or modifications required for the equipment or unit process systems to successfully complete Start-Up and Commissioning.
 - f. Loop diagrams accurately depicting the installed condition of instrumentation and controls.

- g. Any other important background information.

4. Appendix

- a. A summary of all data used in the calculation, including source, formulas with all terms defined.
- b. Calculations for all data submitted, fully defined.
- c. Copies of all raw field data sheets, including those indicating sampling point locations, and notes.
- d. Production and/or operational data.
- e. Calibration procedures and worksheets for sampling equipment.
- f. Copies of calibration records for instrumentation.
- g. PLC Ladder logic documented with comments.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION AND VERIFICATION OF CONDITION

- A. The Contractor shall inspect systems and equipment prior to each start-up and verify their readiness for start-up. Conditions hazardous to equipment or personnel shall be corrected by the Contractor prior to start-up of equipment.
 - 1. Start-up operations shall not proceed using temporary power or temporary instrumentation and control wiring. All electrical and control connections shall be permanent and complete, and all such electrical components and equipment fully functional.
 - 2. Use of repair parts during start-up operations shall not be permitted, except in such situations where the actual on-site verification of such repair parts' operability is specified.
 - 3. The Contractor shall verify that all initial copies of the Maintenance and Operating Instructions have received an acceptable disposition as defined in Section 013323, and the only outstanding item is the field verification of the Instructions.
- B. On successful completion of Start-up, process flows and solids shall be used for commissioning the equipment and unit process systems to show the equipment and unit process systems function properly. Commissioning shall confirm the proper operation of the equipment and unit process systems with process fluids and process solids, adjustment shall be made, and the equipment or unit process systems shall be optimized and brought into compliance with design criteria in preparation for Operational Demonstration.
- C. The Contractor shall coordinate all Start-up and Commissioning activities for equipment and unit processes. The Contractor shall develop a detailed start-up and commissioning plan that includes the following as a minimum:

1. Description of the overall general start-up and commissioning process.
2. List of equipment and unit process systems included for start-up and commissioning activities.
3. Detailed start-up and commissioning sequence of activities.
4. Listing of staff and responsibilities for activities.
5. Contractor shall use a form that will be provided by the Owner.

3.2 PREPARATION

- A. Prior to start-up of equipment or systems, all necessary test equipment shall be in place and operable.
- B. Approved representative(s) of the Manufacturer and Contractor shall be present for the initial start-up of systems or equipment.
- C. The Contractor shall request permission to start-up equipment, including electrical gear, and notify the Owner using a standard Start-Up Request form.
 1. The Start-Up Request shall be submitted to the Owner a minimum of 72 hours before the scheduled start-up. Requests shall be made during normal working hours.
 2. The Contractor shall provide all information in the first Section of the Start-Up Request form.
 3. The Owner will indicate approval or disapproval of the request.
 4. Approval of the request is based solely on impact on plant operations. Approval does not relieve the Contractor of any responsibility for plant and personnel safety.
 5. The Contractor shall obtain the approved Start-Up Request prior to the system or equipment start-up.
 6. If training is to be conducted in conjunction with the start-up this should be indicated on the Start-Up Request form. All requirements of Section 019215, Instruction of Owner's Personnel must be met for training sessions.
 7. Start-ups performed at the direction of the Contractor, per paragraph 3.3(G) of this Section, do not require advance notification to the Engineer.
- D. Normal installation checks, such as for rotation, are not considered start-ups and do not normally require start-up notification. For all equipment and systems so designated in the Contract Documents, or so designated by the Engineer, such checks shall be under the supervision of the approved representative of the manufacturer, and shall be reviewed by the Engineer.
 1. All electrical apparatus which is energized shall be clearly marked.

3.3 CONDUCT OF START-UP AND COMMISSIONING

A. Start-up:

1. All initial start-ups of equipment or systems shall be performed under the technical direction of the approved representative of the manufacturer.
2. Any lack of readiness of associated systems or failure of a system or equipment previously started prior to the date of Final Completion of the Project shall require additional initial start-up service to be performed, under the direction of the approved representative of the manufacturer.
3. The Contractor shall repair, replace or modify any equipment or system which fails to perform as specified in the Contract Documents. Such repair, replacement or modification of deficient work shall be performed under the terms of the General Conditions.
4. During the Operational Demonstration period per Section 019214, Operational Demonstration and at other times when the system is on-line and an integral part of the Wastewater Treatment Plant operations and process, start-ups shall be performed as required by the Contractor.

B. The Contractor shall be responsible for commissioning all work. Final acceptance shall be by the Owner.

C. The Contractor is responsible for the performance and operation of the systems and equipment during commissioning.

D. When Owner personnel are operating systems or equipment, the Contractor shall make available, at all times, persons knowledgeable about the systems or equipment to direct the Owner personnel in its operation.

E. The Contractor shall make all adjustments and corrections necessary to achieve normal, stable operation of systems. Adjustment and corrections shall be in accordance with Section 016617, Maintenance.

F. Any failures of equipment or systems operated under the direction of the Contractor shall be considered deficiencies and shall be corrected in accordance with the General Conditions.

G. During the Operational Demonstration period as defined in Section 019214, Operational Demonstration and at other times, the work will be on-line and an integral part of the Wastewater Treatment Plant operations and process. The Owner maintains control of Wastewater Treatment Plant operations and processes at all times. Therefore:

1. The Contractor shall not commence, resume, terminate, or suspend the operations without the permission of the Owner and only in a sequence and manner suitable to the Owner.

2. The Contractor shall immediately, on a 24-hour per day, 7-day per week basis, adjust or repair any malfunction in the work which in the opinion of the Owner jeopardizes or may jeopardize the proper operation of the Wastewater Treatment Plant.
3. The Contractor shall not start-up, shut down, adjust, or otherwise alter the operation of any component, system, or unit process without the permission of the Owner except in the case of an emergency and in accordance with the General Conditions.

3.4 QUALITY CONTROL

A. Reports of the Approved Representative of the Manufacturer:

1. The approved representative of the manufacturer shall prepare a daily report on each site visit for each system or item of equipment inspected, adjusted, started-up, or worked on.
2. The report shall state the purpose of the visit, the representative's observations and conclusions, and recommendations for further visits or action.
3. The reports shall be submitted in accordance with Section 013323, Shop Drawings, Product Data and Samples within three (3) days of the visit.

END OF SECTION 017517

SECTION 017800 - FINAL COMPLIANCE AND SUBMITTALS

PART 1 - GENERAL

- 1.1 The following forms and related sign-offs shall be documented in accordance with provisions of the contract. These forms shall be completed by the Contractor and approved by the Owner before final retainer is approved for release. Forms for Items A to I will be attached to the Contractor's executed copy of the contract.
- A. Certificate of Substantial Completion (To be submitted at time of Substantial Completion).
 - B. Contractor's Certification of Completion.
 - C. Contractor's Affidavit of Prevailing Wage.
 - D. Consent of Surety Company for Final Payment.
 - E. Affidavit of Final Acceptance Date and Correction Period.
 - F. Before the OWNER will approve and accept the work and release the retainer, the CONTRACTOR will furnish the OWNER a written report indicating the resolution of any and all property damage claims filed with the CONTRACTOR by any party during the construction period. The information to be supplied shall include, but not be limited to, name of claimant, date filed with CONTRACTOR, name of insurance company and/or adjuster handling claim, how claim was resolved and if claim was not resolved for the full amount, a statement indicating the reason for such action.
 - G. American Iron and Steel Step Certification SR-EPA.62 (Applicable for WPCLF & WSRLA funded projects only).
 - H. Build America, Buy America Certifications (When Applicable).
 - I. Subcontractor List, Specification Section 011100 - 2 form (Applicable for CDBG funded projects only).

END OF SECTION 017800

SECTION 017821 - CLEANING AND PROTECTION

PART 1 - GENERAL

1.1 GENERAL

- A. On or before the completion date for the work, the Contractor shall tear down and remove all temporary structures built by him, all construction plant used by him, and shall repair and replace all parts of existing embankments, fences or other structures which were removed or injured by his operations or by the employees of the Contractor. The Contractor shall thoroughly clean out all buildings, sewers, drains, pipes, manholes, inlets and miscellaneous and appurtenant structures, and shall remove all rubbish leaving the grounds in a neat and satisfactory condition.
- B. As circumstances require and when ordered by the Engineer, the Contractor shall clean the road, driveway, and/or sidewalk on which construction activity under this contract has resulted in dirt or any other foreign material being deposited with an automatic self-contained mechanical sweeper with integral water spray, vacuum and on-board or supplementary containment.
- C. Failure to comply with this requirement when ordered by the Engineer or his representative, may serve as cause for the Engineer to stop the work and to withhold any monies due the Contractor until such order has been complied with to the satisfaction of the Engineer.
- D. As the work progresses, and as may be directed, the Contractor shall remove from the site and dispose of debris and waste material resulting from his work. Particular attention shall be given to minimizing any fire and safety hazard from form materials or from other combustibles as may be used in connection with the work, which should be removed daily.
- E. The Contractor shall wash all windows and other glass surfaces, leaving all areas free from putty marks, paint, etc.
- F. During and after installation, the Contractor shall furnish and maintain satisfactory protection to all equipment against injury by weather, flooding or breakage thereby permitting all work to be left in a new condition at the completion of the contract.

END OF SECTION 017821

SECTION 017823 – MAINTENANCE MANUALS

PART 1 - GENERAL

1.1 OPERATION AND MAINTENANCE MANUALS

- A. Operation and maintenance information shall be submitted for all manufactured items, i.e. equipment, hardware, pumps, valves, motors, etc.
- B. This manual will either contain or make reference to all information that has been issued during the construction and start-up periods, as well as information necessary for the proper operation and maintenance of equipment.
- C. It shall be the responsibility of the Contractor who supplies such equipment to obtain from his vendors the required information and submit to the Engineer. This information will be accepted only if properly identified and only after it has been revised, where necessary, to conform to previous transmittals of the same material that have been "approved as noted" by the Engineer. All submittals shall be on 8-1/2" X 11" size paper or folded to that size.
- D. In general and where applicable, the information shall consist of, but not be limited to, six (6) sets of the following:
 - 1. Descriptive literature, bulletins or other data covering equipment or system.
 - 2. Complete list of equipment and appurtenances included with system, complete with manufacturer and model number.
 - 3. Utility requirements.
 - 4. General arrangement drawing.
 - 5. Sectional assembly.
 - 6. Dimension print.
 - 7. Materials of construction.
 - 8. Certified performance curve.
 - 9. Performance guarantee.
 - 10. Parts list.
 - 11. Recommended spare parts list with part and catalog number.
 - 12. Lubrication recommendations and instructions.
 - 13. Schematic wiring diagrams.
 - 14. Schematic piping diagrams.
 - 15. Instrumentation data.
 - 16. Drive dimensions and data.
 - 17. Control data.
 - 18. Operating instructions.
 - 19. Maintenance instructions including troubleshooting guidelines and preventative maintenance instructions with task schedule.
 - 20. Required tools and equipment for operation and maintenance.
 - 21. Safety considerations for O & M procedures.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORDS, DRAWINGS

PART 1 - GENERAL

1.1 RECORD DRAWINGS

- A. The Contractor shall furnish an authentic set of marked-up drawings showing the installation insofar as the installation shall have differed from the Engineer's drawings. The drawings shall be delivered to the Engineer for making revisions to the original drawings immediately after final acceptance by the Owner.
- B. The Contractor shall furnish dimensioned drawings indicating locations of all underground mechanical and electrical facilities.

END OF SECTION 017839

SECTION 017900.01 – OPERATIONAL DEMONSTRATION

PART 1 - GENERAL

1.1 GENERAL DESCRIPTION

A. Work Included:

A demonstration of the operation of all systems is required. This Operational Demonstration shall be conducted, coordinated and recorded by the Contractor in accordance with the requirements specified herein.

1.2 SUMMARY

A. Section Includes:

1. Requirements for the conduct and reporting of the Operational Demonstration. This work is additional to any other installation, shop and factory testing, field testing, dry testing, wet testing, performance testing, balancing, or adjustments required elsewhere in the Contract Documents.

1.3 RELATED SECTIONS

A. Section 017517, Starting of Systems / Commissioning

1.4 DEFINITIONS

- A. Operational Demonstration is defined in Section 017517, Starting of Systems/Commissioning.
- B. Operational Demonstration Log: A chronological record of the status of the system and equipment during the Operational Demonstration. All changes in status or system parameters, adjustments, and results of tests shall be included. Entries shall be made, noting the date and time, at the occurrence of each event. Operational Demonstration Logs shall be on a form acceptable to the Owner.

1.5 SUBMITTALS

A. Quality Control Submittals:

1. Test Reports:
 - a. Operational Demonstration log per subparagraph 3.4.A of this Section.
 - b. Report of Operational Demonstration per subparagraph 3.4.B.2 of this Section.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 EXAMINATION AND VERIFICATION OF CONDITION

- A. Before beginning the Operational Demonstration, the Contractor shall verify that:
1. All required construction activities are completed for the individual screw pump, including any activities by any entity that would interrupt the normal operations of the system. Coordinate with the Owner to resolve such conflicts.
 2. Only one screw pump can be taken out of service at anytime through the duration of work.
 - a. The screw pump shall be within the Operational Demonstration period a minimum of 15 days without issue prior to the next screw pump being taken out of service. If the Contractor elects to begin work on the next screw pump, written permission from the Owner shall be acquired prior to the start of work on the next pump.
 3. Adequate parts and supplies for routine maintenance and replacement are on hand to support system operation through the demonstration period.
 4. Start-up of equipment and systems per Section 017517, Starting of Systems/Commissioning has been completed.
 5. All Repair Parts and Maintenance Materials have been delivered to the Owner.
 6. Certain Instruction of Operating Personnel (training) has been scheduled to take place during the Operational Demonstration where specified. All other training will occur within 45 days prior to initiation of Operational Demonstration. The training of Operations Personnel shall be scheduled to take place during the first half of the demonstration period, and the remaining training of Electrical, Instrumentation and Maintenance Personnel shall be scheduled to be complete before the end of the Operational Demonstration.
 7. The field verification of the Initial Maintenance and Operating Inspections has been completed in accordance with the Specifications.

3.2 PREPARATION

- A. The Contractor shall provide two (2) representatives, a prime and an alternate, who will be responsible for the Operational Demonstration. These representatives will:
1. Demonstrate the operation of systems and equipment to the Owner's operating personnel.
 2. Direct maintenance and repair work, by either the Contractor or the approved representative of the manufacturer of the system components and equipment.

3. Maintain a log of the Operational Demonstration, as described herein.
 4. Be available at all times during the Operational Demonstration to perform these duties.
- B. Submit start-up notification to the Owner per Section 017517, Starting of Systems/Commissioning.

3.3 OPERATIONAL DEMONSTRATION

- A. The Contractor shall perform an Operational Demonstration of the work. Unless otherwise specified, the Operational Demonstration shall be a continuous 30-day, (720 hours) period during which the work is operated and maintained in a continuously on-line, fully functional process status.
- B. The Operational Demonstration shall encompass the entire work, or the portion thereof designated for Substantial Completion.
- C. Filling, draining, heating or cooling to temperature, stabilizing, adjusting, or other start-up activity time shall not be counted as Operational Demonstration time.
- D. During the Operational Demonstration period, the Contractor shall provide 24-hour per day, 7 days per week on-site supervision, in addition to the requirements of supervision as stated in the General Conditions. The Contractor shall provide labor and sufficient material to fully operate and maintain the work 24 hours per day, 7 days per week.
- E. When systems are on-line, conform to the requirements of Section 17517, Starting of Systems/Commissioning, Paragraph 3.3(G) for alterations in the Wastewater Treatment Plant processes.
- F. During the first half of the Operational Demonstration of the system and equipment, Owner personnel will observe the Contractor's personnel operating systems and equipment. The Contractor shall cooperate with this familiarization process.
- G. After the first 15 days of Operational Demonstration of system and equipment, operation of equipment will be assumed by the Owner personnel, under the direction of the Contractor, as described in Section 110801, Starting of Systems/Commissioning.

The Owner remains in control of the plant processes per Section 110801, Starting of Systems/Commissioning. The Contractor shall provide technical direction in the operation of equipment and systems.

- H. Start-up and operation of the system and all associated equipment shall be in accordance with the Initial Maintenance and Operating Instructions which have received an acceptable disposition from the Owner. If deviations from these instructions are necessary, these shall be noted in the Operational Demonstration Log, and subsequently submitted as revisions to the Maintenance and Operating Instructions. During the period of time between the completion of the Operational Demonstration and the Date of substantial Completion, the system and equipment will be operated and maintained under the requirements of the second half of the Operational Demonstration. The Owner will not assume full

responsibility for maintenance of the system and equipment until all conditions for Substantial Completion have been satisfied and both the Contractor and Owner and accepted the Certificate of Substantial Completion.

- I. All required maintenance and servicing prior to the Date of Substantial Completion shall be performed by the Contractor at the specified interval and as necessary. All maintenance and servicing shall be noted in the Operational Demonstration Log.
- J. All outages of equipment, system(s), or the plant should be noted in the Operational Demonstration Log. Plant outages are considered a part of normal plant operation and will not invalidate the Operational Demonstration. The Contractor is responsible for the safe and orderly shutdown and restart of equipment as necessary in the event of an outage. Outage time is not to be included in the Operational Demonstration period.
- K. The Contractor shall attend operational coordination meetings as called by the Owner to review operating conditions of equipment and systems.
- L. If, during the Operational Demonstration, any part of the work fails to fully conform to the requirements of the Contract Documents, the Operational Demonstration shall be considered to have failed, and the work shall not be considered to be Substantially Complete as defined in the General Conditions and the Owner shall so notify the Contractor in writing. If, during the Operation Demonstration, the provisions of the General Conditions are evoked to stop the work, the Operational Demonstration will also be considered to have failed.
- M. Upon failure of the Operational Demonstration, the Contractor shall promptly remedy any defects in the work and shall promptly reschedule and re-start the complete 30 day, (720 hours) Operational Demonstration time period. No Operational Demonstration time will be considered to have accrued to any part of the work by reason of a failed Operational Demonstration.
- N. During the Operational Demonstration, the Owner may require or permit the Operational Demonstration to be suspended:
 - 1. As provided in the General Conditions.
 - 2. Upon the written request of the Contractor to correct or adjust the work when in the judgment of the Owner such required correction or adjustment is insufficient to deem the Operational Demonstration to have failed.
 - 3. If the Operational Demonstration is suspended for any reason except failure, Operational Demonstration time shall accrue to the work from the time of the beginning of the Operational Demonstration to the time of the suspension.

3.4 REPORTING

- A. Daily: Copy of the Operational demonstration Logs shall be submitted to the Owner by 9:00 a.m. the following day.

- B. Within two (2) weeks of the termination or completion of the Operational Demonstration, the Contractor shall submit for approval:
 - 1. Any changes to the Maintenance and Operating Instructions.
 - 2. A report of the Operational Demonstration, describing the equipment utilized and any repairs, modifications, adjustments, or other work performed during the demonstration period.
- C. In the event the conduct of the Operational Demonstration or the submittals are unacceptable to the Owner, the Contractor shall perform the additional work or demonstrations required per the General Conditions.

END OF SECTION 017901

SECTION 017900.02 - INSTRUCTION OF OWNER'S PERSONNEL

PART 1 - GENERAL

1.1 DESCRIPTION

- A. General requirements for the conduct of training of permanent plant operating personnel on the care, maintenance and proper operation of the equipment. Specific requirements for training materials and for training are included in the individual Sections of the Contract Documents.

1.2 SUMMARY

- A. Work Included:

Except as otherwise specifically provided in individual Sections of the Project Manual, work under this Section includes the preparation of the detailed lesson plans and the conduct of detailed training for permanent plant operating personnel. Training shall be conducted on all components of equipment, as specified in individual Sections of the Project Manual.

- B. Training sessions and hours for all equipment specified as requiring training shall be per the manufacturer's recommendations. However, in no case shall the number of sessions be less than two (2) to accommodate multiple shifts. Sessions shall cover maintenance, operations and electrical.

1.3 RELATED SECTIONS

- A. Section 013323, Shop Drawings, Product Data and Samples
- B. Section 017901, Operational Demonstration

1.4 DEFINITIONS

- A. Lesson Plan:

A Lesson Plan is a submittal containing a statement of the instructional objectives of the training, a training outline, credentials of the instructor, audio/visual requirements, a listing of training materials to be used, and the desired schedule times and dates.

- B. Training Aid:

A mock-up, model, sample, or other device used during a training class to help demonstrate the maintenance, operation, or control of equipment.

1.5 SUBMITTALS

- A. Submittal of Instructor's credentials, Lesson Plans, instructional materials, training aids, and other training information shall be coordinated with the Training Schedule.
- B. Enough copies of instructional materials used for training for everyone present shall be provided at the time of the first training session.
- C. Provide two copies of all audio/visual aids utilized during training including films, slides, mock-ups, videotapes, DVDs or other training aids. All multimedia video shall be submitted in either Audio Video Interleave (AVI) format or Moving Pictures Expert Group (MPEG) format.
- D. Submit the following:
 - 1. Proposed training Schedule for the entire Contract showing tentative dates for each training session: include number, type and duration of each session. This schedule shall be submitted 120 days prior to the commencement of any individual training being performed.
 - 2. The detailed credentials of the representative of the equipment manufacturer who is to be the course Instructor for each category and type of training. Include Instructor's name, education, knowledge of equipment, experience as a trainer and employment history with the manufacturer. Include specific details of Instructor's experience pertaining to the operation and maintenance of, the training for, the equipment or system specified. These credentials shall be submitted 60 days prior to the commencement of any training.
 - 3. The Lesson Plan shall be submitted sixty (60) days prior to the commencement of any training and shall cover all components of equipment, regardless of source of supply or manufacturer, and shall include:
 - a. A title page containing: Title of the Lesson Plan, product name and model of equipment; name of manufacturer, manufacturer address and phone number; name and phone number of manufacturer's contact; job location (Name of Facility); contract no.; specification number; Contractor name, address and phone number; subcontractor name, address, phone (if applicable); submittal number assigned by Contractor; and submittal date.
 - b. A table of contents listing the headings: instructional objectives; training outline; credentials of Instructor(s); audio/visual requirements; training materials to be used.
 - c. A detailed instructional objective statement on the goal(s) intended to have been achieved by the end of the training session.

- d. The credentials of Instructors are to include name; education; knowledge of equipment; experience of trainer; and employment history with manufacturer.
- e. The audio/visual requirements listing specific equipment that is to be provided by the Contractor for training purposes.
- f. A list of all training materials to be used. An initial Operations and Maintenance (O&M) Instruction Manual, which has received an acceptable disposition, for the equipment shall be required to be utilized by the Instructor in the training and therefore shall be included on this list.
- g. A request of schedule dates and times for each training session.
- h. A training outline indicating the category of training (maintenance and operation, electrical and instrumentation or system); description of the session; length, and type (classroom or field). The training shall include as a minimum:
 - 1) Electrical and Instrumentation Training: System Equipment) Overview:
 - a) Describe system (equipment) fundamental operating principals and dynamics.
 - b) Identify system's (equipment's) mechanical, electrical and electronic components and features. Review system (equipment) wiring diagrams and process and instrumentation diagrams.
 - c) Identify support systems (equipment) associated with the operation (e.g., air intake filters, valve actuators, motors).
 - d) Identify and describe safety precautions and potential hazards related to maintenance.
 - e) Identify and describe in detail safety and control interlocks.
 - f) Identify and describe alarm conditions and response to alarms.
 - g) Cover the supply of power to process equipment and related appurtenances, lighting, etc.
 - h) Cover low voltage controls, monitoring devices, etc.
 - 2) Electrical and Instrumentation Training Equipment Preventive Maintenance (PM):
 - a) Describe PM inspection procedures required to perform an inspection of the equipment in operation, spot potential trouble symptoms and anticipate breakdowns and forecast maintenance requirements (predictive maintenance).
 - b) Define the recommended PM intervals for each component.
 - c) Provide lubricant and replacement part recommendations and limitations.
 - d) Describe appropriate cleaning practices and recommend intervals.
 - e) Identify and describe the use of special tools required for maintenance of the equipment.

- f) Describe component removal and installation, and disassembly and assembly procedures.
 - g) Perform at least 2 "field" demonstrations of preventive maintenance procedures.
 - h) Describe recommended measuring instruments and procedures, and provide instruction on interpreting alignment measurements, as appropriate.
 - i) Define recommended torque settings, mounting, calibration and alignment procedures and settings, as appropriate.
 - j) Describe recommended procedures to check or test equipment following a corrective repair.
- 3) Electrical and Instrumentation Training Equipment Troubleshooting:
- a) Define recommended systematic troubleshooting procedures.
 - b) Provide component specific troubleshooting checklists.
 - c) Describe applicable equipment testing and diagnostic procedures to facilitate troubleshooting.
- 4) Maintenance and Operation Training: System (Equipment) Overview:
- a) Describe system (equipment) operating (process) function and performance objectives.
 - b) Describe system (equipment) fundamental operating principals and dynamics.
 - c) Identify system's (equipment's) mechanical, electrical and electronic components and features.
 - d) Identify support systems (equipment) associated with the operation (e.g., air intake filters, valve actuators, motors).
 - e) Identify and describe safety precautions and potential hazards related to operation.
 - f) For systems (equipment) comprised of several components: Identify and describe in detail each component's function. Where applicable, group related components into subsystems. Describe subsystem functions and their interaction with other subsystems.
 - g) Identify and describe in detail safety and control interlocks.
- 5) Operation and Maintenance Training, Operation of Equipment:
- a) Describe operating principles and practices.
 - b) Describe routine operating, start-up and shutdown procedures.
 - c) Describe abnormal or emergency start- up, operating, and shutdown procedures that may apply.
 - d) Describe alarm conditions and responses to alarms.
 - e) Describe routine monitoring and record keeping procedures.
 - f) Describe recommended housekeeping procedures.
- 6) Operation and Maintenance Training, Troubleshooting:
- a) Describe how to determine if either corrective maintenance or an operating parameter adjustment is required.

4. Once the Lesson Plan submittal has received an acceptable disposition but at least 3 weeks prior to the actual commencement of the training, Contractor shall submit the detailed training material as a Power Point presentation in an electronic format (either DVD, CDR, or flash drive/micro storage) with appropriate labeling. In addition to the electronic format the Power Point material shall be provided in hardcopy for Owner review and approval. The number of copies shall be as defined in Section 013323, Shop Drawings, Product Data and Samples. The text and lettering on the presentation slides shall not be smaller than 12 font size and shall be black in color. Slides shall have an appropriate light colored background, resulting in a high contrast between the text and background.
5. Sample Evaluation Form: Submit with Lesson Plan a sample Evaluation Form. Form shall include area for comments and evaluation of Instructor, classroom training and field instruction. Form shall identify Contract name and number, Specification Section, Job location, date and time of training, title of training session, name of manufacturer, model number of equipment, Instructor name, and Contractor and Subcontractor's name.

PART 2 – PRODUCTS

2.1 QUALIFICATIONS OF INSTRUCTOR

- A. The course Instructor shall be knowledgeable and experienced in the details of operation and maintenance of the equipment.
- B. The Instructor must be knowledgeable of the equipment's application specific to this work.
- C. The Owner will reject Instructors who are deemed not in compliance with the above stated minimum qualifications. The Contractor will submit for approval alternate Instructors for consideration. No additional cost will be allowed for replacement of Instructors who are unacceptable to the Owner.

PART 3 – EXECUTION

3.1 EXAMINATION AND VERIFICATION OF CONDITION

- A. The training site for the classroom instruction will be provided by the Owner. The Owner will provide this location.
- B. The Contractor shall coordinate and verify to ensure that, prior to the scheduled training time(s):

1. The equipment is ready for Operational Demonstration in accordance with Section 017901, Operational Demonstration.
2. That all associated construction required to operate the equipment in all normal and anticipated operating modes is complete.
3. That the equipment area is well lit and unobstructed, so that all training class attendees may access, hear, and view the training.
4. That the equipment area is free of construction activities that could present a hazard to training class participants.
5. That adequate training materials, as required by paragraph 1.5 of this Section, are on hand for use during the training session.
6. Any representatives of interfacing Contractors or equipment suppliers needed to perform supporting operations allowing demonstration of equipment operation have been notified and will be available.

3.2 PREPARATION

- A. Training classes shall be approved by the state-regulating agency for continuing education. This is in the event of the facility choosing to apply for CH/CEU credits for their training program.
- B. Videotaping of all training will be conducted by the Contractor. Before the start of training the Contractor, and the Contractor will review the training site(s) to establish acceptable sight lines, lighting and locations for the participants.
- C. Training classes shall be scheduled through the Owner. Training shall begin within 45 days to the beginning of the Operational Demonstration period. Certain training sessions will occur only during the Operational Demonstration period as specifically noted in the Contract Documents.
- D. Training classes shall be conducted and separated for the following personnel:
 1. Maintenance and Operation
 2. Electrical and Instrumentation
 3. Systems Training
- E. Audio-visual equipment available at the Owner's training sites include:
 1. Blackboards and/ or Whiteboards
- F. Verify training materials are compatible with all equipment. The Contractor is responsible for providing other audio/visual equipment and training aids as needed.

- G. Classroom and field instruction where specified shall be provided for each group. Field instruction will include attention to applied familiarization with the actual equipment. Training hours as required in the Contract Documents do not include travel, set-up or cleanup time by the Instructor.
- H. Training may be either "field" or "classroom" as specified. If not specifically noted, provide field training. For field training, the Instructor will demonstrate all operations of the equipment and may be expected to show assembly and disassembly procedures, maintenance procedures, replacement procedures, and the like. Field training will generally occur at the installed location of the equipment or material unless mock-ups are approved in the Lesson Plan and provided by the Contractor. Such mock-ups will become property of the Owner after the training sessions unless previously requested in the Lesson Plan.
- I. Systems Training:

The Lesson will provide a detailed description of the system design, intended operation, and interactions of systems components. The Contractor's portion of Systems Training will provide additional detail descriptions of system's components and their interface with each other and other systems. Contractor's personnel for system training will be the same personnel who provided Operation and Maintenance training and Electrical and Instrumentation training.
- J. Training shall be conducted to accommodate the Owner's shift schedules. Contractor shall coordinate with Owner prior to scheduling the training sessions. Contractor shall anticipate multiple shifts.

3.3 CONDUCT OF TRAINING

- A. All topics of the approved Lesson Plan shall be discussed, in the classroom or the field, in complete and sufficient detail to allow plant operating personnel to knowledgeably operate and maintain the equipment in accordance with manufacturer's recommended procedures and safety considerations during all anticipated operational and maintenance situations.
- B. Safety concerns and features intended to enhance safety should be specifically addressed.
- C. Tasks required to maintain the warranty should be specifically addressed.
- D. Frequent reference shall be made to the Operation and Maintenance instructions.
- E. Address all questions and comments proposed by the training session participants as they are raised to the maximum extent practicable. If questions or comments cannot be addressed during the training session, additional materials and/or training may be required as determined by the Contractor.

- F. If any training session exceeds three (3) hours in duration, provide a 1/2- hour break.
- G. Ensure that all parts of the training session are legible or audible on the final tape. The Instructor must repeat all questions to insure that they are audible. Final acceptance of the training is contingent on the acceptability of the videotape.
- H. The Contractor will be backcharged for cancelled training classes if the Owner is not notified at least 72 hours prior to scheduled training.
- I. Training Sessions shall be attended not only by the Owner's Operating Personnel but also by members of the Contractor or any other entities designated by the Owner.

3.4 EVALUATION

- A. Immediately following training, the Instructor shall pass out an evaluation form to the Owner's personnel. This form shall provide a means for the Owner's personnel to comment on the Instructor and the quality, completeness, and value of the session.
- B. Evaluation Forms shall be collected, along with the Attendance Sheet at the end of each training session and the original documents shall be submitted to the Owner for use in determining if additional training is required by the Contractor. If additional training is required due to the material as outlined in the Lesson Plan not being covered correctly or in its entirety or the inability of the Instructor to answer questions pertaining to the operation and maintenance of the equipment, or if the training aids or equipment fail to operate as intended, the Contractor shall provide such additional training at no additional cost to the Owner.

END OF SECTION 017902

SECTION 018000 - SYSTEM PERFORMANCES

PART 1 - GENERAL

1.1 GENERAL

- A. It is the intent of this Contract that the final installation shall be complete in all respects.
- B. The Contractor shall be responsible for all minor details, whether or not shown on the Drawings or specifically included in these Specifications.

1.2 FACILITIES

- A. The facilities and equipment shall function properly and in accordance with plans, specifications and industry standards.
- B. The following equipment includes, but is not necessarily limited to, the following:
 - 1. Pumping Equipment
 - 2. Electrical

1.3 CERTIFICATION

- A. The Contractor shall provide written certification from the manufacturers and/or installers that the various major components are in working order or have been installed in accordance with the manufacturer's instructions.

END OF SECTION 018000

SECTION 024100 - DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. It is the intent of this section that the Contractor shall furnish all of the equipment, labor, and materials necessary to demolish the existing screw pumps and concrete structures as necessary to install the new screw pumps; together with all associated appurtenances as noted on the Contract Drawings, listed in the specifications herein, or as directed by the Engineer.

1.3 JOB CONDITION

- A. The Contractor shall exercise all necessary precaution to protect adjacent properties and roadways from falling debris, material, and sections during the demolition process. All necessary barricades to protect pedestrians and vehicular traffic will be installed.
- B. Owner shall operate all valves and gates required to isolate each screw pump. Contractor shall submit written notification of the operation of a gate a minimum of 72 hours prior to operating.

1.4 SUBMITTALS

- A. The Contractor shall submit to the Engineer prior to the start of any proposed demolition, a written description of the method proposed to abandon, dismantle, or remove any of the structures or equipment located at the site. Under no circumstances will blasting or the use of explosives be allowed. All sewage within the pump channels will be removed before demolition by pumping through the existing pump station.

1.5 SCHEDULE

- A. Demolition shall be scheduled and performed in strict conformance with these specifications and in a manner which will insure no interruption of sewage pumping operations beyond that provided for and approved by the Owner and the Ohio EPA. The date and the time of commencing the separate items of demolition work shall be submitted to the Engineer for review, and no demolition work shall commence until the Engineer's approval of date and time for the specific operation is in the hands of the Contractor.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXCAVATION, DEMOLITION & REMOVAL

- A. The Contractor shall be responsible for the demolition, removal, and transportation from the site of the facility, to the satisfaction of the Engineer, including but not limited to the following:
 - 1. Pump Station:
 - a. Screw pump including but not limited to; screw, flights, motors, reducer, steel deflector, gear boxes, and all appurtenances.
 - 2. The Contractor shall disconnect and remove cable from the electrical panel to all equipment with the exception of the lighting and heating in the Pump Station.

3.2 OWNERSHIP & DISPOSAL OF MATERIALS

- A. All salvaged material shall become the property of the Contractor.
- B. All materials, whether they may be salvageable or not, shall be promptly removed from the construction site as demolition progresses. Material not sold for scrap value shall be transported to an approved land fill site for proper disposal.

END OF SECTION 024100

SECTION 030130 - ENVIRONMENTAL CONCRETE REPAIR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
 - 1. Section 033000 - Cast-in-Place Concrete

1.2 SUMMARY

- A. Furnish labor, materials, equipment, and supervision necessary to remove deteriorated concrete, perform structural and non-structural concrete repairs, and install chemical-resistant protective coating systems for wastewater concrete structures.
- B. Work includes concrete removal, surface preparation, reinforcement cleaning and protection, cementitious concrete repair, curing, and application of protective coating systems.
- C. Repairs shall restore structural integrity, durability, chemical resistance, and liquid-tightness consistent with ACI 350 requirements.

1.3 SUBMITTALS

- A. See Section 013323 – Shop Drawings, Product Data and Samples
- B. Product Data: Submit data for proprietary materials and items including, but not limited to concrete mix design data, bonding agent, coating system, and others as requested by Engineer and as required by Section 033000 - Cast-in-Place Concrete.
 - 1. Mix Design: identify the concrete mix design as per Section 033000.
 - 2. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.
 - 3. Concrete Coating System Manufacturer's Installation Instructions.
 - a. Repair material data sheets.
 - b. Coating system data sheets and chemical resistance documentation.
 - c. Surface preparation and application procedures.
 - 4. Coating contractors' qualifications.
 - 5. Mock-up and adhesion testing procedures.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications, and standards, latest revisions, except where more stringent requirements are shown or specified:

1. ACI 301 "Specifications for Structural Concrete for Buildings."
2. ACI 318 "Building Code Requirements for Reinforced Concrete. "
3. ACI 350 " Environmental Engineering Concrete Structures."
4. ACI 350.4R "Design Considerations."
5. ACI 350.5 "Specifications."
6. ACI 562 "Assessment and Repair of Existing Concrete Structures."
7. ACI 546R "Concrete Repair Guide."
8. ICRI 310.2R "Concrete Surface Profile (CSP)."
9. ICRI 320.1 "Surface Preparation Methods."
10. ASTM C881 "Epoxy Bonding Systems."
11. ASTM C928 "Packaged Cementitious Repair Materials."
12. ASTM C882 "Standard Test Method for Bond Strength of Epoxy-Resin Systems."
13. ASTM D4263 "Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method."
14. ASTM D4417 "Standard Test Methods for Field Measurement of Surface Profile."
15. ASTM D4541 "Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers."
16. ASTM D5162 "Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates."
17. ASTM D7091 "Standard Practice for Measurement of Dry Film Thickness of Nonmagnetic Coatings."
18. ASTM D4414 "Standard Practice for Measurement of Wet Film Thickness by Notched Gauges."
19. SSPC-SP 13 / NACE No. 6 "Surface Preparation of Concrete."
20. SSPC-PA 2 "Procedure for Determining Conformance to Dry Coating Thickness Requirements."
21. NACE SP0188 "Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates."
22. NACE SP0178 "Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined."
23. NACE No. 6 / SSPC-SP 13 "Surface Preparation of Concrete."

- B. Coating applicator shall be manufacturer-approved and experienced in wastewater corrosion protection systems.
 1. Contractor qualifications: minimum three years wastewater coating systems experience.
- C. Materials and installed work may require testing and retesting at anytime during progress of work. Tests, including retesting of rejected materials for installed work, shall be done at Contractor's expense.
- D. Engage a testing agency acceptable to Engineer to perform initial material evaluation and certification tests for chemical-resistant coating systems.

1.5 PROJECT CONDITIONS

- A. Protect adjacent finish materials against spatter during concrete placement.

PART 2 - PRODUCTS

2.1 CONCRETE REPAIR MATERIALS

- A. Cementitious, polymer-modified, non-shrink repair mortars suitable for wastewater exposure.
- B. Minimum properties:
 - 1. Compressive strength $\geq 5,000$ psi at 28 days
 - 2. Low permeability
 - 3. Shrinkage-compensated
 - 4. Compatible modulus of elasticity and coefficient of thermal expansion

2.2 BONDING AGENTS

- A. Epoxy bonding agents:
 - 1. ASTM C881, Type II or Type V, moisture-tolerant
 - 2. Suitable for wastewater service

2.3 2.3 REINFORCEMENT CORROSION PROTECTION

- A. Provide corrosion protection for exposed reinforcement using:
 - 1. Cementitious corrosion inhibitor

2.4 PROTECTIVE COATING SYSTEMS (WASTEWATER SERVICE)

- A. General Requirements
 - 1. Provide chemical-resistant, wastewater-grade protective coating systems designed for:
 - a. Immersion service
 - b. Exposure to hydrogen sulfide (H_2S)
 - c. Biogenic sulfuric acid attack
 - 2. Coating systems shall be:
 - a. Compatible with cementitious repair materials
 - b. Applied only after repair materials have achieved manufacturer-recommended cure
 - c. Installed strictly in accordance with manufacturer's published instructions
- B. Acceptable Coating Systems: Provide one of the following systems, subject to Engineer approval:
 - 1. Sherwin-Williams
 - a. Dura-Plate® 6100 (Immersion-Grade Epoxy)
 - b. Dura-Plate® 6000 (High-Build Epoxy)
 - 2. Sika
 - a. Sikagard® 7000 CR
 - 3. Tnemec
 - a. Vinyl Ester Systems, including:

- 1) Series 1436
- 2) Series 1438
- 3) Series 237

- C. Surface Preparation for Coatings: Concrete surfaces shall be prepared after repair completion to:
1. ICRI CSP 5–7 (minimum), unless coating manufacturer requires higher profile.
 2. Surfaces shall be:
 - a. Sound
 - b. Clean
 - c. Free of laitance, curing compounds, oils, and contaminants
 - d. Within manufacturer-specified moisture and pH limits
 - e. Acid etching is not permitted.

PART 3 - EXECUTION

3.1 CONCRETE REMOVAL

- A. Remove all deteriorated concrete to sound substrate.
- B. Removal methods:
1. Light chipping hammers (≤ 15 lb)
 2. Hydrodemolition where required
- C. Minimum removal:
1. $\frac{3}{4}$ inch or to full circumference of reinforcing steel, whichever is greater.
- D. Feathered edges are not permitted.

3.2 SURFACE PREPARATION

- A. Prepare concrete surfaces in accordance with ICRI 320.1.
- B. Target surface profile:
1. CSP 6–8 for formed or trowel-applied repairs
 2. CSP 7–9 for overhead or high-stress repairs
- C. Surface shall be:
1. Clean
 2. Free of laitance, grease, and debris
 3. SSD unless epoxy systems require dry substrate
- D. Surface pH shall be ≥ 10.0 prior to repair placement.

3.3 REINFORCEMENT PREPARATION

- A. Clean exposed reinforcement to near-white metal.

- B. Reinforcement with section loss > 25% shall be supplemented or replaced as directed by the Engineer.
- C. Provide corrosion protection prior to placement of repair material.

3.4 REPAIR PLACEMENT

- A. Apply bonding agent in accordance with manufacturer's instructions.
- B. Place repair material:
 - 1. While bonding agent is tacky, or
 - 2. Within manufacturer's approved open-time window
- C. Consolidate repair material to eliminate voids and ensure full encapsulation of reinforcement.
- D. Finish to match adjacent surfaces.

3.5 CURING

- A. Cure repairs in accordance with ACI 350 durability requirements.
- B. Acceptable curing methods:
 - 1. Continuous moist curing (minimum 7 days)
 - 2. Wet coverings
 - 3. Approved curing compounds only if compatible with tank service and coatings
- C. Protect repairs from:
 - 1. Thermal shock
 - 2. Early loading
 - 3. Vibration

3.6 WATERTIGHTNESS REQUIREMENTS

- A. Repairs shall be liquid-tight under normal operating head.
- B. After curing, repairs shall exhibit:
 - 1. No visible leakage
 - 2. No damp spots
 - 3. No shrinkage cracking
- C. If leakage is observed, repairs shall be removed and replaced at no additional cost.

3.7 ACCEPTANCE

- A. Acceptance shall be based on:
 - 1. Visual inspection

2. Sounding
3. Verification of surface preparation and curing

B. Cracks exceeding ACI 350 serviceability limits are not permitted.

3.8 3.8 LIMITATIONS

A. This specification does not relieve the Contractor of responsibility for:

1. Proper material selection
2. Workmanship
3. Achieving watertight performance

B. Existing conditions may vary from those shown on the Drawings.

END OF SECTION 030130

SECTION 030140 - EPOXY MORTAR RESURFACING OF SCREW PUMP TROUGHS AND WEAR SURFACES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes surface preparation and installation of a wear resistant epoxy mortar liner within reinforced concrete screw pump troughs and channels at the wastewater treatment facility.
- B. Epoxy Mortar Wear Liner: Provide a trowel-applied, aggregate-filled epoxy mortar system specifically designed for wastewater treatment structures and capable of resisting abrasion, erosion, hydrogen sulfide (H₂S), sulfuric acid attack, and continuous wastewater exposure.
- C. Furnish all labor, materials, equipment, surface preparation, testing, and installation required to provide a trowel-applied epoxy mortar wear liner for rehabilitation of screw pump troughs, channels, inverts, and other locations indicated on the Drawings.
- D. The completed system shall provide:
 - 1. Abrasion resistance.
 - 2. Resistance to wastewater, hydrogen sulfide (H₂S), and sulfuric acid attack.
 - 3. Dense, non-porous surface suitable for continuous or intermittent wastewater exposure.
 - 4. Uniform and accurately formed wear surfaces.

1.2 REFERENCES

- A. ACI 350 – Code Requirements for Environmental Engineering Concrete Structures
- B. ACI 562 – Code Requirements for Assessment, Repair, and Rehabilitation of Existing Concrete Structures
- C. ACI 546R – Guide to Concrete Repair
- D. ASTM C1107 - The Standard Specification for Packaged Dry, Hydraulic-Cement, Non-Shrink Grout
- E. SSPC SP 13 / NACE No. 6 – Surface Preparation of Concrete
- F. ICRI Guideline No. 310.2R – Surface Preparation for Repair of Deteriorated Concrete

1.3 SUBMITTALS

- A. Product data for epoxy mortar system, primer, and bonding agents.

- B. Manufacturer's installation instructions.
- C. Documentation demonstrating suitability for wastewater treatment plant service. Chemical resistance data for wastewater effluent, hydrogen sulfide (H₂S), and sulfuric acid exposure.
- D. Installer qualifications demonstrating experience with epoxy mortar rehabilitation of wastewater structures.
- E. Manufacturer's certification of suitability for submerged and intermittent service.

1.4 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the specification, approved products include:
 - 1. Polywater® Dura-Plate™ 100 Concrete Epoxy Mortar.
 - 2. X-Calibur X-Roc® ResiCrete MH.
 - 3. Epoxytec® Mortartec Systems.
 - 4. Devcon® Wear Guard™ Epoxy Mortar Systems.
 - 5. Sika Sikadur® Epoxy Mortar Systems.
 - 6. Raven Trowel-Grade Epoxy Mortar Systems.
 - 7. Approved equal.

1.5 INSTALLER CERTIFICATION REQUIREMENTS

- A. Installer Qualifications:
 - 1. The epoxy mortar liner system shall be installed by a contractor who is experienced in the installation of wear resistant epoxy mortar or epoxy lining systems in wastewater treatment facilities.
- B. Minimum Experience Requirements:
 - 1. Installer shall have a minimum of five (5) years of documented experience installing epoxy mortar or epoxy lining systems in wastewater or industrial water environments.
 - 2. Installer shall have successfully completed at least three (3) projects of similar scope involving epoxy mortar or lining systems in channels, troughs, invert, or similar hydraulic structures.
- C. Manufacturer Certification:
 - 1. Installer shall be certified, licensed, or approved by the epoxy mortar liner manufacturer for installation of the specified product or an equivalent system.
 - 2. Certification shall be current at the time of installation and shall be issued directly by the product manufacturer or its authorized representative.
- D. Submittals:
 - 1. Submit the following documentation prior to commencement of Work:
 - 2. Manufacturer's written certification or approval of the installer
 - 3. List of comparable completed projects, including owner contact information
 - 4. Name and qualifications of the on site supervisor responsible for liner installation

- E. Installer Responsibility:
 - 1. The installer shall be responsible for:
 - 2. Proper surface preparation
 - 3. Correct mixing, placement, and finishing of the epoxy mortar liner
 - 4. Compliance with manufacturer's installation requirements
 - 5. Coordination with screw pump manufacturer to maintain required operational clearances

1.6 QUALITY ASSURANCE

- A. Installation shall be performed by personnel trained and approved by the epoxy mortar manufacturer.
- B. The manufacturer shall provide technical support during installation upon request.

1.7 FIELD TESTING AND QUALITY CONTROL

- A. General:
 - 1. Testing shall be performed to verify proper installation and performance of the epoxy mortar liner system.
- B. Thickness Verification:
 - 1. Verify liner thickness at a minimum of one test location per 10 linear feet of trough, or as directed by the Engineer.
 - 2. Thickness measurements may be performed by direct measurement, wet film gauges (during placement), or other manufacturer recommended methods.
- C. Bond / Adhesion Testing:
 - 1. Perform adhesion testing in accordance with ASTM D4541 or manufacturer recommended equivalent.
 - 2. Minimum acceptable bond strength shall be greater than the tensile strength of the substrate concrete, unless otherwise recommended by the manufacturer.
- D. Visual Inspection:
 - 1. Inspect finished liner surfaces for:
 - 2. Voids, pinholes, or segregation
 - 3. Delamination or debonding
 - 4. Cracking or shrinkage
 - 5. Irregular thickness or surface defects
- E. Corrective Work:
 - 1. Areas failing inspection or testing shall be repaired or replaced in accordance with the manufacturer's recommendations at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 EPOXY MORTAR SYSTEM

- A. Aggregate-filled epoxy mortar specifically formulated for rehabilitation of wastewater structures.
- B. Material shall be:
 - 1. Non-sag, trowel-applied.
 - 2. Capable of installation to a controlled and uniform thickness
 - 3. Minimum compressive strength: 8,000 psi
 - 4. Abrasion resistance suitable for grit laden wastewater flow
 - 5. Chemical resistance to wastewater effluent, hydrogen sulfide (H₂S), and sulfuric acid
 - 6. Suitable for submerged and intermittent service conditions
 - 7. Suitable for placement from 1/4 inch to 2 inches or greater thickness.
- C. Thickness Requirements:
 - 1. Minimum installed thickness: 2 inches.
 - 2. Liner shall be installed to maintain required tolerances between screw pump flights and the fixed concrete trough.

2.2 SURFACE PRIMER

- A. Manufacturer-recommended epoxy primer compatible with the epoxy mortar system.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. Remove all unsound, deteriorated, contaminated, or delaminated concrete.
- B. Concrete removal shall not damage adjacent sound concrete.
- C. Prepare concrete surfaces by abrasive blasting, hydrodemolition, scarification, or other approved methods.
- D. Remove all dust, laitance, grease, oils, biological growth, and contaminants.
- E. Exposed reinforcing steel shall be cleaned to remove rust, scale, and corrosion products.
- F. Prepare concrete surfaces in accordance with SSPC SP 13 / NACE No. 6 to achieve an ICRI CSP appropriate for epoxy mortar placement or as recommended by the manufacturer
- G. Surfaces shall be clean, sound, and free of contaminants prior to liner installation.

3.2 PRIMING

- A. Apply manufacturer-recommended primer to prepared concrete surfaces.
- B. Install epoxy mortar within the manufacturer's recoat or placement window.

3.3 EPOXY MORTAR PLACEMENT

- A. Install epoxy mortar in accordance with the manufacturer's written recommendations.
- B. Place material to the thickness shown on the Drawings or as required to restore original geometry.
- C. Trowel, screed, or form surfaces to achieve a smooth, dense, and uniform finish.
- D. Re-establish trough contours, invert geometry, and wear surfaces within the tolerances recommended by the screw pump manufacturer.
- E. Eliminate voids, ridges, abrupt transitions, and surface discontinuities.

3.4 COORDINATION WITH SCREW PUMP MANUFACTURER

- A. Final liner thickness, tolerances, and surface finish shall be coordinated with the screw pump manufacturer to maintain required operational clearances between the screw flights and the trough liner

3.5 CURING

- A. Protect installed material from moisture, wastewater flow, vibration, impact, and traffic until cured.
- B. Allow liner to cure in accordance with manufacturer's written recommendations prior to placing the screw pump into service.

3.6 FIELD QUALITY CONTROL

- A. Inspect completed surfaces for:
 - 1. Bond failure.
 - 2. Cracking.
 - 3. Delamination.
 - 4. Voids.
 - 5. Surface irregularities.
- B. Remove and replace defective work at no additional cost to the Owner.

3.7 WARRANTY

- A. Material Warranty:
 - 1. Provide a minimum five (5) year manufacturer's warranty covering defects in materials, including:
 - 2. Loss of bond
 - 3. Premature abrasion
 - 4. Chemical degradation due to wastewater exposure
- B. Installation Warranty:
 - 1. Provide a minimum two (2) year installer warranty covering workmanship, including:
 - 2. Improper surface preparation
 - 3. Improper installation or curing
- C. Warranty Commencement:
 - 1. Warranty period shall commence upon Substantial Completion of the Work.

3.8 MAINTENANCE REQUIREMENTS

- A. Maintenance Data:
 - 1. Submit manufacturer's written maintenance recommendations, including:
 - 2. Routine inspection procedures
 - 3. Acceptable cleaning methods
 - 4. Restrictions on chemicals or mechanical cleaning tools
- B. Inspection Frequency:
 - 1. Owner is recommended to visually inspect liner surfaces at least annually and after major maintenance events involving screw pump removal or reinstallation.
- C. Minor Repairs:
 - 1. Minor liner damage or wear may be repaired using manufacturer approved patch materials compatible with the original epoxy mortar liner.
- D. Limitations:
 - 1. Normal wear due to long term abrasive service is excluded from warranty coverage but shall be considered in lifecycle maintenance planning.

END OF SECTION 030140

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
 - 1. Section 030130 - Environmental Concrete Repair

1.2 SUMMARY

- A. Provide all materials and labor necessary to complete all concrete, plain and reinforced, as indicated on Drawings or as specified in these specifications and as required to complete the Project. Work, without limiting the generality thereof, includes:
 - 1. Installation of concrete to provide footings, foundations, foundation walls, slabs on grade, and other incidental concrete Work.
 - 2. Furnishing and installation of admixtures.
 - 3. Work of other trades required to be built into concrete, such as inserts for connections to steel members, , anchors, embedded plates, high strength mortar, controlled low strength material, , and reinforcing dowels.
 - 4. Finishing of concrete as specified herein or as indicated on Drawings.
- B. This Section specifies cast-in place concrete, including form work, reinforcing, mix design, placement procedures and finishes.
 - 1. Extent of concrete work is shown on drawings.

1.3 SUBMITTALS

- A. See Section 013323 – Shop Drawings, Product Data and Samples
- B. Product Data: Submit data for proprietary materials and items, including but not limited to, repair mortar, concrete mix design data, Portland cement, fly ash, reinforcement, forms, forming accessories, bonding agent, admixtures, patching compounds, waterstops, joint systems, high strength repair/patching mortar, control joint/construction joint locations, curing compounds, dry-shake finish materials, and others as requested by Engineer.
 - 1. Mix Design: Submit each proposed concrete mix design. Mix design(s) proposed shall be sealed by a Professional Engineer registered in the state of Ohio. The concrete mix design shall provide the following data:
 - a. The expected strength.
 - b. Corresponding slump before and after the introduction of mid- or high-range water-reducing admixtures.
 - c. Weights and test results of the ingredients.
 - d. Concrete mix compressive strength test results.
 - e. Other physical properties necessary to review each mix design for conformance with these specifications.
 - f. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.

- g. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.
- 2. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.
- C. Shop Drawings; Reinforcement: Submit original shop drawings prepared for fabrication, bending, and placement of concrete reinforcement. Comply with ACI Detailing Manual showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
- D. Shop Drawings; Form work: Submit shop drawings prepared by a registered Professional Engineer for fabrication and erection of forms for specific finished concrete surfaces. Show form construction including jointing, special form joint or reveals, location and pattern of form tie placement, and other items which affect exposed concrete visually.
 - 1. Engineer's review is for general architectural applications and features only. Design of form work for structural stability and efficiency is Contractor's responsibility.
- E. Samples: Submit samples of materials as requested by Engineer, including names, sources, and descriptions.
- F. Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design tests.
 - 1. The proposed mix design submittal(s) shall follow the procedures of Chapter 5, Sections 5.2 to 5.3 of ACI-318.
 - 2. Reference should be made to ACI-211.5R "Guide for Submittal of Concrete Proportions" for the required submittal information. Sample forms for presenting the necessary information can be found in the addendum at the end of this section. Example Form B should follow a completed Example A in the submittal when laboratory trial batches are used to document a water-cementitious materials ratio curve.
 - 3. Additional data summarizing the past performance records should be an integral part of the submittal if the submittal is based on past performance with the proposed materials and proportions.
 - 4. Alkali-silica reactivity test results.
- G. Materials Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by Engineer. Materials certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications, and standards, latest revisions, except where more stringent requirements are shown or specified:
 - 1. ACI 301 "Specifications for Structural Concrete for Buildings."
 - 2. ACI 318 "Building Code Requirements for Reinforced Concrete."
 - 3. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice."
 - 4. ACI 347 "Guide to Form work for Concrete."
 - 5. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
 - 6. ACI 232.3R - Report on High-Volume Fly Ash Concrete for Structural Applications.

7. ACI 305R - Guide to Hot Weather Concreting.
 8. ACI 305.1 (305.1M) - Specification for Hot Weather Concreting.
 9. ACI 306.1 - Standard Specification for Cold Weather Concreting.
 10. ACI 306R - Guide to Cold Weather Concreting.
 11. ACI 308.1 (308.1M) - Specification for Curing Concrete.
 12. ACI 350.5 (350.5M) - Specifications for Environmental Concrete Structures.
 13. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 14. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
 15. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
 16. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
 17. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
 18. ASTM C150/C150M - Standard Specification for Portland Cement.
 19. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
 20. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete.
 21. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
 22. ASTM C231/C231M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
 23. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.
 24. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
- B. Construct and erect concrete formwork and accessories in accordance with ACI 301, ACI 347 and ACI 350. Perform cast-in-place concrete work in accordance with ACI 301, ACI 318 (for typical structures) and ACI 350 (for environmental structures).
- C. Materials and installed work may require testing and retesting at anytime during progress of work. Tests, including retesting of rejected materials for installed work, shall be done at Contractor's expense.
- D. Engage a testing agency acceptable to Engineer to perform initial material evaluation and certification tests for mix designs and to design concrete mixes.
- E. Pre-installation Conference: Conduct conference at project site to comply with requirements of Division 1 Section "Project Meetings" and the following:
1. At least 35 days prior to submitting design mixes, conduct a meeting to review detailed requirements for preparing concrete design mixes and to determine procedures for satisfactory concrete operations. Review requirements for submittals, status of coordinating work, and availability of materials. Establish preliminary work progress schedule and procedures for materials, inspection, testing and certifications. Require representatives of each entity directly concerned with cast-in-place concrete to attend conference, including, but not limited to, the following:
 - a. Contractor's Superintendent
 - b. Agency responsible for concrete design mixes.
 - c. Agency responsible for field quality control.
 - d. Ready-mix concrete producer.
 - e. Concrete Subcontractor
 - f. Primary admixture manufactures.

- F. Concrete Testing Service: Employ and pay an independent testing laboratory, acceptable to the Owner and Architect to perform material evaluation tests and to review concrete mix designs proposed by Contractor to conform to this Specification.
- G. Alkali-Silica Reactivity Testing: Aggregates used in the concrete shall be tested by an independent testing agency for alkali-silica reactivity in accordance with ASTM C1260.

1.5 PROJECT CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301, ACI 306.1, and as follows:
 - 1. Protect concrete Work from physical damage or reduced strength caused by frost, freezing actions, or low temperatures.
 - 2. When average high and low temperature is expected to fall below 40 deg. F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 3. Do not use frozen materials or materials containing ice or snow.
 - 4. Do not place concrete in contact with surfaces less than 35 deg. F, other than reinforcing steel.
 - 5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
 - 1. Maintain concrete temperature at time of discharge not to exceed 95 deg. F.
 - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.
- C. Protect adjacent finish materials against spatter during concrete placement.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
 - 1. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two (2) edges and one side for tight fit.
- C. Forms for Textured Finish Concrete: Units of face design, size, arrangement, and configuration to match Engineer's control sample. Provide solid backing and form supports to ensure stability of textured form liners.

- D. Forms for Cylindrical Columns and Supports: Metal, fiberglass reinforced plastic, or paper or fiber tubes. Construct paper or fiber tubes of laminated plies using water-resistant adhesive with wax-impregnated exterior for weather and moisture protection. Provide units with sufficient wall thickness to resist loads imposed by wet concrete without deformation.
- E. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.
- F. Form Ties: Factory-fabricated, adjustable-length, snapoff metal or glass fiber-reinforced plastic form ties, designed to prevent form deflection and to prevent the spalling concrete upon removal. Provide units which will leave no metal closer than 1-1/2" to the exposed surface.
 - 1. Provide ties which, when removed, will leave holes not larger than 1" diameter in concrete surface.
 - 2. All form ties shall have a factor of safety of two (2) to determine the recommended safe working load.
 - 3. Form ties for environmental structures shall have a waterstop located within the middle third of the formed concrete.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric. (Flat sheets only)
- D. Welded Deformed Steel Wire Fabric: ASTM A 497.
- E. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.
 - 1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).
 - 3. For the bottom of slabs that are exposed to sanitary liquids, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

2.1 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type II, I/II, V low alkali, and ASTM C 595 blended cement Type IP for typical structures and Type MS for environmental structures.
 - 1. Blended cements that include ASTM C 1157 cements shall not be permitted
 - 2. Use one brand of cement throughout project, unless otherwise acceptable to Engineer.
 - a. Different types of cement shall not be mixed or used alternately without specific written approval by the Engineer.

- b. Different brands of cement may be used when authorized in writing by the Engineer. A resubmittal will be required if different brands are proposed during the Project.
 - 3. Portland cement shall contain less than 0.60 percent alkalis. Portland-pozzolan cement shall be low alkali.
- B. Concrete mixtures shall include either fly ash or slag as shown below, but within the limits stipulated in 2.4.C, unless the proposed combination of cementitious materials has been tested in accordance with ASTM C 1012 and resulted in expansion of not more than 0.10 percent at 6 months.
 - 1. Fly Ash, conforming to ASTM C618, Class F. Limit use of fly ash to not exceed 30% of cementitious material by weight.
 - a. Fly ash pozzolan shall contain less than 1 percent by weight of carbon and less than 3 percent by weight of sulfur trioxide.
 - b. Alkali content (%Na₂Oeq) less than 3.0%.
 - 2. Ground Granulated Blast-Furnace Slag: ASTM C989, Grade 100 or 120: Limit use of granulated blast-furnace slag to not exceed 65% of cement content by weight.
 - 3. The pozzolan supplied during the life of the project shall have been formed at the same single source. The pozzolan color shall not substantially alter the resulting concrete from the normal gray color and appearance.
- C. Normal Weight Aggregates: Fine and coarse aggregates shall conform to ASTM C33. Fine and coarse aggregates shall be regarded as separate ingredients.
 - 1. Aggregates shall be non-reactive and shall be washed before use. Provide aggregates from a single source for exposed concrete.
 - 2. Tests for size and grading of fine and coarse aggregates shall be in accordance with ASTM C136. Combined aggregates shall be well and uniformly graded from coarse to fine sizes to produce a concrete that has optimum workability and consolidation characteristics. The final combined aggregate gradation shall be established during the design mix.
 - 3. For exterior exposed surfaces, do not use fine or coarse aggregates containing spalling-causing deleterious substances.
 - 4. Local aggregates not complying with ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to Engineer.
 - 5. Combined Aggregate Gradation: Well graded from coarsest to finest with not more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 (0.3-mm) sieve, and less than 8 percent may be retained on sieves finer than No. 50 (0.3 mm).
- D. Fine aggregate: fine aggregate shall be hard, dense, durable particles of either sand or crushed stone regularly graded from coarse to fine. Gradation shall conform to ASTM C33.
- E. Coarse aggregate: coarse aggregate shall be hard, angular (not river washed), dense and durable gravel or crushed rock free from injurious amounts of soft and friable particles, alkali, and organic matter. Other deleterious substances shall not exceed the limits listed in ASTM C33, Table 3. Gradation of each coarse aggregate size shall conform TO ASTM C33, Table 2.
- F. Water: Conform with ASTM C94. Water for washing aggregate, for mixing and for curing shall be potable and free from oil and deleterious amounts of acids, alkalis, and organic materials; shall not contain more than 1,000 mg/l of chlorides as Cl, nor more than 1300 mg/l of sulfates as SO₄;

and shall not contain an amount of impurities that may cause a change of more than 25 percent in the setting time of the cement nor a reduction of more than 5 percent in the compressive strength of the concrete at 14 days when compared with the result obtained with distilled water. Additionally, water used for curing shall not contain an amount of impurities sufficient to discolor the concrete.

- G. Admixtures shall be compatible with the concrete and with each other. Calcium chloride or admixtures containing calcium chloride are not acceptable. Admixtures shall be used in accordance with the manufacturer's recommendations and shall be added separately to the concrete mix.
 - 1. Prohibited Admixtures: Calcium chloride thiocyanates or admixtures containing more than 0.1 percent chloride ions are not permitted.
- H. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Air-Mix"; Euclid Chemical Co.
 - b. "Sika Aer"; Sika Corp.
 - c. "MB-VR or MB-AE"; Master Builders.
- I. Water-Reducing Admixture: ASTM C 494, Type A, and containing not more than 0.1 percent chloride ions.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "WRDA"; W.R. Grace.
 - b. "Eucon WR-75"; Euclid Chemical Co.
 - c. "Pozzolith Normal"; Master Builders.
- J. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F and containing not more than 0.1 percent chloride ions.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Sikament 300"; Sika Chemical Corp.
 - b. "Eucon 37"; Euclid Chemical Co.
 - c. "Rheobuild or Polyheed"; Master Builders.
- K. Water-Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type E, and containing not more than 0.1 percent chloride ions.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Accelguard 80"; Euclid Chemical Co.
 - b. "Pozzutec 20"; Master Builders.
 - c. "Daraset"; W.R. Grace & Co.
- L. Water-Reducing, Retarding Admixture: ASTM C 494, Type D, and containing not more than 0.1 percent chloride ions.
 - 1. Products: Subject to compliance with requirements, provide one of the following:

- a. “Pozzolith”; Master Builders.
- b. “Eucon Retarder 75”; Euclid Chemical Co.
- c. “Plastiment”; Sika Chemical Co.

2.2 RELATED MATERIALS

A. Non-Shrink Non-metallic Grout: CRD-C 621 and ASTM C-1107, factory pre-mixed grout.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Non-metallic

- 1) “Set Grout”; Master Builders.
- 2) “Euco-NS”; Euclid Chemical Co.
- 3) “Five Star Grout”; U.S. Grout Corp.

B. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

C. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

- 1. Waterproof paper.
- 2. Polyethylene film.
- 3. Polyethylene-coated burlap.

D. Liquid Membrane-Forming Curing Compound: Liquid type membrane- forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg./sq. m. when applied at 200 sq ft./gal.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. “Masterkure”; Master Builders.
- b. “Ecocure”; Euclid Chemical Co.
- c. “Horn Clear Seal”; A.C. Horn, Inc.

E. Underlayment Compound: Freeflowing, self-leveling, pumpable cementitious base compound for applications from 1 inch thick to feathered edges.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. “Flo-Top”; Euclid Chemical Co.
- b. “Underlayment 110,” Master Builders, Inc.
- c. “Thoro Underlayment Self-Leveling”; Thoro System Products.

F. Epoxy Adhesive: ASTM C 881, two component material suitable for use on dry or damp surfaces. Provide material “Type,” “Grade,” and “Class” to suit project requirements.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. “Epoxite Binder 2390”; A.C. Horn, Inc.
- b. “Sikadur 32 Hi-Mod”; Sika Chemical Corp.
- c. “Euco Epoxy 452 or 620”; Euclid Chemical Co.

- G. High Strength Repair/Patching Mortar: Contractor can, either provide a batch/site mix or a premanufactured bag mix. See Table I for a batch/site mix.
1. premanufactured bag mix shall be polymer modified shrinkage compensated, rapid setting, high strength mortar specifically formulated to make structural repairs in vertical and overhead applications.
 2. Bag mix shall conform to ASTM C928 R2 for structural concrete repair and have a 28-day strength of at least 6,000 psi.
 3. Bag mix maybe extended with aggregate if approved by manufacturer.
 4. The following are approved manufacturers::
 - a. Sika Chemical Corp.
 - b. Five Star Products. Inc
 - c. Euclid Chemical Company
 - d. CTS Cement Manufacturing Corp.
 - e. Dayton Superior Corporation
 - f. SpecChem

2.3 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301 and ACI 211. If the trial batch method is used, use an independent testing facility acceptable to Engineer for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to Engineer.
1. Concrete shall be normal weight concrete composed of specified cement, pozzolan, admixtures, aggregates and water proportioned and mixed to produce a workable, strong, dense, and impermeable concrete.
 2. The Contractor may substitute interground Portland-pozzolan cement conforming to ASTM C595, containing the specified amount of pozzolan in lieu of Portland cement and pozzolan. Pozzolan may be omitted in concrete exposed to normal atmospheric conditions and concrete not in contact with the ground or liquid. Water/cement ratio is based on the combined contents of cement and pozzolan in a given mix proportion.
 3. Controlled Low Strength Material (CLSM) shall be a flowable concrete slurry mix, consisting of cement, pozzolan, water, coarse and fine aggregate. The concrete slurry mix shall be produced by a ready-mix concrete supplier.
- B. Submit written reports to Engineer and Structural Engineer of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Engineer.
- C. Design mixes to provide normal weight concrete with the following properties, as indicated in Table I. :

TABLE 1
CONCRETE REQUIREMENTS

Concrete <u>Class</u>	ASTM Coarse Aggregate Size	Maximum Water/Cement <u>Ratio</u>	Pozzolan, Percent by Weight of Cementitious Materials ^a	Minimum Air Content (Percent)	Minimum ^b 28-Day Compressive <u>Strength, PSI</u>	Slump Range Min-Max /Admix ^c (Inches)
A	57	0.4	20-28	5.5 ^c	5000	3-4/8
B	467 ^d	0.45	20-28	5.5 ^c	3500	4-5/8
C	8	0.48	20-28	5.5	3000	5-6/9
D	57	0.42	20-28	5.5 ^c	5000	3-4/8

- a Pozzolan content may be included in cementitious fraction. Based on the fly ash ratios, for GGBFS pozzolan shall be multiplied by 1.75.
- b Compressive strength shall be determined at the end of 28 days based on test cylinders made and tested in accordance with ASTM C39.
- c Plus or minus 1.5 percent.
- d ASTM coarse aggregate gradation 57 may be substituted at Contractor's option.
- e Min and max represent slump due to water only. Admix refers to recommended maximum slump for the mix after the incorporation of water reducing admixtures.

1. Typical cast-in-place structural concrete shall be Class A, except as otherwise specified or shown on the drawings.
2. Sitework, non-structural concrete (sidewalks, curbs, pavers, etc.) shall be Class B unless otherwise noted on the drawings.
3. Class C shall be used for grouting manhole inverts, as a topping for sloping slabs, forming manhole benches, etc.
4. Cast-in-place concrete for environmental structures shall be Class D, except as otherwise specified or shown on the drawings.

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

E. Admixtures:

1. Use high range water-reducing admixture (super plasticizer) in Classes A and D concrete unless noted otherwise.
2. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).
3. Use air-entraining admixture in all concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content within limits shown in Table I.
4. Use antimicrobial crystalline waterproofing admixture in Class environmental structures concrete.
5. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.

6. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as shown in Table I:
 - a. Concrete containing HRWR admixture (super-plasticizer): Not more than 8" after addition of HRWR to site-verified 2"-3" slump concrete.

2.4 CONCRETE MIXING

- A. Job-Site Mixing: Mix materials for concrete in appropriate drum type batch machine mixer. For mixers of one cu. yd., or smaller capacity, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than one cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd., or fraction thereof.
 1. Provide batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.
- B. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.
 1. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.
 - a. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- C. Prepare design mixtures for each type of concrete required.
 1. The inclusion of either fly ash or slag in the concrete mix is mandatory.
 2. Where fly ash is used:
 - i. The minimum fly ash content shall be 20 percent, and the maximum shall be 30% of cementitious material by weight.
 - ii. Additional fly ash shall not be included in concrete mixed with blended cements.
 3. Where slag is used:
 - i. The minimum slag content shall be 50 percent and the maximum shall be 65% of cementitious material by weight.
 - ii. Additional slag shall not be included in concrete mixed with blended cements.

2.5 PRODUCT DATA

- A. MANUFACTURER'S DATA:
 1. Copies of manufacturer's data shall be provided for the following:
 - a. Cement
 - b. As-delivered concrete strength, slump, temperature, and air content
 - c. Final laboratory report.

B. READY-MIXED CONCRETE TRUCK DELIVERY TICKETS:

1. Each load of ready-mixed concrete delivered to the job site shall be accompanied by a delivery ticket showing the information listed in ASTM C94, Section 16.
2. With each load of concrete delivered to the job there shall be furnished by the ready mixed concrete producer duplicate delivery tickets, one for the Contractor and one for the Engineer.
Delivery tickets shall provide the following information:
 - a. Date and serial number of ticket;
 - b. Name of ready mixed concrete plant;
 - c. Job location;
 - d. Contractor;
 - e. Type and brand name of cement;
 - f. Mix number or specified cement content in bags per cubic yard of concrete;
 - g. Truck number;
 - h. Time dispatched stamped by a time clock;
 - i. Amount of concrete in load in cubic yards;
 - j. Admixtures in concrete, if any;
 - k. Maximum size of aggregate;
 - l. Water added at job, if any;
 - m. Slump of concrete ordered

PART 3 - EXECUTION

3.1 GENERAL

- A. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

3.2 FORMS

- A. Design, erect, support, brace, and maintain form work to support vertical and lateral, static, and dynamic loads that might be applied until such loads can be supported by concrete structure. Construct form work so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain form work construction tolerances complying with ACI 347.
- B. Design form work to be readily removable without impact, shock, or damage to cast-in-place concrete surfaces and adjacent materials.
- C. Construct forms to sizes, shapes, lines, and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

- E. Provide temporary openings where interior area of form work is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.
- F. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- G. Provisions for Other Trades: Provide openings in concrete form work to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- H. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed. Retightening forms and bracing after concrete placement if required to eliminate mortar leaks and maintain proper alignment.

3.3 PLACING REINFORCEMENT

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports, and as herein specified.
 - 1. Avoiding cutting or puncturing vapor retarder during reinforcement placement and concreting operations. Repair damages before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
- C. Accurately position, support, and secure reinforcement against displacement by form work, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.
- D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in longest lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.4 JOINTS

- A. Construction Joints: Locate and install construction joints as indicated or, if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Engineer.
 - 1. Provide a roughen interface with a 1/4", min, amplitude at construction joints in walls, slabs, and between walls and footings.
 - 2. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated.

- B. Isolation Joints in Slabs-on-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as indicated.
- C. Contraction (Control) Joints in Slabs-on-Ground: Construct contraction joints in slabs-on-ground to form panels of patterns as shown. Use inserts 1/4 of slab depth, unless otherwise indicated.
 - 1. Form contraction joints by inserting premolded plastic strips into fresh concrete until top surface of strip is flush with slab surface.
 - 2. Follow the directions of Insert Manufacturer for finishing the slab and joints.
- D. If joint pattern not shown, provide joints not exceeding 15' in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third-bays).

3.5 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto. Electrical conduit shall not be embedded in concrete.

3.6 PREPARATION OF FORM SURFACES

- A. Clean re-used forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.
- B. Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.
- C. Thin form-coating compounds only with thinning agent of type, amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.
- D. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel form work is not acceptable.

3.7 CONCRETE PLACEMENT

- A. Preplacement Inspection: Before placing concrete, inspect and complete form work installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.
 - 1. Apply temporary protective covering to lower 2' of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement.
- B. General: Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete," and as herein specified.

1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
- C. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
- D. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
1. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 3. Maintain reinforcing in proper position on chairs during concrete placement operations.
- E. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
1. When air temperature has fallen to or is expected to fall below 40 deg F (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.
 - a. The concrete shall be maintained within this temperature range for not less than seven (7) days.
 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 or against cold reinforcing steel.
 3. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.
- F. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F (32 deg C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.

2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
3. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.
4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Engineers.

3.8 FINISH OF FORMED SURFACES

- A. **Rough Form Finish:** For formed concrete surfaces not exposed-to- view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.
- B. **Smooth Form Finish:** For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or other similar system. This is an as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed; provide smooth rubbed finish to smooth form finish. Refer to "Concrete Surface Repairs."
- C. **Smooth Rubbed Finish:** Provide smooth rubbed finish to scheduled concrete surfaces, which have received smooth form finish treatment.
 1. Scarify or roughen entire surface by grinding or similar effective means.
 2. Combined one part Portland cement to 1-1/2 parts fine sand by volume and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint. Blend standard Portland cement and white Portland cement, amounts determined by trial patches, so that final color of dry grout will match adjacent surfaces.
 3. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
 4. Repeat the above process if necessary to fill voids or bug holes and obtain a consistent match to adjacent surfaces, subject to acceptance of the Engineer.
- D. **Grout Cleaned Finish:** Provide grout cleaned finish on scheduled concrete surfaces which have received smooth form finish treatment.
 1. Scarify or roughen entire surface by grinding or similar effective means.
 2. Apply Thoroseal plaster mix coating by Thoro System Products or approved equivalent with an approximate thickness of 1/8-inch to 1/4-inch.
 3. Follow the manufacturer's recommendations and guidelines regarding surface preparation, application methods and curing.
 4. Repeat the above process if necessary to fill voids or bug holes and obtain a consistent match to adjacent surfaces, subject to acceptance of the Engineer.
- E. **Related Unformed Surfaces:** At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.9 MONOLITHIC SLAB FINISHES

- A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, Portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated.
 - 1. After placing slabs, plane surface to tolerances for floor flatness F(F) 15 and floor levelness F(L) 13, measured according to ASTM E 1155. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms, or rakes.
- B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.
 - 1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both, Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to tolerances of F(F) 18 F(L) 15. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system.
 - 1. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of F(F), 20 and F(L) 17, measured according to ASTM E1155. Grind smooth surface defects which would telegraph through applied floor covering system.
- D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming.

3.10 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Protect concrete from rapid moisture loss before and during finishing operations.
 - 1. The evaporation graph, Figure 1, of ACI 308 - Curing Concrete, shall be used to determine the evaporation rate during concrete placement. If the rate of evaporation equals or exceeds 0.2 lbs/sq.ft./hr., steps shall be taken to prevent excessive evaporation from the surface.
 - 2. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing.
 - a. Initial curing may be any of the methods listed herein that maintain a satisfactory moisture content and temperature.

3. Begin final curing procedures, if they differ from initial curing, immediately following initial curing and before concrete has dried. Continue curing for at least seven (7) days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
- B. Curing Methods: Perform curing of all structural concrete as herein specified.
1. Provide moisture curing by following methods.
 - a. Keep concrete surface continuously wet by covering with water.
 - b. Continuous water-fog spray.
 - c. Cover concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
 2. Provide moisture-cover curing as follows:
 - a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- C. Provide curing and sealing compound to pavement, walks, and curbs only, as follows:
1. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours) and after surface water sheen has disappeared. Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within three (3) hours after initial application. Maintain continuity of coating and repair damage during curing period.
- D. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs, and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- E. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by moist curing methods.
1. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

3.11 REMOVAL OF FORMS

- A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for five (5) days after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of

in-place concrete by testing field-cured specimens representative of concrete location or members. Lab cured cylinders will not be considered.

- C. Form facing material may be removed five (5) days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.12 RE-USE OF FORMS

- A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated, or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new form work.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Engineer.

3.13 MISCELLANEOUS CONCRETE ITEMS

- A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and 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 with template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
 - 1. Grout base plates and foundations as indicated, using specified non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.

3.14 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Engineer.
 - 1. Saw-cut out honeycomb, rock pockets, voids over 1/4" in any dimension, down to solid concrete but, in no case to a depth of less than 1." Make edges of cuts slightly undercut to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.
 - 2. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

- B. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Engineer. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with Portland Cement patching mortar, or precast cement cone plugs secured in place with bonding agent. When other materials are used, apply them in accordance with manufacturer's recommendations.
1. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
 2. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.
 3. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
 4. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
 5. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Engineer.
 6. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
 8. Perform structural repairs with prior approval of Engineer or Structural Engineer for method and procedure, using specified epoxy adhesive and mortar.
 9. Repair methods not specified above may be used, subject to acceptance of Engineer.
 10. Underlayment Application: Leveling of floors for subsequent finishes may be achieved by use of specified underlayment material.

ADDENDUM
EXAMPLE FORM A

CONCRETE SUPPLIER: _____

PROJECT: _____ CONTRACTOR: _____

MIXTURE ID: _____ SPECIFIED f'_c : _____ PSI

MATERIAL MIXTURE PROPORTIONS lbs-mass/cu.yd. (pcy)

1.0 Cement Type _____ Source: _____

Sp. Gr. _____ pcy _____ cu. ft.

1.1 Other Cementitious Materials: _____ Class: _____ Source: _____

Sp. Gr. _____ pcy _____ cu. ft.

2.0 Aggregate (No. 1) Type: _____ Size: _____ Source: _____

SSD Sp. Gr. _____ pcy _____ cu. ft.

Dry Rodded Unit Wt.: _____ pcf

Alternate (No. 1) Lightweight Aggregate Type: _____ Size: _____ Source: _____

Sp. Gr. Factor _____ over dry pcy _____ cu. ft.

Loose Unit Wt. _____ pcf Estimated Wet _____ pcf

2.1 Aggregate (No. 2) Type: _____ Size: _____ Source: _____

SSD Sp. Gr. _____ pcy _____ cu. ft.

Dry Rodded Unit Wt.: _____ pcf (If Fine Sized - FM _____)

2.2 Aggregate (Nos. 3, 4, n) Type: _____ Size: _____ Source: _____

SSD Sp. Gr. _____ pcy _____ cu. ft.

Dry Rodded Unit Wt.: _____ pcf

3.0 Water: _____ gal. _____ pcy _____ cu. ft.

EXAMPLE FORM A (CONTINUED)

4.0 Admixtures expressed as fluid ounces/cubic yard, and estimated range

Source: _____ Name: _____ Type _____ oz

Source: _____ Name: _____ Type _____ oz

Source: _____ Name: _____ Type _____ oz

Total Admixture Liquid Vol. _____ cu. ft.

(*) Note: Show volume in 4.0 if not included in cubic feet of air or water.

5.0 Other Materials - fibers, color pigment or other additions

Sp. Gr. _____ pcy _____ cu. ft.

Total Mixture Mass and Volume: _____ pcy _____ cu. ft.

Fresh Concrete Properties

Coarse & Fine Aggregate Gradation

Percent Passing

Slump _____ +/- _____ in.

Sieve Size

Aggregate No.

Unit Weight _____ pcf

2 in.

1 2 3 4 Combined

Air Content _____ +/- _____ %

1-1/2 in.

1 in.

3/4 in.

1/2 in.

If Trail Batch Data -

3/8 in.

Identify Batch No. _____

No. 4

Batch Date _____

No. 8

Concrete Temp. _____ °F

No. 16

Comp. Strength-Average _____ °F

No. 30

EXAMPLE FORM A (CONTINUED)

7 day avg. _____ psi

No. 50 _____

28 day avg. _____ psi

No. 100 _____

No. 200 _____

Comments: _____

Signature: _____ Date: _____

Title: _____

Organization: _____

EXAMPLE FORM B

CONCRETE SUPPLIER: _____

MATERIAL TRAIL BATCH NUMBER - proportions per cubic yard

1 2 3 4

1.0 Cement Source: _____

Type _____ lb lb lb lb

1.1 Other Cementitious Material Sources: _____

Type _____ lb lb lb lb

2.0 Aggregate No. 1 Size _____ Source: _____

SSD _____ lb lb lb lb

Alternate No. 1 Lightweight Aggregates Type _____ Source: _____

Sp. Gr. Factor _____

Oven Dry lb lb lb lb

Wet lb lb lb lb

2.1 Aggregate No. 2 Size _____ Source: _____

SSD _____ lb lb lb lb

2.2 Aggregate Nos. 3, 4, n) Size _____ Source: _____

SSD _____ lb lb lb lb

3.0 Water lb lb lb lb

4.0 Admixtures Source: _____

_____ Type _____ oz oz oz oz

_____ Type _____ oz oz oz oz

_____ Type _____ oz oz oz oz

EXAMPLE FORM B (CONTINUED)

5.0 Other Materials

_____ Type _____ lb _____ lb _____ lb _____ lb

Total Mass: _____ lb _____ lb _____ lb _____ lb

Total Mass/cy: _____ pcy _____ pcy _____ pcy _____ pcy

Relative Cubic Yard Volume: _____ cy _____ cy _____ cy _____ cy

Water-Cementitious Material Ratio:

Fresh Concrete Properties

TRAIL BATCH NUMBER

-1 ## -2 ## -3 ## -4

Slump-inches _____

Air-Content % _____

Unit Wt. pcf _____

Concrete Temp. °F _____

Compressive Strength Results (ASTM C192, C39) or Other Specified Test Requirements

7 days _____

Average (7 day) _____

EXAMPLE FORM B (CONTINUED)

28 days

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Average (28 day)

_____	_____	_____	_____
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Water-Cementitious Material Ratio:

_____	_____	_____	_____
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Signature: _____ Date: _____

Title: _____

Organization: _____

END OF SECTION 030000

SECTION 260500 - GENERAL REQUIREMENTS FOR ELECTRICAL WORK

PART 1 - GENERAL

1.1 SECTION INCLUDES:

- A. General
- B. Intent Of Drawings
- C. Interpretation Of Drawings
- D. Quality Control
- E. Submittals
- F. Location Environmental Considerations
- G. Products
- H. Coordination
- I. Demolition
- J. Electrical Installation
- K. Relocate or Make Modifications to Any Existing Electrical, Instrumentation or Control Systems Wiring
- L. Quality Assurance
- M. Examination
- N. Preparation And Storage
- O. Installation
- P. Field Quality Control
- Q. Painting
- R. Cleaning
- S. Operation - Maintenance and Spare Parts Data

1.2 GENERAL

- A. The Electrical Contractor shall be responsible to check with the equipment manufacturers of the physical size of the equipment that it will fit and that it can be moved into the indicated locations.
- B. Intent of Drawings: The Drawings are not intended to be used for construction purposes for the electrical work, but to supplement the Specifications as to the principal features of the electrical design. The intent of this section is that all equipment and electrical devices furnished and installed under this and other sections of the Specifications be properly interconnected to permit successful system operation regardless of whether all interconnections are specifically referenced in the Specifications and associated Drawings.
- C. Interpretation of Drawings
 - 1. The locations of equipment to which electrical connections are to be made are approximate as shown on the Drawings. It shall be the Electrical Contractor's responsibility to determine the exact conduit locations by reviewing shop drawings. The sizes of disconnect switches, motor starters, overload heaters, fuses or circuit breakers are approximate, and it shall be the Electrical Contractors responsibility to obtain the correct sizes based on the actual installed equipment or items. The conduit and wire sizes shown on the Drawings are the minimum sizes required and shall not be reduced.
- D. Quality Control
 - 1. The Electrical Contractor shall maintain a level of quality of materials and installation means as to assure the completed electrical, instrumentation and control system will be completed in compliance with the Specifications.
- E. Submittals
 - 1. Shop Drawings - Submit shop drawings under provision of Section 013323 for all electrical equipment and devices.
 - 2. Shop drawings shall include manufacturer's literature, specifications, schematic diagrams, field wiring interconnection diagrams and any other data necessary to indicate compliance with the Specifications
 - 3. Final "Record" Contract Drawings - Drawings and information required shall include but not be limited to the following:
 - a. Conduit runs shall be shown and identified at each end of run, include where conduit originates and the termination. Each conduit shall have a pull string attached and fastened at each end.
 - b. Power Distribution Schematics - Show actual installed switching details; cable size and type; conduit size, locations and runs; fuse size and type; circuit breaker frame size, trip setting and type.
 - c. Details and Diagrams
 - 1) Elementary Wiring Diagrams - Show actual motor control wiring with wire numbers, telephone system cable routing and station identification with cable numbers.
 - 2) One-Line Diagrams - Show equipment names, fuse sizes and types, heater sizes, conduit and wire sizes, motor FLA and horsepower. Include wire and cable numbers or identification.

- 3) Instrumentation and Control Diagrams - Show actual installed, wired instrumentation loop diagrams, include actual installed device Tag No.'s, Model No.'s, and Scaling.
- d. Lighting and Device Schedule
 - 1) Show actual manufacturers and model numbers.
 - 2) Lighting panel layouts
 - 3) Actual circuit numbers, circuit description, breaker size and type.
4. Payment for the Division 26 work and materials shall not exceed 90% of the total bid price until all Operations and Maintenance data and record as-built drawings have been completed and received by the Owner.

F. Location Environmental Considerations

1. Provide satisfactory operation and maintenance under the following conditions.
2. Temperature:
 - a. Outside: -20° to 110°F
 - b. Inside: +40° to 120°F
3. Relative Humidity: 100 percent
4. Process Temperature:
 - a. Liquid: 32° to 105°F
 - b. Air: -32° to 200°F
5. Atmosphere:
 - a. As indicated on the drawings
 - b. Corrosive atmosphere, Hydrogen Sulfide
 - c. Wet Locations
 - 1) As defined in NEC ART 100
 - 2) Outside exposed areas, areas indoors near pumps, frequent washdown areas
 - d. The interiors of conduits and raceways located in wet areas shall also be designated as wet areas.
 - e. Damp Locations
 - 1) As defined in NEC ART 100
 - 2) Areas under covered enclosures
 - f. Wet and Corrosive areas
 - 1) Enclosures located in areas that are wet and corrosive shall be rated for NEMA 4X Stainless Steel or as noted on the drawings.
 - g. Hazardous Areas (Classified)
 - 1) Areas that are classified as hazardous are indicated on the drawings. All new equipment and installation methods shall conform to the requirements in the NEC.

G. Products

1. Electrical materials and equipment shall be new and shall be labeled by the Underwriters Laboratories, Inc. whenever standards have been established and the label service applies.
2. Wire and Terminal Labeling - Tag all wires, cables, and conduits at each end or termination with suitable permanent tags, printed, stamped, or engraved with the wire, cable, or conduit number. The figures on the tags shall be clear and legible.

3. Safety Signs - High voltage warning signs shall be provided and placed at all guarded locations as required by the NEC. The signs shall be permanent and conspicuous and shall be plainly visible even when doors are open or panels removed from compartments.
4. Engraved Nameplates - Identify all electrical enclosures with engraved phenolic nameplates. Engrave and mount nameplates for all switchgear, disconnect switches, and individual motor starter enclosures indicating equipment served. Nameplates shall be **white with black letters**. Minimum letter size shall be one-quarter inch.

H. Demolition

1. Electrical Contractor shall disconnect power from existing equipment to be removed. General Contractor to remove and dispose of actual equipment.
2. Electrical contractor shall perform the demolition of electrical equipment where indicated on the electrical contract drawings.

I. Electrical Installation

1. Electrical Contractor shall furnish and install, adjust, connect, and put into satisfactory operation all electrical equipment, control components, and instrumentation items as indicated on the Drawings and specified herein.

J. Coordination

1. Electrical Contractor shall review all Specifications and Drawings for the electrical work included under these sections and coordinate this work, investigate existing conditions in the field before submitting proposal, become acquainted with the conditions under which the work of this section of the Specifications will be performed, and accept all conditions as found.
2. Schedule and coordinate all relocations of, or modifications to, electrical instrumentation or control systems wiring, conduit equipment, or appurtenances to whatever extent is necessary and required in order to conform to structural and architectural conditions, duct work and piping interferences, etc. This shall be included under this section of the Specifications.
3. Coordinate with other trades on the project so that all trades install their work to avoid interference with each other. Arrangements made among the trades which result in deviations from Drawings and Specifications are subject to the approval of the Owner.
4. The control panels and/or equipment are to be provided by the equipment supplier, General Contractor, or Systems Integrator. These items will require power and/or interconnections from the disconnect switch to the control panel and/or field mounted devices or junction boxes for power and control. Specific details to be determined by the shop drawings.

1.3 REFERENCES

- A. American National Standards Institute (ANSI)
- B. Factory Mutual Engineering Division (FM)
- C. Illumination Engineering Society (IES)
- D. Institute of Electrical & Electronics Engineers (IEEE)

- E. Insulated Cable Engineers Association (ICEA)
- F. Instrumentation, Systems and Automation Society (ISA)
- G. Joint Industrial Council (JIC)
- H. National Electrical Code (NEC)
- I. National Electrical Manufacturers Association (NEMA)
- J. International Electrical Testing Association (NETA)
- K. National Fire Protection Association (NFPA)
- L. Occupational Safety and Health Administration (OSHA)
- M. Ohio Building Code (OBC)
- N. Underwriters' Laboratories, Incorporated (UL)
- O. ANSI/NEMA 1-2000 Standard Practices for Good Workmanship in Electrical Contracting
- P. Quality Assurance
 - 1. Regulatory requirements
 - a. The Contractor shall obtain and pay for all fees for permits and inspections as required.
 - 2. Installation Standards
 - a. NEC - installation of electrical items shall be in accordance with the NEC.
 - b. Instrumentation and control - Installation of the instrumentation, control system shall be in accordance with standards of the ISA.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all devices at delivery for damage.
- B. Confirm all devices at delivery are as required according to design and shop drawings.
- C. Examine the site and structures for any obstructions which may interfere with the electrical installation as planned.

3.2 PREPARATION AND STORAGE

- A. Provide a dry, heated storage area for all electrical and electronic equipment and devices.

- B. Electrical and electronic equipment devices shall be stored and heated to prevent condensation from forming. Electrical and electronic equipment found with condensation in the enclosure or condensation-caused damage will not be accepted.

3.3 INSTALLATION

- A. The locations of equipment to which electrical connections are to be made are approximate as indicated on the Drawings.
- B. It shall be the Contractor's responsibility to check shop drawings relating to equipment requiring electrical connections and to determine the exact conduit locations.
- C. Electrical and electronic equipment installed but not energized shall continue to have a heat source to keep the enclosure free of condensation. Electrical and electronic equipment found with condensation in the enclosure or condensation-caused damage will not be accepted.
- D. Contractor shall perform all chasing, channeling, drilling, and patching necessary to complete the work. Repair any damage to the building or any equipment. Replace damaged equipment if, in the Engineer's judgment, the repair would not be satisfactory.
- E. No work shall be covered or hidden from view until it has been inspected and approved by the Owner.
- F. Any workmanship or materials not meeting the requirements of the Specifications or Drawings shall be immediately replaced by the Contractor without cost to the Owner and to the satisfaction of the Owner.
- G. All wiring shall have permanent labels at all terminations and junctions and on all field wiring terminal strips.
- H. Safety signs shall be furnished and installed on or around all electrical equipment.
- I. Permanent marking labels shall be installed on exposed sides of each piece of electrical equipment, pull boxes, junction boxes, and terminal boxes stating the maximum voltage level involved with the associated equipment.
- J. Concrete equipment pads for electrical equipment shall be furnished and placed by the Electrical Contractor.

3.4 PAINTING

- A. All wood panel mounting boards shall be painted.
- B. All electrical enclosures shall undergo a phosphatizing prepainting treatment. Final paint coats shall be a polyester powder coating with ANSI 61 light gray color for enclosures mounted inside and with ANSI 24 medium gray color for enclosures mounted outside.
- C. Remove any rust and touch up any scratches on all new electrical devices or enclosures with matching touch-up paint as supplied by the manufacturer.

3.5 FIELD QUALITY CONTROL

- A. Major components of the Electrical System shall be tested per NETA standards. NETA's Standard Specification for Testing, Parts 1 to 5, shall govern all testing.
- B. The following tests are per NETA Acceptance Testing Specifications, Part 7, Inspection and Test Procedures. Visual and Mechanical Inspections shall be performed for all equipment.
 - 1. Cables - Low Voltage shall have the following tests: Insulation resistance, continuity.
 - 2. Circuit Breakers - Low Voltage (Molded Case) that are rated at or over 100 amps shall have the following tests: Contact resistance, time-current characteristic, instantaneous pickup current, insulation resistance.
 - 3. Grounding Systems shall have the following test: Fall of potential.
 - 4. Surge Arresters shall have the following tests: 60 Hz sparkover, insulation power factor, ground continuity.
- C. After all testing has been completed to the satisfaction of the Owner, the entire Electrical (Power) System shall operate for a minimum test period of 30 days. Cumulative down time of all components furnished under Division 26 shall not exceed 1/2 hour as recorded by the Engineer during the test period. System documentation shall be delivered on the last day of the test period. Test period shall not end until system documentation has been delivered. If the cumulative downtime limit is exceeded, the Engineer shall have the following options:
 - 1. Extend the test period as required until the cumulative downtime during the proceeding 30 days does not exceed 1/2 hour as recorded by the Engineer.
 - 2. Sub-systems which have no components contributing to the cumulative downtime will be approved as a partial acceptance.
- D. Sub-systems which have components that contributed to the cumulative downtime shall have their test period begin again after all repairs and adjustments have been made.

3.6 OPERATION - MAINTENANCE AND SPARE PARTS DATA

- A. Submit specific data and information required under individual Division 26 Sections.
 - 1. Submit operation data as required.
 - 2. Submit maintenance data as required.
 - 3. Spare Parts Data - Submit as required. Include manufacturer's list of recommended spare parts.
 - 4. Parts and supplies judged to be necessary to keep equipment and control system operating successfully for first year of operation shall be furnished.
 - 5. Review individual sections for required lists of spare parts to be furnished.

3.7 CLEANING

- A. All areas are to be cleaned of construction debris and wire. Electrical equipment is to be cleaned of all construction dirt, dust, etc.
- B. All electrical and electronic equipment shall be kept clean and free of all dust, dirt, and debris at all times.

- C. All electrical and electronic boxes and enclosures shall have the covers of these boxes and enclosures closed and sealed except when actually working in these boxes and enclosures.

END OF SECTION 260500

SECTION 260519 - CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Building wire and cable
- B. Wiring connectors and connections

1.2 RELATED SECTIONS

- A. Section 260553 - Electrical Identification

1.3 REFERENCES

- A. Quality Control: Follow requirements for references and standards.
- B. NECA Standard of Installation (National Electrical Contractors Association)
- C. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems (International Electrical Testing Association)
- D. NFPA 70 - National Electrical Code

1.4 SUBMITTALS FOR REVIEW

- A. Submittals: Follow procedures for submittals.
- B. Product Data: Provide for each cable assembly type.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

- A. Contract Closeout Submittals - Follow as required.
- B. Project Record Documents: Record actual locations of components and circuits.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS

- A. Conform to NFPA 70.

- B. Furnish products listed and classified by Underwriters Laboratories Inc., or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

1.8 PROJECT CONDITIONS

- A. Verify that field measurements are as indicated.
- B. Conductor sizes are based on copper only.
- C. Wire and cable routing indicated is approximate unless dimensioned.

1.9 COORDINATION

- A. Coordinate Work under provisions of Section 260500.
- B. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.

PART 2 - PRODUCTS

2.1 BUILDING WIRE

- A. Manufacturers:
 - 1. Okonite Company
 - 2. Alpha Wire Company
 - 3. Southwire
 - 4. Substitutions: Follow as required for Material and Equipment.
- B. Description: Multi-stranded insulated copper wire, #12 AWG minimum for feeders and branch circuits, and #14 AWG minimum for control circuits.
- C. Insulation Voltage Rating: 600 volts
- D. Insulation: NFPA 70; Type XHHW or THWN insulation for service, feeders and branch circuits and control circuits.

2.2 WIRING CONNECTORS

- A. Use split bolt connectors for copper conductor splices and taps #6 AWG and larger. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.
- B. Use solderless pressure connectors with insulating covers for copper conductor splices and taps #8 AWG and smaller. Buchanan crimp (Split cap and insulator) or Ideal crimp connector with wrap cap insulator.

- C. Use Adhesive-lined heat shrink tubing for watertight connections, T&B, 3M, or Raychem.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that mechanical work likely to damage wire and cable has been completed.

3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.3 INSTALLATION

- A. Quality Control: Follow as required by manufacturer's instructions.
- B. Route wire and cable as required to meet Project Conditions.
- C. Install cable in accordance with the NECA "Standard of Installation."
- D. Use stranded conductors for control circuits.
- E. Use conductor not smaller than #12 AWG for power and lighting circuits.
- F. Use conductor not smaller than #14 AWG for control circuits.
- G. Use #10 AWG conductors for 20-ampere 120-volt branch circuits longer than 75 feet (25m).
- H. Pull all conductors into raceway at same time.
- I. Use suitable wire pulling lubricant for building wire #4 AWG and larger.
- J. Protect exposed cable from damage.
- K. Use suitable cable fittings and connectors.
- L. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- M. Clean conductor surfaces before installing lugs and connectors.
- N. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- O. Use split bolt connectors for copper conductor splices and taps #6 AWG and larger. Tape un-insulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

- P. Use solderless pressure connectors with insulating covers for copper conductor splices and taps #8 AWG and smaller.
- Q. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps #10 AWG and smaller.
- R. Identify and color code wire and cable under provisions of Section 260553. Identify each conductor with its circuit number or other designation indicated.
- S. Replace conductors damaged during installation.
- T. No splices are allowed in conduits or raceways.

3.4 FIELD QUALITY CONTROL

- A. Starting of Systems: Follow requirements for field inspection, testing, and adjusting.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.3.1.

END OF SECTION 260519

SECTION 260520 - SHIELDED INSTRUMENTATION & VARIABLE FREQUENCY DRIVE CABLE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: Furnish all labor, materials, equipment and incidentals required to provide shielded cable as shown and specified.

1.2 SUBMITTALS

- A. Shop Drawings:
 - 1. Comply with Section 013323.
- B. Product data:
 - 1. Submit for review copies of manufacturer's engineering data and technical information for shielded instrumentation cables proposed for use.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Instrumentation Cable
 - 1. Single Shielded Pair or Triad: 300 volt
 - a. Tinned copper, #18 AWG or larger, stranded, polyethylene insulated conductors twisted with aluminum-polyester shield, stranded tinned #20 AWG copper drain wire and overall chrome vinyl jacket, 100 percent shield cover, rated for 300 volts minimum
 - b. Products and Manufacturers:
 - 1) Belden No. 8760, No. 8770, No. 9318, or No. 9365
 - 2) Alpha No. 2422, No. 2432

2. Multi-paired Shielded 300 volt:

- a. Tinned copper, #18 AWG, stranded PVC insulated conductors, twisted in pairs with aluminum-polyester shield over each pair and its stranded drain wire (#20 AWG), overall chrome vinyl jacket, 100% shield cover
- b. Products and Manufacturers:
 - 1) 3 pair - Belden No. 9369
 - 2) 6 pair - Belden No. 9389
 - 3) 9 pair - Belden No. 9390
 - 4) 11 pair - Belden No. 9391
 - 5) 15 pair - Belden No. 9392
 - 6) Dekoron Poly-set
 - 7) Okonite type SP-OS

B. Variable Frequency Drive Shielded Cable

1. Four-conductor shielded cable

- a. Shielding to have an overall shield with an 85% tinned copper braided shield.
- b. Cable to be Belden Variable Frequency Drive Cable models 29502 through 29535, wire size as indicated or equal.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Delivery, Storage and Protection: Comply with Section 016600.

3.2 INSTALLATION

- A. Install in conduit separated from power cables unless otherwise shown on the Drawings.
- B. Install instrumentation cable conduits as far as possible from power cable conduit.
- C. Ground shield at one end only, as recommended by instrument manufacturer, and as approved by the Owner.

- D. Terminate stranded conductors with pre-insulated crimp type ring tongue terminals properly sized to fit fastening device and to fit wire size.
- E. Identification: Identify all conductors at each terminal and splice location. Identification number labels shall be Thomas & Betts type WSL cable markers or equal with clear heat shrink tubing over the marker.
- F. Install Category 5e and Category 6 cabling in accordance with Commercial Building Telecommunications Pathways and Spaces ANSI/TIA/EIA 569-A and Commercial Building Telecommunications Cabling Standard ANSI/TIA/EIA 568-A.

3.3 TESTING

- A. Test each circuit in the presence of the Owner after permanent cables are in place to demonstrate that the circuit and connected equipment perform satisfactorily and that they are free from improper grounds and short circuits.
- B. Maintain a written record of circuits being tested, marking down circuit number and descriptive function and results of each step in the test procedures including repeated tests.
- C. Any cable or a portion of the cable which fails when tested shall be replaced with a new cable for the full length and retested.

END OF SECTION 260520

SECTION 260526 - GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Grounding electrodes and conductors
- B. Equipment grounding conductors
- C. Bonding

1.2 RELATED SECTIONS

- A. Section 033000 - Cast-In-Place Concrete

1.3 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code

1.4 GROUNDING SYSTEM DESCRIPTION

- A. The system shall consist of a series of driven ground rod electrodes interconnected with bare stranded ground conductors.
- B. All building footer and slab rebar greater than ½" diameter shall be bonded to the ground conductor. Bond at 20-ft intervals and at each corner. IAW NEC connections to rebar may be made with suitable sized ground clamps.
- C. All connections shall be exothermic welds (Cadweld or equal) installed according to the manufacturer's instructions.
- D. Tests shall be performed to determine the grounding grid resistance to ground. The test method shall be as described in NETA Standard ATS-1987, "Acceptance Testing Specification for Electrical Power Distribution Equipment and Systems." A three-point fall-of-potential test shall be performed using two auxiliary electrodes for the measurement. Test reports shall be provided describing the testing procedure and results. The grid-to-ground resistance shall be no greater than 5 ohms. If necessary, additional rods shall be added to achieve the 5-ohm ground. When the Contractor has obtained satisfactory

results, he shall submit test reports to the Engineer for approval. After approval, the contractor shall bond the service entrance ground grid to the service entrance enclosure ground bus. The Owner or Owner's representative shall have the opportunity to inspect all exothermic welds.

- E. All ground cables shall have a minimum of 24" of ground cover.

1.5 PERFORMANCE REQUIREMENTS

- A. Grounding System Resistance: 5 ohms maximum

1.6 SUBMITTALS

- A. Product Data: Provide for grounding electrodes and connections.
- B. Test Reports: Indicate overall resistance to ground (and resistance of each electrode).
- C. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of exothermic connectors.

1.7 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 260500.
- B. Accurately record actual locations of grounding electrodes.

1.8 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc.

PART 2 - PRODUCTS

2.1 ROD ELECTRODE

- A. Manufacturers:
 - 1. ITT Blackburn Co.
 - 2. Copperweld, Bimetallic
 - 3. American Electric - Blackburn
- B. Material: Copper-clad steel
- C. Diameter: 3/4 inch
- D. Length: 10 feet

2.2 MECHANICAL CONNECTORS

- A. Manufacturers:
 - 1. Burndy Corp
 - 2. O-Z/Gedney
- B. Material: Bronze

2.3 EXOTHERMIC CONNECTIONS

- A. Manufacturers:
 - 1. Cadweld

2.4 WIRE

- A. Material: Stranded copper
- B. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.2 INSTALLATION

- A. Install Products in accordance with manufacturer's instructions.
- B. Install rod electrodes at locations indicated. Install additional rod electrodes as required to achieve specified resistance to ground spaced at minimum 10 ft.
- C. Provide bonding to meet Regulatory Requirements.
- D. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

3.3 FIELD QUALITY CONTROL

- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.
- B. Use suitable test instrument to measure resistance to ground of system. Perform testing in accordance with test instrument manufacturer's recommendations using the fall-of-potential method.

END OF SECTION 260526

SECTION 260529 - SUPPORTING DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Conduit and equipment supports
- B. Anchors and fasteners
- C. Concrete equipment supports

1.2 REFERENCES

- A. NECA - National Electrical Contractors Association
- B. ANSI/NFPA 70 - National Electrical Code

1.3 SUBMITTALS

- A. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 - PRODUCTS

2.1 PRODUCT REQUIREMENTS

- A. Materials and Finishes: Provide adequate corrosion resistance.
- B. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products.
- C. Anchors and Fasteners:
 - 1. Concrete block walls: Use expansion anchors.
 - 2. Steel Structural Elements: Use welded fasteners.
 - 3. Concrete Surfaces: Use expansion anchors.

2.2 CHANNEL SYSTEMS

- A. Manufacturers:
 - 1. Unistrut
 - 2. B-Line
 - 3. Allied Power - Strut
 - 4. or Approved Equal
- B. Description:
 - 1. Galvanized steel - General locations
 - 2. Aluminum - Wet, damp areas
 - 3. Stainless steel - Wet, damp, corrosive areas where compatible with chemicals
 - 4. Fiberglass - Wet, damp, corrosive areas where compatible with chemicals
- C. Size: 1-5/8" x 1-5/8"

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".
- C. Do not fasten supports to pipes and conduit except as shown on Drawings.
- D. Obtain permission from Engineer before drilling or cutting structural members.
- E. Fabricate supports from structural steel, galvanized steel, aluminum, or stainless steel channel. Rigidly weld members or use stainless steel hex head bolts and hardware to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- F. Install surface-mounted cabinets and panel boards with minimum of four anchors.
- G. In wet and damp locations use stainless steel or aluminum channel supports with stainless steel fasteners.
- H. In wet and damp locations use stainless steel or aluminum spacers to stand cabinets and panel boards one inch off wall.
- I. Spray coat cut end of galvanized steel channel or rigid steel conduit with spray cold galvanizing.
- J. Galvanized pipe used as equipment supports are to have the open ends capped with galvanized end caps.

- K. Provide concrete equipment pad, housekeeping pads, for all equipment that will be floor mounted. Pads to be formed, chamfered edges, and have a troweled finish. Concrete shall be smoothed around conduits. Equipment panels shall be anchored using concrete anchors. Equipment pads for outdoor mounted panels shall extend from the front of the equipment panel 3'-6" min. to allow for opening and standing.

END OF SECTION 260529

SECTION 260533 - CONDUIT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Metal conduit
 - 1. Rigid Galvanized Steel
 - 2. Aluminum
- B. PVC coated rigid galvanized steel
- C. Nonmetallic conduit
- D. Flexible metal conduit
- E. Liquid-tight flexible metal conduit
- F. Fittings and conduit bodies

1.2 RELATED SECTIONS

- A. Section 260529 - Supporting Devices
- B. Section 260553 - Electrical Identification
- C. Sections 260534 - Boxes and Enclosures

1.3 REFERENCES

- A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated
- B. ANSI C80.5 - Rigid Aluminum Conduit
- C. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies
- D. ANSI/NFPA 70 - National Electrical Code
- E. NECA "Standard of Installation"
- F. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
- G. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing

1.4 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70

1.5 SUBMITTALS

- A. Submit under provisions of Section 012333.
- B. Product Data: Provide for metallic conduit, flexible metal conduit, liquid-tight flexible metal conduit, nonmetallic conduit, flexible nonmetallic conduit, fittings, conduit bodies of each type planned to be used.

1.6 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of project general requirements.
- B. Accurately record actual routing of all conduits exposed and concealed on record drawings.

1.7 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc as suitable for purpose specified and shown.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle Products to site under provisions of Section 016600.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- D. Protect PVC conduit from sunlight.

1.9 PROJECT CONDITIONS

- A. Verify routing and termination locations of conduit prior to rough-in.
- B. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2 - PRODUCTS

2.1 CONDUIT REQUIREMENTS

- A. Minimum Size: 3/4 inch, unless otherwise specified
- B. Underground Installations:
 - 1. More than two feet from Foundation Wall: Use schedule 40 PVC conduit.
 - 2. Within two feet from Foundation Wall: Use plastic coated galv. rigid conduit.
 - 3. In or Under Slab on Grade: Use schedule 40 PVC conduit.
 - 4. When changing from underground to above ground, use PVC-coated galvanized rigid conduit to approximately two feet above finished grade.
 - 5. Conduits passing through poured concrete sidewalks, floating type slabs on grade shall be sleeved.
- C. Outdoor Locations, Above Grade: Use rigid galvanized steel conduit.
- D. In Slab Above Grade:
 - 1. Use schedule 40 PVC.
 - 2. Maximum Size Conduit in Slab: 3/4" for conduits crossing each other.
- E. Continuously Wet and Damp Locations: Use aluminum or PVC-coated rigid steel conduit.
- F. Corrosive Location: Use PVC-coated rigid steel or schedule 40 PVC.
- G. Dry Locations:
 - 1. Concealed in framed wall or above suspended ceilings: Use steel electrical metallic tubing or schedule 40 PVC conduit.
 - 2. Exposed: Use rigid galvanized steel or aluminum conduit or as noted on drawings.
 - 3. Flexible metal conduit can be used for equipment connections. Max length of 3 feet.
- H. Classified hazardous Class I, Division 1 areas & Screen Rooms: PVC coated rigid steel conduit and explosion-proof flexible equipment connections.
- I. Equipment Connections:
 - 1. Use liquid-tight flexible metal conduit.
 - 2. In corrosive or chemical rooms use non-metallic flexible conduit and fittings.
- J. Flexible Conduits shall be limited to three feet or less.

2.2 METAL CONDUIT

- A. Rigid Steel Conduit: ANSI C80.1
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1 all steel fittings

2.3 PVC COATED METAL CONDUIT

- A. Manufacturers:
 - 1. Robroy Industries "Plasti-Bond"
 - 2. Thomas & Betts "OCAL Blue"
- B. Description: NEMA RN 1; rigid steel conduit with external PVC coating, 40 mil thick
- C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel fittings with external PVC coating to match conduit.

2.4 FLEXIBLE METAL CONDUIT

- A. Description: Interlocked aluminum construction
- B. Fittings: ANSI/NEMA FB 1

2.5 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Manufacturers:
 - 1. Sealtight VA Anaconda Metal Hose Div.
 - 2. Liquidtight type L.A. Electric Flex Co.
- B. Description: Interlocked aluminum construction with PVC jacket
- C. Fittings: ANSI/NEMA FB 1

2.6 NONMETALLIC CONDUIT

- A. Manufacturers:
 - 1. Carlon Electrical Products Div.
 - 2. LCP
 - 3. Quil
- B. Description: NEMA TC 2; Schedule 40 PVC
- C. Fittings and Conduit Bodies: NEMA TC 3

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install conduit in accordance with NECA "Standard of Installation".
- B. Install nonmetallic conduit in accordance with manufacturers' instructions.
- C. Arrange supports to prevent misalignment during wiring installation.

- D. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- E. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.
- F. Fasten conduit supports to building structure and surfaces under provisions of Section 260529.
- G. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- H. Do not attach conduit to ceiling support wires.
- I. Arrange conduit to maintain headroom and present neat appearance.
- J. Route exposed conduit parallel and perpendicular to walls.
- K. Route conduit in and under slab from point-to-point.
- L. Do not cross conduits in slab unless $\frac{3}{4}$ " trade size.
- M. Maintain adequate clearance between conduit and piping.
- N. Maintain 12-inch clearance between conduit and surfaces with temperatures exceeding 104°F.
- O. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- P. Bring conduit to shoulder of fittings; fasten securely.
- Q. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- R. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
- S. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2-inch trade size.
- T. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- U. Provide suitable fittings to accommodate expansion and deflection where conduit crosses, control and expansion joints.
- V. Conduits shall be sloped in such a manner that water may drain to the closest pull box if possible.

- W. Provide suitable pull string in each empty conduit except sleeves and nipples.
- X. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- Y. Ground and bond conduit under provisions of Section 260526.
- Z. Identify conduit under provisions of Section 260553.
- AA. Flexible conduit, non-metallic, liquid-tight, and metallic; shall not be used in lengths longer than 6 ft unless specifically approved. Flexible conduit is not to be used in place of neatly run rigid conduit.
- BB. Where called out on plans, provide cable terminators and/or sealing bushings, CRC by O-Z/Gedney or approved equal. Verify specific cable outside diameters and follow manufacturer's installation requirements.

END OF SECTION 260533

SECTION 260534 - PULL, JUNCTION BOXES AND ENCLOSURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Pull Boxes
- B. Junction Boxes
- C. Accessories

1.2 RELATED SECTIONS

- A. Section 260529 - Supporting Devices

1.3 REFERENCES

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum)
- B. NEMA ICS 4 - Terminal Blocks for Industrial Control Equipment and Systems
- C. ANSI/NFPA 70 - National Electrical Code

1.4 SUBMITTALS

- A. Submit under provisions of general project requirements and Section 260500.
- B. Product Data: Provide manufacturer's standard data for boxes and enclosures.
- C. Junction box locations and details
 - 1. Terminal block layout
 - 2. Grounding

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Hoffman
- B. Rittal
- C. Or Equal

2.2 PULL BOXES

- A. Construction:
 - 1. Outdoors, Wet Damp areas, Corrosive areas: NEMA 4/4X, sunlight resistant fiberglass, polycarbonate, or stainless steel (SS) as specified on Drawings enclosure with continuous hinge covers.
 - a. Covers: Continuous SS hinge, held closed by SS screws
 - 2. Indoors exposed: NEMA 12, 13 or as specified on Drawings.
 - 3. Indoors flush wall-mounted: NEMA 1 w/ flush covers
 - 4. Indoors concealed: NEMA 1 w/ screw cover
 - 5. Indoors wet and damp: NEMA 4XSS
 - 6. Indoor corrosive areas: NEMA 4XSS or compatible with chemical
 - 7. Hazardous locations: NEMA 7

2.3 TERMINAL HINGED COVER ENCLOSURES

- A. Construction:
 - 1. Outdoor, Wet Damp areas, Corrosive areas: NEMA 4/4X, sunlight resistant fiberglass or polycarbonate, or SS as specified on Drawings enclosure with continuous hinge cover.
 - a. Covers: Continuous SS hinge, held closed by flush latch operable by screwdriver.
 - 2. Indoors exposed: NEMA 12, 13
 - 3. Indoors flush wall-mounted: NEMA 1 w/ flush covers
 - 4. Indoors concealed: NEMA 1 w/ screw cover
 - 5. Indoors wet and damp: NEMA 4XSS
 - 6. Indoor corrosive areas: NEMA 4XSS or compatible with chemical
 - 7. Hazardous locations: NEMA 7
- B. Provide white enamel interior metal panel for mounting terminal blocks and electrical components.

2.4 CABINETS

- A. Provide metal barriers to form separate compartments containing control wiring at less than 50 volts from power wiring.
- B. Provide accessory feet for free-standing equipment.

2.5 TERMINAL BLOCKS

- A. Manufacturers:
 - 1. Weidmüller SAK 6, SAK 2.5, ASK 1
 - 2. Allen-Bradley
 - 3. Phoenix Contact
 - 4. Square D
 - 5. Or equal
- B. Terminal Blocks: ANSI/NEMA ICS 4
- C. Power Terminals: Unit construction type with closed back and tubular pressure screw connectors, rated 600 volts.
- D. Signal and Control Terminals: Modular construction type, suitable for channel mounting, with tubular pressure screw connectors, rated 300 volts. Ground terminal shall be green.
- E. Provide ground bus terminal block, with each connector bonded to enclosure.
- F. Provide a typed legend of cables and terminal numbers with origin and destination.
- G. Boxes where water may drain from the attached conduits shall have drains installed in the bottom or the lowest point of the box. Conduit penetration at such boxes shall be located along the sides or top of the box. Conduits shall not be installed in a manner that water can enter attached pull conduits.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install Products in accordance with manufacturer's instructions.
- B. Install enclosures and boxes plumb. Anchor securely to wall and structural supports at each corner.
- C. Do not attach boxes directly to masonry, concrete, or brick walls but provide a ¼" spacer of PVC, nylon, or stainless steel.
- D. Install enclosures and boxes using stainless steel fasteners.
- E. Provide supports where required when no wall or other adequate support is available.

END OF SECTION 260534

SECTION 260553 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Nameplates and labels
- B. Wire and cable markers
- C. Conduit markers

1.2 REFERENCES

- A. NFPA 70 - National Electrical Code

1.3 SUBMITTALS

- A. Submit under provisions of Section 260500.
- B. Product Data: Provide catalog data for nameplates, labels, and markers.

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc.

PART 2 - PRODUCTS

2.1 NAMEPLATES AND LABELS

- A. Nameplates:
 - 1. Equipment Identification: Engraved three-layer laminated plastic, black letters on white background
 - 2. Emergency Powered Equipment: Engraved three-layer laminated plastic, black letters on red background, as required by NEC
 - 3. Equipment power source identification: Engraved three-layer laminated plastic, black letters on yellow background
- B. Locations:
 - 1. Each electrical distribution and control equipment enclosure.
 - 2. Junction box.

- C. Letter Size:
 - 1. Use 1/8-inch letters for identifying individual equipment and loads.
 - 2. Use 1/4-inch letters for identifying grouped equipment and loads.
- D. Labels: Embossed adhesive tape, with 3/16-inch white letters on black background. Use only for identification of individual wall switches and receptacles, and control device stations.

2.2 WIRE MARKERS

- A. Manufacturers:
 - 1. T & B Shrink-Kon HVM wire markers
 - 2. Panduit - Pan Code HSDL
 - 3. Brady
- B. Description: Tubing type wire markers
- C. Locations: Each conductor at panelboard gutters, outlet and junction boxes, terminal strip and each load connection.
- D. Legend:
 - 1. Power and Lighting Circuits: Branch circuit or feeder number indicated on Drawings.
 - 2. Control Circuits: Control wire number indicated on schematic and interconnection diagrams on drawings or on shop drawings.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive nameplates and labels.

3.2 APPLICATION

- A. Install nameplate parallel to equipment lines.
- B. Secure nameplate to equipment front using stainless steel screws, rivets, or adhesive.
- C. Identify underground conduits using foil backed underground warning tape. Install one tape per trench at 6 inches below finished grade.

END OF SECTION 260553

SECTION 262213 - DRY-TYPE TRANSFORMERS (600V AND LESS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following types of dry-type transformers rated 600 V and less, with capacities up to 1000 kVA:
 - 1. Distribution transformers.
 - 2. Control and signal transformers.

1.3 SUBMITTALS

- A. Product Data Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer indicated.
- B. Shop Drawings: Wiring and connection diagrams.
- C. Source quality-control test reports.
- D. Output Settings Reports: Record of tap adjustments specified in Part 3.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with IEEE C 57.12.91.
- C. Energy-Efficient Transformers Rated 15 kVA and Larger: Certified as meeting NEMA TP 1, Class 1 efficiency levels when tested according to NEMA TP 2.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.

1.6 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.
- B. Coordinate installation of wall-mounting and structure-hanging supports.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical
 - 2. Siemens Energy & Automation, Inc.
 - 3. Square D/Schneider Electric
 - 4. Engineer Approved Equal

2.2 MATERIALS

- A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.
- B. Cores: Grain-oriented, non-aging silicon steel.
- C. Coils: Continuous windings without splices, except for taps.
 - 1. Internal Coil Connections: Brazed or pressure type.
 - 2. Coil Material: Copper.

2.3 DISTRIBUTION TRANSFORMERS

- A. Comply with NEMA ST 20, and list and label as complying with UL 1561.
- B. Cores: One leg per phase.
- C. Enclosure: Ventilated, drip-proof, NEMA 250, Type 2.
- D. Indoor Transformer Enclosure Finish: Comply with NEMA 250 for "Indoor Corrosion Protection."
- E. Finish Color: Gray.
- F. Insulation Class: 220°C, UL-component-recognized insulation system with a maximum of 150°C rise above 40°C ambient temperature.
- G. Taps for Transformers Smaller Than 3 kVA: One 5 percent tap above normal full capacity.
- H. Taps for Transformers 7.5 to 24 kVA: One 5 percent tap above and one 5 percent tap below normal full capacity.

- I. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and four 2.5 percent taps below normal full capacity.
- J. Select features from six paragraphs and associated subparagraphs below. Coordinate with Drawings.
- K. Electrostatic Shielding: Each winding shall have an independent, single, full-width copper electrostatic shield arranged to minimize interwinding capacitance.
 - 1. Arrange coil leads and terminal strips to minimize capacitive coupling between input and output terminals.
 - 2. Include special terminal for grounding the shield.
 - 3. Shield Effectiveness:
 - a. Capacitance between Primary and Secondary Windings: Not to exceed 33 picofarads over a frequency range of 20 Hz to 1 MHz.
 - b. Common-Mode Noise Attenuation: -120 dBA, minimum at 0.5 to 1.5 kHz; -65 dBA, minimum at 1.5 to 100 kHz.
 - c. Normal Mode Noise Attenuation: -52 dBA, minimum at 1.5 to 10 kHz.
- L. Wall Brackets: Manufacturer's standard brackets.

2.4 CONTROL AND SIGNAL TRANSFORMERS

- A. Description: Self-cooled, two-winding dry type, rated for continuous duty, complying with NEMA ST 1, and listed and labeled as complying with UL 506.
- B. Ratings: Continuous duty. If rating is not indicated, provide at least 50 percent spare capacity above connected peak load.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.
- B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.
- C. Examine walls and floors for suitable mounting conditions where transformers will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install wall-mounting transformers level and plumb with wall brackets fabricated by transformer manufacturer.

- B. Install floor-mounting transformers level on concrete bases not less than 2 inches larger in both directions than supported unit and 4 inches high.

3.3 CONNECTIONS

- A. Ground equipment according to Division 26 Section "Grounding and Bonding".
- B. Connect wiring according to Division 26 Section "Conductors and Cables".
- C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 ADJUSTING

- A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 5 percent. Submit recording and tap settings as test results.
- B. Output Settings Report: Prepare a written report recording output voltages and tap settings.

END OF SECTION 262213

SECTION 262419 - MOTOR CONTROL CENTERS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope:
 - 1. Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install motor control centers.
- B. Coordination:
 - 1. Obtain motor nameplate data on existing equipment or new equipment being furnished for properly sizing circuit breakers, starters and overloads.
 - 2. Obtain data on motor space heater and other accessories for properly sizing control power transformers.
- C. Related Sections:
 - 1. Section 260553, Electrical Identification
 - 2. Section 264313, Transient Voltage Suppression

1.2 REFERENCES

- A. Standards referenced in this Section are:
 - 1. NEMA ICS 18-2001, Motor Control Centers
 - 2. International Electrical Testing Association, (NETA) Acceptance Testing Specification
 - 3. UL 845, Motor Control Centers
 - 4. ANSI C37.2, Standard Electrical Power System Device Function Numbers

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements
 - 1. NEC Article 430, Motors, Motor Circuits, and Controllers
- B. Field Quality Control: Field acceptance testing of motor control centers will be manufacturer service tests.
- C. Test Equipment, Calibration and Reporting: All test equipment, instrument calibration and test reports shall be in accordance with latest edition of NETA Acceptance Testing Specifications.

1.4 SUBMITTALS

- A. Shop Drawings: Submit the following:
 - 1. Product Data: Manufacturer specifications, cut sheets, dimensions, and technical data for all components, materials, and equipment proposed.
 - 2. Outline and summary sheets with schedules of equipment in each unit.

3. One-line diagrams indicating circuit breaker sizes, bus rating, motor controller ratings, and other pertinent information to demonstrate compliance with the Contract Documents.
 4. Unit control schematic and elementary wiring diagrams showing numbered terminal points and interconnections to other units.
- B. Test Plans and Reports: Thirty days in advance of actual factory and field testing, submit proposed testing methods, procedures, and apparatus. Submit reports of completed factory and field testing, including procedures and test results.
- C. Operation and Maintenance Data:
1. Submit complete installation, operation and maintenance manuals including test reports, maintenance data and schedules, description of operation, and spare parts information.
 2. Manuals shall include record drawings of control schematics, including point-to-point wiring diagrams.
 3. Furnish operation and maintenance manuals per Section 017823, Operation and Maintenance Data.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Delivery:
1. Deliver materials to the Site to ensure uninterrupted progress of the Work.
 2. Shipping containers shall be designed to be shipped by truck, rail, or ship. Indoor containers shall be bolted to skids. Breakers and accessories shall be packaged and shipped separately.
 3. Inspect motor control centers for shipping damage or loose parts upon delivery. Check for evidence of water that may have entered equipment during transit.
- B. Handling:
1. Lift, roll or jack motor control center equipment into locations shown.
 2. Motor control centers shall be equipped to be handled by crane. Where cranes are not available equipment shall be suitable for placement on rollers using jacks to raise and lower the groups.
- C. Storage:
1. Store motor control center equipment in a clean, dry location with controls for uniform temperature and humidity. Protect equipment with coverings and maintain environmental controls.

1.6 MAINTENANCE

- A. Spare Parts:
1. Furnish, tag, and box for shipment and long-term storage the following spare parts and special tools for each motor control center lineup:

Item	Quantity per Switchgear Lineup
a. Starters and feeder breakers	Quantities and sizes as shown
b. Fuses	Six of each type and size used
c. Auxiliary control relays	Two, with at least two normally open and two normally closed contacts
d. Control power transformers	Two of each size used
e. Indicating lamps	Twelve
f. Covers for indicating lamps	Six of each color used
g. Starters: Contact kits for Size 1 motor starter	Five sets
h. Starters: Contact kits for Size 2, Size 3, and Size 4 motor starters	One set of each size

- B. Furnish a list of additional recommended spare parts for an operating period of one year. Describe each part, the quantity recommended and current unit price.
1. Package spare parts in suitable containers bearing labels clearly indicating the contents and equipment with which they are to be used. Deliver spare parts at the same time as the motor control centers.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Provide products of one of the following:
1. Schneider Electric/Square D
 2. Eaton
 3. Allen-Bradley
 4. ABB
 5. Siemens
 6. Or equal

2.2 MATERIALS

- A. General: Motor Control Center lineups shall be provided as shown with the following ratings:
1. Service: Voltage rating and number of wires shall be as shown on Drawings. Motor control center shall operate from a three-phase, 60 Hertz system.
 2. Wiring: NEMA Class II, Type B

3. Enclosure: NEMA 1, or as shown on Drawings
4. Interrupting Capacity Rating: Motor control center shall have an interrupting capacity rating above available fault current, as noted on the Drawings. Devices shall be suitable for minimum rating noted.
5. Motor Control Center lineups shall be UL rated as suitable for service entrance where shown on Drawings and as required.

B. Construction:

1. Totally enclosed structure, dead front, consisting of nominal 15- or 20-inch deep, 20-inch wide, 90-inch high vertical sections bolted together to form a unit assembly
2. Vertical sections shall have side sheets extending the full height and depth of section
3. Removable lifting angles for each shipping section
4. Two removable floor sills for mounting
5. Horizontal wireways top and bottom, isolated from horizontal bus and readily accessible
 - a. Wireway openings between sections shall have rounded corners and rolled edges.
6. Isolated vertical wireways with cable supports, accessible through hinged doors, for each vertical section.
 - a. Wireway shall be separate from each compartment and remain intact when compartment is removed.
7. All metal non-conducting parts shall be electrically continuous

C. Bus System:

1. Rating: Bus bracing and bus current capacities above available fault current, as noted on drawings.
2. All bus bars tin-plated-copper rated UL heat rise standards
3. Bus bar connections easily accessible with simple tools
4. Main Horizontal Bus:
 - a. Continuous edge mounted, and isolated from wireways and working areas.
 - b. Bus shall be mounted in vertical center of motor control center to provide easy access and even heat distribution.
 - c. Bus shall be supported, braced, and isolated by a high strength, non-tracking, glass-filled polyester material.
5. Vertical Bus:
 - a. Continuous, and isolated by a glass polyester barrier
 - b. Rated for 300 amperes continuous minimum, and at least equal to the full load rating of all installed units in the associated stack.
6. Grounding Bus: Full length mounted across the bottom, drilled with lugs of appropriate capacity as required

D. Unit Compartments:

1. Provide individual front door for each unit compartment. Door shall be fastened to stationary structure, not the unit itself, so that door can be closed when unit is removed.
2. Starter and feeder unit doors interlocked mechanically with unit disconnect device to prevent unintentional opening of door while energized and unintentional application of power while door is open, with provisions for releasing interlock for intentional access and application of power.

3. Padlocking arrangement permitting locking disconnect device in the “OFF” position with at least three padlocks with door closed or open.
4. Compartments shall be equipped as indicated on the Drawings:
 - a. Blank compartments, unused space, and compartments shown on Drawings as “SPACE” shall have bus covers and be complete with all necessary hardware for future installation of a plug-in unit.
 - b. Provide shutters for each compartment that automatically open when unit is inserted and automatically close when unit is removed.
5. Provide wiring and device identification:
 - a. Identify compartment doors, devices, and field wiring in accordance with Section 260553, Electrical Identification.
 - b. Identify all internal control conductors with permanent-type wire markers. Each wire shall be identified by a unique number attached to it at each termination point.
 - c. Identify all internal control devices with permanent-type markers. Each device shall be identified by a unique number attached to each device.
 - d. Numbering system for each wire and control device shall be identified on the wiring diagrams and shall reflect the actual designations used in the Work.
6. The minimum motor starter size shall be NEMA 1. Starter units shall be completely-draw-out-type in Sizes 1 and 2 and draw-out-type-after-disconnecting-power-leads-only in Sizes 3 and 4.
7. Motor starters shall be NEMA rated and include a magnetic contactor with encapsulated magnet coils. Wound coils are unacceptable. All control shall be 120 volts AC unless noted otherwise.
 - a. Starters shall be full voltage non-reversing unless shown otherwise on Drawings.
 - b. Reduced Voltage Solid-State Starter:
 - 1) General:
 - a) Provide solid-state, stepless, current limiting, soft-start motor controllers (RVSS) as shown on Drawings.
 - b) RVSS shall include an overload relay and a bypass contactor.
 - c) Provide subsystems that will protect RVSS from damage due to over-current and over-voltage
 - d) Current Rating: 115 percent of motor nameplate rated current, continuous, minimum
 - 2) Required Features:
 - a) Adjustable current limit of not more than 250 percent of motor nameplate full load current throughout entire motor acceleration period including first three cycles of voltage waveform from the instant the start signal is engaged
 - b) Adjustable voltage acceleration, from 2 to 30 seconds
 - c) Adjustable voltage deceleration, from 2 to 30 seconds
 - d) Phase loss detection
 - e) LED diagnostic indicators
 - f) Static over-current and over-voltage trip
 - g) Phase reversal, line or fuse loss, and under-voltage protection
 - h) Power unit over temperature protection
 - i) Motor inverse time overload protection

- j) Input line transient over-voltage protection
- 3) Enclosure:
 - a) Cooling fans, if required, shall incorporate anti-friction bearings and internal impedance type motor protection.
 - b) If cooling fans are used, the enclosure for that section shall be NEMA 12 FVF, or NEMA 12 EFVFF force ventilated with filters, per NEMA Standard ICS1-110, installed by motor control center manufacturer.
- 4) On start-up, start driven equipment at zero current and allow driven equipment to accelerate to maximum speed without exceeding the set current limit.
- 5) On normal shutdowns, ramp driven equipment down at set deceleration rate that is non-regenerative for motor prior to shutdown.
- 6) On emergency shutdowns, remove power to motor.
- 7) Diagnostic LEDs: Provide LED pilot lights on unit front that indicate the following:
 - a) Control Power On
 - b) Motor Power On
 - c) Motor Starting
 - d) Motor Fault
 - e) RVSS Fault
- 8) Control Outputs:
 - a) Control output shall be electrically isolated, dry, normally open SPDT contacts, rated 10 amps at 120 volts AC.
 - b) Provide the following control outputs:
 - (1) Motor Running
 - (2) Motor Fault
 - (3) RVSS Fault
- 8. Overload Relays: Provide an overload relay for each motor starter. Overload relays shall be in accordance with the following:
 - a. Electronic Overload Relays: Relays shall be electronic type. Electronic relays shall be multi-function, adjustable, current sensing type and include overload, phase-unbalance, phase-loss, and equipment type ground fault in one package.
 - b. Each overload relay shall be manual reset type and shall include provisions for resetting by an insulated button on front of starter unit door.
 - c. Each overload relay shall include a normally open auxiliary contact for remote alarm purposes.
 - d. Each overload relay shall be sized for full-load amperes and service factor of actual motors installed.
- 9. Individual control power transformers for all starters, capacity as required for all control circuit devices, 100 VA minimum, Class A insulation, two primary fuses, 120 volt secondary, one secondary fuse, and the other secondary leg grounded.
- 10. Separate Control: Where control power to starter is provided by a separate power source, a control power fuse shall be provided in unit and main disconnect shall be equipped with a normally open contact to isolate control circuit from source when controller disconnect is open.

11. Motor horsepowers shown are per existing available documentation and shall be verified in field by Electrical Contractor to ensure proper construction of new control units. Circuit breaker trips and starter overload heaters to be coordinated with the actual equipment installed.
12. Auxiliary contacts, relays, and timers as required for specified control functions shall be verified in field by the Electrical Contractor's review of the existing starter units to ensure new starter units' construction offer the same functions.
13. Current Sensing Devices:
 - a. Current Switch:
 - 1) Produces a dry contact output when load current exceeds set point
 - 2) Suitable for use measuring current on motor leads of 480-volt, 60 Hertz, up to 150 amps, continuous
 - 3) Variable trip point and time delay, trip point adjustable via calibrated dial
 - 4) Monitors currents from 10 mA to 150 amps AC
 - 5) Output relay (Form C), contacts rated up to 20 amps
 - 6) LED trip status indicator
 - 7) Dead band, prevents relay chatter
 - 8) Contact Material: Silver-cadmium oxide
 - 9) Mechanical Life: 10 million operations, typical at rated load
 - 10) Electrical Life: 100,000 operations, typical at rated load
 - b. Current Transducer:
 - 1) Produces 4 -20 mA DC output current proportional to the input RMS AC motor load current.
 - 2) Loop-powered
14. All starter devices, including spare contacts, wired to numbered terminal blocks
15. Terminal blocks for field connections to unit compartments shall be plug-in/pull apart type. Terminals shall be fully accessible from the front and mounted near the front of vertical wireway.
16. Control devices shall be 600-volt heavy duty, NEMA A600. Relays shall have convertible contacts. Pilot devices shall be oiltight. Pilot lights shall be full-voltage type or transformer type with six-volt secondary with the same type utilized throughout the whole MCC.
17. Feeder Circuit Breakers: Thermal magnetic type
 - a. Circuit breakers of 100 ampere frame or smaller shall be mounted in a dual-mount compartment (two breakers in one space factor) or shall mount in one-half space factor, unless otherwise indicated on Drawings.
18. Motor Starter Circuit Breakers: Magnetic trip only motor circuit protectors
19. Provide the following diagrams and tables inside of door for each compartment:
 - a. Elementary wiring diagram
 - b. Table of overload heater sizes with correct heater highlighted
 - c. Table of motor circuit protector settings with correct setting highlighted
20. Where shown on Drawings, incorporate a solid-state protective relaying package (SSPRP) into motor starter for motor protection. Unit shall incorporate the following ANSI C37.2 device function numbers and selectable indications and communication modules:

- a. Product and Manufacturer:
 - 1) GE MultiLin SR469
 - 2) Or equal
- b. Motor Protection Device Functions:
 - 1) Stator winding over-temperature (Device 49)
 - 2) Short circuit (Device 50)
 - 3) Motor overload (Device 49/50/51)
 - 4) Locked rotor - multiple start (Device 48)
 - 5) Phase reversal (Device 46)
 - 6) Ground fault (Device 50G/51G)
 - 7) Mechanical jam
 - 8) Unbalance/negative sequence currents (Device 46)
 - 9) Undercurrent (Device 37)
 - 10) Motor bearing over-temperature (Device 38)
 - 11) Thrust bearing over-temperature (Device 38)
 - 12) Overvoltage (Device 59)
 - 13) Undervoltage (Device 27)
 - 14) Voltage sequence (Device 47)
 - 15) Main trip and lockout output relay (Device 86)
 - 16) Alarm output relay (Device 74)
- c. Selectable Indications:
 - 1) Average motor current
 - 2) Average motor temperature
 - 3) Motor current for each of the three phases
 - 4) Motor temperature readout for six winding RTDs
 - 5) Motor thrust-bearing temperature readout for two bearing RTDs
 - 6) Ground fault current
 - 7) Percent of motor capacity used
 - 8) Line-to-line and line-to-neutral voltages, all three phases
 - 9) Average 15-minute kVA
 - 10) Average 15-minute kW
 - 11) Average 15-minute kVAR
 - 12) Maximum percent full load current since initial startup
 - 13) Hottest RTD and temperature since initial startup
 - 14) Highest percent current unbalance since initial startup
 - 15) Highest ground fault current since initial startup
 - 16) Highest motor bearing temperature since initial startup
 - 17) Highest load bearing temperature since initial startup
 - 18) Maximum line voltage since start
 - 19) Minimum line voltage since start
 - 20) Number of motor starts attempted
 - 21) Number of motor starts completed
 - 22) Hours of operation
 - 23) Number of trips from each of ten protective functions
 - 24) All measured values at the time of a motor trip
 - 25) Values that have been loaded for system inputs and trip points

- d. Communication Module: industrial control network capable of uploading all the above protective function attitudes and all the above listed selectable indications upon being queried by a host PLC connected through compatible network communication port.
- 21. Main and Tie Circuit Breakers: Thermal magnetic molded case type, unless shown otherwise. Where shown, main and tie breakers shall be equipped with key interlocking. Interlocking shall allow only two of the three breakers to be closed at a time. Provide all locks and keys as required. Main circuit breakers shall be 100 percent amperage rated. Circuit breakers with frame ratings 800 amps and greater shall be electronic type with adjustable parameters and ground fault protection.
- E. Surge Protection Device (SPD) Unit:
 - 1. Provide an integral SPD unit for each motor control center. SPD unit shall comply with Section 264313 - Transient Voltage Suppression.

2.3 MAIN METERING DEVICE

- A. Provide a main metering device as shown on Drawings.
 - 1. Microprocessor based monitoring device shall provide complete electrical metering in one package. Device shall include self-contained potential transformers and self-protected internal fuses.
 - 2. Device shall be mounted on compartment door to allow operator access to meter menu and display.
 - 3. Device shall include trend analysis, event logging, and recording. Device shall also include the following direct reading metered values:
 - a. Volts: 0.2 percent accuracy
 - b. Amperes: 0.2 percent accuracy
 - c. Watts, Vars and VA: 0.5 percent accuracy
 - d. Power Factor: 1.0 percent accuracy
 - e. Frequency: 0.05 percent accuracy
 - f. Watt-, and VA-hours: 0.5 percent accuracy
 - g. Var-hours: 1.0 percent accuracy
 - h. Watt, Var and VA Demand: 0.4 percent accuracy
 - i. THD-Voltage: 50th harmonic
 - j. THD-Current: 50th harmonic
 - k. Individual Ampere Harmonics: 50th harmonic
 - l. Individual Voltage Harmonics: 50th harmonic
 - 4. Metering device shall have the following additional features:
 - a. Trend analysis that shall display minimum and maximum values for each metered parameter with date and time of each occurrence.
 - b. Input range of device shall accommodate external current transformers with ranges from 100/5 to 5000/5 and potential transformers from a ratio of 120:120 to 500,000:120. Three current transformers suitably rated shall be included.
 - c. Alarm contacts rated five amps at 120 VAC.
 - d. Three analog outputs programmable to reflect the metered parameters, except kilowatt hours and kilovar hours.
 - e. Communication capability, using RS-485, Modbus RTU Protocol.

5. Control power shall be drawn from monitored incoming AC line. Device shall have non-volatile memory and not require battery backup. During a power failure, device shall retain preset parameters.

2.4 SOURCE QUALITY CONTROL

- A. Perform factory tests on individual motor control units prior to shipment. Tests shall include manufacturer's standard tests, including:
 1. Physical inspection and checking of all components
 2. Mechanical operation and device function tests
 3. Primary, control, and secondary wiring hi-pot tests
- B. Factory tests as outlined above shall be witnessed by the OWNER's representative:
 1. The manufacturer shall notify the OWNER two (2) weeks prior to the date the tests are to be performed.
 2. The manufacturer shall include the cost of transportation and lodging for up to three (3) OWNER's representatives.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine conditions under which Work is to be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.
- B. Electrical Contractor shall verify and document all existing components and wiring terminations of each Motor Control unit to be replaced within existing Motor Control Centers as shown on Drawings for proper construction of replacement control units.

3.2 INSTALLATION

- A. Install motor control centers on concrete bases in accordance with the Contract Documents and manufacturer's recommendations and instructions.
- B. Do not provide openings in top or side of motor control centers not required for conduit.
- C. Cable circuits together within enclosures and identify with durable tag secured to cabling twine.
- D. Set motor circuit protectors at lowest setting that allows motor starting without nuisance tripping.
- E. Verify that wiring diagrams on inside of door of each compartment reflect the circuitry actually provided and that correct overload heater size and motor circuit protector settings are noted.

- F. Install in conformance with the manufacturer's recommendations, governing codes, and the Contract Documents.
- G. Connections to existing facilities shall be coordinated with Owner's operations.
- H. Verify that all conductors, power and control, have been properly identified per Specification Section 260553.

3.3 FIELD QUALITY CONTROL

- A. Perform field testing and inspection of motor control centers. Inspect and test each motor control center after installation. All testing and inspection shall be in accordance with the manufacturer's recommendations and be performed by manufacturer's factory-trained representative, who shall inform OWNER and ENGINEER when equipment is correctly installed. Do not energize equipment without permission of OWNER.
- B. Perform the following minimum tests and checks before energizing equipment:
 - 1. Verify all overload and device settings.
 - 2. Inspect all mechanical and electrical interlocks and controls for proper operation.
 - 3. Check tightness of bolted connections.
 - 4. Measure insulation resistance of each bus section, phase-to-phase and phase-to-ground.
 - 5. Measure insulation resistance of each starter, phase-to-phase and phase-to-ground.
 - 6. Measure insulation resistance of each control circuit with respect to ground.
 - 7. Perform other tests recommended by equipment manufacturer.

3.4 MANUFACTURER SERVICES

- A. Manufacturer Services:
 - 1. Unloading and Installation: Manufacturer's factory-trained representative shall be present during unloading of the equipment and installation in the equipment's final location. Representative shall train installing personnel in advance in the proper handling and rigging of the equipment.
 - 2. Manufacturer's factory-trained representative shall test the system as specified in Article 3.3 of this Section. Representative shall operate and test the system in the presence of ENGINEER and verify that the equipment conforms to requirements.
 - 3. Manufacturer's factory-trained representative shall adjust the system to initial settings as specified in Article 3.5 of this Section.
 - 4. Representative shall revisit the Site as often as necessary until all deficiencies are corrected, prior to readiness for final payment.
 - 5. Provide services of manufacturer's factory-trained representatives to correct defective Work within 72 hours of notification by OWNER during the Correction Period specified in the General Conditions as amended by the Supplementary Conditions.
 - 6. Replacement parts or equipment installed during the Correction Period shall be equal to or better than the original.

- B. Training: Furnish services of qualified factory trained specialists from manufacturer to instruct OWNER's operations and maintenance personnel in recommended operation and maintenance of the products.

3.5 ADJUSTING

- A. Calibrate, set, and program all protective devices. Coordinate protective devices furnished under this Specification section and provide proper settings of all devices.

END OF SECTION 262419

SECTION 262923 - VARIABLE FREQUENCY DRIVES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, services, and incidentals as shown, specified, and required to furnish and install variable frequency drives, complete and operational.
2. Variable frequency drives required under this Section are low-voltage, voltage source inverter, pulse width modulated. Variable frequency drives shall be customized.

B. Where variable frequency drives are being provided by the vendor of the associated driven equipment, costs for variable frequency drives shall be included in the lump sum price for said equipment. Where variable frequency drives are not being provided by the vendor of the associated driven equipment, costs for variable frequency drives shall be included in the general contract price.

C. Related Sections:

1. Section 260553, Electrical Identification
2. Section 260520, Shielded Cable

1.2 REFERENCES

A. Standards referenced in this Section are:

1. IEEE 519, Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems
2. ISO 9000, Quality Management Systems, Fundamentals and Vocabulary
3. ISO 9001, Quality Management Systems, Requirements
4. ISO 9002, Quality Systems, Model for Quality Assurance in Production, Installation and Servicing
5. NEMA AB 1, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures
6. NEMA ICS 2, Industrial Control and Systems, Controllers, Contactors and Overload Relays Rated 600 Volts
7. NEMA ICS 7, Industrial Control and Systems Adjustable Speed Drives
8. NEMA MG 1, Motor and Generator Standard
9. UL 508, Industrial Control Equipment

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer:

- a. Variable frequency drive manufacturer shall have at least five years of experience designing and regularly manufacturing and servicing substantially similar equipment to that specified, and shall submit documentation upon request of at least five installations in satisfactory operation for at least five years.
- b. Manufacturer shall be certified under ISO 9000, ISO 9001, or ISO 9002 for materials and equipment specified.
- c. For all required factory tests, variable frequency drive manufacturer shall use a factory test facility that has calibrated its testing apparatus in the previous twelve months, and is staffed by qualified, experienced technicians.

B. Component Supply and Compatibility:

1. Drives specified under this Section shall employ a low switching frequency or pattern to minimize instantaneous rate of voltage change over time (dv/dt), and the adverse effects of potential bearing currents. Where alternate manufacturers are proposed, obtain manufacturer recommendations regarding bearing currents and provide equipment required at no additional cost to OWNER.
2. Each variable frequency drive shall be totally compatible with associated driven equipment and motors. Variable frequency drives shall be matched to specific load requirements for each system. Operation of variable frequency drive shall not overstress motor insulation.
3. Similar components of drives associated with each system shall be products of a single manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:

- a. Dimensional information and construction details of enclosures. Enclosure details shall consist of exterior and interior front door with nameplate legends, interior door front and rear views, and terminal block layout.
- b. Three-line power and control schematic diagrams.
- c. Wiring diagrams showing the interconnection of conductors to all devices with terminal assignments for remote devices.
- d. Functional description of system operation.
- e. VFD heat dissipation at full load, including heat rejection/cooling system.
- f. Preliminary Harmonic analysis shall utilize:
 - 1) I_L shall be 80% of the connected load.
 - 2) The point of common coupling (PCC) shall be the first main breaker of the motor control center which the VFD is powered from.
 - 3) The level of harmonics at the PCC described above shall not exceed IEEE 519 limits.

2. Product Data:

- a. Technical specifications
- b. Catalog cuts and product literature

3. Testing Plans:
 - a. At least thirty days prior to source quality control testing, submit descriptions of proposed shop testing methods, procedures, and apparatus.
 - b. At least thirty days prior to field quality control testing, submit descriptions of proposed field testing methods, procedures, and apparatus.
- B. Informational Submittals: Submit the following:
 1. Certificates:
 - a. Certification letters from variable frequency drive manufacturer and motor manufacturer that the approved driven equipment has been reviewed and that variable frequency drive units and motors are compatible and shall be provided in accordance with the Contract Documents and requirements of the driven equipment.
 2. Source Quality Control Submittals:
 - a. Within 14 days of completing source quality control tests and inspections, submit test results with indication of whether all criteria of the Contract Documents for the specified equipment were met.
 3. Field Quality Control Submittals:
 - a. Within 14 days of completing field quality control tests and inspections, submit test results with indication of whether all criteria of the Contract Documents for the specified equipment were met.
 4. Manufacturer Reports:
 - a. Preliminary and final harmonic analysis.
 - b. Within 14 days of each visit to the Site by manufacturer's representative, submit written report of reason for visit, problems encountered, solutions implemented, and remaining work.
 5. Qualifications Statements:
 - a. Manufacturer
- C. Closeout Submittals: Submit the following:
 1. Operation and Maintenance Data:
 - a. Submit complete installation, operation and maintenance manuals including test reports, maintenance data and schedules, description of operation, list of recommended spare parts, and spare parts ordering information.
 - b. Manuals shall include record drawings of control schematics, including point-to-point wiring diagrams.
 - c. Comply with Section: Operation and Maintenance Data.
 - d. Field report of final harmonic testing
- D. Maintenance Materials Submittals: Submit the following:
 1. Spare Parts and Extra Stock Materials:
 - a. Furnish, tag, and box for shipment and long-term storage, spare parts and special tools for variable frequency drives. Each spare part set shall include manufacturer's recommended spare parts inventory for one year and include, at minimum, the following:

Item	Quantity per Four VFDs per HP Rating
1) Transistor and diode modules with accessories	One set
2) Power supply module	One
3) Fans	One set
4) Power fuses	One set of each size and type used
5) Control power fuses	Two sets of each size and type used
6) Pilot lights	Two per ten of each type used

2. Furnish a list of recommended spare parts for an operating period of one year. Describe each part, the quantity recommended, and current unit price.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.
2. Shipping containers shall be designed to be shipped by truck, rail, or ship. Indoor containers shall be bolted to skids.
3. Inspect variable frequency drive equipment for shipping damage or loose parts upon delivery. Check for evidence of water that may have entered equipment during transit.

B. Handling:

1. Lift, roll or jack variable frequency drive equipment into locations shown.
2. Variable frequency drives shall be equipped for handling required for installation. Handle equipment in accordance with manufacturer's requirements.

C. Storage:

1. Store variable frequency drive equipment in a clean, dry location with controlled, uniform temperature and humidity. Protect equipment with coverings and maintain environmental controls.

PART 2 - PRODUCTS

2.1 EQUIPMENT PERFORMANCE

A. System Performance:

1. Driven equipment to be controlled by a variable frequency drive shall be provided with a customized variable frequency drive. Each drive unit shall include an adjustable frequency controller with associated controls for continuous speed adjustment and protection of the driven equipment. Output speed control of the driven motor shall be continuous throughout a speed range of 2 to 60 Hertz under variable torque load or constant torque as specified for the driven equipment.
2. Variable frequency drives associated with each set of driven equipment shall be similar to each other.

3. Variable frequency drives shall be UL-listed or ETL-listed and designed, built, and tested in accordance with NEMA AB 1, NEMA ICS 2, NEMA ICS 7, and UL 508.
4. The VFD shall not emit harmonics that exceed IEEE 519 limits at the PCC.
5. The point of common coupling for all VFDs to be tested and conform to IEEE 519 harmonic limits will be considered the first point of connection to the electrical system, be that the motor control center that the VFD power is being supplied from and not the utility connection point.

2.2 MANUFACTURERS

- A. Provide variable frequency drives by one of the following:
 1. Allen-Bradley

2.3 EQUIPMENT

- A. Provide each variable frequency drive with freestanding or wall hanging, front-access, NEMA 1, filtered and gasketed enclosure. Enclosure shall house all components required for the associated variable frequency drive.
- B. Enclosure shall provide adequate cooling for components within and include positive ventilation.
- C. Enclosure shall include circuit breaker disconnect switch. Circuit breakers shall be in accordance with NEMA AB 1. Switch handle shall be suitable for padlocking and be through-the-door type with handle height not exceeding six feet. Operation of switch shall remove the service supply from all internal components. Power devices shall be suitable for interrupting capacity matching that of the upstream Power source in symmetrical amperes. Include current limiting semi-conductor fuses where required for protection of solid-state components. Enclosures without circuit breaker disconnect switches shall instead include unfused disconnect switches rated for the appropriate interrupting current as shown on the drawings or described elsewhere in the contract documents.
- D. Enclosure door shall include an operator interface for access to controller's digital keypad and display.
- E. Equip enclosure front with nameplates for identification of equipment and operating functions. Nameplates shall be in accordance with Section 260553, Electrical Identification.
- F. Equip enclosure with phenolic type terminal blocks suitably labeled for all internal and remote wiring requirements, plus twenty percent spare.
- G. Data shall be formatted as required to communicate with the plant SCADA system. The VFD's shall communicate via-Ethernet TCP/IP. The manufacturer shall coordinate with the plant integrator to map data for SCADA interface.

2.4 ADJUSTABLE FREQUENCY CONTROLLER

- A. General:

1. Adjustable frequency controller shall be microprocessor-based, pulse width modulated design, suitable for operation on a 480-volt, three-phase supply. Controller shall produce an adjustable AC voltage/frequency output to vary speed of driven equipment. Controller shall consist of the following sections:
 - a. The drive shall be a PWM (Pulse Width Modulated) inverter using IGBT transistors.
2. Controller switching frequency shall be adjustable and allow operation at 5,000 Hertz or less. Controller technology shall include a switching scheme that reduces the dV/dt of output supply.
3. Equip controller with a DC bus reactor or input line reactor as required to keep equipment line harmonics to a minimum.
4. Controller's solid-state converter input section switching devices shall have 1600-volt PIV rating.
5. Overload rating of 110 percent variable torque, 150 percent constant torque for one minute.
6. RMS harmonic content of output current shall be less than five percent of fundamental current.
7. Able to withstand output terminal line-to-line short circuits without component failure.

B. Operating Criteria:

1. Operating criteria shall be in accordance with the following:
 - a. Ambient temperature range of zero to 40 °C.
 - b. Operational humidity of up to 90 percent non-condensing.
 - c. Altitude up to 3,300 feet above sea level.
 - d. Nominal voltage of 480-volts plus or minus ten percent, three-phase, three-wire. Include an under-voltage feature to allow trip-free operation down to 35 percent undervoltage.
 - e. Nominal frequency of 60 Hertz plus or minus three Hertz.
 - f. Input power factor of 95 percent displacement power factor at all operating speeds.
 - g. Efficiency of 96 percent at full speed and full load.

C. Features:

1. Controller shall have the following features:
 - a. Digital keypad and display module shall provide parameter setting, adjustments, and monitoring of control functions and faults. Display messages shall be in English.
 - b. Serial communication port shall allow connecting to programmable controller interface using manufacturer standard protocol.
 - c. Independent acceleration/deceleration rates shall provide two to 600 seconds minimum. When called to stop, motor shall decelerate to minimum speed before stopping.
 - d. Power loss feature shall allow five cycle ride-through capability for input supply interruptions.
 - e. Time delay automatic restart shall allow restart after controller fault conditions have been cleared with programmable attempts.
 - f. Coasting motor restart shall allow controller to restart into a coasting motor without damage or tripping. Coasting motor restart feature shall allow

switching from bypass mode to variable frequency drive mode while operating without shutdown.

- g. Isolated control inputs and outputs.

D. Protection:

1. Controller shall have protective functions as follows:
 - a. Input line metal oxide varistor transient protection
 - b. Electronic over-current trip, instantaneous and inverse-time overload protection with thermal memory retention
 - c. Over-temperature trip temperature protection
 - d. Current limit trip protection
 - e. Input line over- and under-voltage trip protection
 - f. Ground fault trip protection

E. Power Line Considerations:

1. The drive shall be designed to operate in accordance with all performance requirements of the contract documents from a power source that contains a maximum of 5% total voltage harmonic distortion, meet current distortion as defined by IEEE-519-1992.
2. Each VFD or multiple sets of VFDs shall be designed and installed such that: the total voltage harmonic distortion reflected back to the power source is a maximum of 5%.
3. When line reactors and harmonic filters are required they shall be provided by VFD supplier and shall be rated for, and compatible with, each VFD. They shall function as a complete system. Additional harmonic filters beyond those shown on drawings may be required in order to comply with the above parameters. The line reactors and harmonic traps shall be mounted inside the respective VFD enclosures. Traps shall be current limiting and fuse-protected as a minimum and shall protect internal wiring and components on each phase. Data on these items shall be included with VFD shop drawings.
4. The VFD supplier shall perform a computer simulated power system study to verify compliance with the parameters as stated herein. The results of this study shall be submitted to the engineer. At a minimum, the submitted results of this study shall include:
 - a. Results summary sheet which briefly describes the power system configuration analyzed and which states the calculated values of total harmonic distortion
 - b. Detailed list of the amplitude of harmonic currents and voltages to the 50th harmonic
 - c. If IEEE 519 is met and where on the power distribution
5. The contractor shall supply the VFD supplier with all power system data required to perform the above-described study. These data may include but are not limited to:
6. A complete one-line diagram of the subject electrical distribution system
7. Complete electrical data on all equipment shown on the one-line diagram is required. At a minimum, this data shall consist of:
 - a. Transformers - kVA, Primary Voltage, Secondary Voltage, Short Circuit Capacity or Impedance.
 - b. Motors - Horsepower, Base Speed, Full Load RMS Current (FLA).

- c. Generators - Short Circuit Capacity or Subtransient Reactances (X_d), Power Factor, kW, X/R Ratio.
- 8. If the distribution system can function in more than one configuration, the configuration(s) to be analyzed shall be clearly defined. Any other information which may affect the behavior of the distribution system shall also be provided.

2.5 OUTPUT FILTER

A. General:

1. Provide output filter to prevent overstressing motor insulation system. Provide output filter with each variable frequency drive when cable length between motor and variable frequency drive exceeds the following, based on noted switching frequencies:
 - a. One kHz switching frequency, 200 feet cable length
 - b. Three kHz switching frequency, 175 feet cable length
2. Provide output filters in all other cases based on recommendations of variable frequency drive and motor manufacturers when actual voltage peaks at motor terminals exceed NEMA MG 1 limits.

B. Features and Criteria:

1. Filter shall be three-phase, 600-volt class motor-protecting type consisting of suitable values of inductance, capacitance, and resistance to form a damped low pass filter.
2. Filter shall be low-loss type specifically designed to reduce voltage waveform dV/dt . Filter shall allow cable minimum lengths exceeding actual application distances with waveforms resulting in voltage spikes at motor terminal that are within NEMA MG 1 Part 31 voltage stress levels.
3. Filter shall be suitable for mounting within variable frequency drive enclosure.

2.6 CONTROLS

A. General:

1. Equip each variable frequency drive control system with relays, switches, fuses, indicating lights, and components required for a complete, functional system.
2. Variable frequency drive control shall be powered from a suitably sized and protected control power transformer.
3. Variable frequency drive control shall include status indicators, controller, and system fault condition displays and operating controls. Provide status indicators and operating controls associated with drive control on front door of enclosure.
4. Control arrangement shall be such that variable frequency drive internal electronic supply voltage is isolated from field wiring.

B. Control and Pilot Devices:

1. Relays shall be standard, latching type, and pneumatic or solid-state time-delay type. Provide relays with contacts rated for ten amps, quantity as required.
2. Pilot devices shall be heavy duty type, rated ten amps continuous. Indicating lights shall be push-to-test LED type.

C. Operation:

1. Controls for each variable frequency drive shall consist of all devices necessary for the following:
 - a. Stop/Start and Speed Control: Stop/start and speed control shall respond to drive-mounted selector switch. With switch in “REMOTE” position, stop/start and speed control shall be based on a stop/start contact and 4–20 mADC speed signal from remote process control panel. With switch in “LOCAL” position, stop/start control shall be based on stop/start pushbuttons located adjacent to driven equipment, and speed control shall be based on drive-mounted speed potentiometer.
 - b. Emergency Stop Control: Emergency stop control shall respond to remote emergency stop pushbutton located adjacent to driven equipment. When activated, driven equipment shall stop immediately in all operating modes.
 - c. Motor Over-temperature Shutdown: Motor over-temperature control shall respond to remote contact that activates on motor over-temperature. When over-temperature is detected, driven equipment shall stop. Include provisions to remotely supply 120-volt power to thermistor control module located at motor.
 - d. Seal water control (required for pumps and other equipment that require seal water): Seal water control shall include provisions to supply 120-volt power to remote seal water solenoid. Seal water solenoid shall energize when equipment requiring seal water is enabled. Equipment requiring seal water shall have a delayed start until remote-located pressure switch verifies seal water flow. Upon loss of seal water, after an adjustable period, an alarm shall be initiated but equipment requiring seal water shall not shut down. When equipment requiring seal water is stopped, seal water solenoid shall remain energized for an adjustable period of time.

D. Auxiliary Features:

1. Provide each variable frequency drive with the following:
 - a. Status Indicators: Status indicators shall include separate pilot lights for indication of motor run (green), and bypass mode (blue).
 - b. Shutdown Indicators: Shutdown indicators shall include separate pilot lights (red) for each shutdown condition. Arrange shutdown indication circuitry so that, when activated, indicator requires manual reset.
 - c. Contact Outputs: Contact outputs shall include separate dry contacts for remote indication of motor run, seal water alarm for equipment with seal water systems, each shutdown condition, and controller faults.
 - d. Speed Output: Speed output shall include 4–20 mADC signal for remote indication of motor speed.

E. Wiring and Device Identification:

1. Provide control wiring and device identification for each variable frequency drive:
 - a. Identify all control conductors with permanent type wire markers. Each wire shall be identified by a unique number and shall be attached to wire at each termination point.
 - b. Identify each control device with permanent type marker. Each device shall be identified by a unique number and shall be attached to each device.
 - c. Numbering system for each wire and control device shall be identified on wiring diagrams and shall reflect actual designations used in the Work.

2.7 SOURCE QUALITY CONTROL

A. Tests:

1. Perform factory tests on each variable frequency drive prior to shipping. Test shall consist of simulating expected load to be driven by operating load through speed ranges specified for driven equipment, for minimum of two hours per drive unit.
2. Provide factory control and alarm tests on each drive unit by simulating each control signal and each alarm function to verify proper and correct drive unit action.
3. Perform specified tests in addition to standard factory tests typically performed.

B. Factory tests as outlined above shall be witnessed by the OWNER's representative:

1. The manufacturer shall notify the OWNER two (2) weeks prior to the date the tests are to be performed.
2. The manufacturer shall include the cost of transportation and lodging for up to three (3) OWNER's representatives.

PART 3 - EXECUTION

3.1 INSPECTION

- #### A.
- Examine conditions under which the Work will be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- #### A.
- Install equipment in accordance with manufacturer's recommendations and instructions and in conformance with Laws and Regulations, and the Contract Documents.
- #### B.
- Unless otherwise shown or indicated, install equipment at existing location of drive unit being replaced.
- #### C.
- Install equipment with sufficient access and working space provided for ready and safe operation and maintenance.
- #### D.
- For installations against masonry walls, provide an insulation board, 1/4-inch minimum thickness, between equipment and wall for corrosion protection. Trim board neatly within outline of equipment.
- #### E.
- Install all terminations, lugs, and required appurtenances necessary to properly terminate power supplies.
- #### F.
- Install control wiring terminations and appurtenances necessary to complete installing control and monitoring devices.

3.3 FIELD QUALITY CONTROL

A. Site Tests:

1. After installation, inspect, adjust, and test each variable frequency drive at the Site. Testing and inspection shall be in accordance with manufacturer's recommendations and be performed by manufacturer's factory-trained representative. Through CONTRACTOR, manufacturer's factory-trained representative shall inform OWNER and ENGINEER when equipment is correctly installed and ready to be energized. Do not energize equipment without permission of OWNER.
2. Perform the following equipment inspection and testing and provide reports documenting procedures and results.
 - a. Verify all device settings and drive adjustments.
 - b. Inspect all mechanical and electrical interlocks and controls for proper operation.
 - c. Test each drive through specified speed ranges and loads for a minimum of two hours per drive unit.
 - d. Test each drive by using actual control signal for remote and local operation.
 - e. Test each drive alarm function.
 - f. Perform other tests recommended by equipment manufacturer.
 - g. Perform Harmonics testing to confirm compliance with IEEE 519 limits.
 - 1) Testing of the Harmonic limits shall be per a VFD system as operating under natural conditions.
 - 2) Utilize the recorded maximum current for the operating VFD system as I_{Load} .
 - 3) Submit all calculations, all collected field data and graphs for review to Engineer.
 - 4) If the VFD system fails to be at or below any or all of the IEEE 519 Harmonic acceptable levels, the VFD manufacturer shall incur all costs associated with retesting, additional harmonic mitigation equipment, equipment installation, and retesting expenses including costs associated with Engineer travel to witness any and all testing.

B. Manufacturer Services:

1. Unloading and Installation: Manufacturer's factory-trained representative shall be present during unloading of equipment and installation at equipment's final location. Representative shall train installing personnel in advance in the proper handling and rigging of equipment. Services by manufacturer's representative under this paragraph shall be at least two eight-hour days at the Site.
2. Post-installation Check: Manufacturer's factory-trained representative shall check and approve the installed equipment before initial operation. Manufacturer shall calibrate, set, and program variable frequency drives provided. Services by manufacturer's representative under this paragraph shall be at least two eight-hour days at the Site.
3. Manufacturer's factory-trained representative shall adjust the system to final settings as specified in Paragraph 3.4 of this section. Manufacturer's factory trained representative shall test as specified in Paragraph 3.3.A of this section. Representative shall operate and test the system in presence of ENGINEER and verify that equipment is in conformance with the Contract Documents. Services by manufacturer's representative under this paragraph shall be at least two eight-hour days at the site.
4. Representative shall revisit the Site as often as necessary until all deficiencies are corrected, prior to readiness for final payment.

5. Provide services of manufacturer's factory-trained representatives to correct defective Work within 72 hours of notification by OWNER during the correction period specified in the General Conditions as may be amended by the Supplementary Conditions.
6. Replacement parts or equipment provided during the correction period shall be equal to or better than original.
7. Training: Provide services of qualified factory trained specialists from manufacturer to instruct OWNER's operations and maintenance personnel in recommended operation and maintenance of equipment.

3.4 ADJUSTING

- A. Following Substantial Completion, when inspection and testing are complete and variable frequency drives are operating, manufacturer's representative shall return to the Site and make final adjustments as required to each variable frequency drive furnished under this Section.

END OF SECTION 262923

SECTION 264313 - TRANSIENT VOLTAGE SURGE SUPPRESSION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes TVSSs for low-voltage power, control, and communication equipment.

1.3 DEFINITIONS

- A. ATS: Acceptance Testing Specifications
- B. SVR: Suppressed voltage rating
- C. TVSS: Transient voltage surge suppressor

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated include rated capacities, operating weights, operating characteristics, furnished specialties, and accessories.
- B. Product Certificates: For transient voltage suppression devices signed by product manufacturer certifying compliance with the following standards:
 - 1. UL 1283
 - 2. UL 1449
- C. Qualification Data: For testing agency
- D. Field quality-control test reports, including the following:
 - 1. Test procedures used
 - 2. Test results that comply with requirements
 - 3. Failed test results and corrective action taken to achieve requirements
- E. Operation and Maintenance Data: For transient voltage suppression devices to include in emergency, operation, and maintenance manuals.
- F. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain suppression devices and accessories through one source from a single manufacturer.
- B. Product Options: Drawings indicate size, dimensional requirements, and electrical performance of suppressors and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements".
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use
- D. Comply with IEEE C62.41, "IEEE Guide for Surge Voltages in Low Voltage AC Power Circuits," and test devices according to IEEE C62.45, "IEEE Guide on Surge Testing for Equipment Connected to Low-Voltage AC Power Circuits".
- E. Comply with NEMA LS 1, "Low Voltage Surge Protection Devices".
- F. Comply with UL 1283, "Electromagnetic Interference Filters," and UL 1449, "Transient Voltage Surge Suppressors".

1.6 PROJECT CONDITIONS

- A. Service Conditions: Rate surge protection devices for continuous operation under the following conditions, unless otherwise indicated:
 - 1. Maximum Continuous Operating Voltage: Not less than 115 percent of nominal system operating voltage

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge suppressors that fail in materials or workmanship within five years from date of Substantial Completion.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Replaceable Protection Modules: One of each size and type installed

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ABB
 - 2. Bussmann; Eaton Corporation
 - 3. Cutler-Hammer, Inc.; Eaton Corporation
 - 4. Innovative Technology, Inc.; Eaton Corporation
 - 5. Intermatic, Inc.
 - 6. LEA International
 - 7. Leviton Mfg. Company, Inc.
 - 8. nVent ERICO
 - 9. Siemens Industry, Inc.
 - 10. Square D; Schneider Electric
 - 11. Transtector Systems, Inc.

2.2 SERVICE ENTRANCE SUPPRESSORS

- A. Surge Protection Device Description: Non-modular, sine-wave-tracking type with the following features and accessories:
 - 1. LED indicator lights for power and protection status
 - 2. Audible alarm, with silencing switch, to indicate when protection has failed
 - 3. One set of dry contacts rated at 5A and 250 VAC, for remote monitoring of protection status
- B. Surge Protection Device Description: Modular design with field-replaceable modules, sine-wave-tracking type with the following features and accessories:
 - 1. Fuses, rated at 200 kA interrupting capacity
 - 2. Fabrication using bolted compression lugs for internal wiring
 - 3. Integral disconnect switch
 - 4. Redundant suppression circuits
 - 5. Redundant replaceable modules
 - 6. Arrangement with copper bus bars and for bolted connections to phase buses, neutral bus, and ground bus
 - 7. Arrangement with wire connections to phase buses, neutral bus, and ground bus
 - 8. LED indicator lights for power and protection status
 - 9. Audible alarm, with silencing switch, to indicate when protection has failed
 - 10. One set of dry contacts rated at 5A and 250 VAC, for remote monitoring of protection status. Coordinate with building power monitoring and control system.
 - 11. Surge-event operations counter
- C. Peak Single-Impulse Surge Current Rating: 240 kA per phase

- D. Connection Means: Permanently wired
- E. Protection modes and UL 1449 SVR for grounded wye circuits with voltages of 480Y/277, 3-phase, 4-wire circuits shall be as follows:
 - 1. Line to Neutral: 800V
 - 2. Line to Ground: 800V
 - 3. Neutral to Ground: 800V

2.3 PANELBOARD SUPPRESSORS

- A. Surge Protection Device Description: Non-modular, sine-wave-tracking type with the following features and accessories:
 - 1. LED indicator lights for power and protection status.
 - 2. Audible alarm, with silencing switch, to indicate when protection has failed.
 - 3. One set of dry contacts rated at 5A and 250 VAC, for remote monitoring of protection status.
- B. Surge Protection Device Description: Modular design with field-replaceable modules, sign-wave-tracking type with the following features and accessories:
 - 1. Fuses, rated at 200 kA interrupting capacity
 - 2. Fabrication using bolted compression lugs for internal wiring
 - 3. Integral disconnect switch
 - 4. Redundant suppression circuits
 - 5. Redundant replaceable modules
 - 6. Arrangement with wire connections to phase buses, neutral bus, and ground bus
 - 7. LED indicator lights for power and protection status
 - 8. Audible alarm, with silencing switch, to indicate when protection has failed
 - 9. One set of dry contacts rated at 5A and 250 VAC, for remote monitoring of protection status. Coordinate with building power monitoring and control system.
 - 10. Surge-event operations counter
- C. Peak Single-Impulse Surge Current Rating: 120 kA per phase
- D. Protection modes and UL 1449 SVR for grounded wye circuits with voltages of 208Y/120, 3-phase, 4-wire circuits shall be as follows:
 - 1. Line to Neutral: 400V
 - 2. Line to Ground: 400V
 - 3. Neutral to Ground: 400V
- E. Protection modes and UL 1449 SVR for 240/120V, single-phase, 3-wire circuits shall be as follows:
 - 1. Line to Neutral: 400V
 - 2. Line to Ground: 400V
 - 3. Neutral to Ground: 400V

- F. Protection modes and UL 1449 SVR for 240/120V, 3-phase, 4-wire circuits with high leg shall be as follows:
 - 1. Line to Neutral: 400V, 800V from high leg
 - 2. Line to Ground: 400V
 - 3. Neutral to Ground: 400V

2.4 ENCLOSURES

- A. NEMA 250, with type matching the enclosure of panel or device being protected.

PART 3 - EXECUTION

3.1 INSTALLATION OF SURGE PROTECTION DEVICES

- A. Install devices at service entrance on load side, with ground lead bonded to service entrance ground.
- B. Install devices for panelboard, Motor Control Center, and auxiliary panels with conductors or buses between suppressor and points of attachment as short and straight as possible. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.
 - 1. Provide multi-pole, 30A circuit breaker as a dedicated disconnect for suppressor, unless otherwise indicated.

3.2 PLACING SYSTEM INTO SERVICE

- A. Do not energize or connect panelboards or Motor Control Centers to their sources until surge protection devices are installed and connected.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test and adjust equipment installation, including connections, and to assist in field testing. Furnish all test results.
 - 1. Verify that electrical wiring installation complies with manufacturer's written installation requirements.
- B. Testing: Perform the following field tests and inspections and prepare test reports:
 - 1. After installing surge protection devices, but before electrical circuitry has been energized, test for compliance with requirements
 - 2. Complete startup checks according to manufacturer's written instructions.
 - 3. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, "Surge Arresters, Low-Voltage Surge Protection Devices" Section. Certify compliance with test parameters.
- C. Remove and replace malfunctioning units and retest as specified above.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transient voltage suppression devices. Refer to Division 1 Section "Closeout Procedures."

END OF SECTION 264313

SECTION 432359 - SCREW PUMPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes open screw pumps.
- B. All screw pumps provided shall be from the same manufacturer.

1.2 COORDINATION

- A. Coordinate installation and startup of Work of this Section with plant operations.

1.3 SUBMITTALS

- A. Product Data: Open screw pumps.
- B. Shop Drawings:
 - 1. Structural and mechanical screw pump computations. The computations shall clearly indicate the following design parameters:
 - a. Brake horsepower at the maximum capacity and lift.
 - b. Required reducer torque at the maximum capacity and lift.
 - c. Radial bearing load and thrust bearing load at the maximum capacity and lift.
 - d. Bearing center distance.
 - e. Maximum screw deflection at the maximum capacity and lift.
 - f. These design calculations shall be certified by the manufacturer and signed by a Professional Engineer.
 - 2. Detailed information shall be submitted for all items such as hardware, motors, reducers, and bearings.
 - 3. Vendor data shall be furnished to confirm the torque rating of the drive.
 - 4. List showing materials of construction of all components.
 - 5. Manufacturer's recommended spare parts.
 - 6. Information on equipment field erection requirements including total weight of assembled components and weight of each sub-assembly.
 - 7. A maintenance schedule showing the required maintenance, frequency of maintenance, lubricants and other items required at each regular preventative maintenance period, including all buy-out items.
 - 8. Process equipment electrical requirements and schematic diagrams.
 - 9. Complete list of deviations from the drawings and specifications.

- C. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For screw pumps.

1.5 WARRANTY

- A. Furnish five-year manufacturer's warranty for pumps and accessories.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Each screw pump shall be furnished complete with spiral steel flighted screw, upper and lower stub shafts, upper and lower support bearings, flow deflection plates, shaft-mounted gear reducer, V-belts and sheaves, drive motor, automatic lower bearing lubrication system, and all necessary anchorage parts.
- B. Design parameters for each unit:

Station	2 nd Influent
Number of Pumps	2
Pump Capacity	3,200 gpm
Lift	14.08 ft
Pump Diameter	44 inches
Number of Flights	3
Flight Thickness	0.25 inches
Torque Tube Diameter	20 inches
Torque Tube Wall Thickness	0.375 inches
Max. Rotational Speed	44 RPM
Motor	15 hp

Station	2 nd Effluent
Number of Pumps	2
Pump Capacity	2,143 gpm
Lift	11.75 ft
Pump Diameter	36 inches
Number of Flights	3
Flight Thickness	0.25 inches

Torque Tube Diameter	20 inches
Torque Tube Wall Thickness	0.375 inches
Max. Rotational Speed	53 RPM
Motor	15 hp

Station	2 nd Activated Sludge
Number of Pumps	2
Pump Capacity	2,770 gpm
Lift	14.08 ft
Pump Diameter	40 inches
Number of Flights	3
Flight Thickness	0.25 inches
Torque Tube Diameter	20 inches
Torque Tube Wall Thickness	0.375 inches
Max. Rotational Speed	49 RPM
Motor	15 hp

2.2 MANUFACTURERS

- A. Lakeside Equipment Corporation.
- B. Epic International, Inc
- C. Or Approved Equal

2.3 SPIRAL SCREW

- A. Spiral screw shall be fabricated of ASTM A36 steel. Flights shall be die formed. Flights shall be helical shaped and continuously welded on both sides to the torque tube. There shall be no more than one flight butt weld per pitch, and all flight butt welds shall be full penetration joints.
- B. Each torque tube shall have a minimum diameter and wall thickness so that screw deflection shall not be greater than the bearing center distance divided by 2,000. Calculations for deflection and bearing loads shall be based on the dead weight of the screw plus the full weight of liquid being pumped. Decreased loading from buoyance effects shall not be considered in the design calculations.
- C. The torque tube shall be sealed water tight with a welded steel plate at each end. All surfaces of the end plates mating with the bolted stub shafts shall be finish machined

while the pump is supported between centers in a lathe after welding to the support tube and after all flight welding is complete to assure alignment and parallelism.

- D. A solid steel upper drive shaft and lower stub shaft fitted with machine faced steel plate flange shall be fastened to the upper and lower ends of the fabricated spiral screw with ASTM A325 high-strength bolts.
- E. The screw shall be placed in a lathe and the flights shall be ground to a true radius.
- F. The alternative material for the screw pump shall be Type 304 stainless steel.

2.4 LOWER BEARING ASSEMBLY

- A. The lower bearing assembly shall be a cam-type with a pressure grease lubricated bronze sleeve bearing pressed onto the shaft and shall carry the radial load of the screw. No thrust load shall be carried by the lower bearing.
- B. The bronze sleeve shall rotate with the lower stub shaft in a bearing housing containing a minimum of two (2) spring loaded lip seals at the top of the bearing assembly. The seals shall be arranged so that one seal excludes wastewater and contaminants from the bearing and the other holds the grease in the bearing. The use of less than two lip seals will not be acceptable.
- C. The bearing assembly shall permit precise angular (vertical) and lateral (horizontal) field adjustment to eliminate misalignment between the upper and lower bearings without the use of shims. Bearing assembly shall accommodate all static and operating deflections of the screw. Bearings with fixed or rigid shafts and housings shall not be acceptable.
- D. The bearing assembly shall be supplied with a split non-rotating shield installed between the housing and rotating screw for operation of the shaft and seals.
- E. The bearing assembly shall accommodate thermal expansion and contraction of the screw within the bearing housing on fully lubricated surfaces not subject to corrosion or seizure.
- F. The bottom of the bearing housing shall be fitted with an inspection plate that can be removed for inspection of the lower bearing without disassembly of the lower stub shaft or bearing housing.
- G. The use of roller or ball bearings will not be acceptable.
- H. There shall be a flow through grease system with grease entering the lower part of the housing and passing across the full face of the bearing sleeve to the upper seals, then to a grease collection container for confirmation the bottom bearing is receiving grease from the automatic lubrication system.

2.5 UPPER BEARING ASSEMBLY

- A. The upper stub shaft shall extend through a grease lubricated upper bearing assembly which shall consist of a split housing fitted with dual bearings, lower spring loaded lip seal, bearing spacer and upper spring loaded lip seal.
- B. All of the thrust load from the pump shall be carried by a spherical roller thrust-type bearing assembly and the upper screw pump radial load shall be carried by a spherical roller bearing. A single dual-purpose bearing will not be acceptable.
- C. The two bearings (radial and thrust) shall be positioned in the bearing housing so that the pressure center of the thrust bearing and radial bearing intersects the axis of the screw at the same point to provide true self-alignment in all planes.
- D. Both radial and thrust bearings shall be rated at a minimum of 100,000 hours AFBMA L10 theoretical design life, based on the dead weight of the screw plus the full weight of the liquid being pumped.
- E. Upper stub shaft shall be grooved and positively locked into the upper bearing assembly by a split collar and locking halter ring. Use of threaded nuts to lock bearings and shafts for support of thrust loading will not be acceptable.
- F. A split bearing housing shall be provided to allow removal of the cover for inspection of the bearings without removal of the stub shaft or the entire bearing assembly.

2.6 DRIVE ASSEMBLY

- A. The drive assembly shall be designed and constructed for a maximum screw rotational speed. The drive assembly shall consist of a shaft-mounted gear reducer, belts and sheaves, and motor.
- B. A shaft-mounted, double-reduction reducer with alloy steel high hardness helical gearing, positive splash-type lubrication and double lip oil seals, shall be keyed to the screw pump stub shaft. Gear reducer shall be designed in accordance with the latest AGMA standards.
- C. The screw pump stub shaft shall be supported by the upper bearing and extended through the reducer hollow bore and centered and held firmly in place by tapered bushings on each side of the reducer. Use of set screws and collar to lock gear reducer to shaft will not be acceptable.
- D. Gear reducer shall be designed with a service factor of not less than 1.5 based on the torque requirements of the screw or 1.0 based on the motor horsepower, whichever is greater. Gear reducer shall have a minimum torque rating.
- E. Reducer shall be held in position by a torque arm and torque arm bracket. Torque arm bracket shall be fastened with cast-in-place anchors. Expansion anchors will not be acceptable.

- F. A visual oil level gauge and oil filler tube for the reducer shall be mounted on the reducer.
- G. A backstop shall be provided with the reducer to prevent reverse rotation of the screw.

2.7 BELTS AND SHEAVES

- A. Power transmission from the motor to the reducer shall be by means of a set of V-belts and sheaves. Belts and sheaves shall be designed with a 1.5 service factor based on full motor horsepower.
- B. Sheaves shall be two section units for both drive and driven sheaves and shall consist of a tapered split shaft bushing with three tapped holes to which the sheave is attached by three cap screws. Changing sheaves shall not require a wheel puller.
- C. Belts and sheaves shall be covered with a fabricated steel belt guard in accordance with OSHA standards.

2.8 MOTOR

- A. Each unit shall be driven by an 1,800 rpm, 3 phase, 60 Hertz, 230/460 volt, horizontal, ball bearing, continuous duty, constant speed, Design B, normal starting torque, totally enclosed fan cooled foot-mounted motor with leads to gasketed conduit box for outdoor operation.
- B. Motor shall be mounted on a fabricated steel plate which provides adjustment of belt slack.

2.9 DEFLECTION PLATES

- A. A flow deflection plate shall be provided to curve around the upper section on the uptake side of the screw to deflect the liquid as the screw rotates.
- B. The flow deflection plate shall be fabricated of not less than $\frac{1}{8}$ -inch stainless steel plate complete with stiffeners where required and stainless steel anchors on 2-foot centers at the bottom edge.
- C. The deflection plate top edge shall have adjustable stainless steel anchors at not more than 8-foot centers.

2.10 SIDE RAIL ASSEMBLY

- A. Provide stainless steel side rails mounted along each side of the screw trough as indicated on the Drawings.
- B. Side rails shall:

1. Reduce carry-back.
 2. Improve hydraulic efficiency.
 3. Minimize splashing.
 4. Prevent debris accumulation.
- C. Material shall be Type 304 stainless steel minimum.
- D. Rails shall be fully adjustable following installation.

2.11 AUTOMATIC LUBRICATION SYSTEM

- A. Each screw pump shall be furnished with a positive pressure, automatic lubrication pump and $\frac{3}{8}$ -inch minimum diameter stainless steel grease line.
- B. The automatic lubrication pump shall provide grease lubricant to the lower bearing assembly with provisions at the pump to manually charge the grease line.
- C. Each lubrication pump shall be adjustable and shall provide 6 ounces per day at the minimum setting and 17 ounces per day at the maximum setting (nominal). Grease reservoir shall hold a minimum of 11 pounds of lubricant.
- D. The lubricant pump shall consist of an eccentric piston pumping element, a check valve, and shall have a one-third ($\frac{1}{3}$) horsepower, TEFC, ball bearing, 230/460 volt, 60 Hz, 3 phase, gear motor connected to the lubricator by a flexible coupling.
- E. A centrifugal switch shall be furnished as an integral component of the grease pump and interlocked with the screw pump drive system. When the screw pump is required to operate, the lubrication pump motor shall switch on. As the lubrication pump motor reaches full speed, the centrifugal switch shall close, energizing the screw pump drive motor. If the grease pump motor stops the centrifugal switch shall open, de-energizing the screw pump drive motor. The centrifugal switch shall be rated for not less than 3 amps at 120 VAC, resistive.
- F. The lubrication system shall be factory assembled on a steel base plate. The coupling shall have a removable metal coupling guard in accordance with OSHA standards.
- G. Grease shall be recovered in a stainless steel collection container with two (2) $\frac{1}{4}$ -inch holes located 1-inch from the top of the container to allow liquid to drain out of the container.
- H. A manual lubrication connection shall be provided if grease pump fails. Connection shall allow greasing of all bearings.

2.12 GROUTING MATERIALS

- A. Equipment manufacturer shall furnish a radius screed for the CONTRACTOR to place the finishing grout in the trough with the screw after the unit has been installed.

- B. Equipment manufacturer shall furnish to the CONTRACTOR one (1) set of grouting sheave(s) and belts to operate the screw at a reduced speed for grouting the trough with the screw pump drive.

2.13 ANCHOR BOLTS

- A. Equipment manufacturer shall furnish all anchor bolts of ample size and strength required to securely anchor each item of equipment. Anchor bolts, hex nuts, and washers shall be 304 stainless steel unless noted otherwise. Anchor bolts shall be L-type embedded. Expansion-type anchors will not be acceptable.
- B. Anchor bolts shall be set by the CONTRACTOR. Equipment shall be placed on the foundations, leveled, shimmed, bolted down, and grouted with a non-shrinking grout.

2.14 SHOP SURFACE PREPARATION AND PAINTING

- A. All fabricated carbon steel or cast iron components for submerged service shall be near-white blast cleaned per SSPC-SP10 and given a 2.5 to 3.5 mil dry film thickness coat of Tnemec Series 1 Omnithane Primer or approved equal.
- B. All fabricated carbon steel or cast iron components for non-submerged service shall be commercial blast cleaned per SSPC-SP6 and given a 2.5 to 3.5 mil dry film thickness coat of Tnemec Series 1 Omnithane Primer or approved equal.
- C. All fabricated carbon steel or cast iron components shall be given a 6.0 to 8.0 mil Tnemec Series N69 Hi-Build Epoxoline II coating or approved equal. Contractor to field repair any damage to coating during delivery, handling, and installation.
- D. Electric motors, speed reducers, and other self-contained or enclosed components shall be supplied with the manufacturer's standard finish coating.
- E. Apply rust preventative compound to all machined, polished, and nonferrous surfaces which are not to be painted.

PART 3 - EXECUTION

3.1 INSTALLATION OF SCREW PUMPS

- A. The manufacturer shall schedule four (4) trips to the project site for start-up assistance and inspection of installed equipment for proper operation.
- B. After the CONTRACTOR has installed the equipment and the units are capable of being operated, the equipment manufacturer shall furnish a qualified representative for a minimum of five (5) days to inspect the equipment and to supervise field testing and startup for the CONTRACTOR.

3.2 OPERATOR TRAINING

- A. Provide operator training for OWNER'S personnel after the system is operational. Training shall take place while manufacturer's representative is at the job site for equipment inspection.

END OF SECTION 432359

SECTION 6
STANDARD SPECIFICATIONS

STANDARD SPECIFICATIONS

1. The "Construction and Material Specifications" of the State of Ohio Department of Transportation (ODOT), 2023 edition, current ODOT supplemental specifications, and current ODOT standard drawings shall govern work and materials which are not specified or modified herein or on the project Contract Drawings. All references to "the Department" shall be changed to "the Owner or his Representative." The project Contract Drawings and Specifications, in the event of a discrepancy, shall supersede the ODOT Specifications.

The absence of an "As Per Plan" designation on some item descriptions in the proposal for which there are clear and controlling plan notes, specifications, or other requirements does not relieve the Contractor of the responsibility to read, bid and construct those particular items in accordance with the governing plan notes, specifications, or other requirements and the Contractor shall have no basis of claim based upon an "order of precedence".

ODOT 104.02 D., 611.04, 611.12, and 611.13 shall not apply to this project.

SECTION 7
SPECIFIC PROJECT REQUIREMENTS

SPECIFIC PROJECT REQUIREMENTS

1 - CONTACT DURING BIDDING

- 1.1 All questions during bidding should be addressed to Ryan Schuster, PE/PM, at Verdantas, LLC, 3875 Embassy Pkwy Ste.200, Akron, OH 44333, rschuster@verdantas.com

2 - PERIODIC PAYMENTS

- 2.1 This project is expected to be funded in whole or in part by the OPWC. The Contractor shall comply with all requirements of this program. The periodic payments to the Contractor may be made in whole or in part through the OWNER and/or OPWC. In paragraph 14.02 C.1 of the General Conditions change "ten days" to "sixty days."

3 - CORRECTION PERIOD

- 3.1 The Correction Period in Section 13.07 of the General Conditions shall be changed from a one (1) year to a two (2) year period.

4 - INSURANCE

- 4.1 Section SC-5.04(D) of the Supplementary Conditions shall be deleted and no "all risk builders risk" or "installation floater" insurance need be purchased by the Contractor.
- 4.2 See the following Bid Set Sections for Insurance Requirements:
- A. Section 1, Instructions to Bidders, Part 10 Insurance
 - B. Section 3, General Conditions, Article 5 Bonds and Insurance (EJCDC) or Article 11 Insurance and Bonds (AIA), whichever is used in the Bid Set
 - C. Section 4, Supplemental Conditions

5 - WORKING HOURS

- 5.1 No work shall be performed between the hours of 7:30 p.m. and 7:30 a.m. nor on Saturday, Sunday, or legal Holidays, without written permission of the Owner.

6 - PROJECT COMPLETION

- 6.1 All work including restoration and clean-up shall be completed no later than the contract completion date. Failure to complete all work within the allotted time will result in assessment of liquidated damages. Upon completion of all work and written notification of same by the Contractor, the Engineer and Owner will compile a punch list. The punch list will be sent to the Contractor. All punch list work shall be completed to the satisfaction of the Engineer and the Owner within 14 days after receipt of the punch list. Failure to complete the punch list work within the allotted time will result in assessment of liquidated damages.

7 - SITE ACCESS

- 7.1 Access to the site for field investigation of existing conditions must be scheduled in advance with the Owner by contacting Mr. Mitch Lambert / Steve Carathers, WWTP Superintendent, who can be reached at (330) 684-5168.

END OF SECTION

SECTION 8
PREVAILING WAGE RATES

PREVAILING WAGES

The Contractor agrees that each individual employed by the Contractor or any Subcontractor and engaged in work on the project under this Contract shall be paid the prevailing wage established by the Ohio Department of Commerce Division of Industrial Compliance (<https://com.ohio.gov/divisions-and-programs/industrial-compliance/wage-and-hour/guides-and-resources/view-prevailing-wage-rates>). This shall occur regardless of any contractual relationship which may be said to exist between the Contractor or any Subcontractor and such individual.

The Prevailing Wage Determination Schedule for this project is attached. If the Contractor needs a wage determination for any trade not included herein, he shall contact the Owner's Prevailing Wage Coordinator.

Prevailing Wage Orientation Meeting

After award of contract the prime contractor and all approved subcontractors shall participate in a prevailing wage orientation meeting.

Prevailing Wage No Work Performed Report

The Prime Contractor and all Subcontractors shall submit Prevailing Wage Reports weekly from the first week of work until the final week of work. This includes weeks when no work is performed. Contractors shall submit a Prevailing Wage Report or the included Non-Performing Week/No Work Report. All prevailing wage reports submitted must be signed.

Prevailing Wage Determination Cover Letter

THE FOLLOWING PAGES ARE PREVAILING RATES OF WAGES ON PUBLIC IMPROVEMENTS FAIRLY ESTIMATED TO BE MORE THAN THE AMOUNT IN O.R.C. SEC. 4115.03 (b) (1) or (2), AS APPLICABLE.

Section 4115.05 provides, in part: "Where contracts are not awarded or construction undertaken within ninety days from the date of the establishment of the prevailing wages, there shall be a redetermination of the prevailing rate of wages before the contract is awarded." The expiration date of this wage schedule is listed above for your convenience only. This wage determination is not intended as a blanket determination to be used for all projects during this period without prior approval of this Department.

Section 4115.04, Ohio Revised Code provides, in part: "Such schedule of wages shall be attached to and made a part of the specifications for the work, and shall be printed on the bidding blanks where the work is done by contract..."

The contract between the letting authority and the successful bidder shall contain a statement requiring that mechanics and laborers be paid a prevailing rate of wage as required in Section 4115.06, Ohio Revised Code.

The contractor or subcontractor is required to file with the contracting public authority upon completion of the project and prior to final payment therefore an affidavit stating that he has fully complied with Chapter 4115 of the Ohio Revised Code.

The wage rates contained in this schedule are the "Prevailing Wages" as defined by Section 4115.03, Ohio Revised Code (the basic hourly rates plus certain fringe benefits). These rates and fringes shall be a minimum to be paid under a contract regulated by Chapter 4115 of the Ohio Revised Code by contractors and subcontractors. The prevailing wage rates contained in this schedule include the effective dates and wage rates currently on file. In cases where future effective dates are not included in this schedule, modifications to the wage schedule will be furnished to the Prevailing Wage Coordinator appointed by the public authority as soon as prevailing wage rates increases are received by this office.

"There shall be posted in a prominent and accessible place on the site of work a legible statement of the Schedule of Wage Rates specified in the contract to the various classifications of laborers, workmen, and mechanics employed, said statement to remain posted during the life of such contract." Section 4115.07, Ohio Revised Code.

Apprentices will be permitted to work only under a bona fide apprenticeship program if such program exists and if such program is registered with the Ohio Apprenticeship Council.

Section 4115.071 provides that no later than ten days before the first payment of wages is due to any employee of any contractor or subcontractor working on a contract regulated by Chapter 4115, Ohio Revised Code, the contracting public authority shall appoint one of his own employees to act as the prevailing wage coordinator for said contract. The duties of the prevailing wage coordinator are outlined in Section 4115.071 of the Ohio Revised Code.

Section 4115.05 provides for an escalator in the prevailing wage rate. Each time a new rate is established, that rate is required to be paid on all ongoing public improvement projects.

A further requirement of Section 4115.05 of the Ohio Revised Code is: "On the occasion of the first pay date under a contract, the contractor shall furnish each employee not covered by a collective bargaining agreement or understanding between employers and bona fide organizations of Labor with individual written notification of the job classification to which the employee is assigned, the prevailing wage determined to be applicable to that classification, separated into the hourly rate of pay and the fringe payments, and the identity of the prevailing wage Coordinator appointed by the public authority. The contractor or subcontractor shall furnish the same notification to each affected employee every time the job classification of the employee is changed."

Work performed in connection with the installation of modular furniture may be subject to prevailing wage.

THIS PACKET IS NOT TO BE SEPARATED BUT IS TO REMAIN COMPLETE AS IT IS SUBMITTED TO YOU. (Reference guidelines and forms are included in this packet to be helpful in the compliance of the Prevailing Wage law.)

PREVAILING WAGE THRESHOLD LEVELS

IMPORTANT NOTICE

Before advertising for bids, contracting, or undertaking construction with its own forces, to construct a public improvement, the Public Authority shall have the Ohio Department of Commerce-Division of Industrial Compliance, Bureau of Wage and Hour Administration determine the prevailing rates of wages for workers employed on the public improvement. The wage determination must be included in the project specifications and printed on the bidding blanks where work is done by contract.

“New” construction threshold for Building Construction:	\$250,000
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“Reconstruction, enlargement, alteration, repair, remodeling, renovation, or painting” threshold level for Building Construction:	\$75,000
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As of January 1, 2026:

“New” construction that involves roads, streets, alleys, sewers, ditches and other works connected to road or bridge construction threshold level has been adjusted to:	\$101,201
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“Reconstruction, enlargement, alteration, repair, remodeling, renovation, or painting” that involves roads, streets, alleys, sewers, ditches and other works connected to road or bridge construction threshold level has been adjusted to:	\$30,320
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A) Thresholds are to be adjusted biennially by the Director of the Ohio Department of Commerce.
 B) Biennial adjustments to threshold levels are made according to the Building Cost for Skilled Labor Index published by McGraw-Hill's Engineering News-Record, but may not increase or decrease more than 3% for any year.

If there are questions concerning this notification, please contact:

Bureau of Wage and Hour Administration

6606 Tussing Road, PO Box 4009

Reynoldsburg, Ohio 43068-9009

Phone: 614-644-2239

Fax: 614-728-8639

www.com.ohio.gov



Help us improve our website! Take a brief [1–2 minute survey](#) to share your experience using the Ohio Department of Commerce website.

Prevailing Wage Contractor Responsibilities



This is a summary of prevailing wage contractors' responsibilities. For more detailed information please refer to [Chapter 4115 of the Ohio Revised Code](#)

[Collapse All Sections](#)

General Information



Ohio's prevailing wage laws apply to all public improvements financed in whole or in part by public funds when the total overall project cost is fairly estimated to be more than \$250,000 for new construction or \$75,000 for reconstruction, enlargement, alteration, repair, remodeling, renovation, or

PW.4

painting.

Ohio's prevailing wage laws apply to all public improvements financed in whole or in part by public funds when the total overall project cost is fairly estimated to be more than \$98,974 for new construction that involves roads, streets, alleys, sewers, ditches and other works connected to road or bridge construction or \$29,653 for reconstruction, enlargement, alteration, repair, remodeling, renovation, or painting of a public improvement that involves roads, streets, alleys, sewers, ditches and other works connected to road or bridge construction.

a. Thresholds are to be adjusted biennially by the Administrator of Ohio Department of Commerce, Division of Industrial Compliance and Labor, Bureau of Wage and Hour Administration

b. Biennial adjustments to threshold levels are made according to the Price Deflator for Construction Index, United States Department of Commerce, Bureau of the Census*, but may not increase or decrease more than 3% for any year

Penalties for violation



Violators are to be assessed the wages owed, plus a penalty of 100% of the wages owed.

Intentional Violations



If an intentional violation is determined to have occurred, the contractor is prohibited from contracting directly or indirectly with any public authority for the construction of a public improvement. Intentional violation means "a willful, knowing, or deliberate disregard for any provision" of the prevailing wage law and includes but is not limited to the following actions:

- Intentional failure to submit payroll reports as required, or knowingly submitting false or erroneous reports.
- Intentional misclassification of employees for the purpose of reducing wages.
- Intentional misclassification of employees as independent contractors or as apprentices.
- Intentional failure to pay the prevailing wage.
- Intentional failure to comply with the allowable ratio of apprentices to skilled workers as required by the regulations established by Ohio Department of Commerce, Division of Industrial Compliance and Labor, Bureau of Wage and Hour Administration.

- Intentionally employing an officer, of a contractor or subcontractor, that is known to be prohibited from contracting, directly or indirectly, with a public authority.

Responsibilities



A. Pay the prevailing rate of wages as shown in the wage rate schedules issued by the Ohio Department of Commerce, Division of Industrial Compliance and Labor, Bureau of Wage and Hour Administration, for the classification of work being performed.

1. Wage rate schedules include all modifications, corrections, escalations, or reductions to wage rates issued for the project.
2. Overtime must be paid at time and one-half the employee's base hourly rate. Fringe benefits are paid at straight time rate for all hours including overtime.
3. Prevailing wages must be paid in full without any deduction for food, lodging, transportation, use of tools, etc.; unless, the employee has voluntarily consented to these deductions in writing. The public authority and the Director of Ohio Department of Commerce, Division of Industrial Compliance and Labor, Bureau of Wage and Hour Administration - must approve these deductions as fair and reasonable. Consent and approval must be obtained before starting the project.

B. Use of Apprentices and Helpers cannot exceed the ratios permitted in the wage rate schedules.

1. Apprentices must be registered with the U.S. Department of Labor Bureau of Apprenticeship and Training.
2. Contractors must provide the Prevailing Wage Coordinator a copy of the Apprenticeship Agreement for each apprentice on the project.

C. Keep full and accurate payroll records available for inspection by any authorized representative of the Ohio Department of Commerce, Division of Industrial Compliance, and Labor, Bureau of Wage and Hour Administration or the contracting public authority, including the Prevailing Wage Coordinator. Records should include but are not limited to:

1. Time cards, time sheets, daily work records, etc.
2. Payroll ledger\journals and canceled checks\check register.
3. Fringe benefit records must include program, address, account number, & canceled checks.

4. Records made in connection with the public improvement must not be removed from the State for one year following the completion of the project.

5. Out-of-State Corporations must submit to the Ohio Secretary of State the full name and address of their Statutory Agent in Ohio.

D. Prevailing Wage Rate Schedule must be posted on the job site where it is accessible to all employees.

E. Prior to submitting the initial payroll report, supply the Prevailing Wage Coordinator with your project dates to schedule reporting of your payrolls.

F. Supply the Prevailing Wage Coordinator a list of all subcontractors including the name, address, and telephone number for each.

1. Contractors are responsible for their subcontractors' compliance with requirements of Chapter 4115 of the Ohio Revised Code.

G. Before employees start work on the project, supply them with written notification of their job classification, prevailing wage rate, fringe benefit amounts, and the name of the Prevailing Wage Coordinator for the project. A copy of the completed signed notification should be submitted to Prevailing Wage Coordinator.

H. Supply all subcontractors with the Prevailing Wage Rates and changes.

I. Submit certified payrolls within two (2) weeks after the initial pay period. Payrolls must include the following information:

1. Employees' names, addresses, and social security numbers.

a. Corporate officers/owners/partners and any salaried personnel who do physical work on the project are considered employees. All rate and reporting requirements are applicable to these individuals.

2. Employees' work classification.

a. Be specific about the laborers and/or operators (Group)

b. For all apprentices, show level/year and percent of journeyman's rate

3. Hours worked on the project for each employee.

a. The number of hours worked in each day and the total number of hours worked each week.

4. Hourly rate for each employee.

a. The minimum rate paid must be the wage rate for the appropriate classification. The Department's Wage Rate Schedule sets this rate.

b. All overtime worked is to be paid at time and one-half for all hours worked more than forty (40) per week.

5. Where fringes are paid into a bona fide plan instead of cash, list each benefit and amount per hour paid to program for each employee.

a. When the amount contributed to the fringe benefit plan and the total number of hours worked by the employee on all projects for the year are documented, the hourly amount is calculated by dividing the total contribution of the employer by the total number of hours worked by the employee.

b. When the amount contributed to the fringe benefit is documented but not the total hours worked, the hourly amount is calculated by dividing the total yearly contribution by 2080.

6. Gross amount earned on all projects during the pay period.

7. Total deductions from employee's wages.

8. Net amount paid.

J. The reports shall be certified by the contractor, subcontractor, or duly appointed agent stating that the payroll is correct and complete; and that the wage rates shown are not less than those required by the O.R.C. 4115.

K. Provide a Final Affidavit to the Prevailing Wage Coordinator upon the completion of the project.

INSTRUCTIONS FOR PREPARING CERTIFIED PAYROLL REPORTS

General:

Contractors and subcontractors are required by law to submit certified payroll reports for work on projects covered by Ohio's Prevailing Wage Law. This form meets the reporting requirements established by Ohio Revised Code Chapter 4115. The use of this form is not mandatory; employers may submit their own forms if all of the required information is included. This form may be reproduced, or additional copies obtained from:

Ohio Department of Commerce
Division of Industrial Compliance
Bureau of Wage and Hour Administration
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
614-644-2239
www.com.ohio.gov

Certified Payroll Heading:

Employer name and address: Company's full name and address...Indicate if the company is a subcontractor.

Subcontractor: Check and list the name of the General Contractor or Prime.

Project: Name and location of the project, including county.

Contracting Public Authority: Name and address of the contracting public authority... (Owner of the project).

Week Ending: Month, day, and year for last day of reporting period.

Payroll #: Indicates first, second, third, etc. payroll filed by the company for the project.

Page indicator: number of pages included in the report.

Project Number: Determined by the public authority...If there is no number leave blank.

Payroll Information by column:

1. Employee Name, Address and Social Security number: This information must be provided for all employees that perform physical labor on the project. The Social Security number is required; the last four digits may be permitted by the public authority. Corporate officers, partners, and salaried employees are considered employees and must be paid the prevailing rate. Individual sole proprietors do not have to pay themselves prevailing rate but must report their hours on the project.
2. Work Class: List classification of work performed by employee. If unsure of work classification, consult the Ohio Department of Commerce-Division of Industrial Compliance & Labor-Bureau of Wage and Hour Administration. Employees working more than one classification should have separate line entries for each classification. Indicate what year/level for Apprentices. Be specific when using laborer and operator classifications; for example, Backhoe Operator or Asphalt Laborer or by "Group".
3. Hours Worked, Day & Date: In the first row of column 3, enter days of the company's pay period for example; M T W TH F S S. The second row is for the date that corresponds with each day for the pay period. In the employee information section, enter the number of hours worked on the prevailing wage project and which day the hours were worked. Separate rows are labeled for (ST) straight time hours and (OT) overtime hours. All hours worked after 40, must be paid at the appropriate overtime rate.
4. Project Total Hours: Total the hours entered for pay period.
5. Base Rate: Enter actual rate per hour paid to the employee. The overtime hourly rate is time and one-half the base rate listed in the prevailing wage schedule plus fringe benefits at straight time rate. The prevailing wage schedule lists the base rate plus fringe benefit amounts. These amounts added together equal the total prevailing wage rate. Employers must pay this total amount in one of three ways.
 - 1) Total rate may be paid in entirety in the base rate to the employee; in which case, the cash designation will be checked for fringe benefits.
 - 2) Total rate may be paid as listed in prevailing wage rate schedule with total fringe amounts paid approved plans.
 - 3) Total rate may be paid with a combination of base rate and fringe payments to approved plans in amounts other than those listed in schedule.
6. Project Gross: Enter total gross wages earned on the project for straight time and overtime. Project hours "X" base rate should equal project gross.
7. Fringes: If fringe benefits are paid in the hourly base rate, indicate this by marking the **Cash** space. If fringe benefits are paid to approved plans as listed in the prevailing wage rate schedule, mark the space **Approved Plans**. If fringe benefits are paid partially in the base rate and partially to approved plans, mark the space **Cash & Approved Plans**. List the hourly amount paid to approved plans for each fringe. If payments are not made on a per hour basis, **calculate the hourly fringe credit by dividing the yearly employer contribution by** the lesser of: hours actually worked in the year (these must be documented) or **2080**. Fringe benefits include: **Employer's share** of health insurance, life insurance, retirement plan, bonus/profit sharing, sick pay, holiday pay, personal leave, vacation, and education/training programs. If unsure of a possible fringe benefit, contact the Ohio Department of Commerce-Division of Industrial Compliance & Labor-Bureau of Wage and Hour Administration.
8. Total Hours All Jobs: Total all hours worked during the pay period including non-prevailing wage jobs.
9. Total Gross All Jobs: Gross amount earned in the pay period for all hours worked.
10. Self-explanatory.
11. Self-explanatory.

Certified Payroll Report

Report for: _____ **Contract No:** _____ **Payroll No:** _____

Company:¹⁾ _____ **If Sub, GC/Prime Contractor Name:** _____ **Project Name & Location:** _____

Address: _____ **Public Authority (Owner):** _____ **Week Ending:** _____

City, State, Zip _____ **Phone No:** _____ **Sheet:**²⁾ _____ **of** _____

1. Employee Name, Address, & SS# (Last 4 digits if permitted)	2. Work Class ³⁾	3. Prevailing Wage Project Hours Worked - Day & Date							4. Total Hours	5. Base Rate	6. Project Gross	Fringes: ☐ Cash ☐ Cash & Approved Plans	Weekly Payroll Amount							
													Fringe Rate Your Company Pays Per Hour							
													H&W	Pens	Vac	Hol	Other	Total		

1) By signing below, I certify that: (1) I pay, or supervise the payment of the employees shown above; (2) during the pay period reported on this form, all hours worked on this project have been paid at the appropriate prevailing wage rate for the class of work done; (3) the fringe benefits have been paid as indicated above; (4) no rebates or deductions have been made, directly or indirectly from the total wages earned, other than permissible deductions as defined in ORC Chapter 4115; and (5) apprentices are registered with the U.S. Dept. of Labor, Bureau of Apprenticeship and Training. I understand that the willful falsification of any of the above statements may subject the Contractor or Subcontractor to civil or criminal prosecution.

Type or Print Name and Title _____ Signature _____ Date _____

11/14 jc ²⁾Attach additional sheets as necessary. ³⁾Type in continuous line, text will wrap.

Prevailing Wage Notification to Employee

4115.05: ...the contractor or subcontractor shall furnish each employee **NOT covered by a collective bargaining agreement** written notification of the job classification to which the employee is assigned, the prevailing wage determined to be applicable to that classification, separated into the hourly rate of pay and the fringe payments, and the identity of the prevailing wage coordinator appointed by the public authority. The contractor or subcontractor shall furnish the same notification to each affected employee every time the job classification of the employee is changed.

Project Name:	Project Number:
Contractor:	
Project Location:	

Prevailing Wage Coordinator	Employee
Public Authority:	Name:
Name of PWC:	Street:
Street:	City:
City:	State/Zip:
State:	Phone Number:
Zip:	Email:
Phone:	Last 4 Digits of SS#:

You will be performing work on this project that falls under these classifications. You will be paid the appropriate rate for the type of work you are performing.

Classification:	Prevailing Wage Rate Total Package:	Minus your fringe benefits*:	Your hourly base rate and overtime:
			/
			/
			/
			/
			/
			/

Hourly fringe benefits paid on your behalf by this company (Yearly amount the **company pays** divided by 2080):

Fringe	Amount	Fringe	Amount
Health Insurance		Vacation	
Life Pension		Holiday	
Pension		Sick Pay	
Other (Specify):		Training	
Other (Specify):		Total Hourly Fringes *	

Contractor's Signature:	Date:
Employee's Signature:	Date:

Certified payroll Report for Non-Performing Week

Date

Contractor:

Subcontractor:

For week beginning on:

For week ending on:

Payroll Number:

Project Number:

Project location:

CERTIFICATION FOR NON-PERFORMING WEEK

I, *Name of Company* the undersigned, am the Prevailing Wage Coordinator with the authority to act for and on behalf of *Company Name* certify under penalty of perjury that no work was performed for the week ending on *Date*. I herein certify under penalty of perjury that all of the above is true and correct as submitted.

Signature

Name, Title, phone number, email address

Select a County: Wayne

[DOWNLOAD \(PDF\)](#)

☐ Union ↑	Classification	Wage Rate Type	Effective Date	Posted Date	
☐ Asbestos Local 207	Asbestos Worker	Commercial	07/08/2026	07/08/2026	View
☐ Asbestos Local 84 Heat & Frost Insulators	Asbestos Worker	Commercial	06/03/2026	06/03/2026	View
☐ Boilermaker Local 744	Boilermaker	Commercial	06/05/2024	06/05/2024	View
☐ Bricklayer Local 23 (Mansfield)	Bricklayer	Commercial	06/03/2026	06/03/2026	View
☐ Bricklayer Local 23 Heavy Hwy (A)	Bricklayer	Commercial	06/10/2026	06/10/2026	View
☐ Bricklayer Local 23 Heavy Hwy (B)	Bricklayer	Commercial	06/10/2026	06/10/2026	View
☐ Carpenter Commercial Zone NEO 1D	Carpenter	Commercial	07/01/2026	07/01/2026	View
☐ Carpenter Floorlayer Zone NEO 1D	Carpenter	Commercial	07/01/2026	07/01/2026	View
☐ Carpenter Hev Hwy Zone NHH C2-A	Carpenter	Commercial	07/01/2026	07/01/2026	View
☐ Carpenter Insulation Zone NEO 1D	Carpenter	Commercial	07/15/2026	07/15/2026	View
☐ Carpenter Millwright NE Zone M1-C	Carpenter	Commercial	07/01/2026	07/01/2026	View
☐ Carpenter Pile Driver Hev Hwy Zone NHH P3-C	Carpenter	Commercial	07/01/2026	07/01/2026	View
☐ Cement Mason & Plasterer Local 109	Cement Mason & Plasterer	Commercial	06/01/2022	06/01/2022	View
☐ Cement Mason Local 109 Hev Hwy	Cement Mason	Commercial	05/01/2026	04/29/2026	View
☐ Electrical Local 71 High Tension Pipe Type Cable	Electrical	Commercial	01/07/2026	01/07/2026	View
☐ Electrical Local 71 Outside (North Central Ohio)	Electrical	Commercial	06/04/2025	06/04/2025	View
☐ Electrical Local 71 Outside Utility Power	Electrical	Commercial	01/07/2026	01/07/2026	View

	Union ↑	Classification	Wage Rate Type	Effective Date	Posted Date	
☐	Electrical Local 71 Underground Residential Distribution	Electrical	Commercial	01/07/2026	01/07/2026	View
☐	Electrical Local 71 Voice Data Video Outside	Electrical	Commercial	03/06/2024	03/06/2024	View
☐	Elevator Local 45	Elevator	Commercial	03/18/2026	03/18/2026	View
☐	Glazier Local 1162	Glazier	Commercial	05/01/2025	04/30/2025	View
☐	Ironworker Local 550	Ironworker	Commercial	05/01/2026	04/29/2026	View
☐	Labor HevHwy 3	Laborer	Commercial	05/01/2026	04/29/2026	View
☐	Labor Local 1015 Building	Laborer	Commercial	05/27/2026	05/27/2026	View
☐	Operating Engineers - Building Local 18 - Zone III	Operating Engineer	Commercial	05/01/2026	04/29/2026	View
☐	Operating Engineers - HevHwy Zone II	Operating Engineer	Commercial	05/01/2026	04/29/2026	View
☐	Painter Local 639 Sign and Display	Painter	Commercial	06/18/2025	06/18/2025	View
☐	Painter Local 639 Zone 2 Sign	Painter	Commercial	05/28/2025	05/28/2025	View
☐	Painter Local 841	Painter	Commercial	07/29/2026	07/29/2026	View
☐	Painter Local 841 (Drywall Finisher/Taper)	Painter	Commercial	07/29/2026	07/29/2026	View
☐	Painter Local 841 Bridge Painter	Painter	Commercial	07/29/2026	07/29/2026	View
☐	Plumber Pipefitter Local 94	Plumber Pipefitter	Commercial	05/19/2025	05/19/2025	View
☐	Roofer Local 88	Roofer	Commercial	06/17/2026	06/17/2026	View
☐	Sheet Metal Local 33 (Akron)	Sheet Metal Worker	Commercial	06/10/2026	06/10/2026	View
☐	Sheet Metal Local 33 Industrial Door	Sheet Metal Worker	Commercial	08/01/2025	07/30/2025	View
☐	Sprinkler Fitter Local 669	Sprinkler Fitter	Commercial	08/06/2025	08/06/2025	View
☐	Truck Driver Locals 20,40,92,100,175,284,348,377,637,697,908,957 - Bldg & HevHwy Class 1	Truck Driver	Commercial	05/01/2026	04/29/2026	View
☐	Truck Driver Locals 20,40,92,100,175,284,348,377,637,697,908,957 - Bldg & HevHwy Class 2	Truck Driver	Commercial	05/01/2026	04/29/2026	View

Prevailing Wage Rates - Skilled Crafts

Details

Union

Asbestos Local 207

Change#

LCN01-2026ib

Craft

Asbestos Worker

Effective Date

07/08/2026

Posted Date

07/08/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Asbestos Abatement	\$35.25		\$11.20	\$7.50	\$1.00	\$4.00	\$0.00	\$0.05	\$0.00	\$0.00	\$59.00	\$76.63
Trainee	Percent	BHR										
Trainee 1 Year - 600 Hrs	70.920000	\$25.00	\$11.20	\$1.90	\$1.00	\$1.00	\$0.00	\$0.05	\$0.00	\$0.00	\$40.15	\$52.65

Special Calculation Note

Other: Drug Testing

Ratio

3 Journeymen to 1 Trainee

Jurisdiction (* denotes special jurisdictional note)

Adams, Ashland, Ashtabula*, Athens, Auglaize, Brown, Butler*, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Erie*, Fairfield, Fayette, Franklin, Geauga, Greene, Guernsey, Hamilton, Hardin, Harrison, Highland, Hocking, Holmes, Huron, Knox, Lake, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Miami, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Portage, Preble, Richland, Ross, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren*, Wayne

Special Jurisdictional Note

Ashtabula County: (post offices & townships of Ashtabula, Austinburg, Geneva, Harperfield, Jefferson, Plymouth & Saybrook) (townships of Andover, Cherry Valley, Colbrook, Canneaut, Denmark, Dorset, East Orwell, Hartsgrove, Kingville, Lenox, Monroe,Morgan,New Lyme,North Kingsville, Orwell, Pierpoint, Richmond Rock Creek, Rome, Sheffield, Trumbull, Wayne, Williamsfield & Windsor)

Butler County: (townships of Fairfield, Hanover, Liberty, Milford, Morgan, Oxford, Ripley, Ross, St. Clair, Union & Wayne) (Lemon & Madison)

Erie County: (post offices & townships of Berlin, Berlin Heights,Birmingham,Florence, Huron, Milan, Shinrock & Vermilion)

Warren County: (townships of: Deerfield, Hamilton, Harlan, Salem, Union & Washington) (Clear Creek, Franklin, Mossie, Turtle Creek & Wayne)

Details

An Abatement Journeyman is anyone who has more than 600 hours in the Asbestos Abatement field.

Asbestos & lead paint abatement including, but not limited to the removal or encapsulation of asbestos & lead paint, all work in conjunction with the preparation of the removal of same & all work in conjunction with the clean up after said removal. The removal of all insulation materials, whether they contain asbestos or not, from mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) is recognized as being the exclusive work of the Asbestos Abatement Workers.

On all mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) that are going to be demolished, the removal of all insulating materials whether they contain asbestos or not shall be the exclusive work of the Laborers.

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Asbestos Local 84 Heat & Frost Insulators	LCN01-2026ib	Asbestos Worker	06/03/2026	06/03/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Asbestos Insulation Worker	\$40.17		\$9.55	\$10.15	\$0.60	\$0.00	\$7.90	\$0.00	\$0.00	\$0.00	\$68.37	\$88.46
Apprentice	Percent	BHR										
1st Year	60.000000	\$24.10	\$9.55	\$6.09	\$0.60	\$0.00	\$5.74	\$0.00	\$0.00	\$0.00	\$46.08	\$58.13
2nd Year	65.000000	\$26.11	\$9.55	\$6.60	\$0.60	\$0.00	\$6.01	\$0.00	\$0.00	\$0.00	\$48.87	\$61.92
3rd Year	75.020000	\$30.14	\$9.55	\$7.61	\$0.60	\$0.00	\$6.55	\$0.00	\$0.00	\$0.00	\$54.45	\$69.52
4th Year	85.000000	\$34.14	\$9.55	\$8.63	\$0.60	\$0.00	\$7.09	\$0.00	\$0.00	\$0.00	\$60.01	\$77.08

Special Calculation Note

Ratio

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Ashland, Ashtabula*, Carroll, Columbiana, Coshocton, Harrison, Holmes, Mahoning, Medina, Portage, Richland, Stark, Summit, Trumbull, Tuscarawas, Wayne

Special Jurisdictional Note

Ashtabula County: except for the townships of Ashtabula, Austinburg, Geneva, Harpersfield, Jefferson, Plymouth and Saybrook.

Details

The removal of all insulation materials, whether they contain asbestos or not, from mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) is recognized as being the exclusive work of the Asbestos Workers. On all mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) that are going to be demolished, the removal of all insulating materials whether they contain asbestos or not shall be the exclusive work of the Laborers.

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Boilermaker Local 744	LCN01-2024ib	Boilermaker	06/05/2024	06/05/2024

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Boilermaker	\$42.70		\$7.07	\$17.74	\$0.78	\$0.00	\$9.56	\$0.34	\$0.00	\$0.00	\$78.19	\$99.54
Apprentice	Percent	BHR										
1st 6 months	70.000000	\$29.89	\$7.07	\$17.74	\$0.78	\$0.00	\$9.56	\$0.34	\$0.00	\$0.00	\$65.38	\$80.33
2nd 6 months	72.500000	\$30.96	\$7.07	\$17.74	\$0.78	\$0.00	\$9.56	\$0.34	\$0.00	\$0.00	\$66.45	\$81.93
3rd 6 months	75.000000	\$32.03	\$7.07	\$17.74	\$0.78	\$0.00	\$9.56	\$0.34	\$0.00	\$0.00	\$67.52	\$83.53
4th 6 months	77.500000	\$33.09	\$7.07	\$17.74	\$0.78	\$0.00	\$9.56	\$0.34	\$0.00	\$0.00	\$68.58	\$85.13
5th 6 months	80.000000	\$34.16	\$7.07	\$17.74	\$0.78	\$0.00	\$9.56	\$0.34	\$0.00	\$0.00	\$69.65	\$86.73
6th 6 months	85.000000	\$36.30	\$7.07	\$17.74	\$0.78	\$0.00	\$9.56	\$0.34	\$0.00	\$0.00	\$71.79	\$89.93
7th 6 months	90.000000	\$38.43	\$7.07	\$17.74	\$0.78	\$0.00	\$9.56	\$0.34	\$0.00	\$0.00	\$73.92	\$93.14
8th 6 months	95.000000	\$40.57	\$7.07	\$17.74	\$0.78	\$0.00	\$9.56	\$0.34	\$0.00	\$0.00	\$76.06	\$96.34

Special Calculation Note

Other: Training Fund

Ratio

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Ashtabula, Carroll, Coshocton, Cuyahoga, Geauga, Harrison, Holmes, Lake, Lorain, Mahoning, Medina, Portage, Stark, Summit, Trumbull, Tuscarawas, Wayne

Special Jurisdictional Note

Details

Prevailing Wage Rates - Skilled Crafts

Details											
Union			Change#			Craft			Effective Date		Posted Date
Bricklayer Local 23 (Mansfield)			LCN01-2026ib			Bricklayer			06/03/2026		06/03/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Bricklayer	\$37.57		\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$65.41	\$84.20
Pointer Caulker Cleaner	\$37.57		\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$65.41	\$84.20
Tile Setter, Stone, Marble & Cement Masons, Plasterer and Terrazzo & Mosaic Workers	\$37.57		\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$65.41	\$84.20
Tile Marble Terrazzo Finishers	\$32.42		\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$60.26	\$76.47
Lay Out Man	\$37.57		\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$65.41	\$84.20
Saw Man	\$37.57		\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$65.41	\$84.20
Stack Worker	\$39.07		\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$66.91	\$86.45
Refractory Hot Work	\$40.07		\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$67.91	\$87.95
Carbon Masonry and Swing Sand Blasting	\$39.07		\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$66.91	\$86.45
Masonry Maintenance Specialist	\$22.54		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$22.54	\$33.81
Apprentice	Percent	BHR										
1st 6 Months	60.000000	\$22.54	\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$50.38	\$61.65
2nd 6 Months	65.000000	\$24.42	\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$52.26	\$64.47
3rd 6 Months	70.000000	\$26.30	\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$54.14	\$67.29
4th 6 Months	75.000000	\$28.18	\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$56.02	\$70.11
5th 6 Months	80.000000	\$30.06	\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$57.90	\$72.93
6th 6 Months	85.000000	\$31.93	\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$59.77	\$75.73
7th 6 Months	90.000000	\$33.81	\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$61.65	\$78.56
8th 6 Months	95.000000	\$35.69	\$11.13	\$12.30	\$0.91	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$63.53	\$81.38
Mason Trainee 1-90 Days	60.000000	\$22.54	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$22.54	\$33.81
91-365 Days	60.000000	\$22.54	\$11.13	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$33.67	\$44.94
2nd Year	70.000000	\$26.30	\$11.13	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$37.43	\$50.58

Special Calculation Note

APPRENTICES BASED ON % OF EACH CLASS ABOVE PLUS FULL FRINGES

Ratio

1-2 Journeymen to 1 Apprentice
3-4 Journeymen to 2 Apprentices
5-6 Journeymen to 2 Apprentices
6-10 Journeymen to 3 Apprentices

** Apprentices must be hired prior to hiring Mason Trainees**

Mason Finisher Ratio
1 Apprentice permits 1 Mason Trainee
2 Apprentices permits 1 Mason Trainee
3 Apprentices permits 2 Mason Trainees
4 Apprentices permits 2 Mason Trainees

Jurisdiction (* denotes special jurisdictional note)

Ashland, Crawford, Hardin, Holmes, Marion, Morrow, Richland, Wayne, Wyandot

Special Jurisdictional Note

Details

Prevailing Wage Rates - Skilled Crafts

Details				
Union	Change#	Craft	Effective Date	Posted Date
Bricklayer Local 23 Heavy Hwy (A)	LCN02-2026ib	Bricklayer	06/10/2026	06/10/2026

Wage Rates												
			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Cement Mason Bricklayer Sewer Water Works A	\$35.31		\$10.71	\$10.14	\$0.59	\$0.00	\$1.80	\$0.00	\$0.00	\$0.00	\$58.55	\$76.21
Apprentice	Percent	BHR										
1st year	70.000000	\$24.72	\$10.71	\$10.14	\$0.59	\$0.00	\$1.80	\$0.00	\$0.00	\$0.00	\$47.96	\$60.32
2nd year	80.000000	\$28.25	\$10.71	\$10.14	\$0.59	\$0.00	\$1.80	\$0.00	\$0.00	\$0.00	\$51.49	\$65.62
3rd year	90.000000	\$31.78	\$10.71	\$10.14	\$0.59	\$0.00	\$1.80	\$0.00	\$0.00	\$0.00	\$55.02	\$70.91

Special Calculation Note

This rate is not for building construction.

This rate applies only to the Cement Masons. All other Bricklaying, PCC, Stone, Tile, Marble, Refractory, Industrial and all other applicable work performed will be performed under the applicable rates for those contracts.

Ratio

3 Journeymen to 1 Apprentice
6 Journeymen to 2 Apprentice
9 Journeymen to 3 Apprentice
12 Journeymen to 4 Apprentice
15 Journeymen to 5 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Geauga, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note

Details

Bricklayer Local 23 Heavy Hwy (A): Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work.

Bricklayer Local 23 Heavy Hwy (B): Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control, Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

Prevailing Wage Rates - Skilled Crafts

Details				
Union	Change#	Craft	Effective Date	Posted Date
Bricklayer Local 23 Heavy Hwy (B)	LCN02-2026ib	Bricklayer	06/10/2026	06/10/2026

Wage Rates												
			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Cement Mason Bricklayer Power Plants Tunnels Amusement Parks B	\$36.31		\$10.71	\$10.14	\$0.60	\$0.00	\$1.80	\$0.00	\$0.00	\$0.00	\$59.56	\$77.72
Apprentice	Percent	BHR										
1st year	70.000000	\$25.42	\$10.71	\$10.14	\$0.60	\$0.00	\$1.80	\$0.00	\$0.00	\$0.00	\$48.67	\$61.38
2nd year	80.000000	\$29.05	\$10.71	\$10.14	\$0.60	\$0.00	\$1.80	\$0.00	\$0.00	\$0.00	\$52.30	\$66.83
3rd year	90.000000	\$32.68	\$10.71	\$10.14	\$0.60	\$0.00	\$1.80	\$0.00	\$0.00	\$0.00	\$55.93	\$72.27

Special Calculation Note
This rate is not for building construction.
This rate applies only to the Cement Masons. All other Bricklaying, PCC, Stone, Tile, Marble, Refractory, Industrial and all other applicable work performed will be performed under the applicable rates for those contracts.

Ratio
3 Journeymen to 1 Apprentice
6 Journeymen to 2 Apprentice
9 Journeymen to 3 Apprentice
12 Journeymen to 4 Apprentice
15 Journeymen to 5 Apprentice

Jurisdiction (* denotes special jurisdictional note)
Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Geauga, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note

Details
Bricklayer Local 23 Heavy Hwy (A): Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work.
Bricklayer Local 23 Heavy Hwy (B): Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control, Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Carpenter Commercial Zone NEO 1D	LCR01-2026ib	Carpenter	07/01/2026	07/01/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Carpenter	\$37.03		\$9.78	\$11.77	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$63.17	\$81.69
Apprentice	Percent	BHR										
1st 3 Months	60.000000	\$22.22	\$9.78	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$32.00	\$43.11
2nd 3 Months	60.000000	\$22.22	\$9.78	\$0.00	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$36.59	\$47.70
2nd 6 Months is 1st year	65.000000	\$24.07	\$9.78	\$0.00	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$38.44	\$50.48
3rd 6 Months	70.000000	\$25.92	\$9.78	\$0.00	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$40.29	\$53.25
4th 6 Months is 2nd year	75.000000	\$27.77	\$9.78	\$0.00	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$42.14	\$56.02
5th 6 Months	80.000000	\$29.62	\$9.78	\$9.42	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$53.41	\$68.22
6th 6 Months is 3rd year	85.000000	\$31.48	\$9.78	\$10.00	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$55.85	\$71.59
7th 6 Months	90.000000	\$33.33	\$9.78	\$10.59	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$58.29	\$74.95
8th 6 Months is 4th year	95.000000	\$35.18	\$9.78	\$11.18	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$60.73	\$78.32

Special Calculation Note

Other: International Training

Ratio

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Carroll, Stark, Tuscarawas, Wayne

Special Jurisdictional Note

Details

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Carpenter Floorlayer Zone NEO 1D	LCN01-2026ib	Carpenter	07/01/2026	07/01/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Carpenter Floorlayer	\$37.03		\$9.78	\$11.77	\$0.82	\$0.00	\$3.61	\$0.18	\$0.00	\$0.00	\$63.19	\$81.70
Apprentice	Percent	BHR										
1st 3 Months	60.000000	\$22.22	\$9.78	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$32.00	\$43.11
2nd 3 Months	60.000000	\$22.22	\$9.78	\$0.00	\$0.82	\$0.00	\$3.61	\$0.18	\$0.00	\$0.00	\$36.61	\$47.72
2nd 6 Months is 1st year	65.000000	\$24.07	\$9.78	\$0.00	\$0.82	\$0.00	\$3.61	\$0.18	\$0.00	\$0.00	\$38.46	\$50.50
3rd 6 Months	70.000000	\$25.92	\$9.78	\$0.00	\$0.82	\$0.00	\$3.61	\$0.18	\$0.00	\$0.00	\$40.31	\$53.27
4th 6 Months is 2nd year	75.000000	\$27.77	\$9.78	\$0.00	\$0.82	\$0.00	\$3.61	\$0.18	\$0.00	\$0.00	\$42.16	\$56.05
5th 6 Months	80.000000	\$29.62	\$9.78	\$9.42	\$0.82	\$0.00	\$3.61	\$0.18	\$0.00	\$0.00	\$53.43	\$68.24
6th 6 Months is 3rd year	85.000000	\$31.48	\$9.78	\$10.00	\$0.82	\$0.00	\$3.61	\$0.18	\$0.00	\$0.00	\$55.87	\$71.61
7th 6 Months	90.000000	\$33.33	\$9.78	\$10.59	\$0.82	\$0.00	\$3.61	\$0.18	\$0.00	\$0.00	\$58.31	\$74.97
8th 6 Months is 4th year	95.000000	\$35.18	\$9.78	\$11.18	\$0.82	\$0.00	\$3.61	\$0.18	\$0.00	\$0.00	\$60.75	\$78.34

Special Calculation Note

Other: International Training

Ratio

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Carroll, Stark, Tuscarawas, Wayne

Special Jurisdictional Note

Details

Prevailing Wage Rates - Skilled Crafts

Details				
Union	Change#	Craft	Effective Date	Posted Date
Carpenter Hev Hwy Zone NHH C2-A	LCN01-2026ib	Carpenter	07/01/2026	07/01/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Carpenter	\$35.23		\$9.66	\$11.77	\$0.82	\$0.00	\$3.09	\$0.15	\$0.00	\$0.00	\$60.72	\$78.33
Apprentice	Percent	BHR										
1st 3 Months	60.000000	\$21.14	\$9.66	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$30.80	\$41.37
2nd 3 Months	60.000000	\$21.14	\$9.66	\$0.00	\$0.82	\$0.00	\$3.09	\$0.15	\$0.00	\$0.00	\$34.86	\$45.43
2nd 6 Months	65.000000	\$22.90	\$9.66	\$0.00	\$0.82	\$0.00	\$3.09	\$0.15	\$0.00	\$0.00	\$36.62	\$48.07
3rd 6 Months	70.000000	\$24.66	\$9.66	\$0.00	\$0.82	\$0.00	\$3.09	\$0.15	\$0.00	\$0.00	\$38.38	\$50.71
4th 6 Months	75.000000	\$26.42	\$9.66	\$0.00	\$0.82	\$0.00	\$3.09	\$0.15	\$0.00	\$0.00	\$40.14	\$53.35
5th 6 Months	80.000000	\$28.18	\$9.66	\$9.42	\$0.82	\$0.00	\$3.09	\$0.15	\$0.00	\$0.00	\$51.32	\$65.41
6th 6 Months	85.000000	\$29.95	\$9.66	\$10.00	\$0.82	\$0.00	\$3.09	\$0.15	\$0.00	\$0.00	\$53.67	\$68.64
7th 6 Months	90.000000	\$31.71	\$9.66	\$10.59	\$0.82	\$0.00	\$3.09	\$0.15	\$0.00	\$0.00	\$56.02	\$71.88
8th 6 Months	95.000000	\$33.47	\$9.66	\$11.18	\$0.82	\$0.00	\$3.09	\$0.15	\$0.00	\$0.00	\$58.37	\$75.10

Special Calculation Note

Other: Training

Ratio

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Carroll, Stark, Tuscarawas, Wayne

Special Jurisdictional Note

Details

Any construction work as performed within the definitions listed here below, all of which, taken together are "Heavy-Highway Construction" work:

"HIGHWAY CONSTRUCTION" work is defined as work performed to provide a facility to accommodate vehicular or pedestrian traffic and includes, but is not limited to, the construction of all streets, roads, expressways, turnpikes, bridges, drainage structures, grade separations, parking lots, rest areas, alleys, sidewalks, guardrails, fences, and sound barriers, but shall not include construction of buildings. "AIRPORT CONSTRUCTION" work is defined as including site preparation, grading, paving, drainage, fences, sidewalks, driveways, parking areas and similar work incidental to the construction of airfields but shall not include the construction of buildings. "HEAVY CONSTRUCTION" work is defined as including, but not limited to grade separations, foundations (does not include building foundations), abutments, retaining walls, shafts, tunnels, subways, elevators, drainage projects, flood control projects, reclamation projects, reservoirs, water supply projects, water development projects, hydro-electric development, utility transmission lines, including right-of-way clearing, locks, dams, dikes, levees, revetments, channels, channel cutoffs, intakes, dredging projects, jetties, breakwater, docks, harbors; and all municipal and utility construction except construction classified as building construction.

"RAILROAD CONSTRUCTION" work is defined as including, grading, drainage, placing of rails, crossties, ballast and the construction of bridges, and other incidentals for railroads, street railways construction projects and rapid transit system projects, but shall not include the construction of buildings.

"SEWER WATERWORKS AND UTILITY CONSTRUCTION" work is defined as including construction of all storm sewers, sanitary sewers, supplying and distributing waterlines, gas lines, telephone and television conduit, underground electrical lines, and similar utility construction. Main waterline and trunk sewers connecting water works and/or sewage disposal plants are included within this definition.

"SUPPORIVE EXCAVATION AND DEEP FOUNDATIONS" work is all driven and drilled foundations within the building site.

"POWER PLANT SITE" work is defined as all work which is inside the property line, but outside the actual building construction. Such work shall include, but is not limited to, the grading and installation of sewer lines, drainage lines, gas lines, telephone and television conduit, underground electrical lines and similar utility construction, parking lots, bridges, roads, streets, sidewalks, reservoirs, ash pits, storage tanks, ramps and other such construction work performed on the work site, but shall not include the actual excavation for the buildings, foundations or footers or construction of the buildings.

"POLLUTION CONTROL, SEWAGE PLANT, WASTE PLANT AND WATER TREATMENT FACILITIES CONSTRUCTION" WORK shall be all work in construction of pumping stations, waste and sewage disposal plants, incinerator plants, water treatment plants, filtration plants, solid waste disposal and similar pollution control facilities.

"SOLAR & WIND FARM" WORK is considered "HEAVY CONSTRUCTION" and includes all work in the construction of solar fields/farms and wind fields/farms (not installations on buildings).

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Carpenter Insulation Zone NEO 1D	LCN01-2026ib	Carpenter	07/15/2026	07/15/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Carpenter Insulation	\$29.62		\$9.78	\$11.77	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$55.76	\$70.57
Apprentice	Percent	BHR										
1st 3 months	60.000000	\$17.77	\$9.78	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$27.55	\$36.44
2nd 3 months	60.000000	\$17.77	\$9.78	\$0.00	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$32.14	\$41.02
2nd 6 months	65.000000	\$19.25	\$9.78	\$0.00	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$33.62	\$43.24
3rd 6 months	70.000000	\$20.73	\$9.78	\$0.00	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$35.10	\$45.46
4th 6 months	75.000000	\$22.21	\$9.78	\$0.00	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$36.58	\$47.68
5th 6 months	80.000000	\$23.70	\$9.78	\$9.42	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$47.49	\$59.34
6th 6 months	85.000000	\$25.18	\$9.78	\$10.00	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$49.55	\$62.14
7th 6 months	90.000000	\$26.66	\$9.78	\$10.59	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$51.62	\$64.95
8th 6 months	95.000000	\$28.14	\$9.78	\$11.18	\$0.82	\$0.00	\$3.62	\$0.15	\$0.00	\$0.00	\$53.69	\$67.76

Special Calculation Note

*Other is Training

Ratio

1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Carroll, Stark, Tuscarawas, Wayne

Special Jurisdictional Note

Details

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Carpenter Millwright NE Zone M1-C	LCN01-2026ib	Carpenter	07/01/2026	07/01/2026

Wage Rates

		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR										
Carpenter Millwright	\$40.23	\$9.61	\$11.50	\$0.82	\$0.00	\$4.01	\$0.20	\$0.00	\$0.00	\$66.37	\$86.48
Certified Welder	\$41.23	\$9.61	\$11.50	\$0.82	\$0.00	\$4.01	\$0.20	\$0.00	\$0.00	\$67.37	\$87.98
Lay-Out Man on Monorail	\$43.25	\$9.61	\$11.50	\$0.82	\$0.00	\$4.01	\$0.20	\$0.00	\$0.00	\$69.39	\$91.02
Apprentice	Percent	BHR									
1st 6 months	60.000000	\$24.14	\$9.61	\$11.50	\$0.82	\$0.00	\$4.01	\$0.20	\$0.00	\$50.28	\$62.35
2nd 6 months	65.000000	\$26.15	\$9.61	\$11.50	\$0.82	\$0.00	\$4.01	\$0.20	\$0.00	\$52.29	\$65.36
3rd 6 months	70.020000	\$28.17	\$9.61	\$11.50	\$0.82	\$0.00	\$4.01	\$0.20	\$0.00	\$54.31	\$68.39
4th 6 months	75.000000	\$30.17	\$9.61	\$11.50	\$0.82	\$0.00	\$4.01	\$0.20	\$0.00	\$56.31	\$71.39
5th 6 months	80.000000	\$32.18	\$9.61	\$11.50	\$0.82	\$0.00	\$4.01	\$0.20	\$0.00	\$58.32	\$74.41
6th 6 months	85.000000	\$34.20	\$9.61	\$11.50	\$0.82	\$0.00	\$4.01	\$0.20	\$0.00	\$60.34	\$77.44
7th 6 months	90.000000	\$36.21	\$9.61	\$11.50	\$0.82	\$0.00	\$4.01	\$0.20	\$0.00	\$62.35	\$80.45
8th 6 months	95.000000	\$38.22	\$9.61	\$11.50	\$0.82	\$0.00	\$4.01	\$0.20	\$0.00	\$64.36	\$83.47

Special Calculation Note

Other is Training

Ratio

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Carroll, Stark, Tuscarawas, Wayne

Special Jurisdictional Note

Details

The term "Millwright and Machine Erectors" jurisdiction shall mean the unloading, hoisting, rigging, skidding, moving, dismantling, aligning, erecting, assembling, repairing, maintenance and adjusting of all structures, processing areas either under cover, under ground or elsewhere, required to process material, handle, manufacture or service, be it powered or receiving power manually, by steam, gas, electricity, gasoline, diesel, nuclear, solar, water, air or chemically, and in industries such as and including, which are identified for the purpose of description, but not limited to, the following: woodworking plants; canning industries; steel mills; coffee roasting plants; paper and pulp; cellophane; stone crushing; gravel and sand washing and handling; refineries; grain storage and handling; asphalt plants; sewage disposal; water plants; laundries; bakeries; mixing plants; can, bottle and bag packing plants; textile mills; paint mills; breweries; milk processing plants; power plants; aluminum processing or manufacturing plants; and amusement and entertainment fields. The installation of mechanical equipment in atomic energy plants; installation of reactors in power plants; installation of control rods and equipment in reactors; and installation of mechanical equipment in rocket missile bases, launchers, launching gantry, floating bases, hydraulic escape doors and any and all component parts thereto, either assembled, semi-assembled or disassembled. The installation of, but not limited to, the following: setting-up of all engines, motors, generators, air compressors, fans, pumps, scales, hoppers, conveyors of all types, sizes and their supports; escalators; man lifts; moving sidewalks; hoists; dumb waiters; all types of feeding machinery; amusement devices; mechanical pin setters and spotters in bowling alleys; refrigeration equipment; and the installation of all types of equipment necessary and required to process material either in the manufacturing or servicing. The handling and installation of pulleys, gears, sheaves, fly wheels, air and vacuum drives, worm drives and gear drives directly or indirectly coupled to motors, belts, chains, screws, legs, boots, guards, booth tanks, all bin valves, turn heads and indicators, shafting, bearings, cable sprockets, cutting all key seats in new and old work, troughs, chippers, filters, calendars, rolls, winders, rewinders, slitters, cutters, wrapping machines, blowers, forging machines, rams, hydraulic or otherwise, planing, extruder, ball, dust collectors, equipment in meat packing plants, splicing of ropes and cables. The laying-out, fabrication and installation of protection equipment including machinery guards, making and setting of templates for machinery, fabrication of bolts, nuts, pans, drilling of holes for any equipment which the Millwrights install regardless of materials; all welding and burning regardless of type, fabrication of all lines, hose or tubing used in lubricating machinery installed by Millwrights; grinding, cleaning, servicing and any machine work necessary for any part of any equipment installed by the Millwrights; and the break-in and trial run of any equipment or machinery installed by the Millwrights. It is agreed the Millwrights shall use the layout tools and optic equipment necessary to perform their work.

Prevailing Wage Rates - Skilled Crafts

Details				
Union	Change#	Craft	Effective Date	Posted Date
Carpenter Pile Driver Hev Hwy Zone NHH P3-C	LCN01-2026ib	Carpenter	07/01/2026	07/01/2026

Wage Rates												
			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Carpenter Pile Driver	\$34.36		\$9.70	\$11.50	\$0.82	\$0.00	\$4.37	\$0.20	\$0.00	\$0.00	\$60.95	\$78.13
Diver	\$51.54		\$9.70	\$11.50	\$0.82	\$0.00	\$4.37	\$0.20	\$0.00	\$0.00	\$78.13	\$103.90
Certified Welder	\$35.41		\$9.70	\$11.50	\$0.82	\$0.00	\$4.37	\$0.20	\$0.00	\$0.00	\$62.00	\$79.70
Apprentice	Percent	BHR										
1st 6 months	60.000000	\$20.62	\$9.70	\$11.50	\$0.82	\$0.00	\$4.37	\$0.20	\$0.00	\$0.00	\$47.21	\$57.52
2nd 6 months	65.000000	\$22.33	\$9.70	\$11.50	\$0.82	\$0.00	\$4.37	\$0.20	\$0.00	\$0.00	\$48.92	\$60.08
3rd 6 months	70.000000	\$24.05	\$9.70	\$11.50	\$0.82	\$0.00	\$4.37	\$0.20	\$0.00	\$0.00	\$50.64	\$62.67
4th 6 months	75.000000	\$25.77	\$9.70	\$11.50	\$0.82	\$0.00	\$4.37	\$0.20	\$0.00	\$0.00	\$52.36	\$65.25
5th 6 months	80.000000	\$27.49	\$9.70	\$11.50	\$0.82	\$0.00	\$4.37	\$0.20	\$0.00	\$0.00	\$54.08	\$67.83
6th 6 months	85.000000	\$29.21	\$9.70	\$11.50	\$0.82	\$0.00	\$4.37	\$0.20	\$0.00	\$0.00	\$55.80	\$70.41
7th 6 months	90.000000	\$30.92	\$9.70	\$11.50	\$0.82	\$0.00	\$4.37	\$0.20	\$0.00	\$0.00	\$57.51	\$72.97
8th 6 months	95.000000	\$32.64	\$9.70	\$11.50	\$0.82	\$0.00	\$4.37	\$0.20	\$0.00	\$0.00	\$59.23	\$75.55

Special Calculation Note
*Other is Training

Ratio
1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)
Carroll, Stark, Tuscarawas, Wayne

Special Jurisdictional Note

Details
Pile Drivers duties shall include but not limited to: Pile driving, milling, fashioning, joining assembling, erecting, fastening, or dismantling of all material of wood, plastic, metal, fiber, cork and composition and all other substitute materials: pile driving, cutting, fitting and placing of lagging, and the handling, cleaning, erecting, installing and dismantling of machinery, equipment and erecting pre-engineered metal buildings. Pile Drivers work but not limited to: unloading, assembling, erection, repairs, operation, signaling, dismantling and reloading all equipment that is used for pile driving including pile butts is defined as sheeting or scrap piling. Underwater work that may be required in connection with the installation of piling. The driver and his tender work as a team and shall arrive at their own financial arrangements with the contractor. Any configuration of wood, steel, concrete or composite that is jetted, driven or vibrated onto the ground by conventional pile driving equipment for the purpose of supporting a future load that may be permanent or temporary. The construction of all wharves and docks, including the fabrication and installation of floating docks. Driving bracing, plumbing, cutting off and capping of all piling whether wood, metal, pipe piling or composite, loading, unloading, erecting, framing, dismantling, moving and handling of pile driving equipment piling used in the construction and repair of all wharves, docks, piers, trestles, caissons, cofferdams and erection of all sea walls and breakwaters. All underwater and marine work on bulkheads, wharves, docks, shipyards, caissons, piers, bridges, pipeline, work, viaducts, marine cable and trestles, as well as salvage and reclamation work where divers are employed. Rate shall include carpenters, acoustic and ceiling installers, drywall installers, pile drivers and floorlayers.

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Cement Mason & Plasterer Local 109	LCN01-2022sks	Cement Mason & Plasterer	06/01/2022	06/01/2022

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Cement Mason	\$31.74		\$9.09	\$7.35	\$0.70	\$0.00	\$4.74	\$0.07	\$0.00	\$0.00	\$53.69	\$69.56
Plasterer	\$30.61		\$8.75	\$7.35	\$0.70	\$0.00	\$4.75	\$0.07	\$0.00	\$0.00	\$52.23	\$67.54
Apprentice Cement Mason	Percent	BHR										
1st year	70.000000	\$22.22	\$9.09	\$7.35	\$0.70	\$0.00	\$4.74	\$0.07	\$0.00	\$0.00	\$44.17	\$55.28
2nd year	79.980000	\$25.39	\$9.09	\$7.35	\$0.70	\$0.00	\$4.74	\$0.07	\$0.00	\$0.00	\$47.34	\$60.03
3rd year	90.000000	\$28.57	\$9.09	\$7.35	\$0.70	\$0.00	\$4.74	\$0.07	\$0.00	\$0.00	\$50.52	\$64.80
Plasterer Apprentice												
1st year	67.530000	\$21.43	\$8.75	\$7.35	\$0.70	\$0.00	\$4.75	\$0.07	\$0.00	\$0.00	\$43.05	\$53.77
2nd year	77.170000	\$24.49	\$8.75	\$7.35	\$0.70	\$0.00	\$4.75	\$0.07	\$0.00	\$0.00	\$46.11	\$58.36
3rd year	86.800000	\$27.55	\$8.75	\$7.35	\$0.70	\$0.00	\$4.75	\$0.07	\$0.00	\$0.00	\$49.17	\$62.95

Special Calculation Note

Other is for International Training.

Ratio

1 Journeymen to 1 Apprentice 5 Journeymen to 2 Apprentice 10 Journeyman to 3 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Carroll, Holmes, Medina, Portage, Stark, Summit, Tuscarawas, Wayne

Special Jurisdictional Note

Details

Finishers when applying colorshake shall be paid an additional \$2.00 per DAY. Swing Scaffolds up to 50 feet shall be paid \$0.25 above the Journeymen rate. Swing Scaffolds over 50 feet shall be paid \$0.35 above the Journeymen rate.

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Cement Mason Local 109 Hev Hwy	LCN01-2026ib	Cement Mason	05/01/2026	04/29/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Cement Mason	\$37.99		\$9.50	\$7.65	\$0.75	\$0.00	\$3.45	\$0.07	\$0.00	\$0.00	\$59.41	\$78.41
Apprentice	Percent	BHR										
1st Year	70.000000	\$26.59	\$9.50	\$7.65	\$0.75	\$0.00	\$3.45	\$0.07	\$0.00	\$0.00	\$48.01	\$61.30
2nd Year	80.000000	\$30.39	\$9.50	\$7.65	\$0.75	\$0.00	\$3.45	\$0.07	\$0.00	\$0.00	\$51.81	\$67.00
3rd Year	90.000000	\$34.19	\$9.50	\$7.65	\$0.75	\$0.00	\$3.45	\$0.07	\$0.00	\$0.00	\$55.61	\$72.70

Special Calculation Note

Other: International Training Fund

Ratio

- 1 Journeyman to 1 Apprentice
- 2 Journeymen to 1 Apprentice thereafter

Jurisdiction (* denotes special jurisdictional note)

Carroll, Holmes, Medina, Portage, Stark, Summit, Tuscarawas, Wayne

Special Jurisdictional Note

Details

Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site, Heavy Construction, Airport Construction Or Railroad Construction Work, Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work, Pollution Control, Sewer Plant, Waste & Water Plant, Water Treatment Facilities Construction.

Prevailing Wage Rates - Skilled Crafts

Details

Union

Electrical Local 71 High Tension Pipe Type Cable

Change#

LCN01-2026ib

Craft

Electrical

Effective Date

01/07/2026

Posted Date

01/07/2026

Wage Rates

		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR										
Electrical Lineman	\$54.94	\$7.50	\$1.65	\$0.55	\$0.00	\$13.19	\$1.00	\$0.00	\$0.00	\$78.83	\$106.30
Certified Lineman Welder	\$54.94	\$7.50	\$1.65	\$0.55	\$0.00	\$13.19	\$1.00	\$0.00	\$0.00	\$78.83	\$106.30
Certified Cable Splicer	\$54.94	\$7.50	\$1.65	\$0.55	\$0.00	\$13.19	\$1.00	\$0.00	\$0.00	\$78.83	\$106.30
Operator A	\$49.20	\$7.50	\$1.48	\$0.49	\$0.00	\$11.81	\$1.00	\$0.00	\$0.00	\$71.48	\$96.08
Operator B	\$43.52	\$7.50	\$1.31	\$0.44	\$0.00	\$10.44	\$1.00	\$0.00	\$0.00	\$64.21	\$85.97
Operator C	\$34.93	\$7.50	\$1.05	\$0.35	\$0.00	\$8.38	\$1.00	\$0.00	\$0.00	\$53.21	\$70.67
Groundman 0-12 months Exp	\$27.47	\$7.50	\$0.82	\$0.27	\$0.00	\$6.59	\$1.00	\$0.00	\$0.00	\$43.65	\$57.38
Groundman 0-12 months Exp w/CDL	\$30.22	\$7.50	\$0.91	\$0.30	\$0.00	\$7.25	\$1.00	\$0.00	\$0.00	\$47.18	\$62.29
Groundman 1 yr or more	\$30.22	\$7.50	\$0.91	\$0.30	\$0.00	\$7.25	\$1.00	\$0.00	\$0.00	\$47.18	\$62.29
Groundman 1 yr or more w/CDL	\$35.71	\$7.50	\$1.07	\$0.36	\$0.00	\$8.57	\$1.00	\$0.00	\$0.00	\$54.21	\$72.06
Equipment Mechanic A	\$43.52	\$7.50	\$1.31	\$0.44	\$0.00	\$10.44	\$1.00	\$0.00	\$0.00	\$64.21	\$85.97
Equipment Mechanic B	\$39.22	\$7.50	\$1.18	\$0.39	\$0.00	\$9.41	\$1.00	\$0.00	\$0.00	\$58.70	\$78.31
Equipment Mechanic C	\$34.92	\$7.50	\$1.05	\$0.35	\$0.00	\$8.38	\$1.00	\$0.00	\$0.00	\$53.20	\$70.66
X-Ray Technician	\$54.94	\$7.50	\$1.65	\$0.55	\$0.00	\$13.19	\$1.00	\$0.00	\$0.00	\$78.83	\$106.30
Apprentice	Percent	BHR									
1st 1000 hrs	60.000000	\$32.96	\$7.50	\$0.99	\$0.33	\$0.00	\$7.91	\$1.00	\$0.00	\$50.69	\$67.17
2nd 1000 hrs	65.000000	\$35.71	\$7.50	\$1.07	\$0.36	\$0.00	\$8.57	\$1.00	\$0.00	\$54.21	\$72.06
3rd 1000 hrs	70.000000	\$38.46	\$7.50	\$1.15	\$0.38	\$0.00	\$9.23	\$1.00	\$0.00	\$57.72	\$76.95
4th 1000 hrs	75.000000	\$41.20	\$7.50	\$1.24	\$0.41	\$0.00	\$9.89	\$1.00	\$0.00	\$61.24	\$81.84
5th 1000 hrs	80.000000	\$43.95	\$7.50	\$1.32	\$0.44	\$0.00	\$10.55	\$1.00	\$0.00	\$64.76	\$86.74
6th 1000 hrs	85.000000	\$46.70	\$7.50	\$1.39	\$0.47	\$0.00	\$11.21	\$1.00	\$0.00	\$68.27	\$91.62
7th 1000 hrs	90.000000	\$49.45	\$7.50	\$1.48	\$0.49	\$0.00	\$11.87	\$1.00	\$0.00	\$71.79	\$96.52

Special Calculation Note

Other is Health Reimbursement Account

Ratio

1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note

Details

Operator "A": John Henry Rock Drill, D-6 (or equivalent) and above, Trackhoe Digger, (320 Track excavator), Cranes (greater then 25 tons and less than 45 tons).

Operator "B": Cranes (greater than 6 tons and up to 25 tons), Backhoes, Road Tractor, Dozer up to D-5, Pressure Digger- wheeled or tracked, all Tension wire Stringing equipment.

Operator "C": Trench, Backhoe, Riding type vibratory Compactor, Ground Rod Driver, Boom Truck (6 ton & below), Skid Steer Loaders, Material Handler.

Special Notes:

When Cable Splicer helpers are used, they must be a Journeyman Lineman.

Pipe installation, holiday testing, welding, cable splicing operation of vacuum pumps and cable pulling equipment and all work requiring the use of hand tools shall be done by Journeymen and Apprentices. Pipe coating, manhole preparations and conditioning, nitrogen connections and flowmeter installation shall be done by or under the direct supervision of a Journeyman.

At least two (2) Journeyman Linemen in addition to certified lineman welders shall be employed to install high voltage pipe.

When pulling cable, at least six (6) of the workmen shall be no less than Journeyman classifications. When pumping oil, only Journeyman Lineman or equipment operators shall be permitted to operate degasifying and oil pumping equipment

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Electrical Local 71 Outside (North Central Ohio)	LCN01-2025ib	Electrical	06/04/2025	06/04/2025

Wage Rates

		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR										
Electrical Lineman	\$46.03	\$7.50	\$1.38	\$0.46	\$0.00	\$9.20	\$0.50	\$0.00	\$0.00	\$65.07	\$88.09
Traffic Signal & Lighting Journeyman	\$44.43	\$7.50	\$1.33	\$0.44	\$0.00	\$8.89	\$0.50	\$0.00	\$0.00	\$63.09	\$85.31
Equipment Operator	\$40.44	\$7.50	\$1.21	\$0.40	\$0.00	\$8.09	\$0.50	\$0.00	\$0.00	\$58.14	\$78.36
Groundman 0-12 months (W/O CDL)	\$24.52	\$7.50	\$0.74	\$0.25	\$0.00	\$4.90	\$0.50	\$0.00	\$0.00	\$38.41	\$50.67
Groundman 0-12 months (W/CDL) plus	\$26.78	\$7.50	\$0.80	\$0.27	\$0.00	\$5.36	\$0.50	\$0.00	\$0.00	\$41.21	\$54.60
Groundsman greater than 1 Year (W/CDL)	\$29.07	\$7.50	\$0.87	\$0.29	\$0.00	\$5.81	\$0.50	\$0.00	\$0.00	\$44.04	\$58.58
Traffic Signal Apprentices											
1st 1,000 hours	\$26.66	\$7.50	\$0.80	\$0.27	\$0.00	\$5.33	\$0.50	\$0.00	\$0.00	\$41.06	\$54.39
2nd 1,000 hours	\$28.88	\$7.50	\$0.87	\$0.29	\$0.00	\$5.78	\$0.50	\$0.00	\$0.00	\$43.82	\$58.26
3rd 1,000 hours	\$31.10	\$7.50	\$0.93	\$0.31	\$0.00	\$6.22	\$0.50	\$0.00	\$0.00	\$46.56	\$62.11
4th 1,000 hours	\$33.32	\$7.50	\$1.00	\$0.33	\$0.00	\$6.66	\$0.50	\$0.00	\$0.00	\$49.31	\$65.97
5th 1,000 hours	\$35.54	\$7.50	\$1.07	\$0.36	\$0.00	\$7.11	\$0.50	\$0.00	\$0.00	\$52.08	\$69.85
6th 1,000 hours	\$39.99	\$7.50	\$1.20	\$0.40	\$0.00	\$8.00	\$0.50	\$0.00	\$0.00	\$57.59	\$77.59
Apprentice Lineman	Percent	BHR									
1st 1,000 Hours	60.000000	\$27.62	\$7.50	\$0.83	\$0.28	\$0.00	\$5.52	\$0.50	\$0.00	\$42.25	\$56.06
2nd 1,000 Hours	65.000000	\$29.92	\$7.50	\$0.90	\$0.30	\$0.00	\$5.98	\$0.50	\$0.00	\$45.10	\$60.06
3rd 1,000 Hours	70.000000	\$32.22	\$7.50	\$0.97	\$0.32	\$0.00	\$6.44	\$0.50	\$0.00	\$47.95	\$64.06
4th 1,000 Hours	75.000000	\$34.52	\$7.50	\$1.04	\$0.35	\$0.00	\$6.90	\$0.50	\$0.00	\$50.81	\$68.07
5th 1,000 Hours	80.000000	\$36.82	\$7.50	\$1.10	\$0.37	\$0.00	\$7.36	\$0.50	\$0.00	\$53.65	\$72.07
6th 1,000 Hours	85.000000	\$39.13	\$7.50	\$1.17	\$0.39	\$0.00	\$7.82	\$0.50	\$0.00	\$56.51	\$76.07
7th 1,000 Hours	90.000000	\$41.43	\$7.50	\$1.24	\$0.41	\$0.00	\$8.28	\$0.50	\$0.00	\$59.36	\$80.07

Special Calculation Note

Other: Health Reimbursement Fund

Ratio

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Belmont, Carroll, Harrison, Holmes, Jefferson, Medina, Portage, Stark, Summit, Wayne

Special Jurisdictional Note

Details

A groundman when directed shall assist a Journeyman in the performance of his/her work on the ground, including the use of hand tools. A Groundman under no circumstances shall climb poles, towers,ladders, or work from an elevated platform or bucket truck. No more than three (3) Groundmen shall work alone. Jobs with more than three Groundmen shall be supervised by a Groundcrew Foreman, Journeyman Lineman, Journeyman Traffic Signal Technician or an Equipment Operator. Scope of Work: installation and maintenance of highway and street lighting, highway and street sign lighting, electronic message boards and traffic control systems, camera systems, traffic signal work, substation and line construction including overhead and underground projects for private and industrial work as in accordance with the IBEW Constitution. This Agreement includes the operation of all tools and equipment necessary for the installation of the above projects.

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Electrical Local 71 Outside Utility Power	LCN01-2026ib	Electrical	01/07/2026	01/07/2026

Wage Rates

Classification	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Electrical Lineman	\$52.03	\$7.50	\$1.56	\$0.52	\$0.00	\$12.49	\$1.00	\$0.00	\$0.00	\$75.10	\$101.12
Substation Technician	\$52.03	\$7.50	\$1.56	\$0.50	\$0.00	\$12.49	\$1.00	\$0.00	\$0.00	\$75.08	\$101.09
Cable Splicer	\$54.50	\$7.50	\$1.64	\$0.55	\$0.00	\$13.08	\$1.00	\$0.00	\$0.00	\$78.27	\$105.52
Operator A	\$46.61	\$7.50	\$1.40	\$0.47	\$0.00	\$11.19	\$1.00	\$0.00	\$0.00	\$68.17	\$91.47
Operator B	\$41.17	\$7.50	\$1.23	\$0.41	\$0.00	\$9.87	\$1.00	\$0.00	\$0.00	\$61.18	\$81.77
Operator C	\$33.00	\$7.50	\$0.99	\$0.33	\$0.00	\$7.92	\$1.00	\$0.00	\$0.00	\$50.74	\$67.24
Groundman 0-12 months Exp	\$26.02	\$7.50	\$0.78	\$0.26	\$0.00	\$6.24	\$1.00	\$0.00	\$0.00	\$41.80	\$54.81
Groundman 0-12 months Exp w/CDL	\$28.62	\$7.50	\$0.86	\$0.29	\$0.00	\$6.87	\$1.00	\$0.00	\$0.00	\$45.14	\$59.45
Groundman 1 yr or more	\$28.62	\$7.50	\$0.86	\$0.29	\$0.00	\$6.87	\$1.00	\$0.00	\$0.00	\$45.14	\$59.45
Groundman 1 yr or more w/CDL	\$33.82	\$7.50	\$1.01	\$0.34	\$0.00	\$8.12	\$1.00	\$0.00	\$0.00	\$51.79	\$68.70
Equipment Mechanic A	\$41.17	\$7.50	\$1.23	\$0.41	\$0.00	\$9.87	\$1.00	\$0.00	\$0.00	\$61.18	\$81.77
Equipment Mechanic B	\$37.09	\$7.50	\$1.11	\$0.37	\$0.00	\$8.90	\$1.00	\$0.00	\$0.00	\$55.97	\$74.52
Equipment Mechanic C	\$33.00	\$7.50	\$0.99	\$0.33	\$0.00	\$7.92	\$1.00	\$0.00	\$0.00	\$50.74	\$67.24
Line Truck w/auger	\$36.40	\$7.50	\$1.09	\$0.36	\$0.00	\$8.71	\$1.00	\$0.00	\$0.00	\$55.06	\$73.26
Apprentice	Percent	BHR									
1st 1000 hrs	60.000000	\$31.22	\$7.50	\$0.94	\$0.31	\$0.00	\$7.49	\$1.00	\$0.00	\$48.46	\$64.07
2nd 1000 hrs	65.000000	\$33.82	\$7.50	\$1.01	\$0.34	\$0.00	\$8.12	\$1.00	\$0.00	\$51.79	\$68.70
3rd 1000 hrs	70.000000	\$36.42	\$7.50	\$1.09	\$0.36	\$0.00	\$8.74	\$1.00	\$0.00	\$55.11	\$73.32
4th 1000 hrs	75.000000	\$39.02	\$7.50	\$1.17	\$0.39	\$0.00	\$9.37	\$1.00	\$0.00	\$58.45	\$77.96
5th 1000 hrs	80.000000	\$41.62	\$7.50	\$1.25	\$0.44	\$0.00	\$9.99	\$1.00	\$0.00	\$61.80	\$82.61
6th 1000 hrs	85.000000	\$44.23	\$7.50	\$1.33	\$0.44	\$0.00	\$10.61	\$1.00	\$0.00	\$65.11	\$87.22
7th 1000 hrs	90.000000	\$46.83	\$7.50	\$1.40	\$0.47	\$0.00	\$11.24	\$1.00	\$0.00	\$68.44	\$91.86

Special Calculation Note

Other: Health Reimbursement Account

Ratio

(1) Journeyman Lineman to (1) Apprentice

Jurisdiction (* denotes special jurisdictional note)

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note

Details

Operator "A": John Henry Rock Drill, D-6 (or equivalent) and above, Trackhoe Digger, (320 Track excavator), Cranes (greater then 25 tons and less than 45 tons).
Operator "B": Cranes (greater than 6 tons and up to 25 tons), Backhoes, Road Tractor, Dozer up to D-5, Pressure Digger- wheeled or tracked, all Tension wire Stringing equipment.
Operator "C": Trench, Backhoe, Riding type vibratory Compactor, Ground Rod Driver, Boom Truck (6 ton & below), Skid Steer Loaders, Material Handler.

An Official State of Ohio site. [Here's how you know](#)

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Electrical Local 71 Underground Residential Distribution	LCN01-2026ib	Electrical	01/07/2026	01/07/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
URD Electrician	\$39.42		\$7.50	\$1.18	\$0.39	\$0.00	\$9.43	\$1.00	\$0.00	\$0.00	\$58.92	\$78.63
Equipment Operator A	\$35.24		\$7.50	\$1.06	\$0.35	\$0.00	\$8.46	\$1.00	\$0.00	\$0.00	\$53.61	\$71.23
Equipment Operator B	\$32.34		\$7.50	\$0.97	\$0.32	\$0.00	\$7.76	\$1.00	\$0.00	\$0.00	\$49.89	\$66.06
Directional Drill Locator	\$35.24		\$7.50	\$1.06	\$0.35	\$0.00	\$8.46	\$1.00	\$0.00	\$0.00	\$53.61	\$71.23
Directional Drill Operator	\$32.34		\$7.50	\$0.97	\$0.32	\$0.00	\$7.76	\$1.00	\$0.00	\$0.00	\$49.89	\$66.06
Groundman 0-12 months Exp	\$25.50		\$7.50	\$0.77	\$0.26	\$0.00	\$6.12	\$1.00	\$0.00	\$0.00	\$41.15	\$53.90
Groundman 0-12 months Exp w/CDL	\$28.15		\$7.50	\$0.84	\$0.28	\$0.00	\$6.76	\$1.00	\$0.00	\$0.00	\$44.53	\$58.60
Groundman 1 yr or more	\$28.15		\$7.50	\$0.84	\$0.28	\$0.00	\$6.76	\$1.00	\$0.00	\$0.00	\$44.53	\$58.60
Groundman 1 yr or more w/CDL	\$33.47		\$7.50	\$1.00	\$0.33	\$0.00	\$8.03	\$1.00	\$0.00	\$0.00	\$51.33	\$68.06
Apprentice	Percent	BHR										
1st 1000 hrs	80.000000	\$31.54	\$7.50	\$0.95	\$0.32	\$0.00	\$7.57	\$1.00	\$0.00	\$0.00	\$48.88	\$64.65
2nd 1000 hrs	85.000000	\$33.51	\$7.50	\$1.01	\$0.34	\$0.00	\$8.04	\$1.00	\$0.00	\$0.00	\$51.40	\$68.16
3rd 1000 hrs	90.000000	\$35.48	\$7.50	\$1.06	\$0.35	\$0.00	\$8.51	\$1.00	\$0.00	\$0.00	\$53.90	\$71.64
4th 1000 hrs	95.000000	\$37.45	\$7.50	\$1.12	\$0.37	\$0.00	\$8.99	\$1.00	\$0.00	\$0.00	\$56.43	\$75.16

Special Calculation Note

Other: Health Reimbursement Account

Ratio

(1) Journeyman Lineman to (1) Apprentice

Jurisdiction (* denotes special jurisdictional note)

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note

Details

This work applies to projects designated for any outside Underground Residential Distribution construction work for electrical utilities, municipalities and rural electrification projects.

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Electrical Local 71 Voice Data Video Outside	LCN02-2024ib	Electrical	03/06/2024	03/06/2024

Wage Rates

Classification	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Electrical Installer Technician I	\$35.39	\$7.25	\$1.06	\$0.00	\$0.00	\$1.77	\$0.00	\$0.00	\$0.00	\$45.47	\$63.17
Installer Technician II	\$33.37	\$7.25	\$1.00	\$0.00	\$0.00	\$1.67	\$0.00	\$0.00	\$0.00	\$43.29	\$59.98
Installer Repairman	\$33.37	\$7.25	\$1.00	\$0.00	\$0.00	\$1.67	\$0.00	\$0.00	\$0.00	\$43.29	\$59.98
Equipment Operator II	\$24.98	\$7.25	\$0.75	\$0.00	\$0.00	\$1.25	\$0.00	\$0.00	\$0.00	\$34.23	\$46.72
Cable Splicer	\$35.39	\$7.25	\$1.06	\$0.00	\$0.00	\$1.77	\$0.00	\$0.00	\$0.00	\$45.47	\$63.17
Ground Driver W/CDL	\$16.69	\$7.25	\$0.50	\$0.00	\$0.00	\$0.83	\$0.00	\$0.00	\$0.00	\$25.27	\$33.62
Groundman	\$14.57	\$7.25	\$0.44	\$0.00	\$0.00	\$0.73	\$0.00	\$0.00	\$0.00	\$22.99	\$30.28
Trainees	Percent	BHR									
Trainee F	50.010000	\$17.70	\$7.25	\$0.53	\$0.00	\$0.89	\$0.00	\$0.00	\$0.00	\$26.37	\$35.22
Trainee E	58.000000	\$20.53	\$7.25	\$0.62	\$0.00	\$1.03	\$0.00	\$0.00	\$0.00	\$29.43	\$39.69
Trainee D	66.000000	\$23.36	\$7.25	\$0.70	\$0.00	\$1.17	\$0.00	\$0.00	\$0.00	\$32.48	\$44.16
Trainee C	74.000000	\$26.19	\$7.25	\$0.79	\$0.00	\$1.31	\$0.00	\$0.00	\$0.00	\$35.54	\$48.63
Trainee B	82.000000	\$29.02	\$7.25	\$0.87	\$0.00	\$1.45	\$0.00	\$0.00	\$0.00	\$38.59	\$53.10
Trainee A	90.000000	\$31.85	\$7.25	\$0.96	\$0.00	\$1.59	\$0.00	\$0.00	\$0.00	\$41.65	\$57.58

Special Calculation Note

Ratio

1Trainee to 1 Journeyman

Jurisdiction (* denotes special jurisdictional note)

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note

Details

Cable Splicer: Inspect and test lines or cables, analyze results, and evaluate transmission characteristics. Cover conductors with insulation or seal splices with moisture-proof covering. Install, splice, test, and repair cables using tools or mechanical equipment. This will include the splicing of fiber. Installer Technician I: Must know all aspects of telephone and cable work. This is to include aerial, underground, and manhole work. Must know how to climb and run bucket. Must have all the tools required to perform these tasks. Must be able to be responsible for the safety of the crew at all times. Must also have CDL license and have at least 5 years experience. Installer Repairman: Perform tasks of repairing, installing, and testing phone and CATV services. Installer Technician II: Have at least three years of telephone and CATV experience. Must have the knowledge of underground, aerial, and manhole work. Must be able to climb and operate bucket. Must have CDL. Must have all tools needed to perform these tasks. Equipment Operator II: Able to operate a digger derrick or bucket truck. Have at least 3 years of experience and must have a valid CDL license. Groundman W/CDL: Must have a valid CDL license and be able to perform tasks such as: climbing poles, pulling down guys, making up material, and getting appropriate tools for the job. Must have at least 5 year's experience. Groundman: Perform tasks such as: climbing poles, pulling down guys, making up material, and getting appropriate tools for the job. Experience 0-5 years.

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Elevator Local 45	LCN01-2026ib	Elevator	03/18/2026	03/18/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Elevator Mechanic	\$63.14		\$16.37	\$11.06	\$0.85	\$5.05	\$10.70	\$2.38	\$0.00	\$0.00	\$109.55	\$141.12
Assistant. Mechanic	\$50.51		\$16.37	\$11.06	\$0.85	\$4.04	\$10.70	\$1.90	\$0.00	\$0.00	\$95.43	\$120.69
Helper	\$44.20		\$16.37	\$11.06	\$0.85	\$3.54	\$10.70	\$1.66	\$0.00	\$0.00	\$88.38	\$110.48
Apprentice	Percent	BHR										
0-6 months Probation	50.000000	\$31.57	\$0.00	\$0.00	\$0.00	\$1.89	\$0.00	\$0.00	\$0.00	\$0.00	\$33.46	\$49.25
1st year	55.000000	\$34.73	\$16.37	\$11.06	\$0.85	\$2.08	\$10.70	\$1.31	\$0.00	\$0.00	\$77.10	\$94.47
2nd year	65.000000	\$41.04	\$16.37	\$11.06	\$0.85	\$2.46	\$10.70	\$1.55	\$0.00	\$0.00	\$84.03	\$104.55
3rd year	70.000000	\$44.20	\$16.37	\$11.06	\$0.85	\$2.65	\$10.70	\$1.66	\$0.00	\$0.00	\$87.49	\$109.59
4th year	80.000000	\$50.51	\$16.37	\$11.06	\$0.85	\$3.03	\$10.70	\$1.90	\$0.00	\$0.00	\$94.42	\$119.68

Special Calculation Note

Other: Holiday Pay

Ratio

- 1 Journeyman to 1 Apprentice
- 1 Journeyman to 1 Helper
- 1 Journeyman to 1 Assistant Mechanic

Jurisdiction (* denotes special jurisdictional note)

Ashland, Carroll, Columbiana, Coshocton, Harrison, Holmes, Mahoning, Medina, Portage, Richland, Stark, Summit, Trumbull, Tuscarawas, Wayne

Special Jurisdictional Note

Details

Vacation 6%/under 5 years based on regular hourly rate for all hours worked. 8%/over 5 years based on regular hourly rate for all hours worked.

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Glazier Local 1162	LCN01-2025ib	Glazier	05/01/2025	04/30/2025

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Glazier	\$32.87		\$7.75	\$7.04	\$0.38	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$48.04	\$64.48
Apprentice	Percent	BHR										
1st Year	65.000000	\$21.37	\$7.75	\$7.04	\$0.38	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$36.54	\$47.22
2nd Year	75.000000	\$24.65	\$7.75	\$7.04	\$0.38	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$39.82	\$52.15
3rd Year	85.000000	\$27.94	\$7.75	\$7.04	\$0.38	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$43.11	\$57.08
4th Year	95.000000	\$31.23	\$7.75	\$7.04	\$0.38	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.40	\$62.01

Special Calculation Note

Ratio

1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Ashland, Carroll, Coshocton, Holmes, Medina, Portage, Richland, Stark, Summit, Tuscarawas, Wayne

Special Jurisdictional Note

Details

Add \$1.25 per hour for High Pay which is all work that requires the employee be supported by equipment which hangs or suspends from the roof of a building or structure including all repelling .

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Ironworker Local 550	LCN01-2026ib	Ironworker	05/01/2026	04/29/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Ironworker	\$38.65		\$11.52	\$9.52	\$0.81	\$0.00	\$3.50	\$0.21	\$0.00	\$0.00	\$64.21	\$83.53
Apprentice	Percent	BHR										
1st 6 months	65.000000	\$25.12	\$11.52	\$9.52	\$0.81	\$0.00	\$3.50	\$0.21	\$0.00	\$0.00	\$50.68	\$63.24
2nd 6 months	69.000000	\$26.67	\$11.52	\$9.52	\$0.81	\$0.00	\$3.50	\$0.21	\$0.00	\$0.00	\$52.23	\$65.56
3rd 6 months	73.000000	\$28.21	\$11.52	\$9.52	\$0.81	\$0.00	\$3.50	\$0.21	\$0.00	\$0.00	\$53.77	\$67.88
4th 6 months	77.000000	\$29.76	\$11.52	\$9.52	\$0.81	\$0.00	\$3.50	\$0.21	\$0.00	\$0.00	\$55.32	\$70.20
5th 6 months	81.000000	\$31.31	\$11.52	\$9.52	\$0.81	\$0.00	\$3.50	\$0.21	\$0.00	\$0.00	\$56.87	\$72.52
6th 6 months	85.000000	\$32.85	\$11.52	\$9.52	\$0.81	\$0.00	\$3.50	\$0.21	\$0.00	\$0.00	\$58.41	\$74.84
7th 6 months	90.000000	\$34.78	\$11.52	\$9.52	\$0.81	\$0.00	\$3.50	\$0.21	\$0.00	\$0.00	\$60.34	\$77.73
8th 6 months	95.000000	\$36.72	\$11.52	\$9.52	\$0.81	\$0.00	\$3.50	\$0.21	\$0.00	\$0.00	\$62.28	\$80.64

Special Calculation Note

OTHER: JIW Upgrading & Drug Testing Fund

Ratio

- 4 Journeymen to 1 Apprentice
- 1 Journeyman to 1 Apprentice, Spinning of Cable for Suspension Bridge
- 1 Journeyman to 1 Apprentice, Ornamental Work
- 2 Journeymen to 1 Apprentice, Reinforcing Work
- 1 Journeyman to 2 Apprentices, Roadway

Jurisdiction (* denotes special jurisdictional note)

Ashland, Carroll, Columbiana*, Coshocton, Holmes*, Huron, Mahoning*, Medina*, Portage*, Richland, Stark, Summit*, Tuscarawas, Wayne

Special Jurisdictional Note

The jurisdictional line between Local 17 and Local 550 is determined as follows: All territory North of Old Route 224 line to be within the jurisdiction of Local 17. All territory South of Old Route 224 line is to be the jurisdiction of Local 550, except for everything within the City limits of Barberton which shall be under the jurisdiction of Local 17.

Details

Prevailing Wage Rates - Skilled Crafts

Details				
Union	Change#	Craft	Effective Date	Posted Date
Laborer HevHwy 3	LCN01-2026ib	Laborer	05/01/2026	04/29/2026

Wage Rates

Classification	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Laborer Group 1	\$38.77	\$9.45	\$4.60	\$0.45	\$0.00	\$2.50	\$0.00	\$0.10	\$0.00	\$55.87	\$75.25
Group 2	\$38.94	\$9.45	\$4.60	\$0.45	\$0.00	\$2.50	\$0.00	\$0.10	\$0.00	\$56.04	\$75.51
Group 3	\$39.27	\$9.45	\$4.60	\$0.45	\$0.00	\$2.50	\$0.00	\$0.10	\$0.00	\$56.37	\$76.00
Group 4	\$39.72	\$9.45	\$4.60	\$0.45	\$0.00	\$2.50	\$0.00	\$0.10	\$0.00	\$56.82	\$76.68
Watch Person	\$33.50	\$9.45	\$4.60	\$0.45	\$0.00	\$2.50	\$0.00	\$0.10	\$0.00	\$50.60	\$67.35
Apprentice	Percent	BHR									
0-1000 hrs	80.000000	\$31.02	\$9.45	\$4.60	\$0.45	\$0.00	\$2.50	\$0.10	\$0.00	\$48.12	\$63.63
1001-2000 hrs	85.000000	\$32.95	\$9.45	\$4.60	\$0.45	\$0.00	\$2.50	\$0.10	\$0.00	\$50.05	\$66.53
2001-3000 hrs	90.000000	\$34.89	\$9.45	\$4.60	\$0.45	\$0.00	\$2.50	\$0.10	\$0.00	\$51.99	\$69.44
3001-4000 hrs	95.000000	\$36.83	\$9.45	\$4.60	\$0.45	\$0.00	\$2.50	\$0.10	\$0.00	\$53.93	\$72.34
More than 4000 hrs	100.000000	\$38.77	\$9.45	\$4.60	\$0.45	\$0.00	\$2.50	\$0.10	\$0.00	\$55.87	\$75.25

Special Calculation Note

Tunnel Laborer rate with air-pressurized add \$1.00 to the above wage rate.

Commercial Driver's License – Any Laborer required to utilize a valid Commercial Driver's License (CDL), are in compliance with necessary FMCSA regulations and approved by the Contractor to operate a Commercial Motor Vehicle (CMV), shall be paid one dollar (\$1.00) per hour above the base rate for the entirety of their working shift.

Ratio

1 Journeyman to 1 Apprentice
3 Journeymen to 1 Apprentice thereafter

Watchmen have no Apprentices

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Ashland, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Madison, Marion, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Richland, Ross, Scioto, Seneca, Shelby, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wyandot

Special Jurisdictional Note

Hod Carriers and Common Laborers - Heavy, Highway, Sewer, Waterworks, Utility, Airport, Railroad, Industrial and Building Site, Sewer Plant, Waste Water Treatment Facilities Construction

Details

Group 1 Laborer (Construction); Plant Laborer or Yardman, Right-of-way Laborer, Landscape Laborer, Highway Lighting Worker, Signalization Worker, (Swimming) Pool Construction Laborer, Utility Man, *Bridge Man, Handyman, Joint Setter, Flagperson, Carpenter Helper, Waterproofing Laborer, Slurry Seal, Seal Coating, Surface Treatment or Road Mix Laborer, Riprap Laborer & Grouter, Asphalt Laborer, Dump Man (batch trucks), Guardrail & Fence Installer, Mesh Handler & Placer, Concrete Curing Applicator, Scaffold Erector, Sign Installer, Hazardous Waste (level D), Diver Helper, Zone Person and Traffic Control. *Bridge Man will perform work as per the October 31, 1949, memorandum on concrete forms, by and between the United Brotherhood of Carpenters and Joiners of America and the Laborers' International Union of North America, which states in; "the moving, cleaning, oiling and carrying to the next point of erection, and the stripping of forms which are not to be re-used, and forms on all flat arch work shall be done by members of the Laborers' International Union of North America."

Group 2 Asphalt Raker, Screwman or Paver, Concrete Puddler, Kettle Man (pipeline), All Machine-Driven Tools (Gas, Electric, Air), Mason Tender, Brick Paver, Mortar Mixer, Skid Steer, Sheetting & Shoring Person, Surface Grinder Person, Screedperson, Water Blast, Hand Held Wand, Power Buggy or Power Wheelbarrow, Paint Striper, Plastic fusing Machine Operator, Rodding Machine Operator, Pug Mill Operator, Operator of All Vacuum Devices Wet or Dry, Handling of all Pumps 4 inches and under (gas, air or electric), Diver, Form Setter, Bottom Person, Welder Helper (pipeline), Concrete Saw Person, Cutting with Burning Torch, Pipe Layer, Hand Spiker (railroad), Underground Person (working in sewer and waterline, cleaning, repairing and reconditioning), Tunnel Laborer (without air),Caisson, Cofferdam (below 25 feet deep), Air Track and Wagon Drill, Sandblaster Nozzle Person, Hazardous Waste (level B), ***Lead Abatement, Hazardous Waste (level C) ***Includes the erecting of structures for the removal, including the encapsulation and containment of Lead abatement process.

Group 3 Blast and Powder Person, Muckers will be defined as shovel men working directly with the miners, Wrencher (mechanical joints & utility pipeline), Yarner, Top Lander, Hazardous Waste (level A), Concrete Specialist, Curb Setter and Cutter, Grade Checker, Concrete Crew in Tunnels. Utility pipeline Tappers, Waterline, Caulker, Signal Person will receive the rate equal to the rate paid the Laborer classification for which the Laborer is signaling.

Group 4 Miner, Welder, Gunite Nozzle Person A.) The Watchperson shall be responsible to patrol and maintain a safe traffic zone including but not limited to barrels, cones, signs, arrow boards, message boards etc. The responsibility of a watchperson is to see that the equipment, job and office trailer etc. are secure.

Prevailing Wage Rates - Skilled Crafts

Details

Union

Labor Local 1015 Building

Change#

LCN01-2026ib

Craft

Laborer

Effective Date

05/27/2026

Posted Date

05/27/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Laborer Group 1	\$35.62		\$9.45	\$4.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$50.17	\$67.98
Group 2	\$36.62		\$9.45	\$4.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$51.17	\$69.48
Group 3	\$38.12		\$9.45	\$4.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$52.67	\$71.73
Group 4	\$37.87		\$9.45	\$4.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$52.42	\$71.35
Group 5	\$28.66		\$9.45	\$4.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$43.21	\$57.54
Apprentice	Percent	BHR										
0-1000 hrs	70.000000	\$24.93	\$9.45	\$4.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$39.48	\$51.94
1001-2000 hrs	80.000000	\$28.50	\$9.45	\$4.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$43.05	\$57.30
2001-3000 hrs	90.000000	\$32.06	\$9.45	\$4.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$46.61	\$62.64
3001-4000 hrs	100.000000	\$35.62	\$9.45	\$4.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$50.17	\$67.98

Special Calculation Note

Ratio
4 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)
Carroll, Stark, Wayne

Special Jurisdictional Note

Details

Group 1 Building & Construction Laborer, Signalman, Flagman, Tool Cribman, Carpenter Tender, Finisher Tender, Concrete Handler, Utility Construction Laborer, Guard Rail Erectors, Hazardous Waste (Level D)

Group 2 Bottom Man, Scaffold Builder, Tunnel laborer, Pipe Layer, Air and Power Driven Tools, Burner on Demolition Work, Swinging Scaffold, Mucker, Caisson Worker, Cofferdam Worker, Powder Men and Dynamite Blaster, Creosote Worker, Form Setter, Plasterer Tender, Hod Carrier Laser Beam Set-up Man, All confined space work, furnaces, pickle tubs, acid-pits, and Hazardous Waste Level (C)

Group 3 Mason Tender, Mortar Mixer, Stonemason Tender, skid-loader, Hazardous Waste Level (B)

Group 4 Gunnite Operator, Hazardous Waste Level (A)

Group 5 Watchman

Prevailing Wage Rates - Skilled Crafts

Details											
Union			Change#			Craft			Effective Date		Posted Date
Operating Engineers - Building Local 18 - Zone III			LCN01-2026ib			Operating Engineer			05/01/2026		04/29/2026

Wage Rates												
			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Operator Group A	\$47.29		\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$64.74	\$88.39
Operator Group B	\$47.17		\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$64.62	\$88.20
Operator Group C	\$46.13		\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$63.58	\$86.65
Operator Group D	\$44.95		\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$62.40	\$84.88
Operator Group E	\$39.49		\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$56.94	\$76.69
Master Mechanic	\$48.29		\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$65.74	\$89.89
Lift Director	\$48.29		\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$65.74	\$89.89
Cranes & Mobile Concrete Pumps 150'-180'	\$47.79		\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$65.24	\$89.14
Cranes & Mobile Concrete Pumps 180'-249'	\$48.29		\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$65.74	\$89.89
Cranes & Mobile Concrete Pumps 249' and over	\$48.54		\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$65.99	\$90.26
Apprentice	Percent	BHR										
1st Year	50.020000	\$23.65	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$41.10	\$52.92
2nd Year	60.000000	\$28.37	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$45.82	\$60.00
3rd Year	70.000000	\$33.10	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$50.55	\$67.10
4th Year	80.000000	\$37.83	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$55.28	\$74.19
Field Mechanic Trainee												
1st Year	60.000000	\$28.37	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$45.72	\$59.91
2nd Year	70.000000	\$33.10	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$50.45	\$67.00
3rd Year	80.000000	\$37.83	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$55.18	\$74.09
4th Year	90.000000	\$42.56	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$59.91	\$81.19

Special Calculation Note

Other: Education & Safety
Misc: National Training

Note: There will be a 10% increase for the apprentices on top of the percentages listed above provided they are operating mobile equipment.

Ratio

For every (3) Operating Engineer Journeymen employed by the company there may be employed (1) Registered Apprentice or trainee Engineer through the referral when they are available. An apprenice, while employed as part of a crew per Article VIII, paragraph 77, will not be subject to the apprenticeship ratios in this collective bargaining agreement

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Ashland, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Coshocton, Crawford, Darke, Defiance, Delaware, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Madison, Marion, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wyandot

Special Jurisdictional Note

Details
Group A - Barrier Moving Machines; Boiler Operators or Compressor Operators, when compressor or boiler is mounted on crane (Piggyback Operation); Boom Trucks (all types); Cableways Cherry Pickers; Combination - Concrete Mixers & Towers; All Concrete Pumps with Booms; Cranes (all types); Compact Cranes, track or rubber over 4,000 pounds capacity; Cranes self-erecting, stationary, track or truck (all configurations); Derricks (all types); Draglines; Dredges (dipper, clam or suction) 3-man crew; Elevating Graders or Euclid Loaders; Floating Equipment; Forklift (rough terrain with winch/hoist); Gradalls; Helicopter Operators, hoisting building materials; Helicopter Winch Operators, Hoisting building materials; Hoes (All types); Hoists (with two or more drums in use); Horizontal Directional Drill; Hydraulic Gantry (lift system); Laser Finishing Machines; Laser Screed and like equipment; Lift Slab or Panel Jack Operators; Locomotives (all types); Maintenance Operator/Technician(Mechanic Operator/Technician and/or Welder); Mixers, paving (multiple drum); Mobile Concrete Pumps, with booms; Panelboards, (all types on site); Pile Drivers; Power Shovels; Prentice Loader; Rail Tamper (with automatic lifting and aligning device); Rotary Drills (all), used on caissons for foundations and sub-structure; Side Booms; Slip Form Pavers; Straddle Carriers (Building Construction on site); Trench Machines (over 24" wide); Tug Boats.
Group B - Articulating/end dumps (minus \$4.00/hour from Group B rate); Asphalt Pavers; Bobcat-type and/or skid steer loader with hoe attachment greater than 7000 lbs.; Bulldozers; CMI type Equipment; Concrete Saw, Vermeer-type; Endloaders; Hydro Milling Machine; Kolman-type Loaders (Dirt Loading); Lead Greasemen; Mucking Machines; Pettibone-Rail Equipment; Power Graders; Power Scoops; Power Scrapers; Push Cats; Rotomills (all), grinders and planers of all types.
Group C - A-Frames; Air Compressors, Pressurizing Shafts or Tunnels; All Asphalt Rollers; Bobcat-type and/or Skid Steer Loader with or without attachments; Boilers (15 lbs. pressure and over); All Concrete Pumps (without booms with 5 inch system); Fork Lifts (except masonry); Highway Drills - all types (with integral power); Hoists (with one drum); House Elevators (except those automatic call button controlled); Buck Hoists, Transport Platforms, Construction Elevators; Hydro Vac/Excavator (when a second person is needed, the rate of pay will be "Class E"); Man Lifts; Material hoist/elevators; Mud Jacks; Pressure Grouting; Pump Operators (installing or operating Well Points or other types of Dewatering Systems); Pumps (4 inches and over discharge); Railroad Tie (Inserter/Remover); Rotovator (Lime-Soil Stabilizer); Submersible Pumps (4"and over discharge); Switch & Tie Tamperers (without lifting and aligning device); Trench Machines (24" and under); Utility Operators.
Group D - Backfillers and Tampers; Ballast Re-locator; Batch Plant Operators; Bar and Joint Installing Machines; Bull Floats; Burlap and Curing Machines; Clefplanes; Compressors, on building construction; Concrete Mixers, more than one bag capacity; Concrete Mixers, one bag capacity (side loaders); All Concrete Pumps (without boom with 4" or smaller system); Concrete Spreader; Conveyors, used for handling building materials; Crushers; Deckhands; Drum Fireman (in asphalt plants); Farm type tractors pulling attachments; Finishing Machines; Form Trenchers; Generators; Gunite Machines; Hydro-seeders; Pavement Breakers (hydraulic or cable); Post Drivers; Post Hole Diggers; Pressure Pumps (over 1/2") discharge); Road Widening Trenchers; Rollers (except asphalt); Self-propelled sub-graders; Shotcrete Machines; Tire Repairmen; Tractors, pulling sheepfoot post roller or grader; VAC/ALLS; Vibratory Compactors, with integral power; Welders.
Group E – Allen Screed Paver (concrete); Boilers (less than 15 lbs. pressure); Cranes-Compact, track or rubber (under 4,000 pounds capacity); Directional Drill "Locator"; Fueling and greasing +\$3.00; Inboard/outboard Motor Boat Launches; Light Plant Operators; Masonry Fork Lifts; Oilers/Helpers; Power Driven Heaters (oil fired); Power Scrubbers; Power Sweepers; Pumps (under 4 inch discharge); Signalperson, Submersible Pumps (under 4" discharge).
Master Mechanics - Master Mechanic
Cranes 150' – 180' - Boom & Jib 150 - 180 feet Cranes 180' – 249' - Boom & Jib 180 - 249 feet Cranes 250' and over - Boom & Jib 250 feet or over

An Official State of Ohio site. [Here's how you know](#)

Prevailing Wage Rates - Skilled Crafts

Details

Union

Operating Engineers - HevHwy Zone II

Change#

LCN01-2026ib

Craft

Operating Engineer

Effective Date

05/01/2026

Posted Date

04/29/2026

Wage Rates

Classification	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Operator Class A	\$47.29	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$64.74	\$88.39
Operator Class B	\$47.17	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$64.62	\$88.20
Operator Class C	\$46.13	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$63.58	\$86.65
Operator Class D	\$44.95	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$62.40	\$84.88
Operator Class E	\$39.49	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$56.94	\$76.69
Master Mechanic	\$48.29	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$65.74	\$89.89
Lift Director	\$48.29	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$65.74	\$89.89
Crane and Mobile Concrete Pump 150' - 179'	\$47.79	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$65.24	\$89.14
Crane and Mobile Concrete Pump 180' - 249'	\$48.29	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$65.74	\$89.89
Crane and Mobile Concrete Pump 250' and Ove	\$48.54	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$65.99	\$90.26
Apprentice	Percent	BHR									
1st Year	50.000000	\$23.64	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.10	\$41.09	\$52.91
2nd Year	60.000000	\$28.37	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.10	\$45.82	\$60.00
3rd Year	70.000000	\$33.10	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.10	\$50.55	\$67.10
4th Year	80.000000	\$37.83	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.10	\$55.28	\$74.19
Field Mech Trainee											
1st year	60.000000	\$28.37	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$45.72	\$59.91
2nd year	70.000000	\$33.10	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$50.45	\$67.00
3rd year	80.000000	\$37.83	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$55.18	\$74.09
4th year	90.000000	\$42.56	\$10.01	\$6.25	\$1.00	\$0.00	\$0.00	\$0.09	\$0.00	\$59.91	\$81.19

Special Calculation Note

Other: Education & Safety Fund
Misc: National Training

**Apprentices wilt receive a 10% increase on top of the percentages listed above provided they are operating mobile equipment.

Ratio

For every (3) Operating Engineer Journeymen employed by the company, there may be employed (1) Registered Apprentice or Trainee Engineer through the referral when they are available. An Apprentice, while employed as part of a crew per Article VIII, paragraph 68 will not be subject to the apprenticeship ratios in this collective bargaining agreement

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Ashland, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Coshocton, Crawford, Darke, Defiance, Delaware, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lucas, Madison, Marion, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note

Details

Class A - Air Compressors on Steel Erection; Asphalt Plant Engineers (Cleveland District Only); Barrier Moving Machine; Boiler Operators, Compressor Operators, or Generators, when mounted on a rig; Boom Trucks (all types); Cableways; Cherry Pickers; Combination- Concrete Mixers & Towers; Concrete Plants (over 4 yd capacity); Concrete Pumps; Cranes (all types); Compact Cranes track or rubber over 4,000 pounds capacity; Cranes self-erecting stationary, track or truck; Derricks (all types); Draglines; Dredges dipper, clam or suction; Elevating Graders or Euclid Loaders; Floating Equipment (all types); Gradalls; Helicopter Crew (Operator- hoist or winch); Hoes (all types); Hoisting Engines; Hoisting Engines, on shaft or tunnel work; Hydraulic Gantry (lifting system); Industrial-type Tractors; Jet Engine Dryer (D8 or D9) diesel Tractors; Locomotives (standard gauge); Maintenance Operators/Technicians (class A); Mixers, paving (single or double drum); Mucking Machines; Multiple Scrapers; Piledriving Machines (all types); Power Shovels, Prentice Loader; Quad 9 (double pusher); Rail Tamper (with automatic lifting and aligning device); Refrigerating Machines (freezer operation); Rotary Drills, on caisson work; Rough Terrain Fork Lift with winch/hoist; Side Booms; Slip Form Pavers; Survey Crew Party Chiefs; Tower Derricks; Tree Shredders; Trench Machines (over 24" wide); Truck Mounted Concrete Pumps; Tug Boats; Tunnel Machines and /or Mining Machines; Wheel Excavators.

Class B - Asphalt Pavers; Automatic Subgrade Machines, self-propelled (CMI-type); Bobcat-type and /or Skid Steer Loader with hoe attachment greater than 7000 lbs.; Boring Machine Operators (more than 48 inches); Bulldozers; Concrete Saws, Vermeer type; Endloaders; Horizontal Directional Drill (50,000 ft. lbs. thrust and over); Hydro Milling Machine; Kolman-type Loaders (production type-dirt); Lead Greasemen; Lighting and Traffic Signal Installation Equipment includes all groups or classifications; Maintenance Operators/Technicians, Class B; Material Transfer Equipment (shuttle buggy) Asphalt; Pettibone-Rail Equipment; Power Graders; Power Scrapers; Push Cats; Rotomills (all), Grinders and Planners of all types, Groovers (excluding walk-behinds); Trench Machines (24 inch wide and under).

Class C - A-Frames; Air Compressors, on tunnel work (low Pressure); Articulating/straight bed end dumps if assigned (minus \$4.00 per hour); Asphalt Plant Engineers (Portage and Summit Counties only); Bobcat-type and/or skid steer loader with or without attachments; Drones; Highway Drills (all types); HydroVac/Excavator (when a second person is needed, the rate of pay will be "Class E"); Locomotives (narrow gauge); Material Hoist/Elevators; Mixers, concrete (more than one bag capacity); Mixers, one bag capacity (side loader); Power Boilers (over 15 lbs. pressure); Pump Operators (installing or operating well Points); Pumps (4 inch and over discharge); Railroad Tie Inserter/Remove; Rollers, Asphalt; Rotovator (lime-soil Stabilizer); Switch & Tie Tampers (without lifting and aligning device); Utilities Operators, (small equipment); Welding Machines and Generators.

Class D - Backfillers and Tampers; Ballast Re-locator; Bar and Joint Installing Machines; Batch Plant Operators; Boring Machine Operators (48 inch or less); Bulk Floats; Burlap and Curing Machines; Concrete Plants (capacity 4 yds. and under); Concrete Saws (multiple); Conveyors (highway); Crushers; Deckhands; Farm type tractors, with attachments (highway); Finishing Machines; Firemen, Floating Equipment (all types); Fork Lifts (highway), except masonry; Form Trenchers; Hydro Hammers; Hydro Seeders; Pavement Breakers (hydraulic or cable); Plant Mixers; Post Drivers; Post Hole Diggers; Power Brush Burners; Power Form Handling Equipment; Road Widening Trenchers; Rollers (brick, grade, macadam); Self-Propelled Power Spreaders; Self-Propelled Sub-Graders; Steam Firemen; Survey Instrument men; Tractors, pulling sheepfoot rollers or graders; Vibratory Compactors, with integral power.

Class E - Compressors (portable, Sewer, Heavy and Highway); Cranes-Compact, track or rubber under 4,000 pound capacity; Drum Firemen (asphalt plant); Fueling and greasing (Primary Operator with Specialized CDL Endorsement Add \$3.00/hr); Generators; Inboard-Outboard Motor Boat Launches; Masonry Fork Lifts; Oil Heaters (asphalt plant); Oilers/Helpers; Power Driven Heaters (oil fired); Power Scrubbers; Power Sweepers; Pumps (under 4 inch discharge); Signalperson; Survey Rodmen or Chairmen; Tire Repairmen; VAC/ALLS.

Master Mechanic - Master Mechanic

Cranes and Mobile Concrete Pumps 150' -179' - Boom & Jib 150 - 179 feet Cranes and Mobile Concrete Pumps 180' - 249' - Boom & Jib 180 - 249 feet Cranes and Mobile Concrete Pumps 250' and over - Boom & Jib 250 feet or over

Prevailing Wage Rates - Skilled Crafts

Details

Union

Painter Local 639 Sign and Display

Change#

LCN01-2025ib

Craft

Painter

Effective Date

06/18/2025

Posted Date

06/18/2025

Wage Rates

		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR										
Top Mechanic Class A	\$27.53	\$4.50	\$0.00	\$0.00	\$0.00	\$0.00	\$1.45	\$0.00	\$0.00	\$33.48	\$47.25
Top Mechanic Class B	\$27.53	\$4.50	\$0.75	\$0.00	\$0.53	\$0.00	\$1.45	\$0.00	\$0.00	\$34.76	\$48.53
Top Helper Class A	\$22.33	\$4.50	\$0.00	\$0.00	\$0.00	\$0.00	\$1.20	\$0.00	\$0.00	\$28.03	\$39.20
Top Helper Class B	\$22.33	\$4.50	\$0.75	\$0.00	\$0.43	\$0.00	\$1.20	\$0.00	\$0.00	\$29.21	\$40.38
Helper Class A	\$17.19	\$4.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.90	\$0.00	\$0.00	\$22.59	\$31.19
Helper Class B	\$17.19	\$4.50	\$0.75	\$0.00	\$0.30	\$0.00	\$0.90	\$0.00	\$0.00	\$23.64	\$32.24
New Hire (90 Days)	\$15.75	\$4.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.55	\$0.00	\$0.00	\$20.80	\$28.68

Special Calculation Note

Other: Sick, Personal & Holiday Pay Swing Stage Rate: Employees shall receive a differential of \$1.50 per hour for all hours worked on scaffolds four sections or higher, including any boom lifts and swing stage scaffolds. In addition, the rigging and derigging of hanging/suspended swing stage systems and rappelling/bolson chair work of a single employee will qualify for \$1.50 differential, will be paid to a single lead Top Mechanic or single lead Top Helper on any given swing stage job, even when it includes multiple running rigs on a single jobsite.

Ratio

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Geauga, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note

Details

The work performed by employees covered by this rate shall include cleaning and refinishing of architectural metals using chemicals, solvents, coatings and hand-applied lacquer thinner, removing scratches from mirror finished metals, burnishing of bronze, statuary finishes on exterior and interior surfaces during the course of the restoration and maintenance of architectural metals, and other specialty metal finishing work, and the use of all tools required to perform such work, including but not limited to polishes, spray equipment and scaffolding. Class A: Less Than 1 Year of Service Class B: More Than 1 Year of Service Top Mechanic: Top Mechanic shall be responsible for ensuring the highest quality of workmanship by Helpers, and be highly competent and knowledgeable in the following areas: coatings, both solvent and waterborne, spraying ability, stainless steel, aluminum and bronze finishing, scaffolding and swing stage work. The Top Mechanic shall also be responsible for providing necessary training of employees in lower classifications and for directing all employees in his/her crew to perform their responsibilities in a productive and efficient manner. Top Helper: For existing Top Helpers at the time of this Agreement shall, in addition to performing the responsibilities of a Helper, be responsible and accountable for the setup, breakdown, safety and quality of the Company's product. Helper: A Helper shall be responsible for performing tasks in refinishing, compliance with safety procedures, setting up and breaking down job sites, setting up and breaking down scaffolding and swing stages, preparing surfaces for refinishing, including but not limited to masking and stripping, cleaning, oxidizing, polishing and scratch removal on various finishes.

Prevailing Wage Rates - Skilled Crafts

Details

Union

Painter Local 639 Zone 2 Sign

Change#

LCN01-2025ib

Craft

Painter

Effective Date

05/28/2025

Posted Date

05/28/2025

Wage Rates

Classification	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Painter Sign Journeyman Tech/Team Leader Class A	\$26.56	\$3.36	\$0.21	\$0.00	\$0.00	\$0.00	\$0.72	\$0.00	\$0.00	\$30.85	\$44.13
Painter Sign Journeyman Tech/Team Leader Class B	\$26.56	\$3.36	\$0.21	\$0.00	\$0.51	\$0.00	\$0.72	\$0.00	\$0.00	\$31.36	\$44.64
Painter Sign Journeyman Tech/Team Leader Class C	\$26.56	\$3.36	\$0.21	\$0.00	\$1.02	\$0.00	\$0.72	\$0.00	\$0.00	\$31.87	\$45.15
Painter Sign Journeyman Tech/Team Leader Class D	\$26.56	\$3.36	\$0.21	\$0.00	\$1.53	\$0.00	\$0.72	\$0.00	\$0.00	\$32.38	\$45.66
Sign Journeyman Class A	\$26.27	\$3.36	\$0.21	\$0.00	\$0.00	\$0.00	\$0.71	\$0.00	\$0.00	\$30.55	\$43.69
Sign Journeyman Class B	\$26.27	\$3.36	\$0.21	\$0.00	\$0.51	\$0.00	\$0.71	\$0.00	\$0.00	\$31.06	\$44.20
Sign Journeyman Class C	\$26.27	\$3.36	\$0.21	\$0.00	\$1.01	\$0.00	\$0.71	\$0.00	\$0.00	\$31.56	\$44.70
Sign Journeyman Class D	\$26.27	\$3.36	\$0.21	\$0.00	\$1.52	\$0.00	\$0.71	\$0.00	\$0.00	\$32.07	\$45.21
Tech Sign Fabrication/ Erector Class A	\$20.67	\$3.36	\$0.21	\$0.00	\$0.00	\$0.00	\$0.56	\$0.00	\$0.00	\$24.80	\$35.14
Tech Sign Fabrication/ Erector Class B	\$20.67	\$3.36	\$0.21	\$0.00	\$0.40	\$0.00	\$0.56	\$0.00	\$0.00	\$25.20	\$35.54
Tech Sign Fabrication/ Erector Class C	\$20.67	\$3.36	\$0.21	\$0.00	\$0.80	\$0.00	\$0.56	\$0.00	\$0.00	\$25.60	\$35.94
Tech Sign Fabrication/ Erector Class D	\$20.67	\$3.36	\$0.21	\$0.00	\$1.19	\$0.00	\$0.56	\$0.00	\$0.00	\$25.99	\$36.33

Special Calculation Note

Other is for paid holidays.

Ratio

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Auglaize, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Greene, Hamilton, Hancock, Hardin, Henry, Highland, Holmes, Huron, Jackson, Knox, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Mercer, Miami, Montgomery, Morrow, Muskingum, Ottawa, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Trumbull, Tuscarawas, Union, Van Wert, Warren, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note

Details

Class A: less that 1 year. Class B: 1-3 years. Class C; 3-10 years. Class D: More than 10 years.

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Painter Local 841	LCN01-2026ib	Painter	07/29/2026	07/29/2026

Wage Rates

Classification	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Painter Brush Roll & Paperhanger	\$33.52	\$8.16	\$9.00	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$53.08	\$69.84
Painter Spray Gun Operator Any and all Coatings)	\$34.37	\$8.16	\$9.00	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$53.93	\$71.11
Swing Scaffold, Bosun Chair, & Window Jacks	\$37.27	\$8.16	\$9.00	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$56.83	\$75.47
Sandblast, Painting of Standpipes, etc. from Scaffolds Open Structural Steel, Standpipes and Water Towers	\$34.77	\$8.16	\$9.00	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$54.33	\$71.72
Epoxy Application	\$34.52	\$8.16	\$9.00	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$54.08	\$71.34
Synthetic Exterior, Lead Abatement, Asbestos Removal	\$34.77	\$8.16	\$9.00	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$54.33	\$71.72
Apprentice	Percent	BHR									
1st Year	65.000000	\$21.79	\$8.16	\$3.70	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$36.05	\$46.95
2nd Year	75.000000	\$25.14	\$8.16	\$4.27	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$39.97	\$52.54
3rd Year	85.000000	\$28.49	\$8.16	\$4.85	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$43.90	\$58.14
4th Year	95.000000	\$31.84	\$8.16	\$5.77	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$48.17	\$64.09

Special Calculation Note

Apprentice pay based on percentage of above appropriate classification.

Night Rate: from 8:00 p.m. to 6:00 a.m. of the regular work week shall be paid for at the rate of \$3.00 per hour above the classification worked rate.

LIGHT COMMERCIAL: The wage rate to be paid for all work on light commercial will be \$1.35 per hour less than the Base Rate for jobs where the total invoice to the customer from the company amounts to less than \$60,000.

Ratio

1 Journeyman to 1 Apprentice
3 Journeymen to 1 Apprentice Thereafter

Jurisdiction (* denotes special jurisdictional note)

Carroll, Coshocton, Holmes, Medina, Portage*, Stark, Summit*, Tuscarawas, Wayne

Special Jurisdictional Note

Summit Cnty: South of and including the Ohio Turnpike, Portage Cnty: North to and including the Ohio Turnpike

Details

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Painter Local 841 (Drywall Finisher/Taper)	LCN01-2026ib	Painter	07/29/2026	07/29/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Painter Drywall Finisher/PainterTaper	\$35.02		\$8.16	\$9.00	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$54.58	\$72.09
Apprentice	Percent	BHR										
1st Year	75.000000	\$26.27	\$8.16	\$3.85	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$40.68	\$53.81
2nd Year	85.000000	\$29.77	\$8.16	\$4.80	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$45.13	\$60.02
3rd Year	95.000000	\$33.27	\$8.16	\$5.77	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$49.60	\$66.23

Special Calculation Note

Night Rate: from 8:00 p.m. to 6:00 a.m. of the regular work week shall be paid for at the rate of \$3.00 per hour above the classification worked rate.

Ratio

1 Journeyman to 1 Apprentice
3 Journeymen to 1 Apprentice Thereafter

Jurisdiction (* denotes special jurisdictional note)

Carroll, Coshocton, Holmes, Medina, Portage*, Stark, Summit*, Tuscarawas, Wayne

Special Jurisdictional Note

Summit County South of and including the Ohio Turnpike, Portage Cnty: North of and including the Ohio Turnpike

Details

Prevailing Wage Rates - Skilled Crafts

Details				
Union	Change#	Craft	Effective Date	Posted Date
Painter Local 841 Bridge Painter	LCN01-2026ib	Painter	07/29/2026	07/29/2026

Wage Rates

Classification	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Painter Bridge Blaster Class 1	\$43.19	\$8.16	\$9.00	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$62.75	\$84.34
Class 2 Bridge Painter, Rigger, Containment Builder, Spot Blaster	\$40.19	\$8.16	\$9.00	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$59.75	\$79.84
Class 3 Equipment Operator/Field Mechanic, Grit Reclamation, Paint Mixer, Traffic Control, Boat Person, Dive (0-5 Years Exp)	\$33.19	\$8.16	\$9.00	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$52.75	\$69.34
Class 3 Equipment Operator/Field Mechanic, Grit Reclamation, Paint Mixer, Traffic Control, Boat Person, Dive (5 plus Years Exp).	\$36.19	\$8.16	\$9.00	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$55.75	\$73.84
Class 4 Concrete Sealing, Concrete Blasting/Power Washing/Etc.	\$36.19	\$8.16	\$9.00	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$55.75	\$73.84
Class 5 Quality Control/Quality Assurance Traffic Safety, Competent Person.	\$36.19	\$8.16	\$9.00	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$0.00	\$55.75	\$73.84
Apprentice	Percent	BHR									
1st Year	65.000000	\$28.07	\$8.16	\$3.70	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$42.33	\$56.37
2nd Year	75.000000	\$32.39	\$8.16	\$4.27	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$47.22	\$63.41
3rd year	85.000000	\$36.71	\$8.16	\$4.85	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$52.12	\$70.47
4th Year	95.000000	\$41.03	\$8.16	\$5.77	\$0.40	\$0.00	\$2.00	\$0.00	\$0.00	\$57.36	\$77.88

Special Calculation Note

Apprentice pay based on percentage of above appropriate classification.

Night Rate: from 8:00 p.m. to 6:00 a.m. of the regular work week shall be paid for at the rate of \$3.00 per hour above the classification worked rate.

LIGHT COMMERCIAL: The wage rate to be paid for all work on light commercial will be \$1.35 per hour less than the Base Rate for jobs where the total invoice to the customer from the company amounts to less than \$60,000.

Ratio

1 Journeyman to 1 Apprentice
3 Journeymen to 1 Apprentice Thereafter

Jurisdiction (* denotes special jurisdictional note)

Carroll, Coshocton, Holmes, Medina, Portage*, Stark, Summit*, Tuscarawas, Wayne

Special Jurisdictional Note

Summit County: South of and including the Ohio Turnpike, Portage County: North to and including the Ohio Turnpike

Details

Class 1 – Abrasive blasting of any kind

Class 2 – Bridge painting, coating applications of any kind. All steel surface preparation other than abrasive blasting. All necessary rigging and containment building and all remedial/ spot blasting.

Class 3 – Tend to all equipment including but not limited to abrasive blasting, power washing, spray painting, forklifts, hoists, truck, etc. Load and unloading trucks, handle materials, man safety boats, handle traffic control, clean up/ vacuum abrasive blast materials and related tasks.

Class 4 – All aspects of concrete coating/ sealing including but not limited to preparation, containment, etc.

Class 5 – Verify and record that all work is completed according to job specifications. Assure that all health and safety standards are adhered to. Assure all traffic is safely handled.

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Plumber Pipefitter Local 94	OCR01-2025ib	Plumber Pipefitter	05/19/2025	05/19/2025

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Plumber Pipefitter	\$41.23		\$10.73	\$6.29	\$0.97	\$0.00	\$6.80	\$0.10	\$0.00	\$0.00	\$66.12	\$86.74
Apprentice	Percent	BHR										
1st Year	45.000000	\$18.55	\$10.73	\$0.00	\$0.97	\$0.00	\$3.40	\$0.10	\$0.00	\$0.00	\$33.75	\$43.03
2nd Year	55.000000	\$22.68	\$10.73	\$0.50	\$0.97	\$0.00	\$3.40	\$0.10	\$0.00	\$0.00	\$38.38	\$49.71
3rd Year	60.000000	\$24.74	\$10.73	\$0.50	\$0.97	\$0.00	\$3.40	\$0.10	\$0.00	\$0.00	\$40.44	\$52.81
4th Year	70.000000	\$28.86	\$10.73	\$0.50	\$0.97	\$0.00	\$5.10	\$0.10	\$0.00	\$0.00	\$46.26	\$60.69
5th Year	80.000000	\$32.98	\$10.73	\$0.50	\$0.97	\$0.00	\$5.10	\$0.10	\$0.00	\$0.00	\$50.38	\$66.88

Special Calculation Note

Other is International Training Fund.

Ratio

1 Journeymen to 2 Apprentice 4 Journeymen to 3 Apprentice 6 Journeymen to 4 Apprentice 9 Journeymen to 5 Apprentice 11 Journeyman to 6 Apprentice 3 Journeyman to 1 Apprentice Thereafter

Jurisdiction (* denotes special jurisdictional note)

Carroll*, Stark, Wayne

Special Jurisdictional Note

In Carroll County the following townships are included: Ross, Monroe, Union, Lee, Orange, Perry and London.

Details

Prevailing Wage Rates - Skilled Crafts

Details				
Union	Change#	Craft	Effective Date	Posted Date
Roofer Local 88	ORC01-2026ib	Roofer	06/17/2026	06/17/2026

Wage Rates												
		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate	
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)			
Classification	BHR											
Roofer	\$35.00	\$10.91	\$10.80	\$0.40	\$0.00	\$3.10	\$0.21	\$0.00	\$0.00	\$60.42	\$77.92	
HELPERS												
Helper -500 Hrs. 1st 6 months	\$20.00	\$2.25	\$0.00	\$0.40	\$0.00	\$3.10	\$0.21	\$0.00	\$0.00	\$25.96	\$35.96	
Helper - 500 Hrs. 2nd 6 months	\$22.75	\$10.91	\$10.80	\$0.40	\$0.00	\$3.10	\$0.21	\$0.00	\$0.00	\$48.17	\$59.55	
2nd year Helper	\$24.50	\$10.91	\$10.80	\$0.40	\$0.00	\$3.10	\$0.21	\$0.00	\$0.00	\$49.92	\$62.17	
3rd year Helper	\$26.25	\$10.91	\$10.80	\$0.40	\$0.00	\$3.10	\$0.21	\$0.00	\$0.00	\$51.67	\$64.80	
4th year Helper	\$28.00	\$10.91	\$10.80	\$0.40	\$0.00	\$3.10	\$0.21	\$0.00	\$0.00	\$53.42	\$67.42	
5th year Helper	\$29.75	\$10.91	\$10.80	\$0.40	\$0.00	\$3.10	\$0.21	\$0.00	\$0.00	\$55.17	\$70.05	
Apprentice	Percent	BHR										
1st 6 months w/500 hrs	65.000000	\$22.75	\$10.91	\$10.80	\$0.40	\$0.00	\$3.10	\$0.21	\$0.00	\$0.00	\$48.17	\$59.55
2nd 6 months w/500 hrs	70.000000	\$24.50	\$10.91	\$10.80	\$0.40	\$0.00	\$3.10	\$0.21	\$0.00	\$0.00	\$49.92	\$62.17
3rd 6 months w/500 hrs	75.000000	\$26.25	\$10.91	\$10.80	\$0.40	\$0.00	\$3.10	\$0.21	\$0.00	\$0.00	\$51.67	\$64.80
4th 6 months w/500 hrs	80.000000	\$28.00	\$10.91	\$10.80	\$0.40	\$0.00	\$3.10	\$0.21	\$0.00	\$0.00	\$53.42	\$67.42
5th 6 months w/500 hrs	85.000000	\$29.75	\$10.91	\$10.80	\$0.40	\$0.00	\$3.10	\$0.21	\$0.00	\$0.00	\$55.17	\$70.05
6th 6 months w/500 hrs	90.000000	\$31.50	\$10.91	\$10.80	\$0.40	\$0.00	\$3.10	\$0.21	\$0.00	\$0.00	\$56.92	\$72.67
7th 6 months w/500 hrs	95.000000	\$33.25	\$10.91	\$10.80	\$0.40	\$0.00	\$3.10	\$0.21	\$0.00	\$0.00	\$58.67	\$75.30

Special Calculation Note
Other: \$0.07 Drug Education, \$0.05 Construction Industry Development Board, \$0.09 International Training Fund
Roofers working in any form of coal tar pitch, whether hot or cold, installing and/or removing will be paid \$.25 more per hour.

Ratio
1 Journeyman to 1 Apprentice to 1 Helper
No helper shall be used on any one job unless 1 Journeyman and 1 Apprentice are working on said job

Jurisdiction (* denotes special jurisdictional note)
Ashland, Carroll, Coshocton, Crawford, Holmes, Huron, Medina, Portage, Richland, Stark, Summit, Tuscarawas, Wayne

Special Jurisdictional Note

Details

Prevailing Wage Rates - Skilled Crafts

Details

Union

Sheet Metal Local 33 (Akron)

Change#

LCN01-2026sks

Craft

Sheet Metal Worker

Effective Date

06/10/2026

Posted Date

06/10/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Sheet Metal Worker	\$39.19		\$10.30	\$14.36	\$0.97	\$0.00	\$8.00	\$0.00	\$0.00	\$0.00	\$72.82	\$92.41
Apprentice	Percent	BHR										
1st Year	60.000000	\$23.51	\$10.30	\$4.91	\$0.21	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.93	\$50.69
2nd Year	65.000000	\$25.47	\$10.30	\$6.58	\$0.97	\$0.00	\$4.00	\$0.00	\$0.00	\$0.00	\$47.32	\$60.05
3rd Year	70.000000	\$27.43	\$10.30	\$6.99	\$0.97	\$0.00	\$4.00	\$0.00	\$0.00	\$0.00	\$49.69	\$63.40
4th Year	80.000000	\$31.35	\$10.30	\$7.80	\$0.97	\$0.00	\$4.00	\$0.00	\$0.00	\$0.00	\$54.42	\$70.09

Special Calculation Note

No special calculations for this skilled craft wage rate are required at this time.

Ratio

1 Journeymen to 1 Apprentice
2 Journeymen to 1 Apprentice
3 Journeymen to 2 Apprentice
4 Journeymen to 2 Apprentice
5-7 Journeymen to 3 Apprentice
8-10 Journeymen to 4 Apprentice
11-13 Journeymen to 5 Apprentice
14-15 Journeymen to 6 Apprentice and maintaining a 3 to 1 apprentice ratio thereafter.

Jurisdiction (* denotes special jurisdictional note)

Ashland, Carroll, Coshocton, Crawford, Holmes, Medina, Portage, Richland, Stark, Summit, Tuscarawas, Wayne

Special Jurisdictional Note

Details

Scope of Work: This Agreement covers the rates of pay and conditions of employment of all employees of the Employer engaged in, but not limited to, the a) manufacture, fabrication, assembling, handling, erection, installation, dismantling, conditioning, adjustment, alteration, repairing and servicing of all ferrous or non-ferrous metal work and all other materials used in lieu thereof and of all HVAC systems, air-veyor systems, exhaust systems, and air handling systems regardless of material used, including the setting of all equipment and all reinforcements in connection therewith; (b) all lagging over insulation and all duct-lining; (c) testing, servicing, and balancing of all air-handling equipment and duct work; (d) the preparation of all shop and field sketches, whether manually drawn or computer assisted, used in fabrication and erection, including those taken from original architectural and engineering drawings or sketches, and (e) metal roofing; and (f) all other work included in the jurisdictional claims of Sheet Metal Worker's International Association. Industrial Door- Installation and service of overhead doors roll up doors, docks and dock leveling.

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Sheet Metal Local 33 Industrial Door	LCN01-2025ib	Sheet Metal Worker	08/01/2025	07/30/2025

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Sheet Metal Worker	\$26.53		\$8.71	\$5.66	\$0.19	\$0.00	\$2.61	\$0.61	\$0.00	\$0.00	\$44.31	\$57.58
Trainees	Percent	BHR										
Probationary Period (60 Days)	52.000000	\$13.80	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$13.80	\$20.70
61st day -12 months	58.000000	\$15.39	\$8.71	\$1.96	\$0.19	\$0.00	\$1.68	\$0.35	\$0.00	\$0.00	\$28.28	\$35.98
2nd Year	68.000000	\$18.04	\$8.71	\$1.96	\$0.19	\$0.00	\$1.90	\$0.41	\$0.00	\$0.00	\$31.21	\$40.23
3rd Year	73.000000	\$19.37	\$8.71	\$1.96	\$0.19	\$0.00	\$2.05	\$0.45	\$0.00	\$0.00	\$32.73	\$42.41
4th Year	80.000000	\$21.22	\$8.71	\$1.96	\$0.19	\$0.00	\$2.17	\$0.49	\$0.00	\$0.00	\$34.74	\$45.35
5th Year	86.000000	\$22.82	\$8.71	\$1.96	\$0.19	\$0.00	\$2.31	\$0.52	\$0.00	\$0.00	\$36.51	\$47.92

Special Calculation Note

Other: Holiday Pay

Ratio

1-2 Journeyman to 1 Trainee
3-4 Journeymen to 2 Trainee
5-6 Journeymen to 3 Trainees
7-8 Journeymen to 4 Trainees
9-10 Journeymen to 5 Trainees
11-13 Journeymen to 6 Trainees
14-16 Journeymen to 7 Trainees
17-19 Journeymen to 8 Trainees
Maintaining a 3 Journeymen to 1 Trainee ratio thereafter

Jurisdiction (* denotes special jurisdictional note)

Ashland, Ashtabula, Carroll, Columbiana, Coshocton, Crawford, Cuyahoga, Defiance, Erie, Fulton, Geauga, Hancock, Henry, Holmes, Huron, Lake, Lorain, Lucas, Mahoning, Medina, Ottawa, Paulding, Portage, Putnam, Richland, Sandusky, Seneca, Stark, Summit, Trumbull, Tuscarawas, Wayne, Williams, Wood

Special Jurisdictional Note

Details

Prevailing Wage Rates - Skilled Crafts

Details

Union

Change#

Craft

Effective Date

Posted Date

Sprinkler Fitter Local 669

LCR01-2025ib

Sprinkler Fitter

08/06/2025

08/06/2025

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Sprinkler Fitter	\$48.28		\$12.40	\$7.40	\$0.54	\$0.00	\$7.74	\$0.00	\$0.00	\$0.00	\$76.36	\$100.50
Apprentice	Percent	BHR										
CLASS 1	50.000000	\$24.14	\$9.03	\$0.00	\$0.54	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$33.71	\$45.78
CLASS 2	56.000000	\$27.04	\$9.03	\$0.00	\$0.54	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$36.61	\$50.13
CLASS 3	61.000000	\$29.45	\$12.40	\$7.40	\$0.54	\$0.00	\$1.15	\$0.00	\$0.00	\$0.00	\$50.94	\$65.66
CLASS 4	65.000000	\$31.38	\$12.40	\$7.40	\$0.54	\$0.00	\$1.15	\$0.00	\$0.00	\$0.00	\$52.87	\$68.56
CLASS 5	69.000000	\$33.31	\$12.40	\$7.40	\$0.54	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$55.05	\$71.70
CLASS 6	75.000000	\$36.21	\$12.40	\$7.40	\$0.54	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$57.95	\$76.05
CLASS 7	79.000000	\$38.14	\$12.40	\$7.40	\$0.54	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$59.88	\$78.95
CLASS 8	84.000000	\$40.56	\$12.40	\$7.40	\$0.54	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$62.30	\$82.58
CLASS 9	89.000000	\$42.97	\$12.40	\$7.40	\$0.54	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$64.71	\$86.19
CLASS 10	93.000000	\$44.90	\$12.40	\$7.40	\$0.54	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$66.64	\$89.09

Special Calculation Note

Ratio

1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note

Details

Sprinkler Fitter work shall consist of the installation, dismantling, maintenance, repairs, adjustments, and corrections of all fire protection and fire control systems including the unloading, handling by hand, power equipment and installation of all piping or tubing, appurtenances and equipment pertaining thereto, including both overhead and underground water mains, fire hydrants and hydrant mains, standpipes and hose connections to sprinkler systems used in connection with sprinkler and alarm systems. Also all tanks and pumps connected thereto, also included shall be CO-2 and Cardox Systems, Dry Chemical Systems, Foam Systems and all other fire protection systems.

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Truck Driver Locals 20,40,92,100,175,284,348,377,637,697,90 8,957 - Bldg & HevHwy Class 1	LCN01-2026ib	Truck Driver	05/01/2026	04/29/2026

Wage Rates

		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR										
Truck Driver CLASS 1	\$34.90	\$10.75	\$9.60	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$55.75	\$73.20
Apprentice	Percent	BHR									
First 6 months	80.000000	\$27.92	\$10.75	\$9.60	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$48.77	\$62.73
7-12 months	85.020000	\$29.67	\$10.75	\$9.60	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$50.52	\$65.36
13-18 months	90.000000	\$31.41	\$10.75	\$9.60	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$52.26	\$67.97
19-24 months	95.020000	\$33.16	\$10.75	\$9.60	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$54.01	\$70.59
25-30 months	100.000000	\$34.90	\$10.75	\$9.60	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$55.75	\$73.20

Special Calculation Note

Ratio

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note

Details

CLASS 1: Drivers on trucks, including but not limited to: 4-wheel service trucks; 4-wheel dump trucks; batch trucks; drivers on tandems; truck sweepers (not to include power sweepers and scrubbers) Drivers on tractor – trailer combinations including but not limited to the following: Semi-tractor trucks; pole trailers; ready-mix trucks; fuel trucks; all trucks five (5) axle and over; drivers on belly dumps; truck mechanics (when needed).

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Truck Driver Locals 20,40,92,100,175,284,348,377,637,697,90 8,957 - Bldg & HevHwy Class 2	LCN01-2026ib	Truck Driver	05/01/2026	04/29/2026

Wage Rates

		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR										
Truck Driver CLASS 2	\$35.91	\$10.75	\$9.60	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$56.76	\$74.72
Apprentice	Percent	BHR									
First 6 months	79.990000	\$28.72	\$10.75	\$9.60	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$49.57	\$63.93
7-12 months	85.000000	\$30.52	\$10.75	\$9.60	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$51.37	\$66.63
13-18 months	90.000000	\$32.32	\$10.75	\$9.60	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$53.17	\$69.33
19-24 months	95.000000	\$34.11	\$10.75	\$9.60	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$54.96	\$72.02
25-30 months	100.000000	\$35.91	\$10.75	\$9.60	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$56.76	\$74.72

Special Calculation Note

Ratio

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note

Details

CLASS 2: Drivers on articulated dump trucks; rigid-frame rock trucks; distributor trucks; low boys/drag driver on the construction site only and heavy duty equipment (irrespective of load carried) when used exclusively for transportation on the construction site only.