

Contractor Schmidt Environmental Construction, Inc.

Set No. \_\_\_\_\_

**PROJECT MANUAL FOR  
TOWN OF LEXINGTON  
SEWER SYSTEM IMPROVEMENTS  
CWSRF #CS010886-02 / KG PROJECT #22-0032**

Prepared for:

Town of Lexington

Lauderdale County, Alabama

March 2024



Prepared by:

5/2/24

**THE KELLEY GROUP**  
" A CIVIL ENGINEERING COMPANY "



**Town of Lexington  
Sewer System Improvements**

**CWSRF #CS010886-02  
KG Project #22-0032**

*Lauderdale County, Alabama*

**OWNER**

**Town of Lexington**  
11060 Highway 101  
Lexington, AL 35648  
PH: (256) 229-5221  
Mayor Sandra Burroughs

**ENGINEER**

**THE KELLEY GROUP**

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CWSRF #CS010886-02**

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**SECTION 00 11 13**  
**ADVERTISEMENT FOR BIDS**

Sealed bids will be received by the Town of Lexington at Lexington Town Hall, located at 11060 Highway 101, Lexington, AL 35648, until Tuesday, June 4, 2024, at 10:00 A.M. CST, and then publicly opened and read aloud for furnishing all labor and materials, and performing all work described as follows:

**Town of Lexington Sewer System Improvements**

The project consists of demolition of existing sewer lagoon infrastructure, removal of sediment, liners, and appurtenances from two (2) sewer lagoon cells and disposal of the same. Installation of new lagoon aeration, baffle curtain, effluent pumps, blowers, controls, sludge pump, valves, actuators, and related equipment for a fully functional lagoon treatment system.

A non-mandatory pre-bid conference will be held at Lexington Town Hall, located at 11060 Highway 101, Lexington, AL 35648 on Wednesday, May 15, 2024, at 3:00 P.M. CST. An opportunity for a site visit will follow the pre-bid meeting.

Lexington obtained assistance through the Alabama Department of Environmental Management (ADEM) Clean Water State Revolving Fund (CWSRF) American Rescue Plan Act (ARPA) to make improvements to the sewer system. Compliance with all applicable Federal, State, and local laws, rules, and regulations is required.

Bid documents may be purchased ONLY from Alabama Graphics online plan room at [www.algraphicsplanroom.com](http://www.algraphicsplanroom.com) or by calling (205) 252-8505. The project engineering firm is The Kelley Group, (256) 248-7030. General Contractors who bid must purchase, at a minimum, the digital plans and specifications. Documents are available at reproduction cost with no refunds available.

All bids must be on the bid form provided in the Specifications and submitted in its entirety. A cashier's check drawn on an Alabama bank or Bidder's Bond, payable to the Town of Lexington for an amount not less than five percent (5%) of the amount bid, but in no event more than ten thousand dollars, shall be filed with the bid. The bidders' bond shall be prepared on the form specified in the specifications and signed by a bonding company authorized to do business in the State of Alabama.

Performance and Labor and Material Payment Bonds, proof of insurance, verification of E-Verify enrollment, and a complete list of subcontractors and suppliers will be required prior to the signing of the Contract. A Performance Bond in an amount equal to one hundred percent (100%) of the contract costs and Labor and Material Payment Bond in an amount of one hundred percent (100%) of the contract cost in the form and terms approved by the Town of Lexington will be required at the signing of the contract. In addition, the Contractor must furnish to the Town of Lexington at the time of the signing of the contract a certificate of insurance coverage as provided in the specifications. The right is reserved to reject any and/or all bids to waive informalities and to furnish any item of material or work to change the amount of said Contract.

No bids will be considered unless the bidder, whether resident or non-resident of Alabama, is properly qualified to submit a bid for this construction in accordance with all applicable laws of the State of Alabama. This shall include evidence of holding a current license from the State Licensing Board for General Contractors, Montgomery, Alabama, as required by Chapter 8 of Title 34 of the Code of

Alabama, 1975. In addition, non-residents of the State, if a corporation, shall show evidence of having qualified with the Secretary of State to do business in the State of Alabama.

The bidder shall show evidence by clearly displaying the current license number on the outside of the sealed envelope in which the bid is delivered. In addition, bids shall be clearly identified on the exterior of the package with the bidder's name, address, the name of the project being bid, and the time and place of the bid opening. No bid may be withdrawn after the scheduled closing time for receipt of bids for a period of sixty (60) days. The Owner reserves the right to reject any or all bids and to waive technical errors if the best interest of the Owner will thereby be promoted. All bids received after the date and time of the bid opening noted above will be returned unopened.

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## INSTRUCTIONS TO BIDDERS

### ARTICLE 1 - DEFINED TERMS

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- 1.01 Terms used in these Instructions to Bidders will have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below, which are applicable to both the singular and plural thereof:
- A. *Bidder*--The individual or entity who submits a Bid directly to OWNER.
  - B. *Sub-bidder*—The individual or entity that submits a bid to a Bidder.
  - C. *Issuing Office*--The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.
  - D. *Successful Bidder*--The lowest, qualified, responsible Bidder submitting a responsive Bid to whom OWNER (on the basis of OWNER's evaluation as hereinafter provided) makes an award.
  - E. *Bidding Documents*—The Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Conditions, the Bid Form, the Contract Documents (including all Addenda issued prior to receipt of Bids), and the Technical Specifications.

### ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

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- 2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement or Invitation to Bid may be obtained from Alabama Graphics. The deposit will be non-refundable.
- 2.02 Complete sets of Bidding Documents must be used in preparing Bids; neither OWNER nor ENGINEER assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.03 OWNER and ENGINEER, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

### ARTICLE 3 - QUALIFICATIONS OF BIDDERS

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- 3.01 At the time of the bid, each bidder must submit evidence of the **Bidder's Alabama Licensing Board for General Contractor's license with a major classification of MU (Municipal & Utility).**
- 3.02 CONTRACTOR will supply the OWNER and ENGINEER with a minimum of five (5) references and validation of performing similar size and type of municipal sewer system improvements.

- 3.03 To demonstrate Bidder's qualifications to perform the Work, within five days of OWNER's request, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be requested by the Owner. Each Bidder must submit evidence of Bidder's qualifications to do business in the State of Alabama.
- 3.04 According to Alabama law, "As a condition of the award of any contract, grant, or incentive by the state, any political subdivision, or any state-funded entity to a business entity or employer that employs one or more employees WITHIN THE STATE OF ALABAMA, the business or employer shall provide documentation establishing that the business or employer is enrolled in eVerify. During the performance of the contract, the business or employer shall participate in the eVerify program and shall verify every employee that is required to be verified according to the applicable federal rules and regulations." **eVerify:** <https://verify.alabama.gov>
- 3.05 At the time of bid, the bidding Contractor **MUST** provide proof of enrollment in the Alabama eVerify program and must continue to use eVerify to check employees as directed by the eVerify system. This enrollment proof is a copy of the eVerify Memorandum of Understanding (MoU) the contractor receives when registration on eVerify is finalized. The affidavit is no longer required.
- 3.06 Any subcontractor that works on the project **MUST** also provide to the contractor and OWNER/ENGINEER the proof of enrollment in eVerify and must also use the system to verify employees.
- 3.07 The contractor that the contract is awarded to **MUST** (at the time of the bid if possible, but before the contract is awarded) provide proof of active registration with the System for Award Management (SAM) website.
- 3.08 The contractor that the contract is awarded to **MUST** (at the time of the bid if possible, but before the contract is awarded) provide the Beason-Hammon Alabama Taxpayer and Citizen Protection Act certification form.
- 3.09 Any subcontractor that works on the project **MUST** also provide to the contractor and OWNER/ENGINEER the Beason-Hammon Alabama Taxpayer and Citizen Protection Act certification form.
- 3.10 The contractor that the contract is awarded to **MUST** (at the time of the bid if possible, but before the contract is awarded) provide the State of Alabama Disclosure Form.
- 3.11 Any subcontractor that works on the project **MUST** also provide to the contractor and OWNER/ENGINEER the State of Alabama Disclosure Form.
- 3.12 The contractor the contract is awarded to **MUST NOT BE** listed on the Federally Debarred List.
- 3.13 Davis Bacon Prevailing Wage Rates for Lauderdale County are required.**

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA,  
AND SITE

4.01 Subsurface and Physical Conditions

A. The Supplementary Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that the Engineer has used in preparing the Bidding Documents, if any.
2. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that ENGINEER has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in paragraph 4.01.A will be made available by OWNER to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the “technical data” contained therein upon which Bidder is entitled to rely as provided in paragraph 4.02 of the General Conditions has been identified and established in paragraph 4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any “technical data” or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.02 Underground Facilities

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site are based upon information and data furnished to OWNER and ENGINEER by owners of such Underground Facilities, including OWNER or others. The information and data reflected in the Contract Documents with respect to Underground Facilities at or contiguous to the site are based upon information and data furnished to the owner and Engineer by others of such Underground Facilities or others, and Owner does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary conditions.

4.03 Hazardous Environmental Condition

A. The Supplementary Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that ENGINEER has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in paragraph 4.03.A will be made available by OWNER to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the “technical data” contained therein upon which Bidder is entitled to rely as provided in paragraph 4.06 of the General Conditions has been identified and established in paragraph 4.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any “technical data” or any other data,

interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

- 4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in paragraph 4.06 of the General Conditions.
- 4.05 On request, OWNER will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. The bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.
- 4.06 Reference is made to Article 7 of the Supplementary Conditions for the identification of the general nature of other work that is to be performed at the Site by OWNER or others (such as utilities and other prime contractors) that relates to the Work for which a Bid is to be submitted. On request, OWNER will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such other work.
- 4.07 It is the responsibility of each Bidder before submitting a Bid to:
- A. Examine and carefully study the Bidding Documents, including any Addenda and the other related data identified in the Bidding Documents;
  - B. Visit the Site and become familiar with and satisfy Bidder as to the general, local, quantities, and Site conditions that may affect the cost, progress, and performance of the Work;
  - C. Become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect the cost, progress, or performance of the Work;
  - D. Carefully study all reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions, and carefully study all reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions;
  - E. Obtain and carefully study (or assume responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect

- of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;
- F. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for the performance of the Work at the price bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;
  - G. Become aware of the general nature of the work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Bidding Documents;
  - H. Correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;
  - I. Promptly give ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by ENGINEER is acceptable to Bidder; and
  - J. Determine that the Bidding Documents are generally sufficient to indicate and convey an understanding of all terms and conditions for the performance of the Work.
- 4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception, the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given ENGINEER written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by ENGINEER are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey an understanding of all terms and conditions for performing and furnishing the Work.

## ARTICLE 5 - PRE-BID CONFERENCE

1. **A non-mandatory pre-bid conference will be held at Lexington Town Hall, located at 11060 Highway 101, Lexington, AL 35648 on Wednesday, May 15, 2024, at 3:00 P.M. CST. An opportunity for a site visit will follow the pre-bid meeting.** The purpose of the meeting is to answer all questions the contractor may have prior to submitting his bid. The nonattendance of the pre-bid conference will not relieve the contractor from any additional stipulations discussed and or added to the project during the pre-bid meeting. Topics that cannot be covered or answered in entirety during the pre-bid will be answered afterward by written statement. All questions should be addressed in writing to Jessica Mandrell, Project Manager, [jessica@kelleynetwork.com](mailto:jessica@kelleynetwork.com), and Edward Smith, P.E., at [edward@kelleynetwork.com](mailto:edward@kelleynetwork.com).



2. Verbal questions and/or answers will not be binding. Unless expressly mentioned and noted for additional comment during the pre-bid conference, no additional questions will be fielded/answered less than 24 hours prior to the bid opening.

#### ARTICLE 6 - SITE AND OTHER AREAS

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- 6.01 The Site is identified in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by OWNER unless otherwise provided in the Bidding Documents.

#### ARTICLE 7 - INTERPRETATIONS AND ADDENDA

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- 7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to ENGINEER in writing. Interpretations or clarifications considered necessary by ENGINEER in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by ENGINEER as having received the Bidding Documents. Questions received less than *five* days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by OWNER or ENGINEER.

#### ARTICLE 8 - BID SECURITY

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- 8.01 A Bid must be accompanied by Bid security made payable to OWNER in an amount of 5% of Bidder's maximum Bid price and in the form of a certified or bank check or a Bid Bond on the form attached issued by a surety meeting the requirements of paragraphs 5.01 and 5.02 of the General Conditions.
- 8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, OWNER may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom OWNER believes to have a reasonable chance of receiving the award may be retained by OWNER until the earlier of seven days after the Effective Date of the Agreement or 60 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.
- 8.03 Bid security of other Bidders whom OWNER believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

## ARTICLE 9 - CONTRACT TIMES

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- 9.01 The number of days within which, or the dates by which, the Work is to be completed and ready for final payment are set forth in the Agreement.

## ARTICLE 10 - LIQUIDATED DAMAGES

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- 10.01 Provisions for liquidated damages, if any, are set forth in the Agreement.

## ARTICLE 11 - SUBSTITUTE AND "OR-EQUAL" ITEMS

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- 11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by CONTRACTOR if acceptable to ENGINEER, application for such acceptance will not be considered by ENGINEER until after the Effective Date of the Agreement. The procedure for submission of any such application by CONTRACTOR and consideration by ENGINEER is set forth in the General Conditions and may be supplemented in the General Requirements.

## ARTICLE 12 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

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- 12.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to OWNER in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to OWNER a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by OWNER. If ENGINEER, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, ENGINEER may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, in which case apparent Successful Bidder shall submit an acceptable substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and OWNER may consider such price adjustment in evaluating Bids and making the contract award.
- 12.02 If apparent Successful Bidder declines to make any such substitution, OWNER may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which OWNER or ENGINEER makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to OWNER and ENGINEER subject to revocation of such acceptance after the Effective Date of the Agreement as provided in paragraph 6.06 of the General Conditions.
- 12.03 CONTRACTOR shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom CONTRACTOR has reasonable objection.

- 12.04 The Owner and the prime contractor shall use the necessary resources to identify and directly solicit no less than 3 certified DBE/MBE firms and 3 WBE firms to bid in each expected contract/subcontract area. If a diligent and documented search of ALDOT, SBA, and MBDA directories does not identify 3 potential certified DBE/MBE firms and 3 potential certified WBE firms, then the prime contractor shall post an advertisement in at least 1 of the other online or print resources. Whenever possible, post solicitation for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date. If Prime Contractor is not utilizing subcontractors, solicitation is not necessary. A letter must be provided by prime contractor stating no subcontractors will be used within 10 days of award. **Solicitation of DBE/MBE/WBE subcontractor is required, utilization of DBE/MBE/WBE is not required.**

The documentation of these good faith DBE/MBE/WBE solicitation efforts must be detailed in order to allow for satisfactory review. Such documentation might include fax confirmation sheets, copies of solicitation letters/emails, printouts of the online solicitations, printouts of online search results, affidavits of publication in newspapers, etc. The prime contractor is strongly encouraged to follow up each written, fax, or email solicitation with at least 1 logged phone call.

#### ARTICLE 13 - PREPARATION OF BID

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- 13.01 The Bid form is included with the Bidding Documents. Additional copies may be obtained from ENGINEER.
- 13.02 All blanks on the Bid form shall be completed by printing in ink or by typewriter and the Bid signed. A Bid price shall be indicated for each Bid item listed therein, or the words "No Bid," "No Change," or "Not Applicable" entered.
- 13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.
- 13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.
- 13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown below the signature.
- 13.06 A Bid by an individual shall show the Bidder's name and official address.
- 13.07 A Bid by a joint venture shall be executed by each joint venture in the manner indicated on the Bid form. The official address of the joint venture must be shown below the signature.
- 13.08 All names shall be typed or printed in ink below the signatures.

- 13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid form.
- 13.10 The address and telephone number for communications regarding the Bid shall be shown.
- 13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract. Bidder's state contractor license number for the state of the Project, if any, shall also be shown on the Bid form.
- 13.12 Bids must be priced on a Unit Cost of Lump Sum basis for the base contract and include a separate price for each alternative described in the Specifications as provided for in the Bid Form.
- 13.13 The Bid price shall include such amounts as the Bidder deems proper for overhead and profit on account of cash allowances named in the Contract Documents.

#### ARTICLE 14 - BASIS OF BID; EVALUATION OF BIDS

##### 14.01 Unit Price

- A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.
- B. The total of all estimated prices will be determined as the sum of the products of the estimated quantity of each item and the unit price Bid for the item. The final quantities and Contract Price will be determined in accordance with paragraph 11.03 of the General Conditions.
- C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.
- 14.02 The Bid price shall include such amounts as the Bidder deems proper for overhead and profit on account of cash allowances, if any, named in the Contract Documents as provided in paragraph 11.02 of the General Conditions.
- 14.03 Bid prices will be compared after adjusting for differences in the time designated by Bidders for Substantial Completion. The adjusting amount will be determined at the rate set forth in the Contract Documents for liquidated damages for failing to achieve Substantial Completion for each day before or after the desired date appearing in Article 9.

#### ARTICLE 15 - SUBMITTAL OF BID

- 15.01 Each prospective Bidder is furnished one copy of the Bidding Documents with one separate unbound copy each of the Bid form, and, if required, the Bid Bond. The unbound copy of the Bid form is to be completed and submitted with the Bid security.

- 15.02 Contractor will supply the OWNER and ENGINEER with a minimum of five (5) references and validation of performing similar size and type of municipal sewer system improvements.
- 15.03 The information will be included in the Contractors bid package for review by the OWNER and ENGINEER in considering the Contractor's bid.
- 15.04 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the advertisement or invitation to Bid and shall be enclosed in an opaque sealed envelope plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, Contractor License Number and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to **Attention: Mayor Sandra Burroughs, Town of Lexington, 11060 Highway 101, Lexington, AL 35648.**

#### ARTICLE 16 - MODIFICATION AND WITHDRAWAL OF BID

- 16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.
- 16.02 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with OWNER and promptly thereafter demonstrates to the reasonable satisfaction of OWNER that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid at the discretion of OWNER, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

#### ARTICLE 17 - OPENING OF BIDS

- 17.01 Bids will be opened at the time and place indicated in the advertisement or invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

#### ARTICLE 18 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

- 18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid form, but OWNER may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

#### ARTICLE 19 - AWARD OF CONTRACT

- 19.01 OWNER reserves the right to reject any or all Bids, including without limitation, non-conforming, non-responsive, unbalanced, or conditional Bids. OWNER further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to be non-responsive. OWNER may also reject the Bid of any Bidder if OWNER believes that it would not be in the best interest of the Project to make an award to that Bidder. OWNER also

reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

- 19.02 More than one Bid for the same Work from an individual or entity under the same or 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 that Bidder has an interest.
- 19.03 In evaluating Bids, OWNER will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.
- 19.04 In evaluating Bidders, OWNER will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.
- 19.05 OWNER may conduct such investigations as OWNER deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.
- 19.06 If the Contract is to be awarded, OWNER will award the Contract to the Bidder whose Bid is in the best interests of the Project.

## ARTICLE 20 - CONTRACT SECURITY AND INSURANCE

- 20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth OWNER's requirements as to performance and payment Bonds and insurance. When the Successful Bidder delivers the executed Agreement to OWNER, it must be accompanied by such Bonds.

## ARTICLE 21 - SIGNING OF AGREEMENT

- 21.01 When OWNER gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to OWNER with the required Bonds. Within ten days thereafter, OWNER shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

**SECTION 00 22 13**  
**OWNER'S INSTRUCTIONS CONCERNING**  
**BONDS AND INSURANCE FOR CONSTRUCTION**

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PROJECT: Town of Lexington Sewer System Improvements  
CWSRF #CS010886-02

DESCRIPTION: The project consists of demolition of existing sewer lagoon infrastructure, removal of sediment, liners, and appurtenances from two (2) sewer lagoon cells and disposal of the same. Installation of new lagoon aeration, baffle curtain, effluent pumps, blowers, controls, sludge pump, valves, actuators, and related equipment for a fully functional lagoon treatment system.

OWNER: Town of Lexington  
11060 Highway 101  
Lexington, AL 35648

TO: (ENGINEER) The Kelley Group  
P.O. Box 45  
Tuscumbia, AL 35674

ATTENTION: CONTRACTORS

---

The following are your instructions with respect to the requirements for Bonds and insurance to be included in the Contract Documents for the above Project.

**I. BONDS**

- A. Bid Security is to be provided by each Bidder in the amount of 5% of the bid price and will be in the form of:
- |   |            |
|---|------------|
| 1. Bid Bond; the prescribed type of Bid Bond is attached.         | <b>YES</b> |
| 2. Certified or bank cashier's check drawn to the order of Owner. | <b>YES</b> |
- B. Construction Performance Bond in an amount equal to the Contract Price and construction Payment Bond in an amount equal to the Contract Price. **YES**

**II. LIABILITY INSURANCE**

The limits of liability for the liability required by paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by law or regulations and the coverage under paragraph 5.04 shall be as follows:

- A. Workers' Compensation, etc. under paragraphs 5.04.A.1 and 5.04.A.2 of the General Conditions:
- |           |           |
|-----------|-----------|
| 1. State: | Statutory |
|-----------|-----------|

2. Applicable Federal (e.g. Longshoreman's): Statutory
  3. Employer's Liability: \$500/500/500
- B. Comprehensive or Commercial General Liability under paragraphs 5.04.A.3 through 5.04.A.7 of the General Conditions (including Premises-Operations; Independent Contractors' Protection; Products Liability -- Completed Operations; Broad Form Property Damage):
1. General Aggregate  
(Except Products-Completed Operations) \$ 2,000,000
  2. Products-Completed Operations Aggregate \$ 2,000,000
  3. Personal and Advertising Injury (per Person/Organization) \$ 1,000,000
  4. Each Occurrence (Bodily Injury and Property Damage) \$ 1,000,000
  5. Personal Injury Liability Coverage will include Claims arising out of Employment. **NO**
  7. Exclusions of Property in Contractor's Care, Custody or Control will be eliminated. **NO**
  8. Property Damage Liability Insurance will Provide Coverage for Explosion, Collapse and Underground Damage. **YES**
- C. Contractual Liability under paragraph 5.04.B.4 of the General Conditions (Bodily Injury and Property Damage).
1. General Aggregate \$ 2,000,000
  2. Each Occurrence \$ 1,000,000
- D. Automobile Liability under paragraph 5.04.A.6 of the General Conditions:
1. Bodily Injury: \$1,000,000 Each Person  
\$1,000,000 Each Accident
  2. Property Damage: \$500,000 Each Accident  
or a combined single limit of \$1,000,000
- E. Liability coverage for OWNER, ENGINEER, ENGINEER's Consultants and others listed in the Supplementary Conditions will be provided, subject to customary exclusions for professional liability:
1. By endorsement as additional insureds on Contractor's Liability Policy. **YES**
  2. By a separate Protective Liability Policy covering all of them issued by CONTRACTOR's general liability carrier. (Indicate amounts of coverages \$ \_\_\_\_\_) **NO**
  3. List here by name and address any additional individuals or entities (in addition to OWNER, ENGINEER and ENGINEER'S Consultants) to be identified in the Supplementary Conditions as insureds or additional insureds under the required liability policies: **NONE**
- F. Excess Liability **YES**
1. Umbrella Form: **YES**



2. General Aggregate \$ 2,000,000  
3. Each Occurrence \$ 2,000,000

III. PROPERTY INSURANCE (BUILDER'S RISK)

**APPLICABLE**

- A. Property insurance to the full replacement cost of the Work (subject to deductible amount per paragraph 3.B herein) in accordance with paragraph 5.06 of the General Conditions will be provided by (select one):

OWNER \_\_\_\_\_  
CONTRACTOR   X  

- B. Such insurance will be subject to the following deductible amount \$\_\_\_\_\_ in accordance with paragraph 5.06.D of the General Conditions. **(Applies only when OWNER provides Property Insurance).**

- C. Boiler and machinery insurance in accordance with paragraph 5.06.B of the General Conditions will be provided by OWNER: **NO**  
and will provide coverage for the following objects subject to the following limits:

1. Objects to be insured (identify):  
2. Limits \$\_\_\_\_\_ .00

- D. Other Property Insurance

Provided by	Type of Coverage	Amount
-------------	------------------	--------

- E. List here by name and address all individuals or entities (in addition to OWNER, CONTRACTOR, Subcontractors, ENGINEER, and ENGINEER's Consultant) to be identified in the Supplementary Conditions as insureds or additional insureds under property insurance policies: **The Kelley Group; Town of Lexington.**

BY: Sandra Burroughs DATE: 04/02/24  
(OWNER)



**SECTION 00 41 43**  
**BID FORM**

Project Identification: **Town of Lexington Sewer System Improvements**  
**CWSRF #CS010886-02**

**The project consists of demolition of existing sewer lagoon infrastructure, removal of sediment, liners, and appurtenances from two (2) sewer lagoon cells and disposal of the same. Installation of new lagoon aeration, baffle curtain, effluent pumps, blowers, controls, sludge pump, valves, actuators, and related equipment for a fully functional lagoon treatment system.**

This Bid is Submitted to:

**Town of Lexington**  
**11060 Highway 101**  
**Lexington, AL 35648**

- 1.01 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with OWNER in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.
- 2.01 The Bidder declares that he understands that when quantities of Work for which unit price bids are requested are shown in the Advertisement Invitation for Bids, and in the Proposal, such quantities are approximate only and are subject to either increase or decrease, that, should the quantities of any of the Work items increase, the Bidder proposed to perform the additional Work at the unit prices bid by him, that should the quantities of any of the Work items be decreased, payment will be made only for the actual quantities of Work performed and such payment will be based upon the unit prices bid by him, and that he shall make no claim for profits anticipated on the decrease in quantities of Work. Actual quantities will be paid for as the Work progresses, in accordance with the provisions of the Contract Agreement, and such quantities shall be subject to final measurements and determinations made upon completion of the Work.
- 3.01 Bidder accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. The Bid will remain subject to acceptance for 60 days after the Bid opening or for such a longer period of time that Bidder may agree to in writing upon request of OWNER.
- 4.01 In submitting this Bid, Bidder represents, as set forth in the Agreement, that:
- A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of all of which is hereby acknowledged.

Addendum No.

Addendum Date

\_\_\_\_\_

\_\_\_\_\_

- B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect the cost, progress, and performance of the Work.
  - C. Bidder is familiar with and is satisfied with all federal, state, and local Laws and Regulations that may affect the cost, progress, and performance of the Work.
  - D. Bidder has carefully studied all the following if supplied: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions, and (2) reports and drawings of a Hazardous Environmental Condition, if any, which has been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions.
  - E. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.
  - F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for the performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.
  - G. Bidder is aware of the general nature of work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Bidding Documents.
  - H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.
  - I. Bidder has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by ENGINEER is acceptable to Bidder.
  - J. The Bidding Documents are generally sufficient to indicate and convey an understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.
- 5.01 Bidder further represents that this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or

induced any individual or entity to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.

6.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

BASE BID					
Item #	ITEM	UNIT	QTY	Unit Price	Total Price
1	Mobilization/Demobilization - Including, but not limited to, insurance, bonds, permits, submittals, existing site documentation, and site cleanup (Limited to 6% of the contract total)	LS	1		
2	Influent Plug Valve - Furnish and Install 14" Plug Valve with Valve Box to prevent influent flow to Cell 1	LS	1		
3	Furnish and Install Bypass Pumping - To include pump, suction hose, discharge hose, trenching, steel plates, thrust blocking, etc. to provide a fully functional bypass pumping system for the duration of work while Cells 1 and 2 are out of service.	LS	1		
4	Clearing and Grubbing - Clear and grub entire lagoon site to include removal and disposal of trees, weeds, etc. along perimeter of lagoon cells. Spray with herbicide and pre-emergent to prevent immediate regrowth.	LS	1		
5	Demolition - Remove existing lagoon aerators, lagoon covers, pumping/dewatering of Cells 1 and 2, Cell 1 lagoon liner, Cell 2 lagoon liner, vertical turbine pump 1, flow control actuator, flow control butterfly valves, etc. Allow Owner option to accept any operational lagoon aerators, pumps, etc. Cost for delivery of any stored equipment to Owner's storage facility shall be considered incidental to this bid item. Disposal of remaining materials at approved landfills shall be considered incidental to this bid item.	LS	1		
6	Cell 1 Lagoon Liner - Furnish and Install 60 mil lagoon liner in Cell 1 (Aeration Cell) to include compacted sand repair as required, sub-drainage/venting system, geotextile cushion underlay, pipe/structure penetrations, etc. to provide a fully functional lagoon liner system.	LS	1		
7	Cell 2 Lagoon Liner - Furnish and Install 60 mil lagoon liner in Cell 1 (Settling Cell) to include compacted sand repair as required, sub-drainage/venting system, geotextile cushion underlay, pipe/structure penetrations, etc. to provide a fully functional lagoon liner system.	LS	1		
8	Baffle Curtain - Furnish and Install approximately 183 linear feet of lagoon baffle curtain with end anchors, bottom anchors, flow-through window, etc. to provide a fully functional lagoon partition system in Cell 1 (aeration cell).	LS	1		
9	Aeration System - Furnish and Install positive displacement blower, stainless steel header pipe, carbon steel air pipe, air valves, stainless steel manifold, weighted air tubing, nine (9) weighted aerators, etc. to provide a fully functional lagoon aeration system.	LS	1		

BASE BID					
Item #	ITEM	UNIT	QTY	Unit Price	Total Price
10	Process Control System - Furnish and Install lagoon control panel to include aeration control system, flow meters, flow meter outputs, valve actuator control system, variable frequency drives, breakers, disconnects, etc. to provide a fully functional process control center. Costs for installing conduit, wire, junction boxes, wire termination, system start-up, testing, etc. shall be considered incidental to this bid item.	LS	1		
11	Effluent Pump Installation – Install new effluent vertical turbine pump 1. To include pump pad, anchor bolts, leveling grout, wiring, air relief valves (2), priming, painting, start-up, testing, etc. to provide a fully functional effluent pump system. Precipitation-based pump control system shall be considered incidental to this bid item.	LS	1		
12	Sludge Pump - Furnish and install self-priming pump, concrete pad, 4" suction pipe system, check valve (1), isolation plug valve (1), air relief valve (1), 3" effluent force main, discharge splash block, wiring, control panel, etc. to provide a fully functional sludge removal pumping system. Cost for conduit, wire, etc. required to provide power to the pump/panel shall be considered incidental to this bid item.	LS	1		
BASE BID TOTAL:					

ADDITIVE ALTERNATE (BASE BID + ADDITIVE ALTERNATE)					
Item #	ITEM	UNIT	QTY	Unit Price	Total Price
ALT 1	Flow Control System – Remove and replace flow control system (two valves, one actuator) to include 8" butterfly valves (2), electric actuators (2) wiring, conduit, control system, etc. to provide a fully functional electric-actuated flow control selection system.	LS	1		
ADDITIVE ALTERNATE TOTAL:					

DEDUCTIVE ALTERNATE (BASE BID - DEDUCTIVE ALTERNATE)					
Item #	ITEM	UNIT	QTY	Unit Price	Total Price
ALT 2	Effluent Pump Replacement - Remove and replace existing effluent vertical turbine pump 1 with existing rebuilt vertical turbine pump supplied by Owner. To include pump pad, anchor bolts, leveling grout, wiring, air relief valves (2), priming, painting, start-up, testing, etc. to provide a fully functional effluent pump system. Precipitation-based pump control system shall be considered incidental to this bid item. Cost for loading and transport of existing pump from Owner's facility to site shall be considered incidental to this bid item. The bid price for this item shall be considered a deduction from the base bid, and a replacement to Line Item #11, should the OWNER choose to award this item. The base bid will be reduced by the amount of Line Item #D1 should this alternative be awarded.	LS	1		
DEDUCTIVE ALTERNATE TOTAL:					

Unit Prices have been computed in accordance with paragraph 11.03.B of the General Conditions.

7.01 Bidder acknowledges that estimated quantities are not guaranteed and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities provided, determined as provided in the Contract Documents.

- A. The OWNER reserves the right, at its sole discretion, to award some, all, or none of the bid items listed in the bid form, including additive and deductive alternates, in any order, as the OWNER perceives in his best interest. CONTRACTOR reserves the right to accept award of the Contract as awarded by the OWNER. If CONTRACTOR should choose not to accept award, ENGINEER may then recommend award to next low responsive bidder or choose to recommend rejection of remaining bids.
- B. The OWNER can, and will, consider options in the selection or rejection of Alternate #1 and Alternate #2 when identifying the low responsive bidder.

8.01 Bidder agrees that the Work will be substantially complete within **180** calendar days after the date when the Contract Times commence to run as provided in paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with paragraph 14.07.B of the General Conditions within **210** calendar days after the date when the Contract Times commence to run.

9.01 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the times specified above, which shall be stated in the Agreement.

**10.01 Bidder will submit with his bid package references stating his qualifications to perform the work required and provide a minimum of five (5) references and validation of performing similar size and type of municipal sewer system improvements.**

11.01 The following documents are attached to and made a condition of this Bid:

- A. Required Bid security in an amount no less than 5% of the bid price, but in no event more than \$10,000, or the form of the bid bond provided in this Project Manual; and
- B. A tabulation of Subcontractors, Suppliers and other individuals and entities required to be identified in this Bid; and
- C. Required bidder qualifications statement with supporting data as detailed in the Instruction to Bidders.

The terms used in this Bid with initial capital letters have the meanings indicated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

SUBMITTED on \_\_\_\_\_, 20\_\_\_\_\_.



If Bidder is:

An Individual

Name (typed or printed): \_\_\_\_\_

By: \_\_\_\_\_ (SEAL)  
*(Individual's signature)*

Doing business as: \_\_\_\_\_

Business address: \_\_\_\_\_

\_\_\_\_\_

Phone No.: \_\_\_\_\_ FAX No.: \_\_\_\_\_

Email: \_\_\_\_\_

A Partnership

Partnership Name: \_\_\_\_\_ (SEAL)

By: \_\_\_\_\_  
*(Signature of general partner -- attach evidence of authority to sign)*

Name (typed or printed): \_\_\_\_\_

Business address: \_\_\_\_\_

\_\_\_\_\_

Phone No.: \_\_\_\_\_ FAX No.: \_\_\_\_\_

Email: \_\_\_\_\_

A Corporation

Corporation Name: \_\_\_\_\_ (SEAL)

State of Incorporation: \_\_\_\_\_

Type (General Business, Professional, Service, Limited Liability): \_\_\_\_\_

By: \_\_\_\_\_  
*(Signature -- attach evidence of authority to sign)*

Name (typed or printed): \_\_\_\_\_

Title: \_\_\_\_\_

(CORPORATE SEAL)

Attest \_\_\_\_\_  
*(Signature of Corporate Secretary)*

Business address: \_\_\_\_\_

\_\_\_\_\_

Phone No.: \_\_\_\_\_ FAX No.: \_\_\_\_\_

Email: \_\_\_\_\_

Date of Qualification to do business is \_\_\_\_\_.

A Joint Venture

Joint Venturer Name: \_\_\_\_\_ (SEAL)

By: \_\_\_\_\_  
*(Signature of joint venture partner -- attach evidence of authority to sign)*

Name (typed or printed): \_\_\_\_\_

Title: \_\_\_\_\_

Business address: \_\_\_\_\_

\_\_\_\_\_

Phone No.: \_\_\_\_\_ FAX No.: \_\_\_\_\_

Joint Venturer Name: \_\_\_\_\_ (SEAL)

By: \_\_\_\_\_  
*(Signature -- attach evidence of authority to sign)*

Name (typed or printed): \_\_\_\_\_

Title: \_\_\_\_\_

Business address: \_\_\_\_\_

\_\_\_\_\_

Phone No.: \_\_\_\_\_ FAX No.: \_\_\_\_\_

Email: \_\_\_\_\_

Phone and FAX Number, and Address for receipt of official communications:

\_\_\_\_\_

\_\_\_\_\_



**SECTION 00 43 13  
BID BOND**

**BIDDER** (Name and Address):

\_\_\_\_\_  
\_\_\_\_\_

**SURETY** (Name and Address of Principal Place of Business):

\_\_\_\_\_  
\_\_\_\_\_

Contact Person: \_\_\_\_\_ Email: \_\_\_\_\_  
Tel. No.: \_\_\_\_\_

**OWNER:** Town of Lexington  
11060 Highway 101  
Lexington, AL 35648

**BID:**

BID DUE DATE: \_\_\_\_\_

PROJECT (Brief Description Including Location):

**Town of Lexington Sewer System Improvements**

The project consists of demolition of existing sewer lagoon infrastructure, removal of sediment, liners, and appurtenances from two (2) sewer lagoon cells and disposal of the same. Installation of new lagoon aeration, baffle curtain, effluent pumps, blowers, controls, sludge pump, valves, actuators, and related equipment for a fully functional lagoon treatment system.

**BOND**

BOND NUMBER: \_\_\_\_\_

DATE (Not later than Bid due date): \_\_\_\_\_

PENAL SUM: \_\_\_\_\_  
(Words) (Figures)

IN WITNESS WHEREOF, Surety, and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER

SURETY

\_\_\_\_\_(Seal)  
Bidder's Name and Corporate Seal

\_\_\_\_\_(Seal)  
Surety's Name and Corporate Seal

By: \_\_\_\_\_  
Signature and Title

By: \_\_\_\_\_  
Signature and Title  
(Attach Power of Attorney)

Attest: \_\_\_\_\_  
Signature and Title

Attest: \_\_\_\_\_  
Signature and Title

- Note:
- (1) Above addresses are to be used for giving required notice.
  - (2) Any singular reference to Bidder, Surety, OWNER or other party shall be considered plural where applicable.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to OWNER upon default of Bidder the penal sum set forth on the face of this Bond.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by OWNER) the executed Agreement required by the Bidding Documents and any performance and payment Bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
  - 3.1 OWNER accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by OWNER) the executed Agreement required by the Bidding Documents and any performance and payment Bonds required by the Bidding Documents, or
  - 3.2 All Bids are rejected by OWNER, or
  - 3.3 OWNER fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from OWNER, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of and any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by OWNER and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power or Attorney evidencing the authority of the officer, agent or representative who executed this Bond on behalf of Surety to execute, seal and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.





**SECTION 00 51 00**  
**NOTICE OF AWARD**

Dated: \_\_\_\_\_

TO: \_\_\_\_\_  
(BIDDER)

ADDRESS: \_\_\_\_\_

OWNER: **Town of Lexington**

**CONTRACT: Sewer System Improvements  
CWSRF #CS010886-02**

You are notified that your Base Bid dated \_\_\_\_\_ for the above Contract has been considered. You are the apparent Successful Bidder and have been awarded a Contract for the:

# Sewer System Improvements

## CWSRF #CS010886-02

The Contract Price of your Contract is \_\_\_\_\_, (\$ \_\_\_\_\_), based on unit prices.

3 copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award. 3 sets of Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within 15 days of the date you receive this Notice of Award.

1. Deliver to the ENGINEER 3 fully executed counterparts of the Contract Documents.  
[Each of the Contract Documents must bear your signature on page 8].
2. Deliver with the executed Contract Documents the Contract security (Bonds) as specified in the Instructions to Bidders (Article 20), and General Conditions (paragraph 5.01).
3. (List other conditions precedent).

**Please provide the necessary Powers of Attorney. The Certificates of Insurance must show:**

- a) Town of Lexington and The Kelley Group as additional insureds.
- b) Town of Lexington as Certificate Holder

- c) Provisions for “Waiver of Subrogation” against the owner, engineer(s), and their consultants by the contractor, subcontractors, and their insurers.
- d) Explicitly, that appropriate coverage is provided for the explosion, collapse, and underground damage.
- e) Insurance cancellation notice will be given 30 days in advance, signed acknowledgment acquired, and strike out “endeavor to” and the last two lines in the cancellation block.

**Please provide your insurance company with a copy of this Notice of Award with the enclosed bonds and insurance requirements documents to aid them in properly preparing their paperwork.**

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

Within ten days after you comply with the above conditions, OWNER will return to you one fully executed counterpart of the Contract Documents.

**Town of Lexington**  
(OWNER)

By: \_\_\_\_\_  
**Mayor Sandra Burroughs**

Copy to ENGINEER

**STANDARD FORM OF AGREEMENT  
BETWEEN OWNER AND CONTRACTOR  
ON THE BASIS OF A STIPULATED PRICE**

**THIS AGREEMENT** is by and between the Town Of Lexington (hereinafter called OWNER) and \_\_\_\_\_ (hereinafter called CONTRACTOR). OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 – WORK

- 1.01 CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

**The project consists of demolition of existing sewer lagoon infrastructure, removal of sediment, liners, and appurtenances from two (2) sewer lagoon cells and disposal of the same. Installation of new lagoon aeration, baffle curtain, effluent pumps, blowers, controls, sludge pump, valves, actuators, and related equipment for a fully functional lagoon treatment system.**

ARTICLE 2 - THE PROJECT

- 2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

**Sewer System Improvements  
CWSRF #CS010886-02**

ARTICLE 3 – ENGINEER

- 3.01 The Project has been designed by:

The Kelley Group  
P.O. Box 45  
Tuscumbia, AL 35674

who is hereinafter called ENGINEER and who is to act as OWNER's representative, assume all duties and responsibilities, and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - CONTRACT TIMES

- 4.01 Time of the Essence

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

#### 4.02 Days to Achieve Substantial Completion and Final Payment

- A. The Work will be substantially completed within **180** calendar days after the date when the Contract Times commence to run as provided in paragraph 2.03 of the General Conditions and completed and ready for final payment in accordance with paragraph 14.07 of the General Conditions within **210** calendar days after the date when the Contract Times commence to run.

#### 4.03 Liquidated Damages

- A. CONTRACTOR and OWNER recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expenses, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER, and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty), CONTRACTOR shall pay OWNER **\$500** for each day that expires after the time specified in paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if CONTRACTOR neglects, refuses, or fails to complete the remaining Work within the Contract Time or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER **\$500** for each day that expires after the time specified in paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

### ARTICLE 5 - CONTRACT PRICE

- 5.01 OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to paragraphs 5.01.A below:

- A. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in this paragraph 5.01.A:

TOTAL OF ALL UNIT PRICES \_\_\_\_\_ (\$ \_\_\_\_\_)

- B. As provided in paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by ENGINEER as provided in paragraph 9.08 of the General Conditions. Unit prices have been computed as provided in paragraph 11.03 of the General Conditions.

### ARTICLE 6 - PAYMENT PROCEDURES

- 6.01 Submittal and Processing of Payments

- A. CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by ENGINEER as provided in the General Conditions.

6.02 Progress Payments; Retainage

- A. OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR's Applications for Payment during performance of the Work as provided in paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured on the number of units completed:
1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as ENGINEER may determine or OWNER may withhold, in accordance with paragraph 14.02 of the General Conditions:
    - a. 95% of Work completed (with the balance being retainage). If the Work has been 50% completed as determined by ENGINEER, and if the character and progress of the Work have been satisfactory to OWNER and ENGINEER, OWNER, on recommendation of ENGINEER, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no retainage on account of Work subsequently completed, in which case the remaining progress payments prior to Substantial Completion will be in an amount equal to 100% of the Work completed less the aggregate of payments previously made; and
    - b. 95% of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
  2. Upon Substantial Completion, OWNER shall pay an amount sufficient to increase total payments to CONTRACTOR to 97.5% of the Work completed, less such amounts as ENGINEER shall determine in accordance with paragraph 14.02.B.5 of the General Conditions and less 100% of ENGINEER's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 Final Payment

- A. Upon final completion and acceptance of the Work in accordance with paragraph 14.07 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER as provided in said paragraph 14.07.

ARTICLE 7 – INTEREST

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- 7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of 5% per annum.

## ARTICLE 8 - CONTRACTOR'S REPRESENTATIONS

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8.01 In order to induce OWNER to enter into this Agreement, CONTRACTOR makes the following representations:

- A. CONTRACTOR has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
- B. CONTRACTOR has visited the Site and become familiar with and is satisfied with the general, local, and Site conditions that may affect the cost, progress, and performance of the Work.
- C. CONTRACTOR is familiar with and is satisfied with all federal, state, and local Laws and Regulations that may affect the cost, progress, and performance of the Work.
- D. CONTRACTOR has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site (if available) and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions.
- E. CONTRACTOR has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by CONTRACTOR, including applying the specific means, methods, techniques, sequences, and procedures of construction, if any, expressly required by the Contract Documents to be employed by CONTRACTOR, and safety precautions and programs incident thereto
- F. CONTRACTOR does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
- G. CONTRACTOR is aware of the general nature of work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. CONTRACTOR has correlated the information known to CONTRACTOR, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

- I. CONTRACTOR has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that CONTRACTOR has discovered in the Contract Documents, and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.
- J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

## ARTICLE 9 - CONTRACT DOCUMENTS

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### 9.01 Contents

#### A. The Contract Documents consist of the following:

- 1. This Agreement (pages 1 to 7, inclusive);
- 2. Performance Bond (pages 1 to 5, inclusive);
- 3. Payment Bond (pages 1 to 4, inclusive);
- 4. General Conditions (pages 1 to 58, inclusive);
- 5. Supplementary General Conditions (pages 1 to 4, inclusive);
- 6. ADEM SRF Supplemental General Conditions (pages 1 to 39, inclusive);
- 7. Contract Provisions for Non-Federal Entity Contracts Under Federal Awards (pages 1 to 3, inclusive);
- 8. Beason-Hammon/E-Verify Certification (pages 1 to 1, inclusive);
- 9. Beason-Hammon Clause (page 1 to 1, inclusive);
- 10. Specifications as listed in the table of contents of the Project Manual;
- 11. Drawings as listed in the table of contents of the Project Manual and contained therein;
- 12. Addenda (numbers \_\_\_ to \_\_\_, inclusive);
- 13. Exhibits to this Agreement (enumerated as follows):
  - a. Notice to Proceed (pages 1 to 1, inclusive);
  - b. CONTRACTOR's Bid (pages 1 to 8, inclusive);
  - c. Documentation submitted by CONTRACTOR prior to Notice of Award (pages \_\_\_ to \_\_\_, inclusive);
  - d. \_\_\_\_\_;

14. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
- a. Written Amendments;
  - b. Work Change Directives;
  - c. Change Order(s).
- B. The documents listed in paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in paragraph 3.05 of the General Conditions.

#### ARTICLE 10 – MISCELLANEOUS

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##### 10.01 Terms

- A. Terms used in this Agreement will have the meanings indicated in the General Conditions.

##### 10.02 Assignment of Contract

- A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, monies that may become due and monies that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

##### 10.03 Successors and Assigns

- A. OWNER and CONTRACTOR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

##### 10.04 Severability

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon OWNER and CONTRACTOR, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.



IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed this Agreement in triplicate.

One counterpart each has been delivered to OWNER and CONTRACTOR. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR or on their behalf.

This Agreement will be effective on \_\_\_\_\_ (which is the Effective Date of the Agreement).

OWNER:

CONTRACTOR:

**Town of Lexington**

\_\_\_\_\_

By: \_\_\_\_\_

**Mayor Sandra Burroughs**

By: \_\_\_\_\_

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest \_\_\_\_\_

Attest \_\_\_\_\_

Address for giving notices:

Address for giving notices:

P.O. Box 457

Lexington, Alabama 35648

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Designated Representative:

Designated Representative:

Name: Edward A. Smith, P.E.

Name: \_\_\_\_\_

Title: Professional Engineer

Title: \_\_\_\_\_

Address: P.O. Box 45

Tuscumbia, Alabama 35674

Address: \_\_\_\_\_

\_\_\_\_\_

Phone: 256-248-7030

Phone: \_\_\_\_\_

Facsimile: 1-866-225-7488

Facsimile: \_\_\_\_\_



**SECTION 00 55 00  
NOTICE TO PROCEED**

Dated: \_\_\_\_\_

TO: \_\_\_\_\_  
(BIDDER)

ADDRESS: \_\_\_\_\_

OWNER: **Town of Lexington**

CONTRACT: **Sewer System Improvements  
CWSRF #CS010886-02**

You are notified that the Contract Times under the above contract will commence to run on \_\_\_\_\_. By that date, you will start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is \_\_\_\_\_, and the date of readiness for final payment is \_\_\_\_\_.

Before you may start any Work at the Site, paragraph 2.05.C of the General Conditions provides that you and Owner must each deliver to the other (with copies to the Engineer and other identified additional insureds) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the Site, you must:

Notify the Owner and Engineer of the date that you plan to start; verify existing utilities; provide the Owner and Engineer with any agreements the Contractor has made with individuals concerning this project; and coordinate construction activities with the Town of Lexington and the Engineer.

**Town of Lexington  
(OWNER)**

By: \_\_\_\_\_  
**Mayor Sandra Burroughs**

Copy to ENGINEER



**SECTION 00 61 13**  
**PERFORMANCE BOND**

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

CONTRACTOR (Name and Address):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

SURETY (Name and Address of Principal  
Place of Business):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Contact: \_\_\_\_\_  
Tel: \_\_\_\_\_  
Email: \_\_\_\_\_

OWNER:     **Town of Lexington**  
              **11060 Highway 101**  
              **Lexington, AL 35648**

CONTRACT: **Sewer System Improvements**  
              **CWSRF #CS010886-02**

Date: \_\_\_\_\_  
Amount: \$\_\_\_\_\_ (based on unit prices)  
Description (Name and Location):

**Sewer System Improvements**

The project consists of demolition of existing sewer lagoon infrastructure, removal of sediment, liners, and appurtenances from two (2) sewer lagoon cells and disposal of the same. Installation of new lagoon aeration, baffle curtain, effluent pumps, blowers, controls, sludge pump, valves, actuators, and related equipment for a fully functional lagoon treatment system.

BOND:

Date (Not earlier than Contract Date): \_\_\_\_\_  
Amount: \$\_\_\_\_\_

Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title:

SURETY

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title:

(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title:

SURETY

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title:

1. The CONTRACTOR and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Contract, which is incorporated herein by reference.
2. If the CONTRACTOR performs the Contract, the Surety and the CONTRACTOR have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.
3. If there is no OWNER Default, the Surety's obligation under this Bond shall arise after:
  - 3.1 The OWNER has notified the CONTRACTOR and the Surety at the addresses described in paragraph 10 below, that the OWNER is considering declaring a CONTRACTOR Default and has requested and attempted to arrange a conference with the CONTRACTOR and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Contract. If the OWNER, the CONTRACTOR and the Surety agree, the CONTRACTOR shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the OWNER's right, if any, subsequently to declare a CONTRACTOR Default; and
  - 3.2 The OWNER has declared a CONTRACTOR Default and formally terminated the CONTRACTOR's right to complete the Contract. Such CONTRACTOR Default shall not be declared earlier than twenty days after the CONTRACTOR and the Surety have received notice as provided in paragraph 3.1; and
  - 3.3 The OWNER has agreed to pay the Balance of the Contract Price to:
    - 3.3.1 The Surety in accordance with the terms of the Contract;
    - 3.3.2 Another contractor selected pursuant to paragraph 4.3 to perform the Contract.
4. When the OWNER has satisfied the conditions of paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
  - 4.1 Arrange for the CONTRACTOR, with consent of the OWNER, to perform and complete the Contract; or
  - 4.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
  - 4.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the OWNER for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the OWNER and the contractor selected with the OWNER's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the OWNER the amount of damages as described in paragraph 6 in excess of the Balance of the Contract Price incurred by the OWNER resulting from the CONTRACTOR Default; or
  - 4.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances;

- 4.4.1 After investigation, determine the amount for which it may be liable to the OWNER and, as soon as practicable after the amount is determined, tender payment therefor to the OWNER; or
  - 4.4.2 Deny liability in whole or in part and notify the OWNER citing reasons therefor.
- 5. If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the OWNER to the Surety demanding that the Surety perform its obligations under this Bond, and the OWNER shall be entitled to enforce any remedy available to the OWNER. If the Surety proceeds as provided in paragraph 4.4, and the OWNER refuses the payment tendered or the Surety has denied liability, in whole or in part, without further notice the OWNER shall be entitled to enforce any remedy available to the OWNER.
- 6. After the OWNER has terminated the CONTRACTOR's right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the OWNER shall not be greater than those of the CONTRACTOR under the Contract, and the responsibilities of the OWNER to the Surety shall not be greater than those of the OWNER under the Contract. To a limit of the amount of this Bond, but subject to commitment by the OWNER of the Balance of the Contract Price to mitigation of costs and damages on the Contract, the Surety is obligated without duplication for:
  - 6.1 The responsibilities of the CONTRACTOR for correction of defective Work and completion of the Contract;
  - 6.2 Additional legal, design professional and delay costs resulting from the CONTRACTOR's Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and
  - 6.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the CONTRACTOR.
- 7. The Surety shall not be liable to the OWNER or others for obligations of the CONTRACTOR that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the OWNER or its heirs, executors, administrators, or successors.
- 8. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders and other obligations.
- 9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after CONTRACTOR Default or within two years after the CONTRACTOR ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.



10. Notice to the Surety, the OWNER or the CONTRACTOR shall be mailed or delivered to the address shown on the signature page.
11. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the Contract was performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
12. Definitions.
- 12.1 Balance of the Contract Price: The total amount payable by the OWNER to the CONTRACTOR under the Contract after all proper adjustments have been made, including allowance to the CONTRACTOR of any amounts received or to be received by the OWNER in settlement of insurance or other Claims for damages to which the CONTRACTOR is entitled, reduced by all valid and proper payments made to or on behalf of the CONTRACTOR under the Contract.
- 12.2 Contract: The agreement between the OWNER and the CONTRACTOR identified on the signature page, including all Contract Documents and changes thereto.
- 12.3 CONTRACTOR Default: Failure of the CONTRACTOR, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
- 12.4 OWNER Default: Failure of the OWNER, which has neither been remedied nor waived, to pay the CONTRACTOR as required by the Contract or to perform and complete or comply with the other terms thereof.



**SECTION 00 61 14**  
**LABOR & MATERIAL PAYMENT BOND**

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

CONTRACTOR (Name and Address):

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SURETY (Name and Address  
of Principal Place of Business):

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Contact: \_\_\_\_\_

Tel: \_\_\_\_\_

Email: \_\_\_\_\_

OWNER: **Town of Lexington**  
**11060 Highway 101**  
**Lexington, AL 35648**

CONTRACT: **Sewer System Improvements**  
**CWSRF #CS010886-02**

Date: \_\_\_\_\_

Amount: \$\_\_\_\_\_ (based on unit prices)

Description (Name and Location):

**Sewer System Improvements**

The project consists of demolition of existing sewer lagoon infrastructure, removal of sediment, liners, and appurtenances from two (2) sewer lagoon cells and disposal of the same. Installation of new lagoon aeration, baffle curtain, effluent pumps, blowers, controls, sludge pump, valves, actuators, and related equipment for a fully functional lagoon treatment system.

BOND:

Date (Not earlier than Contract Date): \_\_\_\_\_

Amount: \$\_\_\_\_\_

Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title:

SURETY

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title:

(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title

SURETY

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title

1. The CONTRACTOR and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the OWNER to pay for labor, materials and equipment furnished for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to the OWNER, this obligation shall be null and void if the CONTRACTOR:

2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2. Defends, indemnifies and holds harmless the OWNER from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract, provided the OWNER has promptly notified the CONTRACTOR and the Surety (at the addresses described in paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the CONTRACTOR and the Surety, and provided there is no OWNER Default.

3. With respect to Claimants, this obligation shall be null and void if the CONTRACTOR promptly makes payment, directly or indirectly, for all sums due.

4. The Surety shall have no obligation to Claimants under this Bond until:

4.1. Claimants who are employed by or have a direct contract with the CONTRACTOR have given notice to the Surety (at the addresses described in paragraph 12) and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with the CONTRACTOR:

4.2.1. Have furnished written notice to the CONTRACTOR and sent a copy, or notice thereof, to the OWNER, within 90 days after

having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and

4.2.2. Have either received a rejection in whole or in part from the CONTRACTOR, or not received within 30 days of furnishing the above notice any communication from the CONTRACTOR by which the CONTRACTOR had indicated the claim will be paid directly or indirectly; and

4.2.3. Not having been paid within the above 30 days, have sent a written notice to the Surety and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the CONTRACTOR.

5. If a notice required by paragraph 4 is given by the OWNER to the CONTRACTOR or to the Surety, that is sufficient compliance.

6. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

6.1. Send an answer to the Claimant, with a copy to the OWNER, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2. Pay or arrange for payment of any undisputed amounts.

7. The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

8. Amounts owed by the OWNER to the CONTRACTOR under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the

CONTRACTOR furnishing and the OWNER accepting this Bond, they agree that all funds earned by the CONTRACTOR in the performance of the Contract are dedicated to satisfy obligations of the CONTRACTOR and the Surety under this Bond, subject to the OWNER's priority to use the funds for the completion of the Work.

9. The Surety shall not be liable to the OWNER, Claimants or others for obligations of the CONTRACTOR that are unrelated to the Contract. The OWNER shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

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

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by paragraph 4.1 or paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the OWNER or the CONTRACTOR shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the OWNER or the CONTRACTOR, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

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

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, the CONTRACTOR shall promptly furnish a copy of this Bond or shall permit a copy to be made.

## 15. DEFINITIONS

15.1. Claimant: An individual or entity having a direct contract with the CONTRACTOR or with a Subcontractor of the CONTRACTOR to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of the CONTRACTOR and the CONTRACTOR's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

15.2. Contract: The agreement between the OWNER and the CONTRACTOR identified on the signature page, including all Contract Documents and changes thereto.

15.3. OWNER Default: Failure of the OWNER, which has neither been remedied nor waived, to pay the CONTRACTOR as required by the Contract or to perform and complete or comply with the other terms thereof.

**SECTION 00 72 43**  
**GENERAL CONDITIONS**  
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## GENERAL CONDITIONS

### ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

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#### 1.01 *Defined Terms*

A. Wherever used in the Contract Documents and printed with initial or all capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the 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. *Bidding Documents*--The Bidding Requirements and the proposed Contract

Documents (including all Addenda issued prior to receipt of Bids).

7. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, Bid security form, if any, and the Bid form with any supplements.

8. *Bonds*--Performance and payment bonds and other instruments of security.

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*--The Contract Documents establish the rights and obligations of the parties and include the Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications

and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders, and ENGINEER's written interpretations and clarifications issued on or after the Effective Date of the Agreement. Approved Shop Drawings and the reports and drawings of subsurface and physical conditions are not Contract Documents. Only printed or hard copies of the items listed in this paragraph are Contract Documents. Files in electronic media format of text, data, graphics, and the like that may be furnished by OWNER to CONTRACTOR 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 Substantial Completion; and (ii) 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.A 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. *ENGINEER's Consultant*--An individual or entity having a contract with ENGINEER to furnish services as ENGINEER's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.

21. *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.

22. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

23. *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 in connection with the Work.

24. *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.

25. *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.

26. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

27. *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.

28. *Notice of Award*--The written notice by OWNER to the apparent successful bidder stating that upon timely compliance by the apparent successful bidder with the conditions precedent listed therein, OWNER will sign and deliver the Agreement.

29. *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.

30. *OWNER*--The individual, entity, public body, or authority with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be performed.

31. *Partial Utilization*--Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

32. *PCBs*--Polychlorinated biphenyls.

33. *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.

34. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part as may be indicated elsewhere in the Contract Documents.

35. *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.

36. *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.

37. *Resident Project Representative*--The authorized representative of ENGINEER who may be assigned to the Site or any part thereof.

38. *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.

39. *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.

40. *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.

41. *Specifications*--That part of the Contract Documents consisting of written technical descriptions of materials, equipment,

systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

42. *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.

43. *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.

44. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

45. *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 any Subcontractor.

46. *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.

47. *Unit Price Work*--Work to be paid for on the basis of unit prices.

48. *Work*--The entire completed 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.

49. *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.

50. *Written Amendment*--A written statement modifying the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

## 1.02 Terminology

### A. Intent of Certain Terms or Adjectives

1. Whenever in the Contract Documents the terms "as allowed," "as approved," or terms of like effect or import are used, or 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 action or determination will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed 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 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 9.10 or any other provision of the Contract Documents.

*B. Day*

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

*C. Defective*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it does not conform to the Contract Documents or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or 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).

*D. 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.

E. Unless stated otherwise in the Contract Documents, words or phrases which 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

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### 2.01 *Delivery of Bonds*

A. When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to

OWNER such Bonds as CONTRACTOR may be required to furnish.

## 2.02 *Copies of Documents*

A. OWNER shall furnish to CONTRACTOR up to ten copies of the Contract Documents. 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. *CONTRACTOR's Review of Contract Documents:* 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 may discover and shall obtain a written interpretation or clarification

from ENGINEER before proceeding with any Work affected thereby; however, 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 knew or reasonably should have known thereof.

B. *Preliminary Schedules:* Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for its 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 Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing, and processing such submittal; 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.

C. *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.

#### 2.06 *Preconstruction Conference*

A. Within 20 days after the Contract Times start to run, but before any Work at the Site is started, a conference attended by 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.B, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

#### 2.07 *Initial Acceptance of Schedules*

A. Unless otherwise provided in the Contract Documents, at least ten 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.B. CONTRACTOR shall have an additional ten 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 any specified Milestones and 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 Shop Drawing and Sample 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

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#### 3.01 *Intent*

A. The Contract Documents are complementary; what is called for by one is as binding as if called for 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 may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended 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, nor shall any such provision or instruction be effective to assign to OWNER, ENGINEER, or any of ENGINEER's Consultants, agents, or employees 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. 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 any provision of any

Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once. 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; provided, however, that CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity, or discrepancy unless CONTRACTOR knew or reasonably should have known 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, code, or instruction (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 in one or more of the following ways: (i) a Written Amendment; (ii) a Change Order; or (iii) 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: (i) a Field Order; (ii) ENGINEER's approval of a Shop Drawing or Sample; or (iii) ENGINEER's written interpretation or clarification.

### 3.05 *Reuse of Documents*

A. CONTRACTOR and any Subcontractor or Supplier or other individual or entity performing or furnishing any of the Work under a direct or indirect contract with OWNER: (i) shall not 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 ENGINEER's Consultant, including electronic media editions; and (ii) shall not reuse any of 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 adaption by ENGINEER. This prohibition will survive final payment, completion, and acceptance of the Work, or termination or completion of the Contract. Nothing herein shall preclude CONTRACTOR from retaining copies of the Contract Documents for record purposes.

## ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDI- TIONS; REFERENCE POINTS

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### 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, 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 of explorations and tests of subsurface conditions at or contiguous to the Site that ENGI-

NEER has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that ENGINEER has used in preparing the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized:* CONTRACTOR may rely upon the general 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, ENGINEER, or any of ENGINEER's Consultants 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 at or contiguous to the Site 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 9.08 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 in respect of 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 within the time and 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, OWNER, ENGINEER, and ENGINEER's Consultants 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.

#### 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; 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 of 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:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings

relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the ENGINEER in the preparation of the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized:* CONTRACTOR may rely upon the general 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, ENGINEER or any of ENGINEER’s Consultants 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); 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.

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 to CONTRACTOR written notice: (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, ENGINEER, ENGINEER's Consultants and the officers, directors, partners, employees, agents, other 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.E 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, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, other 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.F 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 are not intended to apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

## ARTICLE 5 - BONDS AND INSURANCE

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### 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 CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, 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 current 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 must be accompanied by a certified copy of such agent's authority to act.

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 within 20 days thereafter substitute 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 coverage's 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 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. OWNER shall deliver to CONTRACTOR, with copies to each additional insured 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.

#### 5.04 *CONTRACTOR's Liability Insurance*

A. CONTRACTOR shall purchase and maintain such liability and other 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: (i) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (ii) 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 so required by this paragraph 5.04 to be purchased and maintained shall:

1. with respect to insurance required by paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (subject to any customary exclusion in respect of professional liability) OWNER, ENGINEER, ENGINEER's Consultants, 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, partners, employees, agents, and other 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 coverage's 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 completed operations insurance;

4. include contractual liability insurance covering CONTRACTOR's indemnity obligations under paragraphs 6.07, 6.11, and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least thirty 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);

6. 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

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment (and 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, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, 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, 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 additional insured to whom a certificate of insurance has been issued.

B. OWNER shall purchase and maintain such boiler and machinery 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, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with 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 additional insured 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 paragraph 5.06, OWNER shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment. 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, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other 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 additional insureds thereunder. OWNER and CONTRACTOR waive all rights against each other and their respective officers, directors, partners, employees, agents, and other 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, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other 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, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, and other 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 peril 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, ENGINEER, or ENGINEER's Consultants and the officers, directors, partners, employees, agents, and other 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 insureds, 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 or Written Amendment.

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 2.05.C. 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

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### 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, but 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. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

B. At all times during the progress of the Work, CONTRACTOR shall assign a competent resident superintendent thereto who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the Site and shall have authority to act on behalf of CONTRACTOR. All communications given to or received from the superintendent shall be binding on CONTRACTOR.

### 6.02 *Labor; Working Hours*

A. CONTRACTOR shall provide competent, suitably qualified personnel to survey, lay out, and construct the Work 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, and CONTRACTOR will not permit overtime work or the performance of Work on 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 General Requirements, 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 warranties and guarantees specifically called for 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. 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 (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of Article 12. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

#### 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: (i) it is at least equal in quality, durability, appearance, strength, and design characteristics; (ii) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole, and;

b. CONTRACTOR certifies that: (i) there is no increase in cost to the OWNER; and (ii) it will conform substantially, even with deviations, 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 that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Re-

quests for review of proposed substitute items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR.

c. The procedure for review by ENGINEER will be as set forth in paragraph 6.05.A.2.d, as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances.

d. CONTRACTOR shall first 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 shall certify that the proposed substitute item will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified, and be suited to the same use as that specified. The application will state the extent, if any, to which the use of the proposed substitute item will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not 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 work on the Project) to adapt the design to the proposed substitute item and whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute item from that specified will be identified in the application, and available engineering, sales, maintenance, repair, and

replacement services will be indicated. The application will also 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, all of which will be considered by ENGINEER in evaluating the proposed substitute item. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute item.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and 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 procedure for review by ENGINEER will be similar to that provided in subparagraph 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 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 either a Change Order for a substitute or 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 time required by ENGINEER and ENGINEER's Consultants in evaluating substitute proposed or submitted by CONTRACTOR pursuant to paragraphs 6.05.A.2 and 6.05.B and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER approves a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's Consultants for evaluating each such 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 or Written Amendment signed. 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 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 shall it 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 an additional insured 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, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other 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. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees or agents, and other consultants 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. CONTRACTOR shall pay all charges of utility

owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto, such as plant investment fees.

#### 6.09 *Laws and Regulations*

A. CONTRACTOR shall give all notices and 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 primary 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 may 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, ENGINEER, ENGINEER's Consultant, and the officers, directors, partners, employees, agents, and other consultants 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 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, Written Amendments, 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. 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. 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 ENGINEER's Consultant, 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). 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 to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. All submittals will be identified as ENGINEER may require and in the number of copies specified in the General Requirements. The 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.E.

B. CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers, and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.17.E. The numbers of each Sample to be submitted will be as specified in the Specifications.

C. Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER as required by paragraph 2.07, 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.

#### D. *Submittal Procedures*

1. Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

a. all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

b. all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incident thereto; and

d. CONTRACTOR shall also have 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.

2. Each submittal shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to

CONTRACTOR's review and approval of that submittal.

3. At the time of each submittal, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to ENGINEER for review and approval of each such variation.

#### E. *ENGINEER's Review*

1. ENGINEER will timely review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample 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 of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of each submittal as required by paragraph 6.17.D.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 approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.17.D.1.

F. *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, ENGINEER, and ENGINEER's Consultants that all Work will be in accordance with the Contract Documents and will not be defective. 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.

B. 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 acceptance by OWNER or any failure to do so;

6. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER;

7. any inspection, test, or approval by others; or

8. 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, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, and other 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:

1. 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; and

2. is caused in whole or in part 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, regardless of whether or not caused in part by any negligence or omission of an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations

regardless of the negligence of any such individual or entity.

B. In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors, partners, or employees 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 Consultants or to the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them 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.

#### ARTICLE 7 - OTHER WORK

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#### 7.01 *Related Work at Site*

A. OWNER may perform other work related to the Project at the Site by OWNER's employees, or let 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 and each utility owner (and OWNER, if OWNER is performing the other work with OWNER's employees) proper and safe access to the Site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, 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 their work and will only cut or alter their 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.



## ARTICLE 8 - OWNER'S RESPONSIBILITIES

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### 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 Promptly When Due*

A. OWNER shall make payments to CONTRACTOR promptly 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 in respect of 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 in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by ENGINEER in preparing the Contract Documents.

### 8.06 *Insurance*

A. OWNER's responsibilities, if any, in 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 in 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. If and to the extent OWNER has agreed to furnish CONTRACTOR reasonable evidence that financial arrangements have been made to satisfy OWNER's obligations under the Contract Documents, OWNER's

responsibility in respect thereof will be as set forth in the Supplementary Conditions.

## ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

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### 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 and will not be changed without written consent of OWNER and ENGINEER.

### 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 9.10, and 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 responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.10 and in the Supplementary Conditions. 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 *Clarifications and Interpretations*

A. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents as ENGINEER may determine necessary, which shall be consistent with the intent of and reasonably inferable from the Contract Documents. Such written clarifications and interpretations will be binding on OWNER and CONTRACTOR. 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, that

should be allowed as a result of a written clarification or interpretation, a Claim may be made therefor as provided in paragraph 10.05.

#### 9.05 *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 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, as a result of a Field Order, a Claim may be made therefor as provided in paragraph 10.05.

#### 9.06 *Rejecting Defective Work*

A. ENGINEER will have authority to disapprove or 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.

#### 9.07 *Shop Drawings, Change Orders and Payments*

A. In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraph 6.17.

B. In connection with ENGINEER's authority as to Change Orders, see Articles 10, 11, and 12.

C. In connection with ENGINEER's authority as to Applications for Payment, see Article 14.

#### 9.08 *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.

#### 9.09 *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. Claims, disputes and other matters relating to the acceptability of the Work, the quantities and classifications of Unit Price Work, the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, and Claims seeking changes in the Contract Price or Contract Times will be referred initially to ENGINEER in writing, in accordance with the provisions of paragraph 10.05, with a request for a formal decision.

B. When functioning as interpreter and judge under this paragraph 9.09, 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. The rendering of a decision by ENGINEER pursuant to this paragraph 9.09 with respect to any such Claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.07) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such Claim, dispute, or other matter.

#### 9.10 *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 9.10 shall also apply to ENGINEER's Consultants, Resident Project Representative, and assistants.

### ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

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#### 10.01 *Authorized Changes in the Work*

A. Without invalidating the Agreement 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 Written Amendment, 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.B.

#### 10.03 *Execution of Change Orders*

A. OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER (or Written Amendments) 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 notice 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) is required by the provisions of any Bond to be given to a surety, 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 and Disputes*

A. *Notice:* Written notice stating the general nature of each Claim, dispute, or other matter 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. Notice of the amount or extent of the Claim, dispute, or other matter 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, dispute, or other matter). 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 Time 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).

B. *ENGINEER's Decision:* ENGINEER will render a formal decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any. ENGINEER's written decision on such Claim, dispute, or other matter will be final and binding upon OWNER and CONTRACTOR unless:

1. an appeal from ENGINEER's decision is taken within the time limits and in accordance with the dispute resolution procedures set forth in Article 16; or

2. if no such dispute resolution procedures have been set forth in Article 16, a written notice of intention to appeal from ENGINEER's written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within 30 days after the date of such decision, and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction within 60 days after the date of such decision or within 60 days after Substantial Completion, whichever is later (unless otherwise agreed in writing by OWNER and CONTRACTOR), to exercise such rights or remedies as the appealing party may have with respect to such Claim, dispute, or other matter in accordance with applicable Laws and Regulations.

C. If ENGINEER does not render a formal decision in writing within the time stated in paragraph 10.05.B, a decision denying the Claim in its entirety shall be deemed to have been issued 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

D. No Claim for an adjustment in Contract Price or Contract Times (or

Milestones) will be valid if not submitted in accordance with this paragraph 10.05.

## ARTICLE 11 - COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK

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### 11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs 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 include only the following items, and shall not include any of the costs itemized in paragraph 11.01.B.

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 at the Site. 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, 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, expressage, and similar petty cash items in connection with the Work.

i. When the Cost of the Work is used to determine the value of a Change Order or of a Claim, the cost of premiums for additional Bonds and insurance required because of the changes in the Work or caused by the event giving rise to the Claim.

j. When all the Work is performed on the basis of cost-plus, 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, 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 and 11.01.B.

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 *Cash 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 as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:

1. the 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

2. CONTRACTOR's costs for unloading and handling on the Site, labor, installation costs, overhead, profit,

and other expenses contemplated for the 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.

B. 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. 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 9.08.

B. 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.

C. 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 signifi-

cantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. if 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

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### 12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order or by a Written Amendment. 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 paragraph 12.01.C.2.a 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 (or Milestones) may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Times (or Milestones) 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 (or Milestones) covered by a Change Order or of any Claim for an adjustment in the Contract Times (or Milestones) will be determined in

accordance with the provisions of this Article 12.

## 12.03 *Delays Beyond CONTRACTOR's Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) 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.

## 12.04 *Delays Within CONTRACTOR's Control*

A. The Contract Times (or Milestones) will not be extended due to 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.

## 12.05 *Delays Beyond OWNER's and CONTRACTOR's Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay.

## 12.06 *Delay Damages*

A. In no event shall OWNER or ENGINEER be liable to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from:

1. delays caused by or within the control of CONTRACTOR; or

2. delays beyond the control of both OWNER and CONTRACTOR including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

B. Nothing in this paragraph 12.06 bars a change in Contract Price pursuant to this Article 12 to compensate CONTRACTOR due to delay, interference, or disruption directly attributable to actions or inactions of OWNER or anyone for whom OWNER is responsible.

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

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### 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. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

### 13.02 *Access to Work*

A. OWNER, ENGINEER, ENGINEER's Consultants, other representatives and personnel of OWNER, independent testing laboratories, and govern-

mental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's Site 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 said paragraph 13.04.B; 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, it must, if requested by ENGINEER, be uncovered 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. If it is found

that such 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. If, however, such 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 Milestones), 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. 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).

### 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 Laws or Regulations or 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: (i) repair such defective land or areas, or (ii) correct such defective Work or, if the defective Work has been rejected by OWNER, remove it from the Project and replace it with Work that is not defective, and (iii) 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. If CONTRACTOR does not promptly comply with the terms of such 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,

and 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.

B. 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 or by Written Amendment.

C. 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.

D. 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 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 and remedy any such deficiency.

B. In exercising the rights and remedies under this paragraph, OWNER shall proceed expeditiously. In connection with such corrective and 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 (or Milestones) 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

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#### 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 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 pro-gress 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 on the Site 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, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.08, and to 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: (i) 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 (ii) that 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 to supervise, direct, or control the Work or for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for CONTRACTOR's failure to comply with Laws and Regulations applicable to CONTRACTOR's performance of the Work. Additionally, said review or recommendation will not impose responsibility on ENGINEER to make any examination to ascertain how or for what purposes CONTRACTOR has used the moneys

paid on account of the Contract Price, or 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 referred to 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 Written Amendment or 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 must 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 corrects to OWNER's satisfaction the reasons for such action.

3. If it is subsequently determined 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.

#### 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. Promptly thereafter, 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. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and 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. 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.

B. OWNER shall have the right to exclude CONTRACTOR from the Site after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

#### 14.05 *Partial Utilization*

A. Use by OWNER at OWNER's option of 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, may be accomplished prior to Substantial Completion of all the Work subject to the following conditions.

1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. 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. 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.

2. No 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: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by subparagraph 5.04.B.7; (ii) consent of the surety, if any, to final payment; and (iii) 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 or OWNER's property might in any way be responsible 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. *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 will become due and, when due, 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 and recommendation of ENGINEER, and without terminating the Agreement, 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 writing which are still unsettled.

**ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION**

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*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 allowed 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 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 the surety, if any) seven days written notice, terminate the services of CONTRACTOR, 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), 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 finish the Work as OWNER may deem expedient. In such case, CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. 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.

C. 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.

#### 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, elect to terminate the Contract. In such case, CONTRACTOR shall be paid (without duplication of any items):

1. for 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. for 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. for 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. for 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, the Work is suspended for more than 90 consecutive days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within 30 days after it is submitted, or 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. 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

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### 16.01 *Methods and Procedures*

A. Dispute resolution methods and procedures, if any, shall be as set forth in the Supplementary Conditions. If no method and procedure has been set forth, and subject to the provisions of paragraphs 9.09 and 10.05, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

## ARTICLE 17 - MISCELLANEOUS

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### 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 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 if 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, and 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 Agreement.

#### 17.05 *Controlling Law*

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



**SECTION 00 73 00**

## SUPPLEMENTARY GENERAL CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (No. 1910-8, 1996 Edition) and other provisions of the Contract Documents as indicated below. All provisions, which are not so amended or supplemented, remain in full force and effect. The enumeration of the Supplementary General Conditions corresponds to the amended sections of the General Conditions.

## SC-2.02.A Copies of Documents

Delete 2.02.A and insert the following in its place: Owner shall furnish to CONTRACTOR up to three copies of the Contract Documents. Additional copies will be furnished upon request at the cost of reproduction.

## SC-4.04 Underground Facilities

Delete 4.04B and insert the following in its place: It is the CONTRACTOR's responsibility to contact the various utility owner's and determine the exact location of ALL existing utilities on the project whether shown on the plans or not.

SC-5.04 Concerning Contractors Liability Insurance

Addition to SC-5.04B.1 to include **The contractor will be required to include the following as additional insured: Town of Lexington; The Kelley Group, LLC**

Add the following new paragraph immediately after paragraph 5.04.B:

- C. The limits of liability for the insurance required by paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:**
- 1. Workers' Compensation, and related coverages under paragraphs 5.04.A.1 and A.2 of the General Conditions:**
- |  |                      |
|--|----------------------|
| <b>a. State:</b>                                     | <b>Statutory</b>     |
| <b>b. Applicable Federal (e.g., Longshoreman's):</b> | <b>Statutory</b>     |
| <b>c. Employer's Liability:</b>                      | <b>\$500/500/500</b> |
- 2. Contractor's General Liability under paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:**

- |  |             |
|--|-------------|
| a. General Aggregate   | \$2,000,000 |
| b. Products – Completed Operations Aggregate   | \$2,000,000 |
| c. Personal and Advertising Injury   | \$1,000,000 |
| d. Each Occurrence (Bodily Injury and Property Damage)   | \$1,000,000 |
| e. Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages where applicable. |             |
| f. Excess or Umbrella Liability  |             |
| 1) General Aggregate   | \$2,000,000 |
| 2) Each Occurrence   | \$2,000,000 |
3. Automobile Liability under paragraph 5.04.A.6 of the General Conditions:
- |                             |             |
|-----------------------------|-------------|
| a. Bodily Injury:           |             |
| Each person                 | \$1,000,000 |
| Each Accident               | \$1,000,000 |
| b. Property Damage:         |             |
| Each Accident               | \$500,000   |
| c. Combined Single Limit of | \$1,000,000 |
4. The Contractual Liability coverage required by paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:
- |                     |             |
|---------------------|-------------|
| a. Bodily Injury:   |             |
| Each Accident       | \$1,000,000 |
| Annual Aggregate    | \$2,000,000 |
| b. Property Damage: |             |
| Each Accident       | \$1,000,000 |
| Annual Aggregate    | \$2,000,000 |
5. Additional named insureds shall be the Owner, the Engineer and their Consultants.
6. Liability coverage for Owner, Engineer, Engineer's Consultants and other will be provided, subject to customary exclusions for professional Liability:

a. By endorsement as additional insureds on Contractor's Liability Policy.  
YES

7. Excess Liability:	YES
Umbrella Form:	YES
General Aggregate:	\$2,000,000
Each Occurrence:	\$2,000,000

SC-6.01 Contractor's Responsibilities

Add the following new paragraph immediately after paragraph 6.01.B:

**C. The CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Owner has the right to have impaired persons or dangerous material/equipment removed from the site at the CONTRACTOR's expense.**

SC-6.06 Concerning Subcontractors, Suppliers, and Others

Addition to SC-6.06B to include **The contractor will be required to submit a list of Subcontractors, Suppliers, and other persons and organizations (including those who are to furnish the principal items of material and equipment) to the Owner in advance of the specified date prior to the Effective Date of the Agreement. The prime contractor is required to have an executed contract with all subcontractors establishing scope of services and the costs associated. The contracts must be submitted for review prior to the Notice to Proceed is issued.**

Add the following new paragraph immediately after paragraph 6.06D:

**E. All subcontractors must provide a copy of active license issued by the Alabama General Contractors Licensure Board and proof of insurance coverage listing the Owner and Engineer as additional insureds.**

Add the following new paragraph immediately after paragraph 6.12 A:

**B. Contractor is required to keep all project related records in addition to the Record Documents for three years. Contractor to provide Owner and Engineer access to the records.**

SC-14.02 Progress Payments

**Monthly estimates for payment shall be submitted to the office of the Engineer by the Friday nearest the 25<sup>th</sup> of each month. Payment amounts will be verified by the Engineer and then processed by the Owner within 10 days following Engineer approval of request. Owner retains the right to inspect invoice of materials and financial items. Owner has 30 days from receipt of Engineer's approval to make payment.**



**State of Alabama**  
**Alabama Department of Environmental Management**  
**State Revolving Fund (SRF) Loan Program**



SRF Section  
Permits and Services Division  
Alabama Department of Environmental Management  
Post Office Box 301463  
Montgomery, Alabama 36130-1463

(334) 271-7793  
(334) 271-7950 FAX

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## **Supplemental General Conditions** **for SRF Assisted**

Public Drinking Water and Wastewater  
Facilities Construction Contracts



SRF Project Number: CS010886-02

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## I – ADEM Special Conditions

1. Construction within State rights-of-way shall be in accordance with the Alabama Department of Transportation policies and procedures.
2. Construction is to be carried out in compliance with applicable NPDES permits and in a manner that prevents bypassing of raw wastewater flows during construction. If bypassing is anticipated, the ADEM NPDES Enforcement Branch (334-271-7975) shall be advised in advance and the contractor shall take all necessary steps to minimize the impacts of bypassing.
3. Siltation and soil erosion shall be minimized during construction. The contractor shall obtain an NPDES storm water permit for construction if required.
4. The owner shall provide and maintain competent and adequate supervision and inspection.
5. ADEM and EPA shall have access to the site and the project work at all times.
6. These Special Conditions shall supersede any conflicting provisions of this contract.
7. **A project sign is required.** See **Parts XVII and XVIII, pages SGC-36 – SGC-37**, for more information.

## II – Bonds and Insurance

Bonding requirements shall comply with Alabama Act No. 97-225. Provisions of the Act are summarized below:

1. Bid Bond – Not less than 5% of either the owner's estimated cost or of the proposed prime contractor's bid up to a maximum of \$10,000. The bid guarantee shall consist of a cashier's check drawn on an Alabama bank or a bid bond executed by a surety company duly authorized and qualified to make bonds in the State of Alabama.
2. Performance Bond – In an amount not less than 100% of the contract price.
3. Payment Bond – Payable to the awarding authority, shall be executed in an amount not less than 50% of the contract price.

In addition to the insurance requirements elsewhere in the specifications, the owner or the contractor, as appropriate, must acquire any flood insurance made available by the Federal Emergency Management Agency as required by 40 CFR 30.600 (b), if construction will take place in a flood hazard area identified by the Federal Emergency Management Agency.

## III – Utilization of Disadvantaged Businesses Enterprises (DBEs)

It is the policy of the State Revolving Loan Fund (SRF) to promote a "fair share" of sub-agreement awards to **small, minority, and/or women-owned businesses** for equipment, supplies, construction, and services. Compliance with these contract provisions is required in order for project costs to be eligible for SRF funding. *The "fair share" objective is a goal, not a quota.* DBE (Disadvantaged Business Enterprise) is an all-inclusive business classification, which includes MBE (minority business enterprises and/or WBE (women business enterprises) and is used synonymously when these entities are referenced individually or collectively.

Failure on the part of the apparent successful bidder to submit required information to the Loan Recipient (Owner) may be considered (by the Loan Recipient (Owner)) in evaluating whether the bidder is responsive to the bid requirements. The project objectives for utilization of Minority Business Enterprises (MBEs) and Women's Business Enterprises (WBEs) are as follows:

Commodities (Supplies)	MBE 4%	WBE 11%
Contractual (Services)	MBE 8%	WBE 30%
Equipment	MBE 5%	WBE 20%
Construction	MBE 2.5%	WBE 3%

For purposes of clarification:

- This objective applies to any Federally assisted procurement agreement in excess of \$10,000.
- This objective necessitates three responsibilities; separate solicitations must be made of small and minority and women's business enterprises.
- A minority business is a business, at least 51 percent of which is owned and controlled by minority group members (Black; Hispanic; Asian American; American Indian; and, any other designations approved by the Office of Management and Budget).
- A women's business is a business, at least 51 percent of which is owned and controlled by one or more women.
- The control determination will revolve around the minority or woman owner's involvement in the day-to-day management of the business enterprise.
- Solicitation should allow adequate time for price analysis. ADEM recommends that contact be made no later than 15 days before bid opening.
- Efforts taken to comply with this objective must be documented in detail; maintain records of firms contacted, including any negotiation efforts to reach competitive price levels, and awards to the designated firms.
- ADEM recommends that the Loan Recipient (Owner) or proposed Prime Contractor utilizes the services of the Minority Business Development Service Centers. These Centers are funded by the U.S. Department of Commerce to provide technical, financial and contracting assistance to minority and women's business enterprises. These Centers are located in a number of Regional cities.
- Use of the services provided by these Centers does not absolve the Loan Recipient (Owner) or proposed Prime Contractor from pursuing additional efforts to meet this objective.

#### IV – Six Affirmative Steps for Good Faith DBE (MBE-WBE) Solicitation

The Loan Recipient (Owner) shall follow the six affirmative steps found in the SRF application when using loan funds to procure sources of supplies, construction and services.

If the successful bidder plans to subcontract a portion of the project, the bidder must submit to the owner within 10 days after bid opening, evidence of the affirmative steps taken to utilize small, minority and women's businesses. These six affirmative steps or 'good faith efforts' are required methods to ensure that DBEs have the opportunity to compete for procurements funded by EPA financial assistance dollars. Such affirmative steps are described as follows:

1. Ensure DBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. This will include placing DBEs on solicitation lists and soliciting them whenever there are potential sources.



2. Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitation for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.
3. Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs. This will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process.
4. Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.
5. Use the resources, services, and assistance of the AL Department of Transportation (ALDOT), Small Business Administration (SBA), and the Minority Business Development Agency of the Department of Commerce (MBDA).
6. If the Contractor awards subcontracts, it must take the steps described in items (1) through (5) listed above.

## V – Documentation Required from Loan Recipient (Owner) and Contractor

The low, responsive, responsible bidder must forward the following items, in duplicate, to the loan recipient (owner) no later than 10 days after bid opening. The Loan Recipient (Owner) shall transmit one (1) copy of its DBE documentation of the prime contractor solicitation and one (1) copy of the prime contractor's/bidder's DBE documentation of all subcontractor solicitation to the SRF Section within 14 days after bid opening.

1. SRF project number and project name/loan name\*. (\*not contract name)
2. List of **all** subcontractors (DBE and non-DBE) with name, address, telephone number, estimated contract dollar amount and duration. If there are to be no subcontractors, please indicate such in a letter on company letterhead.
3. List of any subcontract work yet to be committed with estimate of dollar amount and duration of contract.
4. MBE-WBE (DBE) Documents - See **Part V, page SGC-6**.
5. Debarred Firms Certification – See **Part XIV, page SGC-25**.
6. Certification Regarding Equal Employment Opportunity – See **Part XIII, page SGC-24**.

The Loan Recipient (Owner) shall submit annual MBE/WBE Utilization Reports (EPA Form 5700-52A, **pages SGC-16 - SGC-17**) within 30 days of the end of the annual reporting period (**October 30<sup>th</sup>, i.e. by November 30<sup>th</sup>**). Submit reports directly to:

Laketa Ross, Accountant  
Administrative Section  
Fiscal Branch  
Alabama Department of Environmental Management  
Post Office Box 301463  
Montgomery, Alabama 36130-1463

**The proposed Prime Contractor must submit the following items to the Loan Recipient (Owner):**

**1) DBE Compliance Form.** The Loan Recipient (Owner) must submit this information to the SRF Section to demonstrate compliance with the DBE requirements. ADEM's approval is required prior to award of the construction contract and commencement of any SRF-funded construction. **(Page SGC-8)**

**2) Certification Regarding Equal Employment Opportunity.** This form is required of the proposed prime contractor (re: all subcontracts executed) and should be submitted with the prime proposed contractor's MBE-WBE solicitation submittal to the Loan Recipient (Owner). **(Page SGC-24)**

**3) Debarred Firms Certification.** This form is required of the proposed prime contractor (re: all subcontracts executed) and should be submitted with the prime proposed contractor's MBE-WBE solicitation submittal to the Loan Recipient (Owner). **(Page SGC-25)**

**4) EPA Form 6100-2 DBE Subcontractor Participation Form.** This form gives a DBE subcontractor the opportunity to describe the work the DBE subcontractor received from the proposed prime contractor, how much the DBE subcontractor was paid, and any other concerns the DBE subcontractor might have. The proposed prime contractor must provide this form to each DBE subcontractor for the DBE subcontractor's submittal to the SRF Section's MBE-WBE Compliance Staff (to be forwarded to EPA's DBE Coordinator). **(Page SGC-10)**

**5) EPA Form 6100-3 DBE Subcontractor Performance Form.** This form captures an intended DBE subcontractor's description of work to be performed for the proposed prime contractor and the price of the work. The proposed prime contractor must provide this form to each DBE subcontractor for the DBE subcontractor's submittal to the SRF Section's MBE-WBE Compliance Staff (to be forwarded to EPA's DBE Coordinator). **(Page SGC-12)**

**6) EPA Form 6100-4 DBE Subcontractor Utilization Form.** This form captures the proposed prime contractor's intended use of all identified DBE subcontractors and the estimated dollar amount of the work. The proposed prime contractor must provide this form to each DBE subcontractor for the DBE subcontractor's submittal to the SRF Section's MBE-WBE Compliance Staff (to be forwarded to EPA's DBE Coordinator). **(Page SGC-14)**

**7) EPA Form 5700-52 A MBE/WBE Utilization Reports (DBE Annual Report), if applicable.** The Loan Recipient (Owner) must submit this information to the SRF Section within 30 days of the end of the annual reporting period (October 30th), i.e., **by November 30th**. **(Pages SGC-16 - SGC-17)**

**8) Changes to Approved DBE Compliance Form, if applicable.** If any changes, substitutions, or additions are proposed to the subcontractors included in previous Department approvals, the Owner must submit this information to the Department for prior approval in order for the affected subcontract work to be eligible for SRF funding. **(Page SGC-23)**

**9) Certified Payrolls.** These should be submitted to the Loan Recipient (Owner), at least, monthly for the prime contractor and all subcontractors. The Loan Recipient (Owner) must maintain payroll records and make these available for inspection

Please note that DBEs, MBEs, and WBEs must be certified in writing by EPA, SBA, or DOT (or by state, local, Tribal, or private entities whose certification criteria match EPA's). Depending upon the certifying agency, a DBE may be classified as a Disadvantaged Business Enterprise (DBE), a Minority Business Enterprise (MBE), or a Women's Business Enterprise (WBE). Written certification as a DBE (MBE or WBE) is required in order to be counted toward the Loan Recipient/Owner's MBE-WBE accomplishments.

The documentation of these good faith solicitation efforts must be detailed in order to allow for satisfactory review. Such documentation might include fax confirmation sheets, copies of solicitation letters/emails, printouts of the online solicitations, printouts of online search results, affidavits of publication in newspapers, etc. The proposed prime contractor is strongly encouraged to follow up each written, fax, or email solicitation with, at least, 1 logged phone call.

The proposed prime contractor must employ the six affirmative steps to subcontract with DBEs, even if the proposed prime contractor has achieved its fair share objectives.

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The prime contractor must employ the six affirmative steps to subcontract with DBEs, even if the proposed prime contractor has achieved its fair share objectives. If a DBE subcontractor fails to complete work under the subcontract for any reason, the proposed prime contractor must notify the Loan Recipient (Owner) in writing prior to any termination and must employ the six 'good faith efforts' described above if using a replacement subcontractor. Any proposed changes from an approved DBE subcontractor must be reported to the Loan Recipient (Owner) and to the SRF Section on the Changes to Approved Subcontractors Form prior to initiation of the action. EPA Forms Nos. 6100-3 and 6100-4 must also be submitted to the SRF Section for new DBE subcontracts.

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## VI – Resources for Identifying MBE-WBE (DBE) Contractors/Subcontractors

The following organizations may provide assistance in soliciting DBE participation:

City of Birmingham  
Office of Economic  
Development  
ATTN: **Monique Shorts**,  
Economic Specialist  
710 20th Street North  
Birmingham, Alabama  
35203  
Ph: (205) 254-2799  
Fax: (205) 254-7741  
[Monique.shorts@birminghamal.gov](mailto:Monique.shorts@birminghamal.gov)

U.S. Small Business  
Administration  
<http://www.pro-net.sba.gov>

National Association  
of Minority  
Contractors (NAMC)  
<https://namcatlanta.org/>

Alabama Department  
of Transportation  
ATTN: **John Huffman**  
1409 Coliseum Boulevard  
Montgomery, Alabama  
36130  
Ph: (334) 244-6261  
<http://www.dot.state.al.us>

U.S. Department of  
Commerce  
Minority Business  
Development Agency  
ATTN: **Donna Ennis**  
75 5<sup>th</sup> Street NW,  
Suite 300  
Atlanta, Georgia 30308  
Ph: (404) 894-2096  
<http://www.mbda.gov/>

Governor's Office of  
Minority and Women's  
Business Enterprises  
**Hilda Lockhart**,  
STEP Project Director  
401 Adams Avenue  
Suite 360  
Montgomery, Alabama  
36130  
Ph: (334) 242-2220

Birmingham Construction  
Industrial Authority ATTN:  
**Ashley Orl** or **Kimberly  
Bivins**  
601 37<sup>th</sup> Street South  
Birmingham, Alabama  
35222  
Ph: (205) 324-6202  
[aorl@bcia1.org](mailto:aorl@bcia1.org)  
[kbaylorbivins@bcia1.org](mailto:kbaylorbivins@bcia1.org)

### **NOTE:**

- (1) The Loan Recipient (Owner) and the proposed Prime Contractor shall use the necessary resources to identify and directly solicit no less than three (3) certified DBE/MBE/WBE companies to bid in each expected contract/subcontract area. If a diligent and documented search of ALDOT, SBA, and MBDA directories does not identify three (3) potential certified DBE/MBE/WBE firms, then the proposed Prime Contractor shall post an advertisement in, at least, one (1) of the other online or print resources. Whenever possible, post solicitation for bids or proposals should be posted/advertised for a minimum of 30 calendar days before the bid or proposal closing date.
- (2) Expenditures to a DBE that acts merely as a broker or passive conduit of funds, without performing, managing, or supervising the work of its subcontract in a manner consistent with normal business practices may not be counted.
- (3) The proposed Prime Contractor should attempt to identify and first solicit DBEs in the geographic proximity of the project before soliciting those located farther away.
- (4) In addition, our SRF DBE Compliance Staff is readily available for assistance, as follows: Laketa Ross at (334) 271-7727 or [laketa.ross@adem.alabama.gov](mailto:laketa.ross@adem.alabama.gov) OR Diane Lockwood (DBE Coordinator) at (334) 271-7815 or [dpl@adem.alabama.gov](mailto:dpl@adem.alabama.gov).

## VII – DBE Compliance Form

**NOTE: FOR DBE COMPLIANCE, ONE (1) COPY OF THIS FORM (WITH ALL INFORMATION OUTLINED) IS REQUIRED (WITH THE LOAN RECIPIENT (OWNER)'S DBE SUBMITTAL) FOR EACH PR&CS REVIEW. THE LOAN RECIPIENT (OWNER) AND PROPOSED PRIME CONTRACTOR SHOULD ENSURE THAT THIS INFORMATION IS COMPLETE PRIOR TO THE PR&CS SUBMITTAL TO THE SRF SECTION.**

Loan Recipient: \_\_\_\_\_ SRF Loan (Project) Number: \_\_\_\_\_

### **CERTIFICATIONS:**

*I certify that the information submitted on and with this form is true and accurate and that this company has met and will continue to meet the conditions of this construction contract regarding DBE solicitation and utilization. I further certify that criteria used in selecting subcontractors and suppliers were applied equally to all potential participants and that EPA Forms 6100-2 and 6100-3 were distributed to all DBE subcontractors.*

\_\_\_\_\_  
(Proposed Prime Contractor Signature)      Date \_\_\_\_\_

\_\_\_\_\_  
(Printed Name and Title)

*I certify that I have reviewed the information submitted on and with this form and that it meets the requirements of the Loan Recipient's/Owner's State Revolving Fund loan contract.*

**(\*\*Only ONE (1) signature required below.)**

\_\_\_\_\_  
(Signature of Loan Recipient (Owner))      Date \_\_\_\_\_

**OR\*\***

\_\_\_\_\_  
(Loan Recipient's (Owner's) Representative's Signature, **(P.E.)**)      Date \_\_\_\_\_

\_\_\_\_\_  
(Printed Name and Title)

### **GENERAL INFORMATION:**

Loan Recipient (Owner) Contact: \_\_\_\_\_

Loan Recipient (Owner) Phone Number/Email: \_\_\_\_\_

Consulting Engineer Contact: \_\_\_\_\_

Consulting Engineer Phone Number/Email: \_\_\_\_\_

Proposed Prime Contractor: \_\_\_\_\_

Proposed Prime Contractor Contact: \_\_\_\_\_

Proposed Prime Contractor Phone Number/Email: \_\_\_\_\_

Proposed Prime Contract Amount:      \$ \_\_\_\_\_

Proposed Total DBE/MBE Participation: \$ \_\_\_\_\_ Percentage: \_\_\_\_\_ % Goal: 2.5%

Proposed Total WBE Participation:      \$ \_\_\_\_\_ Percentage: \_\_\_\_\_ % Goal: 3.0%

**Please ensure the following is submitted in the *full* DBE submittal (with the DBE COMPLIANCE FORM (page SGC-8)):**

- (1) **List of all committed and uncommitted subcontractors** by trade, including company name, address, telephone number, contact person, dollar amount of subcontract, and DBE/MBE/WBE status. Indicate in writing if no solicitations were made because the contractor intends to use only its own forces to accomplish the work.
- (2) **Proof of certification (certificate or letter)** by EPA, SBA, DOT (or by state, local, Tribal, or private entities whose certification criteria match EPA's) for each subcontractor listed as a DBE, MBE, or WBE.
- (3) **Documentation of solicitation effort for prospective DBE firms**, such as fax confirmation sheets, copies of solicitation letters/emails, printout of the online solicitations, printouts of online search results, affidavits of publication in newspapers, etc. The prime contractor is strongly encouraged to follow up each written, fax, or email solicitation with at least 1 logged phone call. Whenever possible, post solicitation for bids or proposals should be for a minimum of 30 calendar days before the bid or proposal closing date.
- (4) **Justification for not selecting a certified DBE subcontractor** that submitted a low bid for any subcontract area.
- (5) **Certification By Proposed Prime Contractor or Subcontractor Regarding Equal Opportunity Employment. (Page SGC-24)**
- (6) **Debarred Firms Certification. (Page SGC-25)**
- (7) **EPA Form 6100-2 DBE Subcontractor Participation Form** for **each** proposed **certified** DBE subcontractor.\*  
(Page SGC-10) (\*This form is completed by the proposed prime contractor. It is signed by **each** proposed subcontractor **only**.)
- (8) **EPA Form 6100-3 DBE Subcontractor Performance Form** for each DBE subcontractor.\*\*  
(Page SGC-12) (\*\*This form is completed by the proposed prime contractor and signed by each proposed certified subcontractor and the proposed prime contractor per subcontract.)
- (9) **EPA Form 6100-4 DBE Subcontractor Utilization Form** to summarize all DBE subcontracts/subcontractors.\*\*\*  
(Page SGC-14) (\*\*\*)This form is completed and signed by the proposed prime contractor **only**.)

## **NOTE:**

**ALL DBE contractors selected must have a current DBE certificate or letter of certification by an approved certifying agency.**

### **Loan Recipient (Owner) DBE Submittal**

**At minimum**, the Loan Recipient (Owner)'s DBE submittal should **always** consist of **a cover letter** (*preferred, but optional*) **and a VII - DBE Compliance Form (page SGC-8) and DBE solicitation documentation** (i.e., DBE solicitation list(s) with source(s) of list(s) clearly identified, contractor contact information and results/outcomes of each solicitation (or of the overall solicitation effort, if all results/outcomes were the same), documentation of solicitation method (i.e., copies of emails, phone logs, faxes, etc.).

### **Prime Contractor DBE Submittal**

**At minimum**, the Prime Contractor's DBE submittal should **always** consist of **a cover letter** (*preferred, but optional*) **and DBE solicitation documentation** (i.e., DBE solicitation list(s) with source(s) of list(s) clearly identified, subcontractor contact information and results/outcomes of each solicitation (or of the overall solicitation effort, if all results/outcomes were the same), documentation of solicitation method (i.e., copies of emails, phone logs, faxes, etc.) **OR** a "No Subcontractors" Letter (*if none will be utilized*) **and a List of ALL (DBE/non-DBE) subcontractors contracted/yet to be contracted and ALL EPA 6100 Forms described above (DBE subcontractors selected or not) and Certification Regarding Equal Employment Opportunity and Debarred Firms Certification.**

# VIII - EPA Form 6100-2 DBE Subcontractor Participation Form



OMB Control No: 2090-0030

## Disadvantaged Business Enterprise (DBE) Program DBE Subcontractor Participation Form

An EPA Financial Assistance Agreement Recipient must require its prime contractors to provide this form to its DBE subcontractors. This form gives a DBE<sup>1</sup> subcontractor<sup>2</sup> the opportunity to describe work received and/or report any concerns regarding the EPA-funded project (e.g., in areas such as termination by prime contractor, late payments, etc.). The DBE subcontractor can, as an option, complete and submit this form to the EPA DBE Coordinator at any time during the project period of performance.

Subcontractor Name		Project Name	
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact	
Address			
Telephone No.		Email Address	
Prime Contractor Name		Issuing/Funding Entity:	

Contract Item Number	Description of Work Received from the Prime Contractor Involving Construction, Services , Equipment or Supplies	Amount Received by Prime Contractor

<sup>1</sup> A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

<sup>2</sup> Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.



## VIII - EPA Form 6100-2 DBE Subcontractor Participation Form



OMB Control No: 2090-0030

## Disadvantaged Business Enterprise (DBE) Program DBE Subcontractor Participation Form

Please use the space below to report any concerns regarding the above EPA-funded project:

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

<b>Subcontractor Signature</b>	<b>Print Name</b>
<b>Title</b>	<b>Date</b>

The public reporting and recordkeeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

# IX - EPA Form 6100-3 DBE Subcontractor Performance Form



OMB Control No: 2090-0030

## Disadvantaged Business Enterprise (DBE) Program DBE Subcontractor Performance Form

This form is intended to capture the DBE<sup>1</sup> subcontractor's<sup>2</sup> description of work to be performed and the price of the work submitted to the prime contractor. An EPA Financial Assistance Agreement Recipient must require its prime contractor to have its DBE subcontractors complete this form and include all completed forms in the prime contractors bid or proposal package.

Subcontractor Name		Project Name	
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact	
Address			
Telephone No.		Email Address	
Prime Contractor Name		Issuing/Funding Entity:	

Contract Item Number	Description of Work Submitted to the Prime Contractor Involving Construction, Services, Equipment or Supplies	Price of Work Submitted to the Prime Contractor

DBE Certified By: <input type="radio"/> DOT <input type="radio"/> SBA <input type="radio"/> Other: _____	Meets/ exceeds EPA certification standards? <input type="radio"/> YES <input type="radio"/> NO <input type="radio"/> Unknown
---	---

<sup>1</sup> A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

<sup>2</sup> Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.



# IX - EPA Form 6100-3 DBE Subcontractor Performance Form



OMB Control No: 2090-0030

## Disadvantaged Business Enterprise (DBE) Program DBE Subcontractor Performance Form

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

<b>Prime Contractor Signature</b>	<b>Print Name</b>
<b>Title</b>	<b>Date</b>

<b>Subcontractor Signature</b>	<b>Print Name</b>
<b>Title</b>	<b>Date</b>

The public reporting and recordkeeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

# X - EPA Form 6100-4 DBE Subcontractor Utilization Form



OMB Control No: 2090-0030

## Disadvantaged Business Enterprise (DBE) Program DBE Subcontractor Utilization Form

This form is intended to capture the prime contractor's actual and/or anticipated use of identified certified DBE<sup>1</sup> subcontractors<sup>2</sup> and the estimated dollar amount of each subcontract. An EPA Financial Assistance Agreement Recipient must require its prime contractors to complete this form and include it in the bid or proposal package. Prime contractors should also maintain a copy of this form on file.

Prime Contractor Name		Project Name	
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact	
Address			
Telephone No.		Email Address	
Issuing/Funding Entity:			

I have identified potential DBE certified subcontractors	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
If yes, please complete the table below. If no, please explain:			
Subcontractor Name/ Company Name	Company Address/ Phone/ Email	Est. Dollar Amt	Currently DBE Certified?

Continue on back if needed

<sup>1</sup> A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

<sup>2</sup> Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

# X - EPA Form 6100-4 DBE Subcontractor Utilization Form



OMB Control No: 2090-0030

## Disadvantaged Business Enterprise (DBE) Program DBE Subcontractor Utilization Form

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

<b>Prime Contractor Signature</b>	<b>Print Name</b>
<b>Title</b>	<b>Date</b>

The public reporting and recordkeeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.





**U.S. ENVIRONMENTAL PROTECTION AGENCY  
MBE/WBE UTILIZATION UNDER FEDERAL GRANTS  
AND COOPERATIVE AGREEMENTS**

**PART I OF II  
(PAGES SGC-16 & SGC-17)**

FOR COOPERATIVE AGREEMENTS OR OTHER FEDERAL FINANCIAL ASSISTANCE WHERE THE COMBINED TOTAL OF FUNDS BUDGETED FOR PROCURING SUPPLIES, EQUIPMENT, CONSTRUCTION OR SERVICES EXCEED \$150,000. PART 1: PLEASE REVIEW INSTRUCTIONS BEFORE COMPLETING																							
1A. FEDERAL FISCAL YEAR (Oct 1- Sep 30) 20_____			1B. REPORT TYPE <input type="checkbox"/> Annual <input type="checkbox"/> Last Report (Project completed)																				
1C: REVISION OF A PRIOR YEAR REPORT? <input type="radio"/> No <input type="radio"/> Yes, Year _____ IF YES, BRIEFLY DESCRIBE THE REVISIONS YOU ARE MAKING:																							
2A. EPA FINANCIAL ASSISTANCE OFFICE ADDRESS (ATTN: DBE COORDINATOR)			3A. RECIPIENT NAME AND ADDRESS																				
2B. EPA DBE COORDINATOR Name: Email: Phone: Fax:			3B. RECIPIENT REPORTING CONTACT Name: Address: Phone: Email:																				
4A. FINANCIAL ASSISTANCE AGREEMENT ID NUMBER (SRF State Recipients, refer to Instructions for Completion of blocks 4A, 5A and 5C)			4B. FEDERAL FINANCIAL ASSISTANCE PROGRAM TITLE OR CFDA NUMBER:																				
5A. TOTAL ASSISTANCE AGREEMENT AMOUNT EPA Share: \$ _____ Recipient Share: \$ _____ <input type="checkbox"/> N/A (SRF Recipient)/Loan Amount: \$ _____			5B. If NO procurements and NO accomplishments were made this reporting period (by the recipients, sub-recipients, loan recipients, and prime contractors), <b>CHECK and SKIP to Block No. 7.</b> (Procurements are all expenditures through contract, order, purchase, lease or barter of supplies, equipment, construction, or services needed to complete Federal assistance programs. Accomplishments, in this context, are procurements made with MBEs and/or WBEs.) <input type="checkbox"/>																				
5C. Total Procurements This Reporting Period (Only include amount not reported in any prior reporting period) Total Procurement Amount \$ _____ (Include total dollar values awarded by recipient, sub-recipients and SRF loan recipients, including MBE/WBE expenditures.)																							
5D. Were sub-awards issued under this assistance agreement? Yes <input type="radio"/> No <input type="radio"/> Were contracts issued under this assistance agreement? Yes <input type="radio"/> No <input type="radio"/>																							
5E. MBE/WBE Accomplishments This Reporting Period Actual MBE/WBE Procurement Accomplished (Include total dollar values awarded by recipient, sub-recipients, SRF loan recipients and Prime Contractors.) <table border="1"><thead><tr><th></th><th>Construction</th><th>Equipment</th><th>Services</th><th>Supplies</th><th>Total</th></tr></thead><tbody><tr><td>\$MBE:</td><td>_____</td><td>_____</td><td>_____</td><td>_____</td><td>0.00</td></tr><tr><td>\$WBE:</td><td>_____</td><td>_____</td><td>_____</td><td>_____</td><td>0.00</td></tr></tbody></table>							Construction	Equipment	Services	Supplies	Total	\$MBE:	_____	_____	_____	_____	0.00	\$WBE:	_____	_____	_____	_____	0.00
	Construction	Equipment	Services	Supplies	Total																		
\$MBE:	_____	_____	_____	_____	0.00																		
\$WBE:	_____	_____	_____	_____	0.00																		
6. COMMENTS: (If no MBE/WBE procurements, please summarize how certified MBEs/WBEs were notified of the opportunities to compete for the procurement dollars entered in Block 5C and why certified MBEs /WBEs were not awarded any procurements during this reporting period.)																							
7. NAME OF RECIPIENT'S AUTHORIZED REPRESENTATIVE			TITLE																				
8. SIGNATURE OF RECIPIENT'S AUTHORIZED REPRESENTATIVE			DATE																				

EPA FORM 5700-52A available electronically at [https://www.epa.gov/sites/production/files/2014-09/documents/epa\\_form\\_5700\\_52a.pdf](https://www.epa.gov/sites/production/files/2014-09/documents/epa_form_5700_52a.pdf)



## Instructions:

### A. General Instructions:

MBE/WBE utilization is based on 40 CFR Part 33. The reporting requirement reflects the class deviation issued on November 8, 2013, clarified on January 9, 2014 and modified on December 2, 2014. EPA Form 5700-52A must be completed annually by recipients of financial assistance agreements where the combined total of funds budgeted for procuring supplies, equipment, construction or services exceeds \$150,000. This reporting requirement applies to all new and existing awards and voids all previous reporting requirements.

In determining whether the \$150,000 threshold is exceeded for a particular assistance agreement, the analysis must focus on funds budgeted for procurement under the supplies, equipment, construction, services or "other" categories, and include funds budgeted for procurement under sub-awards or loans

Reporting will also be required in cases where the details of the budgets of sub-awards/loans are not clear at the time of the grant awards and the combined total of the procurement and sub-awards and/or loans exceeds the \$150,000 threshold.

When reporting is required, all procurement actions are reportable, not just the portion which exceeds \$150,000.

If at the time of award the budgeted funds exceed \$150,000 but actual expenditures fall below, a report is still required.

If at the time of award, the combined total of funds budgeted for procurements in any category is less than or equal to \$150,000 and is maintained below the threshold, no DBE report is required to be submitted.

Recipients are required to report 30 days after the end of each federal year, per the terms and conditions of the financial assistance agreement.

Last reports are due October 30<sup>th</sup> or 90 days after the end of the project period, whichever comes first.

MBE/WBE program requirements, including reporting, are material terms and conditions of the financial assistance agreement.

### B. Definitions:

**Procurement** is the acquisition through contract, order, purchase, lease or barter of supplies, equipment, construction or services needed to accomplish Federal assistance programs.

A **contract** is a written agreement between an EPA recipient and another party (also considered "prime contracts") and any lower tier agreement (also considered "subcontracts") for equipment, services, supplies, or construction necessary to complete the project. This definition excludes written agreements with another public agency. This definition includes personal and professional services, agreements with consultants, and purchase orders.

A **minority business enterprise (MBE)** is a business concern that is (1) at least 51 percent owned by one or more minority individuals, or, in the case of a publicly owned business, at least 51 percent of the stock is owned by one or more minority

individuals; and (2) whose daily business operations are managed and directed by one or more of the minority owners. In order to qualify and participate as an MBE prime or subcontractor for EPA recipients under EPA's DBE Program, an entity must be properly certified as required by 40 CFR Part 33, Subpart B.

U.S. citizenship is required. Recipients shall presume that minority individuals include Black Americans, Hispanic Americans, Native Americans, Asian Pacific Americans, or other groups whose members are found to be disadvantaged by the Small Business Act or by the Secretary of Commerce under section 5 of Executive order 11625. The reporting contact at EPA can provide additional information.

A **woman business enterprise (WBE)** is a business concern that is, (1) at least 51 percent owned by one or more women, or, in the case of a publicly owned business, at least 51 percent of the stock is owned by one or more women and (2) whose daily business operations are managed and directed by one or more of the women owners. In order to qualify and participate as a WBE prime or subcontractor for EPA recipients under EPA's DBE Program, an entity must be properly certified as required by 40 CFR Part 33, Subpart B.

Business firms which are 51 percent owned by minorities or women, but are in fact not managed and operated by minorities or females do not qualify for meeting MBE/WBE procurement goals. U.S. Citizenship is required.

### **Good Faith Efforts**

A recipient is required to make the following good faith efforts whenever procuring construction, equipment, services, and supplies under an EPA financial assistance agreement. These good faith

efforts for utilizing MBEs and WBEs must be documented. Such documentation is subject to EPA review upon request:

1. Ensure DBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For Indian Tribal, State and Local and Government recipients, this will include placing DBEs on solicitation lists and soliciting them whenever they are potential sources.
2. Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitations for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.
3. Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs. For Indian Tribal, State and local Government recipients, this will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process.
4. Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.
5. Use the services and assistance of the SBA and the Minority Business Development Agency of the Department of Commerce.
6. If the prime contractor awards subcontracts, require the prime contractor to take the steps in paragraphs (a) through (e) of this section.

### C. Instructions for Part I:

1A. Specify Federal fiscal year this report covers. The Federal fiscal year runs from October 1st through September 30th (**e.g. November 29, 2014 falls within Federal fiscal year 2015**)

1B. Specify report type. Check the annual reporting box. Also indicate if the project is completed.

1C. Indicate if this is a revision to a previous year and provide a brief description of the revision you are making.

2A-B. Please refer to your financial assistance agreement for the mailing address of the EPA financial assistance office for your agreement.

The "EPA DBE Reporting Contact" is the DBE Coordinator for the EPA Region from which your financial assistance agreement was originated. For a list of DBE Coordinators please refer to the EPA OSBP website at [http://epa.gov/osbp/dbe\\_cord](http://epa.gov/osbp/dbe_cord).

3A-B. Identify the agency, state authority, university or other organization which is the recipient of the Federal financial assistance and the person to contact concerning this report.

4A. Provide the Assistance Agreement number assigned by EPA. A separate report must be submitted for each Assistance Agreement.

**\*For SRF recipients:** In box 4a list numbers for ALL OPEN Assistance Agreements being reported on this form.

4B. Refer back to Assistance Agreement document for this information.

5A. Provide the total amount of the Assistance Agreement which includes Federal funds plus recipient matching funds and funds from other sources.

**\*For SRF recipients only:** SRF recipients will not enter an amount in 5a. SRF recipients should check the "N/A" box.

5B. Self-explanatory.

5C. Provide the total dollar amount of **ALL** procurements awarded this reporting period by the recipient, sub-recipients, and SRF loan recipients, **including** MBE/WBE expenditures, not just the portion which exceeds \$150,000. For example: Actual dollars for procurement from the procuring office; actual contracts let from the contracts office; actual goods, services, supplies, etc., from other sources including the central purchasing/procurement centers).

**\*NOTE:** To prevent double counting on line 5C, if any amount on 5E is for a subcontract and the prime contract has already been included on Line 5C in a prior reporting period, then report the amount going to MBE or WBE subcontractor on line 5E, but exclude the amount from Line 5C. To include the amount on 5C again would result in double counting because the prime contract, which includes the subcontract, would have already been reported.

**\*For SRF recipients only:** In 5c please enter the total annual procurement amount under all of your SRF Assistance Agreements. The figure reported in this section is **not** directly tied to an individual Assistance Agreement identification number. (**SRF state recipients report state procurements in this section**)



5D. State whether or not sub-awards and/or subcontracts have been issued under the financial assistance agreements by indicating “yes” or “no”.

5E. Where requested, also provide the total dollar amount of all MBE/WBE procurement awarded during this reporting period by the recipient, sub-recipients, SRF loan recipients, and prime contractors in the categories of construction, equipment, services and supplies. These amounts include Federal funds plus recipient matching funds and funds from other sources.

6. If there were no MBE/WBE accomplishments this reporting period, please briefly how certified MBEs/WBEs were notified of the opportunities to compete for the procurement dollars entered in Block 5C and why certified MBEs /WBEs were not awarded any procurements during this reporting period.

7. Name and title of official administrator or designated reporting official.

8. Signature, month, day, and year report submitted.

#### **D. Instructions for Part II:**

For each MBE/WBE procurement made under this financial assistance agreements during the reporting period, provide the following information:

1. Check whether this procurement was made by the recipient, sub-recipient/SRF loan recipient, or the prime contractor.

2. Check either the MBE or WBE column. If a firm is both an MBE and WBE, the recipient may choose to count the entire procurement towards EITHER its MBE or WBE accomplishments. The recipient may also divide the total amount of the procurement (using any ratio it so chooses) and count those divided amounts toward its MBE and WBE accomplishments. If the recipient chooses to divide the procurement amount and count portions toward its MBE and WBE accomplishments, please state the appropriate amounts under the MBE and WBE columns on the form. **The combined MBE and WBE amounts for that MBE/WBE contractor must not exceed the “Value of the Procurement” reported in column #3**

3. Dollar value of procurement.

4. Date of procurement, shown as month, day, year. Date of procurement is defined as the date the contract or procurement was awarded, **not** the date the contractor received payment under the awarded contract or procurement, unless payment occurred on the date of award. **(Where direct purchasing is the procurement method, the date of procurement is the date the purchase was made)**

5. Using codes at the bottom of the form, identify type of product or service acquired through this procurement (e.g., enter 1 if construction, 2 if supplies, etc.).

6. Name, address, and telephone number of MBE/WBE firm.

**\*\*This data is requested to comply with provisions mandated by: statute or regulations (40 CFR Parts 30, 31, and 33 and/or 2 CFR Parts 200 and 1500); OMB Circulars; or added by EPA to ensure sound and effective assistance management. Accurate, complete data are required to obtain funding, while no pledge of confidentiality is provided.**

The public reporting and recording burden for this collection of information is estimated to average 1 hour per response annually. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclosure or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, OPPE Regulatory Information Division, U.S. Environmental Protection Agency (2136), 1200 Pennsylvania Avenue, NW, Washington, D.C. 20460. Include the OMB Control number in any correspondence. Do not send the completed form to this address.

## XII – Changes to Approved DBE Compliance Form

**NOTE: THIS FORM IS REQUIRED OF THE LOAN RECIPIENT (OWNER) (WITH THE PRIME CONTRACTOR'S INPUT) FOR DBE COMPLIANCE ONLY IF A SUBCONTRACTOR/SUPPLIER/VENDOR IS SOUGHT AND/OR PROCURED AFTER THE CONTRACT ATA (APPROVAL-TO-AWARD) HAS BEEN ISSUED. IT IS SIMILAR TO THE DBE COMPLIANCE FORM (PAGE SGC-8) IN THAT IT IS THE COVER/SUMMARY FORM USED TO DOCUMENT THE ADDITIONAL DBE SOLICITATION AND/OR REVISE THE ORIGINAL DBE APPROVAL STATUS.**

Loan Recipient: \_\_\_\_\_

Loan (Project) Number: \_\_\_\_\_

### **CERTIFICATIONS:**

*I certify that the information submitted on and with this form is true and accurate and that this company has met and will continue to meet the conditions of this construction contract regarding DBE solicitation and utilization. I further certify that criteria used in selecting subcontractors and suppliers were applied equally to all potential participants and that EPA Forms 6100-2 and 6100-3 were distributed to all DBE subcontractors.*

\_\_\_\_\_  
(Prime Contractor Signature)      Date \_\_\_\_\_

\_\_\_\_\_  
(Printed Name and Title)

*I certify that I have reviewed the information submitted on and with this form and that it meets the requirements of the Loan Recipient's/Owner's State Revolving Fund loan contract. (\*Only ONE (1) signature required below.)*

\_\_\_\_\_  
(Signature of Loan Recipient (Owner))      Date \_\_\_\_\_

**OR\***

\_\_\_\_\_  
(Loan Recipient's (Owner's) Representative's Signature, (P.E.))      Date \_\_\_\_\_

\_\_\_\_\_  
(Printed Name and Title)

### **GENERAL INFORMATION: (Please attach additional pages to address 1 through 5, as needed.)**

- (1) If an approved subcontractor is terminated or replaced, please identify this company and briefly state the reason.
- (2) For new or additional subcontractors, list name, trade, address, telephone number, contact person, dollar amount of subcontract and DBE status.
- (3) Attach proof of certification by EPA, SBA, DOT (or by state, local, Tribal or private entities whose certification criteria match EPA's) for each subcontractor listed as a DBE, MBE or WBE.
- (4) Attach documentation of solicitation effort for prospective DBE firms, such as fax confirmation sheets, copies of solicitation letters/emails, printouts of the online solicitations, printouts of online search results, affidavits of publication in newspapers, etc. The prime contractor is strongly encouraged to follow up each solicitation with, at least, one (1) logged phone call. Whenever possible, post solicitation for bids or proposals should be for a minimum of 30 calendar days before the bid or proposal closing date.
- (5) Provide justification for not selecting a certified DBE subcontractor that submitted a low bid for any subcontract area.

### XIII – Certification Regarding Equal Employment Opportunity

The prime contractor is required to comply with Executive Order 112-46 of September 24, 1965 entitled "Equal Employment Opportunity" as amended by Executive Order 11375 of October 13, 1967.

The contract for the work under this proposal will obligate the prime contractor and its subcontractors not to discriminate in employment practices.

The prime contractor shall not maintain or provide for his/her employees the facilities, which are segregated on a basis of race, creed, color or national origin, whether such facilities are segregated by directive or on a de facto basis.

The prime contractor must, if requested, submit a compliance report concerning their employment practices and policies in order to maintain his/her eligibility to receive the award of the contract.

The prime contractor must be prepared to comply in all respects with any contract provisions regarding non-discrimination stipulated in conjunction with labor standards.

#### PRIME CONTRACTOR'S CERTIFICATION:

Prime Contractor's Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause. Yes\_\_\_\_ No\_\_\_\_
2. Compliance Reports were required to be filed in connection with such contract or subcontract. Yes\_\_\_\_ No\_\_\_\_
3. Bidder has filed all compliance reports due under applicable contract requirements. Yes\_\_\_\_ No\_\_\_\_

If answer to item 3 is "No", please explain in detail on reverse side of this certification.

Certification - The information above is true and complete to the best of my knowledge and belief.

Signature of Prime Contractor: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

#### XIV – Debarred Firms Certification

All prime construction contractors shall certify that Subcontracts have not and will not be awarded to any firm that is currently on the General Service Administration's Master List of Debarred, Suspended and Voluntarily Excluded Persons, in accordance with the provisions of ADEM Administrative Code 335-6-14-.35. Debarment action is taken against a firm for noncompliance with Federal Law.

All bidders shall complete this certification in duplicate and submit both copies to the Loan Recipient (Owner) with the bid proposal. The Loan Recipient (Owner) shall transmit one copy to the SRF Section within 14 days after the bid opening.

Project Name/Loan Name\*:

(\*not **Contract** Name)

\_\_\_\_\_

SRF Project No.:

\_\_\_\_\_

The undersigned hereby certifies that the firm of \_\_\_\_\_

\_\_\_\_\_ has not and will not award a subcontract, in connection with any contract awarded to it as the result of this bid, to any firm that is currently on the General Service Administration's Master List of Debarred, Suspended, and Voluntarily Excluded Persons.

Signature of Prime Contractor:

\_\_\_\_\_

Title:

\_\_\_\_\_

Date:

\_\_\_\_\_

## XV – Davis-Bacon and Related Acts

### **Labor Standards Provisions for Federally Assisted Contracts**

#### **Wage Rate Requirements Under FY 2013 Continuing Appropriation**

##### **I. Requirements under the Consolidated and Further Continuing Appropriations Act. 2013 (P.L. 113-6) For Subrecipients That Are Governmental Entities:**

The following terms and conditions specify how recipients will assist EPA in meeting its Davis-Bacon (DB) responsibilities when DB applies to EPA awards of financial assistance under the FY 2013 Continuing Resolution with respect to State recipients and subrecipients that are governmental entities. If a subrecipient has questions regarding when DB applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring, it may contact the State recipient. If a State recipient needs guidance, the recipient may contact Cynthia Y. Edwards at [Edwards.Cynthiay@epa.gov](mailto:Edwards.Cynthiay@epa.gov) or at 404-562-9340 of EPA, Region 4 Grants and SRF Management Section, for guidance. The recipient or subrecipient may also obtain additional guidance from DOL's web site at <http://www.dol.gov/whd/>

##### **1. Applicability of the Davis- Bacon (DB) prevailing wage requirements.**

Under the FY 2013 Continuing Resolution, DB prevailing wage requirements apply to the construction, alteration, and repair of treatment works carried out in whole or in part with assistance made available by a State water pollution control revolving fund and to any construction project carried out in whole or in part by assistance made available by a drinking water treatment revolving loan fund. If a subrecipient encounters a unique situation at a site that presents uncertainties regarding DB applicability, the subrecipient must discuss the situation with the recipient State before authorizing work on that site.

##### **2. Obtaining Wage Determinations.**

(a) Subrecipients shall obtain the wage determination for the locality in which a covered activity subject to DB will take place prior to issuing requests for bids, proposals, quotes or other methods for soliciting contracts (solicitation) for activities subject to DB. These wage determinations shall be incorporated into solicitations and any subsequent contracts. Prime contracts must contain a provision requiring that subcontractors follow the wage determination incorporated into the prime contract.

(i) While the solicitation remains open, the subrecipient shall monitor [www.wdol.gov](http://www.wdol.gov) weekly to ensure that the wage determination contained in the solicitation remains current. The subrecipients shall amend the solicitation if DOL issues a modification more than 10 days prior to the closing date (i.e. bid opening) for the solicitation. If DOL modifies or supersedes the applicable wage determination less than 10 days prior to the closing date, the subrecipients may request a finding from the State recipient that there is not a reasonable time to notify interested contractors of the modification of the wage determination. The State recipient will provide a report of its findings to the subrecipient.

(ii) If the subrecipient does not award the contract within 90 days of the closure of the solicitation, any modifications or supersedes DOL makes to the wage determination contained in the solicitation shall be effective unless the State recipient, at the request of the subrecipient, obtains an extension of the 90 day period from DOL pursuant to 29 CFR 1.6(c)(3)(iv). The subrecipient shall monitor [www.wdol.gov](http://www.wdol.gov) on a weekly basis if it does not award the contract within 90 days of closure of the solicitation to ensure that wage determinations contained in the solicitation remain current.

(b) If the subrecipient carries out activity subject to DB by issuing a task order, work assignment or similar instrument to an existing contractor (ordering instrument) rather than by publishing a solicitation, the subrecipient shall insert the appropriate DOL wage determination from [www.wdol.gov](http://www.wdol.gov) into the ordering instrument.

(c) Subrecipients shall review all subcontracts subject to DB entered into by prime contractors to verify that the prime contractor has required its subcontractors to include the applicable wage determinations.

(d) As provided in 29 CFR 1.6(f), DOL may issue a revised wage determination applicable to a subrecipient's contract after the award of a contract or the issuance of an ordering instrument if DOL determines that the subrecipient has failed to incorporate a wage determination or has used a wage determination that clearly does not apply to the contract or ordering instrument. If this occurs, the subrecipient shall either terminate the contract or ordering instrument and issue a revised solicitation or ordering instrument or incorporate DOL's wage determination retroactive to the beginning of the contract or ordering instrument by change order. The subrecipient's contractor must be compensated for any increases in wages resulting from the use of DOL's revised wage determination.

### **3. Contract Subcontract Provisions.**

(a) The Recipient shall insure that the subrecipient(s) shall insert in full in any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the FY 2010 appropriation , the following clauses:

#### **(1) Minimum wages.**

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Subrecipients may obtain wage determinations from the U.S. Department of Labor's web site, [www.dol.gov](http://www.dol.gov).

(ii)(A) The subrecipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the subrecipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the subrecipient (s) to the State award official. The State award official will transmit the request, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the subrecipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

## **(2) Withholding.**

The subrecipient(s), shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.



### **(3) Payrolls and basic records.**

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the subrecipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the subrecipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <https://www.dol.gov/agencies/whd/forms/wh347> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the subrecipient(s) for transmission to the State or EPA if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the subrecipient(s).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5(a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5(a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### **(4) Apprentices and trainees.**

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program.

If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

**(5) Compliance with Copeland Act requirements.**

The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

**(6) Subcontracts.**

The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may be appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

**(7) Contract termination: debarment.**

A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**(8) Compliance with Davis-Bacon and Related Act requirements.**

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

**(9) Disputes concerning labor standards.**

Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and Subrecipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.

**(10) Certification of eligibility.**

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

#### **4. Contract Provision for Contracts in Excess of \$100,000.**

(a) Contract Work Hours and Safety Standards Act. The subrecipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

##### **(1) Overtime requirements.**

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

##### **(2) Violation; liability for unpaid wages; liquidated damages.**

In the event of any violation of the clause set forth in paragraph (a)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a)(1) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (a)(1) of this section.

##### **(3) Withholding for unpaid wages and liquidated damages.**

The subrecipient, upon written request of the EPA Award Official or an authorized representative of the Department of Labor, shall withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

##### **(4) Subcontracts.**

The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (a)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a)(1) through (4) of this section.

(b) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Subrecipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Subrecipient shall insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

## 5. Compliance Verification

(a) The subrecipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. The subrecipient must use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.

(b) The subrecipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, the subrecipient should conduct interviews with a representative group of covered employees within two weeks of each contractor or subcontractor's submission of its initial weekly payroll data and two weeks prior to the estimated completion date for the contract or subcontract. Subrecipients must conduct more frequent interviews if the initial interviews or other information

indicates that there is a risk that the contractor or subcontractor is not complying with DB. Subrecipients shall immediately conduct necessary interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence.

(c) The subrecipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The subrecipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable, the subrecipient should spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract. Subrecipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB. In addition, during the examinations the subrecipient shall verify evidence of fringe benefit plans and payments there under by contractors and subcontractors who claim credit for fringe benefit contributions.

(d) The subrecipient shall periodically review contractors and subcontractors use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.

(e) Subrecipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at <https://www.dol.gov/agencies/whd/contact/local-offices>.

***(Insert applicable wage rate determination here.)***

Wage Rates are county specific for *Heavy Construction* and can be found at:  
<https://sam.gov/content/wage-determinations>

## XVI – American Iron and Steel Requirement



**Section 4.13 Compliance with 2014 Appropriations Act.** (a) The Loan Recipient agrees to comply with all federal requirements applicable to the Authority Loan (including those imposed by P.L. 113-76, Consolidated Appropriations Act (the "2014 Appropriations Act") and related SRF Policy Guidelines) which the Loan Recipient understands includes, among other things, requirements that all of the iron and steel products used in the Project are to be produced in the United States ("American Iron and Steel") unless (i) the Loan Recipient has requested and obtained a waiver from the U.S. Environmental Protection Agency pertaining to the Project or (ii) the Authority has otherwise advised the Loan Recipient in writing that the Buy American Requirement is not applicable to the Project. .

(b) The Loan Recipient also agrees to comply with all recordkeeping and reporting requirements under the Clean Water Act (codified generally under 33 U.S.C. §1251 et seq.) (the "Clean Water Act"), including any reports required by a federal agency or the Authority such as performance indicators of program deliverables, information on costs and Project progress. The Loan Recipient understands that (i) each contract and subcontract related to the Project is subject to audit by appropriate federal and state entities, and (ii) failure to comply with the Clean Water Act and this Agreement may be an Event of Default hereunder that results in a repayment of the Authority Loan in advance of the maturity of the Evidence of Indebtedness and/or other remedial actions.

The Loan Recipient agrees to cause all contractors and subcontractors to comply with (through the inclusion of appropriate terms and conditions in all contracts, subcontracts and lower tiered transactions, such terms and conditions to be in substantially the form set forth in connection with the development and construction of the project

The Contractor acknowledges to and for the benefit of the \_\_\_\_\_, Alabama ("Purchaser"), and the Alabama Water Pollution Control Authority or the Drinking Water Finance Authority (the "State Authority") that it understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund that have statutory requirements commonly known as "American Iron and Steel;" that requires all of the iron and steel products used in the project to be produced in the United States ("American Iron and Steel") including iron and steel products provided by the Contractor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the State Authority that (a) the Contractor has reviewed and understands the American Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Purchaser or the State Authority. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser or State Authority to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Purchaser or State Authority resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State Authority or any damages owed to the State Authority by the Purchaser). While the Contractor has no direct contractual privity with the State Authority, as a lender to the Purchaser for the funding of its project, the Purchaser and the Contractor agree that the State Authority is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State Authority.



## XVII – Project Sign Detail - CWSRF

 <small>Alabama Department of Environmental Management</small>	<b>STATE OF ALABAMA</b> Honorable (name), Governor	
<b>ALABAMA WATER POLLUTION CONTROL AUTHORITY</b> <b>POLLUTION CONTROL PROJECT</b>		
(NAME OF OWNER) <b>(NAME OF PROJECT)</b>		
\$(amount) STATE REVOLVING FUND LOAN		
(NAME OF CONTRACTOR) • CONTRACTOR (NAME OF ENGINEER) • CONSULTING ENGINEER		
ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT U.S. ENVIRONMENTAL PROTECTION AGENCY		

1. Sign is to be constructed of ½" MDO plywood, 4' x 8'. Alternate materials may be used if approved by ADEM prior to use.
2. Paint with two (2) coats oil-base enamel before lettering.
3. Background color white; lettering black.
4. Lettering may be painted or vinyl. All lettering sizes to be proportionate to sign layout.
5. Sign shall be attached to 4" x 4" x 8' treated posts. Alternatives may be used if approved by ADEM prior to use.
6. Sign shall be placed in prominent location, easily readable from existing street or roadway.
7. Sign shall be maintained in good condition until completion of project.



## XVIII – Project Sign Detail - DWSRF

 Alabama Department of Environmental Management	<b>STATE OF ALABAMA</b> Honorable (Name), Governor	
<b>ALABAMA DRINKING WATER FINANCE AUTHORITY INFRASTRUCTURE PROJECT</b>		
<b>(NAME OF OWNER)</b> <b>(NAME OF PROJECT)</b>		
<b>\$(amount) STATE REVOLVING FUND LOAN</b>		
<b>(NAME OF CONTRACTOR) • CONTRACTOR</b> <b>(NAME OF ENGINEER) • CONSULTING ENGINEER</b>		
<b>ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT U.S. ENVIRONMENTAL PROTECTION AGENCY</b>		

1. Sign is to be constructed of ½" MDO plywood, 4' x 8'. Alternate materials may be used if approved by ADEM prior to use.
2. Paint with two (2) coats oil-base enamel before lettering.
3. Background color white; lettering black.
4. Lettering may be painted or vinyl. All lettering sizes to be proportionate to sign layout.
5. Sign shall be attached to 4" x 4" x 8' treated posts. Alternatives may be used if approved by ADEM prior to use.
6. Sign shall be placed in prominent location, easily readable from existing street or roadway.
7. Sign shall be maintained in good condition until completion of project.

## XIX – Construction Contract Requirements

This checklist is to be completed by the Loan Recipient (Owner)/Engineer when submitting plans and specifications to the SRF Section for review. It affirms to the SRF reviewer that the Loan Recipient (Owner)/Engineer has addressed these items (in boilerplate form) within the specifications manual.

Contract Page No.	Satisfied Yes/No	
_____	_____	Bid Advertisement (including date, time, and location of bid opening).
_____	_____	Bid Bond.
_____	_____	Performance Bond (100%).
_____	_____	Payment Bond (Not less than 50%).
_____	_____	Contract Length.
_____	_____	Liquidated Damages.
_____	_____	Liability Insurance (including workman's comp, public liability, and builder's risk, if applicable).
_____	_____	Method of Award (i.e. lowest, responsive, responsible bidder).
_____	_____	Air testing of gravity sewers (if applicable).

Within 14 days after the bid opening, the Loan Recipient (Owner)/Engineer is to prepare the Project Review and Cost Summary (per the **PR&CS Checklist, page SGC-39**) and submit it to the SRF Section of ADEM. Upon completion of review, a written ATA (Approval-to-Award) will be issued.

### **NOTE:**

***The Loan Recipient (Owner) assumes all financial risk, if the construction contract is awarded prior to the issuance of an ATA letter by the SRF Section.***

## XX – Project Review and Cost Summary

<b>ADEM</b> Alabama Department of Environmental Management	<b>SRF Project Review and Cost Summary</b>	Form Revised 07-2021
<p>This form is to be completed and submitted (with supporting documentation) to the SRF Section <u>within 14 days after bid opening</u>. Following satisfactory review, an ATA (Approval-to-Award) letter will be issued. After the ATA is issued/award of the contract, a pre-construction conference should be scheduled (<b>with the SRF Project Manager in attendance</b>). <u>A complete, bound set of the executed contract documents manual</u> should be forwarded to the SRF Section for review and written approval following the pre-construction conference.</p> <p>Loan Recipient: _____ Project Number: _____</p> <p>Project Name: _____</p> <p>Contract Number: _____ Contract Name: _____</p> <p>1. Date of plans and specifications concurrence letter from ADEM-SRF Section: _____</p> <p>    Date of construction permit issuance from ADEM-DW Branch: _____</p> <p>2. Attach copies of the following documents:</p> <p>___ a. Bid advertisement with certification by publisher and date(s) of publication.</p> <p>___ b. Certified bid tabulation.</p> <p>___ c. Proposal of the selected bidder.</p> <p>___ d. Bid bond.</p> <p>___ e. Engineer's letter to the loan recipient recommending award of the contract. If the award is made to other than the low bidder, provide justification.</p> <p>___ f. Site certificates for the project, if not previously submitted with the SRF loan application.</p> <p>___ g. <b><u>DBE Documentation from the loan recipient (owner) and the prime contractor.</u></b> Utilization, solicitation and documentation requirements (with a list of required documents) are discussed in detail in Parts III - V (pages SGC-3 - SGC-23) of the ADEM <i>SRF Supplemental General Conditions</i> for SRF Assisted Public Drinking Water and Wastewater Facilities Construction Contracts.</p> <p>___ h. Copy of the wage determination used in bidding.</p> <p>___ i. Any addenda that have been issued after ADEM review of the plans and specifications.</p> <p>Comments: _____</p> <p>_____</p> <p>_____</p>		



**SECTION 00 73 02**  
**Contract Provisions for Non-Federal Entity Contracts**  
**Under Federal Awards**

In addition to other provisions required by the Federal agency or non-Federal entity, all contracts made by the non-Federal entity under the Federal award must contain provisions covering the following, as applicable.

- 1.01 Contracts for more than the simplified acquisition threshold currently set at \$150,000, which is the inflation-adjusted amount determined by the Civilian Agency Acquisition Council and the Defense Acquisition Regulations Council (Councils) as authorized by 41 U.S.C. 1908, must address administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as appropriate.
- 1.02 All contracts in excess of \$10,000 must address termination for cause and for convenience by the non-Federal entity, including the manner by which it will be affected and the basis for settlement.
- 1.03 Equal Employment Opportunity. Except as otherwise provided under 41 CFR Part 60, all contracts that meet the definition of “federally assisted construction contract” in 41 CFR Part 60-1.3 must include the equal opportunity clause provided under 41 CFR 60-1.4(b), in accordance with Executive Order 11246, “Equal Employment Opportunity” (30 FR 12319, 12935, 3 CFR Part, 1964-1965 Comp., p. 339), as amended by Executive Order 11375, “Amending Executive Order 11246 Relating to Equal Employment Opportunity,” and implementing regulations at 41 CFR part 60, “Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor.”
- 1.04 Davis-Bacon Act, as amended (40 U.S.C. 3141-3148). When required by Federal program legislation, all prime construction contracts in excess of \$2,000 awarded by non-Federal entities must include a provision for compliance with the Davis-Bacon Act (40 U.S.C. 3141-3144, and 3146-3148) as supplemented by Department of Labor regulations (29 CFR Part 5, “Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction”). In accordance with the statute, contractors must be required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, contractors must be required to pay wages not less than once a week. The non-Federal entity must place a copy of the current prevailing wage determination issued by the Department of Labor in each solicitation. The decision to award a contract or subcontract must be conditioned upon the acceptance of the wage determination. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency. The contracts must also include a provision for compliance with the Copeland “Anti-Kickback” Act (40 U.S.C. 3145), as supplemented by Department of Labor regulations (29 CFR Part 3, “Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States”). The Act provides that each contractor or subrecipient must be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency.

- 1.05 Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708). Where applicable, all contracts awarded by the non-Federal entity in excess of \$100,000 that involve the employment of mechanics or laborers must include a provision for compliance with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible, provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions that are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market or contracts for transportation or transmission of intelligence.
- 1.06 Rights to Inventions Made Under a Contract or Agreement. If the Federal award meets the definition of “funding agreement” under 37 CFR §401.2 (a) and the recipient or subrecipient wishes to enter into a contract with a small business firm or nonprofit organization regarding the substitution of parties, assignment or performance of experimental, developmental, or research work under that “funding agreement,” the recipient or subrecipient must comply with the requirements of 37 CFR Part 401, “Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements,” and any implementing regulations issued by the awarding agency.
- 1.07 Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended—Contracts and subgrants of amounts in excess of \$150,000 must contain a provision that requires the non-Federal award to agree to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).
- 1.08 Debarment and Suspension (Executive Orders 12549 and 12689)—A contract award (see 2 CFR 180.220) must not be made to parties listed on the governmentwide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), “Debarment and Suspension.” SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.
- 1.09 Byrd Anti-Lobbying Amendment (31 U.S.C. 1352)—Contractors that apply or bid for an award exceeding \$100,000 must file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier must also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the non-Federal award.

**SECTION 00 73 33**  
**BEASON-HAMMON/ E-VERIFY CERTIFICATION**

**GENERAL:**

- A. Bidders hereby reminded that they are required to comply with requirements of Alabama Immigration Law, Act 2011-535 (also referred to as the “Beason-Hammon Alabama Taxpayer and Citizen Protection Act”, or H.B. 658), as amended by Act No. 2012-491, including in part and effective January 1, 2012, enrollment in the E-Verify Program of the United States Department of Homeland Security:
1. Contractor’s signed “E-Verify Memorandum of Understanding” will be required to be attached to any Contract awarded.
  2. General Contractors and Subcontractors shall be enrolled in, participate in and maintain compliance for the duration of this contract and as otherwise required by statute.
- B. The following statement shall and will be included in the Contract for Construction:

**“By signing this contract, the contracting parties affirm, for the duration of the agreement, that they will not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the state of Alabama. Furthermore, a contracting party found to be in violation of this provision shall be deemed in breach of the agreement and shall be responsible for all damages resulting therefrom.”**

- C. Additional information and Guidance are available at the following websites:
1. E-Verify portal maintained by the State of Alabama:  
<http://immigration.alabama.gov>
  2. Alabama Office of the Attorney General Website:  
<http://www.ago.alabama.gov/Page-Immigration>
  3. Alabama Building Commission:  
<http://www.bc.state.al.us/PDFs/Bulletins/GuidanceonAct2012-491-DatedMay-29-2012.pdf>
  4. U.S. Department of Homeland Security, E-Verify: <http://www.dhs.gov/E-Verify>





State of \_\_\_\_\_  
County of \_\_\_\_\_

CERTIFICATE OF COMPLIANCE WITH THE BEASON-HAMMON ALABAMA TAXPAYER AND  
CITIZEN PROTECTION ACT (ACT 2011-535, as amended by ACT 2012-491)

DATE: \_\_\_\_\_

RE Contract/Grant/Incentive (describe by number or subject):

\_\_\_\_\_ by and between  
\_\_\_\_\_ (Contractor/Grantee) and  
\_\_\_\_\_ (State Agency, Department or Public Entity)

The undersigned hereby certifies to the State of Alabama as follows:

1. The undersigned holds the position of \_\_\_\_\_ with the Contractor/Grantee named above, and is authorized to provide representations set out in this Certificate as the official and binding act of that entity, and has knowledge of the provisions of THE BEASON-HAMMON ALABAMA TAXPAYER AND CITIZEN PROTECTION ACT (ACT 2011-535 of the Alabama Legislature, as amended by ACT 2012-491) which is described herein as "the Act."
2. Using the following definitions from Section 3 of the Act, select and initial either (a) or (b), below, to describe the Contractor/Grantee's business structure.

**BUSINESS ENTITY.** Any person or group of persons employing one or more persons performing or engaging in any activity, enterprise, profession, or occupation for gain, benefit, advantage, or livelihood, whether for profit or not for profit.

a. Self-employed individuals, business entities filing articles of incorporation, partnerships, limited partnerships, limited liability companies, foreign corporations, foreign limited partnerships, and foreign limited liability companies authorized to transact business in this state, business trusts, and any business entity that registers with the Secretary of State.

b. Any business entity that possesses a business license, permit, certificate, approval, registration, charter, or similar form of authorization issued by the state, any business entity that is exempt by law from obtaining such a business license, and any business entity that is operating unlawfully without a business license.

**EMPLOYER.** Any person, firm, corporation, partnership, joint stock association, agent, manager, representative, foreman, or other person having control or custody of any employment, place of employment, or of any employee, including any person or entity employing any person for hire within the State of Alabama, including a public employer. This term shall not include the occupant of a household contracting with another person to perform casual domestic labor within the household.

- \_\_\_\_ (a) The Contractor/Grantee is a business entity or employer, as those terms are defined in Section 3 of the Act.
- \_\_\_\_ (b) The Contractor/Grantee is not a business entity or employer, as those terms are defined in Section 3 of the Act.
3. As of the date of this Certificate, the Contractor/Grantee does not knowingly employ an unauthorized alien within the State of Alabama and hereafter, it will not knowingly employ, hire for employment, or continue to employ an unauthorized alien within the State of Alabama;
  4. The Contractor/Grantee is enrolled in E-Verify unless it is not eligible to enroll because of the rules of that program or other factors beyond its control.

Certified this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Name of Contractor/Grantee/Recipient

By: \_\_\_\_\_

Its \_\_\_\_\_

The above Certification was signed in my presence by the person whose name appears above, on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

WITNESS: \_\_\_\_\_

\_\_\_\_\_  
Printed Name of Witness



Company ID Number:

## **THE E-VERIFY MEMORANDUM OF UNDERSTANDING FOR EMPLOYERS**

### **ARTICLE I PURPOSE AND AUTHORITY**

The parties to this agreement are the Department of Homeland Security (DHS) and the \_\_\_\_\_ (Employer). The purpose of this agreement is to set forth terms and conditions which the Employer will follow while participating in E-Verify.

E-Verify is a program that electronically confirms an employee's eligibility to work in the United States after completion of Form I-9, Employment Eligibility Verification (Form I-9). This Memorandum of Understanding (MOU) explains certain features of the E-Verify program and describes specific responsibilities of the Employer, the Social Security Administration (SSA), and DHS.

Authority for the E-Verify program is found in Title IV, Subtitle A, of the Illegal Immigration Reform and Immigrant Responsibility Act of 1996 (IIRIRA), Pub. L. 104-208, 110 Stat. 3009, as amended (8 U.S.C. § 1324a note). The Federal Acquisition Regulation (FAR) Subpart 22.18, "Employment Eligibility Verification" and Executive Order 12989, as amended, provide authority for Federal contractors and subcontractors (Federal contractor) to use E-Verify to verify the employment eligibility of certain employees working on Federal contracts.

### **ARTICLE II RESPONSIBILITIES**

#### **A. RESPONSIBILITIES OF THE EMPLOYER**

1. The Employer agrees to display the following notices supplied by DHS in a prominent place that is clearly visible to prospective employees and all employees who are to be verified through the system:
  - a. Notice of E-Verify Participation
  - b. Notice of Right to Work
2. The Employer agrees to provide to the SSA and DHS the names, titles, addresses, and telephone numbers of the Employer representatives to be contacted about E-Verify. The Employer also agrees to keep such information current by providing updated information to SSA and DHS whenever the representatives' contact information changes.
3. The Employer agrees to grant E-Verify access only to current employees who need E-Verify access. Employers must promptly terminate an employee's E-Verify access if the employer is separated from the company or no longer needs access to E-Verify.

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4. The Employer agrees to become familiar with and comply with the most recent version of the E-Verify User Manual.
  5. The Employer agrees that any Employer Representative who will create E-Verify cases will complete the E-Verify Tutorial before that individual creates any cases.
    - a. The Employer agrees that all Employer representatives will take the refresher tutorials when prompted by E-Verify in order to continue using E-Verify. Failure to complete a refresher tutorial will prevent the Employer Representative from continued use of E-Verify.
  6. The Employer agrees to comply with current Form I-9 procedures, with two exceptions:
    - a. If an employee presents a "List B" identity document, the Employer agrees to only accept "List B" documents that contain a photo. (List B documents identified in 8 C.F.R. § 274a.2(b)(1)(B)) can be presented during the Form I-9 process to establish identity.) If an employee objects to the photo requirement for religious reasons, the Employer should contact E-Verify at 888-464-4218.
    - b. If an employee presents a DHS Form I-551 (Permanent Resident Card), Form I-766 (Employment Authorization Document), or U.S. Passport or Passport Card to complete Form I-9, the Employer agrees to make a photocopy of the document and to retain the photocopy with the employee's Form I-9. The Employer will use the photocopy to verify the photo and to assist DHS with its review of photo mismatches that employees contest. DHS may in the future designate other documents that activate the photo screening tool.
- Note: Subject only to the exceptions noted previously in this paragraph, employees still retain the right to present any List A, or List B and List C, document(s) to complete the Form I-9.
7. The Employer agrees to record the case verification number on the employee's Form I-9 or to print the screen containing the case verification number and attach it to the employee's Form I-9.
  8. The Employer agrees that, although it participates in E-Verify, the Employer has a responsibility to complete, retain, and make available for inspection Forms I-9 that relate to its employees, or from other requirements of applicable regulations or laws, including the obligation to comply with the antidiscrimination requirements of section 274B of the INA with respect to Form I-9 procedures.
    - a. The following modified requirements are the only exceptions to an Employer's obligation to not employ unauthorized workers and comply with the anti-discrimination provision of the INA: (1) List B identity documents must have photos, as described in paragraph 6 above; (2) When an Employer confirms the identity and employment eligibility of newly hired employee using E-Verify procedures, the Employer establishes a rebuttable presumption that it has not violated section 274A(a)(1)(A) of the Immigration and Nationality Act (INA) with respect to the hiring of that employee; (3) If the Employer receives a final nonconfirmation for an employee, but continues to employ that person, the Employer must notify DHS and the Employer is subject to a civil money penalty between \$550 and \$1,100 for each failure to notify DHS of continued employment following a final nonconfirmation; (4) If the Employer continues to employ an employee after receiving a final nonconfirmation, then the Employer is subject to a rebuttable presumption that it has knowingly

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employed an unauthorized alien in violation of section 274A(a)(1)(A); and (5) no E-Verify participant is civilly or criminally liable under any law for any action taken in good faith based on information provided through the E-Verify.

b. DHS reserves the right to conduct Form I-9 compliance inspections, as well as any other enforcement or compliance activity authorized by law, including site visits, to ensure proper use of E-Verify.

9. The Employer is strictly prohibited from creating an E-Verify case before the employee has been hired, meaning that a firm offer of employment was extended and accepted and Form I-9 was completed. The Employer agrees to create an E-Verify case for new employees within three Employer business days after each employee has been hired (after both Sections 1 and 2 of Form I-9 have been completed), and to complete as many steps of the E-Verify process as are necessary according to the E-Verify User Manual. If E-Verify is temporarily unavailable, the three-day time period will be extended until it is again operational in order to accommodate the Employer's attempting, in good faith, to make inquiries during the period of unavailability.

10. The Employer agrees not to use E-Verify for pre-employment screening of job applicants, in support of any unlawful employment practice, or for any other use that this MOU or the E-Verify User Manual does not authorize.

11. The Employer must use E-Verify for all new employees. The Employer will not verify selectively and will not verify employees hired before the effective date of this MOU. Employers who are Federal contractors may qualify for exceptions to this requirement as described in Article II.B of this MOU.

12. The Employer agrees to follow appropriate procedures (see Article III below) regarding tentative nonconfirmations. The Employer must promptly notify employees in private of the finding and provide them with the notice and letter containing information specific to the employee's E-Verify case. The Employer agrees to provide both the English and the translated notice and letter for employees with limited English proficiency to employees. The Employer agrees to provide written referral instructions to employees and instruct affected employees to bring the English copy of the letter to the SSA. The Employer must allow employees to contest the finding, and not take adverse action against employees if they choose to contest the finding, while their case is still pending. Further, when employees contest a tentative nonconfirmation based upon a photo mismatch, the Employer must take additional steps (see Article III.B. below) to contact DHS with information necessary to resolve the challenge.

13. The Employer agrees not to take any adverse action against an employee based upon the employee's perceived employment eligibility status while SSA or DHS is processing the verification request unless the Employer obtains knowledge (as defined in 8 C.F.R. § 274a.1(l)) that the employee is not work authorized. The Employer understands that an initial inability of the SSA or DHS automated verification system to verify work authorization, a tentative nonconfirmation, a case in continuance (indicating the need for additional time for the government to resolve a case), or the finding of a photo mismatch, does not establish, and should not be interpreted as, evidence that the employee is not work authorized. In any of such cases, the employee must be provided a full and fair opportunity to contest the finding, and if he or she does so, the employee may not be terminated or suffer any adverse employment consequences based upon the employee's perceived employment eligibility status

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(including denying, reducing, or extending work hours, delaying or preventing training, requiring an employee to work in poorer conditions, withholding pay, refusing to assign the employee to a Federal contract or other assignment, or otherwise assuming that he or she is unauthorized to work) until and unless secondary verification by SSA or DHS has been completed and a final nonconfirmation has been issued. If the employee does not choose to contest a tentative nonconfirmation or a photo mismatch or if a secondary verification is completed and a final nonconfirmation is issued, then the Employer can find the employee is not work authorized and terminate the employee's employment. Employers or employees with questions about a final nonconfirmation may call E-Verify at 1-888-464-4218 (customer service) or 1-888-897-7781 (worker hotline).

14. The Employer agrees to comply with Title VII of the Civil Rights Act of 1964 and section 274B of the INA as applicable by not discriminating unlawfully against any individual in hiring, firing, employment eligibility verification, or recruitment or referral practices because of his or her national origin or citizenship status, or by committing discriminatory documentary practices. The Employer understands that such illegal practices can include selective verification or use of E-Verify except as provided in part D below, or discharging or refusing to hire employees because they appear or sound "foreign" or have received tentative nonconfirmations. The Employer further understands that any violation of the immigration-related unfair employment practices provisions in section 274B of the INA could subject the Employer to civil penalties, back pay awards, and other sanctions, and violations of Title VII could subject the Employer to back pay awards, compensatory and punitive damages. Violations of either section 274B of the INA or Title VII may also lead to the termination of its participation in E-Verify. If the Employer has any questions relating to the anti-discrimination provision, it should contact OSC at 1-800-255-8155 or 1-800-237-2515 (TDD).

15. The Employer agrees that it will use the information it receives from E-Verify only to confirm the employment eligibility of employees as authorized by this MOU. The Employer agrees that it will safeguard this information, and means of access to it (such as PINS and passwords), to ensure that it is not used for any other purpose and as necessary to protect its confidentiality, including ensuring that it is not disseminated to any person other than employees of the Employer who are authorized to perform the Employer's responsibilities under this MOU, except for such dissemination as may be authorized in advance by SSA or DHS for legitimate purposes.

16. The Employer agrees to notify DHS immediately in the event of a breach of personal information. Breaches are defined as loss of control or unauthorized access to E-Verify personal data. All suspected or confirmed breaches should be reported by calling 1-888-464-4218 or via email at [E-Verify@dhs.gov](mailto:E-Verify@dhs.gov). Please use "Privacy Incident – Password" in the subject line of your email when sending a breach report to E-Verify.

17. The Employer acknowledges that the information it receives from SSA is governed by the Privacy Act (5 U.S.C. § 552a(i)(1) and (3)) and the Social Security Act (42 U.S.C. 1306(a)). Any person who obtains this information under false pretenses or uses it for any purpose other than as provided for in this MOU may be subject to criminal penalties.

18. The Employer agrees to cooperate with DHS and SSA in their compliance monitoring and evaluation of E-Verify, which includes permitting DHS, SSA, their contractors and other agents, upon



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reasonable notice, to review Forms I-9 and other employment records and to interview it and its employees regarding the Employer's use of E-Verify, and to respond in a prompt and accurate manner to DHS requests for information relating to their participation in E-Verify.

19. The Employer shall not make any false or unauthorized claims or references about its participation in E-Verify on its website, in advertising materials, or other media. The Employer shall not describe its services as federally-approved, federally-certified, or federally-recognized, or use language with a similar intent on its website or other materials provided to the public. Entering into this MOU does not mean that E-Verify endorses or authorizes your E-Verify services and any claim to that effect is false.

20. The Employer shall not state in its website or other public documents that any language used therein has been provided or approved by DHS, USCIS or the Verification Division, without first obtaining the prior written consent of DHS.

21. The Employer agrees that E-Verify trademarks and logos may be used only under license by DHS/USCIS (see [M-795 \(Web\)](#)) and, other than pursuant to the specific terms of such license, may not be used in any manner that might imply that the Employer's services, products, websites, or publications are sponsored by, endorsed by, licensed by, or affiliated with DHS, USCIS, or E-Verify.

22. The Employer understands that if it uses E-Verify procedures for any purpose other than as authorized by this MOU, the Employer may be subject to appropriate legal action and termination of its participation in E-Verify according to this MOU.

## **B. RESPONSIBILITIES OF FEDERAL CONTRACTORS**

1. If the Employer is a Federal contractor with the FAR E-Verify clause subject to the employment verification terms in Subpart 22.18 of the FAR, it will become familiar with and comply with the most current version of the E-Verify User Manual for Federal Contractors as well as the E-Verify Supplemental Guide for Federal Contractors.

2. In addition to the responsibilities of every employer outlined in this MOU, the Employer understands that if it is a Federal contractor subject to the employment verification terms in Subpart 22.18 of the FAR it must verify the employment eligibility of any "employee assigned to the contract" (as defined in FAR 22.1801). Once an employee has been verified through E-Verify by the Employer, the Employer may not create a second case for the employee through E-Verify.

- a. An Employer that is not enrolled in E-Verify as a Federal contractor at the time of a contract award must enroll as a Federal contractor in the E-Verify program within 30 calendar days of contract award and, within 90 days of enrollment, begin to verify employment eligibility of new hires using E-Verify. The Employer must verify those employees who are working in the United States, whether or not they are assigned to the contract. Once the Employer begins verifying new hires, such verification of new hires must be initiated within three business days after the hire date. Once enrolled in E-Verify as a Federal contractor, the Employer must begin verification of employees assigned to the contract within 90 calendar days after the date of enrollment or within 30 days of an employee's assignment to the contract, whichever date is later.

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b. Employers enrolled in E-Verify as a Federal contractor for 90 days or more at the time of a contract award must use E-Verify to begin verification of employment eligibility for new hires of the Employer who are working in the United States, whether or not assigned to the contract, within three business days after the date of hire. If the Employer is enrolled in E-Verify as a Federal contractor for 90 calendar days or less at the time of contract award, the Employer must, within 90 days of enrollment, begin to use E-Verify to initiate verification of new hires of the contractor who are working in the United States, whether or not assigned to the contract. Such verification of new hires must be initiated within three business days after the date of hire. An Employer enrolled as a Federal contractor in E-Verify must begin verification of each employee assigned to the contract within 90 calendar days after date of contract award or within 30 days after assignment to the contract, whichever is later.

c. Federal contractors that are institutions of higher education (as defined at 20 U.S.C. 1001(a)), state or local governments, governments of Federally recognized Indian tribes, or sureties performing under a takeover agreement entered into with a Federal agency under a performance bond may choose to only verify new and existing employees assigned to the Federal contract. Such Federal contractors may, however, elect to verify all new hires, and/or all existing employees hired after November 6, 1986. Employers in this category must begin verification of employees assigned to the contract within 90 calendar days after the date of enrollment or within 30 days of an employee's assignment to the contract, whichever date is later.

d. Upon enrollment, Employers who are Federal contractors may elect to verify employment eligibility of all existing employees working in the United States who were hired after November 6, 1986, instead of verifying only those employees assigned to a covered Federal contract. After enrollment, Employers must elect to verify existing staff following DHS procedures and begin E-Verify verification of all existing employees within 180 days after the election.

e. The Employer may use a previously completed Form I-9 as the basis for creating an E-Verify case for an employee assigned to a contract as long as:

- i. That Form I-9 is complete (including the SSN) and complies with Article II.A.6,
- ii. The employee's work authorization has not expired, and
- iii. The Employer has reviewed the Form I-9 information either in person or in communications with the employee to ensure that the employee's Section 1, Form I-9 attestation has not changed (including, but not limited to, a lawful permanent resident alien having become a naturalized U.S. citizen).

f. The Employer shall complete a new Form I-9 consistent with Article II.A.6 or update the previous Form I-9 to provide the necessary information if:

- i. The Employer cannot determine that Form I-9 complies with Article II.A.6,
- ii. The employee's basis for work authorization as attested in Section 1 has expired or changed, or
- iii. The Form I-9 contains no SSN or is otherwise incomplete.

**Note:** If Section 1 of Form I-9 is otherwise valid and up-to-date and the form otherwise complies with



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Article II.C.5, but reflects documentation (such as a U.S. passport or Form I-551) that expired after completing Form I-9, the Employer shall not require the production of additional documentation, or use the photo screening tool described in Article II.A.5, subject to any additional or superseding instructions that may be provided on this subject in the E-Verify User Manual.

g. The Employer agrees not to require a second verification using E-Verify of any assigned employee who has previously been verified as a newly hired employee under this MOU or to authorize verification of any existing employee by any Employer that is not a Federal contractor based on this Article.

3. The Employer understands that if it is a Federal contractor, its compliance with this MOU is a performance requirement under the terms of the Federal contract or subcontract, and the Employer consents to the release of information relating to compliance with its verification responsibilities under this MOU to contracting officers or other officials authorized to review the Employer's compliance with Federal contracting requirements.

### **C. RESPONSIBILITIES OF SSA**

1. SSA agrees to allow DHS to compare data provided by the Employer against SSA's database. SSA sends DHS confirmation that the data sent either matches or does not match the information in SSA's database.

2. SSA agrees to safeguard the information the Employer provides through E-Verify procedures. SSA also agrees to limit access to such information, as is appropriate by law, to individuals responsible for the verification of Social Security numbers or responsible for evaluation of E-Verify or such other persons or entities who may be authorized by SSA as governed by the Privacy Act (5 U.S.C. § 552a), the Social Security Act (42 U.S.C. 1306(a)), and SSA regulations (20 CFR Part 401).

3. SSA agrees to provide case results from its database within three Federal Government work days of the initial inquiry. E-Verify provides the information to the Employer.

4. SSA agrees to update SSA records as necessary if the employee who contests the SSA tentative nonconfirmation visits an SSA field office and provides the required evidence. If the employee visits an SSA field office within the eight Federal Government work days from the date of referral to SSA, SSA agrees to update SSA records, if appropriate, within the eight-day period unless SSA determines that more than eight days may be necessary. In such cases, SSA will provide additional instructions to the employee. If the employee does not visit SSA in the time allowed, E-Verify may provide a final nonconfirmation to the employer.

Note: If an Employer experiences technical problems, or has a policy question, the employer should contact E-Verify at 1-888-464-4218.

### **D. RESPONSIBILITIES OF DHS**

1. DHS agrees to provide the Employer with selected data from DHS databases to enable the Employer to conduct, to the extent authorized by this MOU:

a. Automated verification checks on alien employees by electronic means, and

**Company ID Number:**

- b. Photo verification checks (when available) on employees.
2. DHS agrees to assist the Employer with operational problems associated with the Employer's participation in E-Verify. DHS agrees to provide the Employer names, titles, addresses, and telephone numbers of DHS representatives to be contacted during the E-Verify process.
3. DHS agrees to provide to the Employer with access to E-Verify training materials as well as an E-Verify User Manual that contain instructions on E-Verify policies, procedures, and requirements for both SSA and DHS, including restrictions on the use of E-Verify.
4. DHS agrees to train Employers on all important changes made to E-Verify through the use of mandatory refresher tutorials and updates to the E-Verify User Manual. Even without changes to E-Verify, DHS reserves the right to require employers to take mandatory refresher tutorials.
5. DHS agrees to provide to the Employer a notice, which indicates the Employer's participation in E-Verify. DHS also agrees to provide to the Employer anti-discrimination notices issued by the Office of Special Counsel for Immigration-Related Unfair Employment Practices (OSC), Civil Rights Division, U.S. Department of Justice.
6. DHS agrees to issue each of the Employer's E-Verify users a unique user identification number and password that permits them to log in to E-Verify.
7. DHS agrees to safeguard the information the Employer provides, and to limit access to such information to individuals responsible for the verification process, for evaluation of E-Verify, or to such other persons or entities as may be authorized by applicable law. Information will be used only to verify the accuracy of Social Security numbers and employment eligibility, to enforce the INA and Federal criminal laws, and to administer Federal contracting requirements.
8. DHS agrees to provide a means of automated verification that provides (in conjunction with SSA verification procedures) confirmation or tentative nonconfirmation of employees' employment eligibility within three Federal Government work days of the initial inquiry.
9. DHS agrees to provide a means of secondary verification (including updating DHS records) for employees who contest DHS tentative nonconfirmations and photo mismatch tentative nonconfirmations. This provides final confirmation or nonconfirmation of the employees' employment eligibility within 10 Federal Government work days of the date of referral to DHS, unless DHS determines that more than 10 days may be necessary. In such cases, DHS will provide additional verification instructions.

### **ARTICLE III**

#### **REFERRAL OF INDIVIDUALS TO SSA AND DHS**

##### **A. REFERRAL TO SSA**

1. If the Employer receives a tentative nonconfirmation issued by SSA, the Employer must print the notice as directed by E-Verify. The Employer must promptly notify employees in private of the finding and provide them with the notice and letter containing information specific to the employee's E-Verify

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case. The Employer also agrees to provide both the English and the translated notice and letter for employees with limited English proficiency to employees. The Employer agrees to provide written referral instructions to employees and instruct affected employees to bring the English copy of the letter to the SSA. The Employer must allow employees to contest the finding, and not take adverse action against employees if they choose to contest the finding, while their case is still pending.

2. The Employer agrees to obtain the employee's response about whether he or she will contest the tentative nonconfirmation as soon as possible after the Employer receives the tentative nonconfirmation. Only the employee may determine whether he or she will contest the tentative nonconfirmation.
3. After a tentative nonconfirmation, the Employer will refer employees to SSA field offices only as directed by E-Verify. The Employer must record the case verification number, review the employee information submitted to E-Verify to identify any errors, and find out whether the employee contests the tentative nonconfirmation. The Employer will transmit the Social Security number, or any other corrected employee information that SSA requests, to SSA for verification again if this review indicates a need to do so.
4. The Employer will instruct the employee to visit an SSA office within eight Federal Government work days. SSA will electronically transmit the result of the referral to the Employer within 10 Federal Government work days of the referral unless it determines that more than 10 days is necessary.
5. While waiting for case results, the Employer agrees to check the E-Verify system regularly for case updates.
6. The Employer agrees not to ask the employee to obtain a printout from the Social Security Administration number database (the Numident) or other written verification of the SSN from the SSA.

## **B. REFERRAL TO DHS**

1. If the Employer receives a tentative nonconfirmation issued by DHS, the Employer must promptly notify employees in private of the finding and provide them with the notice and letter containing information specific to the employee's E-Verify case. The Employer also agrees to provide both the English and the translated notice and letter for employees with limited English proficiency to employees. The Employer must allow employees to contest the finding, and not take adverse action against employees if they choose to contest the finding, while their case is still pending.
2. The Employer agrees to obtain the employee's response about whether he or she will contest the tentative nonconfirmation as soon as possible after the Employer receives the tentative nonconfirmation. Only the employee may determine whether he or she will contest the tentative nonconfirmation.
3. The Employer agrees to refer individuals to DHS only when the employee chooses to contest a tentative nonconfirmation.
4. If the employee contests a tentative nonconfirmation issued by DHS, the Employer will instruct the

**Company ID Number:**

employee to contact DHS through its toll-free hotline (as found on the referral letter) within eight Federal Government work days.

5. If the Employer finds a photo mismatch, the Employer must provide the photo mismatch tentative nonconfirmation notice and follow the instructions outlined in paragraph 1 of this section for tentative nonconfirmations, generally.

6. The Employer agrees that if an employee contests a tentative nonconfirmation based upon a photo mismatch, the Employer will send a copy of the employee's Form I-551, Form I-766, U.S. Passport, or passport card to DHS for review by:

- a. Scanning and uploading the document, or
- b. Sending a photocopy of the document by express mail (furnished and paid for by the employer).

7. The Employer understands that if it cannot determine whether there is a photo match/mismatch, the Employer must forward the employee's documentation to DHS as described in the preceding paragraph. The Employer agrees to resolve the case as specified by the DHS representative who will determine the photo match or mismatch.

8. DHS will electronically transmit the result of the referral to the Employer within 10 Federal Government work days of the referral unless it determines that more than 10 days is necessary.

9. While waiting for case results, the Employer agrees to check the E-Verify system regularly for case updates.

## **ARTICLE IV SERVICE PROVISIONS**

### **A. NO SERVICE FEES**

1. SSA and DHS will not charge the Employer for verification services performed under this MOU. The Employer is responsible for providing equipment needed to make inquiries. To access E-Verify, an Employer will need a personal computer with Internet access.

## **ARTICLE V MODIFICATION AND TERMINATION**

### **A. MODIFICATION**

1. This MOU is effective upon the signature of all parties and shall continue in effect for as long as the SSA and DHS operates the E-Verify program unless modified in writing by the mutual consent of all parties.

2. Any and all E-Verify system enhancements by DHS or SSA, including but not limited to E-Verify checking against additional data sources and instituting new verification policies or procedures, will be covered under this MOU and will not cause the need for a supplemental MOU that outlines these changes.

Company ID Number:

## **B. TERMINATION**

1. The Employer may terminate this MOU and its participation in E-Verify at any time upon 30 days prior written notice to the other parties.
2. Notwithstanding Article V, part A of this MOU, DHS may terminate this MOU, and thereby the Employer's participation in E-Verify, with or without notice at any time if deemed necessary because of the requirements of law or policy, or upon a determination by SSA or DHS that there has been a breach of system integrity or security by the Employer, or a failure on the part of the Employer to comply with established E-Verify procedures and/or legal requirements. The Employer understands that if it is a Federal contractor, termination of this MOU by any party for any reason may negatively affect the performance of its contractual responsibilities. Similarly, the Employer understands that if it is in a state where E-Verify is mandatory, termination of this by any party MOU may negatively affect the Employer's business.
3. An Employer that is a Federal contractor may terminate this MOU when the Federal contract that requires its participation in E-Verify is terminated or completed. In such cases, the Federal contractor must provide written notice to DHS. If an Employer that is a Federal contractor fails to provide such notice, then that Employer will remain an E-Verify participant, will remain bound by the terms of this MOU that apply to non-Federal contractor participants, and will be required to use the E-Verify procedures to verify the employment eligibility of all newly hired employees.
4. The Employer agrees that E-Verify is not liable for any losses, financial or otherwise, if the Employer is terminated from E-Verify.

## **ARTICLE VI PARTIES**

- A. Some or all SSA and DHS responsibilities under this MOU may be performed by contractor(s), and SSA and DHS may adjust verification responsibilities between each other as necessary. By separate agreement with DHS, SSA has agreed to perform its responsibilities as described in this MOU.
- B. Nothing in this MOU is intended, or should be construed, to create any right or benefit, substantive or procedural, enforceable at law by any third party against the United States, its agencies, officers, or employees, or against the Employer, its agents, officers, or employees.
- C. The Employer may not assign, directly or indirectly, whether by operation of law, change of control or merger, all or any part of its rights or obligations under this MOU without the prior written consent of DHS, which consent shall not be unreasonably withheld or delayed. Any attempt to sublicense, assign, or transfer any of the rights, duties, or obligations herein is void.
- D. Each party shall be solely responsible for defending any claim or action against it arising out of or related to E-Verify or this MOU, whether civil or criminal, and for any liability wherefrom, including (but not limited to) any dispute between the Employer and any other person or entity regarding the applicability of Section 403(d) of IIRIRA to any action taken or allegedly taken by the Employer.
- E. The Employer understands that its participation in E-Verify is not confidential information and may be disclosed as authorized or required by law and DHS or SSA policy, including but not limited to,

Company ID Number:

Congressional oversight, E-Verify publicity and media inquiries, determinations of compliance with Federal contractual requirements, and responses to inquiries under the Freedom of Information Act (FOIA).

F. The individuals whose signatures appear below represent that they are authorized to enter into this MOU on behalf of the Employer and DHS respectively. The Employer understands that any inaccurate statement, representation, data or other information provided to DHS may subject the Employer, its subcontractors, its employees, or its representatives to: (1) prosecution for false statements pursuant to 18 U.S.C. 1001 and/or; (2) immediate termination of its MOU and/or; (3) possible debarment or suspension.

G. The foregoing constitutes the full agreement on this subject between DHS and the Employer.

**To be accepted as an E-Verify participant, you should only sign the Employer's Section of the signature page. If you have any questions, contact E-Verify at 1-888-464-4218.**

Company ID Number:

Approved by:

<b>Employer</b>	
Name (Please Type or Print)	Title
Signature	Date
<b>Department of Homeland Security – Verification Division</b>	
Name (Please Type or Print)	Title
Signature	Date



Company ID Number:

Information Required for the E-Verify Program	
Information relating to your Company:	
Company Name	
Company Facility Address	
Company Alternate Address	
County or Parish	
Employer Identification Number	
North American Industry Classification Systems Code	
Parent Company	
Number of Employees	
Number of Sites Verified for	



**Are you verifying for more than 1 site? If yes, please provide the number of sites verified for in each State:**

[illegible][illegible]

**Information relating to the Program Administrator(s) for your Company on policy questions or operational problems:**

[illegible]

[illegible]



CERTIFICATE OF COMPLIANCE WITH ACT 2016-312

DATE: \_\_\_\_\_

Re: Contract/Grant/Incentive (describe by number or subject):

\_\_\_\_\_ by and between \_\_\_\_\_  
(Contractor/Grantee) and \_\_\_\_\_ (State Agency, Department or  
Public Entity.

The undersigned hereby certifies to the State of Alabama as follows:

1. The undersigned holds the position of \_\_\_\_\_ with the Contractor/Grantee named above, and is authorized to provide representations set out in this Certificate as the official and binding act of that entity, and has knowledge of Alabama's Act 2016-312.
2. In compliance with Act 2016-312, the contractor hereby certifies that it is not currently engaged in, and will not engage in, the boycott of a person or an entity based in or doing business with a jurisdiction with which this state can enjoy open trade.

Certified this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Name of Contractor/Grantee/Recipient

By: \_\_\_\_\_

Its: \_\_\_\_\_

The above Certification was signed in my presence by the person whose name appears above on this  
\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Witness: \_\_\_\_\_

\_\_\_\_\_  
Printed Name of Witness



**SECTION 00 73 37**  
**BYRD ANTI-LOBBYING AMENDMENT CERTIFICATION**

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
3. The undersigned shall require that the language of this certification is included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of the fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The Contractor, \_\_\_\_\_, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chap. 38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

\_\_\_\_\_  
Signature of Contractor's Authorized Official

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name and Title of Contractor's Authorized Official





**SECTION 00 73 46**  
**DAVIS BACON WAGE RATES DETERMINATION**

General Decision Number: AL20240117 01/05/2024

Superseded General Decision Number: AL20230117

State: Alabama

Construction Type: Heavy

Counties: Colbert and Lauderdale Counties in Alabama.

**HEAVY CONSTRUCTION PROJECTS**

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	<ul style="list-style-type: none"><li>. Executive Order 14026 generally applies to the contract.</li><li>. The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.</li></ul>
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	<ul style="list-style-type: none"><li>. Executive Order 13658 generally applies to the contract.</li><li>. The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.</li></ul>

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/05/2024

CARP1209-001 01/01/2021

	Rates	Fringes
CARPENTER (Includes Form Work)...	\$ 26.15	13.11
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SUAL2015-045 08/02/2017		

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER, Includes Water Sewer Lines.....	\$ 13.71 **	0.00
ELECTRICIAN.....	\$ 19.56	0.00
LABORER: Common or General, Includes Water Sewer Lines.....	\$ 13.40 **	3.60
LABORER: Pipelayer, Includes Water Sewer Lines.....	\$ 14.65 **	0.00
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 17.18 **	0.00
OPERATOR: Loader, Includes Water Sewer Lines.....	\$ 17.64	2.14
TRUCK DRIVER: Dump Truck, Includes Water Sewer Lines.....	\$ 12.56 **	2.12
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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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\*\* Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.20) or 13658 (\$12.90). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number

where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

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WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION



## SECTION 01 11 13 SUMMARY OF WORK

### PART 1 – GENERAL

#### 1.01 CONTRACT DESCRIPTION

- A. Contract Type: Unit Price as described in Agreement – EJCDC
- B. The contract award, if made, will be made to the low-responsive bidder. A “responsive” bid shall be evidenced by: (1) A Bid form complete in accordance with the Instructions to Bidders and with instructions and/or requests contained in any other sections of the Contract Documents; (2) A Bid Form not evidencing any apparent unbalanced pricing for the performance of the Items of Work; (3) a Bid Form without excisions, special conditions or qualifications made by the Bidder; and (4) a Bid Form containing no alternative bids or offerings for any items unless such alternative bids or offerings are requested in the Technical Specifications or Contract Documents.
- C. The successful bidder must furnish a Performance Bond for one hundred (100%) percent of the bid amount and a Labor and Material Payment Bond for one hundred (100%) percent of the bid amount and must secure his bond from a bonding company’s representative or agent in the State of Alabama.
- D. The attention of bidders is called to provisions of State Law Governing General Conditions, as set forth in Chapter 4 (Section 65 to 82, inclusive) of Title 46 of the Code of Alabama of 1940, as amended; and bidders shall be governed by law insofar as it is applicable. The above-mentioned provisions of the Code make it illegal for the OWNER to consider a Bid from anyone who is not properly licensed under such code provisions. The OWNER, therefore, will not consider any bid unless the bidder produces evidence that he is so licensed. Neither will the OWNER enter into a Contract with a foreign corporation that is not qualified under State Law to do business in the State of Alabama. **The bidder must be licensed by the Alabama Licensing Board for General Contractors with a major classification of MU (Municipal & Utility). The CONTRACTOR must include his General Contractor’s license number and classification on the outside of the sealed bid envelope.**
- E. Unit Price
  - 1. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.
  - 2. The total of all estimated prices will be determined as the sum of the products of the estimated quantity of each item and the unit price Bid for the item. The final quantities and Contract Price will be determined in accordance with paragraph 11.03 of the General Conditions.
  - 3. The OWNER reserves the right, at its sole discretion, to award some, all, or none of the bid items listed in the bid form, including additive and deductive alternates, in

any order, as the OWNER perceives in his best interest. CONTRACTOR reserves the right to accept award of the Contract as awarded by the OWNER. If CONTRACTOR should choose not to accept award, ENGINEER may then recommend award to next low responsive bidder or choose to recommend rejection of remaining bids.

4. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

## 1.02 WORK UNDER THIS CONTRACT

- A. The Contract provides all labor to make improvements to the sewer system.
- B. The work to be performed, including work detailed and not detailed in the Contract Documents, shall be in accordance with specifications prepared by The Kelley Group, LLC.
- C. The CONTRACTOR will notify the ENGINEER by 8 a.m. Friday of the next week's operations and promptly notify the ENGINEER of any work stoppages due to weather or other conditions preventing work, partial or complete days.
- D. **Line Item #1 - Mobilization/Demobilization** - to include, but not limited to, insurance, bonds, permits, submittals, existing site documentation, and site cleanup (Limited to 6% of the construction total: 4% for Mobilization, 2% for Demobilization).
- E. **Line Item #2 – Influent Plug Valve** – Furnish and install 14” Plug Valve with Valve Box, Cover, etc. to cut flow off from influent bar screen to aeration cell (Cell 1).
  1. This work item shall be performed first, in order that bypass pumping can be installed to bypass aeration and settling cells (Cell 1 and Cell 2). Bypass suction line shall be installed downstream of manual bar screens such that sewage is screened prior to being pumped to storage lagoon.
  2. CONTRACTOR may pump down influent lift station (East Street) prior to performing this work and keep pumps off for an amount of time agreed upon with OWNER.
- F. **Line Item #3 – Bypass Pumping** – Furnish and install bypass pumping system to include pump, suction hose, discharge hose, trenching, steel plates, thrust blocking, etc. to provide a fully functional temporary bypass pumping system to be maintained for the duration of the project.
  1. CONTRACTOR shall supply ENGINEER with bypass pumping plan submittal prior to commencement of construction. Plan shall include pump sizing, pipe sizing, pump



control system, fuel sources, refueling plan, pipe materials, driveway crossing plan, thrust blocking plan, and any other pertinent material submittals.

2. CONTRACTOR may use rigid pipe in lieu of flexible suction or discharge hose.
3. This bid item shall be inclusive of manpower, power, fuel, etc. to monitor and maintain bypass pumping and prevent any outages that may cause spills or overflows. Backup pumping systems shall be available should an outage of the primary system occur.
4. CONTRACTOR shall be responsible for notification to ENGINEER and ADEM should any spills or overflows occur, as well as for cleanup of any spills or overflows relating to bypass pumping failures.
5. CONTRACTOR may pump down and shut off flow from East Street lift station for duration of bypass pumping installation, so long as approved by ENGINEER and OWNER.

**G. Line Item #4 – Clearing and Grubbing** – Clear and Grub entire lagoon site to include removal and disposal of trees, shrubs, and other vegetation along perimeter of lagoon cells. Spray with herbicide to prevent immediate regrowth.

1. CONTRACTOR shall ensure that entire lagoon site within perimeter fence is cleared and grubbed and all debris is removed from site at CONTRACTOR's expense.
2. CONTRACTOR shall spray gravel access drives with herbicide and pre-emergent to kill all vegetation prevent immediate regrowth of vegetation. CONTRACTOR shall spray balance of site with herbicide to kill all woody and broad-leaf vegetation, and pre-emergent to prevent immediate regrowth of vegetation. CONTRACTOR shall maintain no re-growth by using pre-emergent until project is accepted by OWNER. CONTRACTOR shall ensure that no runoff of herbicide into lagoon cells occurs during performance of this work.

**H. Line Item #5 – Demolition** – Remove all existing lagoon aerators (approximately eight), all lagoon covers (approximately ten), all lagoon baffles (approximately four) and anchors, Cell 1 lagoon liner, Cell 2 lagoon liner, Vertical Turbine Pump 1, etc.

1. CONTRACTOR shall allow OWNER the option to retain any mechanical equipment removed during demolition. CONTRACTOR shall load, haul, and unload any equipment chosen to be retained to OWNER's storage facility at no additional cost.
2. Dewatering of Cell 1 and Cell 2 to prepare for removal of lagoon liner shall be considered incidental to this line item. CONTRACTOR may pump liquid contents of each cell to Cell 3 for storage while cells are out of service.
3. CONTRACTOR shall be responsible for any permitting associated with disposal of any plastics, objects, sediment, sludge, etc. associated with dewatering and preparation to remove lagoon liners. Disposal of the cell contents shall be considered incidental to this line item.

4. CONTRACTOR shall be responsible for treating any material removed from Cell 1 and Cell 2 and hauled away for vector control and shall ensure that material meets all ADEM guidelines for transport and depositing in a licensed landfill.
- I. **Line Item #6 – Cell 1 Lagoon Liner** – Furnish and Install 60 mil HDPE lagoon liner in Cell 1 (aeration) to include compacted sand repair as required, sub-drainage/venting system, geotextile cushion underlay, pipe/structure penetrations, etc. to provide a fully functional lagoon liner system.
1. CONTRACTOR shall inspect lagoon liner base and sub-base to ensure adequate compaction per lagoon liner manufacturer's recommendations. CONTRACTOR shall repair in place any damaged areas to lagoon liner sub-base and base prior to installation of new liner system.
  2. CONTRACTOR shall subcontract lagoon liner installation to liner manufacturer's forces or provide evidence of certification to install liner by lagoon liner manufacturer if CONTRACTOR wishes to install liner with their own forces.
- J. **Line Item #7 – Cell 2 Lagoon Liner** – Furnish and Install 60 mil HDPE lagoon liner in Cell 2 (settling) to include compacted sand repair as required, sub-drainage/venting system, geotextile cushion underlay, pipe/structure penetrations, etc. to provide a fully functional lagoon liner system.
1. CONTRACTOR shall inspect lagoon liner base and sub-base to ensure adequate compaction per lagoon liner manufacturer's recommendations. CONTRACTOR shall repair in place any damaged areas to lagoon liner sub-base and base prior to installation of new liner system.
  2. CONTRACTOR shall subcontract lagoon liner installation to liner manufacturer's forces or provide evidence of certification to install liner by lagoon liner manufacturer if CONTRACTOR wishes to install liner with their own forces.
- K. **Line Item #8 – Baffle Curtain** – Furnish and Install approximately 183 linear feet of lagoon baffle curtain with end anchors, bottom anchors, flow-through window, etc. to provide a fully functional lagoon flow partitioning system in Cell 1 (aeration cell).
1. CONTRACTOR shall field-verify required dimensions of baffle curtain prior to release to production of baffle curtain materials. CONTRACTOR shall notify ENGINEER in writing of any discrepancies between proposed dimensions and actual field dimensions.
  2. CONTRACTOR may subcontract baffle curtain installation to curtain manufacturer's forces if so desired.
  3. CONTRACTOR shall provide detail of curtain anchoring system, as well as proposed location of anchoring points, to ENGINEER prior to release to production of baffle curtains and anchor system.

- L. **Line Item #9 – Aeration System** – Furnish and Install approximately positive displacement blower package, stainless steel header pipe, isolation valves, check valves, discharge pressure gauge, carbon steel air pipe, purge valve, stainless steel manifold, weighted air tubing, nine (9) weighted aerators, etc. to provide a fully functional lagoon aeration system.
1. CONTRACTOR shall field-verify required dimensions of air pipe and air tubing prior to release to production of materials.
  2. CONTRACTOR shall provide and install blower and aeration system per manufacturers' recommendations. Details provided are for reference purposes. CONTRACTOR shall verify all installation requirements with equipment manufacturers prior to commencement of construction.
  3. CONTRACTOR shall install purge valve at low point of air pipe where pipe turns ninety degrees (90°) from blowers to stainless steel manifold. Air pipe shall slope down from blowers to tee (with surge valve installed on blind flange) and up from tee to manifold.
- M. **Line Item #10 – Process Control System** – Furnish and Install lagoon process control panel to include aeration control system, flow meter input/output, valve actuator control, variable frequency drives, manual aeration control, automatic aeration control by flow, breakers, disconnects, enclosure, etc. to provide a fully functional process control system.
1. CONTRACTOR shall furnish and install all conduit, wire, trenching, wire termination, testing, start-up etc. to provide a fully functional system. All materials and equipment required for power and control of lagoon equipment shall be considered incidental to this bid item.
  2. CONTRACTOR shall furnish and install influent and effluent flow meters, meter vaults, hatches, remote displays, conduit, wire, trenching, wire termination, testing, start-up, etc. required to provide a fully functional flow monitoring system for lagoon influent and lagoon effluent. Flow meter hardware, installation, programming, and integration shall be considered incidental to Bid Item Number 10.
  3. CONTRACTOR may subcontract system integration to licensed integrator/electrical Subcontractor if so desired.
    - a. Approved System Integrators for this project are:
      - (a) Dexter Fortson Associates
        - (i) Bessemer, AL
      - (b) Matthews Integration
        - (i) Huntsville, AL
  4. Aeration control system shall be provided by aeration system manufacturer and shall be capable of manual operation using manual variable frequency drive settings for aeration control, or by automatic operation using flow meter output (4-20 mA) for control of variable frequency drive settings for aeration control. The amount of air

output by variable frequency drives to provide adequate aeration for varying flow amounts shall be per aeration system manufacturer's recommendations and shall be field verified at time of start-up.

N. **Line Item #11 – Effluent Pump Installation** – Install new effluent vertical turbine pump 1 To include pump pad, anchor bolts, leveling grout, wiring, air relief valves (2), priming, painting, testing, start-up, etc. to provide a fully functional effluent pump system.

1. Pump detail drawings are for reference per old record drawings by others. CONTRACTOR shall field verify elevations, dimensions, existing concrete conditions, existing pipe diameters, existing pipe condition, etc. prior to release to production of materials. Any potential issues with installation of effluent pump shall be addressed to ENGINEER in writing prior to commencement of construction.
2. CONTRACTOR shall provide new air relief valves for both Pump 1 and Pump 2 and shall provide sketch of proposed installation of same to ENGINEER prior to commencement of construction.
3. CONTRACTOR shall furnish and install new pump control panel to be level-controlled by level in effluent pump wet well. Costs for panel, wire conduit, trenching, junction boxes, wire termination, etc. shall be considered incidental to this bid item.
4. CONTRACTOR or Systems Integrator shall furnish and install precipitation-based pump control system with pump control panel such that pumps can not pump to sprayfield during rain events.
  - a. Precipitation Sensor shall be WS100 by Lufft, or equal.
  - a. Precipitation Sensor shall be integrated such that effluent pumps are restricted from running in the event of 0.125" or more of precipitation.

O. **Line Item #12 – Sludge Pump** – Furnish and Install self-priming pump, concrete pad, suction pipe system, check valve, isolation valve, air relief valve, 3" effluent force main, discharge splash block, wiring, control panel, etc. to provide a fully functional sludge removal system.

1. CONTRACTOR shall install self-priming pump, pump base, motor, and anchor bolts in accordance with pump manufacturer's recommendations.
2. CONTRACTOR shall provide submittal of proposed anchoring plan and pump discharge plan to include effluent header piping and valve arrangement prior to commencement of construction.
3. Effluent force main shall be installed according to standard sewer force main specifications and shall include ductile iron fittings, thrust blocking, and other appurtenances as necessary.
4. CONTRACTOR shall be responsible for providing/installing suction pipe system per detail. This work shall be considered incidental to this bid item.

5. CONTRACTOR shall furnish and install pump control panel for this pump to include an automatic high water level float switch. The pump will typically be operated in manual mode to remove sludge, however. Any wiring, conduit, trenching, equipment, etc. required to provide power to this pump control panel shall be considered incidental to this bid item.
- P. Additive Alternate Line Item #ALT 1 – Flow Control System** – Remove and replace flow control system to include 8” butterfly valves (2), electric actuators (2), wire, conduit, control system in process control panel, etc. to provide a fully functional electric-actuated flow control selection system.
1. CONTRACTOR shall provide shop drawing of electric actuator layout to ensure fit in existing vault prior to release to production of materials.
  2. CONTRACTOR or Systems Integrator shall integrate flow control actuators into process control system in order that flow be diverted to storage lagoon (Cell 3) during times of heavy precipitation when effluent pumps are not allowed to run.
  3. This line item shall be considered an optional additive to the base bid price should the OWNER choose to award this item.

**Q. Deductive Alternate Line Item #ALT 2 – Effluent Pump Replacement**

1. This line item shall be considered a deductive alternative to Line Item #11. If the OWNER should choose to award this item, Line Item #11 will be omitted from the award.
2. The bid price for this item shall be considered a deduction from the base bid, and a replacement to Line Item #11, should the OWNER choose to award this item. The base bid will be reduced by the amount of Line Item #D1 should this alternative be awarded.
3. Any costs associated with loading, handling, hauling, storage, etc. of equipment provided by OWNER shall be considered incidental to the deductive alternate bid item.

### 1.03 PROJECT DESCRIPTIONS

- A. OWNER obtained assistance through the Alabama Department of Environmental Management (ADEM) Clean Water State Revolving Fund (CWSRF/ARPA-BIL) to make improvements to the sewer system.

### 1.04 PROJECT OBJECTIVES

- A. The project objective is to make improvements to the sewer system, mainly the sewage treatment lagoon, to alleviate issues with sewage treatment that contribute to permit violations.

## 1.05 SERVICES AND PRODUCTS

### A. OWNER's Responsibilities

1. Review shop drawings and submittal data following approval by ENGINEER within ten (10) days following receipt.
2. Arrange for and deliver OWNER reviewed Shop Drawings, Product Data, and Samples to the CONTRACTOR.
3. Recipients are hereby notified that Buy America Provision must be adhered to. All steel, iron, and manufactured products used in this project are required to be produced in the United States.
4. Make payments on properly submitted and approved payment requests within 30 days of ENGINEER's review of the submitted invoice.

### B. CONTRACTOR's Responsibilities

1. Provide detailed instructions for the construction process/timetable. Supply the OWNER and ENGINEER by 8 am each Friday with the planned location of work for the following week.
2. Schedule for delivery with Supplier; Receive and unload products at the site; inspect for completeness or damage and secure all materials until installation.
3. Handle, store, and install finished products in accordance with manufacturer instructions. Provide the engineer with written, planned execution of the work, including the plan for the handling, storage, and installation of the supplied products.
4. Provide ENGINEER with CONTRACTOR's invoice by the Friday nearest the 25<sup>th</sup> of each month.
5. Attend progress meetings that will be held monthly as close to the 20<sup>th</sup> of the month as possible, or as needed, to review installations prior to submitting an invoice.

## 1.06 STORED MATERIALS (NOT USED)

## 1.07 CONTRACTOR'S USE OF SITE

- A. Cooperate with OWNER and adjacent property OWNERS to minimize conflict.
- B. All attempts shall be made to keep all public roads and private drives open during construction. In the event a road closing is unavoidable, the road shall be open within a

reasonable time approved by the OWNER, and an alternate route shall be provided during the interruption. All public services, i.e., police and fire, shall be notified by CONTRACTOR prior to any road closing.

#### 1.08 WORK SEQUENCE

- A. Coordinate construction schedule and operations with the OWNER and ENGINEER.
  - 1. Construction shall be sequenced such that lagoon treatment system is out of service for the minimal amount of time possible.
  - 2. CONTRACTOR shall submit projected time for treatment outage to ENGINEER for approval prior to commencement of construction.
  - 3. **Should storage lagoon near full capacity during outage of lagoon treatment system, CONTRACTOR may pump out contents of storage lagoon and haul to nearby treatment facility. A request to perform this work should be addressed in writing to ENGINEER and payment for this work shall be negotiated as required.**

#### 1.09 LICENSES AND PERMITS

- A. The CONTRACTOR shall be responsible for securing from the Local Municipalities all permits, licenses and for paying all taxes required to perform the Contract Work.
- B. The CONTRACTOR shall be responsible for compliance with all Federal, State and local laws and ordinances regarding licenses and permits.

#### 1.10 PROTECTION OF THE OWNER, WORKMEN, AND THE PUBLIC

- A. The CONTRACTOR is responsible for the safe execution of the work.
- B. The ENGINEER and the OWNER shall not be required to act as Safety Engineers or Safety Supervisors.
- C. The CONTRACTOR is solely responsible for the safe prosecution of the work.
- D. It is the CONTRACTOR's responsibility to secure advice from the Safety officer from his insurance company.

#### 1.11 LOCATION OF UNDERGROUND OBSTRUCTIONS

- A. The CONTRACTOR shall be responsible for carefully protecting utilities during the execution of the work.
- B. Utilities that are damaged due to activities of the CONTRACTOR shall be repaired at no expense to the OWNER.

## 1.12 REGULATORY REQUIREMENTS

- A. Secure from the office of the Inspection Services, Division of the Public Works Department of the Local Municipalities, Information for regulatory licenses and permits required.
- B. Obtain permits and licenses from each Municipality.
- C. Requirements contained in each individual authority's permit shall become the provisions and requirements for completion of the work.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION



**SECTION 01 21 43  
TIME ALLOWANCES**

**PART 1 – GENERAL**

**1.01 EXTENSIONS OF CONTRACT TIME**

- A. If the basis exists for an extension of time in accordance with the General Conditions, an extension of time on the basis of weather may be granted only for the number of Weather Delay Days in excess of the number of days listed as the Standard Baseline for that month.
- B. Reasonably anticipated days of adverse weather as set forth below shall not be cause for an extension of the Contract time unless such extension is agreed to in writing between CONTRACTOR and OWNER.
- C. The CONTRACTOR shall ask for total adverse weather days. The CONTRACTOR's request shall be considered only for days over the allowable number of days stated below.
- D. Contract is on a calendar day basis.

**1.02 STANDARD BASELINE FOR AVERAGE CLIMATIC RANGE**

- A. Standard Baseline shall be regarded as the normal and anticipatable number of calendar days for each month during which construction activity shall be expected to be prevented and suspended by cause of adverse weather. Suspension of construction activity for the number of days each month as listed in the Standard Baseline is included in the Work and is not eligible for an extension of Contract Time.
- B. Standard Baseline is as follows:

<u><b>January</b></u>	<u><b>February</b></u>	<u><b>March</b></u>	<u><b>April</b></u>	<u><b>May</b></u>	<u><b>June</b></u>
11	10	8	7	5	6
<u><b>July</b></u>	<u><b>August</b></u>	<u><b>September</b></u>	<u><b>October</b></u>	<u><b>November</b></u>	<u><b>December</b></u>
6	5	4	3	5	8

**1.03 ADVERSE WEATHER and WEATHER DELAY DAYS**

- A. Adverse Weather is defined as the occurrence of one or more of the following conditions which prevent exterior construction activity or access to the site within twenty-four (24) hours:
  - 1. precipitation (rain, snow, or ice) in excess of one-tenth inch (0.10") liquid measure
  - 2. temperatures which do not rise above 32 degrees F by 10:00 a.m.

3. temperatures which do not rise above that specified for the day's construction activity by 10:00 a.m., if any is specified.
4. sustained wind in excess of twenty-five (25) m.p.h.
5. standing snow in excess of one inch (1.00")

B. Adverse Weather may include, if appropriate, "dry-out" or "mud" days:

1. for rain days above the standard baseline;
2. only if there is a hindrance to site access or site work, such as excavation, backfill, and footings; and,
3. at a rate no greater than 1 make-up day for each day or consecutive days of rain beyond the standard baseline that total 1.0 inch or more, liquid measure, unless specifically recommended otherwise by the ENGINEER.
4. A Weather Delay Day may be counted if adverse weather prevents work on the project for fifty percent (50%) or more of the CONTRACTOR's scheduled work day, including a weekend day or holiday if CONTRACTOR has scheduled construction activity that day.

#### 1.04 DOCUMENTATION and SUBMITTALS

A. Weather Delay Report

1. Use a copy of Section 01 26 25 as a Weather Delay Report, indicating for each calendar month the days on which construction activity affecting the critical path of the Work was prevented by weather conditions. Mark the column for the general cause, and, under "Specifics," indicate the corresponding measurement of precipitation, temperature, wind, or other influencing factors and the construction activity that was scheduled and delayed. At the end of the month, add up the number of days delay, subtract the baseline number given in Section 01 21 43, and show the resulting claimable days. Submit a copy of the completed report with the next application for payment and with a subsequent claim for time extension. Claims for time extension based upon weather delays will be denied if a submitted report does not corroborate the claim or if no report was submitted when it was required in accordance with this paragraph.
- B. Submit daily jobsite work logs showing which and to what extent construction activities have been affected by weather on a monthly basis.
- C. Submit actual weather data to support a claim for time extension obtained from the nearest NOAA weather station or other independently verified source approved by ENGINEER at beginning of project.

- D. Use Standard Baseline data provided in this Section when documenting actual delays due to weather in excess of the average climatic range.
- E. Organize claims and documentation to facilitate evaluation on the basis of calendar month periods and submit in accordance with the procedures for Claims established in the General Conditions.
- F. If an extension of the Contract Time is appropriate, it shall be implemented in accordance with the provisions of the General Conditions and the applicable General Requirements.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION



**SECTION 01 26 25  
WEATHER DELAY REPORT**

Project Number and Project Name					Month and Year reported below
Day of month	"X" if Work delayed by this cause				See Section 01 21 43 for instructions for this form.
	Precip	Temp	Wind	Dryout	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
Total number of days this month with delay due to weather					
Baseline number from Section 01 21 43					
Total – Baseline = claimable days					

*\*Attach Weather Data Reports as stated in Section 01 21 43\**



**SECTION 01 30 00**  
**ADMINISTRATIVE REQUIREMENTS**

**PART 1 – GENERAL**

**1.01 SECTION INCLUDES**

- A. Preconstruction meeting.
- B. Progress meetings.
- C. Construction progress schedule.
- D. Project record documents.
- E. Project inspections.
- F. Contract administration forms.
- G. Approved Permits and Approved Construction Plans required at site.

**1.02 RELATED REQUIREMENTS**

- A. SECTION 00 72 43 - General Conditions
- B. SECTION 00 73 00 - Supplementary Conditions
- C. SECTION 01 70 00 - Execution and Closeout Requirements

**1.03 Administration of the Contract**

- A. The ENGINEER's normal working hours are from 7:30 A.M. to 5:00 P.M. Monday through Thursday and 7:30 A.M. to 11:30 A.M. on Friday.
- B. The CONTRACTOR will be furnished free of charge three (3) copies of the Project Manual and will be furnished as many additional copies as he may require, at the cost of reproduction. An electronic pdf copy will also be provided.
- C. Contract time shall be based on calendar days. A calendar day is one of twenty-four (24) hours beginning at 12:00 midnight.
- D. The CONTRACTOR shall include verification of all necessary permits to the ENGINEER with the first payment request. A certified Release of Liens form shall be submitted with each following invoice for payment.

**PART 2 – PRODUCTS (NOT USED)**

**PART 3 – EXECUTION**

### 3.01 PRECONSTRUCTION MEETING

A. ENGINEER will schedule a meeting after the Notice of Award has been made, and ADEM's approval to award the project has been granted.

B. Attendance Required:

1. OWNER
2. ENGINEER.
3. CONTRACTOR.
4. SUBCONTRACTORS.

C. After notification that the contract has been executed, the ENGINEER will arrange with the OWNER and CONTRACTOR and conduct a pre-construction conference to be held at the project site. **The CONTRACTOR shall require attendance by his major Subcontractors and shall furnish to the ENGINEER and OWNER:**

- 1. List of Subcontractors and Material Suppliers**
- 2. List of Material Supplies**
- 3. Schedule of Values based on Scope of Work**
- 4. Change Orders**
- 5. Invoice Procedure**
- 6. Submittals for Review**
- 7. Submittals for Information**
- 8. Progress Meetings**
- 9. Pre-Close out Meeting**
- 10. Notification of Rain Days**
- 11. 48-hour notification before construction**

D. ENGINEER shall prepare and distribute minutes.

E. Agenda:

1. Designation of personnel representing the parties to Contract, OWNER,



CONTRACTOR, and ENGINEER.

2. CONTRACTOR shall furnish the following prior to his first payment and in accordance with the General Conditions within 10 days after the effective date of the agreement:
  - a. Cost breakdown (Schedule of Values) shall be in standard Construction Specifications Institute format.
  - b. List Sub-CONTRACTORS and major suppliers.
  - c. Construction Schedule as defined in Paragraph 2.05 of General Conditions and Supplementary Conditions.
  - d. No payments to the CONTRACTOR shall be made until this information is provided.
3. Roles of Individuals:
  - a. ENGINEER - shall be solely responsible for the direction of the project. All instructions to CONTRACTOR shall come from the ENGINEER. All decisions and directions shall be in writing. Verbal instructions shall be immediately confirmed in writing.
  - b. OWNER - ENGINEER to receive instructions only from OWNER. Program or design changes shall be approved by the OWNER prior to any work being performed by the ENGINEER. Establish ground rules for the CONTRACTOR and his personnel while working on Owner's premises. If representatives of the OWNER find any discrepancies they believe to be contrary to the Contract Documents, they shall notify the ENGINEER. If it is thought that the discrepancy needs immediate attention, the individual discovering the discrepancy and the CONTRACTOR's representative should call the ENGINEER for immediate resolution. Provide staff throughout the project to make judgment calls.
  - c. CONTRACTOR - Work shall be according to the Contract Documents, not necessarily standard practice. The CONTRACTOR shall keep and distribute minutes of all meetings except for the Preconstruction meeting. Emergency action to protect life or property shall be taken immediately by the superintendent on the site. Less urgent action shall be resolved by telephone among the appropriate parties.
4. Change Orders:
  - a. All requests for a change in time and/or money shall be submitted to the ENGINEER, with proper backup data, for his review. The ENGINEER shall submit the Change Order to OWNER with his recommendation of action required. The Change Order shall be approved by OWNER prior to any

additional work being performed.

- b. Change Orders cannot be approved without the proper breakdown as required by the General Conditions, Section 11.01. The same requirements apply to time extension requests.
- c. Change Orders should be rounded to the nearest whole dollar amount.
- d. User-paid change orders are not allowed.
- e. User-requested change orders are to be avoided.
- f. Change order documents shall be transferred between the OWNER, CONTRACTOR, and ENGINEER using the process designated in the General Conditions.

5. Invoice Procedure:

- a. ENGINEER to provide acceptable invoice format to CONTRACTOR.
- b. All invoices must include an original with original signatures in blue ink.
- c. CONTRACTOR shall submit the original and electronic Excel file of the Certificate for Payment directly to the ENGINEER. A certificate for payment need not be notarized.
- d. After review, the ENGINEER shall process the Certificates as promptly as possible, in any case, within ten (10) days. If a Certificate is held for any reason, a written notice stating the reason for delay should be given to the OWNER and the CONTRACTOR. If a Certificate is changed for any reason, changes will be made to all copies.
- e. Distribution of copies shall be as follows:
  - (1) ENGINEER forwards original directly to OWNER with a transmittal letter/memo.
  - (2) ENGINEER forwards a copy of the transmittal letter and one (1) copy of the Certificate to CONTRACTOR. One (1) copy is retained for ENGINEER records. One (1) copy sent to OWNER.
- f. If federal funds are involved, compliance with additional regulations are required, including but not limited to:
  - (1) Davis Bacon Act - Wage rate & payroll records.
  - (2) Drug-Free Workplace Act

(3) Civil Rights EOP poster with the name of EOP person shown.

6. Prior Approval:

- a. Only items as specified or prior approved in accordance with the Contract Documents will be incorporated into the project. Approval of shop drawings does not relieve CONTRACTOR of complying with the Prior Approval clause.

7. Testing Lab:

- a. The OWNER will engage and pay for the testing laboratory if required. If the CONTRACTOR obtains the services of a testing laboratory, he will be responsible for all costs for that laboratory.
- b. ENGINEER should furnish Testing Lab with written notice of types and frequency of required tests. Set up a procedure for Testing Lab notification.
- c. No off-site testing unless called for in the Contract Documents.
- d. OWNER will pay a minimum of standby time for outside testing personnel. CONTRACTOR may be billed if not well controlled.
- e. Testing Lab invoices must be an original with the original signatures of a Lab representative and the ENGINEER on the face of the invoice.

8. Project Sign:

- a. Project sign location to be agreed upon at the pre-construction meeting. Form and substance to match requirements in ADEM Supplemental General Conditions.

9. Meetings:

- a. Establish a time and place for the Monthly Meeting. Notify OWNER prior to and provide minutes of all other meetings.

10. General Correspondence:

- a. Project Number must be on all correspondence.
- b. CONTRACTOR shall copy OWNER on any correspondence if:
  - (1) It involves a controversial issue.
  - (2) It relates to information requests to the ENGINEER that had not been furnished in a timely manner.

11. Miscellaneous Items to be Discussed as Necessary:

- a. Outages/Interruptions of Services. CONTRACTOR is to request, in writing, all outages/interruptions to the user. The amount of advance notice is to be determined by the user. The coordination of outages or interruptions is the responsibility of the CONTRACTOR.
- b. CONTRACTOR use/access to pertinent buildings and facilities.
- c. CONTRACTOR is responsible for the disposal of all other materials in accordance with laws and regulations.
- d. Safety and First Aid. This is the CONTRACTOR's responsibility.
- e. Pictures or videos of existing conditions should be made.

12. Pre-Close Out Meeting

- a. When the project reaches 75 to 80% completion, the ENGINEER will schedule a meeting with the CONTRACTOR and the OWNER to review the requirements and procedures for the Final Inspection and Acceptance.

3.02 PROGRESS MEETINGS

- A. CONTRACTOR shall schedule and administer Project Meetings as necessary for proper and timely completion of the Project. The CONTRACTOR shall:
  - 1. Notify OWNER, ENGINEER, and those specified to attend.
  - 2. Prepare agenda.
  - 3. Record proceedings and distribute to OWNER, ENGINEER, all attendees, and other interested parties.
- B. ENGINEER will attend meetings in his capacity as the OWNER's representative to familiarize himself generally with the progress of the Work and to receive requests for interpretations necessary for the execution and the progress of the Work.
- C. Representatives of the OWNER may attend meetings.
- D. Progress Meetings shall be held monthly at a time agreed to by the ENGINEER prior to submitting each Request for Payment. Progress Meetings shall be held at the City or Town Hall and shall be attended by the CONTRACTOR's field and office representatives responsible for the Project and by representatives of the Subcontractors and major materials suppliers as warranted by the current status of the Work. Agenda for Progress Meetings shall be, but are not limited to, the following:

E. Agenda:

1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede or will impede planned progress.
5. Review of RFI log, submittal log, and change order log.
6. Review off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during the succeeding work period.
10. Maintenance of quality and work standards.
11. Effect of proposed changes on progress schedule and coordination.
12. Other business relating to Work.

F. CONTRACTOR shall record minutes and distribute copies within two days after the meeting to participants, with two copies to ENGINEER, OWNER, participants, and those affected by decisions made.

3.03 CONSTRUCTION PROGRESS SCHEDULE

- A. **Within 14 days after the date established in Notice to Proceed, submit a preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for the remainder of Work. No Work will be allowed to proceed until the preliminary schedule has been accepted by the Owner and Engineer.**
- B. If the preliminary schedule requires revision after review, submit the revised schedule within 3 days.
- C. **Within 7 days after a joint review of the preliminary schedule, submit a draft of the proposed complete schedule for review.**
  1. Include written certification that major CONTRACTORS and SUBCONTRACTORS have reviewed and accepted the proposed schedule.
- D. **Submit an updated schedule with each Application for Payment.**

- E. Provide projected construction schedules for the entire work; revise periodically.
- F. Prepare a schedule in the form of a horizontal bar chart, with horizontal bars representing Project breakdown by various units of work. Superimpose on bar chart vertical lines representing months of the year and weeks of each month.
- G. Minimum sheet size: As required to fit all information rendered in a legible manner on one (1) sheet.
- H. Provide a complete sequence of construction by activity.
- I. Provide sub-schedules to define critical portions of the entire schedule.
- J. Update Schedule as required. Show all changes since the previous submission of the updated schedule.
- K. Indicate the progress of each activity; show start and completion dates. Revise with each update.

#### 3.04 PROJECT RECORD DOCUMENTS

- A. CONTRACTOR shall maintain documents at the site, as specified in General Conditions. Store record documents apart from documents used for construction.
- B. Provide files and racks for storage of documents.
  - 1. Drawings: Maintain one (1) complete set of blueline prints of Contract Drawings.
  - 2. **CONTRACTOR to include descriptive notes and comments of any issues on one dedicated set of plans to be transmitted to the ENGINEER at the close of the project.**

#### 3.05 PROJECT INSPECTIONS

- A. Where inspections of in-place work are specified, and ENGINEER's approval is required before further work can take place, or where records of procedures are specified; schedule inspection:
  - 1. With ENGINEER.
  - 2. Give no less than twenty-four (24) hours' notice.
- B. **Contractor to notify ENGINEER and ENGINEER's Representative to schedule a quantities inspection five days prior to submitting a monthly invoice.**
- C. Where inspection reveals project non-compliance, reschedule inspection by giving a further twenty-four (24) hours' notice.

3.06 CONTRACT ADMINISTRATION FORMS

A. The following forms will be provided at the pre-construction meeting:

1. Submittal Identification & Contractor's Approval Statement
2. Contractor's Application for Payment
3. American Iron & Steel (AIS) Compliance Form
4. Contractor's Release of Liens Form
5. Change Order Form
6. Contractor's Completion Certificate

B. These forms shall be used as applicable in the administration of the Contract.

3.07 APPROVED PERMITS AND APPROVED CONSTRUCTION PLANS REQUIRED AT SITE

A. CONTRACTOR shall have at the project site during construction all required permits and approved sets of plans as required by Federal, State and Local Law.

B. ADEM NPDES Permit (If Required)

END OF SECTION





**SECTION 01 32 00**  
**CONSTRUCTION PROGRESS DOCUMENTATION**

**PART 1 – GENERAL**

**1.01 SUMMARY**

- A. This section covers the requirements for establishing and updating the construction schedule(s) for the project. OWNER was issued Unilateral Order No. 23-045-WP by ADEM and must achieve compliance by April 2025.

**1.02 SUBMITTALS**

- A. CONTRACTOR shall prepare a detailed construction schedule in a graphic format suitable for displaying the schedule and submit four (4) copies of each schedule to ENGINEER at the Preconstruction Conference for review and comment. ENGINEER will return one copy to CONTRACTOR with revisions suggested or necessary for coordination of the work.

**1.03 FORMAT**

- A. The construction schedule shall show the complete work sequence by activity and location, the dates for the beginning and completion of major task items, and the projected percentage of completion for each item as of the first day of the month. At a minimum, the following items shall be shown separately:

1. Show project-specific items including, but not limited to:

- a. Mobilization.
- b. Clearing and Grubbing.
- c. Topsoil Removal, Stockpiling, and Replacement.
- d. Pump station Replacement.
- e. Screenings Headworks
- f. Sludge Removal.
- g. Effluent Pump replacement.
- h. Utility Work (by CONTRACTOR and others).
- i. Lagoon curtain removal and installation.
- j. Aerator/mixer installation.
- k. Bioflos installation.
- l. Flow meter installation.
- m. Cloth disk filter installation.
- n. UV installation

- B. CONTRACTOR may be required to include a critical path schedule for SHOP DRAWINGS, tests, and other submittal requirements for equipment and materials and show the delivery status of critical and major items of equipment and materials.

**1.04 UPDATES**

A. Construction Schedule Revisions:

1. CONTRACTOR shall submit a revised construction schedule when changes occur when requested by OWNER or ENGINEER, and with each application for partial payment. The revised construction schedule shall show changes that occurred since the previous submission, including the actual progress of each item to date and revised projections of progress and completion.
2. CONTRACTOR shall provide a narrative report, as needed or as requested by OWNER or ENGINEER, to define anticipated problems and their effects on the schedule, recommended corrective actions, and the effect of changes on the schedules of others.

B. ENGINEER's Responsibility:

1. ENGINEER's review is only for the purpose of checking conformity with the CONTRACT DOCUMENTS.
2. ENGINEER's review does not relieve CONTRACTOR from any responsibility to determine the means, methods, techniques, sequences, and procedures of construction as provided in the CONTRACT DOCUMENTS.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

**SECTION 01 33 00**  
**SUBMITTAL PROCEDURES**

**PART 1 – GENERAL**

**1.01 SECTION INCLUDES**

- A. Guidance for submission of Shop Drawings, Product Data, and Samples as required by Specification Sections.

**1.02 Related requirements specified elsewhere:**

- A. SECTION 01 30 00 -Administrative Requirements
- B. SECTION 01 70 00 – Execution and Closeout Requirements
- C. Various Technical Sections that state-specific submittal requirements.

**1.03 Prepare and submit with Construction Schedule, a separate schedule listing:**

- A. Dates for submission of Shop Drawings, Samples, and Product Data.
- B. Dates, when approved Shop Drawings, Samples, and Product Data, will be needed for each portion of the Project.

**1.04 SHOP DRAWINGS**

- A. Submit original drawings, prepared by the CONTRACTOR, Subcontractor, supplier, or distributor, which illustrate some portion of the Work, showing fabrication, layout, setting, or erection details. The drawings must follow the guidelines below:
- B. Drawings must be prepared by a qualified detailer.
- C. Drawings shall identify details by reference to the sheet and detail numbers as shown on Contract Drawings.
- D. Reproducible prints made from Contract Drawings are not acceptable.

**1.05 PRODUCT DATA**

- A. Submit, where specified, manufacturer's standard schematic drawings:
- B. Modify drawings to delete information that is not applicable to Project.
- C. Supplement standard information to provide additional information applicable to Project.

**1.06 Submit, where specified, manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data.**

A. Clearly mark each copy to identify pertinent materials, products, or models.

1. Show dimensions and clearances required.
2. Show performance characteristics and capacities.
3. Show wiring diagrams and controls.

#### 1.07 SAMPLES

A. Submit, where specified, physical examples to illustrate materials, equipment, or workmanship and to establish standards against which completed work will be judged.

B. Office Samples: Where size and quantity are not specified, submit sufficient to clearly illustrate:

1. Functional characteristics of product or material, complete with integrally related parts and attachment devices.
2. Full range of color samples.

#### 1.08 CONTRACTOR'S RESPONSIBILITIES

A. Review Shop Drawings, Product Data, and Samples in accordance with General Conditions prior to submission. Stamp and initial Shop Drawings, Product Data, and Samples to show CONTRACTOR's review prior to submission to ENGINEER for review.

1. Provide submittal review coversheet on submittal to engineer to include CONTRACTOR's stamp with review status, room for ENGINEER's submittal review stamp, and, at a minimum, the following information:
  - a. Description of materials covered in submittal.
  - b. Pertinent specification section(s) for submittal.
  - c. Pertinent plan sheet(s) for submittal
  - d. Verification of review and approval of dimensions, layout, etc. in accordance with the Contract Documents.
  - e. A numbered system for tracking submittals issued to ENGINEER for review.

B. Verify:

1. Field Measurements.
2. Field construction criteria.

3. Catalog numbers and similar data.
- C. Coordinate each submittal with requirements of work and Contract Documents.
- D. CONTRACTOR's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by ENGINEER's review of submittals unless ENGINEER gives written acceptance of specific deviations.
- E. Notify ENGINEER in writing at the time of submission of deviations in submittals from requirements of Contract Documents.
- F. Deliver all submittals to, and collect all reviewed submittals from, the ENGINEER's Office.
- G. Begin no work which requires submittals until submittals are approved.
- H. After ENGINEER's review, distribute copies.

#### 1.09 SUBMISSION REQUIREMENTS

- A. Where an earlier date is not specified, schedule submissions and each resubmission to allow at least ten (10) days for ENGINEER's review.
- B. Where Specifications require submittals "For Record Purposes," "For Information Only," or similar wording, submit three (3) copies of each item or one (1) electronic copy. Such submittals will not be stamped and returned by the ENGINEER.
- C. Unless specified "For Record Purposes," "For Information Only," or similar wording, submittals shall be for ENGINEER's review and shall be submitted as follows:
  1. Submit six (6) bond copies of Shop Drawings. Two (2) copies will be retained by the ENGINEER, and four (4) copies will be returned to the CONTRACTOR for distribution OR submit one (1) electronic copy to the ENGINEER.
  2. Submit six (6) copies of Product Data; two (2) copies will be retained by ENGINEER, and four (4) copies will be returned to the CONTRACTOR for distribution OR submit one (1) electronic copy to the ENGINEER.
  3. Submit Samples in the number and size specified in each Specification Section.
- D. Unless previously agreed by ENGINEER and CONTRACTOR, each submission shall be complete and shall include all Shop Drawings, Product Data, and Samples necessary to fully describe each portion of the Project. Partial and incomplete submissions will not be considered.
- E. Accompany submittals with a transmittal letter, in duplicate, containing:

1. Date.
2. Project title and number.
3. CONTRACTOR's name and address.
4. The number of each Shop Drawing, Product Datum, and Sample submitted.
5. Relation to adjacent structure or materials.
6. Field dimensions clearly identified as such.
7. Specifications Section Number.
8. Applicable Standards, such as ASTM Number or Federal Specification.
9. A blank space, 4" x 5", for ENGINEER's stamp.
10. Identification of deviation from Contract Documents (if any).
11. CONTRACTOR's stamp, initialed, certifying to review of submittal in accordance with 1.05 A.

#### 1.10 RESUBMISSION REQUIREMENTS

##### A. Shop Drawings:

1. Revise initial Drawings as required and resubmit as specified for initial submittal.
2. Indicate in transmittal letter writing any changes which have been made other than those requested by ENGINEER.

##### B. Product Data and Samples: Submit new and revised Data and Samples as specified for initial submission.

#### 1.11 DISTRIBUTION OF SUBMITTALS AFTER REVIEW

- A. Run the required number of distribution prints from stamped and reviewed submittals. Distribute copies of Shop Drawings and Product Data which carry ENGINEER's stamp to:
1. CONTRACTOR's file
  2. Job site file
  3. Record Documents file
  4. Subcontractors

5. Supplier/Fabricator

6. Distribute Samples as directed.

#### 1.12 ENGINEER'S DUTIES

A. Submittals will be reviewed with reasonable promptness.

B. ENGINEER will review for:

1. Design concept of Project

2. Information given in Contract Documents

C. The ENGINEER's review will not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique or procedure of construction is indicated or required by the Contract Documents) and will not extend to safety precautions or programs incident thereto.

D. Review of a separate item shall not constitute review of an assembly in which item functions.

E. ENGINEER will affix stamp and initials verifying his review of submittal.

F. ENGINEER will return submittals to CONTRACTOR for distribution.

G. ENGINEER will not stamp and return submittals required "For Record Purpose", "For Information Only", or similar wording. Failure of the ENGINEER to respond to such submittals which may not conform to Contract requirements shall not be construed as approval of deviations from the Contract and will not relieve the CONTRACTOR from responsibility for compliance with Contract requirements.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION





**SECTION 01 50 00**  
**TEMPORARY FACILITIES AND CONTROLS**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Locations
- B. Access and Staging Area
- C. Temporary utilities.
- D. Temporary water and gas services.
- E. Temporary Electricity Services
- F. Temporary telecommunications services.
- G. Temporary sanitary facilities.
- H. Temporary Controls: Barriers, enclosures, fencing, and sheet piling.
- I. Security requirements.
- J. Fire Protection
- K. Pumping and Draining
- L. Vehicular access and parking.
- M. Waste removal facilities and services.
- N. Project identification sign.
- O. Field offices.

**1.02 LOCATIONS**

- A. Locate temporary facilities and signs in designated areas to avoid interfering with facility operations. All locations of temporary facilities must be approved by facility staff prior to the beginning of construction.

**1.03 ACCESS AND STAGING AREA**

- A. In accordance with the general conditions of the contract, it is understood that prior to bidding, the CONTRACTOR became familiar with the conditions existing at the site and accepts the site and conditions thereupon as they are.
- B. Staging Area: The CONTRACTOR and Subcontractors shall locate offices, materials storage and staging, equipment storage and maintenance areas, and similar major facilities in a staging area that does not interfere with operations required under the Contract.

#### 1.04 TEMPORARY UTILITIES

- A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.
- B. Use trigger-operated nozzles for water hoses to avoid waste of water.

#### 1.05 TEMPORARY WATER AND GAS SERVICES

- A. It shall be the responsibility of the CONTRACTOR to determine a source of water and gas service to be used for construction purposes and to make arrangements, pay deposits, furnish and install equipment, piping, valves, outlets, and hoses to provide construction water, and gas during the construction period.
- B. The CONTRACTOR shall pay all costs for water and gas service for construction purposes and shall pay all costs for water and gas used during construction until acceptance.
- C. Provide cold water and paper cups for drinking by Project workers.

#### 1.06 TEMPORARY ELECTRICITY SERVICES

- A. It shall be the responsibility of the CONTRACTOR to determine a source for electric power to be used for construction purposes and to make arrangements, pay deposits, and furnish and install equipment, poles, wiring, switches, and outlets to provide an adequate supply of electricity for lighting and power during construction. Meet applicable safety requirements.
- B. The CONTRACTOR shall pay all costs for providing electric service for construction purposes and shall pay for current use during construction until acceptance.

#### 1.07 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to the field office at the time of project mobilization.

#### 1.08 TEMPORARY SANITARY FACILITIES

- A. Provide adequate temporary toilet facilities for the use of persons working at the site, as determined by the size of the workforce on site and Local Sanitary Code Requirements.
- B. Maintain toilets in a clean and sanitary condition. Provide toilet tissue in a suitable holder. Provide natural or artificial light and ventilation to toilet compartments.
- C. Remove temporary toilets when construction is completed and accepted.
- D. Provide and maintain required facilities and enclosures. Provide at the time of project mobilization.
- E. Maintain daily in a clean and sanitary condition.
- F. At the end of construction, return facilities to the same or better condition as originally found.

#### 1.09 BARRIERS

- A. CONTRACTOR shall construct and maintain until construction is completed and accepted, fences, barricades, and other necessary items required to prevent injury to persons on or about the Project site, damage to property, and intrusion of unauthorized persons.
- B. Provide personal safety equipment for authorized visitors.
- C. Protect structures, utilities, sidewalks, pavements, and other facilities immediately adjacent to excavations from damage or displacement.
- D. The CONTRACTOR will be responsible for maintaining access at all times during the construction of the facility.
- E. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for OWNER'S use of the site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- F. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing buildings.
- G. Provide protection for plants designated to remain. Replace damaged plants.
- H. Protect non-owned vehicular traffic, stored materials, sites, and structures from damage.
- I. Traffic Controls: CONTRACTOR shall provide a traffic control plan as needed.

#### 1.10 FENCING

- A. Construction: CONTRACTOR to provide gated access to the work site and remove at the completion of the project.

#### 1.11 SHEET PILING

- A. In addition to the work specified, provide sheet piling, should such be found necessary. All sheet pile designs must be signed by a licensed ENGINEER in the state where the work is being done.
- B. Type, thickness, shoring, bracing and other details in regard to sheet piling shall be CONTRACTOR's sole responsibility and shall be determined by him as necessitated by excavation depth, soil conditions, rainfall, traffic adjacent to site and other related factors.

#### 1.12 SECURITY

- A. Coordinate with OWNER to ensure premises remains secure during construction.

#### 1.13 FIRE PROTECTION

- A. Provide general temporary fire protection during the construction period.
- B. Have immediately available suitable fire extinguishers in areas where welding, flame cutting, and other hazardous operations are underway.

#### 1.14 PUMPING AND DRAINING

- A. Keep working and storage areas free from water that could damage or that could interfere with the progress of work.
- B. Slope ground to drain surface water away from excavations and structures.
- C. Pump or drain to designated points as determined by the ENGINEER. Distribute discharge to prevent excessive erosion. Replace eroded materials.

#### 1.15 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to the use of streets and sidewalks, access to emergency facilities, and access to emergency vehicles. Load all trucks bringing materials to the site or removing earth and debris from the site in a manner to prevent dropping materials, earth, or debris on public streets, roads, and highways.
- B. Coordinate access and haul routes with governing authorities and OWNER. Confirm all local regulations regarding load limits.
- C. Provide and maintain access to fire hydrants free of obstructions.

- D. Provide means of removing mud from vehicle wheels before entering streets. Maintain an installation at all points where and when trucks enter or leave the site to remove materials, mud, or debris immediately from streets, roads, and highways.
- E. Designated existing on-site roads may be used for construction traffic.
- F. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
- G. Do not allow vehicle parking on existing pavement.

#### 1.16 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site Daily.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
- E. Remove temporary work when need for its use has passed.
- F. Clean area that was occupied by temporary work. Remove debris, rubbish and excess materials from site on a daily basis.

#### 1.17 PROJECT IDENTIFICATION

- A. Provide project identification sign of design and construction indicated on Drawings.
- B. Erect on site at location indicated.
- C. Signs, as necessary for safety and to meet insurance requirements will be required.
- D. No other signs are allowed without OWNER permission except those required by law.

#### 1.18 FIELD OFFICES

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

- C. Locate offices a minimum distance of 30 feet from existing and new structures.
- D. For exterior storage, provide suitable and sufficient enclosed covered structures with raised flooring, to protect materials and equipment subject to damage by weather or construction work.
- E. Provide weatherproof coverage for materials and equipment needing only limited protection.
- F. Allocate and designate storage areas and workspaces for various trades.
- G. Arrange temporary buildings and designate storage spaces to avoid interfering with operations, to avoid re-handling and to expedite progress of work.

#### 1.19 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.

#### PART 2 - PRODUCTS (NOT USED)

#### PART 3 – EXECUTION (NOT USED)

END OF SECTION

**SECTION 01 51 36**  
**PUMP STATION FLOW CONTROL**

**PART 1 – GENERAL**

**1.01 SUMMARY**

- A. This section addresses the work related to the control of sewage flow. The CONTRACTOR shall furnish all labor, materials, equipment, and supplies and shall perform all work related to the control of sewage flow. Flow control and routing methods shall be subject to review by the ENGINEER prior to work commencing on each portion of the system.

**1.02 SUBMITTALS**

- A. Submit shop drawings and manufacturer's data in accordance with the provisions of Section 01 33 00 – Submittal Procedures.
- B. **The CONTRACTOR shall submit flow control and sewage bypassing arrangement plans to the ENGINEER for review and approval at least 7 days prior to commencing work on each portion of the system.** Flow control includes, but is not limited to, plugging and bypass pumping or hauling as appropriate for the work to be performed. The plans must be specific and complete, and shall include, but not be limited to, the following details:
  - 1. Capacities of equipment.
  - 2. Number and types of pump:
    - a. Two minimum
    - b. Lead pump to be electric motor powered
    - c. Lag pump to be diesel engine powered
  - 3. Road crossing details.
  - 4. Protection against pipe breaks.
  - 5. Sewer plugging methods and bypass time duration.
  - 6. Size, length, material, and method of installation for suction and discharge piping.
  - 7. Method of noise control for each pump and/or generator.
  - 8. Locations of bypass equipment, suction intake, and pump discharge.
  - 9. Alarm system with a monitoring and response plan.

10. List of emergency CONTRACTOR contact phone numbers

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 FLOW CONTROL

- A. Bypassed flows must be discharged to the sanitary sewer system Lagoon, appropriate watertight vehicle or appropriate watertight container.
- B. Flows shall be diverted, hauled, or otherwise handled to prevent flows from interfering with the work to be performed on that portion of the system.
- C. When pumping/bypassing is required, the CONTRACTOR shall supply the necessary pumps, conduits, engines, and other equipment to divert the flow of sewage as appropriate. The CONTRACTOR shall have backup equipment available should the primary system fail. The pumping/bypass system shall be adequate in size to handle the existing peak use flows and additional flows that occur with rainstorms.
- D. The CONTRACTOR shall furnish the labor and supervision to set up, operate, and maintain the pumping/bypass system.
- E. The CONTRACTOR shall select pumping/bypass equipment that will not have noise levels above sixty decibels (60 db) at a distance of 50 feet (50').
- F. The CONTRACTOR may dispose of the sewage directly to the sewage lagoon.

3.02 FLOW CONTROL PRECAUTIONS

- A. When the flow in a sewer line is plugged, blocked, or bypassed, the CONTRACTOR shall take precautions to protect public health and to protect the sewer lines from damage that might result from sewer surcharging. Further, the CONTRACTOR shall take precautions to ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved. The CONTRACTOR shall be responsible for any damage resulting from his flow control operations.
- B. When the flow in a sewer line is plugged or blocked, the CONTRACTOR shall monitor the conditions upstream of the plug and shall be prepared to immediately start bypass pumping, if needed. No such liquid or solid matter shall be allowed to be discharged, stored, or deposited on the ground, swale, road, stormwater drainage system, or other open environment. The CONTRACTOR shall protect all pumps, conduits, and other equipment used for bypass from traffic.
- C. Should any liquid or solid matter from the sewer collection system be spilled, discharged, leaked, or otherwise deposited to the open environment as a result of the CONTRACTOR'S flow control operations, the CONTRACTOR shall immediately clean



up and disinfect the affected area and assume all costs associated herewith. The CONTRACTOR shall also notify the Public Utilities Operations Division and appropriate regulatory agencies.

END OF SECTION



## **SECTION 01 71 13 MOBILIZATION**

### PART 1 – GENERAL

#### 1.01 DESCRIPTION

- A. This work consists of preparatory work and operations, including those necessary for the movement of personnel, equipment, supplies, and incidentals to the project site; the establishment of offices, buildings, and other facilities necessary for work on the project; the cost of bonds and any required insurance; and other preconstruction expenses necessary for the start of the work, excluding the cost of construction materials.

### PART 2 – PRODUCTS (NOT USED)

### PART 3 – EXECUTION

#### 3.01 CONSTRUCTION REQUIREMENTS

- A. Payment will be made at the contract lump sum price, subject to the following provisions:
- B. Partial payment for mobilization will be made in accordance with the following schedule up to a maximum of 5 percent of the original total contract amount, including this item, and payment of any remaining amount will be made up of the completion of all work under the contract.

<b>Percent of Total Contract Amount Earned</b>	<b>Allowable Percent of the Lump Sum Price for the Item</b>
1 <sup>st</sup> Partial Estimate	25
25	50
50	75
75	100

- C. Nothing herein shall be construed to limit or preclude partial payments otherwise provided by the contract.
- D. When the contract does not have a pay item for mobilization, no direct payment will be made for mobilization.

END OF SECTION



## **SECTION 01 73 19 EQUIPMENT INSTALLATION**

### **PART 1 – GENERAL**

#### **1.01 SCOPE**

- A. This section covers general installation requirements of new equipment units that have been purchased by the CONTRACTOR as part of this Work. Equipment-specific installation requirements are covered in the equipment sections.

#### **1.02 GENERAL**

- A. Equipment installed under this section shall be erected and placed in proper operating condition in full conformity with Drawings, Specifications, engineering data, instructions, and recommendations of the equipment manufacturer unless exceptions are noted by ENGINEER.

#### **1.03 COORDINATION**

- A. When the manufacturer's field services are provided by the equipment manufacturer, CONTRACTOR shall coordinate the services with the equipment manufacturer. CONTRACTOR shall give ENGINEER written notice at least 30 days prior to the need for manufacturer's field services furnished by others.

### **PART 2 – PRODUCTS**

#### **2.01 MATERIALS**

- A. Materials shall be as follows:
  - 1. Grout: As specified in the Grouting section.
  - 2. Anti-Seize thread lubricant for SS bolts: as specified in the Anchorage in the Concrete and Masonry section.

### **PART 3 – EXECUTION**

#### **3.01 INSTALLATION**

- A. Equipment shall not be installed or operated except by, or with the guidance of, qualified personnel having the knowledge and experience necessary to obtain proper results.
- B. Each equipment unit shall be leveled, aligned, and shimmed into position. Installation procedures shall be as recommended by the equipment manufacturer and as required herein. Shimming between machined surfaces will not be permitted.

- C. Anti-seize thread lubricant shall be liberally applied to the threaded portion of all stainless-steel bolts during assembly. For equipment installed in drinking water facilities, the anti-seize lubricant shall meet the requirements of NSF-61.
- D. When specified in the equipment sections, the equipment manufacturer will provide installation supervision and installation checks. For installation supervision, the manufacturer's field representative will observe, instruct, guide, and direct the CONTRACTOR's erection or installation procedures as specified in the equipment specifications. For installation checks, the manufacturer's field representative will inspect the equipment installation immediately following installation by CONTRACTOR and observe the tests indicated in the equipment sections. The manufacturer's representatives will revisit the site as often as necessary to ensure installation is satisfactory to OWNER.
- E. All equipment shall be protected by the CONTRACTOR after installation, prior to final acceptance by OWNER. Protection provisions shall be as recommended by the manufacturer and shall include provisions to prevent rust, mechanical damage, and foreign objects entering the equipment.

### 3.02 STARTUP AND TESTING

- A. Startup requirements and tests associated with startup shall be as indicated in the equipment sections. Other field tests shall be as indicated in the specific equipment sections. The startup and tests required shall occur in the order listed in the following paragraphs. Tests shall not begin until any installation supervision and installation checks by the equipment manufacturer have been completed, except where noted below.
- B. Preliminary field tests shall be conducted on all equipment by CONTRACTOR on the equipment indicated in the equipment sections, and the tests shall be performed as indicated. When an installation check is specified in the equipment sections, the equipment manufacturer's representative will participate in these tests to the extent described in the equipment sections.
- C. These tests shall not be considered an acceptance test but rather a test to determine initial performance curves and efficiency just prior to the equipment entering service.

END OF SECTION

## **SECTION 01 75 11 STARTUP REQUIREMENTS**

### **PART 1 – GENERAL**

#### **1.01 SCOPE**

- A. This section includes the requirements for startup and testing all items of equipment and systems that form a part of this Contract and training of OWNER's personnel. The purpose of this section is to define the requirements for bringing individual equipment, systems, and facilities online and for proving proper operation and performance of that Work. CONTRACTOR is required to develop, submit, and maintain detailed plans, including the designation of management and staff, for these activities as specified herein.
- B. The startup, testing, and commissioning services referenced or specified herein include the following:
  - 1. Startup and Testing
    - a. Startup checks
    - b. Functional testing
  - 1. Functional acceptance testing
  - 2. Commissioning
  - 3. Operational acceptance testing

#### **1.02 DEFINITIONS**

- A. Startup and Testing is the transitional phase between the completion of construction and the start of commissioning and includes the following:
  - 1. Pre-Startup Activities and Checks - Inspections, tests, and other activities necessary to determine that equipment, systems, and subsystems have been properly manufactured and installed. Pre-startup activities shall include an audit of all factory testing of equipment and compiling the results for comparison to startup and commissioning testing.
  - 2. Functional Testing – Initial limited operation of equipment to demonstrate the capability of installed components to perform their intended functions, respond to controls, and safely interface with external systems, followed by operation of individual systems in manual and automatic mode to test the full functionality of individual systems.
  - 3. Commissioning - The establishment of the treatment processes for the

plant.

4. Operational Acceptance Testing - Continuous testing of complete the treatment processes under specified operating conditions in accordance with the technical Specifications and applicable regulations to demonstrate proper performance of the facility.

#### 1.03 GENERAL

- A. The CONTRACTOR shall be responsible for and furnish all labor, materials, instruments, incidentals, and equipment required for startup, testing, and commissioning. Temporary facilities required to carry out the specified testing, including temporary pipes, pumps, and other appurtenances, shall be furnished and installed, and removed when no longer required for startup, testing, and commissioning. Refer to Section 01 50 00 – Construction Facilities and Temporary Controls for requirements concerning water and power for startup and testing. Chemicals required for startup and testing will be provided by the CONTRACTOR.
- B. Startup and testing shall be conducted during normal working hours during the workweek of Monday through Friday unless otherwise approved by the OWNER. Where continuous long-term testing is required, testing may continue over the weekends and holidays with prior approval from the OWNER.

#### 1.04 CONSTRAINTS

- A. Startup and testing shall be conducted in a manner that does not compromise the operation of the existing facilities or the quality of treated products released from the facility. Any startup and testing activities affecting the operation of the existing facilities shall be coordinated with the OWNER and shall be shown on the Progress Schedule. The OWNER will cooperate with the CONTRACTOR to the extent possible but will have sole authority in decisions affecting existing operations.
- B. The minimum constraints for startup and testing include the following:
  1. Maintain the effluent permit limitations established for the lagoon. The facility NPDES permit is included in the appendix.
  2. Complete the startup checklist for each process equipment; provide the Owner and Engineer with a written report; review the report with Owner and Engineer and discuss findings.
  3. Notify Subs, Manufacturer, Owner, and Engineer of all startup and testing dates 21 days prior to activities.
  4. For each piece of process equipment that does not meet every expectation, schedule repeated attempts within 1 week of initial startup.
  5. Establish a single point of contact to act as the startup manager for startup



activities. Startup manager to be present at regular construction meetings. Startup activities are to only be performed in the presence of the startup manager.

6. Assure that all tests are completed in accordance with accepted testing procedures.
7. Ensure readiness for all testing by completing pre-test checks before scheduling the presence of the Owner and Engineer for the startup.
8. Assure all safety guidelines are established and followed.
9. Ensure the startup team is ready and prepared to perform immediate repairs to any equipment found to not pass the startup program.
10. Schedule a meeting to review Contractor's startup submittals and activities and receive written authorization to proceed.

1.05 STARTUP MANAGER, STARTUP TEAM, AND MANUFACTURER'S FIELD SERVICES REPRESENTATIVES

- A. The CONTRACTOR shall maintain a dedicated startup team led by a startup manager. The individual to be designated as startup manager shall be identified within 45 days of the Notice to Proceed and will be reviewed by OWNER and ENGINEER. Once accepted, the CONTRACTOR shall not change the startup manager throughout the full period of performance of the Work without written permission of the OWNER. Once engaged in the Project, the startup manager shall attend regular construction progress meetings. No startup activities shall begin until the startup manager has arrived at the job site.
- B. The startup manager shall be on Site full-time prior to any field startup and testing activities and shall remain on site until all startup, testing, and commissioning activities are complete.
- C. Startup Manager. The startup manager shall be a startup and testing expert with a minimum of 5 years of experience starting up equipment and systems of similar type, size, capacity, and complexity to the equipment and systems included in this Project. The startup manager shall have the necessary experience to fully understand all startup requirements, manage the CONTRACTOR's resources providing the startup services, and prepare all startup documentation, as specified. The startup manager's assigned duties and responsibilities are those specifically related to planning, supervising, and executing startup activities and shall include, but shall not be limited to, the following:
  1. Coordinating all testing and startup activities.
  2. Preparing all startup and field testing plans, documentation, and forms.

3. Liaising between the CONTRACTOR, ENGINEER, and OWNER for all startup and testing activities.
4. Developing a comprehensive schedule for all startup activities and providing regular schedule updates. The startup and testing schedule shall be incorporated into the Progress Schedule.
5. Scheduling and leading startup, testing, and commissioning planning meetings.
6. Conduct coordination meetings during startup, testing, and commissioning at least weekly.
7. Coordinating manufacturers' services and their certification of proper installation and/or operation of equipment as required by the Specifications.
8. Overseeing and administering all startup, testing, and commissioning activities, including either direct participation in the activities and/or oversight and monitoring of activities. It shall be the startup manager's responsibility to ensure that all tests have been completed in accordance with accepted testing procedures.
9. Ensuring readiness for and coordinating maintenance, repair, and adjustment of equipment and systems during startup testing and commissioning.
10. Conducting or overseeing pre-test checks to ensure readiness for testing. Verify all piping hydrostatic testing and flushing have been completed prior to field testing connected equipment.
11. Ensuring all testing equipment is in proper working order and has been calibrated to appropriate standards.
12. Develop safe work policies and procedures, including lockout/tagout procedures and personal protective equipment policies, that will be followed during all field startup and testing activities. At a minimum, the CONTRACTOR shall comply with OSHA and the OWNER's established safety guidelines. It shall be the startup manager's responsibility to ensure all safety procedures are followed at all times.
13. Reviewing and approving all equipment training sessions prior to submission to ENGINEER to assure that the training is compliant with the requirements of the Specifications and includes all applicable operation, maintenance, safety, functional, performance, and startup and testing information.
14. Organizing teams made up of qualified representatives of Suppliers,

Subcontractors, and others, as appropriate, to efficiently and expeditiously startup and test the equipment and systems installed and constructed under this Contract. The objective of this program shall be to demonstrate to the ENGINEER and OWNER that the structures, systems, and equipment constructed and installed under this Contract meet all performance requirements and that the facility is ready for operation as intended. In addition, the testing program shall produce baseline operating conditions for the OWNER to use in a preventive maintenance program.

15. Ensuring the development and maintenance of records documenting all startup, testing, and commissioning activity. The records shall be organized by a major process system into organized files/binders and turned over to the OWNER prior to applying for final payment. Testing records shall be accessible to the ENGINEER and OWNER at all times to allow monitoring of the progress.
  16. Ensuring the startup team is equipped and ready to make emergency repairs and adjustments to equipment installed and modified as part of the Project.
  17. Scheduling and conducting a one-day workshop with the OWNER and ENGINEER to resolve submittal review comments to the CONTRACTOR's startup, testing, and commissioning plan submittal.
  18. Notifying the OWNER and all respective equipment manufacturers at least 21 days prior to the date when each equipment system is scheduled for pre-startup activities and checks.
  19. Organize International Electrical Testing Association (NETA) acceptance testing in accordance with the Electrical Equipment Installation section.
- D. Startup Team. The startup team shall include the startup manager and all staff deemed necessary for the successful completion of startup, testing, and commissioning. This will typically include engineers, major equipment vendors, operators, and representatives from the Instrumentation and Control System Supplier. Additional trade representatives may be included as project requirements dictate.
- E. Manufacturer's Field Services Representative. The manufacturers shall provide a technically qualified field-service representative for the installation, startup, and testing of equipment furnished, as specified in the equipment sections. The manufacturer shall submit qualifications and experience records for all key personnel to be involved in startup activities.
1. The manufacturer's field services representative shall be employed full-time in installation, startup, and testing of similar equipment and facilities and work directly for the manufacturer.

2. The representative shall have conducted startup activities similar to those required herein on at least two other projects of similar complexity.
3. The OWNER or ENGINEER shall have the right to reject the manufacturer's field services representative at any time for immediate replacement by the manufacturer if the accepted qualifications are not representative of the actual experience or abilities of the representative, as determined by the OWNER or ENGINEER.

#### 1.06 SUBMITTALS

A. CONTRACTOR shall submit the following information in accordance with the requirements of the Submittals Procedures section.

1. Startup manager's qualifications and past project experience, including contact names, addresses, and current telephone numbers of OWNER representatives, can be used to verify the accuracy of the information. Submittal shall be made at the preconstruction conference.
2. Manufacturers' field services representative's qualifications and past project experience, including contact names, addresses, and current telephone numbers, can be used to verify the accuracy of the information.
3. Qualification submittals shall be made 3 weeks before the manufacturer's representative is scheduled to be on Site.
4. Manufacturer's certification of proper installation of all equipment as specified in the equipment sections.
5. Equipment and system startup, testing, and commissioning plans and schedule in accordance with the requirements of this section. The startup manager shall coordinate with Subcontractors and include their information in the startup and testing plan.
6. Unless otherwise specified in the equipment sections, preliminary copies of field calibration results. Submittal shall be made prior to the start of each test for associated systems.
7. Daily logs.

#### 1.07 STARTUP AND TESTING REQUIREMENTS

A. Startup Checks. Prior to field testing of all equipment, the CONTRACTOR shall perform the following:

1. Inspect and clean equipment, devices, and connected piping so they are free of foreign material.

2. Lubricate equipment in accordance with the manufacturer's instructions. Turn rotating equipment by hand.
  3. Open and close valves by hand and operate other devices to check for binding interference, or improper functioning.
  4. Test and commission related electrical system components in accordance with the requirements specified in the Electrical and the Electrical Equipment Installation sections.
  5. Calibrate all instruments associated with the equipment.
  6. Check for proper rotation, adjustment, alignment, balancing, mechanical and electrical connections, and any other conditions that may damage or impair equipment from functioning properly.
  7. Inspect and verify proper anchorage.
  8. Obtain manufacturer's certification of proper installation where specified in the equipment sections.
- B. All equipment shall be confirmed ready to test by the ENGINEER based on the following:
1. Acceptance of CONTRACTOR's startup and testing plan.
  2. Notification in writing by the startup manager that each piece of equipment or system is ready for testing.
  3. Verification by the ENGINEER and OWNER that all lubricants, tools, maintenance equipment, spare parts, and approved equipment operation and maintenance manuals have been furnished as specified.
  4. Cleanliness of equipment, devices, and connected work.
  5. Adequate completion of work adjacent to or interfacing with equipment to be tested.
  6. Confirmation of manufacturer's representative's availability to assist with testing, where specified, and satisfactory fulfillment of all other manufacturers' responsibilities as specified.
  7. ENGINEER's review of all related civil construction, mechanical, and electrical installations.
  8. Confirmation of completion of acceptable testing of all adjacent piping, ductwork, and other affected Work.

C. Functional Testing. All startup checks shall be completed prior to functional testing. Functional testing shall be in accordance with relevant standards and in accordance with the instructions of the manufacturers.

1. Ancillary and/or temporary facilities necessary to recycle, control, or discharge water, air, chemical, or gas from facilities being tested, shall be operational.
2. Functional testing shall include the functional operation of each piece of equipment. All moving parts of equipment and machinery shall be tested and adjusted so that they move freely and function satisfactorily. Functional testing shall demonstrate the correct operation of all hardwired interlocks and controls.
3. Functional testing of power-actuated valves shall include at least 4 full open-close operations. Testing shall demonstrate the maximum number of operations per hour as recommended by the actuator manufacturer without overheating.
4. Once functional testing of individual pieces of equipment is completed, individual systems' functional testing shall commence. Individual system functional testing shall include the startup of the complete system of mechanical, electrical, and instrumentation and control equipment as a functional process system. Field inspection prior to startup, as specified in the Instrumentation and Control System section, and other testing by the Instrumentation and Control System Supplier required to verify readiness for automatic operation of the individual system shall be completed before the commencement of individual system functional testing.
5. Individual system functional testing shall include operation in manual and automatic modes, startup operation, and shutdown in normal and emergency modes. Individual systems shall be tested over their entire operating range and for sufficient time to demonstrate the intended functionality of each piece of equipment and the system. If any part of a system shows evidence of unsatisfactory or improper operation during the test period, correction or repairs shall be made, and the functional testing shall be repeated until satisfactory results are obtained.
6. Functional testing of all process and pumping equipment and drive motors, including auxiliary equipment, shall be in accordance with the appropriate and approved test codes, such as those specified by the American Society of Mechanical Engineers, Hydraulic Institute Standards, and IEEE.
7. Qualified personnel from the electrical and mechanical trades responsible for installation of the equipment, shall be available during functional testing involving electrically operated equipment. Where appropriate, a

representative of the Instrumentation and Control System Supplier shall also be available.

D. Functional Acceptance Testing. Once the CONTRACTOR's functional testing is complete and associated documentation has been submitted and accepted by the ENGINEER, the CONTRACTOR shall conduct functional acceptance testing of each complete process system to demonstrate individual systems meet the specified requirements. Acceptance testing shall include the successful demonstration of all operating functions and conditions that are specified for the equipment, system, and controls. The manufacturer's representative shall be on Site during acceptance testing when specified in the equipment specifications. The Functional Acceptance Testing shall include the following submissions prior to commencement:

1. Prerequisite checklist, to be acknowledged by the ENGINEER prior to initiating the test, that demonstrates that all testing and other Work required to be completed prior to the test is complete.
2. Listing of OWNER's personnel necessary to operate the system and conduct any related monitoring of performance.
3. A listing of CONTRACTOR's personnel designated to supervise and direct the OWNER's operators as required herein.
4. Listing of standby personnel, equipment, and materials that will be available if needed during the test period.
5. Step-by-step procedures for the operation of the facility showing how local and remote control of equipment will be demonstrated.
6. Description of all data and other information to be reported in support of the completed test. Include any blank data logs that may be used for recording results.
7. Descriptions of all necessary calculations that must be completed to verify the specified results are being achieved, including formulas.
8. Blank sign-off form for the test acknowledging the CONTRACTOR's, ENGINEER's, OWNER's, and the equipment manufacturer's acceptance of the test.

E. CONTRACTOR shall provide OWNER and ENGINEER 14 days' notice prior to testing of any individual system. All testing shall be scheduled and conducted such that the specified testing duration can be completed without extending past regular working hours on a Friday.

F. Individual system acceptance testing shall continue for 48 hours without interruption for each system, and all parts shall operate satisfactorily in all respects

under a range of conditions to simulate the full operating range of the equipment or system. If there are multiple parallel components or trains, then the testing duration will be 48 hours for each individual train.

G. If any part of a system shows evidence of unsatisfactory or improper operation during the testing period, correction or repairs shall be made, and the test repeated until the test is successfully completed. Testing interrupted by power failure will not be required to be repeated, but the test shall be continued upon restoration of power and extended to the specified duration at no additional cost to the OWNER.

H. During this testing period, the CONTRACTOR shall operate all equipment.

#### 1.08 COMMISSIONING

A. Once startup and testing are complete, documentation of all startup and testing activities shall be submitted for review and accepted by the ENGINEER. After acceptance, commissioning of the constructed facilities shall be conducted by the CONTRACTOR working with the OWNER and ENGINEER. The facility shall be operated in accordance with the operating permit, laws, and regulations. The CONTRACTOR shall provide mechanics, electricians, and controls technicians during commissioning as required for troubleshooting and repair.

#### 1.09 OPERATION ACCEPTANCE TESTING

A. At the completion of the Individual System Acceptance Tests and when the overall process has stabilized sufficiently as determined by the ENGINEER, operational acceptance testing of the complete facility constructed or modified under the Contract shall be conducted. Operational acceptance testing shall not be conducted concurrently with other individual system acceptance or performance tests.

B. The test shall run for at least 7 days with the entire facility operating in the intended manner. The test shall demonstrate to the satisfaction of the ENGINEER that the facilities are complete and meet all specified requirements, and can be continuously operated for their full intended function. During the testing period, the plant shall operate under all control modes, including manual, remote-manual, and automatic. The OWNER's staff shall operate the facility.

C. Duty and standby equipment shall be alternated so that all equipment is selected for duty operation for a period of at least 2 days during the test. Unless indicated otherwise, if any item malfunctions or a defect is found during the test, the item shall be repaired and the test either extended a duration to be determined by the ENGINEER and OWNER depending on the severity of the malfunction or defect or restarted at time zero with no credit given for the operating time before the malfunction or the defect was found. Malfunctions or defects meeting both of the following conditions may, at the ENGINEER's discretion, be considered grounds for not requiring restarting the test at time zero:



1. Malfunctions that do not cause an interruption to the operation of the facility because standby equipment can be placed into service.
  2. Malfunctions that are corrected within four (4) hours of the time the malfunction is detected. Correction of a malfunction or defect will be considered complete only after the affected equipment is placed back into service and is operating as intended for a continuous period of 24 hours without additional failure.
- D. All malfunctions, defects in materials or workmanship, or other flaws, which appear during this test period, shall be immediately corrected by the CONTRACTOR. If spare parts from the specified spare parts inventory are used to make repairs, they shall be replaced immediately and must be replaced prior to application for final payment.
- E. The CONTRACTOR shall supply all oil, grease, lubricants, fuels, and ancillary equipment required for operational acceptance testing. All shall be filled to their properly full levels before testing.
- F. All plant control system coordination issues shall be resolved, and data trending requirements shall be functional during this period.
- G. During operational acceptance testing, treated water meeting regulatory requirements as determined by the OWNER, will be delivered to the distribution system.

#### 1.10 PERFORMANCE TESTING (NOT USED)

#### 1.11 STARTUP SCHEDULE AND STARTUP AND COMMISSIONING PLANS

- A. Plans and schedules shall be developed to facilitate coordinated and efficient startup, testing, and commissioning of the Project equipment and systems.
- B. The CONTRACTOR shall submit a startup, testing, and commissioning plan and schedule to the ENGINEER no later than 90 calendar days prior to the commencement of startup and testing. A minimum of 21 days shall be allowed for review by ENGINEER and OWNER. The schedule and plan must be accepted a minimum of 30 days prior to the commencement of startup and testing. The schedule and plan shall include sections for startup checks, functional testing, functional acceptance testing, commissioning, and operational acceptance testing.
- C. Forms for startup and testing shall include identification of equipment or system, startup/test date, nature of startup/test, startup/test objectives, startup/test prerequisites, startup/test results, instruments employed for the startup/test and signature spaces for the ENGINEER's witness (where applicable) and the CONTRACTOR's startup manager.

D. Startup Schedule. A startup schedule that provides an overall sequence and duration for all startup, testing, and commissioning activities shall be prepared and maintained. This schedule shall serve as a companion but shall not be a replacement for the startup plan. The startup schedule described in this section shall be integrated into the overall Progress Schedule and shall be prepared as specified for the Progress Schedule in the Construction Progress Schedule section. The Startup Schedule shall be updated weekly to during the startup, testing, and commissioning period.

E. Startup Plan. The Startup Plan shall include the following.

1. Introduction with a narrative description of the overall testing and startup program. The description shall include all contractual or regulatory treatment requirements to be demonstrated.
2. A summary of the objectives and approach for startup checks, functional testing, functional acceptance testing, commissioning, and operational acceptance testing.
3. List the instruments, equipment, and systems that will undergo startup and testing with references to the appropriate PIDs, equipment tags/identification numbers, Specification numbers, and standards for testing procedures.
4. Schedule for startup and field testing for each instrument, piece of equipment (including redundant equipment), and system.
5. Safety and emergency response plan, including a list of emergency and non-emergency contacts (email and phone).
6. Organization chart for CONTRACTOR's startup and testing personnel with assigned responsibilities for each.
7. Startup and testing record-keeping plan.
8. Plan for reuse and disposal of water/wastewater from startup, testing, and commissioning, including information on any required regulatory permits/approvals.
9. Description of temporary facilities that will be provided. List of chemicals to be provided.

F. Within 7 to 14 days of initial submittal of the startup plan, the CONTRACTOR shall schedule a workshop with the OWNER and ENGINEER to present the plan. The CONTRACTOR shall submit minutes of the workshop, including action items and a schedule for updating the startup plan, to the ENGINEER within 3 days of the workshop.

- G. Individual plans for each phase of startup, testing, and commissioning can be assembled as chapters in the startup plan or submitted as individual documents but should be correlated to ensure there is no disagreement between chapters or separate documents.
- H. Startup Checks Plan. The startup checks plan shall be subdivided into plans for each system and major component. Each system/major component plan shall include but not be limited to the following:
1. Identification of information for each component or piece of equipment to be inspected as part of the system. All applicable tag numbers shall be included.
  2. Specific activities to be completed on each component, piece of equipment, or system as required to demonstrate proper installation and connection.
  3. A tracking checklist of prerequisites for the checks and each step of the checking procedure, including any temporary facilities or utility requirements.
  4. Listing of manufacturer's representative(s) to be on-site during the check. Sign off forms for the CONTRACTOR's startup manager.
- I. Functional Testing and Functional Acceptance Testing Plans. The functional testing plan shall include procedures and reporting for functional testing. The functional testing plan shall be subdivided into testing plans for each system. Each system test plan shall include but not be limited to the following:
1. A narrative description of the purpose and goals of the test for each component, piece of equipment, or system, which should include all activities (including those required by vendors/suppliers) necessary to verify proper equipment and system functionality.
  2. Identification of each component or piece of equipment to be tested as part of the system. All applicable tag numbers shall be included.
  3. Schedule and duration for the tests.
  4. Prerequisites for each test, including any temporary facilities or utility requirements.
  5. Pass/fail criteria for the test.
  6. A checklist for tracking testing progress which includes prerequisites for the test and each step of the testing procedure. The checklist shall include specified performance criteria that are to be met.

7. A description of the test apparatus required to conduct the test.
8. Identification of all temporary facilities and chemicals required during startup. Listing of manufacturer's representative(s) to be on-site during the test.
9. Certificates of proper installation, as applicable to the test.
10. Step-by-step detailed procedure of the test. The level of detail shall be sufficient for a witness to be able to follow the steps during the test and be confident that the test is being performed as planned. All steps required to proceed through the test in an orderly manner are considered significant, and each of these steps shall be included in the procedure.
11. Copies of the data recording forms that will be used during the test.
12. Calculation methodologies to be used to evaluate the data and/or test criteria for the test.
13. Sample computations or analyses for the test with results in the same format as the final report. This item is intended to demonstrate how data collected will be used to generate final results. A sample shall be included for each type of computation required for the test and analysis of results.
14. Blank sign-off forms for the test acknowledging the startup manager's, ENGINEER's, OWNER's, and equipment manufacturer's acceptance of the test where applicable.
15. The functional testing plan shall identify constraints for individual systems start-up.

#### 1.12 REPORTS AND RECORDS

- A. Records of all startup and testing shall be compiled by the CONTRACTOR and submitted to the ENGINEER. Prior to being submitted to the ENGINEER, the startup manager shall certify that the results recorded and the tested systems comply with the Contract requirements. Records shall include all documentation assembled for each piece of equipment or system involved in the startup and testing, including all certifications, forms, and check lists completed during the startup and test, and sign-off forms.
- B. Records of all startup and testing shall be compiled as separate documents for each system tested and shall be submitted within 48 hours of completion of the startup and testing for each system. Testing samples that require analysis periods greater than 48 hours shall be clearly defined in the startup plan but shall not preclude delivery of the balance of the records within the 48 hour timeframe.
- C. The CONTRACTOR shall provide formal reporting and documentation of failures,

malfunctions or defects, and repairs made during the startup and/or testing activities. A "System Problem Report" form is included as Appendix B and shall be used by the CONTRACTOR to document problems that arise during these tests and their resolution. Records submitted shall include "System Problem Report" forms completed during testing.

#### 1.13 GENERAL TRAINING REQUIREMENTS

- A. Training shall be provided for all equipment and shall be conducted by qualified factory service personnel. General requirements for equipment training are listed in this section, and all costs required thereof shall be included in the CONTRACTOR's bid. Where specific training requirements are provided in the Equipment sections, any specific training requirements provided in the equipment specification shall be met in addition to the general training requirements provided herein.
- B. Qualified factory service personnel shall instruct the OWNER's operating personnel in correct operation and maintenance procedures. The instruction shall demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment. Such instruction shall be provided while the respective representative's equipment is fully operational. Onsite instruction shall be given by qualified persons who have been made familiar in advance with the equipment and systems in the plant.
- C. The CONTRACTOR shall have submitted and accepted the O&M Manuals (specified in the Submittals Procedures section) prior to the commencement of training.
- D. A resume of the training instructor and agenda for the training session(s) shall be provided to ENGINEER at least 2 weeks in advance of the training. The training session shall be organized into maintenance versus operation topics and identified as such on the agenda.
- E. CONTRACTOR shall maintain a log of training provided, including instructors, topics (attach agenda), dates, times, and attendance list.
- F. Training sessions shall be organized in a format compatible with video recording. Instructors shall have well-prepared instructional material. The use of visual aids, e.g. films, pictures, and slides, is recommended during the classroom training programs. At least 10 copies of the instruction material shall be made available to OWNER's staff attending the training session.
- G. The CONTRACTOR shall provide a recording of all training sessions. Completed, labeled DVDs shall be provided to the OWNER for each type of training session. Recording may be done by CONTRACTOR's staff, but recording shall be high quality and clearly audible and performed from a stable structure or tripod, allowing steady, non-shaking video.

- H. The CONTRACTOR shall notify the ENGINEER at least 28 days in advance of each equipment test or OWNER training session. Training shall be completed immediately after the equipment is placed in service and prior to proceeding to Operation Acceptance Testing.
- I. Training shall be provided on-site to all separate shifts of the OWNER's personnel between the hours of 6:00 a.m. and 9:00 p.m. as necessary.

#### 1.14 OPERATIONS TRAINING

- A. Operations training shall provide a complete overview of all equipment, testing, adjusting, operation, and maintenance procedures. Separate 4-hour operations training sessions shall be provided on-site to all separate shifts of the OWNER's personnel between the hours of 6:00 a.m. and 9:00 p.m. for up to 10 persons. Operations training shall take the form of classroom instruction and hands-on training and shall cover.
- B. Documentation in the final Operations and Maintenance Manuals.
- C. Equipment/system startup and shutdown procedures.
- D. System operation procedures and all modes of operations and safety precautions.
- E. Procedures for dealing with abnormal conditions and emergency situations for which there is a specified system response.
- F. Procedures for troubleshooting.

#### 1.15 MAINTENANCE TRAINING

- A. In addition to operations training, where applicable, hands-on maintenance training shall be provided in separate sessions for mechanical maintenance. Sessions shall run consecutively following the operations training. Each session shall consist of at least one 4-hour training session for mechanical maintenance.

END OF SECTION

## **SECTION 01 78 36 WARRANTIES AND BONDS**

### **PART 1 – GENERAL**

#### **1.01 SUMMARY**

- A. This section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including the manufacturer's standard warranties on products and special warranties.

- B. Related Sections

- 1. SECTION 01 77 00 – Closeout Procedures

#### **1.02 SUBMITTALS**

- A. Submit written warranties to the OWNER prior to the date fixed by the ENGINEER for Substantial Completion. If the Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the work, or a designated portion of the work, submit written warranties upon request of the OWNER.
- B. Forms for special warranties are included at the end of this Section. Prepare a written document utilizing the appropriate form, ready for execution by the CONTRACTOR or the CONTRACTOR and Subcontractor, supplier, or manufacturer. Submit a draft to the OWNER for approval prior to final execution.
- C. Refer to individual Sections for specific content requirements and particular requirements for the submittal of special warranties.
- D. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents and sized to receive 8½- inch by 11-inch paper.
- E. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the Section in which specified and the name of the product or work item.
- F. Provide heavy paper dividers with celluloid-covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of the installer, supplier, and manufacturer.
- G. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS," the project title or name, and the name, address, and telephone number of the CONTRACTOR.

- H. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

#### 1.03 WARRANTY EQUIPMENT

- A. Related Damages and Losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure, or that must be removed and replaced to provide access for correction of warranted work.
- B. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents. The CONTRACTOR is responsible for the cost of replacing or rebuilding defective work regardless of whether the OWNER has benefited from the use of the work through a portion of its anticipated useful service life.
- D. OWNER's Recourse: Written warranties made to the OWNER are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the OWNER can enforce such other duties, obligations, rights, or remedies.
- E. Rejection of Warranties: The OWNER reserves the right to reject warranties and to limit selections to products with warranties not in conflict with the requirements of the contract Documents.
- F. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the CONTRACTOR of the warranty on the work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the CONTRACTOR.

#### 1.04 MANUFACTURER'S CERTIFICATIONS

- A. Where required, the CONTRACTOR shall supply evidence, satisfactory to the ENGINEER, that the CONTRACTOR can obtain manufacturers' certifications as to the CONTRACTOR's installation of equipment.

#### 1.05 DEFINITIONS

- A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the OWNER.
- B. Special Warranties are written warranties required by or incorporated in the Contract



Documents, either to extend time limits provided by standard warranties or to provide greater rights for the OWNER.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION



**SECTION 02 56 14**  
**SLUDGE REMOVAL AND DISPOSAL**

**PART 1 – GENERAL**

**1.01 DESCRIPTION OF THE WORK**

- A. The CONTRACTOR shall be responsible for removing, land applying sludge, and/or transporting biosolids to other authorized treatment for disposal in a manner that complies with local, State, and Federal requirements.
- B. CONTRACTOR shall be responsible for staging sludge removal, polymer treatment, maintaining geo bags as sludge dries, transport to landfill, and removal of all equipment used in sludge removal.
- C. Any disturbed land, property, or other items shall be repaired to the previous condition.
- D. Soil sampling, sludge sampling, transporting biosolids, and land application shall be completed by the CONTRACTOR in accordance with the Alabama Department of Environmental Management requirements, acceptable standards, and Best Management Practices.
- E. Eight (8) grab samples shall be taken to form one (1) composite sample at the end of each work day to determine the percent solids, which shall be recorded to verify the amount of the solids being removed. **The CONTRACTOR may propose an alternative method during preconstruction for evaluation by the OWNER and the ENGINEER.**
- F. CONTRACTOR shall be responsible for any additional testing except what is clearly identified as being costs borne by the OWNER.
- G. Final reporting shall be completed by the CONTRACTOR as required by the United States Environmental Protection Agency (EPA) and Alabama Department of Environmental Management and copies of any reports and/or correspondence with the EPA or Alabama Department of Environmental Management shall be sent to the OWNER.
- H. CONTRACTOR is responsible for obtaining agreements with licensed landfills and shall send proof of acceptance to the OWNER and ENGINEER.
- I. CONTRACTOR shall be responsible for completing and providing to the OWNER all necessary forms required by EPA and Alabama Department of Environmental Management for required record keeping and reporting requirements.
- J. Questions regarding the technical aspects of this specification should be directed to Edward Smith, P.E., The Kelley Group, at 256-248-7030 or emailed to [edward@kelleynetwork.com](mailto:edward@kelleynetwork.com).

- K. Repairs and replacements shall be made by the CONTRACTOR at his expense and shall be made with a minimum of time lost.
- L. Time lost due to breakdown or replacement of parts shall not be considered as a basis for payment.
- M. The OWNER reserves the right to reject any item of equipment when, in the opinion of the Department's Representative, the item is not in satisfactory operating condition.

## PART 2 – SCOPE OF WORK

### 2.01 WORK REQUIRED

- A. The work required by this project shall consist of furnishing all labor, materials, operation of CONTRACTORs plant, equipment, and supervision, and performing all work necessary to complete the lagoon biosolids removal and disposal, all in accordance with this document. The work shall consist of, but not necessarily be limited to, performing the following work tasks where specified:
  - 1. Biosolids removal shall be performed by dredging and/or pumping to fully remove biosolids from the lagoon. The CONTRACTOR shall remove all biosolids of each lagoon cell bottom, combine them with selected polymer, deposit them in geo bags for dewatering, maintain geo bags during the dewatering process, and transport liquid or dried biowaste to a licensed landfill.
  - 2. Transportation of removed biosolids to an authorized biosolids disposal facility shall comply with all EPA and the Alabama Department of Environmental Management regulations affecting the transport of liquid or dried biosolids.

### 2.02 BIOSOLIDS REMOVAL

- A. The CONTRACTOR shall provide all necessary dredging and/or pumping or biosolids removal equipment and appurtenances as necessary to fully remove biosolids from the designated cells of the lagoon.
- B. The interior dikes have a 3:1 slope.
- C. The CONTRACTOR shall make himself familiar with the scope of services to be provided for under this contract, and it shall be the CONTRACTOR's sole responsibility to determine liquid biosolids, volumes, percent solids, and types to be removed.
- D. The plans and specifications present a suggested method of sludge removal. The CONTRACTOR shall determine the most effective method of removing liquid biosolids from the existing lagoons. Any methodology to be used must be in accordance with all EPA and the Alabama Department of Environmental Management regulations. Shop drawings must be submitted and approved prior to the start of contract work.

- E. If needed for the cleaning operation, the CONTRACTOR may decant portions of the existing cell to be cleaned only into the front end of the existing lagoon treatment facility by pumping. Care shall be taken not to transfer biosolids from the individual cells into the other portions of the lagoon. After decanting, the use of heavy equipment to remove biosolids increases the risk of damaging the existing lagoon bottom. Should the OWNER, his representative, or the Alabama Department of Environmental Management determine that damage has been done to the liner sub-surface, remedial work shall be required at the CONTRACTOR's expense.
- F. Removed biosolids shall be polymer mixed prior to dewatering, should the CONTRACTOR choose to dewater the material. Screening shall remove excess plastics, floatables, and other debris. Sludge shall be deposited in containers acceptable for disposal at the sanitary landfill. The CONTRACTOR shall pay all costs associated with pumping, handling, and disposal.

## 2.03 TRANSPORTATION OF BIOSOLIDS

- A. Transportation of biosolids shall be in accordance with these specifications, with the exception that any EPA or the Alabama Department of Environmental Management regulations more stringent than those contained in these specifications shall supersede those contained herein.
- B. The CONTRACTOR shall comply with all Federal, State, county, and municipal requirements, regulations, laws, and ordinances. The CONTRACTOR, if required, shall be responsible for any traffic plan, signage, barriers, flagmen, etc., on public rights-of-way or additional testing as may be required for transportation and acceptance at a licensed landfill.
- C. The CONTRACTOR shall furnish all personnel, pumps, vehicles, testing, reporting, training, equipment, documentation, and safety equipment as necessary to remove, dewater and transport the removed biosolids to a licensed landfill.
- D. All vehicles shall comply with all Federal, State, county, and local transportation requirements and be properly registered and licensed to operate. Configuration of vehicles will be such that biosolids are not spilled from the vehicle while in route. All vehicles will be cleaned of any biosolids outside of the load area prior to leaving the site and again prior to leaving the landfill transportation activities.
- E. If there are complaints about spillage from transportation equipment, the CONTRACTOR shall take the necessary steps to correct the complaints. The CONTRACTOR shall be responsible for the immediate cleanup of any spilled biosolids on the plant site and shall include the loading areas and roadways. Cleanup shall include sweeping, shoveling, or washing all equipment and/or road areas. Whenever possible, sweeping or shoveling shall be used for cleanup, with limited washing done so as to use as little water as possible. All cleanup equipment shall be provided by the CONTRACTOR.

## 2.04 LAND APPLICATION OF BIOSOLIDS

- A. Application of biosolids shall be in accordance with these specifications, with the exception that any EPA or Alabama Department of Environmental Management regulations more stringent than those contained in these specifications shall supersede those contained herein. Acceptance by a licensed landfill shall be pre-approved by the ENGINEER and/or the Alabama Department of Environmental Management.
- B. Dewatering activities shall be performed on the plant site and be designed to allow all water runoff to be directed back into the lagoon. No runoff or dewatering shall be allowed to leave the plant site without being directed through the lagoon.
- C. The CONTRACTOR shall be responsible for obtaining all necessary approvals for the selected landfill. The CONTRACTOR shall provide information to satisfy the OWNER and ENGINEER that the site is approvable by the Alabama Department of Environmental Management
- D. The route for transporting dried solids from the plant site to the landfill shall be submitted to the ENGINEER for review. Prior to beginning biosolids removal from the lagoon, the CONTRACTOR shall indicate where dewatering operations will be located, how dewatering effluent will be directed back to the lagoon, and any locations for runoff prevention. Application areas to be utilized shall be designated in an approved manner by the CONTRACTOR.
- E. In accordance with all EPA and the Alabama Department of Environmental Management regulations, runoff of biosolids during the dewatering and transportation process shall be strictly prohibited. The CONTRACTOR shall use whatever means necessary to ensure that no surface drainage of biosolids occurs to downstream landowners, ponds, or waterways. The methods used shall be dependent upon existing site features and the chosen application method. Runoff prevention methods may include but are not limited to, straw bale barriers, silt fences, temporary embankment dikes, sediment traps, plastic sheeting, etc. Upon completion of the project, the runoff prevention measures shall be removed, and the waterways and site restored to the existing conditions. The CONTRACTOR shall keep an updated map showing placement of runoff prevention methods.
- F. Surface ponding of biosolids shall not be permitted.
- G. Loading operations and biosolids transport and application shall take place during the hours of 7:00 a.m. and 6:00 p.m., Monday through Saturday unless otherwise approved by the OWNER and ENGINEER.
- H. The staging area (the area where biosolids are unloaded from the transport vehicle) must be acceptable to the licensed landfill.
- I. The CONTRACTOR shall provide information concerning the transportation, each type of vehicle, and/or equipment utilized. Further, the CONTRACTOR shall maintain a daily

writing log of biosolids removed, including pounds (or tons) of dry solids and liquid volume. Solids sampling and testing reports shall be provided to the ENGINEER by the CONTRACTOR at no additional cost.

- J. At the conclusion of biosolids removal activities, ground cover, fences, and appurtenances that were removed or damaged to facilitate access must be replaced immediately to the OWNER's satisfaction. All equipment and materials shall be removed from the job site upon completion. Berms, haul routes, lagoon sites, and other surfaces damaged or disturbed by the CONTRACTOR's operations shall be restored to their previous conditions.
- K. The CONTRACTOR shall keep equipment in good operating condition at all times. All maintenance will be done at the CONTRACTOR's expense.
- L. Cost of utilities and their installation and hook-up will be borne by the CONTRACTOR.
- M. The CONTRACTOR shall be responsible for maintaining the records of each landfill where biosolids were delivered. This data will be submitted on a form acceptable to the ENGINEER and the Alabama Department of Environmental Management. This information shall include, as a minimum, and shall be submitted with the shop drawings:
  - 1. Date(s) and time(s) of biosolids delivery
  - 2. Amount delivered on each date
  - 3. Landfill cell applied to
  - 4. Name of the landfill operator
  - 5. Any operating difficulties
  - 6. Number of loads delivered
  - 7. Weather, including temperature, wind, sun, etc.

## 2.05 SLUDGE DISPOSAL AT OTHER TREATMENT FACILITIES

- A. The CONTRACTOR may haul biosolids to other treatment facilities permitted for disposal. Information shall be provided regarding the receiving facility and the facility's anticipated method of biosolid disposal, such as land application, dewatering, and landfill disposal, sludge disposal lagoon, or incineration.
- B. Testing of sludge, other than total solids, is not required if sludge is hauled to a municipal wastewater treatment facility or other permitted wastewater facility unless it is required by the accepting facility.
- C. The CONTRACTOR shall provide the OWNER the required documentation and records for hauling biosolids to other receiving facilities, final tonnage and/or volume of biosolids hauled, and record of person/company responsible for final sludge disposal.

## 2.06 MEASUREMENT AND PAYMENT

- A. Work performed under this contract shall be paid for as shown on the Bid Form.

- B. Payment of price bid shall constitute full compensation for furnishing all labor, materials, tools, equipment incidentals, and all costs required to fully complete the work.
- C. All work not specifically set forth as a pay item in the Bid Form shall be considered a subsidiary obligation of the CONTRACTOR, and all costs in connection therewith shall be included in the price bid.
- D. Final payment will only be made for completed and accepted work.
- E. Payment will be made at the prices bid, and the price shall include lagoon cleaning; biosolids hauling; biosolids loading and unloading; any earthwork, excavation, compaction, and/or seeding required for restoration; erosion and sediment control materials and construction, signs, water, additional laboratory test, and any other incidentals necessary to complete the project in accordance with the plans and specifications.

END OF SECTION



**SECTION 03 30 00**  
**CAST-IN-PLACE CONCRETE**

**PART 1 – GENERAL**

**1.01 SECTION INCLUDES**

- A. Preparation
- B. Joints
- C. Installation of Embedded Items
- D. Concrete Placement
- E. Patching
- F. Defective Concrete
- G. Field Testing Concrete

**1.02 RELATED SECTIONS**

- A. Section 33 30 00 – Sanitary Sewerage

**1.03 REFERENCE STANDARDS**

- A. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete.
- B. ACI 305 - Hot Weather Concreting
- C. ACI 306 - Cold Weather Concreting
- D. ACI 308 - Standard Practice for Curing Concrete
- E. ACI 318 - Building Code Requirements for Reinforced Concrete
- F. ACI 211.1 - Recommended Practice for Selecting Proportions for Normal Weight Concrete
- G. ACI 347 - Recommended Practice for Concrete Form Work
- H. ACI 315 - Manual of Standard Practice for Detailing Reinforced Concrete Structures
- I. ACI 503.1 - Standard Specifications for Bonding Plastic Concrete, Steel, Wood, Brick, and Other Materials to Hardened Concrete with a Multi-Component Epoxy Adhesive

- J. ASTM B-221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
- K. ASTM C-33 - Concrete Aggregates
- L. ASTM C-94 - Ready-Mixed Concrete
- M. ASTM C-150 - Portland Cement
- N. ASTM C-260 - Air Entraining Admixtures for Concrete
- O. ASTM C-330 - Light Weight Aggregates for Structural Concrete
- P. ASTM C-494 - Chemical Admixtures for Concrete
- Q. ASTM C-618 - Fly Ash and Raw or Calcinated Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
- R. ASTM C-948 - Test Method for Dry and Wet Bulk Density, Water Absorption and Apparent Porosity of Thin Sections of Glass-Fiber-Reinforced Concrete
- S. ASTM D-994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type)
- T. ASTM D-1190 - Concrete Joint Sealer, Hot-Poured Elastic Type
- U. ASTM D-1751 - Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)
- V. ASTM D-1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

#### 1.04 QUALITY ASSURANCE

- A. The CONTRACTOR shall perform Work in accordance with ACI 301 and ACI 318.
- B. The CONTRACTOR shall maintain one copy of documents on-site.
- C. The CONTRACTOR shall acquire cement and aggregates from the same source for all work.
- D. The CONTRACTOR shall conform to ACI 305 when concreting during hot weather.
- E. The CONTRACTOR shall conform to ACI 306 when concreting during cold weather.
- F. Testing Laboratory Services:

1. The OWNER will employ and pay for the services of an independent geotechnical testing laboratory to perform specific services and necessary tests as outlined below:
  - a. All mix designs shall be proportioned in accordance with Section 4.3 of ACI 318-83. Mix designs must be approved prior to placing the initial concrete at the job site. During concrete placement, an independent geotechnical laboratory technician shall make a set of five test cylinders for every 50 cubic yards, or fraction thereof, of each concrete pour placed each day. The independent geotechnical laboratory technician shall break a cylinder from each set on the 3rd, 7th, 14th, and 28th day.
  - b. CONTRACTOR to provide a minimum of 24 hours' notice to ENGINEER prior to pouring concrete.
  - c. During concrete placement, an independent geotechnical laboratory technician shall make all concrete cylinders and slump test at the point where concrete is placed into the forms.

G. Tolerances:

1. The CONTRACTOR shall ensure that cured concrete meets the following tolerances:
  - a. Variations from plumb =  $\pm 3/8$ -in. per 10 ft. but not more than 1 inch total
  - b. Variations from level =  $\pm 3/8$ -in. per 10 ft. but not more than  $1/2$  inch total
  - c. Variations from horizontal =  $\pm 3/8$ -in. per 10 ft. but not more than  $1/2$  inch total
  - d. Variations in size and locations =  $\pm 1/4$  inch openings or sleeves
  - e. Reinforcing steel placement =  $\pm 3/8$  inch

1.05 SUBMITTALS

A. The CONTRACTOR shall submit product data.

1. Submit concrete mix design including the following:
  - a. Break down of material content per cubic yard of concrete.
  - b. Show the dry weight of cement.
  - c. Show saturated surface-dried weights of fine and coarse aggregate.
  - d. Show the weight of water.
  - e. List quantities, types, and names of admixtures.

2. Submit trial mix laboratory reports.
3. Submit product data on each admixture proposed.
4. Submit the certification of aggregate quality. Include a statement for an independent lab that the aggregates used are not reactive.

#### 1.06 STORAGE

- A. The CONTRACTOR shall store cement at the site in an approved manner to prevent the absorption of moisture or contamination.
- B. The CONTRACTOR shall store aggregates at the site in an approved manner to prevent the inclusion of foreign materials in the concrete.
- C. The CONTRACTOR shall store admixtures in an approved manner to prevent contamination, evaporation, or damage. The CONTRACTOR shall protect liquid admixtures from freezing and from harmful temperature ranges.

#### 1.07 QUALIFICATION FOR READY-MIX CONCRETE MANUFACTURER

- A. Concrete shall be manufactured and delivered to the project site by a ready-mix manufacturer experienced in ready-mix concrete.

#### 1.08 JOB CONDITIONS

- A. The CONTRACTOR shall follow methods outlined in ACI 306 if the concrete is to be placed when the atmospheric temperature is expected to be less than 40° F.
- B. Calcium chloride will not be considered for approval as an accelerating admixture during cold weather construction.
- C. The CONTRACTOR shall follow methods outlined in ACI 305 if the concrete is to be placed when the atmospheric temperature is expected to exceed 90° F.
- D. Manufacturer's recommendations shall be strictly followed in regard to atmospheric temperature limitations during the application of epoxy or acrylic polymer-modified concrete materials.

### PART 2 – PRODUCTS

#### 2.01 GENERAL

- A. Class A concrete shall be formed reinforced concrete having a 28-day minimum compressive strength of 4000 pounds per square inch. Class A concrete shall be cast-in-place in forms for foundations, pipe collars, footings, piers, sidewalks, curbs and gutters, headwalls, manholes, monolithic sewers, and similar structures.

- B. Class B concrete shall be non-formed, non-reinforced concrete having a 28-day minimum compressive strength of 3000 pounds per square inch. Class B concrete shall be used for bottom trench stabilization, pipe protection encasement, pipe collars, anchors, massive sections, and similar work.
- C. Other classes, types, or designs for cast-in-place concrete may be specified in the Plans or Special Conditions or approved by the ENGINEER as circumstances require.
- D. Concrete ingredients shall be selected, proportioned, and mixed to produce a workable, homogeneous concrete.
- E. Concrete components shall conform to the minimum requirements of this section.

## 2.02 CONCRETE MATERIALS

- A. Portland Cement shall conform to the following:
  - 1. All water-bearing structures shall conform to Type V ASTM C-150, including optional tables. Tri-calcium Aluminate shall not exceed 5%.
  - 2. Non-water bearing structures shall conform to the requirements of ASTM C-150, Type 1.
  - 3. The CONTRACTOR shall use one brand of cement throughout the project unless otherwise acceptable to the ENGINEER.
- B. Fly Ash, if permitted, shall conform to the requirements of ASTM C-618, Type F.
- C. Normal weight aggregates shall conform to the requirements of ASTM C-33 and as specified in this section. The CONTRACTOR shall provide aggregates from a single source for exposed concrete.
  - 1. For exterior exposed surfaces, the CONTRACTOR shall not use fine or coarse aggregates containing spall-causing deleterious substances.
  - 2. Local aggregates not in compliance with the soundness and durability requirements of ASTM C-33 shall not be used except with prior written approval of the ENGINEER and provided it can be shown by special testing or a record of past performance that these aggregates produce concrete of adequate strength and durability. Aggregate soundness testing for fine and coarse aggregates shall be in accordance with ASTM C-88 using a sodium sulfate solution.
- D. Fine aggregates shall conform to the requirements of ASTM C-330. The content of material passing a number 200 sieve shall not exceed 4 percent. The CONTRACTOR shall use only clean, sharp, natural sand.
- E. Coarse aggregates shall be crushed limestone conforming to the requirements of ASTM C- 33. Crushed limestone for coarse aggregate shall consist of uncoated particles of sound,

the durable rock of uniform quality containing no more than 15 percent flat or elongated particles (long dimension more than five times the short dimension). Content of material passing a number 200 sieve shall not exceed 0.5 percent. No surface, yellow or soft stone shall be permitted. The specific gravity of the stone shall not be less than 2.56.

- F. Water shall be clean and potable.
- G. The CONTRACTOR shall provide concrete admixtures which contain not more than 0.1 percent chloride ions.
  - 1. Water-reducing admixture shall conform to requirements of ASTM C-494, Type A.
  - 2. Air-entraining admixture shall conform to requirements of ASTM C-260, certified by the manufacturer to be compatible with other required admixtures.
  - 3. High-range water-reducing admixture (Super Plasticizer) shall conform to requirements of ASTM C-494, Type F or Type G.
  - 4. Water-reducing, accelerating admixture shall conform to requirements of ASTM C-494, Type E.
  - 5. Water-reducing, retarding admixture shall conform to requirements of ASTM C-494, Type D.

## 2.03 RELATED MATERIALS

- A. Granular Base and/ or Sand Cushion: As shown and specified on the Construction Drawings.
- B. Vapor Retarder: The CONTRACTOR shall provide vapor retarder cover over prepared base material where indicated below slabs on grade. The CONTRACTOR shall use only materials that are resistant to deterioration when tested in accordance with ASTM E-154. Vapor retarder shall consist of a Polyethylene sheet not less than 6 mils thick.
- C. Absorptive Cover: The CONTRACTOR shall provide burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M-182, Class 2, where required.
- D. Moisture-Retaining Cover: During curing, the CONTRACTOR shall provide a moisture-retaining cover complying with ASTM C-171, where required.
- E. Liquid Membrane-Forming Curing Compound: The CONTRACTOR shall provide a liquid-type membrane-forming curing compound complying with ASTM C-309, Type I, Class A where required. Apply at 200 sq. ft./gal.
- F. Water-Based Acrylic Membrane Curing Compound: The CONTRACTOR shall provide a water-based acrylic membrane curing compound conforming to ASTM C-309, Type I, Class B.

- G. Bonding Compound: The bonding compound shall be polyvinyl acetate or acrylic base.
- H. Epoxy Adhesive: The CONTRACTOR shall provide epoxy adhesive conforming to ASTM C-881 two-component material suitable for use on dry or damp surfaces. The CONTRACTOR shall provide material Type, Grade, and Class to suit project requirements.
- I. Sealer: The CONTRACTOR shall provide a sealer conforming to the ALDOT Standard Specifications.
- J. Forms shall be new material at the project start. Undamaged forms meeting the requirements of allowable tolerances may be reused with approval from the ENGINEER. Forms shall be constructed of steel or finished lumber true to line and grade, mortar tight, and free from irregularities and holes. They shall be of sufficient strength to avoid displacement and held together with approved form clamps. Forms shall be coated with non-staining mineral oil or other ENGINEER-approved release agents. Forms shall be removed within 24 to 72 hours after placing concrete but shall not be removed until inspected and approved by the ENGINEER or his agent.

#### 2.04 PROPORTIONING AND DESIGN OF MIXES

- A. Concrete mix design for particular applications shall be submitted to the ENGINEER for approval.
- B. An independent testing laboratory acceptable to the ENGINEER for preparing and reporting proposed mix designs shall prepare design mixes for each type and strength of concrete by laboratory trial batch methods as specified in ACI 301.
- C. Design mixes shall provide normal weight, air-entrained concrete with the following properties, as indicated on the Plans, per ASTM C-94.
  - 1. Cement: Type V ASTM C-150 including optional tables. Tri-calcium Aluminate for all water-bearing structures and surfaces shall not exceed 5%. Type I may be used for non-water-bearing structures.
  - 2. Admixtures:
    - a. Air entraining shall conform to ASTM C-260.
    - b. Pozzolans shall conform to ASTM C-618.
    - c. Admixtures other than air-entraining agents and pozzolans shall be used only when authorized in writing by the ENGINEER.
  - 3. Coarse Aggregate shall be Number 57, conforming to ASTM C-33.
  - 4. Fine Aggregate shall conform to ASTM C-33.
  - 5. Slump shall be between 3 and 5 inches.

6. Air content shall be $6\% \pm 1\%$ , conforming to ASTM C-94.		
7. Mix Proportioning: One Cubic Yard	Class A	Class B
a. Minimum 28 day compressive strength (psi)	4000	3000
b. Cement per cubic yard Concrete (lbs.).		
1. Minimum	517	423
2. Maximum	N/A	517
c. Pozzolan (fly ash) (lbs./cubic yard)	100	N/A
d. Volume of water per cu. ft. of cement – Maximum (Gal) *Water to cement ratio for all water bearing structures and surfaces shall be in the range of 0.45 to 0.48.	*	7.5
e. Amount of air entrained in fresh mix	ASTM C-0 94 (LR)	

## 2.05 CONCRETE MIXING

- A. Ready-mix concrete shall comply with the requirements of ASTM C-94, and as specified.
- B. Mix concrete only in quantities for immediate use.
- C. Do not retemper or use set concrete.
- D. Type V cement shall be used for all sewage-containing structures.

## 2.06 REINFORCING MATERIAL FOR CAST IN PLACE CONCRETE

- A. Reinforcing bars shall conform to the requirements of ASTM A-615, A-616, or A- 617. Reinforcing bars shall be grade 60 deformed bars.
- B. Welded wire fabric or cold-drawn wire for concrete reinforcement shall conform to the requirements of ASTM A-185 or ASTM A-82, respectively.

## 2.07 GROUT FOR FILLING OF VOIDS

- A. Grout shall be flowable fill material with a 1000 psi compressive strength at 28 days when using a 4" x 8" cylinder mold. The CONTRACTOR shall submit the design mix to the ENGINEER for approval prior to beginning work.

## PART 3 – EXECUTION



### 3.01 PREPARATION

- A. The CONTRACTOR shall prepare previously placed concrete by cleaning it with a steel brush and applying a bonding agent in accordance with the manufacturer's instructions.
- B. In locations where new concrete is dowelled to existing work, the CONTRACTOR shall drill holes in existing concrete, insert steel dowels, and pack solid with non-shrink grout.
- C. The CONTRACTOR shall coordinate the placement of joint devices with the erection of concrete form work and placement of form accessories.
- D. The CONTRACTOR shall coat contact surfaces of forms with an approved, nonresidual, low-VOC form-coating compound before reinforcement is placed.
- E. The CONTRACTOR shall 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. The CONTRACTOR shall apply form-coating material in compliance with the manufacturer's instructions.
- F. The CONTRACTOR shall coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

### 3.02 JOINTS

- A. The CONTRACTOR shall locate and install construction joints as indicated or, if not indicated, so as not to impair the strength and appearance of the structure, as acceptable to the ENGINEER.
- B. The CONTRACTOR shall provide keyways shown in the Plans, in construction joints for walls, slabs, and between walls and footings as shown on the Plans.
- C. The CONTRACTOR shall place construction joints perpendicular to main reinforcement. The CONTRACTOR shall continue reinforcement across construction joints except as otherwise indicated. The CONTRACTOR shall not continue reinforcement through the sides of strip placements.
- D. The CONTRACTOR shall use a bonding agent on existing concrete surfaces that will be joined with fresh concrete.
- E. The CONTRACTOR shall provide water stops in construction joints as indicated. The CONTRACTOR shall install water stops to form a continuous diaphragm in each joint. The CONTRACTOR shall make provisions to support and protect exposed water stops during the progress of Work. The CONTRACTOR shall field-fabricate joints in water stops in accordance with manufacturer's printed instructions.
- F. The CONTRACTOR shall construct isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as equipment bases and elsewhere as indicated.

### 3.03 INSTALLATION OF EMBEDDED ITEMS

- A. The CONTRACTOR shall 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. The CONTRACTOR shall use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.
- B. The CONTRACTOR shall set edge forms, bulkheads, and intermediate screed strips for slabs to obtain the required elevations and contours in finished surfaces. The CONTRACTOR shall provide and secure units to support screed strips using strike-off templates or compacting-type screeds.
- C. All exposed formed concrete edges shall have a 3/4" chamfer unless otherwise noted.

### 3.04 CONCRETE PLACEMENT

- A. Prior to placing an order for concrete, the CONTRACTOR shall inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. The CONTRACTOR shall notify other crafts to permit the installation of their work and cooperate with other trades in setting such work. In addition to other equipment required for placement, the CONTRACTOR shall provide standby vibrators (minimum of two (2) units) during all concrete placement.
- B. The CONTRACTOR shall comply with ACI 304, "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete," and as herein specified.
- C. The CONTRACTOR shall deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, the CONTRACTOR shall provide construction joints as herein specified. The CONTRACTOR shall deposit concrete to avoid segregation at its final location.
- D. The concrete shall be placed in such a manner to produce solid concrete free of honeycomb, and sand streaks. Concrete shall not be allowed to drop freely a distance greater than 5 feet. Concrete shall be compacted with mechanical vibrating equipment supplemented by hand spading and tamping. It shall be placed upon clean, damp surfaces, free from water. Concrete that has contained its water content for more than 45 minutes shall not be placed unless a variance is approved by the ENGINEER. Freshly placed concrete shall be protected from washy rain, flowing water, or other injurious conditions and shall not be allowed to become dry from the time it is placed until the expiration of the 7-day curing period.
- E. The CONTRACTOR shall be required to have all necessary equipment and supplies on-site before starting a pour, including two vibrators, concrete buckets, pumps, cranes, and curing compounds as applicable.
- F. The CONTRACTOR shall 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, the CONTRACTOR shall place each layer while the preceding layer is still plastic to avoid cold joints. When placing concrete, the use of aluminum pipe or other aluminum conveying devices will not be permitted. Maximum height of concrete free fall shall not exceed 5 feet. The CONTRACTOR shall use placement devices such as chutes, pouring spouts, and pumps as required. Concrete that has contained its water content for more than 60 minutes shall not be placed unless a variance is approved by the ENGINEER.

1. The CONTRACTOR shall consolidate placed concrete with hand-held mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. The CONTRACTOR shall use equipment and procedures for the consolidation of concrete in accordance with ACI 309. Form vibrators are prohibited.
  2. The CONTRACTOR shall not use vibrators to transport concrete inside forms. The CONTRACTOR shall insert and withdraw vibrators vertically at uniformly spaced locations not farther than the visible effects of the machine. The CONTRACTOR shall place vibrators to rapidly penetrate the placed layer and at least 6" into the preceding layer. The CONTRACTOR shall not insert vibrators into lower layers of concrete that have begun to set. At each insertion, the CONTRACTOR shall limit the duration of vibration to the time necessary to consolidate concrete and complete the embedment of reinforcement and other embedded items without causing segregation of mix.
- G. The CONTRACTOR shall deposit and consolidate concrete slabs in a continuous operation, within the limits of construction joints, until the placing of a panel or section is completed.
1. The CONTRACTOR shall consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  2. The CONTRACTOR shall bring slab surfaces to the correct level with straightedge and strike-off. The CONTRACTOR shall use bull floats prior to beginning finishing operations.
  3. The CONTRACTOR shall maintain reinforcing in the proper position during concrete placement.
- H. The CONTRACTOR shall protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures in accordance with provisions of ACI 306.
- I. When air temperatures have fallen to or are expected to fall below 40°F (4°C), the CONTRACTOR shall uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50°F (10°C) and not more than 80°F (27°C) at point of placement.

1. The CONTRACTOR shall not use frozen materials or materials containing ice or snow or place concrete on a frozen subgrade or on a subgrade containing frozen materials.
  2. The CONTRACTOR shall not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
  3. The CONTRACTOR shall maintain the concrete at a temperature of not less than 50°F and not more than 90°F for a period not less than 72 hours.
- J. When hot weather conditions exist that would seriously impair the quality and strength of concrete, the CONTRACTOR shall place concrete in compliance with ACI 305 and as herein specified.
1. The CONTRACTOR shall cool ingredients before mixing to maintain the concrete temperature at time of placement below 90°F (32°C).
- K. All permanently exposed concrete work inside and outside shall be thoroughly rubbed with Carborundum stones to remove from marks and other defects, and produce a smooth, uniform finish, no sooner than 24 hours, nor later than 72 hours after the placement of the concrete. In lieu of rubbing the unfinished concrete, the CONTRACTOR may seal the concrete with a sealing compound approved by the ENGINEER.
- L. After the concrete has been placed, it shall be protected against the loss of moisture and damage from other adjacent construction operations. The concrete shall be kept wet until forms have been removed. After forms have been removed, the concrete shall be rubbed as specified and then wetted and tightly covered with polyethylene film or other approved curing material for a period of twenty-one (21) days in accordance with ASTM C-309 for curing concrete. It shall be the responsibility of the CONTRACTOR to maintain moisture in the concrete during the specified curing period.

### 3.05 PATCHING

- A. Allow ENGINEER to inspect concrete surfaces immediately upon the removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify ENGINEER upon discovery.
- C. Patch imperfections as directed by the ENGINEER.

### 3.06 DEFECTIVE CONCRETE

- A. Concrete not conforming to required lines, details, dimensions, tolerances, or specified requirements shall be considered defective.

- B. The CONTRACTOR shall repair or replace defective concrete as directed by the ENGINEER.
- C. The CONTRACTOR shall not patch, fill, touch up, repair, or replace exposed concrete except upon the express direction of the ENGINEER for each individual area.

### 3.07 FIELD TESTING CONCRETE

- A. Strength Tests During the Work: The ENGINEER will make five concrete test cylinders for every 50 cubic yards poured or for each day pour, whichever amount of concrete is smaller. Cylinders will be made and tested in accordance with ASTM C-31, ASTM C-172, and ASTM C-39. The standard age of the test shall be 28 days. The first cylinder will be broken at 7 days. If the 7-day break exceeds the specified strength, then no further tests will be made until the 28th day. If the 7-day break does not meet the specified strength, then the second cylinder will be tested on the 14th day. In either event, the remaining cylinder(s) will be tested on the 28th day. When the test cylinders fail to conform to the compressive strength requirements, the ENGINEER shall have the right to order a change in the concrete mix for the remaining portions of the Work at no additional cost to the OWNER. The CONTRACTOR may wish to make additional cylinders at his own expense as verification.
- B. Test of Hardened Concrete in or Removed From the Structure: When the results of the strength tests of the control specimens indicate the concrete as placed does not meet specification requirements, or where there is other evidence that the quality of the concrete is below specification requirements, core-boring tests shall be made in conformance with ASTM C-42. Core specimens will be tested by the OWNER. All deficiencies shall be corrected, or if the CONTRACTOR elects, he may submit a proposal for approval that load tests be made. If the proposal is approved, the load test shall be made by the CONTRACTOR, and the test results evaluated by the ENGINEER. If any concrete shows evidence of failure during the load test or fails the core test as evaluated, the deficiency shall be corrected. Any deficiency shall be corrected in a manner approved by the ENGINEER, and at no additional cost to the OWNER.
- C. During the concrete placement, the OWNER's testing representative shall be responsible for making the test cylinders. The CONTRACTOR shall furnish the molds, and shall furnish a container suitable to the OWNER's testing representative for storing cylinders in a moist, or saturated condition, at the CONTRACTOR's expense. The OWNER's testing representative and/or the OWNER shall transport and test the cylinders at no expense to the CONTRACTOR. The cylinders will be tested at the OWNER's designated testing facility.

END OF SECTION



**SECTION 08 11 00  
HATCHES**

**PART 1 – GENERAL**

**1.01 SECTION INCLUDES**

- A. This section addresses the work related to furnishing and installing all supervision, labor, materials and equipment in the work for metal fabrications including hatches for installation on both the interior and exterior of a pumping station.

**1.02 Related Sections**

- A. 01 60 00 Product Requirements
- B. 03 30 00 Cast-in-Place Concrete

**1.03 SUBMITTALS**

- A. Submit shop drawings and manufacturers' data in accordance with the provisions of Section 01 33 00 – Submittal Procedures.

**1.04 REFERENCES**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. The referenced publications shall be the current effective edition.
- B. ASTM International (ASTM)
  - 1. ASTM A193 – Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperatures or High Pressure Service and Other Special Purpose Applications
  - 2. ASTM A276 – Standard Specification for Stainless Steel Bars and Shapes
  - 3. ASTM B108 – Standard Specification for Aluminum-Alloy Permanent Mold Castings
  - 4. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
  - 5. ASTM B221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
  - 6. ASTM D1187 – Asphalt-Base Emulsions for Use as Protective Coatings for Metal

## PART 2 – PRODUCTS

### 2.01 HATCHES

A. Load Rating: 300 pounds per square foot.

B. Frame:

1. Material: Extruded aluminum with mitered and welded corners.
2. Anchors: Continuous type or bolt-on strap type.
3. Provide frame with built-in neoprene gasket.
4. Apply a bituminous coating to surfaces of frame that will be in contact with concrete.

C. Cover:

1. Material: 1/4 inch mill finish one piece aluminum diamond plate, reinforced with stiffening ribs
2. Hinges: Stainless steel; cam-action type with torsion bars.
3. Hold Open Arm: Stainless steel; automatically locks door at 90 degree position; provide aluminum grip handle to release door for closing.
4. Lock: Stainless steel; slam type with fixed handle inside and removable key wrench outside. Provide lock hasp.
5. Maximum allowable deflection less than length of span/180 or 0.25 inches, whichever is less.

D. Hardware and Fasteners: Type 316 stainless steel.

E. Accessories: Provide one key wrench for each door supplied.

F. Acceptable manufacturers:

1. Halliday Products
2. USF Fabrication
3. Approved Equal

## PART 3 – EXECUTION



### 3.01 INSTALLATION

- A. Install hatches in accordance with manufacturer's published instructions.

END OF SECTION



**SECTION 22 05 23**  
**GENERAL DUTY VALVES FOR PLUMBING PIPING**

**PART 1 - GENERAL**

**1.01 SUMMARY**

**A. Work included:**

1. Valves, General
2. Gate Valves
3. Balancing Valves
4. Ball Valves
5. Swing Check Valves
6. Backflow Prevention Assemblies
7. Pressure Regulating Valve-Domestic Water
8. Thermostatic Master Mixing Valves (ASSE 1017 Rated)
9. Thermostatic Point-of-Use Mixing Valves (ASSE 1070 Rated)

**PART 2 – PRODUCTS**

**2.01 MANUFACTURERS**

**A. Source Limitations for Valves:** Obtain each type of valve from a single source and from a single manufacturer.

**B. Valves, General**

1. Apollo
2. Armstrong
3. ASCO
4. Cla-Val
5. Conbraco
6. Crane

7. Clow
8. Griswold
9. Hammond
10. Hays
11. Jenkins
12. Josam
13. Kennedy
14. Milwaukee
15. Mueller
16. Nibco
17. Red-White Valve
18. Smith
19. Stockham
20. Tour Anderson
21. Wade
22. Watts
23. Wilkins
24. Zurn
25. Or approved equivalent.

C. Gate Valves

1. See Valves General above.

D. Balancing Valves

1. Caleffi
2. Griswold

3. Hays
4. Armstrong CBV
5. Tour Anderson
6. Or approved equivalent.

E. Ball Valves

1. See Valves General above.

F. NSF Valves

1. Clow
2. Kennedy
3. Nibco
4. Or approved equivalent.

G. Swing Check Valves

1. See Valves General above.

H. Backflow Prevention Assemblies

1. Backflow Preventers
  - a. Apollo
  - b. Cla-Val
  - c. Conbraco
  - d. Watts
  - e. Or approved equivalent.
2. Backflow Prevention Assemblies - Reduced Pressure Zone Backflow Preventer (RPBP) for High Hazard Applications - 2-inches and Smaller:
  - a. Febco 860-with 650A.
  - b. Conbraco 40-210-AGD.
  - c. Wilkins 375-XL-SAG.

- d. Watts 919-QT-S valve with 919AGC or 919AGF.
  - e. Or approved equivalent.
- 3. Backflow Prevention Assemblies - Reduced Pressure Zone Backflow Preventer (RPBP) for High Hazard Applications - 2-1/2-inches and Larger:
  - a. Febco 860 with 758A.
  - b. Conbraco Apollo 40-700 with 758A.
  - c. Watts 909-S-NFA-NRS with AGC.
  - d. Wilkins 375-FSC.
  - e. Or approved equivalent.
- 4. Backflow Prevention Assemblies - Double Check Valve Assembly (DCVA) for Low Hazard Applications - 2-inches and smaller:
  - a. Febco 850-650A
  - b. Conbraco Apollo 40-110-T2
  - c. Watts 007-QT-FDA-S
  - d. Wilkins 350-S-XL
  - e. Or approved equivalent.
- 5. Backflow Prevention Assemblies - Double Check Valve Assembly (DCVA) for Low Hazard Applications - 2-1/2-inches and larger:
  - a. Conbraco Apollo 45-11-1
  - b. Watts 709-DCDA with 77F-01-FDA-12
  - c. Or approved equivalent.

I. Spill Resistant Pressure Vacuum Breaker:

- 1. Febco
- 2. Conbraco
- 3. Watts

4. Wilkins
5. Or approved equivalent.

J. Atmospheric Vacuum Breakers:

1. Febco
2. Conbraco
3. Watts
4. Wilkins
5. Or approved equivalent.

K. Pressure Regulating Valve-Domestic Water:

1. Cash Acme
2. Cla-Val
3. Watts
4. Wilkins
5. Or approved equivalent.

L. Thermostatic Master Mixing Valves (ASSE 1017 Rated):

1. Holby Tempering Valve
2. Lawler Series 66
3. Leonard Type TM
4. Powers LFMM430 (Lead Free)
5. Symmons Temp Control Series 5
6. Or approved equivalent.

M. Thermostatic Point-of-Use Mixing Valves (ASSE 1070 Rated):

1. Lawler
2. Leonard

3. Powers Hydroguard
4. Or approved equivalent.

## 2.02 VALVES - GENERAL

### A. General

1. Sizes: Unless otherwise indicated, provide valves of the same size as the upstream pipe size.
2. Operators: Provide handwheels, fastened to valve stem, for valves other than quarter-turn. Provide lever handle for quarter-turn valves 6 inches and smaller. Provide gear operators for quarter-turn valves 8 inches and larger and plug valves installed over 5 feet above the finished floor.
3. Valve Identification: The manufacturer's name (or trademark) and pressure rating clearly marked on the valve body.

### B. Valves in Insulated Piping: With 2-inch stem extension and the following features:

1. Ball Valves: With an extended operating handle of non-thermal-conductive material and protective sleeve that allows operation on the valve without breaking the vapor seal or disturbing insulation and memory stops that are fully adjustable after the insulation is applied.

### C. Valve-End Connections:

1. Flanged: With flanges according to ASME B16.1 for iron valves.
2. Solder Joint: With sockets according to ASME B16.18.
3. Threaded: With thread according to ASME B1.20.1.

### D. Valve Bypass and Drain Connections: MSS SP-45.

### E. Building Service:

1. Shutoff and Isolation Valves:
  - a. Pipe Sizes 3-inches and Smaller: Ball Valve.
2. Drain Service: Ball Valves.
3. Strainer Blow-Off: Ball Valve.
4. Check Valves: Swing.



## 2.03 GATE VALVES

### A. Gate Valves - Class 125:

1. 2-inches and Smaller: MSS SP-80, Class 125, ASTM B62 cast bronze composition body, bonnet, and solid disc, copper-silicon non-rising stem, brass packing gland, Teflon impregnated packing, and malleable iron hand-wheel.
2. 2-1/2-inches and Larger: MSS SP-70, Class 125, ASTM A126 Grade B Ductile iron body, bolted bonnet and disc, bronze trim, copper silicon non-rising stem, bronze packing gland, Teflon impregnated packing and malleable iron hand-wheel.

### B. Gate Valves - Class 150:

1. 2-inches and Smaller: Class 150, MSS SP-80, ASTM B62 cast bronze body, bronze bonnet, bronze wedge, non-rising stem, brass packing gland, non-asbestos packing, and aluminum or malleable iron hand-wheel.
2. 2 1/2-inches and Larger: Class 150, MSS SP-70, ASTM A126 Grade B, IBBM, ductile iron body, bonnet and wedge, bronze trim, non-rising stem, brass packing gland, non-asbestos packing, and cast iron hand-wheel.

### C. Gate Valves - Class 250:

1. 2-inches and Smaller: Class 250, SWP, MSS SP-80, ASTM B61, cast bronzed body, bronze bonnet, bronze wedge, non-rising stem, bronze packing gland, non-asbestos packing, and aluminum or malleable iron hand-wheel.
2. 2 1/2-inches and Larger: Class 250, SWP, MSS, SP-70, ASTM A126, Grade B cast iron body, cast iron bonnet, cast iron wedge, bronze trim, non-rising stem, brass packing gland, non-asbestos packing, and cast iron hand-wheel.

## 2.04 BALANCING VALVES

### A. Maximum 125 PSIG System Working Water Pressure.

### B. Manual Set Balancing Valves:

1. Valves are to be of the "Y" pattern, equal percentage globe-style and provide three functions:
  - a. Precise flow measurement.
  - b. Precision flow balancing.
  - c. Positive drip-tight shut-off.

2. Valve to provide multi-turn, 360-degree adjustment with micrometer-type indicators located on the valve handwheel. Valves have a minimum of five full 360-degree handwheel turns. 90-degree circuit-setter style ball valves are not acceptable. The valve handle has a hidden memory feature, which will provide a means for locking the valve position after the system is balanced. Valves are to be furnished with precision machined venturi built into the valve body to provide highly accurate flow measurement and flow balancing. The venturi is to have two 1/4-inch threaded brass metering ports with check valves and gasketed caps located on the inlet side of the valve. Valves are to be furnished with flow-smoothing fins downstream of the valve seat and integral to the forged valve body to make the flow more laminar. The valve body, stem, and plug is to be brass. The handwheel is to be high-strength resin.
3. 2-1/2-inch and Larger: Valves are to be of the "Y" pattern, equal percentage globe-style, and provide three functions:
  - a. Precise flow measurement.
  - b. Precision flow balancing.
  - c. Positive drip-tight shut off. Valve to provide multi-turn, 360-degree adjustment with micrometer-type indicators located on the valve handwheel. Valves are to have a minimum of five full 360-degree handwheel turns. 90-degree circuit-setter style ball valves are not acceptable. The valve handle has a hidden memory feature, which will provide a means for locking the valve position after the system is balanced. Valve body to be either cast iron with integrated cast iron flanges (2-1/2-inch to 12-inch) or ductile iron with industrial standard grooved ends (2-1/2-inch to 12-inch). The valve stems, and plug disc is to be bronze with a handwheel that permits multi-turn adjustments. Sizes 2-1/2-inch and 3-inch - five turns, sizes 4-inch to 6-inch - 6 turns, sizes 8-inch to 10-inch - 12 turns, and size 12-inch - 14 turns. Flange adapters are to be provided to prevent rotation.

C. Automatic Flow Control Valve:

1. 1/2-inches and Larger: Construction and attachment style as required by piping system. Internal working parts and removable flow cartridge stainless steel. Valves to be factory set and automatically limit flow to specified capacities with 5 percent plus or minus accuracy over entire operating pressure differential.
2. Provide shut-off valve of supply side of valve and check valve on discharge side of valve.
3. Minimum Flow Through Valve:
  - a. 1/2-inches size: 1 gpm.

- b. 3/4-inches size: 1.5 gpm.

## 2.05 BALL VALVES

- A. All ball valves on brazed piping are to be three-piece.
- B. 2-1/2 Inches and Smaller: MSS SP-110, 400-600 PSI, two-piece full port ball configuration, bronze body, extended soldered ends for copper pipe and threaded ends for iron pipe, lead-free brass or stainless steel ball, lead-free brass stem, Teflon seat, extended steel handle. Apollo 77CLF 100 Series two-piece.
- C. 3 Inches and Larger: MSS SP-110, 400-600 PSI, three-piece full port ball configuration, bronze body, extended soldered ends for copper pipe and threaded ends for iron pipe, lead-free brass or stainless steel ball, lead-free brass stem, Teflon seat, extended steel handle. Apollo 82- 100/82A 140 Series three-piece.
- D. Full Port Ball Valve: 2- to 4-inch ductile iron, ASTM A536, micro finish steel chrome-plated or stainless steel ball and stem. TFE seats, 600 PSI.

## 2.06 SWING CHECK VALVES

- A. 2 inches and Smaller: Class 125, bronze body, horizontal swing, regrinding type, Y-pattern, renewable disc. Nibco 413. MSS SP-80.
- B. 2-1/2-inches and Larger: Class 125, iron body, bolted bonnet, horizontal swing, Renewable seat, disc, flanged ends. Nibco F918. MSS SP-71.
- C. Rubber Flapper Check Valve: Horizontal or vertical upward flow installation. Working pressure to 175 PSI. Ductile iron or cast iron body. Steel-reinforced Buna-N rubber flapper epoxy coating on wetted parts. MSS SP-80.
- D. Gruvlok Series 7800 Check Valve: Horizontal installation. Working pressure to 300 PSI, Type 304/302 Stainless Steel conforming to ASTM 167. Ductile body, ASTM A536, stainless clapper, EPDM, nitrile or optional Viton bumper, and bonnet seals. Stainless wetted parts.

## 2.07 BACKFLOW PREVENTION ASSEMBLIES

- A. General: Assemblies model numbers listed below are for general comparison. Project-specific model numbers are to be verified contractor as approved by the jurisdiction where the project is located.
- B. Reduced Pressure Zone Backflow Preventer (RPBP) for High Hazard Applications:
  - 1. 2-inches and Smaller: Assembly consists of shutoff ball valves in the inlet and outlet and strainer on the inlet. Assemblies include test cocks and pressure-differential relief valves located between two positive seating check valves and

comply with the requirements of ASSE Standard 1013 and AWWA C511. Bronze construction, threaded ends, stainless steel internal parts, FDA strainer, and air gap fitting. Route pipe from air gap fitting to the approved waste receptor.

2. 2-1/2-inches and Larger: Assembly consists of shutoff OS&Y gate valves in the inlet and outlet and strainer on the inlet. Assemblies include test cocks and pressure-differential relief valves located between two positive seating check valves and comply with the requirements of ASSE Standard 1015 and AWWA C511. Epoxy-coated cast iron body construction, flanged ends, stainless steel internal parts, bronze seats, and FDA strainer.

C. Double Check Valve Assembly (DCVA) for Low Hazard Applications:

1. 2-inches and Smaller: Assembly consists of shutoff ball valves in the inlet and outlet and FDS strainer on the inlet. Assemblies include test cocks and two positive seating check valves and comply with the requirements of ASSE Standard 1015 and AWWA C510. Bronze construction, threaded ends, and stainless-steel internal parts.
2. 2-1/2-inches and Larger: Assembly consists of shutoff OS&Y gate valves in the inlet and outlet and strainer on the inlet. Assemblies include test cocks and two positive seating check valves and comply with the requirements of ASSE Standard 1015 and AWWA C510. Epoxy coat cast iron body construction, strainer flanged ends, and stainless-steel internal parts.

D. Spill Resistant Pressure Vacuum Breaker: Watts Model 800MCQT with 777S "Y" strainer.

E. Atmospheric Vacuum Breaker: Assembly consists of a bronze vacuum breaker body with a silicone disc and full-size orifice. Device to be IAPMO listed, meet ASSE standard 1001, and ANSI standard A113.1.1 rough chrome plate finish.

## 2.08 PRESSURE REGULATING VALVE-DOMESTIC WATER

- A. Water: Bronze body, diaphragm or piston type, spring actuated, with separate or integral stainless-steel strainer, pressure range to suit conditions, approved for potable water use, low lead. Provide shutoff valves, pressure relief valves, unions, drain valves, and bypasses.
- B. Water: Automatic control pressure regulating valve, stainless steel seat, stem and spring, diaphragm actuated with brass body, hydraulic control pilots with effluent operating temperature range 32 degrees F to 180 degrees F, FDA and AWWA approved.
- C. Water: Bronze body construction, stainless steel strainer screen, thermal expansion bypass with a renewable stainless-steel seat, and high temperature resisting diaphragm.

## 2.09 THERMOSTATIC MASTER MIXING VALVES (ASSE 1017 RATED)

- A. Thermostatic type with bronze body construction, corrosion resistant materials, union end

stops, check inlets with strainers, 0-200 degree F dial thermometer, and discharge shut-off valve. Mixing valves to meet ASSE 1017.

- B. Maximum required delta temperature differential between hot water supply temperature and delivery temperature is 15 degrees F. Set valve outlet temperature per drawing requirements.
- C. Flow from the tempered water circulating pump to be split to mixing valve and building hot water heating system.

#### 2.10 THERMOSTATIC POINT-OF-USE MIXING VALVES (ASSE 1070 RATED)

- A. Thermostatic type with bronze body construction, corrosion resistant materials, union end stops, check inlets with strainers, 0-200 degree F dial thermometer and discharge shut-off valve. Mixing valves to meet ASSE 1070.
- B. Maximum required delta temperature differential between hot water supply temperature and delivery temperature is 15 degrees F. Set valve outlet temperature per drawing requirements.

END OF SECTION



**SECTION 31 05 13**  
**SOIL MATERIALS**

**PART 1 – GENERAL**

**1.01 SECTION INCLUDES**

- A. Subsoil materials
- B. Topsoil materials

**1.02 RELATED SECTIONS**

- A. SECTION 31 22 13 – Rough Grading
- B. SECTION 31 23 33 - Trenching and Backfill

**1.03 REFERENCES**

- A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in. Drop.
- B. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb Rammer and 12 inch Drop.
- C. ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- D. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb Rammer and 18 inch Drop.
- E. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- F. ASTM D2487 - Classification of Soils for Engineering Purposes.
- G. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- H. ASTM D3017 - Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

**PART 2 – PRODUCTS**

**2.01 SUBSOIL MATERIALS**

A. Subsoil Type S2:

1. Excavated and re-used material or imported borrow.
2. Graded.
3. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.

2.02 TOPSOIL MATERIALS

A. Topsoil Type S4:

1. Excavated and reused material.
2. Graded.
3. Free of roots, rocks larger than ½ inch, subsoil, debris, large weeds and foreign matter.

2.03 AGGREGATE FILL MATERIALS

A. Aggregate fill Type A1:

1. Limestone aggregate meeting ALDOT requirements for a No. 57 stone or smaller.

PART 3 – EXECUTION

3.01 SOIL REMOVAL

- A. Excavate subsoil and topsoil as shown on finished contours.
- B. Remove lumped soil, boulders, and rock.
- C. Stockpile excavated material in area designated on site and remove excess material not being used, from site.

3.02 STOCKPILING

- A. Stockpile materials off site at locations approved by the OWNER.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.



D. Prevent intermixing of soil types or contamination.

E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

### 3.03 STOCKPILE CLEANUP

A. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION



## **SECTION 31 10 00 SITE CLEARING**

### **PART 1 – GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Removal of surface debris
- B. Removal of paving, curbs, and sidewalks
- C. Removal of trees, shrubs, and other plant life

#### **1.02 RELATED SECTIONS**

- A. SECTION 31 22 13 – Rough Grading

#### **1.03 REGULATORY REQUIREMENTS**

- A. Conform to State and local laws and ordinances for environmental requirements, disposal of debris, burning debris on site, and use of herbicides.
- B. Coordinate clearing Work with utility companies.
- C. The CONTRACTOR is responsible for obtaining any storm water discharge permits required during construction.

### **PART 2 – PRODUCTS (NOT USED)**

### **PART 3 – EXECUTION**

#### **3.01 PREPARATION**

- A. Verify that existing plant life designated to remain is tagged or identified. Contact the property owners at properties that will be affected by this project and have the property owners identify any plants or items they want moved out of the construction zone. If feasible, CONTRACTOR shall move the requested items.
- B. Identify an area offsite that meets local laws and ordinances for placing removed materials.
- C. Locate all existing utilities and notify ENGINEER of possible conflicts.

#### **3.02 PROTECTION**

- A. Locate, identify, and protect utilities that remain from damage.

- B. Protect trees, plant growth, and features designated to remain, as final landscaping.
- C. Protect benchmarks, survey control points, and existing structures from damage or displacement.
- D. Protect adjoining property from damage. CONTRACTOR is responsible for any damage that is caused as a result of this project.
- E. CONTRACTOR to remove all vegetation within the work area and dispose of offsite.

### 3.03 CLEARING

- A. Clear areas required for access to site and execution of Work. Keep disturbance to a minimum.
- B. Remove and dispose of trees and shrubs as needed within the boundaries of the project. Remove stumps. Approval must be obtained from ENGINEER or OWNER before any cutting of trees or shrubs will be allowed.
- C. Clear undergrowth and dead wood, without disturbing subsoil.
- D. Apply herbicide to remaining stumps and roots to inhibit growth.

### 3.04 REMOVAL

- A. Remove debris, rock, and extracted plant life from site.
- ~~B. Partially remove and dispose all paving, curbs, and sidewalks; as indicated on the Plans. Neatly saw cut edges at right angle to surface.~~

END OF SECTION

## **SECTION 31 22 13 ROUGH GRADING**

### **PART 1 – GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Removal of topsoil and subsoil.
- B. Cutting, grading, filling, rough contouring, compacting, and preparing the site for building pads, paving, curb and gutter, sidewalks, etc.

#### **1.02 RELATED SECTIONS**

- A. Section 31 10 00 - Site Clearing
- B. Section 31 05 13 – Soil Materials

#### **1.03 REFERENCES**

- A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10 lb Rammer and an 18m inch Drop.
- B. ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- C. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb Rammer and 12 inch Drop.
- D. ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- E. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb Rammer and 18 inch Drop.
- F. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- G. ASTM D2419 - Test Method For Sand Equivalent Value of Soils and Fine Aggregate.
- H. ASTM D2434 - Test Method For Permeability of Granular Soils (Constant Head).
- I. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- J. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

#### 1.04 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

### PART 2 – PRODUCTS

#### 2.01 MATERIALS

- A. Topsoil: Type S4 as specified in Section 31 05 13
- B. Subsoil Fill: Type S2 as specified in Section 31 05 13.
- C. Structural Fill: Type S2 as specified in Section 31 05 13.

### PART 3 – EXECUTION

#### 3.01 EXAMINATION

- A. Verify site conditions.
- B. Verify that the survey benchmark and intended elevations for the Work are as indicated.

#### 3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect utilities that remain from damage.
- D. Protect above and below-grade utilities that remain.
- E. Protect plant life, lawns, and other features remaining as a portion of final landscaping.
- F. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

#### 3.03 SUBSOIL EXCAVATION

- A. Excavate subsoil from areas to be further excavated, re-landscaped, or re-graded as indicated on the finished contours plan.
- B. Do not excavate wet subsoil.

- C. When excavating through roots, perform work by hand and cut roots with a sharp axe.
- D. Stockpile in the area approved by the OWNER to a depth not exceeding 8 feet and protect from erosion. Remove from the site; subsoil is not being reused.
- E. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key placed fill material to slope to provide a firm bearing.
- F. Stability: Replace damaged or displaced subsoil to the same requirements as for specified fill.

#### 3.04 FILLING

- A. Fill areas to contours and elevations with unfrozen materials.
- B. Maintain optimum moisture content of fill materials to attain required compaction density.
- C. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise.
- D. Make grade changes gradual. Blend slope into level areas.
- E. Remove surplus fill materials from site.

#### 3.05 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 1/10 of a foot from required elevation.

END OF SECTION





**SECTION 31 23 00  
EARTHWORK**

**PART 1 – GENERAL**

**1.01 SECTION INCLUDES**

- A. Protection, modification, or installation of utilities as site work progresses with particular attention to grade changes and necessary staging or phasing of work.
- B. Cutting, filling, and grading to required lines, dimensions, contours, and elevations for proposed improvements.
- C. Scarifying, compacting, drying, dewatering and removal of unsuitable material to ensure proper preparation of areas for fills or proposed improvements.

**1.02 REFERENCE STANDARDS**

- A. American Society for Testing and Materials (ASTM) latest edition
  - 1. D422 Standard Test Method For Particle – Size Analysis of Soil
  - 2. D 698 Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN.m/m<sup>3</sup>))
  - 3. D 1557 Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 Kn.m/m<sup>3</sup>))
  - 4. D 2216 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures
  - 5. D 2487 Classification of Soils for engineering Purposes
  - 6. D 2922 Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)
  - 7. D 3017 Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
  - 8. D 4318 Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- B. American Association of State Highway and Transportation Officials (AASHTO) latest edition

1. T 88 Particle Size Analysis of Soils
2. State Department of Transportation (DOT): Standard Specifications for Construction and Materials, Latest Edition

#### 1.03 QUALITY ASSURANCE

- A. An independent testing laboratory, selected and paid by OWNER, will be retained to perform construction testing on site.
  1. The independent testing laboratory shall prepare test reports that indicate test location, elevation data, and test results. OWNER, Civil Engineering Consultant, and CONTRACTOR shall be provided with copies of reports within 96 hours of time that test was performed. In event that test performed fails to meet Specifications, the independent testing laboratory shall notify OWNER and CONTRACTOR immediately.
  2. Costs related to retesting due to failures shall be paid for by CONTRACTOR at no additional expense to OWNER. CONTRACTOR shall provide free access to site for testing activities.
  3. Quality assurance testing shall be in accordance with Part 3, Section 3.07, "Field Quality Control".

#### 1.04 SUBMITTALS

- A. Submit 30-pound sample of each type of fill/backfill material that is to be used in airtight container(s) to the independent testing laboratory for classification and certification of material.
- B. Submit name of each material supplier and specific type and source of each material. Change in source throughout project requires approval of OWNER.
- C. If fabrics or geogrids are to be used, design shall be submitted for approval to OWNER.
- D. Submit Dewatering Plans upon request by OWNER.

### PART 2 – PRODUCTS

#### 2.01 MATERIALS

- A. Excavated and re-used material for subsoil fill as specified herein.
- B. Aggregate fill as specified in Section 31 05 13.

- C. Imported fill material approved by OWNER and specified herein.
- D. Topsoil fill as specified in Section 31 05 13.
- E. Filter and drainage fabrics as specified in Section 01 57 13.

## 2.02 EQUIPMENT

- A. Transport off-site materials to project using well-maintained and operating vehicles. Once on site, transporting vehicles shall stay on designated haul roads and shall at no time endanger improvements by rutting, overloading, or pumping.

## 2.03 SOURCE QUALITY CONTROL

- A. In areas to receive pavement, California Bearing Ratio (CBR) test shall be performed for each type of material that is imported from off-site. Acceptable California Bearing Ratio (CBR) shall be 10.
- B. Following tests shall be performed as part of construction testing requirements on each type of on-site or imported soil material used as compacted fill:
  - 1. Moisture and Density Relationship: ASTM D 698 (or ASTM D 1557)
  - 2. Mechanical Analysis: AASHTO T 88 (or ASTM D422)
  - 3. Plasticity Index: ASTM D 4318

## PART 3 – EXECUTION

### 3.01 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Locate and identify existing utilities that are to remain and protect from damage.
- C. Notify utility companies to remove or relocate public utilities that are in conflict with proposed improvements.
- D. Protect plant life, lawns, fences, existing structures, sidewalks, paving, and curbs, unless otherwise noted on construction drawings from excavating equipment and vehicular traffic.
- E. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker is destroyed or needs to be removed it shall be reset by licensed land surveyor and replaced, as necessary, by same.

- F. Remove from site, material encountered in grading operations that, in opinion of OWNER or Agent, is unsuitable or undesirable for backfilling, subgrade, or foundation purposes. Dispose of in manner satisfactory to OWNER. Backfill areas with layers of suitable material and compact as specified herein.
- G. Prior to placing fill in low areas, such as previously existing creeks, ponds, or lakes, perform following procedures:
  - 1. Drain water out by gravity with ditch having flow line lower than lowest elevation in low area. If drainage cannot be performed by gravity ditch, use adequate pump to obtain the same results.
  - 2. After drainage of low area is complete, remove mulch, mud, debris, and other unsuitable material by using acceptable equipment and methods that will keep natural soils underlying low area dry and undisturbed.
  - 3. All muck, mud, and other materials removed from low areas shall be dried on-site by spreading in thin layers for observation by OWNER or Agent. Material shall be inspected and, if found to be suitable for use as fill material, shall be incorporated into lowest elevation of site filling operation, but not under building subgrade or within 10'-0" of perimeter of building subgrade or paving subgrade. If, after observation by OWNER or Agent, material is found to be unsuitable, unsuitable material shall be removed from site.
- H. Undercut and recompact loose sands in the upper 2 to 3 feet of existing grade prior to placement of any fill.
- I. Prior to constructing any slopes, begin by undercutting the toe to key in the fill mass to be constructed. Provide benches into existing slopes in accordance with the construction drawings.

### 3.02 EXCAVATION FOR FILLING AND GRADING

- A. Classification of Excavation: CONTRACTOR acknowledges that site has been investigated to determine type, quantity, quality, and character of excavation work to be performed. Excavation shall be considered unclassified excavation, except as indicated in the Contract Documents.
- B. When performing grading operations during periods of wet weather, provide adequate dewatering, drainage and ground water management to control moisture of soils.
- C. Shore, brace, and dewater excavations as necessary to maintain excavation in accordance with OSHA regulations.

- D. Excavated material containing rock or stone greater than 4-inches in largest dimension shall not be used within the upper 24-inches of proposed subgrade in parking and drive areas and within 48" of the subgrade of building areas to 10 feet outside of the building area.
- E. Rock or stone less than 12-inches in largest dimension is acceptable as fill to within the upper 24-inches of proposed subgrade in parking and drive areas, and 48" of the subgrade of building areas to 10 feet outside of the building area.
- F. Rock or stone less than 4-inches in largest dimension and mixed with suitable material is acceptable as fill within the upper 24-inches of proposed subgrade in parking and drive areas, and 48" of the subgrade of building areas to 10 feet outside of the building area.

### 3.03 FILLING AND SUBGRADE PREPARATION

- A. Fill areas to contours and elevations shown on Construction Drawings with unfrozen materials.
- B. Place fills in continuous lifts specified herein.
- C. Subgrade areas exposed by excavation or stripping subgrade shall be scarified to minimum depth of 8-inches and compacted to minimum of 98 percent of maximum density, in accordance with ASTM D 698. Moisture content shall be within 2 percent of optimum moisture content. These areas shall then be proofrolled to detect areas of insufficient compaction. Proofrolling shall be accomplished by making minimum of 2 complete passes with fully-loaded tandem-axle dump truck with a maximum weight of 20 tons, or approved equal, in each of 2 perpendicular directions while under the supervision and direction of the independent testing laboratory. Areas of failure shall be excavated and recompacted as specified herein. Continual failure areas shall be stabilized at no additional cost to OWNER.
- D. Fill materials used in preparation of subgrade in all areas other than structures, utilities, or pavements(see related sections for backfilling within these areas) shall be placed in lifts or layers not to exceed 8-inches loose measure and compacted to 98 percent of maximum density, in accordance with ASTM D 698. Moisture content shall be within 2 percent of optimum moisture content.
- E. Material imported from off-site shall have CBR value equal to or above pavement design of 10

### 3.04 MAINTENANCE OF SUBGRADE

- A. Verify finished subgrades to ensure proper elevation and conditions for construction above subgrade.

- B. Protect subgrade from excessive wheel loading during construction, including concrete trucks, dump trucks, and other construction equipment.
- C. Remove areas of finished subgrade found to have insufficient compaction density to depth necessary and replace in manner that will comply with compaction requirements by use of material equal to or better than best subgrade material on site. Surface of subgrade after compaction shall be hard, uniform, smooth, stable, and true to grade and cross-section.

### 3.05 BORROW AND SPOIL SITES

- A. CONTRACTOR shall be responsible for compliance with NPDES and local erosion control permitting requirements for any and all, on-site and off-site, disturbed spoil and borrow areas. Upon completion of spoil and/or borrow operations, the CONTRACTOR shall clean up spoil and/or borrow areas in a neat and reasonable manner to the satisfaction of off-site property owner, if applicable, OWNER, and Engineering Consultant

### 3.06 RIPRAP

- A. Place rip-rap in areas where indicated on Construction Drawings. Stone for rip-rap shall consist of field stone or rough unhewn quarry stone as nearly uniform in section as is practical. Stones shall be dense, resistant to action of air and water, and suitable for purpose intended. Unless otherwise specified, stones used as rip-rap shall weigh between 50-pounds and 150-pounds each, and at least 60 percent of stones shall weigh more than 100-pounds each.
- B. Dress slopes and other areas to be protected to line and grade shown on Construction Drawings prior to placing of rip-rap. Undercut areas to receive rip-rap to elevation equal to final elevation less average diameter of stones before placing rip-rap.
- C. Install filter fabric and bedding stone prior to placement of stones if so indicated on Construction Drawings. Bedding stone shall be quarried and crushed angular limestone, 6-inches in depth in accordance with Section 31 05 13. Filter fabric shall be as specified in Section 01 57 13 and as detailed on Construction Drawings.
- D. Place stones so that greater portion of weight is carried by earth and not by adjacent stones. Place stones in single layer with close joints. Upright areas of stone shall make angle of approximately 90 degree with embankment slope. Place courses from bottom of embankment upward, with larger stones being placed in lower courses. Fill open joints and embed stones in embankment as necessary to present uniform top surface such that variation between tops of adjacent stones shall not exceed 3-inches.

### 3.07 FINISH GRADING

- A. Grade areas where finish grade elevations or contours are indicated on Construction Drawings, other than paved areas and buildings, including excavated areas, filled and transition areas, and landscaped areas. Graded areas shall be uniform and smooth, free from rock, debris, or irregular surface changes. Finished subgrade surface shall not be more than 0.10-feet above or below established finished subgrade elevation. Ground surfaces shall vary uniformly between indicated elevations. Grade finished ditches to allow for proper drainage without ponding and in manner that will minimize erosion potential. For topsoil, sodding and seeding requirements refer to Section 01 57 13.
- B. Correct settled and eroded areas within 1 year after date of completion at no additional expense to OWNER. Bring grades to proper elevation. Replant or replace grass, shrubs, bushes, or other vegetation that appears dead, dying, or disturbed by construction activities.

### 3.08 FIELD QUALITY CONTROL

- A. Field density tests for in-place materials shall be performed as part of construction testing requirements according to one of following standards:
  - 1. Nuclear Method: ASTM D 2922 (Method B-Direct Transmission)
- B. Perform density test as follows:
  - 1. Building Subgrade Areas, Including 10'-0" Outside of Exterior Building Lines: In cut areas, not less than 1 compaction test for every 2,500 sq. ft. In fill areas, same rate of testing for each 8-inch lift, measured loose.
  - 2. Areas of Construction Exclusive of Building Subgrade Areas: In cut areas, not less than 1 compaction test for every 10,000 sq. ft. In fill areas, same rate of testing for each 8-inch lift, measured loose.
- C. Corrective measures for non-complying compaction:
  - 1. Remove and recompact deficient areas until proper compaction is obtained at no additional expense to OWNER.

END OF SECTION





**SECTION 31 23 33**  
**TRENCHING AND BACKFILLING**

**PART 1 – GENERAL**

**1.01 SECTION INCLUDES**

- A. Excavating trenches for utilities.
- B. Compacted fill from the top of utility bedding to subgrade elevations.
- C. Backfilling and compaction.

**1.02 RELATED SECTIONS**

- A. Section 31 05 13 - Soil Materials.
- B. Section 33 30 00 – Sanitary Sewerage

**1.03 REFERENCES**

- A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in. Drop.
- B. ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- C. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb Rammer and 12 inch Drop.
- D. ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- E. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb Rammer and 18 inch Drop.
- F. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- G. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- H. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

**1.04 DEFINITIONS**

- A. Utility: Any buried pipe, duct, conduit, or cable.

#### 1.05 FIELD MEASUREMENTS

- A. Verify that the survey bench-mark, control point, and intended elevations for the Work are as shown on drawings.

#### 1.06 COORDINATION

- A. Verify work associated with lower elevation utilities is complete before placing higher elevation utilities.

### PART 2 – PRODUCTS

#### 2.01 MATERIALS

- A. Fill Type S2: As specified in Section 31 05 13.
- B. Structural Fill Type A1: As specified in Section 31 05 13.
- C. Concrete: Concrete thrust blocks are to be cast in place with a compressive strength of 3,000 psi.

### PART 3 – EXECUTION

#### 3.01 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Protect plant life, lawns, and other features remaining as a portion of final landscaping.
- C. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- D. Maintain and protect above and below-grade utilities, which are to remain.
- E. Cut out soft areas of sub-grade not capable of compaction in place. Backfill with Fill Type S2 or A1 and compact to a density equal to or greater than requirements for subsequent backfill material.

#### 3.02 EXCAVATING

- A. Excavate subsoil required for utilities.
- B. Cut trenches sufficiently wide to enable installation and allow inspection. Minimum width

of trenches shall be as indicated in the plans. Remove water or materials that interfere with Work.

- C. Do not interfere with 45 degrees bearing splay of foundations.
- D. Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.
- E. Remove lumped subsoil, boulders, rock, organic materials, and debris.
- F. Correct areas over-excavated by backfilling with appropriate material.
- G. Stockpile excavated material in area designated on site and removed excess material not being used from the site.

### 3.03 BACKFILLING

- A. Backfill trenches to contours and required cover with unfrozen fill materials.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy sub-grade surfaces.
- C. Granular Fill A1: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.
- D. Soil Fill Type S2: Place and compact material in equal continuous layers not exceeding 12 inches compacted depth.
- E. Employ a placement method that does not disturb or damage utilities in the trench.
- F. Maintain optimum moisture content of fill materials to attain required compaction density.
- G. Remove surplus fill materials from the site.

### 3.04 TOLERANCES

- A. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.
- B. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

### 3.05 PROTECTION OF FINISHED WORK

- A. Protect finished Work.
- B. Reshape and re-compact fills subjected to vehicular traffic during construction.

### 3.06 SCHEDULE

#### A. Sewer Main – Type 3 Laying Condition (Normal Soil):

1. Pipe bedded in loose consolidated soil type S-2; 4-inch minimum.
2. Backfill to a minimum cover of 36" above pipe with lightly consolidated Fill Type S2.
3. A minimum of 4 inches of topsoil type S4 at the surface

#### B. Sewer Main – Type 4 Laying Condition (Normal Soil):

1. Pipe bedded in aggregate type A-1; 4 inch minimum.
2. Backfill to a minimum cover of 36" above pipe with Fill Type S2, in 12 inch lifts, compacted to 80 percent Standard Proctor, AASHTO T-99.
3. A minimum of 4 inches of topsoil type S4 at the surface

#### C. Sewer Main – Type 5 Laying Condition (Laying in Rock):

1. Pipe bedded in aggregate type A-1; 4 inch minimum.
2. Backfill to top of the pipe with aggregate type A-1; compacted in 8" lifts to 90 percent Standard Proctor, AASHTO T-99.
3. Backfill remainder to a minimum cover of 36" above pipe with Fill Type S2, in 12 inch lifts, compacted to 80 percent Standard Proctor, AASHTO T-99.
4. A minimum of 4 inches of topsoil type S4 at the surface

#### D. Sewer – Beneath roadways and drives:

1. Pipe bedded in aggregate type A-1; 4 inch minimum.
2. Backfill remainder to a minimum cover of 36" above pipe with Fill Type A-1, in 8 inch lifts, compacted to 90 percent Standard Proctor, AASHTO T-99.

END OF SECTION

## **SECTION 31 37 16 RIP RAP**

### **PART 1 – GENERAL**

#### **1.01 SECTION INCLUDES**

- A. RIP RAP

#### **1.02 RELATED SECTIONS**

- A. Section 31 22 13 - Rough Grading.
- B. Section 31 23 33 - Trenching and Backfilling

#### **1.03 UNIT PRICE – MEASUREMENT AND PAYMENT**

- A. Rip rap: By the ton.
- B. Geotextile Fabric: Subsidiary to the riprap tonnage price.

#### **1.04 QUALITY ASSURANCE**

- A. Perform work in accordance with ALDOT standards.

### **PART 2 – PRODUCTS**

#### **2.01 MATERIALS**

- A. Rip rap: ALDOT Class I Rip rap material consisting of graded stones ranging from 10 to 100 pounds with not more than 10% having a weight over 100 pounds and at least 50% having a weight over 50 pounds and not over 10% having a weight under 10 pounds.
- B. Rip rap: ALDOT Class IV Rip rap material consisting of graded stones ranging from 50 to 1,000 pounds with not more than 25% having a weight over 1000 pounds and at least 50% having a weight over 500 pounds and not more than 25% having a weight under 50 pounds.
- C. Geotextile Fabric: Non-biodegradable, woven.

### **PART 3 – EXECUTION**

#### **3.01 PLACEMENT**

- A. Place geotextile fabric over the substrate, lap edges, and ends.

- B. Place rip rap at embankment slopes as indicated.
- C. Installed Thickness: 18-inch average.

END OF SECTION

## **SECTION 32 13 13 CONCRETE PAVING**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Concrete sidewalks, stair steps, integral curbs, gutters, median barriers, parking areas, and Roads.

#### **1.02 RELATED SECTIONS**

- A. Alabama Standard Specifications for Roads and Bridges; State of Alabama Department of Transportation and Development; Latest Edition.
- B. ACI 301 -Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2005.
- C. ACI 305R -Hot Weather Concreting; American Concrete Institute International; 1999.
- D. ACI 306R -Cold Weather Concreting; American Concrete Institute International; 1988.

### **PART 2 – PRODUCTS**

#### **2.01 FORM MATERIALS**

- A. Wood or Steel form material, profiled to suit conditions.
- B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D 1751), sponge rubber or cork (ASTM D 1752), or Treated Redwood with cap or bonded and pressed fiber board with cap or Engineer approved equal.
  - 1. Thickness: 1/2" inch unless specified otherwise.

#### **2.02 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A 615/A 615M Grade 40 (280); deformed billet steel bars; unfinished finish.
- B. Steel Welded Wire Reinforcement: Plain type, ASTM A 185/A 185M; in flat sheets; unfinished.
- C. Dowels: ASTM A 615/A 615M Grade 40 (280); deformed billet steel bars; unfinished finish.

#### **2.03 CONCRETE MATERIALS**

- A. Obtain cementitious materials from same source throughout.

B. Concrete Materials: Provide in accordance with State of Alabama Highways standards.

## 2.04 ACCESSORIES

### A. Joint Sealer Requirements:

1. Type: S – Single Component.
2. Grade: P -Pourable or Self-Leveling used for horizontal traffic joints.
3. Use: T -Traffic.
4. Immersion rated sealant applications require primer.
5. Color: gray or stone

### B. Joint Cleaner:

1. Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

### C. Primer:

1. Non-staining type, recommended by sealant manufacturer to suit the application.

### D. Joint Backing:

1. Round foam rod compatible with sealant; oversized 25 to 50 percent larger than joint width; recommended by sealant manufacturer to suit the application.

### E. Bond Breaker:

1. Pressure sensitive tape recommended by sealant manufacturer to suit application.

### F. Masking tape:

1. Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

## 2.05 CONCRETE MIX DESIGN

A. Concrete mix shall conform to Section 109 of the Alabama Standard Specifications for Highway Construction, 2018 Edition.

### B. Concrete Properties:



1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days. As indicated on drawings.

## 2.06 MIXING

### A. On Project Site:

1. Mix in drum type batch mixer, complying with ASTM C 685. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

### B. Transit Mixers:

1. Comply with ASTM C 94/C 94M.

## PART 3 – EXECUTION

## 3.01 EXAMINATION

- A. Verify that compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of the base are correct.

## 3.02 SUB BASE

- A. Prepare subbase in accordance with State of Alabama Department of Transportation standards.

## 3.03 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Coat surfaces of manhole frames with oil to prevent bonding with concrete pavement.
- C. Notify the Engineer minimum 24 hours prior to commencement of concreting operations.

## 3.04 FORMING

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertically in position, in straight lines. Secure to formwork during concrete placement.

## 3.05 REINFORCEMENT

- A. Place reinforcement as indicated.

- B. Interrupt reinforcement at contraction joints.
- C. Place dowels to achieve pavement and curb alignment as detailed.

### 3.06 COLD AND HOT WEATHER CONCRETING

- A. Follow recommendations of ACI 305R when concreting during hot weather.
- B. Follow the recommendations of ACI 306R when concreting during cold weather.
- C. Do not place concrete when the base surface temperature is less than 40 degrees F, or the surface is wet or frozen.

### 3.07 PLACING CONCRETE

- A. Place concrete in accordance with State of Alabama Department of Transportation standards.
- B. Do not place concrete when the base surface is wet.
- C. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.
- D. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

### 3.08 JOINTS

- A. Align curb, gutter, and sidewalk joints.
- B. Place 1/4 inch wide expansion joints at Locations as detailed on the drawing's foot intervals and to separate paving from vertical surfaces and other components and in the pattern indicated.
  - 1. Form joints with joint filler extending from the bottom of the pavement to within 1/4 inch of the finished surface.
  - 2. Secure to resist movement by wet concrete.
- C. Provide keyed joints as indicated.
- D. Saw cut contraction joints 1/8 -7/16 inch wide at an optimum time after finishing. Cut shall be at 1/4 of the depth of the slab.

### 3.09 JOINT SEALING

- A. Examination

- B. Verify substrate surfaces and joint openings are ready to receive work.
- C. Verify joint surfaces are clean and dry.
- D. Ensure concrete surfaces are fully cured.
- E. Report unsatisfactory conditions in writing to the Engineer.
- F. Do not proceed until unsatisfactory conditions are corrected.

### 3.10 PREPARATION

- A. Prepare joints in accordance with ASTM C 1193 and manufacturer's instructions.
- B. Clean joint surfaces to remove dirt, dust, oils, wax, paints, and other contamination capable of affecting primer and sealant bonds.
- C. Clean concrete joint surfaces to remove curing agents and form release agents.
- D. Protect elements surrounding the Work of this section from damage or disfiguration.
- E. Apply masking tape to adjacent surfaces when required to prevent damage to finishes from sealant installation.

### 3.11 SEALANT INSTALLATION

- A. Install primer and sealants in accordance with ASTM C 1193 and the manufacturer's instructions.
- B. Install joint backing to maintain the following joint ratios:
  - 1. Joints up to 1/2 inch (13 mm) Wide: 1:1 width-to-depth ratio.
  - 2. Joints Greater than 1/2 inch (13 mm) Wide: 2:1 width to depth ratio; maximum 1/2 inch joint depth.
  - 3. Install a bond breaker where joint backing is not used.
  - 4. Apply primer where required for sealant adhesion.
  - 5. Install sealants immediately after joint preparation.
  - 6. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- C. Joining Silicone and Polyurethane Sealants:
  - 1. Install polyurethane sealants first.

2. Join silicone sealant to polyurethane in accordance with the manufacturer's instructions.
3. Tool exposed joint surface concave.

### 3.12 CLEANING

- A. Remove masking tape.
- B. Clean adjacent surfaces soiled by sealant installation.

### 3.13 TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.
- B. Maximum Variation From True Position: 1/4 inch.
- C. Maximum Variation From Design Thickness: 1/4 inch.

### 3.14 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 32 12 16.
  1. Provide free access to concrete operations at the project site and cooperate with the appointed firm.
  2. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
- B. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

### 3.15 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian or vehicular traffic over pavement for 7 days minimum after finishing.

END OF SECTION

## **SECTION 32 92 19 SEEDING**

### **PART 1 – GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Seeding, mulching, and fertilizer.
- B. Maintenance.

#### **1.02 RELATED SECTIONS**

- A. Section 31 05 13 - Soil Materials: Topsoil material.
- B. Section 31 23 33 - Trenching: Rough grading over cut.
- C. Section 32 91 19 - Landscape Grading: Preparation of subsoil and placement of topsoil in preparation for the work of this Section.

#### **1.03 UNIT PRICE – MEASUREMENT AND PAYMENT**

- A. Included in site work.

#### **1.04 REFERENCES**

- A. FS O-F-241 - Fertilizers, Mixed, Commercial.

#### **1.05 DEFINITIONS**

- A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

#### **1.06 MAINTENANCE DATA**

- A. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height and types, application frequency, and recommended coverage of fertilizer.

#### **1.07 QUALITY ASSURANCE**

- A. Provide seed mixture in containers showing the percentage of seed mix, year of production, net weight, date of packaging, and packaging location.

#### **1.08 REGULATORY REQUIREMENTS**

- A. Comply with regulatory agencies for fertilizer and herbicide composition.
- B. Provide a certificate of compliance from an authority having jurisdiction indicating approval of seed mixture.

#### 1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.
- B. Deliver fertilized in waterproof bags showing weight, chemical analysis, and name of the manufacturer.

#### 1.10 MAINTENANCE SERVICE

- A. Maintain seeded areas immediately after placement until the grass is well established and exhibits a vigorous growing condition.

### PART 2 – PRODUCTS

#### 2.01 SEED MIXTURE

- A. Seed Mixture:
  - 1. Pensacola Bahia Grass: 20 lbs/acre.
  - 2. Kentucky 31 Fescut: 20 lbs/acre.
  - 3. Bermuda Grass (Hulled): 20 lbs/acre.
  - 4. Reseeding Crimson Clover: 20 lbs/acre.
- B. Recommended seed mixture may vary depending on the time of year.

#### 2.02 SOIL MATERIALS

- A. Topsoil: As specified in Section 31 05 13 – Soil Materials: Type S-4.

#### 2.03 ACCESSORIES

- A. Mulching Material: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.
- B. Fertilizer: FS O-F-241, Type I, Grade A; recommended for grass, with fifty percent of the elements derived from organic sources, of proportion necessary to eliminate any deficiencies of topsoil.

- C. Water: Clean, fresh, and free of substances or matter which could inhibit vigorous growth of grass.
- D. Erosion Fabric: Jute matting, open weave.
- E. Stakes: Softwood lumber, chisel pointed.
- F. String: Inorganic fiber.

## PART 3 – EXECUTION

### 3.01 EXAMINATION

- A. Verify that the prepared soil base is ready to receive the work of this Section.

### 3.02 FERTILIZING

- A. Apply fertilizer in accordance with the manufacturer's instructions.
- B. Apply after smooth raking of topsoil.
- C. Do not apply fertilizer at the same time or with the same machine as will be used to apply seed.
- D. Mix thoroughly into the upper 2 inches of topsoil.
- E. Lightly water to aid the dissipation of fertilizer.

### 3.03 SEEDING

- A. Apply seed at a rate of 2 lbs per 1000 sq ft evenly in two intersecting directions. Rake in lightly.
- B. Do not seed areas in excess of that which can be mulched on the same day.
- C. Do not sow immediately following rain, when the ground is too dry, or during windy periods.
- D. Roll seeded area with roller not exceeding 112 lbs.
- E. Immediately following seeding and compacting, apply mulch.
- F. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

### 3.04 SEED PROTECTION

- A. Identify seeded areas with stakes and string around area periphery.
- B. Cover seeded slopes where the grade is 4 inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.
- C. Lay fabric smoothly on the surface and bury the top end of each section in a 6 inch deep excavated topsoil trench. Provide a 12 inch overlap of adjacent rolls. Backfill the trench and rake smooth, level with adjacent soil.
- D. Secure outside edges and overlaps at 36-inch intervals with stakes.
- E. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.
- F. At the sides of ditches, lay fabric laps in the direction of water flow. Lap ends and edges minimum 6 inches.

### 3.05 MAINTENANCE

- A. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches.
- B. Neatly trim edges and hand clip where necessary.
- C. Immediately remove clippings after mowing and trimming.
- D. Water to prevent grass and soil from drying out.
- E. Roll the surface to remove minor depressions or irregularities.
- F. Control the growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- G. Immediately reseed areas, which show bare spots.
- H. Protect seeded areas with warning signs during maintenance period.

END OF SECTION



**SECTION 33 01 10**  
**VALVES FOR WATER AND SEWER SYSTEMS**

**PART 1 GENERAL**

**1.01 SUMMARY**

**A. Section Includes:**

1. Tapping Sleeve and Valves
2. Rubber Seated Butterfly Valves
3. Resilient Wedge Gate Valves
4. Eccentric Plug Valves
5. Swing Check Valves
6. Silent Check Valves
7. Insertion Valves
8. Air/Vacuum and Air Release Valves (Including Combination Types)
9. Pilot Operated Control Valves
10. Line Stopping
11. Accessories

**B. Related Sections:**

1. Plans and general provisions of the Contract including General Conditions, Special Provisions and Technical Specifications.

**1.02 REFERENCES**

**A. American Water Works Association:**

1. AWWA C111 / A21.11-17 – Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings
2. AWWA C115 - ANSI Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
3. AWWA C116 – Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile Iron and Gray-Iron Fittings

4. AWWA C504 – Rubber-Seated Butterfly Valves
5. AWWA C508 – Swing Check Valves for Waterworks Service 2 in through 48 in
6. AWWA C509 – Resilient-Seated Gate Valves for Water Supply Service
7. AWWA C512 – Air Release, Air/Vacuum, and Combination Air Valves for Water and Wastewater Service.
8. AWWA C515 – Reduced Wall, Resilient-Seated Gate Valves for Water-Supply Service.
9. AWWA C517 – Resilient-Seated Cast Iron Eccentric Plug Valves
10. AWWA C530 – Pilot-Operated Control Valves
11. AWWA C541 – Hydraulic and Pneumatic Cylinder and Vane Type Actuators for Valves and Slide Gates
12. AWWA C542 – Electric Motor Actuators for Valves and Slide Gates
13. AWWA C550 - Protecting Epoxy Interior Coating for Valves and Hydrants.
14. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.

B. National Sanitation Foundation:

1. NSF 61 - Drinking Water System Components - Health Effects

### 1.03 UNIT PRICE – MEASUREMENT AND PAYMENT

A. Tapping Sleeve and Valve Assemblies:

1. Basis of Measurement: Each, unless otherwise noted in the Plans.
2. Basis of Payment: Includes all labor, material, and equipment associated with excavation (includes rock excavation), installation of tapping sleeve and tapping valve, tap of existing line, removal of coupon, installation of associated valve riser (valve box), concrete ring around top of valve box, valve marker, general fill, testing, cleanup and restoration, and all related items.

B. Insertion Valves:

1. Basis of Measurement: Each, unless otherwise noted in the Plans.
2. Basis of Payment: Includes all labor, material, and equipment associated with excavation (includes rock excavation), preparation of pipe at insertion site, and installation of the insertion valve assembly in accordance with the manufacturer's recommendations. Also includes installation of associated valve riser (valve box), concrete ring around top of valve box, valve marker, general fill, testing, cleanup and restoration, and all related items.

C. Water and Sewer Valves:

1. Basis of Measurement: Each, unless otherwise noted in the Plans or if a portion of an assembly.

2. Basis of Payment: Includes all labor, material, and equipment associated with excavation (including rock excavation), connection and placement of valve, joint restraints, installation of associated valve riser (valve box), concrete ring around top of valve box, valve marker, general fill, compaction, cleanup and restoration, testing, and all related items.

D. Pilot Operated Control Valve Assemblies:

1. Basis of Measurement: Per Each or Lump Sum as indicated in the Proposal.
2. Basis of Payment: Includes all labor, material, and equipment associated with excavation (including rock excavation), valve vault, pilot operated control valve, associated internal and external piping as indicated in the plans, associated isolation valves as indicated in the Plans, drain piping as indicated in the Plans, related site work, general fill, compaction, cleanup and restoration, testing, start- up and commissioning services, and all related items.

E. Air Release and Air/Vacuum Valve Assemblies:

1. Basis of Measurement: Each, unless otherwise noted in the Plans or if a portion of an assembly.
2. Basis of Payment: Includes all labor, material, and equipment associated with excavation (including rock excavation), vault or manhole for access, air valve assembly, connection to main, connecting internal piping, isolation valves and valves associated with accessories, drain piping as indicated in the Plans, fill as indicated in the plans, compaction, cleanup and restoration, testing, and all related items.

F. Line Stopping Assemblies:

1. Basis of Measurement: Each, unless otherwise noted in the Plans or if a portion of an assembly.
2. Basis of Payment: Includes all labor, material, and equipment associated with excavation (including rock excavation), preparation of pipe at the location to be stopped off, and the installation of a temporary line stopping assembly in accordance with the manufacturer's recommendations. Also includes a concrete line stop support (with pipe wrapped with visqueen or polywrap) according to the manufacturer's requirements, but with minimum dimensions of 2 feet from both ends and sides of the assembly and a depth from the spring line to 2 feet below the main.

1.04 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Shop Drawing:

1. Installation Plan: Submit description of proposed installation.
- C. Design Data: Submit manufacturer's latest published literature include illustrations, installation instructions, maintenance instructions and parts lists.
- D. Manufacturer's Certificates: Submit Statement of Compliance and supporting data, from material suppliers stating that equipment and accessories provided meet or exceed AWWA Standards, NSF 61 certification, and specification requirements.
- E. For Pilot-Operated Control Valves, provide schematic for pilot system operation.
- F. For Insertion Valves or Line Stopping Assemblies, provide proposed procedures.

#### 1.05 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 – Execution & Closeout Requirements.
- B. Project Record Documents: Record actual locations of valves and appurtenances.
- C. Provide Operation and Maintenance Data for equipment indicating materials of construction, recommended maintenance activities and intervals, procedures for adjustments and troubleshooting, and sources for procurement of replacement parts.
- D. For Pilot-Operated Control Valves, provide certification from manufacturer certifying installation of equipment in accordance with manufacturer's recommendations.
- E. Where the Plans or Special Provisions require such, provide spare parts and maintenance materials to Owner.

#### 1.06 QUALITY ASSURANCE

- A. All Products for use in potable water systems shall be NSF 61 certified.

#### 1.07 QUALIFICATIONS

- A. Manufacturer:
  1. Utilize equipment and materials from Owner's standard list of acceptable manufacturers provided in the Special Provisions. If no such list is provided, utilize equipment and materials from list of acceptable manufacturers provided in these specifications.
  2. Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three years documented experience.

## 1.08 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 - Product Requirements.
- B. Prepare valves and accessories for shipment according to AWWA Standards and seal valve ends to prevent entry of foreign matter into product body.
- C. Store products in accordance with manufacturer's written recommendations and instructions, and in areas protected from weather, moisture, or possible damage; do not store products directly on ground.
- D. Handle products in accordance with manufacturer's written recommendations and instructions, and in such a manner as to prevent damage to interior or exterior mechanisms and surfaces.

## 1.09 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures or utilities, and landscape in immediate or adjacent areas.

## PART 2 - PRODUCTS

### 2.01 BASIC PROVISIONS FOR GATE, PLUG, BUTTERFLY, AND CHECK VALVES

- A. End Connections: Mechanical joint, flanged, or wafer type as indicated in the Plans. If no such indication is provided, utilize mechanical joint for buried applications and flanged joints for exposed applications. Mechanical joints shall conform to AWWA C111 and shall be provided with retainer gland devices. Flanged joints shall conform to AWWA C115 ANSI B16.1 CL 150 unless noted otherwise and shall be provided with 316 stainless steel nuts and bolts.
- B. Valve operators:
  - 1. Provide gate, plug, and butterfly valves with open-left (counterclockwise) operation.
  - 2. Provide gate valves with non-rising stems unless specifically stated otherwise in the plans.
  - 3. Provide with 2-inch square operating nut for buried applications.
  - 4. Provide with handwheel operator for exposed applications with manual opening, or 2-inch square operating nut where electric or pneumatic actuator is utilized.

5. Provide side-mounted right-angle gear reducer on plug and butterfly valves 6-inch and larger, and on gate valves 16 inch and larger.

C. Coatings:

1. Provide fusion-bonded epoxy coating conforming to AWWA C116 on all valves for buried applications.
2. Provide coating in accordance with manufacturer's recommendations on all valves for exposed applications where this section is included. If section is not included provide bituminous coating.
3. Provide flow direction arrow on all plug and check valves.

## 2.02 TAPPING SLEEVES AND VALVES

A. Tapping Sleeves:

1. Stainless steel, full circumferential gasket, flanged outlet.
2. Manufacturers:
  - a. Mueller.
  - b. JCM Industries
  - c. Ford Meter Box Co.
  - d. Substitutions: Section 01600 - Product Requirements.
3. Outlet Flange Dimensions and Drilling: AWWA C207 Class D, ANSI 150lb. drilling and MSS SP-60.

B. Tapping Valves:

1. AWWA C515, resilient wedge with non-rising stem. Epoxy coated ductile iron body. Inlet flanges shall conform to ANSI B16.1, Class 150 and MSS SP-60. Mechanical joint outlets shall conform to AWWA C111.
2. Manufacturers:
  - a. Mueller
  - b. M and H
  - c. American Flow Control
  - d. Substitutions: Section 01 60 00 - Product Requirements.

## 2.03 RUBBER SEATED BUTTERFLY VALVES

A. Manufacturers:

1. Dezurik
  2. Pratt
  3. Valmatic
  4. Substitutions: Section 01 60 00 – Product Requirements
- B. Valve body and disc constructed of ASTM A 536 cast iron (Grade 65-45-12). Valve disc shall be of the solid type.
- C. Valve shaft constructed of ASTM A 276 Type 304 stainless steel.
- D. Resilient seat constructed of Buna-N mated to Type 316 stainless steel body seat ring. Resilient seat shall be located on the valve disc and shall provide a continuous, uninterrupted seating surface.
- E. All retaining hardware constructed of Type 316 stainless steel.
- F. 150 psi maximum working pressure rating unless stated otherwise in the plans.
- 2.04 RESILIENT WEDGE GATE VALVES

A. Manufacturers:

1. Mueller
  2. M and H Valve Co.
  3. American Flow Control
  4. Flomatic
  5. Substitutions: Section 01 60 00 - Product Requirements.
- B. Resilient Wedge Gate Valves: AWWA C515; ductile iron wedge and body.
1. Resilient seats.
  2. Stem: Non-rising bronze stem.
  3. Wedge: Ductile iron, completely encapsulated with resilient material.
  4. All internal parts shall be accessible without removing the body from the line.
  5. 250 psig maximum working pressure rating standard or 350 psi maximum working pressure rating where indicated on the plans.

2.05 ECCENTRIC PLUG VALVES

A. Manufacturers:

1. DeZurik
2. Mueller

3. Pratt
  4. Flomatic
  5. VSI (Pending AIS Requirements)
  6. Substitutions: Section 01 60 00 – Product Requirements
- B. Solid, one-piece plug constructed of cast iron conforming to ASTM A 126 Class B or ductile iron conforming to ASTM 536 Grade 65-45-12.
- C. Cast iron body conforming to ASTM A 126 Class B with rectangular port. Permanently lubricated sleeve-type bearings constructed of Type 316 stainless steel.
- D. Maximum working pressure rating of at least 175 psi for 12-inch and smaller valves, at least 150 psi for larger valves.

## 2.06 SWING CHECK VALVES

- A. Manufacturers:
1. Dezurik
  2. M and H Valve
  3. Mueller
  4. Pratt
  5. Flomatic
  6. Substitutions: Section 01 60 00 – Product Requirements.
- B. Body, disc, and disc arm constructed of ASTM A 536 ductile iron (65-45-12).
- C. Shaft shall be a single piece, constructed of Type 304 stainless steel.
- D. Valve to be of single disc type with full flow passage.
- E. Valve to be supplied with lever and weight unless plans require oil or air cushioning device.
- F. Valve to have bolted removable cover for cleaning and maintenance.
- G. 200 psi maximum working pressure rating for 3-inch through 12-inch valves, 150 psi for valves larger than 12-inch, unless noted otherwise in the plans.

## 2.07 SILENT CHECK VALVES

- A. Manufacturers:
1. Dezurik
  2. Pratt
  3. Val-Matic
  4. Flomatic
  5. Substitutions: Section 01 60 00 – Product Requirements



- B. Valve body constructed of ASTM A536 ductile iron (65-45-12).
- C. Valve to incorporate a center guided, spring loaded disc, guided at opposite ends and having a short linear stroke that generates a flow area equal to pipe size.
- D. Seat and disc to be cast bronze or aluminum bronze. Compression spring to be Type 316 stainless steel.
- E. Valve to have a replaceable guide bushing held in position by the spring. The spring shall be designed to withstand 100,000 cycles without failure and provide a cracking pressure of 0.5 psi.
- F. Valve disc to be concave to the flow direction.
- G. Leakage rate not to exceed one-half the allowable rate for metal seated valves under AWWA C508 or 0.5 oz per hour per inch of valve diameter.
- H. 250 psi maximum working pressure rating unless noted otherwise in the plans.

## 2.08 INSERTION VALVES

- A. Manufacturers:
  - 1. TEAM Industrial Services
  - 2. Advanced Valve Technologies
  - 3. Hydra-Stop
  - 4. Substitutions: Section 01 60 00– Product Requirements
- B. Valve body constructed of ASTM A536 ductile iron (65-45-12).
- C. Hardware: 304 Stainless Steel
- D. Seat and disc to be cast bronze or aluminum bronze. Compression spring to be Type 316 stainless steel.
- E. Valve to have a replaceable guide bushing held in position by the spring. The spring shall be designed to withstand 100,000 cycles without failure and provide a cracking pressure of 0.5 psi.
- F. Leakage rate not to exceed one-half the allowable rate for metal seated valves under AWWA C508 or 0.5 oz per hour per inch of valve diameter.
- G. 250 psi maximum working pressure rating unless noted otherwise in the plans.

## 2.09 AIR/VACUUM AND AIR RELEASE VALVES

A. Manufacturers:

1. ARI, Inc
2. APCO Valve and Primer Company
3. Crispin Valve
4. Valmatic Valve Co.
5. Bermad
6. Substitutions: Section 01 60 00 - Product Requirements.

B. Air release and air/vacuum valves shall be specifically designed by the manufacturer for either clean water service (in the case of finished potable water or other non-solids bearing water systems) or sewage service (in the case of sewerage or other potentially solids bearing systems such as raw water service) as indicated in the plans.

C. Provide air/vacuum valves, air release valves, or combination air valves having the following functionality as indicated in the plans:

1. Air/Vacuum Valves shall open to exhaust large volumes of air in situations such as pipeline filling and shall also open to admit air for the purpose of relieving internal vacuum conditions in situations such as pipeline draining.
2. Air Release Valves shall open to exhaust small pockets of air while the pipeline is operating under pressure.
3. Combination Air Valves shall have the functionality of both air/vacuum valves and air release valves and may be of either the single body or dual body configured.

D. Design Requirements:

1. Provide Air Release and Combination Air Valves with minimum 5/16-inch orifice for exhausting small pockets of air while pipeline is operating under pressure.
2. Provide all air valves and all related accessories with pressure ratings equal to or greater than the maximum pipeline working pressure at the location of the air valve installation.
3. Provide all air valves with low pressure sealing capability equal to or less than 2 psi or, where specifically indicated in the plans, equal to or less than 1 psi.

E. End Connections:

1. 2-inch and smaller valves: Threaded end connections
2. Valves larger than 2-inch: Flanged end connections conforming to ANSI B 16.1 CL 125 unless otherwise indicated in the plans.

F. Accessories: Provide the following accessories with each assembly:

1. For clean water service applications:
  - a. Provide inflow preventing device which prevents entry of external water into the pipeline system through the air inlet / outlet. Device shall allow the entry or exit of air while preventing entry of water.
  - b. Provide shut-off valve on the inlet side of the valve which allows isolation of the air valve from the pipeline system. Valve shall have the same or greater pressure rating as the pipeline system.
  - c. Utilize bronze ball valves with end connections compatible with air valve inlet connection for 2-inch and smaller air valves.
  - d. Utilize gate valve with end connections compatible with air valve inlet connection for air valves larger than 2 inches.
2. For sewage service applications:
  - a. Provide backflushing accessories as follows:
  - b. Blow-off / drain connection and shut-off valve.
  - c. Clean water supply connection and shut-off valve.
  - d. Backwash supply hose with quick disconnect.
  - e. All shut-off valves shall be bronze, full-ported ball valves.
  - f. Provide shut-off valve on the inlet side of the valve which allows isolation of the air valve from the pipeline system. Valve shall have the same or greater pressure rating as the pipeline system.
  - g. Utilize bronze ball valves with end connections compatible with air valve inlet connection for 2-inch and smaller air valves.
  - h. Utilize gate valve with end connections compatible with air valve inlet connection for air valves larger than 2 inches.

## 2.10 PILOT OPERATED CONTROL VALVES

### A. Manufacturers:

1. Bermad
2. Cla-Val
3. Watts
4. Flomatic

5. Substitutions: Section 01 60 00 - Product Requirements

- B. Globe or angle pattern as indicated in the plans with ductile iron body and cover conforming to ASTM A 536. Provide with NSF 61 listed fusion bonded epoxy coating and interior lining. Studs and cover nuts shall be 316 stainless steel.
- C. Stainless steel throttling components.
- D. All trim shall be stainless steel.
- E. Disc and diaphragm assembly shall contain a BUNA-N synthetic rubber seal securely retained on 3-1/2 sides by a disc retainer and disc guide.
- F. End Connections:
  - 1. For main valves larger than 2-inch, provide flanged end connections conforming to ASTM C115 ANSI B16.1 CL 125 unless otherwise indicated in the plans.
  - 2. For main valves 2-inch and smaller, threaded end connections may be utilized if approved by the Engineer.
- G. Pilot system:
  - 1. Regulators, fittings, and valves shall be constructed of stainless steel. Pilot system tubing shall be constructed of braided, flexible stainless-steel tubing. All components of the pilot system shall have a working pressure rating in excess of the anticipated pressure conditions shown on the plans.
  - 2. Operation range suitable for the pressure range indicated in the plans.
  - 3. Provide with an external Y-strainer, adjustable opening and closing speed components, and ball-type isolation cock valves.
  - 4. All wetted surfaces contacted by consumable water shall contain less than 0.25% lead by weight.
  - 5. Pilot system manufactured and assembled by the same company as the main valve.
- H. Accessories:
  - 1. Provide brass or stainless-steel engraved nameplate for each control valve and associated pilot securely affixed to the associated component. Nameplate shall indicate the following information as applicable:
    - a. Catalog and serial number
    - b. Function, size, material, and pressure rating

- c. Type of pilot control system used and control adjustment range
2. Where indicated in the plans, provide valve position indicating post.
3. Where indicated in the plans, provide pressure gauges as follows:
  - a. 4-inch diameter, glycerin-filled stainless steel with the pressure measurement range as indicated in the plans.
  - b. Provide with threaded connections and stainless-steel connecting tubing and fittings.
  - c. Minimum of 1/2" diameter tap size or larger where indicated in the plans.
  - d. Provide with quarter-turn ball shut-off valves.
  - e. Provide with pulsation damper where indicated in the plans.
4. Where indicated in the plans, provide main-line strainer:
  - a. Provide the same size as the control valve and installed immediately upstream from the control valve.
  - b. Ductile iron body with epoxy coating matching that of the control valve body.
  - c. Flanged end connections sized to match those of the associated control valve.
  - d. Incorporate stainless steel screen which is removable for replacement or maintenance without removing the strainer body.
  - e. NSF-61 certified.
  - f. Assembly rated for the same working pressure as the control valve.
  - g. Where indicated in the plans, provide accessories, trim, and configuration which reduces internal cavitation.
  - h. Where required for valve function, provide solenoids suitable for operation on 120V single-phase AC power, with NEMA IV enclosure and manual operator unless indicated otherwise in the plans.

I. Control Valve Operations and Functionality:

1. Control valves of the following types shall function through a pilot control system as follows:

- a. Pressure Reducing Valves – Automatically reduce a varying upstream pressure to an operator-adjustable constant downstream pressure set point, regardless of flow rate. A decrease in downstream pressure shall cause the main valve to increase its opening, thereby increasing the downstream pressure toward the set point. An increase in downstream pressure shall cause the main valve to decrease its opening, thereby decreasing the downstream pressure toward the set point. Where specifically indicated in the plans, provide an internal check feature which prevents flow from downstream to upstream via the pilot control system.
- b. Pressure Relief Valves – Remain closed while upstream pressure is below an operator-adjustable set point. Open to exhaust water and relieve pressure when upstream pressure exceeds the set point.
- c. Surge Anticipator Valves – Automatically open a pre-set amount upon upstream pressure falling below an operator adjustable set point in anticipation of oncoming surge. Automatically close upon pressure rising above set point.
- d. Pressure Sustaining Valves – Automatically maintain upstream pressure at an operator-adjustable set point with varying downstream pressure, regardless of flow rate. A decrease in upstream pressure shall cause the main valve to decrease its opening, thereby decreasing the flow rate and increasing upstream pressure toward the set point. An increase in upstream pressure shall cause the main valve to increase its opening, thereby increasing the flow rate and decreasing the upstream pressure toward the set point.
- e. Single Acting Altitude Valves – Remain fully open until the water level in a downstream reservoir or tank reaches an operator-adjustable level setpoint, then close fully. Upon the water level in the downstream tank or reservoir falling a pre-set distance, re-open fully. This valve shall be designed for one-way flow only.
- f. Double Acting Altitude Valve – Remain fully open until the water level in a downstream reservoir or tank reaches an operator-adjustable level set point, then close fully. Upon either pressure on the upstream side falling below an operator-adjustable set point, or, the water level in the downstream reservoir or tank falling a pre-set distance, re-open fully. This valve shall be designed for two-way flow.
- g. Solenoid-Controlled Open / Close Valve – Either open or close pilot system in response to a changing electrical current to the solenoid, which in turn either opens or closes the main valve. Solenoid shall be either normally open (open upon loss of electrical signal) or normally closed (close upon loss of electrical signal) as indicated in the plans.

- h. Solenoid-Controlled Booster Pump Control Valve – Pump operation shall begin with the control valve closed. Upon pump start-up, simultaneously energize solenoid and begin opening the main valve slowly, as controlled by the opening speed control. Upon signal to shut-down pump, maintain the pump running, de-energize the solenoid, and begin slowly closing the main valve, as controlled by the closing speed control. Upon main valve reaching the fully-closed position, a limit switch shall release a valve / pump interlock, and the pump shall shut down. Where indicated in the plans an internal check feature shall be provided to prevent reverse flow.
- i. Solenoid-Controlled Deep Well Pump Control Valve – Pump operation shall begin with the valve open. Upon pump start-up, simultaneously energize solenoid and begin closing the main valve slowly, as controlled by the closing pump speed control. Upon signal to shut down the pump or upon loss of power, the solenoid is de-energized, and the main valve begins to open slowly, as controlled by the opening speed control. Upon the main valve reaching the fully open position,

## 2.11 LINE STOPPING ASSEMBLIES

### A. Manufacturers:

- 1. JCM Industries
- 2. Substitutions: Section 01 60 00 – Product Requirements

B. Blind Flange: 150 lb, ASTM A36 Carbon Steel, Epoxy Coated.

C. Blind Flange Gasket: Styrene-Butadiene Rubber (SBR) compounded for use with water.

D. Gasket: Nitrile Butadiene Rubber (NBR, Buna-N) per ASTM D2000

E. Bolts and Hardware: Stainless Steel 18-8 Type 304

F. Finish: Fusion applied Epoxy Coating per ANSI/AWWA C213 Standard

## 2.12 ACCESSORIES

### A. Valve Boxes for Buried Valves:

- 1. 12-inch diameter valves and smaller: Domestic cast iron, two-piece, screw type for height adjustment.
- 2. Valves larger than 12-inch: Domestic cast iron, three-piece, screw type for height adjustment.
- 3. For either size condition, provide 6-inch ductile iron pipe riser sections as required for additional height where standard is insufficient.

4. Provide with cast iron lid marked “Water” or “Sewer” as applicable.

B. Valve Markers for Buried Valves:

1. Provide fiberglass marker (either round or flat) or concrete monument as required in the plans. If no such indication is present, provide flat fiberglass marker.
2. For fiberglass markers, provide either blue color for potable water or green color for sewer. Provide with Owner’s standard labeling information as indicated in the plans or specifications. If no such information is present, provide minimum labeling as follows:
  - a. “Warning – Water (Sewer) Pipeline Below”
  - b. Notification to contact 811 service before digging
  - c. Owner’s emergency contact information.
3. For concrete markers, provide dimensions as indicated in the plans. Provide with markings as shown in the plans. If no such information is present, provide minimum information as follows:
  - a. “Water (Sewer) Valve

C. Valve Operating Nut Stem Extensions:

1. For buried valves where the valve operating nut is greater than 48-inches below the top of the valve box, provide a stainless-steel stem extension designed to fit snugly and securely onto operating nut and with 2-inch square top operating nut designed to fit into standard valve wrench. Provide length as required so that top of operating nut is between 12 and 36 inches below the top of the valve box.
2. For non-buried valves, provide stainless steel stem extensions and appropriate mounting brackets / guides where indicated in the plans. For applications where electric or pneumatic actuators are utilized, extensions shall be suitably sized to withstand torque imparted by actuator.

D. Post Type Position Indicators:

1. Manufacturers:
  - a. Mueller
  - b. M and H Valve
  - c. American Flow Control
  - d. Substitutions: Section 01 60 00 - Product Requirements.
2. Vertical Indicator Post designed to operate a non-rising stem gate valve with above ground visual indication of valve position (open or shut).



3. Indicator post shall feature a telescoping stem that can be adjusted to its final position without field cutting of the stem.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements.
- B. Determine exact location, configuration, features, and size of valves and accessories from the Plans; obtain clarification and directions from Engineer prior to execution of work.
- C. Verify invert elevations of existing work prior to excavation and installation.

#### 3.02 PREPARATION

- A. Identify required lines, levels, contours and datum locations.
- B. Locate, identify, and protect utilities to remain from damage.
- C. Do not interrupt existing utilities without permission and without making arrangements to provide temporary utility services.

#### 3.03 INSTALLATION

- A. Install all equipment in accordance with the manufacturer's instructions.

#### 3.04 EQUIPMENT START-UP AND COMMISSIONING

- A. For pilot-operated control valves, provide on-site services of a manufacturer-certified start-up technician to initially establish set points prior to start-up and make adjustments to equipment as necessary following initial start-up. Start-up technician shall instruct Owner's staff on operation, maintenance and adjustments of equipment. Services shall be provided for a minimum of 8 hours on-site per control valve, and additionally as necessary if there are difficulties associated with the start-up, at no additional cost to the Owner.

#### 3.05 DISINFECTION OF POTABLE WATER PIPING SYSTEM

- A. Flush and disinfect system in accordance with Contract Documents.

END OF SECTION



**SECTION 33 01 30**  
**CLEANING OF DRAINS, SEWERS, AND MANHOLES**

**PART 1 – GENERAL**

**1.01 SUMMARY**

- A. Section includes cleaning of sewer pipe and fittings installed and/or rehabilitated, complete as shown on the Drawings and as specified herein.
- B. Cleaning includes proper high-pressure water jetting, rodding, bucketing, brushing, and flushing of drains, sewers, and manholes prior to inspection by closed circuit television, pipeline rehabilitation or replacement, point repairs, manhole preparation, and testing operations.
- C. Clean all sewers to remove debris, roots, intruding services, deposits, and other blockages to a minimum of 95 percent open. Perform sewer cleaning work to an acceptable level as necessary to perform a thorough television inspection of the sewer. If the pipe condition is such that cleaning may cause a potential collapse, then the pipe shall be televised without attempting to clean it to 95 percent condition, pending approval by ENGINEER.
- D. Related Requirements

1. SECTION 33 01 31 – CCTV Inspection of Sewer Pipelines

**1.02 DEFINITIONS**

- A. Light Cleaning: Small amounts of debris existing within the sewer line and where sewer reaches do not require heavy cleaning, as defined below, and that produce little or no debris.
- B. Heavy Cleaning: Large deposits of debris or heavy root growth existing within the sewer line and where sewer reaches require debris removal of depths up to 25 percent of pipe height.
- C. Excessive Heavy Cleaning: Large deposits of debris or heavy root growth existing within the sewer line and where sewer reaches require debris removal exceeding the definition of Heavy Cleaning, and the time required to clean and inspect the line must be at least twice the average time required to clean and inspect other sewers of comparable length and diameter.

**1.03 UNIT PRICE - MEASUREMENT AND PAYMENT**

- A. Light Cleaning
  - 1. Clean sewer using standard industry procedures of high-pressure water jetting equipment or other approved equipment. Costs related to cleaning of such sewers

shall be included in CONTRACTOR's unit prices for CCTV and Heavy Cleaning.

2. Basis of Measurement: By linear foot.
3. Basis of Payment: TV inspection, data compiling according to NASSCO PACP standards, and audio-video recording of the pipeline.

B. Heavy cleaning

1. Heavy cleaning must be approved by ENGINEER. Include costs related to cleaning of such sewers in Unit Prices for Heavy Cleaning. Costs related to televising of such sewers following heavy cleaning shall be included in Unit Prices for CCTV and Heavy Cleaning. Compensation for heavy cleaning of a particular line will only be paid if:
  - a. Heavy cleaning was authorized by the ENGINEER prior to the performance of the work.
  - b. CONTRACTOR proves that both significant time and effort were necessary to clean the line (i.e. time required to clean and inspect the line must be at least twice the average time required to clean and inspect other sewers of comparable length and diameter.
  - c. Adequate video proof of 'before' blockage, debris, grit or grease build-up, or other condition is provided.
  - d. A submerged camera does not justify a need for heavy cleaning; proof that submergence was due to a blockage or heavy debris and not sag in the line will be required.
2. Heavy Cleaning will be paid for on a lineal foot basis only for the length required to be cleaned, i.e., from the downstream manhole to the approximate location of heavy cleaning. This may or may not include the entire pipe section unless otherwise approved by the ENGINEER or OWNER.
3. Basis of Measurement: By linear foot, measured.
4. Basis of Payment: TV inspection, data compiling according to NASSCO PACP standards, and audio-video recording of the pipeline.

C. Excessive Heavy Cleaning

1. Pipes that contain excessive blockages will be paid on a time and material basis upon approval by ENGINEER. A full-time resident observer is required to oversee time and material work. Provide direct water source as required. ENGINEER or OWNER may determine any individual pipe is to be cleaned on a time and material basis.

#### 1.04 INFORMATIONAL SUBMITTALS

- A. Refer to SECTION 01 33 00 - Submittal Procedures.
- B. Submit a safety plan prior to performing any on-site work that includes the following as a minimum:
  - 1. Confined Space Entry.
  - 2. Personal Protective Equipment.
- C. Qualifications Statements:
  - 1. CONTRACTOR shall have a minimum of five years experience in the sewer line and underground structure cleaning and must submit a list of at least three customers who have had similar work completed by CONTRACTOR. Furnish trained and qualified technicians with proper experience operating equipment that is being used on this project.

#### 1.05 CLOSEOUT SUBMITTALS

- A. Refer to SECTION 01 78 00 - Closeout Submittals.
- B. Submit one complete set of documentation regarding inspections and work performed. Based on work scope, submit written reports, photographs, and External Hard Drives that incorporate color video and data.

### PART 2 – PRODUCTS (NOT USED)

### PART 3 - EXECUTION

#### 3.01 PREPARATION

- A. Remove debris, roots, intruding services, deposits, and other blockages to a minimum of 95 percent open as necessary to perform a thorough television inspection of the sewer. If pipe condition is such that cleaning may cause a potential collapse, televise pipe without attempting to clean it to 95 percent condition, pending approval by ENGINEER.
- B. Refer to SECTION 01 73 00 – Execution.
- C. Select, based on pre-construction CCTV inspection, cleaning equipment to address conditions of manhole and sewer lines at the time the work commences to adequately remove dirt, grease, rocks, sand, and other materials and obstructions from sewer lines and manholes to allow performance of other work.
- D. Take satisfactory precautions to protect sewer lines from damage that might be caused by

improper use of cleaning equipment. Whenever using hydraulically propelled cleaning tools that depend upon water pressure to provide their cleaning force, or any tools that retard flow of water in sewer lines, take precautions to ensure that water does not cause damage or flooding to public or private property.

- E. No fire hydrant shall be obstructed in case of a fire in the area served by the hydrant.
- F. Remove water meters, piping, and related equipment from fire hydrants at the end of each work day.

### 3.02 EQUIPMENT

#### A. Hydraulic Sewer Cleaning Equipment

1. Equipment: movable dam type constructed so that a portion of the dam may be collapsed at any time during cleaning operation to protect against flooding of the sewer.
2. Movable dam shall be the same diameter as the pipe being cleaned and shall provide a flexible scraper around the outer periphery to ensure total removal of grease. If sewer cleaning balls or other such equipment which cannot be collapsed instantly are used, take special precautions against flooding sewers and public or private property.

#### B. High-Velocity Jet (Hydrocleaning) Equipment:

1. Have a minimum of 500 feet of high-pressure hose.
2. Have a selection of two or more velocity nozzles that are capable of producing a scouring action from 15 to 45 degrees in all size lines to be cleaned. Also include a high-velocity gun for washing and scouring manhole walls and floor.
3. Be capable of producing a minimum of 80 gallons per minute flows from a fine spray to a long-distance solid stream and delivering up to 1000 psi. Be able to carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel. Locate controls so equipment can be operated above ground. Select flow rates and pressures as required for each size of sewer, type of debris, and amount of debris, and as recommended by nozzle manufacturers.
4. Have a water tank, auxiliary engines and pumps, and a hydraulically driven hose reel.
5. Have root-cutting blades that are hydraulically spun.

#### C. Mechanical Cleaning Equipment

1. Bucket machines shall be in pairs and with sufficient power to perform the work

in an efficient manner. Machines shall be belt operated or have an overload device. Machines with a direct drive that could cause damage to the pipe shall not be acceptable.

2. Power rodding machines shall be either sectional or continuous type capable of holding a minimum of 750 feet of the rod. Rod shall be specifically treated steel. To ensure safe operation, the machine shall have a fully enclosed body and an automatic safety release clutch or relief valve.

### 3.03 APPLICATION

- A. Provide appropriate screening to stop the passing of materials into downstream sewers. Sludge, dirt, sand, rocks, grease, and other solid or semisolid residue, debris, and material resulting from cleaning operations shall be removed at downstream manhole of the section of the sewer being cleaned. Passing material from the manhole section to the manhole section, which could cause line stoppages, accumulations of sand in wet wells, or damage to pumping equipment, shall not be permitted.
- B. Remove debris, residue, and other materials resulting from cleaning operations from the site at the end of each workday and shall be disposed of in an approved and lawful manner. Under no circumstances will the accumulation of debris, residue, and other matter be permitted on site beyond the stated time unless prior written authorization is given for storage in totally enclosed containers.
- C. Flushing of sanitary sewers to facilitate cleaning activities without the capture of solids and debris is expressly prohibited without the written permission of the ENGINEER.
- D. Retrieval of equipment lodged in pipes or a wet well is CONTRACTOR's responsibility and shall be performed at CONTRACTOR's expense.
- E. Cleaning Precautions: During sewer cleaning operations, satisfactory precautions shall be taken in the use of cleaning equipment. When hydraulically propelled cleaning tools (which depend upon water pressure to provide their cleaning force) or tools that retard flow in sewer lines are used, precautions shall be taken to ensure that the water pressure created does not damage or cause flooding of public or private property being served by sewer. When possible, flow of sewage in the sewer shall be utilized to provide the necessary pressure for hydraulic cleaning devices. When additional water from fire hydrants is necessary to avoid delay in normal work procedures, water shall be conserved and not used unnecessarily.
- F. No sewer cleaning shall take place in a particular sewer segment until upstream pipe segments have been cleaned. If cleaning is done in a downstream pipe segment in order to facilitate overall cleaning operations, the segment shall be re-cleaned at no additional cost to OWNER after pipes upstream of that segment have been cleaned.
- G. Sewer line walls shall be cleaned adequately to provide for proper operation of joint testing and sealing equipment or internal inspection to discern structural defects,

misalignment and infiltration/inflow sources. Cleaning shall be performed immediately prior to joint testing and sealing and internal inspection to preclude the build-up of debris from infiltration/inflow sources and discharges from upstream pipeline sections.

- H. Designated sewer manhole sections shall be cleaned using hydraulically propelled, high-velocity jet or mechanically powered equipment. If cleaning of an entire section cannot be successfully performed from one manhole, equipment shall be set up on the other manhole and cleaning again attempted. If, again, successful cleaning cannot be performed or equipment fails to traverse the entire manhole section, it will be assumed that a major blockage exists, and cleaning effort shall be repeated with other types of equipment. Immediately report any blockages to the ENGINEER.
- I. Water for sewer cleaning shall be provided by the OWNER and obtained at locations in accordance with the OWNER. If water is obtained from a potable supply, provide appropriate backflow prevention devices as required by the authority having jurisdiction to protect the potable system from cross connections and contamination. Prevent cross-contamination of any public or private water systems used for this purpose.

#### 3.04 FIELD QUALITY CONTROL

- A. Refer to SECTION 01 40 00 - Quality Requirements.
- B. Acceptance of sewer line cleaning is contingent on satisfactory completion of television inspection. If television inspection shows cleaning to be unsatisfactory, re-clean the sewer line and re-inspect until cleaning is shown to be satisfactory.
- C. If internal joint testing and sealing is to follow cleaning, give particular attention to the adequacy of cleaning to ensure that proper seating of the sealing packer can be achieved.
- D. Inspection of cleaning operations will be made on a daily basis by the ENGINEER.

#### 3.05 FINAL CLEANING

- A. Refer to SECTION 01 77 00 - Closeout Procedures.
- B. Upon cleaning of underground sewer lines or structures, removal debris from finish grade and clean work areas so conditions at conclusion of the work are equal to or better than areas prior to work of this Section.

END OF SECTION



**SECTION 33 05 05**  
**BURIED PIPING INSTALLATION**

**PART 1 – GENERAL**

**1.01 SUMMARY**

A. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to install and test all buried piping, fittings, and specials. The Work includes the following:

1. All types and sizes of buried piping, except where buried piping installations are specified under other Sections or other contracts.
2. Unless otherwise shown or specified, this Section includes all buried piping Work required, beginning at the outside face of structures or structure foundations, including piping beneath structures, and extending away from structures.
3. Work on or affecting existing buried piping.
4. Installation of all jointing and gasket materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, cathodic protection, and other Work required for a complete, buried piping installation.
5. Supports, restraints, and thrust blocks.
6. Pipe encasements, with the exception of piping embedded in concrete within a structure or foundation.
7. Field quality control, including testing.
8. Cleaning and disinfecting.
9. Incorporation of valves, meters, and special items shown or specified into piping systems in accordance with the Contract Documents and as required.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before buried piping Work.
2. Coordinate with appropriate piping Sections of Division 40, Process Integration.

C. Related Sections

1. SECTION 40 05 19 – Ductile Iron pipe.
2. SECTION 40 05 31 – Thermoplastic Process Pipe.

3. SECTION 40 05 39 – Concrete Pipe. (NOT USED)

D. Related Standards

1. ASTM C924, Practice for Testing Concrete Pipe Sewer Lines by Low- Pressure Test Method.
2. ASTM D2321, Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
3. ASTM D2774, Practice for Underground Installation of Thermoplastic Pressure Piping.
4. ASTM F1417, Test Method for Installation Acceptance of Plastic Gravity Sewer Lines using Low-Pressure Air.
5. ANSI/AWWA C105, Polyethylene Encasement for Ductile-Iron Pipe Systems.
6. ANSI/AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
7. ANSI/AWWA C600, Installation of Ductile-Iron Water Mains and Their Appurtenances.
8. ANSI/AWWA C605, Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.
9. ANSI/AWWA C606, Grooved and Shouldered Joints.
10. ANSI/AWWA C651, Disinfecting Water Mains.
11. AWWA M23, PVC Pipe - Design and Installation.
12. AWWA M41, Ductile-Iron Pipe and Fittings.
13. ASCE 37, Design and Construction of Sanitary and Storm Sewers.
14. American Concrete Pipe Association, Concrete Pipe Handbook.
15. Chlorine Institute, Inc., Piping Systems for Dry Chlorine, Pamphlet No. 6.
16. NFPA 24, Standard for the Installation of Private Fire Service Mains and their Appurtenances.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements and recommendations of authorities having jurisdiction over the Work, including:
  - a. OWNER's Water Department
2. Obtain required permits for Work in roads, rights-of-way, railroads, and other areas of the Work.

1.03 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
  - a. Laying schedules for concrete pipe and piping with restrained joints.
  - b. Details of piping, specials, joints, harnessing and thrust blocks, and connections to piping, structures, equipment, and appurtenances.
2. Product Data:
  - a. Manufacturer's literature and specifications, as applicable, for products specified in this Section.
3. Testing Procedures:
  - a. Submit proposed testing procedures, methods, apparatus, and sequencing. Obtain ENGINEER's approval prior to commencing testing.

B. Informational Submittals: Submit the following:

1. Certificates:
  - a. Certificate signed by the manufacturer of each product certifying that product conforms to applicable referenced standards.
2. Field Quality Control Submittals:
  - a. Results of each specified field quality control test.

C. Closeout Submittals: Submit the following:

1. Record Documentation:
  - a. Maintain accurate and up-to-date record documents showing modifications made in the field, in accordance with approved submittals, and other Contract

modifications relative to buried piping Work. Submittal shall show the actual location of all piping Work and appurtenances at the same scale as the Drawings.

- b. Show piping with elevations referenced to the Project datum and dimensions from permanent structures. For each horizontal bend in piping, include dimensions to at least three permanent structures, when possible. For straight runs of piping, provide offset dimensions as required to document piping location.
- c. Include profile drawings with buried piping record documents when the Contract Documents include piping profile drawings.
- d. Conform to SECTION 01 78 39 – Project Record Documents.

#### 1.04 DELIVERY, STORAGE, AND HANDLING

##### A. Delivery:

- 1. Deliver materials to the Site to ensure uninterrupted progress of the Work.
- 2. Upon delivery, inspect pipe and appurtenances for cracking, gouging, chipping, denting, and other damage and immediately remove from Site and replace with acceptable material.

##### B. Storage:

- 1. Store materials to allow convenient access for inspection and identification. Store material off-ground using pallets, platforms, or other supports. Protect packaged materials from corrosion and deterioration.
- 2. Pipe and fittings other than PVC and CPVC may be stored outdoors without cover. Cover PVC and CPVC pipe and fittings stored outdoors.

##### C. Handling:

- 1. Handle pipe, fittings, specials, and accessories carefully in accordance with the pipe manufacturer's recommendations. Do not drop or roll material off trucks. Do not drop, roll, or skid piping.
- 2. Avoid unnecessary handling of pipe.
- 3. Keep pipe interiors free from dirt and foreign matter.
- 4. Protect interior linings and exterior coatings of pipe and fittings from damage. Replace pipe and fittings with damaged lining regardless of the cause of damage.

## PART 2 – PRODUCTS

### 2.01 MATERIALS

A. Pipe materials are specified in the Contract Drawings.

B. General:

1. Manufacturer shall cast or paint on each length of pipe and each fitting pipe material, diameter, and pressure or thickness class.

### 2.02 BURIED PIPING IDENTIFICATION

A. Polyethylene Underground Warning Tape for Metallic Pipelines:

1. Tracer tape shall be of inert, acid- and alkali-resistant, polyethylene, four mils thick, six inches wide, suitable for direct burial. The tape shall be capable of stretching to twice its original length.
2. Message shall read, “CAUTION “POTABLE WATER,” “SANITARY SEWER,” “CHLORINE GAS,” or other appropriate services, as indicated in the Contract Drawings and “PIPE BURIED BELOW” with bold letters approximately two inches high. Messages shall be printed at maximum intervals of two feet.
3. Manufacturer: Provide products of one of the following:
  - a. Brady Corporation
  - b. Seton Identification Products
  - c. Marking Services, Inc.
  - d. Or equal.

B. Detectable Underground Warning Tape for Non-Metallic Pipelines:

1. Tape shall be of inert, acid- and alkali-resistant, polyethylene, five mils thick, six inches wide, with aluminum backing, and have 15,000 psi tensile strength and 80 percent elongation capability. Tape shall be suitable for direct burial.
2. Message shall read, “CAUTION “POTABLE WATER,” “SANITARY SEWER,” “CHLORINE GAS,” or other appropriate services, as indicated in the Contract Drawings “PIPE BURIED BELOW” with bold letters approximately two inches high. Messages shall be printed at maximum intervals of two feet.
3. Manufacturer: Provide products of one of the following:

- a. Brady Corporation
- b. Seton Identification Products
- c. Marking Services, Inc.
- d. Or equal.

### PART 3 – EXECUTION

#### 3.01 INSTALLATION

##### A. General:

- 1. Install piping as shown, specified, and recommended by the pipe and fittings manufacturer.
- 2. In the event of a conflict between the manufacturer's recommendations and the Contract Documents, request an interpretation from the ENGINEER before proceeding.
- 3. ENGINEER will observe excavations and bedding prior to laying pipe by CONTRACTOR. Notify ENGINEER in advance of excavating, bedding, pipe laying, and backfilling operations.
- 4. Minimum cover over buried piping shall be 5 feet unless otherwise shown or approved by ENGINEER.
- 5. Earthwork is specified in SECTION 31 23 00 – Earthwork.
- 6. Excavation in excess of that required or shown and that is not authorized by ENGINEER shall be filled at CONTRACTOR's expense with drainage fill furnished, placed, and compacted in accordance with SECTION 31 23 00 – Earthwork.
- 7. Comply with NFPA 24 for "Outside Protection," where applicable to water piping systems used for fire protection.

##### B. Separation of Sewers and Potable Water Piping:

- 1. Horizontal Separation:
  - a. Where possible, existing and proposed potable water mains and service lines and sanitary, combined, and storm sewers shall be separated horizontally by a clear distance of at least ten feet.
  - b. If local conditions preclude the specified clear horizontal separation, installation will be allowed if potable water main is in separate trench or on

undisturbed earth shelf on one side of sewer and with bottom of potable water main at least 18 inches above top of sewer.

c. Exception:

- 1) Where it is not possible to provide minimum horizontal separation described above, construct potable water main of cement-lined ductile iron pipe with restrained push-on joint or restrained mechanical joint pipe complying with public water supply design standards of authority having jurisdiction. Hydrostatically test water main and sewer as specified in this Section prior to backfilling. Hydrostatic test pressure at crossing shall be at least 150 psi.

2. Vertical Separation:

- a. Provide minimum vertical distance of 18 inches between outside of potable water main and outside of sewer when sewer crosses over potable water main.
- b. Center a section of potable water main pipe at least 17.5 feet long over sewer so that sewer joints are equidistant from potable water main joints.
- c. Provide adequate structural support where potable water main crosses under sewer. At minimum, provide compacted select backfill for ten feet on each side of crossing.

d. Exceptions:

- 1) Where it is not possible to provide minimum vertical separation described above, construct potable water main of cement-lined ductile iron pipe with restrained push-on joint or restrained mechanical joint pipe. Hydrostatically test water main and sewer as specified in this Section, prior to backfilling. Hydrostatic test pressure at crossing shall be at least 150 psi.
- 2) Encase either potable water main or sewer in watertight carrier pipe extending ten feet on each side of crossing, measured perpendicular to potable water main.

C. Plugs:

1. Temporarily plug installed pipe at end of each day of work or other interruption of pipe installation to prevent entry of animals, liquids, and persons into pipe, and entrance or insertion of deleterious materials into pipe.
2. Install standard plugs in bells at dead ends, tees, and crosses. Cap spigot and plain ends.
3. Fully secure and block plugs, caps, and bulkheads installed for testing to withstand

specified test pressure.

4. Where plugging is required for phasing of the Work or subsequent connection of piping, install watertight, permanent type plugs, caps, or bulkhead acceptable to ENGINEER.

D. Bedding Pipe: Bed pipe as specified and in accordance with details on the Drawings.

1. Trench excavation and backfill and bedding materials shall conform to SECTION 31 23 23 – Trenching and Backfilling, as applicable.
2. Where ENGINEER deems existing bedding material unsuitable, remove and replace existing bedding with approved granular material furnished, placed, and compacted in accordance with SECTION 31 23 23 – Trenching and Backfilling. Payment for additional excavation and providing granular material will be made under the unit price payment items in the Contract.
3. Where pipe is installed in rock excavation, provide a minimum of three inches of granular bedding material underneath pipes smaller than four-inch nominal diameter, and a minimum of six inches of granular bedding material underneath pipes four-inch nominal diameter and larger.
4. Excavate trenches below bottom of pipe by amount shown and indicated in the Contract Documents. Remove loose and unsuitable material from bottom of trench.
5. Carefully and thoroughly compact pipe bedding with handheld pneumatic compactors.
6. Do not lay pipe until ENGINEER approves bedding condition.
7. Do not bring pipe into position until preceding length of pipe has been bedded and secured in its final position.

E. Laying Pipe:

1. Conform to manufacturer's instructions and requirements of standards and manuals listed below, as applicable:
  - a. Ductile Iron Pipe: ANSI/AWWA C600, ANSI/AWWA C105, AWWA M41.
  - b. Concrete Pipe: AWWA M9.
  - c. Steel Pipe: ANSI/AWWA C206, AWWA M11.
  - d. Thermoplastic Pipe: ASTM D2321, ASTM D2774, ANSI/AWWA C605, AWWA M23, AWWA M45, AWWA M55.



- e. Sanitary and Storm Sewers: ASCE 37.
2. Install pipe accurately to line and grade shown and indicated in the Contract Documents, unless otherwise approved by ENGINEER. Remove and reinstall pipes that are not installed correctly.
  3. Slope piping uniformly between elevations shown.
  4. Keep groundwater level in trench at least 24 inches below bottom of pipe before laying pipe. Do not lay pipe in water. Maintain dry trench conditions until jointing and backfilling are complete. Keep clean and protect interiors of pipe, fittings, valves, and appurtenances.
  5. Start laying pipe at lowest point and proceed towards higher elevations, unless otherwise approved by ENGINEER.
  6. Place bell and spigot-type pipe so that bells face the direction of laying, unless otherwise approved by ENGINEER.
  7. Place concrete pipe containing elliptical reinforcement with minor axis of reinforcement in vertical position.
  8. Excavate around joints in bedding and lay pipe so that pipe barrel bears uniformly on trench bottom.
  9. Deflections at joints shall not exceed 75 percent of amount allowed by pipe manufacturer, unless otherwise approved by ENGINEER.
  10. For PVC and CPVC piping with solvent welded joints, 2.5-inch diameter and smaller, and copper tubing, snake piping in trench to compensate for thermal expansion and contraction.
  11. Carefully examine pipe, fittings, valves, and specials for cracks, damage, and other defects while suspended above trench before installation. Immediately remove defective materials from the Site and replace with acceptable products.
  12. Inspect interior of all pipe, fittings, valves, and specials and completely remove all dirt, gravel, sand, debris, and other foreign material from pipe interior and joint recesses before pipe and appurtenances are moved into excavation. Bell and spigot-type mating surfaces shall be thoroughly wire brushed and wiped clean and dry immediately before pipe is laid.
  13. Field cut pipe, where required, with machine specially designed for cutting the type of pipe being installed. Make cuts carefully, without damage to pipe, coating or lining, and with smooth end at right angles to axis of pipe. Cut ends on push-on joint type pipe shall be tapered and sharp edges filed off smooth. Do not flame-cut pipe.

14. Do not place blocking under pipe, unless specifically approved by ENGINEER for special conditions.
15. Touch up protective coatings in a manner satisfactory to ENGINEER prior to backfilling.
16. Notify ENGINEER in advance of backfilling operations.
17. On steep slopes, take measures acceptable to ENGINEER to prevent movement of pipe during installation.
18. Thrust Restraint: Where required, provide thrust restraint conforming to Article 3.3 of this Section.
19. Exercise care to avoid flotation when installing pipe in cast-in-place concrete, and in locations with high groundwater.

F. Jointing Pipe:

1. Ductile Iron Mechanical Joint Pipe:
  - a. Immediately before making joint, wipe clean the socket, plain end, and adjacent areas. Taper cut ends and file off sharp edges to provide smooth surface.
  - b. Lubricate plain ends and gasket with soapy water or manufacturer's recommended pipe lubricant, in accordance with ANSI/AWWA C111, just prior to slipping gasket onto plain end of the joint assembly.
  - c. Place gland on plain end with lip extension toward the plain end, followed by gasket with narrow edge of gasket toward plain end.
  - d. Insert plain end of pipe into socket and press gasket firmly and evenly into gasket recess. Keep joint straight during assembly.
  - e. Push gland toward socket and center gland around pipe with gland lip against gasket.
  - f. Insert bolts and hand-tighten nuts.
  - g. If deflection is required, make deflection after joint assembly and prior to tightening bolts. Alternately tighten bolts approximately 180 degrees apart to seat gasket evenly. Bolt torque shall be as follows:

Pipe Diameter (inches)	Bolt Diameter (inches)	Range of Torque (ft-lbs)
3	5/8	45 to 60
4 to 24	3/4	75 to 90
30 to 36	1	100 to 120
42 to 48	1.25	120 to 150

- h. Bolts and nuts, except those of stainless steel, shall be coated with two coats, minimum dry film thickness of eight mils each, of high build solids epoxy or bituminous coating manufactured by Thnemec, or equal.
- i. Restrained mechanical joints shall be in accordance with Section 40 05 19, Ductile Iron Pipe.

2. Ductile Iron Push-On Joint Pipe:

- a. Prior to assembling joints, thoroughly clean with wire brush the last eight inches of exterior surface of spigot and interior surface of bell, except where joints are lined or coated with a protective lining or coating.
- b. Wipe clean rubber gaskets and flex gaskets until resilient. Conform to manufacturer's instructions for procedures to ensure gasket resiliency when assembling joints in cold weather.
- c. Insert gasket into joint recess and smooth out entire circumference of gasket to remove bulges and to prevent interference with proper entry of spigot of entering pipe.
- d. Immediately prior to joint assembly, apply thin film of pipe manufacturer's recommended lubricant to surface of gasket that will come in contact with entering spigot end of pipe or apply a thin film of lubricant to outside of spigot of entering pipe.
- e. For assembly, center spigot in pipe bell and push pipe forward until spigot just makes contact with rubber gasket. After gasket is compressed and before pipe is pushed or pulled in the rest of the way, carefully check gasket for proper position around the full circumference of joint. Final assembly shall be made by forcing spigot end of entering pipe past gasket until spigot makes contact with base of the bell. When more than a reasonable amount of force is required to assemble the joint, remove spigot end of pipe to verify proper positioning of gasket. Do not use gaskets that have been scored or otherwise damaged.
- f. Maintain an adequate supply of gaskets and joint lubricant at the Site when pipe jointing operations are in progress.

3. Ductile Iron Proprietary Joints:

- a. Install pipe that utilizes proprietary joints for restraint specified in SECTION 40 05 19 – Ductile Iron Pipe, or other such joints, in accordance with manufacturer's instructions.
- 4. Thermoplastic Pipe Joints:
  - a. Solvent Cement Welded Joints:
    - 1) Bevel pipe ends and remove all burrs before making joints. Clean pipe and fittings thoroughly. Do not attempt to make solvent cement joints if temperature is below 40 degrees F. Do not make solvent cement welded joints in wet conditions.
    - 2) Use solvent cement supplied or recommended by pipe manufacturer.
    - 3) Apply joint primer and solvent cement and assemble joints in accordance with recommendations and instructions of manufacturer of joint materials and pipe manufacturer.
    - 4) Take appropriate safety precautions when using joint primers and solvent cements. Allow air to circulate freely through pipelines to allow solvent vapors to escape. Slowly admit water when flushing or filling pipelines to prevent compression of gases within pipes.
  - b. Bell and Spigot Joints:
    - 1) Bevel pipe ends, remove all burrs, and provide a reference mark at correct distance from pipe end before making joints.
    - 2) Clean spigot end and bell thoroughly before making the joint. Insert O-ring gasket while ensuring that gasket is properly oriented. Lubricate spigot with manufacturer's recommended lubricant. Do not lubricate bell and O-ring. Insert spigot end of pipe carefully into bell until reference mark on spigot is flush with bell.
- 5. Mechanical Coupling Joints:
  - a. Mechanical couplings include: sleeve-type flexible couplings, split flexible couplings, ANSI/AWWA C606 grooved or shouldered end couplings, plasticized PVC couplings, and other mechanical couplings specified in SECTION 40 05 06 – Couplers, Adapters, and Specials for Process Piping.
  - b. Prior to installing and assembling mechanical couplings, thoroughly clean joint ends with wire brush to remove foreign matter.
  - c. For mechanical couplings that incorporate gaskets, after cleaning apply lubricant to rubber gasket or inside of coupling housing and to joint ends. After lubrication, install gasket around joint end of previously installed piece

and mate joint end of subsequent piece to installed piece. Position gasket and place coupling housing around gasket and over grooved or shouldered joint ends. Insert bolts and install nuts tightly by hand. Tighten bolts uniformly to produce an equal pressure on all parts of housing. When housing clamps meet metal to metal, joint is complete and further tightening is not required.

- d. For plasticized PVC couplings, loosen the stainless-steel clamping bands and remove clamps from coupling. Slide coupling over plain ends of pipes to be joined without using lubricants. Place clamps over each end of coupling at grooved section and tighten with torque wrench to torque recommended by manufacturer.

#### G. Backfilling:

1. Conform to applicable requirements of SECTION 31 23 00 – Earthwork.
2. Place backfill as Work progresses. Backfill by hand and use power tampers until pipe is covered by at least one foot of backfill.

#### H. Connections to Valves and Hydrants:

1. Install valves and hydrants as shown and indicated in the Contract Documents.
2. Provide suitable adapters when valves or hydrants and piping have different joint types.
3. Provide thrust restraint at all hydrants and at valves located at pipeline terminations.

#### I. Transitions from One Type of Pipe to Another:

1. Provide necessary adapters, specials, and connection pieces required when connecting different types and sizes of pipe or connecting pipe made by different manufacturers.

#### J. Closures:

1. Provide closure pieces shown or required to complete the Work.

### 3.02 TRACER TAPE INSTALLATION

#### A. Pipe Polyethylene Underground Warning Tape for Metallic Pipelines:

1. Provide polyethylene tracer tape for buried metallic piping, which includes pipe that is steel, ductile iron, cast iron, concrete, copper, and corrugated metal.
2. Provide tracer tape 12 to 18 inches below finished grade, above and parallel to buried pipe.

3. For pipelines buried eight feet or greater below finished grade, provide second line of magnetic tracer tape 2.5 feet above crown of buried pipe, aligned along pipe centerline.
4. Tape shall be spread flat with message side up before backfilling.

B. Detectable Underground Warning Tape for Non-Metallic Pipelines:

1. Provide polyethylene tracer tape with aluminum backing for buried, non-metallic piping, which includes pipe that is PVC, CPVC, polyethylene, HDPE, FRP, ABS, and vitrified clay.
2. Provide magnetic tracer tape 12 to 18 inches below finished grade, above and parallel to buried pipe.
3. For pipelines buried eight feet or greater below finished grade, provide second line of magnetic tracer tape 2.5 feet above crown of buried pipe, aligned along the pipe centerline.
4. Tape shall be spread flat with message side up before backfilling.

### 3.03 THRUST RESTRAINT

- A. Provide thrust restraint on pressure piping systems where shown or indicated in the Contract Documents.
- B. Thrust restraint may be accomplished by using restrained pipe joints or concrete thrust blocks. Thrust restraints shall be designed for axial thrust exerted by test pressure as required by the OWNER.
- C. Place concrete thrust blocks against undisturbed soil. Where undisturbed soil does not exist, or for projects where the Site consists of backfill material, thrust restraint shall be provided by restrained pipe joints.

D. Restrained Pipe Joints:

1. Pipe joints shall be restrained by means suitable for the type of pipe being installed.
  - a. Ductile Iron, Push-on Joints and Mechanical Joints: Restrain with proprietary restrained joint system as specified in Section 40 05 19, Ductile Iron Pipe; lugs and tie rods; or other joint restraint systems approved by ENGINEER.
  - b. Thermoplastic Joints: Where bell and spigot-type or other non-restrained joints are utilized, provide tie rods across joint or other suitable joint restraint system, subject to the approval of ENGINEER.
  - c. Prestressed Concrete Cylinder Pipe Joints: Restrain utilizing clamp type

restrained joint, snap ring-type restrained joint, or by welding. Concrete pipe requiring restraint shall have sufficient longitudinal steel reinforcement provided to handle thrust forces at maximum design stress of 12,500 psi. Thrust forces in longitudinally must be transmitted directly to steel joint bands using welded connections sufficient to carry stresses involved. No allowance for the concrete to handle tensile forces is allowed. Thrust restraint shall be in accordance with ANSI/AWWA Manual M9.

- d. Joints for Concrete Pipe Other than Prestressed Concrete Cylinder Pipe: Restrain joints utilizing clamp type restrained joint or snap ring-type restrained joint.

E. Concrete Thrust Blocks:

1. Provide concrete thrust blocks on pressure piping at changes in alignment of 15 degrees or more, at tees, plugs and caps, and where shown or indicated in the Contract Documents. Construct thrust blocks of Class B concrete, conforming to SECTION 03 30 00 – Cast in Place Concrete.
2. Install thrust blocks against undisturbed soil. Place concrete so that pipe and fitting joints are accessible for repair.
3. Concrete thrust block size shall be as shown on the Drawings or as approved by ENGINEER.

### 3.04 WORK AFFECTING EXISTING PIPING

A. Location of Existing Underground Facilities:

1. Locations of existing Underground Facilities shown on the Drawings should be considered approximate.
2. Determine the true location of existing Underground Facilities to which connections are to be made, crossed, and that could be disturbed, and determine location of Underground Facilities that could be disturbed during excavation and backfilling operations, or that may be affected by the Work.

### 3.05 FIELD QUALITY CONTROL

A. General:

1. Test all piping in this Section.
2. When authorities having jurisdiction are to witness tests, notify ENGINEER and authorities having jurisdiction in writing at least 48 hours in advance of testing.
3. Conduct all tests in presence of ENGINEER.

4. Remove or protect pipeline-mounted devices that could be damaged by testing.
5. Provide all apparatus and services required for testing, including:
  - a. Test pumps, compressors, hoses, calibrated gages, meters, test containers, valves, fittings, and temporary pumping systems required to maintain OWNER's operations.
  - b. Temporary bulkheads, bracing, blocking, and thrust restraints.
6. Provide air if an air test is required, power if pumping is required, and gases if gases are required.
7. Unless otherwise specified, OWNER will provide fluid required for hydrostatic testing. CONTRACTOR shall provide means to convey fluid for hydrostatic testing into piping being tested. CONTRACTOR shall provide fluid for other types of testing required.
8. Repair observed leaks and repair pipe that fails to meet acceptance criteria. Retest after repair.
9. Unless otherwise specified, testing shall include existing piping systems that connect with new piping system. Test existing pipe to nearest valve. Piping not installed by CONTRACTOR and that fails the test shall be repaired upon authorization of OWNER. Unless otherwise included in the Work, repair of existing piping or Underground Facilities will be paid as extra Work.

B. Testing:

1. Unless otherwise specified, required test pressures are at lowest elevation of pipeline segment being tested.
2. Test Pressure:
  - a. Test pressure as required by the OWNER based on maximum anticipated sustained operating pressure and methods described in applicable ANSI/AWWA manual or standard that applies to the piping system.

C. Hydrostatic Testing:

1. Preparation for Testing:
  - a. For thermoplastic pipe, follow procedures described in Section 7 of ANSI/AWWA Standard C605.
  - b. For other piping follow procedures described in ANSI/AWWA Manual M9, except that minimum wetting period required immediately prior to testing for asbestos cement pipe shall be 24 hours rather than the 48 hours prescribed for



concrete pipe. Wetting period is not required for pipe that is not cement mortar-lined.

2. Test Procedure:

- a. Fill pipeline slowly to minimize air entrapment and surge pressures. Fill rate shall not exceed one foot of pipe length per second in pipe being tested.
- b. Expel air from pipe as required. Obtain approval of ENGINEER prior to tapping pipe for expelling air.
- c. Examine exposed joints and valves and make repairs to eliminate visible leakage.
- d. After specified wetting period, add fluid as required to pressurize line to required test pressure. Maintain test pressure for a stabilization period of ten minutes before beginning test.
- e. Timed test period shall not begin until after pipe has been filled, exposed to required wetting period, air has been expelled, and pressure stabilized.
- f. Timed Test Period: After stabilization period, maintain test pressure for at least two hours. During timed testing period, add fluid as required to maintain pressure within five psig of required test pressure. Test pressure shall then remain steady for one hour, indicating no leakage.
- g. Pump from test container to maintain test pressure. Measure volume of fluid pumped from test container and record on test report. Record pressure at test pump at 15 minute intervals for duration of test.

3. Allowable Leakage Rates: Leakage is defined as the quantity of fluid supplied to pipe segment being tested to maintain pressure within five psi of test pressure during timed test period. Allowable leakage rates for piping are:

- a. Rates based on formula or table in ANSI/AWWA Manual M41:
  - 1) Metal pipe joined with rubber gaskets as sealing members, including the following joint types:
    - a) Bell and spigot and push-on joints.
    - b) Mechanical joints.
    - c) Bolted sleeve type couplings.
    - d) Grooved and shouldered couplings.
- b. Rates based on make-up allowance in ANSI/AWWA Manual M9:

- 1) Prestressed concrete cylinder pipe and other types of concrete pipe joined with O-ring rubber gasket sealing members.
- c. Rates based on formula or table in ANSI/AWWA C605:
  - 1) Plastic pipe joined with O-ring gasket sealing members.

D. Sewer Testing with Low Pressure Air:

1. Plug and bulkhead ends and lateral connections of pipe segment to be tested.
2. Required test pressure shall be increased by an amount equal to the elevation of groundwater above invert of lowest point of pipe segment being tested.
3. Test in accordance with requirements of authority having jurisdiction.
4. If there are no Laws and Regulations covering the test, use test procedures described in the following standards:
  - a. Thermoplastic and HDPE Pipe: ASTM F1417.
  - b. Concrete Pipe: ASTM C924.

E. Vertical Deflection Test for Thermoplastic, FRP, and HDPE Pipe:

1. Conduct vertical deflection test at least thirty days after backfill has been placed.
2. Manually pull pin-type vertical gauge mounted on sled through pipe. Gauge shall be manufactured by Quality Test Products, or equal. Set gauge so that sled will stop if vertical deflection of pipe exceeds five percent. Excavate and re-install piping that fails deflection test, and retest.
3. Use rigid ball or mandrel for deflection test, which shall have diameter of at least 95 percent of base inside diameter or average inside diameter of piping, depending on which is specified in applicable ASTM standard, including appendix, to which pipe is manufactured. Perform test without mechanical pulling devices. Re-install and retest pipe segments that exceed deflection of five percent.

### 3.06 CLEANING AND DISINFECTION

A. Cleaning, General: Clean pipe systems as follows:

1. Thoroughly clean all piping, including flushing with water, dry air, or inert gas as required, in manner approved by ENGINEER, prior to placing in service. Flush chlorine solution and sodium hypochlorite piping with water.
2. Piping 24-inch diameter and larger shall be inspected from inside and debris, dirt

and foreign matter removed.

3. For piping that requires disinfection and has not been kept clean during storage or installation, swab each section individually before installation with five percent sodium hypochlorite solution.

B. Disinfection:

1. Disinfect all potable and finished water piping.
2. Suggested procedure for accomplishing complete and satisfactory disinfection is specified below.
  - a. Prior to disinfection, clean piping as specified and flush thoroughly.
  - b. Conform to procedures described in ANSI/AWWA C651. Use continuous feed method of disinfecting unless alternative method is acceptable to ENGINEER.
3. Water for initial flushing, testing, and disinfection will be furnished by OWNER. CONTRACTOR shall provide all temporary piping, hose, valves, appurtenances, and services required. Cost of water required for re-disinfection will be paid by CONTRACTOR to OWNER at water utility's standard rates.
4. Chlorine shall be provided by CONTRACTOR.
5. Bacteriologic tests will be performed by OWNER. Certified test laboratory report will be provided to CONTRACTOR, if requested.
6. Chlorine concentration in water entering the piping shall be between 50 and 100 ppm, such that minimum residual concentration of 25 mg/L remains after 24-hour retention period. Disinfect piping and all related components. Repeat as necessary to provide complete disinfection.
7. After required retention period, flush chlorinated water to closed drain line, unless otherwise acceptable to ENGINEER. Properly dispose of chlorinated water in accordance with Laws and Regulations. Do not discharge chlorinated water to storm sewers, ditches, or overland.

END OF SECTION



**SECTION 33 30 00**  
**SANITARY SEWERAGE**

**PART 1 – GENERAL**

**1.01 SUMMARY**

- A. This Section includes sanitary sewerage system piping and appurtenances from a point 5 feet outside the building to the point of disposal.
- B. The extent of the sanitary sewerage system is indicated on the Drawings and as otherwise required by authorities having jurisdiction.
- C. All fees and charges for sanitary sewerage service, taps, connections, permits, impact fees, etc., shall be paid by the Contractor from his/her contract amount.

**1.02 RELATED SECTIONS**

- A. Section Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related work specified elsewhere includes:
  - 1. Section 31 23 00 – Earthwork
  - 2. Section 31 37 16 – Rip-Rap and Crushed Stone
  - 3. Section 03 30 00 – Cast-in-Place Concrete
  - 4. Section 01 57 13 – Temporary Erosion Control
  - 5. Section 32 12 16 – Asphalt Paving
- C. Related Specifications
  - 1. ASTM C 443: Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
  - 2. ASTM C 478: Specification for Precast Reinforced Concrete Manhole Sections
  - 3. ASTM C 497: Test Methods for Concrete Pipe, Manhole Sections, or Tile
  - 4. ASTM C 877: Specification for External Sealing Bands for Concrete Pipe, Manholes and Precast Box Sections
  - 5. ASTM C 923: Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals

6. ASTM C 990: Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
7. ASTM C 1244: Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill
8. AASHTO M 199M/M 199-05: Precast Reinforced Concrete Manhole Sections
9. AASHTO T 280: Concrete Pipe, Manhole Sections, or Tile
10. State of Alabama Department of Transportation Standard Specifications for Highway Construction.
11. U. S. Department of Labor, Occupational Safety and Health Administration.

### 1.03 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
  1. Product data for piping, valves, fittings, and specialties.
  2. Shop drawings for precast concrete sanitary manholes, including frames and covers.
    - a. Shop drawings for cast-in-place concrete or field-erected masonry sanitary manholes, if any, including frames and covers.

### 1.04 QUALITY ASSURANCE

- A. Environmental Compliance: Comply with applicable portions of local environmental agency regulations pertaining to sanitary sewerage systems.
- B. Utility Compliance: Comply with local utility regulations and standards pertaining to sanitary sewerage systems.
- C. Comply with requirements of authorities having jurisdiction, when more stringent than specified or otherwise indicated.
- D. Pumping Stations must have a final inspection at the end of a one-year warranty period.
- E. If during construction of the project, the site or project conditions reveal conflicts or harm to existing utilities either by vicinity or by destruction during construction, the contractor must repair or relocate the existing utility at the contractor or developer's expense. Failure to do this in a timely manner will result in suspension of the project or rejection of final acceptance of the project until the item is corrected. If a major break occurs and the contractor does not correct immediately a repair will be made and billed to the Contractor.

- F. All improvements will have a 1-year warranty beginning from the date of substantial completion.

#### 1.05 PROJECT CONDITIONS

- A. Site Information: Perform site survey, research public utility records, and verify existing utility locations. Verify that sanitary sewerage system piping may be installed in compliance with original design and referenced standards.
- B. The Contractor shall maintain all drainage ways, gutters, etc. at all times. The Contractor shall remove any eroded or washed material that enters pipes, ditches, or streams.
- C. The Contract shall provide erosion control as required to protect from damage surrounding areas. Erosion control measures shall meet all requirements of Section 01 57 13 - Temporary Erosion Control

#### 1.06 SEQUENCING AND SCHEDULING

- A. Coordinate connection to public sewer with utility company.
- B. Coordinate with interior building sanitary drainage piping.
- C. Coordinate with other utility work.

### PART 2 – PRODUCTS

#### 2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Cleanouts:
    - a. Ancon, Inc
    - b. Josam Co
    - c. Smith (Jay R.) Mfg. Co.
    - d. Wade Div.; Tyler Pipe.
    - e. Zurn Industries, Inc.; Hydromechanics Div.
  - 2. Underground Warning Tapes:
    - a. Allen Systems, Inc.; Reef Industries, Inc.

- b. Brady (W.H.) Co.; Signmark Div.
- c. Calpico, Inc.
- d. Carlton Industries, Inc.
- e. EMED Co., Inc.
- f. Seton Name Plate Co.

## 2.02 PIPE & FITTINGS

General: Provide pipe and pipe fitting materials compatible with each other. Where more than one type of materials or products is indicated below, refer to drawings for locations of each one, or if not indicated, selection is Installer's option.

### A. Gravity Sewer

1. Ductile Iron Pipe shall meet the requirements of ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51, latest revision. Pressure classes and wall thicknesses shall be in accordance with bury depths and laying conditions as specified in the above mentioned standards. Minimum pressure class for buried pipe shall be 350 psi for pipes less than or equal to 12 inches, 250 psi for pipes less than or equal to 24 inches, and 150 psi for pipes greater than or equal to 30 inches. For depths of cuts greater than 8 feet, pipe wall thickness may be required to be greater than the minimum specified. The design parameters specified in ANSI/AWWA C151/A21.51, latest revision, shall be followed to determine the minimum pipe wall thickness under these conditions. Thickness of gravity sewers shall be based on an internal pressure of 0 psi gage or atmospheric pressure.
2. 4-inch green stripe must be painted along the top of all sanitary sewer gravity mains. Ductile Iron Pipe shall be installed under storm drains, under a depth of 3 feet to the top of the pipe, and over a depth of 12 feet to the top of the pipe.
3. All ductile iron pipe for underground installation shall be provided with an exterior bituminous coating of 1 mil minimum thickness. All ductile iron pipe shall have an interior cement mortar lining with a 40-mil thickness coating of Protecto 401 ceramic epoxy or approved equal.
4. PVC pipe shall be SDR 26 heavy wall sewer pipe meeting the requirements of ASTM D3034 for 4" to 15" gravity pipe and ASTM F679 for 18" and 21" gravity pipe. All PVC pipe shall be green in color and shall have green sanitary sewer marker tape buried with all mains and lateral.
5. Sewer laterals shall be Ductile Iron Pipe meeting the requirements of AWWA C151, pressure class 350 minimum, from the main to the property line if the depth of the sewer is over 12 feet or under 3 feet to the top of the pipe. Laterals between 3 and 12



feet to the top of the pipe may be SDR 26 meeting ASTM D3034. Laterals from the property line to the structure may be Ductile Iron Pipe, class 350 minimum, Schedule 40 solid PVC pipe, or SDR 26 as approved by the Building Official or Engineer.

B. Force Main Sewers

1. Ductile Iron Pipe shall meet the requirements of AWWA9 C151, pressure class 350 minimum, for force main installations. A 4-inch green stripe must be painted along the top of all sanitary sewer gravity mains. PVC pipe shall not be used for force mains unless otherwise directed.
2. HDPE shall be a minimum of DR-11, 200 PSI. (IPS 3" and Smaller and DIPS 4" and Larger) Specification applies for both Laterals and Force Mains.
3. Gaskets for ductile iron pipe shall meet the requirements of AWWA C111 for rubber gaskets. Gaskets for PVC pipe shall be ASTM F477 elastomeric seals.
4. D.I. Pipe shall be manufactured by U.S. Pipe and Foundry or American Cast Iron Pipe Company only. Pipe from other manufacturers will not be accepted.
5. PVC Pipe shall be C900 DR25 (minimum) green pipe as manufactured by JM Eagle or equal.

C. Couplings

1. Rubber or elastomeric sleeve and stainless-steel band assembly fabricated to match outside diameters of pipes to be joined.

D. Sleeves

1. ASTM C 425, rubber for vitrified clay pipe; ASTM C 443, rubber for concrete pipe; ASTM C 564, rubber for cast-iron soil pipe; and ASTM F 477, elastomeric seal for plastic pipe. Sleeves for dissimilar or other pipe materials shall be compatible with pipe materials being joined.

E. Bands

1. Stainless steel, one at each pipe insert.

F. Fittings

1. Fittings on PVC or Ductile Iron force main piping shall be restrained joints as follows:
  - a. Compact Ductile Iron in accordance with ANSI/AWWA C153/A21.53 with Mega-Lug type retainer glands with twist off nuts.
  - b. Joint restraint may be provided using Lok-Ring or equivalent pipe joints.
  - c. Transition gaskets shall be used with pressure class PVC pipe to Ductile Transitions.

- d. Fittings shall not be used on gravity sewer piping. All changes in direction on gravity piping shall occur at a manhole.
- e. Connections of gravity sewers to old mains or repairs shall be performed with Imax style adapters. No Fernco style or metal banding strap adapters allowed.
- f. Ductile iron sleeve style adapters allowed.

#### G. Encasement

- 1. Polyethylene encasement for ductile iron pipe shall meet the requirements of ANSI/AWWA C105/A21.5 and shall only be used around gas mains.
- 2. Casing pipe shall be ASTM A252, Grade 2, with casing spacers, minimum 4 per joint, and end seals.

#### H. Valves

- 1. All valves shall be AWWA C515 resilient seated gate valves, plug valves, etc. with ductile iron body and bonnet, bronze or 304SS stems, non-rising stems, and 2" square operating nut.
- 2. Valve boxes shall comply with AWWA M44 for cast-iron valve boxes with adjustable extension and 5' diameter barrel. The use of PVC valve boxes and/or extensions is prohibited.
- 3. Stainless Steel / Brass check valve and cut off valves shall be installed on all low-pressure force main laterals at the right of way / easement line.

### 2.03 MANHOLES

- A. Precast Concrete Manholes: Normal traffic precast reinforced concrete in accordance with ASTM C 478, 48" minimum diameter, placed on a minimum of 4" of  $\frac{3}{4}$ " crushed stone, of depth indicated with provision for ASTM C 443 rubber gasket joints. All manhole covers shall be round.
  - 1. Base Section: 6-inch minimum thickness monolithic base section for floor slab and 4-inch minimum thickness for walls and base riser section, and having a separate base slab or base section with integral floor of precast concrete inverts.
  - 2. Riser Sections: 4-inch minimum thickness; 48-inch diameter, and lengths to provide depth indicated.
  - 3. Top Section: Eccentric cone type, unless concentric cone or flat-slab-top type is indicated. Top of cone to match grade rings.
  - 4. Grade Rings: Provide 2 or 3 reinforced concrete rings, of 6 to 9 inches total thickness and match 24-inch diameter frame and cover.

5. Gaskets: ASTM C 443, rubber.
  6. Steps: Cast into base, riser, and top sections sidewall at 12-to 16-inch equally spaced intervals.
  7. Pipe Connectors: ASTM C 923, resilient, Kor-N-Seal of size required, for each pipe connecting to base section.
  8. Channel and Bench: Concrete.
  9. Manhole Frames: All manhole frames and covers shall be East Jordan Iron Works Model V-1480-1 or John Bouchard & Sons Model 1190 lettered "Sanitary Sewer" or approved equivalent. SEWER or STORM SEWER will not be accepted for lettering on sanitary sewer manholes.
  10. External Manhole Sealing Sleeve to prevent inflow and infiltration shall be as manufactured by Sealing Systems, Inc. or approved equivalent.
  11. Rings and covers must have plastic or rubber non-flood inserts installed on every manhole.
  12. All manhole penetrations shall have Kor-N-Seal pipe connectors.
  13. All precast manholes shall be new, unused manholes delivered directly from the manufacturer to the job site. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the outside of the barrel.
  14. Manhole base, riser, transition, and cone sections shall have offset tongue and grove joints and shall be made watertight with pre-lubricated rubber gaskets conforming to ASTM C443 and butyl sealant water stops.
  15. Manholes shall be assembled with the fewest number of sections to makeup the required height, thereby reducing the number of joints. The use of more than one riser section of 16" or less shall be prohibited.
- B. Cast-in-Place Manholes (if any):
1. When the inside diameter of the largest pipe is 33" or greater, the manhole base may be cast-in-place.
  2. The base must not be cast less than 4" or more 12" above the outside top of the main incoming or outgoing pipe.
  3. Concrete used must be Class "A" Portland Cement Concrete. Slump must not exceed 2" as determined by the slump cone method of ASTM C143. All manhole covers shall be round. Minimum and maximum wall thicknesses for the cast-in-place sections must conform to the following table and strictly adhered to.

**MINIMUM/MAXIMUM WALL THICKNESSES  
FOR CAST-IN-PLACE SECTIONS**

<b>Manhole Diameter (inches)</b>	<b>Minimum Wall Thickness (inches)</b>	<b>Maximum Wall Thickness (inches)</b>
48	5	7
60	6	8
72	7	9
84	8	10
96	9	11

4. Inside diameters of the cast-in-place portions must equal the diameter of the manhole specified. Standard precast manhole riser sections and other components as specified in this Section must be used above the cast-in-place base to bring the manhole rim to grade.
5. Manholes with cast-in-place bases and all of the associated connections and joints must be capable of passing the leakage test as specified in these Specifications.
6. Cast-In-Place manholes must maintain the specified internal diameter throughout the manhole base and riser sections. The internal diameter must not be decreased until the cone section or flat slab top is placed. Cast-In-Place manhole base bottoms must be placed on a minimum of 4 inches of 3/4-inch crushed rock.
7. Cast-In-Place manhole bases must be 8 inches thick with #4 steel reinforcing bars placed at 12 inches on center each way. The reinforcing must be centered between the manhole invert and bedding.
8. Concrete on the cast portion may be placed against undisturbed earth provided wall if thickness requirements can be met; otherwise, outside forms are required. Forms must be removed, and the structure visually inspected prior to backfill. All rock pockets, cracks, or other defects must be patched in conformance with these specifications.
9. Standard concentric cones conforming to ASTM C478 must be used on all manholes shown on the Plans unless otherwise specified. Where depth is insufficient for cones, concentric flat slab tops must be used.
10. Joints in precast manhole shafts must be sealed by buttering the joint space of the previously laid barrel section or base with mortar or must be sealed with preformed plastic sealing compound and installed as recommended by the manufacturer. All joint surfaces must be thoroughly cleaned prior to placing the sealing compound or buttering with mortar. The inside and outside of mortared joints must be plastered with mortar and the inside brushed to a smooth finish with a wet brush. Special precautions must be taken to see that the entire joint space is filled with mortar and is watertight.
11. The joint between the manhole frame and the cone or grade ring must be sealed by buttering the joint space with mortar or using an epoxy adhesive.

12. The in-place depth of the 24-inch manhole opening must not exceed 18 inches from the top of the frame to the top of the cone. If the manhole is a flat slab top, or if the depth of the opening must exceed 18 inches, a 36-inch frame and cover with corresponding 36-inch manhole components must be used. The depth of a 36-inch opening as described above must not exceed 24 inches.
13. Components for construction of manholes must be selected to provide the least achievable vertical dimension between the finished frame surface and the top of the cone or soffit of the flat slab top. The depth of precast grade rings or cast-in-place grade rings must not exceed 8 inches on new or reconstructed manholes.
14. At the Contractor's option, the manhole frame and cover size may be increased from 24 to 36 inches if necessary to facilitate testing of the storm drain system. No additional compensation will be paid to the contractor if the contractor elects to increase the size, and the manhole frame and cover will be paid for at the unit price bid for the 24-inch frame and cover. If the Contractor elects to install a 36-inch frame and cover, it must remain as a permanent part of the improvements (i.e. it must not be replaced with a 24-inch frame and cover after testing).
15. All castings must be manufactured true to pattern and with satisfactory fit of all component parts. Round frames and covers must have machined bearing surfaces. Manhole covers that do not fit neatly and bear firmly in the ring will be rejected.
16. Unless otherwise specified, exposed surfaces of the castings with the parts assembled and disassembled must be painted with commercial quality asphalt paint after testing and assembly.
17. Bottom, Walls, and Top: Reinforced concrete.
18. Channel and Bench: Concrete.
19. Steps: Cast into sidewall at 12- to 16-inch intervals.

#### 2.04 MANHOLE STEPS

- A. General: Wide enough for a man to place both feet on one step and designed to prevent lateral slippage off the step.
  1. Material: Copolymer Polypropylene Plastic Coating over  $\frac{1}{2}$  inch minimum Grade 60 steel reinforcing, 12-inches wide, with slip resistant surface.
  2. Manhole steps shall conform to ASTM C478 as manufactured by M.A. Industries, Model PSI-PF, or Equal.

#### 2.05 MANHOLE FRAME AND COVERS

- A. Manhole frames and covers shall be close-grained, cast-iron, smooth, clean, free of blisters, blowholes and other defects and conform to ASTM A48, Class 30B. Plane or grind bearing surfaces to ensure a flat, fine surface. Castings judged to be defective by the Owner or Engineer will be rejected and shall be replaced by the Contractor.
- B. Covers and frames shall be “heavy-duty” type, rated for a minimum of H-20 loading. Covers and frames shall be made in the United States. All castings shall be clearly marked with the manufacturer's name, product catalog No. and made in the U.S.A. in cast letters.
- C. Manhole covers shall be cast with two non-penetrating type pick holes. Covers shall not have vent holes.
- D. Manhole frames and covers shall be of either Standard Type (non-bolted) or Watertight Type (bolt-down), as indicated on the drawings. If not indicated, manhole covers shall be standard type. In locations where the manhole rim elevation is below the 100-year flood elevation, manhole frame and covers shall be Watertight Type.

## 2.06 CLEANOUTS

- A. General: Provide cast-iron ferrule and countersunk brass cleanout plug, with round cast-iron access frame and heavy-duty, secured, scoriated cast-iron cover.

## 2.07 IDENTIFICATION

- A. Plastic Underground Warning Tapes: Polyethylene plastic tape with metallic core, 6 inches wide by 4 mils thick, solid green in color with continuously printed caption in black letters “CAUTION - SEWER LINE BURIED BELOW.”

## PART 3 – EXECUTION

### 3.01 PREPARATION OF FOUNDATION FOR BURIED SANITARY SEWAGE SYSTEMS

- A. Grade trench bottom to provide a smooth, firm, stable, and rock-free foundation, throughout the length of the pipe.
- B. Remove unstable, soft, and unsuitable materials at the surface upon which pipes are to be laid and backfill with clean sand or pea gravel to indicated level.
- C. Shape bottom of trench to fit bottom of pipe. Fill unevenness with tamped sand backfill. Dig bell holes at each pipe joint to relieve the bells of all loads and to ensure continuous bearing of the pipe barrel on the foundation.
- D. Perform excavation to lines and grades established by the Drawings. Construct excavation a minimum of two (2) feet in diameter larger than the outside dimensions of the manhole base and sections.
- E. If material in bottom of excavation is unsuitable for supporting manhole, excavate

unsuitable material to a depth specified by the Engineer and backfill resulting void with ALDOT No. 57 crushed limestone.

- F. Backfill around manholes constructed in paved areas or areas to be paved with ALDOT 825, Type "A". Compact backfill in 8-inch loose lifts to minimum density of 95% Standard Proctor Density with vibratory compaction equipment.
- G. Backfill around manholes in unimproved areas and lawns with native materials, compacted in 8-inch loose lifts to minimum density of 95% Standard Proctor Density.

### 3.02 PIPE APPLICATIONS FOR UNDERGROUND SANITARY SEWERS

- A. Refer to Paragraph 2.02 above.

### 3.03 INSTALLATION, GENERAL

- A. General Locations and Arrangements: Drawings (plans and details) indicate the general location and arrangement of the underground sanitary sewerage system piping. Location and arrangement of piping layout take into account many design considerations. Install the piping as indicated, to the extent practical.
- B. Install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings in accordance with manufacturer's recommendations for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.
- C. Use manholes for changes in direction, except where a fitting is indicated. Use fittings for branch connections, except where direct tap into existing sewer is indicated.
- D. Use proper size increasers, reducers, and couplings, where different size or material of pipes and fittings are connected. Reduction of the size of piping in the direction of flow is prohibited.
- E. Install piping pitched down in direction of flow, at minimum slope of 2 percent, except where indicated otherwise.
- F. Extend sanitary sewerage system piping to connect to building sanitary drains, of sizes and in locations indicated.
- G. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed, by tunneling, jacking, or a combination of both.
- H. Ductile iron force main and gravity sewer pipe shall be installed in accordance with AWWA C600.
- I. PCV gravity sewer pipe shall be installed in accordance with ASTM D2321.

- J. Sewer lines shall be installed with a minimum 18” vertical and 60” horizontal separation.
- K. Manholes shall be installed at all changes in direction on gravity sewer piping.
- L. All gravity sewer pipe shall be bedded in a minimum of 6” of ALDOT #8910 stone.
- M. All gravity sewer pipe shall be backfilled to 12” minimum above the pipe with ALDOT #8910 or #57 stone.
- N. All trenches under paving shall be backfilled completely with ALDOT #8910 stone.
- O. The maximum allowable slope on gravity sewer piping is 12% without the Engineer’s approval. All pipes on slopes over 10% will have concrete restraint collars on 50-foot centers with the first collar located at the face of the downstream manhole.
- P. If a geotechnical engineer/tester is present, after reaching 12” of stone above the top of the sanitary sewer main, a geotextile fabric may be laid over the stone and compacted backfill installed in a maximum of 6” lifts reaching 98% compaction may be utilized if separate compaction test reports will be submitted otherwise all sanitary sewers within roads, parking lots, or paved areas will have to be backfilled with 100% stone.
- Q. Cleanout are required on all force mains at locations directed by the Engineer and as shown on the plans at 750’ increments or as directed.
- R. All Low-Pressure force mains shall be installed at 36” minimum cover to 60” maximum cover unless otherwise directed by the Engineer.
- S. Low-Pressure Force Main / Force Mains shall be bedded in a minimum of 6” Stone (#8910) and stone shall extend above the pipe a minimum of 12”.
- T. Bedding:
  - 1. Class “1” Bedding shall be ALDOT Standard Specifications for Highway Construction, Section 801, as follows:
    - (a) ***Gravity Pipe (ALL materials) – No. 57 crushed limestone.***
    - (b) ***Pressure Pipe (material NOT PLASTIC) – No. 57 crushed limestone.***
    - (c) ***Pressure Pipe (PLASTIC material) – No. 8910 crushed limestone.***
  - 2. Class “2” Bedding shall be reinforced concrete 3000 psi design mix.
  - 3. Class “3” Bedding shall be native soil.
- U. Select Backfill:



1. Select backfill where specified or required shall be crushed limestone. Crushed stone shall meet or exceed the requirements of the ALDOT Standard Specifications for Highway Construction, Section 825, Type "A".

V. Standard Backfill:

1. Standard backfill shall consist of native soils of good earth, sand, gravel, and shall be free of large rocks, boulders and other deleterious substances.

W. Pipe Joint Construction and Installation

1. Join and install PVC pipe as follows:
  - (a) Solvent cement joint pipe and fittings, joining with solvent cement in accordance with ASTM D 2855 and ASTM F 402.
  - (b) Pipe and gasketed fittings, joining with elastomeric seals in accordance with ASTM D 3212, and for truss pipe ASTM D 2680, Appendix XI.
  - (c) Installation in accordance with ASTM D 2321.
  - (d) Maximum deflection at any joint shall be one-half the manufacturer's recommended maximum deflection allowed.

X. Manholes

1. General: Install manholes complete with accessories as indicated, or if not indicated, in compliance with project requirements and authorities having jurisdiction. Form continuous concrete or split pipe section channels and benches between inlets and outlet. Set tops of frames and covers flush with finish surface where manholes occur in pavements. Elsewhere, set tops 3 inches above finish surface, unless otherwise indicated.
  - (a) Place precast concrete manhole sections as indicated and install in accordance with ASTM C 891.
  - (b) Construct brick manholes as indicated.
  - (c) Construct cast-in-place manholes as indicated.
  - (d) Provide rubber joint gasket complying with ASTM C 443 at joints of sections.
  - (e) Install manhole steps as indicated.

Y. Placing Manhole Base and Sections:

1. Manholes shall be constructed to the sizes, shapes, dimensions and at the locations shown on the plans.
2. Precast manhole bases shall be set plumb and true to the lines and grades specified by the plans. Manholes out of plumb in excess of 1/4 inch in eight (8) feet shall be reset.
3. Clean ends of manhole sections of foreign materials and inspect ends for damage.

4. Place pre-lubricated gasket into recess. Follow gasket and water stop manufacturers' installation instructions. Set manhole section.
5. When new openings are required in existing manholes, openings shall be core drilled.

Z. Granular Base

1. Remove standing water from excavation. Place 12-inches minimum of ALDOT #57 stone and compact with vibratory compaction equipment.
2. Excavations deeper than 12-inches below required grade of manhole base, not approved by the Engineer, shall be filled with ALDOT No. 57 crushed limestone and compacted by vibratory compaction equipment at no additional cost to the Owner.

AA. Cleanouts

1. Install cleanouts and extension from sewer pipe to cleanout at grade as indicated. Set cleanout frame and cover in concrete block 18 by 18 by 12 inches deep, except where location is in concrete paving. Set top of cleanout 1 inch above surrounding earth grade or flush with grade when installed in paving.

BB. Tap Connections

1. Make connections to existing piping and underground structures so that finished work will conform as nearly as practicable to the requirements specified for new work.
2. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6-inch overlap, with not less than 6 inches of 3000-psi 28-day compressive-strength concrete.
3. Make branch connections from side into existing 4- to 21-inch piping by removing section of existing pipe and installing wye fitting, into existing piping. Encase entire wye with not less than 6 inches of 3000-psi 28-day compressive-strength concrete.
  - i. Provide concrete that will attain minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.
  - ii. Use epoxy bonding compound as interface between new and existing concrete and piping materials.
4. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris, concrete, or other extraneous material that may accumulate.

CC. Installation Of Identification

1. Install continuous plastic underground warning tape during back-filling of trench for underground water service piping. Locate 6 to 8 inches below finished grade, directly over piping.

### 3.04 FIELD QUALITY CONTROL

- A. Testing: Perform testing of completed piping in accordance with local authorities having jurisdiction.
- B. Cleaning: Clear interior of piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.
  1. In large, accessible piping, brushes and brooms may be used for cleaning.
  2. Place plugs in ends of uncompleted pipe at end of day or whenever work stops.
  3. Flush piping between manholes, if required by local authority, to remove collected debris.
- C. Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.
  1. Make inspections after pipe between manholes and manhole locations has been installed and approximately 2 feet of backfill is in place, and again at completion of project.
  2. If inspection indicates poor alignment, debris, displaced pipe, infiltration or other defects correct such defects, and reinspect.
  3. **ALL SEWER MAINS AND MANHOLES MUST BE VISUALLY INSPECTED BY THE OWNER'S REPRESENTATIVE AND ENGINEER, OR ENGINEER'S REPRESENTATIVE PRIOR TO BACKFILLING. ANY MAINS OR MANHOLES NOT INSPECTED PRIOR TO BACKFILL WILL NOT BE ACCEPTED.**
  4. A representative of the sewer department must be present when the cap on all service stub-outs is removed. At submerged stub-outs, the water level in the excavation must be lowered and kept below the elevation of the cap until the cap is removed and the pipe is extended above the water level. Any caps removed without a representative of the sewer department present will result in rejection of the connection.

### 3.05 MANHOLE TESTING

- A. All new manholes must be tested for leakage after assembly but prior to back-filling around the manhole.
- B. The Contractor is responsible for conducting all leakage tests.

- C. The Contractor is responsible for providing all equipment, materials, and labor for performing and making measurements of the leakage tests.
- D. The Engineer or Engineer's Representative must witness all leakage tests and verify the accuracy and acceptability of the equipment utilized.
- E. The Engineer or Engineer's Representative may require a manhole to be tested after backfilling if there is reason to suspect that the manhole has been disturbed during the backfilling operation or at other times during construction.
- F. When leakage exceeds the amount allowed by these Specifications, the Contractor, at its own expense, must determine the source, or sources, of leakage and repair or replace all defective materials and workmanship to the satisfaction of the Engineer and Owner.
- G. The extent and type of repair that may be allowed, as well as results, are subject to the approval of the Engineer and Owner.
- H. The completed manhole installation must then be retested and required to meet the requirements of this Section. Any individually detectable leaks must be repaired, regardless of the results of the tests.
- I. Manholes must be tested for leakage by the following method:
  - 1. Manhole Vacuum Test
    - (a) All lift holes, connections, and inside and outside joints must be sealed as described in this Section. All pipes entering the manhole must be plugged, taking care to securely brace the plug from being drawn into the manhole. Plugs and the ends of pipes connected by flexible boots must be blocked to prevent their movement during the vacuum test. When plugs are being placed, the pipe adjacent to the manhole must be visually inspected to detect any evidence of shear in the pipe due to differential settlement between the pipe and the manhole.
    - (b) A probable point of leakage is at the junction of the manhole and the pipe; therefore the plug must be placed in the connected pipes outside of the manhole base. The test head must be placed at the inside of the top of the cone section and the seal inflated in accordance with the manufacturer's recommendations. In the case of flat slab top manholes, the test head must be placed at the top surface of the flat slab top. A vacuum of 10 inches of mercury (approximately 5 psi) must be drawn and the vacuum pump shut off. With the valves closed, the time must be measured for the vacuum to drop to 9 inches. The manhole passes the test if the measured time is greater than the times listed in the following Table for the particular manhole size.

<b>MINIMUM VACUUM PASS TIMES</b>	
<b>Manhole Size (inches)</b>	<b>Minimum time (seconds) to drop to 9" Hg</b>
<b>48</b>	<b>60</b>
<b>54</b>	<b>67</b>
<b>60</b>	<b>75</b>
<b>72</b>	<b>90</b>
<b>84</b>	<b>105</b>
<b>96</b>	<b>120</b>

- (c) If the manhole fails the initial test, repairs must be made while the vacuum is still being drawn. Re-testing must continue until a satisfactory test is obtained.

2. Test by the Exfiltration Method

- (a) At the discretion of the Engineer, the Contractor can substitute the Exfiltration Method of testing for the Vacuum Test described in Section 3.05.I.1. This method can only be used when ground water is not present. If ground water is present, a Vacuum Test must be used unless otherwise directed by the Engineer. All backfilling and compaction must be completed prior to the commencement of testing.
- (b) The procedures for the test include the following:
- (i) Manhole section interiors must be carefully inspected; units found to have through wall lift holes, or any penetration of the interior surface by inserts provided to facilitate handling, will not be accepted. Coating must be applied after the testing unless coating is applied before field assembly, or at the factory. All lift holes and exterior joints must be plugged with an acceptable non-shrink grout. Grout must not be placed in horizontal joints. Tests must be performed before grouting the invert or around pipe penetrations and before coating the interior surfaces of the manhole or junction box.
  - (ii) After cleaning the interior surface of the manhole, the Contractor must place and inflate pneumatic plugs in all of the connecting pipes to isolate the manhole; sealing pressure within the plugs must be as recommended by the plug manufacturer.

J. Failure to Pass the Test

1. If the manhole fails to pass the initial test method as described in Section 3.05.I.1, "Test by the Vacuum Method", of these Specifications, and, if allowed, the Exfiltration Test Method, per Section 3.10.B, of these Specifications, or if visible groundwater leakage

into the manhole is observed, the Contractor must locate the leak, if necessary, by disassembling the manhole.

2. The Contractor must check the gaskets and replace them if necessary.
3. The Contractor may re-lubricate the joints and re-assemble the manhole, or the Contractor may install an acceptable exterior joint sealing product on all joints and then retest the manhole. If the Contractor chooses to attempt to repair the manhole rather than replace it, the manhole must be retested until it passes. Cold applied preformed plastic gaskets cannot be used for repair.
4. Records of all manhole testing must be made available to the Engineer at the close of each working day, or as otherwise directed by the Engineer.
5. Any damaged or visually defective products or any products out of acceptable tolerance must be removed from the site.

### 3.06 MEASUREMENT AND PAYMENT

- A. The quantity of each type of manhole will be measured by the unit. The unit price paid for each manhole includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing manholes, complete in place, including excavation and backfill, manhole bases, mortar, concrete, reinforcement, and acceptance testing, as shown or specified in the Contract, specified in these Specifications, and directed by these the Engineer.
- B. Payment for adjusting manholes will conform to these Specifications, with the following exceptions:
  1. The unit price paid includes all necessary excavation, backfill, sealing, and concrete; and
  2. The unit price paid will be the average of all depths and limits of adjustment required.
- C. The unit price paid for manhole reconstruction includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in reconstructing manholes, complete in place, including excavation and backfill, demolition, disposal, mortar, concrete, and reinforcement as shown on the plans or specified in the Contract, in these Specifications, and as directed by the Engineer.

END OF SECTION

**SECTION 40 50 00**  
**INSTRUMENTATION AND CONTROL SYSTEMS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section includes general information, products, and execution for instrumentation and control systems.
- B. Related Sections:
  - 1. SECTION 01 31 00 - Project Management and Coordination
  - 2. SECTION 01 44 33 - Manufacturer's Services
  - 3. SECTION 01 78 23 - Operation and Maintenance Data
  - 4. SECTION 01 91 00 – Commissioning
  - 5. SECTION 26 05 00 - Common Work Results for Electrical
  - 6. SECTION 26 05 19 - Low-Voltage Conductors
  - 7. SECTION 26 08 00 - Commissioning of Electrical Systems
  - 8. SECTION 27 00 00 - Communications Systems

**1.02 REFERENCES**

- A. Section American National Standards Institute (ANSI):
  - 1. C39.1 - Requirements for Electrical Analog Indicating Instruments
  - 2. C84.1 - Electric Power Systems and Equipment — Voltage Ratings (60 Hertz)
- B. CSA Group (CSA):
  - 1. C22.2 NO. 107.1 - Power conversion equipment
- C. Institute of Electrical and Electronics Engineers (IEEE)
  - 1. C37.90.1 - Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus
  - 2. C62.41.2 - Recommended Practice on Characterization of Surges in Low-Voltage (1,000 V and less) AC Power Circuits

3. C62.45 - Recommended Practice on Surge Testing for Equipment connected to Low-Voltage (1,000 V and less) AC Power Circuits

4. 802.3 - Standard for Ethernet

D. National Electrical Manufacturers Association (NEMA):

1. ICS 2 - Controllers, Contactors and Overload Relays Rated 600 V

2. PE1 - Uninterruptible Power Systems (UPS) — Specification and Performance Verification

E. National Fire Protection Association (NFPA):

1. 70 - National Electrical Code (NEC)

F. NSF International/American National Standards Institute (NSF/ANSI):

1. 61 - Drinking Water System Components — Health Effects

G. Occupational Safety and Health Administration (OSHA):

1. 29 CFR 1910 - Occupational Safety and Health Standards

H. Underwriters Laboratories (UL):

1. 1449 - Standard for Surge Protective Devices

2. 1778 - Standard for Uninterruptible Power Supply Equipment

### 1.03 DEFINITIONS

A. Unwitnessed Factory Test (UFT)

B. Witnessed Factory Test (WFT)

C. Operational Readiness Test (ORT)

D. Functional Demonstration Test (FDT)

E. Site Acceptance Test (SAT)

F. Site Demonstration Test (SDT)

### 1.04 COORDINATION

A. The I&C Systems Subcontractor shall be a Subcontractor to the Electrical Contractor.



B. The following I&C Systems Subcontractors (Integrators) are pre-approved:

1. Dexter Fortson Associates, Inc.  
5511 Powder Plant Lane  
Birmingham, AL 35022  
(205) 432-2700
2. Matthews Integration  
2809 Newby Road SW, Suite 127  
Huntsville, AL 35805  
(256) 430-9890
3. Engineer Approved Equal

C. Work Includes: Engineering, design, providing, installing, calibrating, adjusting, testing, documenting, starting up, and OWNER training for a complete I&C system.

D. Detailed Design: The I&C design, as indicated in the Contract Documents, includes functional, performance, and component requirements. Complete the detailed I&C design.

E. I&C Work Scope:

1. At a minimum, provide LCPs, ECPs, controls, and instruments shown on the Drawings, etc.
2. For equipment and ancillaries required for the I&C system:
  - a. Furnish and install the equipment specified in the Contract Documents required for the I&C.
  - b. Completing detail design.
  - c. Required Submittals.
  - d. Instructions, details, recommendations, and coordination for the certificate of proper installation.
  - e. Verify readiness for operation.
  - f. Verify the correctness of final interface.
  - g. Adjusting and calibrating.
  - h. Starting up and commissioning.
  - i. Testing and coordination of testing.

j. Training.

3. Verify the following Work is provided: Correct size, type, materials, connections, and interface of field equipment and devices.
4. For equipment not provided under I&C systems but directly connected to equipment required by I&C systems:
  - a. Obtain the Manufacturer's information on installation, interface, function, and adjustment.
  - b. Coordinate to allow required interface and operation with I&C.
  - c. For operation and control, verify that installations, interfacing signal terminations, and adjustments have been completed in accordance with the Manufacturer's recommendations.
  - d. Test to demonstrate required interface and operation with I&C.
  - e. Examples of items that may be in this category shall not be limited to:
    - 1) Electrical equipment indicated in Division 26.
    - 2) Valve operators.
    - 3) Switchgear.
    - 4) RVSS motor controllers.
    - 5) Transformers.
    - 6) Pumps and motors.

F. Wiring External to I&C Equipment:

1. Special control and communications cable: Provided by the I&C contractor.
2. Other wiring and cable: As specified in SECTION 26 05 19 – Low-Voltage Electrical Power Conductors and Cables.

## 1.05 SEQUENCING AND SCHEDULING

A. I&C Progress Schedule:

1. Coordinate activities and interactions between the ENGINEER and the OWNER for coordination meetings, testing, programming, Submittal reviews, test witnessing, and training. Clarify required Work sequences and major milestone

prerequisites.

2. Format: As specified in SECTION 01 31 00 - Project Management and Coordination.
3. Include:
  - a. Design activities.
  - b. Submittals.
  - c. Purchasing, fabricating, and assembly activities.
  - d. Shipment and delivery.
  - e. Installation.
  - f. Testing.
  - g. Startup.
  - h. Training.
  - i. Coordination meetings.
  - j. Substantial Completion date.
  - k. Acceptance.

B. Prerequisite Activities and Lead Times: Do not begin the following key Project activities until the prerequisite activities and lead times listed below have been completed and satisfied:

1. Submittal to the ENGINEER:
  - a. Prerequisite: ENGINEER acceptance of the I&C progress schedule.
  - b. Provide PLC equipment as shown on the Drawings or listed in the specifications.
2. Hardware purchasing, fabrication, and assembly: Associated Shop Drawing Submittals completed.
3. Tests: Associated test plan Submittal completed.
4. Training: Associated training plan Submittal, reviewed, and accepted by the ENGINEER.

5. PLC applications software configuring.
  6. FDT: Shop Drawing Submittals completed.
  7. FDT completed.
  8. PLC applications software configuring and testing.
  9. Shipment to site: Completion of Shop Drawing Submittals, preliminary O&M manuals, and for I&C elements involved in the FDT.
  10. ORT: The allowance for interruptions to the CONTRACTOR's Work due to applications software testing shall be 10 days total.
  11. PAT:
    - a. Prerequisite: ORT completed, and facility started up.
    - b. Allowance for interruptions to the CONTRACTOR's Work due to applications software testing shall be 10 days total.
- C. I&C Substantial Completion Date: In accordance with the General Conditions and the Supplementary Conditions, unless otherwise noted below for I&C. Additional prerequisites for Substantial Completion include:
1. I&C Submittals accepted or approved, as specified.
  2. PAT successfully completed.
  3. OWNER training plan on schedule.
  4. Spares, expendables, and test equipment delivered to the OWNER.
  5. Service and maintenance agreements submitted for the Work required in this Section.
- D. I&C Acceptance: In accordance with the General Conditions, unless otherwise specified below for I&C.
1. When the ENGINEER issues a written notice of acceptance, the following prerequisites shall have been met:
    - a. I&C certificate of Substantial Completion.
    - b. Punchlist items completed.
    - c. Final revisions to O&M manuals accepted.

- d. After the I&C has been completely installed and made operational, the entire system shall be subject to an operational test run before being accepted. To complete the requirement, the I&C and PLC/RTU communications shall operate properly, without significant system malfunction, as deemed by the ENGINEER, for a continuous uninterrupted time period of 20 days. If the PLC/RTU system fails to meet the requirement, make the necessary repairs or adjustments required to correct the problem. The acceptance test shall completely restart from the beginning for a complete retest.
- e. Maintenance service agreements for I&C have been accepted by the OWNER.

## 1.06 SUBMITTALS

- A. Testing As specified in SECTION 26 05 00 – Common Work Results for Electrical.
- B. ENGINEER's Review: The ENGINEER will act upon the CONTRACTOR's Submittal and transmit a response to the CONTRACTOR no later than 10 days after receipt. Resubmittals will be subject to the same review time.
- C. Administrative Submittals:
  - 1. Statements of qualification:
    - a. I&C Contractor.
    - b. I&C Contractor's site representative.
    - c. Resume for each I&C Contractor's on-site startup and testing team member.
  - 2. I&C progress schedule:
    - a. Submit within 30 days after the Pre-Construction Meeting.
    - b. Upon acceptance by the ENGINEER, it shall form the basis and schedule for Submittal reviews, test witnessing, and partial payments relating to I&C Work.
  - 3. OWNER training plan: As specified in SECTION 01 44 33 – Manufacturer's Services.
- D. Shop Drawings:
  - 1. Itemized Bill of Materials:
    - a. Equipment, components, devices, and materials in the format specified in SECTION 26 05 00 – Common Work Results for Electrical.
    - b. Data included:

- 1) Tag number.
  - 2) Description.
  - 3) Manufacturer, complete model number, and options not defined by the model number.
  - 4) Quantity supplied.
2. Catalog cuts for equipment, components, devices, and materials:
    - a. Catalog information.
    - b. Descriptive literature.
    - c. External power and signal connections.
    - d. Scaled drawings showing exterior dimensions and locations of electrical interfaces, mechanical interfaces, and mounting arrangements.
    - e. Specific features and configuration data:
      - 1) Location or service.
      - 2) Manufacturer and complete model number.
      - 3) Setpoints and scale range.
      - 4) Engineering specifications.
      - 5) Equipment weights.
      - 6) Power and grounding requirements.
      - 7) Materials of construction.
    - f. Name, address, and telephone number of the Manufacturer's local office, representative, distributor, or service facility.
  3. Construction drawings:
    - a. Show to scale enclosure, internal equipment layout, and external device nameplates and layout.
    - b. Show dimensions and locations of panel-mounted devices, doors, louvers, and subpanels (internal and external).
    - c. Panel legend: List front of panel devices by tag numbers, nameplate

inscriptions, service legends, and annunciator inscriptions.

- d. Construction details: NEMA rating, materials, material thickness, structural stiffeners and brackets, lifting lugs, louvers, mounting brackets and tabs, door hinges and latches, and welding.
  - e. Samples of LCPs mimic bus graphic materials, colors, and adhesive.
  - f. Cable access areas and cable routing.
  - g. Anchor bolt size and location.
  - h. Installation and mounting detail drawings.
  - i. P&IDs.
  - j. Hydraulic and electrical schematics.
  - k. Equipment weights.
4. Wiring diagrams:
- a. Ladder diagrams in a format similar to those shown on the drawings.
  - b. Diagrams shall be coordinated and show field interfaces.
  - c. Interconnection from power sources and panelboards.
  - d. Electrical connections between equipment, consoles, panels, terminal junction boxes, and field-mounted components.
  - e. Component and panel terminal board identification numbers, and external wire and cable numbers.
  - f. Circuit names, identify terminals, cable ID tags, actual cable lengths, and conduit tags.
  - g. Grounding diagram, philosophy, implementation, terminations, type, and connections.
  - h. Show each circuit individually.
  - i. Identify each item with attributes listed:
    - 1) Wires, conductors, cables: Type, number, size and color.
    - 2) Terminals: Location, terminal strip number, and terminal block number.

- 3) Discrete components:
  - a) Tag number, terminal numbers, and location.
  - b) Switching action, open or close on rising or falling variable, setpoint value and units, and variable description.
- 4) I/O point list for I/O points, include:
  - a) Point names and descriptions.
  - b) Point addresses, tag numbers, functions, ranges, and engineering units.
  - c) Wire and cable assignments.
  - d) I/O card layout, module, and block number.
  - e) Field wiring termination assignments.
- 5) Relay coils:
  - a) Tag number and its function.
  - b) On the right side of the run where the coil is located, list the contact location by ladder number and sheet number.
- 6) Relay contacts: Coil tag number, function, and coil location.
5. LCP cabinet power consumption and heat dissipation, tabulate and summarize:
  - a. Required voltages, currents, and phases.
  - b. Maximum heat dissipations Btu per hour.
  - c. Include calculations.
6. Communications with LCP devices, PLC equipment: Describe configuration, operation, limitations, and diagnostics for LANs, data highway, serial links, and other communication paths.
7. Applications software documentation:
  - a. Complete configuration documentation for microprocessor based configurable devices.
  - b. For each device, include a program configuration listing showing:
    - 1) Functional blocks or modules used.



- 2) Configuration, calibration, and tuning parameters.
- 3) Descriptive annotations.

E. Shop Drawings for changes impacting software configuration:

1. Schedule:
  - a. Submit first changes as part of Shop Drawings.
  - b. Submit updated changes at 30-day intervals.
2. Changes to I/O list reflecting actual equipment and instrumentation.
3. Changes required to software configuration resulting from installation of alternative, upgraded, and modified equipment.

F. Quality Control Submittals:

1. Testing Related Submittals:
  - a. Unwitnessed factory test: No Submittals required.
  - b. FDT, operational readiness, and PAT:
    - 1) Preliminary test procedures: Outlines of proposed tests, forms, and checklists.
    - 2) Final test procedures: Proposed test procedures, forms, and checklists.
    - 3) Test documentation: A copy of the signed off test procedures when tests are completed. completed component calibration sheets with O&M manuals.
2. O&M manuals:
  - a. As specified in SECTION 01 78 23 – Operations and Maintenance Date, unless otherwise specified in this Section.
  - b. Include Shop Drawing submittal information.
  - c. Manufacturer's O&M manuals: Certificate of proper installation, instructions for installation, operation, maintenance, troubleshooting, and calibration. Include internal schematics and wiring diagrams.
  - d. Software documentation: Updated version of software.

- e. Hardcopy and electronic version of installed programs in controllers.
- f. Calibration, startup, and commissioning reports.
- g. Complete lists of equipment furnished, including Manufacturer model numbers, correct settings, alarm points, and operating ranges.
- h. Detailed instructions for periodic maintenance schedules, equipment inspection, and adjustment.
- i. Drawings shall be provided in electronic media on standard IBM computer compatible hi-speed USB flash drives and in quality hardcopy media. AutoCAD Drawings shall be in accordance with Design Drafting Standards.
- j. List of spares and expendables required and recommended.

G. Contract Closeout Submittals: Prior to the Substantial Completion date, submit service agreements signed by the OWNER and the maintenance provider for Work required in this Section.

H. Extra Materials:

- 1. Furnish, box, tag, and clearly mark on exterior, identify each item with the Manufacturer's name, description, and part number for shipment and long-term storage, and deliver prior to 75%« of the Substantial Completion date the following extra materials for the LCPs and associated components:
  - a. Fuses: A minimum of 10 of each type and size.
  - b. One 24 VDC power supplies.
  - c. Indicating light bulbs and LEDs: A minimum of 10 of each type and size.
  - d. Relay: 3 of each type.
  - e. Corrosion-inhibiting vapor capsules: The Manufacturer's recommended 2-year supply.
  - f. Spray pump filter adhesive: One pint.
  - g. One spare PLC chassis, I/O cards, communications ports, power supply and CPU.

I. Warranty Documentation:

- 1. Sample warranty.
- 2. Warranty.

J. Supplements listed in this Section.

#### 1.07 QUALITY ASSURANCE

A. The CONTRACTOR shall provide OWNER contact information to Equipment Manufacturers as "owner of record" for warranties, recalls, updates (including software and firmware), notices, etc.

B. UL Compliance: Materials manufactured within the scope of UL shall conform to UL Standards and have an applied UL listing mark.

C. Qualifications:

1. I&C Contractor qualifications:

- a. A minimum of 10 years of documented experience in the Work of this Section.
- b. Approved by the Manufacturer.

2. I&C Contractor's site representative qualifications: A minimum of 10 years of documented experience in the Work of this Section.

D. Coordination Meetings:

1. General: As specified in SECTION 01 31 00 – Project Management and Coordination.

- a. Location: At the site or the ENGINEER's office, as approved by the ENGINEER.
- b. Attended by: ENGINEER, CONTRACTOR, Subcontractor, Manufacturer, and OWNER, as requested by the ENGINEER.
- c. Meeting frequency: When requested by the ENGINEER. Estimated monthly in the first half of the Project and weekly in the second half of the Project.

E. Training:

1. General:

- a. Provide an integrated training program for the OWNER's personnel.
- b. Perform training to meet the specific needs of the OWNER's personnel.
- c. Include training sessions, classroom, and field, for managers, ENGINEERs, operators, and maintenance personnel.

- d. Accommodate the OWNER's personnel schedule.
  - e. The OWNER reserves the right to make and reuse videos of the training sessions.
2. O&M training:
- a. Coordinate specific requirements specified in the I&C subsystems.
  - b. Include a review of O&M manuals and a survey of spares, expendables, and test equipment.
  - c. Use equipment similar to that provided or currently owned by the OWNER.
  - d. Provide training suitable for instrument technicians with at least a 2-year associate engineering or technical degree, or equivalent education and experience in electronics, instrumentation, or digital systems.
3. Operation training:
- a. Training session duration: One instructor day.
  - b. Number of training sessions: One.
  - c. Location: Project site.
  - d. Content:
    - 1) Loop/circuit functions: Understanding of loop/circuit functions, including interlocks for each loop/circuit.
    - 2) Operation: For example, adjusting variable setpoints, manual/remote control, protective relay trips and resets, annunciator acknowledgment and resetting.
    - 3) Interfaces with field equipment, governor equipment, electrical equipment, existing equipment, etc.
4. Maintenance training:
- a. Training session duration: One instructor day.
  - b. Number of training sessions: One.
  - c. Location: Project site.
  - d. Content: Provide training for each type of component and function provided.

- 1) Functions: Understanding details of each loop/circuit and how they function.
- 2) Component calibration.
- 3) Adjustments: For example, controller tuning constants, current switch trip points, and similar items.
- 4) Troubleshooting and diagnosis for components.
- 5) Replacing lamps, fuses, reset breakers, reset protective relays.
- 6) Component removal and replacement.
- 7) Periodic maintenance.

F. Instrument Tag Numbers: The tag number notation corresponds to the Drawings and is used in the loop specifications. Example: PI-02-01.

<u>Notation</u>	<u>Explanation</u>
PI	ISA designator for Pressure Indicator
02	Loop number
01	First unit number

#### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Provide field and warehouse storage facilities for equipment.
- B. Prior to shipment, include corrosive-inhibitive vapor capsules in shipping containers, and related equipment as recommended by the Capsule Manufacturer.
- C. Prior to installation, store items in dry indoor locations. Provide heating in storage areas for items subject to corrosion under damp conditions.
- D. Cover panels and other elements exposed to dusty construction environments.

#### 1.09 SITE CONDITIONS

- A. Materials and equipment shall be designed and manufactured for continuous operation, site conditions as specified in SECTION 26 05 00 – Common Work Results for Electrical.

#### 1.10 WARRANTY

- A. Manufacturer: Warranty for one year from the Substantial Completion date for the satisfactory performance and installation of the I&C system and associated appurtenances.

## PART 2 – PRODUCTS

### 2.01 APPROVED MANUFACTURERS

#### A. Emerson Terminal Blocks, 0 V to 600 V:

1. General purpose, #8 AWG to #4 AWG:
  - a. General Electric, EB series
2. Terminal block, general purpose:
  - a. General Electric, CR 151A2
  - b. Terminal block, fuse/disconnect plug:
    - 1) Phoenix Contact, V10K 1,5-D/TG/D/PE v\with Type ST, UK 6,3-HESI 600V/25A, UK 5-NES I 600V/6.3A
  - c. Terminal block, general purpose:
    - 1) Phoenix Contact, Type UKSN and UK6N
  - d. Terminal block, ground:
    - 1) Phoenix contact, Type USLKG
  - e. Terminal block, blade disconnect switch:
    - 1) Phoenix Contact, Type UDK4-MTK
  - f. Terminal block, fuse/disconnect plug:
    - 1) Phoenix Contact, V10K 1,5-D/TG/D/PE with Type ST
  - g. Terminal block, fused, 24 VDC:
    - 1) Phoenix Contact, Type UK6,3-HESI
  - h. Terminal block, fused, 120 VAC:
    - 1) Phoenix Contact, UK6,3-HESI
  - i. Terminal block, fused, 120 VAC, high current:
    - 1) Phoenix Contact
3. Enclosure/Cabinet, Hoffman freestanding 2 door:

- a. Exhaust grill:
  - 1) Hoffman TEP10UL12
- b. Cooling fan:
  - 1) Hoffman TFP101 UL12
- c. Data pocket:
  - 1) Hoffman ADP3
- d. Corrosion-inhibiting vapor capsules:
  - 1) Hoffmann Engineering, Model A-HCI
  - 2) Northern Instruments, Model Zerust VC
- e. Aluminum air filters:
  - 1) Hoffman Series A-FLT
- f. 3-point door latches:
  - 1) Southco Type 44

B. Panel Electrical:

- 1. Relays:
  - a. MOV for AC voltage coils:
    - 1) Littlefuse, Model V240ZA05
  - b. MOVs for DC voltage coils:
    - 1) Littlefuse, Model V180ZA5
  - c. Auxiliary industrial control relays:
    - 1) Potter & Brumfield, KUEP series
  - d. Magnetic control, machine tool and industrial relays:
    - 1) General Electric; Type CR120B
  - e. 24 V Signal/control relays:

- 1) IDEC Corp series RH

C. Corrosion-Inhibiting Vapor Capsules:

1. Hoffmann Engineering, Model A-HCI
2. Northern Instruments, Model Zerust VC

## 2.02 MATERIALS

A. Electrical Requirements:

1. Wires within enclosures:
  - a. Wiring shall be as specified in SECTION 26 05 19 – Low Voltage Electrical Power Conductors & Cables.
  - b. AC circuits:
    - 1) CT and PT secondary wiring shall be SIS, type conductors.
    - 2) Type: 600 V, Type THHN/THWN stranded copper.
    - 3) Size: For current to be carried, but not less than #14 AWG.
  - c. Analog signal circuits:
    - 1) Type: 600 V, Type 3 stranded copper, twisted shielded pairs.
    - 2) Size: #16 AWG, minimum.
  - d. Other DC circuits:
    - 1) 125 VDC shall be SIS, type conductors.
    - 2) Type: 600 V, Type THHN/THWN stranded copper.
    - 3) Size: #14 AWG, minimum.
  - e. Special signal circuits: Use the Manufacturer's standard cables.
  - f. Wire identification: Numbered and tagged at each termination.
    - 1) Wire color scheme shall be as follows:
      - a) Power, AC: Black.C



- b) Control, AC: Red.
  - c) Neutral: White.
  - d) Ground: Green.
  - e) Power, DC: Blue.
  - f) Control, DC: Violet.
  - g) Foreign voltages, AC: Yellow.
  - h) Foreign voltages, DC: Blue/white.
- 2) Wire tags: Snap-on or slip-on PVC wire markers with legible machine printed markings and numbers. Adhesive and taped-on tags shall not be acceptable.
2. Terminal blocks, 0 V to 600 V:
- a. General:
    - 1) Accommodate present and spare needs.
    - 2) One wire per terminal.
    - 3) Wire spare and unused panel-mounted elements to their panels' terminal block.
    - 4) Spare terminals: 20% of the connected terminals, but no less than 10 per terminal block.
  - b. General purpose, #8 AWG to #4 AWG:
    - 1) Connection type: Washer head binding screws into molded one-piece terminal boards, conductors and cables terminated with heavy duty ring terminals.
  - c. Terminal block, general purpose:
    - 1) Use for conductor and cable terminations.
    - 2) Rated voltage: 600 VAC.

- 3) Rated current: 30 A.
  - 4) Wire size: #18 AWG to #10 AWG.
  - 5) Connection type: Washer head binding screws, conductor and cables terminated with heavy duty ring terminals.
  - 6) Provide the Manufacturer's mounting kit and marking strip. Marking shall be permanent machine produced.
- d. Terminal block, fuse/disconnect plug:
- 1) Use: Provide one for each analog I/O field interface cable.
  - 2) Rate voltage: 300 VAC.
  - 3) Rated current: 15 A.
  - 4) Wire size: #30 AWG to #14 AWG.
  - 5) Terminal block, general purpose:
    - a) Rated voltage: 600 VAC.
    - b) Rated current: 30 A.
    - c) Wire size: #22 AWG to #10 AWG.
    - d) Rated wire size: #10 AWG.
    - e) Color: Gray body.
    - f) Spacing: 0.25-inch, maximum.
    - g) Test sockets: One screw test socket 0.079-inch diameter.
  - 6) Terminal block, ground:
    - a) Wire size: #20 AWG to #10 AWG.
    - b) Rated wire size: As required.
    - c) Color: Green and yellow body.
    - d) Spacing: 0.25-inch, maximum.

- e) Grounding: Ground terminal blocks electrically grounded to the mounting rail.
- 7) Terminal block, blade disconnect switch:
- a) Rated voltage: 600 VAC.
  - b) Rated current: 10 A.
  - c) Wire size: #22 AWG to #12 AWG.
  - d) Rated wire size: #12 AWG.
  - e) Color: Gray body, orange switch.
  - f) Spacing: 0.25-inch, maximum.
- 8) Terminal block, fuse/disconnect plug:
- a) Use: Provide one for each analog input and output field interface wire.
  - b) Rated voltage: 300 VAC.
  - c) Rated current: 15 A for terminal block, 6.3 A for ST-SI-UK 4 disconnect plug.
  - d) Wire size: #30 AWG to #14 AWG.
  - e) Fusing shall be approved by the ENGINEER.
- 9) Terminal block, fused. 24 VDC:
- a) Rated voltage: 600 VDC.
  - b) Rated current: 16 A.
  - c) Wire size: #26 AWG to #8 AWG.
  - d) Rated wire size: #10 AWG.
  - e) Color: Black body.
  - f) Fuse: Amperage size as required.
  - g) Indication: LED diode 24 VDC.
  - h) Spacing: 0.32-inch, maximum.

10) Terminal block, fused, 120 VAC:

- a) Rated voltage: 600 VAC.
- b) Rated current: 6.3 A.
- c) Wire size: #26 AWG to #8 AWG.
- d) Rated wire size: #12 AWG.
- e) Color: Black body.
- f) Fuse: Amperage size as required.
- g) Indication: Neon lamp 110 VAC.
- h) Leakage current: 1.0 mA, maximum.
- i) Spacing: 0.32-inch, maximum.

11) Terminal block, fused, 120 VAC, high current:

- a) Rated voltage: 600 VAC.
- b) Rated current: 35 A.
- c) Wire size: #18 AWG to #8 AWG.
- d) Rated wire size: #8 AWG.
- e) Fuse: Amperage size as required.

3. Grounding:

- a. Enclosures, control panels, and cabinets' signal and shield ground connections shall be made as shown on the Drawings.
- b. Each control panel and cabinet shall have a dedicated #4 AWG ground conductor from the ground grid to the grounding terminal, control panel, and cabinet. Control panel grounding:
  - 1) Furnish isolated copper grounding bus for signal and shield ground connections.
  - 2) Ground the ground bus at a common signal ground point in accordance with NFPA 70.

- 3) Single point ground for each analog loop:
  - a) Locate at the DC power supply for the loop.
  - b) Use to ground wire shields for the loop.
- 4) Ground terminal block rails to the ground bus.

B. Nameplates, Tags, and Mimic Bus:

1. Mimic bus, graphic display.
  - a. The front of the LCP and ECP shall include a graphic display (mimic bus) showing major flows *and* functions as shown on the Drawings.
  - b. Graphic materials, lines, and symbols shall be formed from 1/8-inch-thick fade-resistant colored plastic.
  - c. The graphic materials shall be cemented to the LCP front with 3M 300 series adhesive or as recommended by the Manufacturer and approved by the ENGINEER, to form the mimic bus.
  - d. Graphic materials, shapes, adhesive, and colors shall be approved by the ENGINEER.
2. Panel nameplates: Enclosure identification located on the enclosure face.
  - a. Location and inscription: As shown on the Drawings.
  - b. Materials: Adhesive backed, laminated plastic.
  - c. Letters: 1/2-inch white surface engraved to a black core, white with black letters.
3. Component nameplates: Component identification located as shown on the Drawings, or near component.
  - a. Inscription: Component tag number.
  - b. Materials: Adhesive backed, laminated plastic.
  - c. Letters: 3/16-inch white surface engraved to a black core, white with black letters.
4. Nametags: Component identification for field devices.
  - a. Inscription: Component tag number.

- b. Materials: 16 gauge, Type 304 stainless steel.
  - c. Letters: 3/16-inch imposed.
  - d. Mounting: Affix to component with 16 gauge or 18 gauge stainless steel wire or stainless steel screws.
5. LCP, ECP, metal-clad switchgear drawings: Include a folder in the enclosure with a complete set of As-Built Drawings. Provide laminated As-Built Drawings of the conduit/conductor schedules.

## 2.03 COMPONENTS

A. Component Specifications: Located in Supplement A at the end of this Section.

B. Nameplates and Tags:

- 1. Panel nameplates: Enclosure identification located on the enclosure face.
  - a. Location and inscription: As shown on the Drawings.
  - b. Materials: Adhesive backed, laminated plastic.
  - c. Letters: 1/2-inch white surface engraved to a black core, white with black letters.
- 2. Component nameplates: Component identification located as shown on the Drawings, or near component.
  - a. Inscription: Component tag number.
  - b. Materials: Adhesive backed, laminated plastic.
  - c. Letters: 3/16-inch white surface engraved to a black core, white with black letters.
- 3. Nametags: Component identification for field devices.
  - a. Inscription: Component tag number.
  - b. Materials: 16 gauge, Type 304 stainless steel.
  - c. Letters: 3/16-inch imposed.
  - d. Mounting: Affix to component with 16 gauge or 18 gauge stainless steel wire or stainless steel screws.
- 4. Drawings: Include a folder in the cabinets for a complete set of As-Built Drawings. Coordinate with the Electrical Contractor and the ENGINEER to provide laminated As-Built Drawings of the conduit/conductor schedules in each cabinet.

## 2.04 FABRICATION

### A. General:

1. Panel dimensions, device and instrument arrangements, labels, and wire tags shall be approved by the ENGINEER, before panel fabrication.
2. Factory assembly: Assemble enclosures, install instruments, wire, and devices at factory. No fabrication other than the correction of minor defects or minor transit damage permitted on-site.
3. Electrical work, equipment, and devices: In accordance with the applicable requirements of SECTION 26 05 00.

### B. Wiring Within Enclosures:

1. Restrain by plenum rated plastic ties and ducts or metal raceways, unless otherwise shown on the Drawings.
2. Hinge wiring: Secure at each end so that bending or bending will be around the longitudinal axis of wire. Protect the bend area with sleeve.
3. Arrange wiring neatly, cut to proper length, and remove surplus wire.
4. Provide abrasion protection for wire bundles which pass through holes or across edges of sheet metal.
5. Connections to screw type terminals:
  - a. Ring-tongue lugs.
  - b. Use the Manufacturer's recommended tool with the required sized anvil to make crimp lug terminations.
  - c. Wires terminated in a crimp lug: One, maximum.
  - d. Lugs installed on a screw terminal: 2, maximum.
6. Connections to compression clamp type terminals:
  - a. Strip, prepare, and install wires in accordance with the Terminal Manufacturer's recommendations.
  - b. Wires installed in a compression screw and clamp: One, maximum.
7. Splicing and tapping of wires, allowed only at device terminals or terminal blocks.
8. Terminate 24 VDC and analog signal circuits on a separate terminal block from

AC circuit terminal blocks, unless otherwise shown on the Drawings.

9. Separate analog and DC circuits by at least 6-inches from AC power and control wiring, except at unavoidable crossover points and at device terminations. Separation methods and channels in cabinets and control panels, including concrete trough, shall be approved by the ENGINEER.
10. Arrange wiring to allow access for testing, removal, and maintenance of circuits and components.
11. Plastic wire duct fill: Do not exceed the Manufacturer's recommendations.

C. Provide Corrosion-Inhibiting Vapor Capsules in Enclosures, Panels, and Cabinets.

D. Temperature Control:

1. Non-ventilated panels: Size to adequately dissipate heat from equipment mounted inside panel or on panel.
2. Ventilated panels:
  - a. Furnish with louvers and forced ventilation as required to prevent temperature buildup from equipment mounted inside panel or on panel. Size to adequately dissipate heat from equipment mounted inside panel or in panel face. Panel louvers shall have industrial, heavy duty, washable aluminum air filters.
  - b. Construction: Stamped sheet metal.
  - c. Ventilation fans:
    - 1) Furnish where required to provide adequate cooling.
    - 2) Create positive internal pressure within panel.
    - 3) Fan motor power: 120 V, 60 Hz AC, thermostatically controlled.
  - d. Panel louvers shall have industrial, heavy duty, washable aluminum air filters.
3. Provide and install louvers, forced ventilation, and thermostats to control the temperature in control panels and cabinets containing PLCs and equipment requiring ventilation. The forced ventilation in the control panels and cabinets shall keep the control panels and cabinets internal temperature below 75°F.
4. Space heaters: Thermostatically controlled to maintain internal panel temperatures above dew point.

E. Freestanding Panel Construction:



1. Materials: Sheet steel unless otherwise shown on Drawings with a minimum thickness of 10 gauge.
2. Panel fronts:
  - a. Fabricated from a single piece of sheet steel.
  - b. No seams or bolt heads visible when viewed from front.
  - c. Panel cutouts: Smoothly finished with rounded edges.
  - d. Stiffeners: Steel angle or plate stiffeners or both on back of panel face to prevent panel deflection under instrument loading or operation.
3. Internal framework:
  - a. Structural steel for instrument support and panel bracing.
  - b. Permit panel lifting without racking or distortion.
4. Lifting rings to allow simple, safe rigging and lifting of panel during installation.
5. Adjacent panels: Securely bolted together so front faces are parallel.
6. Doors:
  - a. Full height, fully gasketed access doors as shown in the Drawings.
  - b. Latches: 3-point, Southco Type 44.
  - c. Handles: D ring, foldable type.
  - d. Hinges: Full length, continuous, piano type, steel hinges with stainless steel pins.

F. Panel Electrical:

1. Power distribution within panels:
  - a. Provide overcurrent protection on each individual branch circuit distributed from panelboards.
    - 1) Locate to provide a clear view of and access to breakers when the door is open.
    - 2) Breaker sizes: Coordinate such that a fault in the branch circuit will blow only the branch breaker but not trip the main breaker.

- b. Circuit wiring: P&IDs and control diagrams on the Drawings show function only. Use following rules for actual circuit wiring:
  - 1) 120 VAC branch circuit loading: 15 A continuous, maximum.
  - 2) 24 V branch circuit loading: Minimum overcurrent and circuit sizes are shown on the Drawings. Size breakers, fuses, and circuits for actual loads, less than 75% of full load circuit capacity.
  - 3) Panel lighting and service outlets: Put on separate 20 A 120 VAC branch circuit.
  - 4) Provide 120 VAC plugmold for panel components with line cords.
- 2. Signal distribution:
  - a. Isolated 4 mA to 20 mA DC signals.
  - b. Signal wiring shall be twisted, shielded pairs, as specified in SECTION 26 05 19.
- 3. Signal switching:
  - a. Use dry circuit type relays or switches.
  - b. No interruption of 4 mA to 20 mA loops during switching.
  - c. Switching transients in associated signal circuit:
    - 1) 4 mA to 20 mA DC signals: 0.2 mA, maximum.
    - 2) One VDC to 5 VDC signals: 0.05V, maximum.
- 4. Relays:
  - a. General:
    - 1) Relays shall be provided with surge protection across the coils as follows:
      - a) Surge suppressers: Magnetic control, machine tool, and industrial relays.
      - b) MOVE: Ac voltage coils.
      - c) Diodes: DC voltage coils.
      - d) Surge protection shall be provided and installed as recommended by the Relay Manufacturer and approved by the ENGINEER.

- 2) Signal/control circuit switching relays:
  - a) Relay mounting: Plug-in type socket.
  - b) Relay enclosure: Furnish dust cover.
  - c) Socket type: Screw terminal interface with wiring.
  - d) Socket mounting: DIN rail.
  - e) Provide hold down clips.
- b. Magnetic control, machine tool, and. industrial relays:
  - 1) Use when shown on the Drawings.
  - 2) NEMA ICS 2, Class A600 (600 V, 10 A continuous, 7,200 VA make, 720 VA break), industrial control with a minimum of 4 field-convertible contacts.
  - 3) Time delay attachment: Solid-state.
  - 4) Provided and installed with the Manufacturer recommended and provided surge suppressors across the coil terminals. The surge suppressor shall be designed to absorb energy surges that appear on the line.
- c. 24 V signal/control relays:
  - 1) Tags: As shown on the Drawings.
  - 2) Type: Compact general-purpose plug-in.
  - 3) Contact arrangement: As shown on the Drawings, 2 Form C contacts minimum.
  - 4) Contact rating: 10 A minimum at 24 VDC and 250 VAC.
  - 5) Contact material: Silver cadmium oxide alloy.
  - 6) Coil voltage: 120 VAC or 24 VDC.
  - 7) Coil power: 2.2 VA/1.3 W.
  - 8) Provided and installed with the Manufacturer recommended and provided surge suppressors across the coil terminals. The surge suppressor shall be designed to absorb energy surges that appear on the line.

- 9) Expected mechanical life: 10,000,000 operations minimum.
  - 10) Expected electrical life at rated load: 100,000 operations.
  - 11) Indication type: LED indicator lamp.
  - 12) Lockable push-to-test button.
5. Internal panel lights for control panels and cabinets:
- a. Type: Switched enclosed and gasketed, fiberglass, industrial lamp LED fixtures.
  - b. Mounting: Inside, centered at the top.
6. Service outlets for control panels and cabinets:
- a. Type: 3-wire, 120 V, 20 A, duplex receptacles.
  - b. 2 locations to be approved by the ENGINEER.

G. Factory Finishing:

1. Minimum requirements for steel panels:
- a. Sand panel and remove mill scale, rust, grease, and oil.
  - b. Fill imperfections and sand smooth.
  - c. Paint panel interior and exterior with one coat of epoxy coating metal primer, 2 finish coats of 2-component type epoxy enamel.
  - d. Sand surfaces lightly between coats.
  - e. DFT: 3-mils, minimum.
  - f. Color: ANSI-61 gray unless otherwise shown on the Drawings.

## PART 3 – EXECUTION

### 3.01 GENERAL

- A. Provide materials, equipment, and software, whether indicated or not, necessary for complete system integration and performance.
- B. Use products of one Manufacturer and of the same series or family of models to achieve standardization for appearance, operation, maintenance, spare parts, and Manufacturer's services.

C. Communications systems as specified in SECTION 27 00 00.

### 3.02 PREPARATION

- A. Equipment provided by the I&C contractor and installed by others requires the I&C Contractor to observe and advise on installation to extent required to certify with ORT that equipment has been properly installed.
- B. For equipment not provided by the I&C Contractor, but that directly interfaces with the I&C, verify the following conditions:
  - 1. Proper installation, calibration, and adjustment.
  - 2. Correct control action.
  - 3. Switch settings and dead bands.
  - 4. Opening and closing speeds and travel stops.
  - 5. Input and output signals.

### 3.03 INSTALLATION

- A. Material and Equipment Installation:
  - 1. Follow the Manufacturer's installation instructions. Provide signed draft copy of the Manufacturer's certification of proper installation prior proceeding with further testing.
  - 2. Wiring connected to I&C components and assemblies, including power wiring as specified in SECTION 26 05 19.
- B. Provide, install, and be responsible for a complete fully operational I&C including field I/O connections and terminations, and communications between the PLC, devices, and communications. Provide and install wiring, cables, PLC/RTU ports, and connectors as needed to properly implement the I&C. The OWNER shall provide the computer system and GUI.
- C. PLC programming logic shall be provided by and installed by the ENGINEER. Demonstrate to the ENGINEER required communications. Provide assistance to the ENGINEER in testing, configuring, calibrating, and scaling of the PLC I/O points as required during the programming of the PLC and startup of the I&C.
- D. The intent of the Contract Documents is to show general locations and the minimum amount of devices and interconnection required to make the I&C functional. The detailed design, layout, and installation of the required control wiring, interconnections, and

devices to make the complete system fully functional is the CONTRACTOR'S responsibility.

- E. Install and perform in accordance with the Manufacturer's recommendations including, but not limited to, PLC/RTU communications equipment, I/O cards and terminations, testing, startup, and other necessary appurtenances.
  - 1. The fully operational system shall include:
    - a. Communications between PLCs and office servers.
    - b. Field I/O connections and terminations in accordance with the Contract Documents.
    - c. Field I/O connections include, but are not limited to, primary elements, transmitters, control panels, etc.
  - 2. PLC programming logic shall be provided by and installed by the ENGINEER.
  - 3. Demonstrate to the ENGINEER network communications between the PLCs and office servers.

### 3.04 PROTECTION

- A. Protect enclosures and other equipment containing electrical, I&C devices, including spare parts, from corrosion through the use of corrosion-inhibiting vapor capsules.
- B. Periodically replace capsules in accordance with the Capsule Manufacturer's recommendations. Replace capsules just prior to Final Payment and Acceptance.

### 3.05 QUALITY CONTROL

- A. General:
  - 1. Test I&C elements, both hardware and software.
  - 2. Factory tests described under this article:
    - a. UFT.
    - b. FDT.
  - 3. On-site tests described in this Section:
    - a. SDT.
    - b. ORT

- 1) Phase 1
- 2) Phase 2.
- c. PAT.
4. Test format — cause and effect:
  - a. The person conducting the test initiates an input, cause.
  - b. The specific test requirement is satisfied and if correct result, effect occurs.
5. Procedures, forms, and checklists:
  - a. Except for UFT, conduct tests in accordance with, and documented on, ENGINEER-approved procedures, forms, and checklists.
  - b. Describe each test item to be performed.
  - c. Have space after each test item description for signoff by the appropriate party after satisfactory completion.
6. Required test documentation: Test procedures, forms, and checklists. Signed by the ENGINEER and the CONTRACTOR except for Phase 1 ORT items signed only by the CONTRACTOR.
7. Conducting tests:
  - a. Special testing materials and equipment.
  - b. Wherever possible, perform tests using actual process variables, equipment, and data.
  - c. If not practical to test with real process variables, equipment, and data, provide suitable means of simulation.
  - d. Define simulation techniques in test procedures.
8. Coordinate I&C testing with the OWNER and the affected Contractors.
9. The ENGINEER will actively participate in many of the tests and reserves the right to test or retest specified functions whether or not explicitly stated in the test procedures.
10. The ENGINEER's decision will be final regarding the acceptability and completeness of testing.

B. UFT:

1. Scope: Inspect and test I&C to ensure it is operational, ready for FDT.
2. Location: I&C Contractor's factory.
3. Integrated test:
  - a. Interconnect and test I&C.
  - b. Exercise and test functions.
  - c. Simulate required I/O.

C. FDT:

1. General: During the initial coordination meetings, the ENGINEER and the I&C Contractor shall evaluate and discuss the requirements for the FDT. To facilitate the coordination of the PLC, software programming, the FDT may be replaced with SDT at the site. The ENGINEER will make the final decision regarding the substitution of SDT for the FDT.
2. The I&C Contractor shall include a minimum of one week in the schedule for factory testing and preliminary PLC checkouts with the ENGINEER.
3. The I&C Contractor shall include any changes regarding this in the I&C progress schedule.
4. The I&C Contractor shall make allowances for the ENGINEER to load pre-developed PLC software for testing during the FDT.
5. The software shall assist in demonstrating the correct operation of the PLC and RTU communications and specific functions.
6. The I&C Contractor shall provide simulated hardwire interfaces as required to test specific loops and functions.
7. Scope: Test entire I&C, with exception of primary elements and final control elements, to demonstrate it is operational.
8. Location: I&C Contractor's factory.
9. Functions:
  - a. Demonstrate functions as required for I&C, PLCs, control panels, and cabinets.
  - b. Timing: Include tests for timing requirements.



- c. Diagnostics: Demonstrate online and offline diagnostic tests and procedures.
  - d. Communications: Demonstrate communications between PLCs, RTUs, control panels, and cabinets.
10. Correct deficiencies found and complete prior to shipment to the site.
11. Failed tests:
- a. Repeat and witnessed by the ENGINEER.
  - b. With approval of the ENGINEER, certain tests may be conducted by the I&C Contractor and witnessed by the ENGINEER as part of ORT.
12. Make the following documentation available to the ENGINEER at the test site both before and during FDT:
- a. Drawings, specifications, addenda, and change orders.
  - b. Master copy of FDT procedures.
  - c. Shop Drawing Submittals for equipment being tested.
13. Daily schedule for FDT:
- a. Begin each day meeting to review the day's test schedule.
  - b. End each day with a meeting to review the day's test results and to review or revise the next day's test schedule.

D. SDT:

- 1. Replaces the FDT if no FDT is performed.
- 2. The SDT shall follow the same procedures and tests as the FDT but is performed on the site instead of at the Manufacturer's factory.

E. On-site Supervision: The I&C site representative shall be on-site during the total period required to supervise, coordinate, and complete on-site I&C activities.

F. Startup and Testing Team:

- 1. Thoroughly check installation, terminations, and adjustments.
- 2. Complete on-site tests.
- 3. Complete on-site training.

4. Provide startup assistance to the ENGINEER.
- G. ORT: Prior to startup test period and PAT, inspect, test, and document that entire I&C is ready for operation.
1. Cleaning and checking and functional testing activities as specified in SECTION 01 91 00 – Commissioning.
  2. Phase 1 ORT: Performed by the I&C Contractor to test and document that I&C, excluding ENGINEER-provided PLC and RTU applications software, is ready for operation. For I&C systems for which the ENGINEER provides applications software, provide sufficient temporary software configuring to allow testing of the subsystems.
    - a. Inspections and tests:
      - 1) Check I&C for proper installation, calibration, and adjustment on a loop-by-loop, circuit-by-circuit, and component-by-component basis.
      - 2) Provide space on forms for signoff by the I&C Contractor and the ENGINEER.
      - 3) Organize and track inspection, adjustment, and calibration of each loop, circuit, and component, include:
        - a. Project name.
        - b. Tag number for each component.
        - c. Checkoffs/signoffs for each component:
          - (1) Tag/identification.
          - (2) Installation.
          - (3) Termination wiring.
          - (4) Calibration/adjustment.
          - (5) Interface terminations.
          - (6) I/O interface terminations with PLC.
        - d. I/O signals for PLC are operational: Received/sent, processed, and adjusted.
        - e. Total loop or circuit operational.

- f. Space for comments.
- 4) Component calibration sheet for each component, except simple hand switches, lights, gauges, and similar items, and each PLC I/O module and include:
- a. Project name.
  - b. Loop or circuit number and description.
  - c. Component tag number or I/O module number.
  - d. Manufacturer, model number/serial number for component.
  - e. Summary of functional requirements, for example:
    - 1) Indicators, scale, and ranges.
    - 2) Transmitters/converters, input, and output ranges.
    - 3) Computing elements' function.
    - 4) Controllers, action, and control modes.
    - 5) Switching elements, unit range, differential, reset, and auto/manual.
    - 6) I/O modules: Input or output.
  - f. Calibrations, for example:
    - 1) Analog devices: Actual I/O at 0%, 10%, 50%, and 100% of span, rising and falling.
    - 2) Discrete devices: Actual trip points and reset points.
    - 3) Controllers: Mode settings.
    - 4) I/O modules: Actual inputs or outputs of 0%, 10%, 50%, and 100% of span, rising and falling.
  - g. Space for comments.
- 5) Maintain loop and circuit status reports, valve adjustment sheets, and component calibration sheets at the site and make them available to the ENGINEER for review, at all times.

- b. FDTs, repeat:
    - 1) Repeat FDT on-site with entire I&C installed.
    - 2) Use FDT test procedures as the basis for the test.
    - 3) In general, the test shall not require witnessing. However, portions of the test, as identified by the ENGINEER during original FDT, shall be witnessed.
  - c. ORT forms: Shall be approved by the ENGINEER.
3. Phase 2 ORT: A combined effort between the I&C Contractor and the ENGINEER to confirm that I&C, including applications software, is ready for operation.
- a. Prerequisite: Completion of Phase 1 ORT.
  - b. Joint test with the ENGINEER. Repeat of the ENGINEER's FDT application software tests, except using actual devices. Control and communications with PLC and computer tested on loop-by-loop, circuit-by-circuit, and component-by-component basis.
  - c. Test procedures approved by the ENGINEER based on Phase 1 ORT and on FDT application software tests.
4. Additional field testing and commissioning as specified in SECTION 26 08 00.

#### H. PAT:

- 1. Performance testing activities as specified in SECTION 01 91 00 – Commissioning.
- 2. Once ORT has been completed and the facility has been started up, perform jointly with the ENGINEER a PAT on complete I&C to demonstrate it is operating as required by the Contract Documents. Demonstrate each required function on a paragraph-by-paragraph, loop-by-loop, circuit-by-circuit, and component-by-component basis.
- 3. Tests shall be the same as required for FDT except that the entire installed I&C shall be tested using actual process variables and functions demonstrated.
- 4. Perform local and manual tests *for each* loop, circuit, and component before proceeding to remote and automatic modes.
- 5. Where possible, verify test results using visual confirmation of process equipment and actual process variable. Exercise and observe devices supplied by others, as needed to verify correct signals to and from such devices and to confirm overall

system functionality. Test verification by means of disconnecting wires or measuring signal levels shall be acceptable only where the direct operation of equipment is not possible.

6. Make updated versions of documentation required for PAT available to the ENGINEER at the site both before and during testing.
  7. Make one copy of the O&M manuals available to the ENGINEER at the site both before and during testing.
  8. Follow the daily schedule required for FDT.
  9. PAT procedures and forms shall be approved by the ENGINEER.
- I. Specialty Equipment: For certain components or systems provided under this Section but not manufactured by the I&C Contractor, provide the services of a qualified Manufacturer's Representative during installation, startup, demonstration testing, and OWNER training.

### 3.06 CLEANING

- A. Clean debris, dirt, dust, etc. from equipment.

END OF SECTION



**SECTION 40 71 12**  
**ELECTROMAGNETIC FLOW METER**

**PART 1 – GENERAL**

**1.01 SUMMARY**

- A. There shall be furnished a Flanged Electromagnetic Flow Meter. The meter shall be the ISOMAG model MS2500 Flow Sensor and MV110 Converter/Transmitter.

**1.02 FLOW METER DESCRIPTION**

- A. An inline electromagnetic flow meter system shall be furnished and installed as shown on the plans and in accordance with the manufacturer's recommendations.
- B. The flow metering system shall operate on the principle of electromagnetic induction, with a pulsed DC excitation frequency, and shall produce a signal output that is directly proportional and linear with the volumetric flow rate of the liquid flowing through the flow sensor.
- C. The system shall include a flanged flow sensor, remote mount converter/transmitter and (2) grounding rings. The 33ft. interconnect sensor coil and electrode cables shall be dual shield for high noise immunity designed specifically for use with electromagnetic flow sensors.

**1.03 FLOW SENSORS- MS2500**

- A. The 6" flow sensor tube shall be constructed of 304 stainless-steel lined with NSF61 rated Polypropylene and rated for a working pressure up to 285 psi.
- B. The flow sensor shall be a flanged design. Flange rating shall be ANSI class 150#.
- C. Installation shall be accomplished by installing the flow sensor between two ANSI class 150# mating flanges.
- D. The flow sensor shall have two flow measuring electrodes and one internal ground electrode. The electrode material shall be 316 Stainless Steel.
- E. The flow sensor housing shall be constructed of corrosion resistant epoxy coated carbon steel, welded at all joints. It shall be capable of permanent submergence in 6' of water.
- F. Flow Sensor shall be properly grounded via provided Integral ground electrode.
- G. Sensor shall be factory calibrated and written certification provided to the Owner & Engineer.

#### 1.04 CONVERTER/TRANSMITTER-MV110

- A. The converter/transmitter shall be microprocessor based and shall energize the detector coils with a digitally controlled pulsed DC signal.
- B. The converter/transmitter shall include a non-volatile memory chip capable of storing all programmable data and accumulated totalizer values in the event of a power interruption.
- C. Automatic zero stability, low flow cut-off, bi-directional flow measurement, empty pipe detection and full diagnostics shall be standard features of the converter/transmitter.
- D. The converter/transmitter shall include a backlit graphic alphanumeric display which may be user configured in the field to display the following values:
  - 1. Flow Rate in user selected engineering units.
  - 2. Forward totalizer in selected volume units.
  - 3. Reverse totalizer in selected volume units
  - 4. Error or alarm messages.
- E. The converter/transmitter shall include a 3-button programming keypad. The programming functions shall be available in a user-friendly, plain English, menu driven software through the backlit graphic alphanumeric display.
- F. In addition to the backlit graphic alphanumeric display, the converter/transmitter can provide:
  - 1. Erection drawings with equipment mark numbers.
  - 2. Complete operating instructions for controlling, modifying, and operating the equipment provided for this facility.
- G. The power requirement of the converter/transmitter shall be 100-240Vac.
- H. The converter/transmitter enclosure shall be housed in a non-metallic IP67/NEMA 6 enclosure for remote wall mounting.
- I. The converter/transmitter shall be supplied with a rechargeable battery backup and charger and be supplied with a USB cable type A/USB Mini B for PC programming, 2 Micro SD Cards 32 gigabytes.
- J. The converter/transmitter shall be supplied with two (2) 4-20mA analog outputs.



## 1.05 SYSTEM PERFORMANCE AND CALIBRTION

- A. The metering system shall perform to an accuracy better than  $\pm 0.40\%$  of rate over a flow velocity range from 1.0 to 36 feet per second.
- B. The metering system shall be capable of measuring the volumetric flow rate of liquids having an electrical conductivity as low as 5.0 ms/cm.
- C. The system measuring repeatability shall be 0.1% full scale.
- D. Each meter shall be hydraulically calibrated in an ISO 9001 or NIST certified calibration laboratory, which utilizes a gravimetric testing method with a measuring uncertainty of 0.1%. The accredited calibration laboratory must also conform to ISO17025 standards. Each sensor shall be provided with a calibration certificate with a calibration factor.

END OF SECTION



**SECTION 40 97 00**  
**VARIABLE FREQUENCY DRIVES**

**PART 1 – GENERAL**

**1.01 SUMMARY**

- A. This section addresses the work related to furnishing and installing all supervision, labor, materials, and equipment in the work for and functionality of the equipment that reacts to the varying liquid level in the wet well and varies the rotating speed of the sewage pumps in response to those changing levels.

**1.02 SUBMITTALS**

- A. Submit shop drawings and manufacturers' data in accordance with the provisions of SECTION 01 33 00 – Submittal Procedures.

**1.03 SYSTEM DESCRIPTION**

- A. Furnish each pump motor with a VFD unit integrated into the motor and wet well level control systems as specified.
- B. The VFDs shall start, stop, and vary the speed of the pumps in response to changes in wet well level as sensed by a bubbler type level sensing system.
- C. The VFDs shall be capable of automatic and manual operation. Automatic speed setting shall be from a proportional 4-20mA signal, manual control shall be accomplished using a potentiometer, 0–10-volt DC signal, installed on the VFD control panel.
- D. The VFDs shall be capable of remote operation of all functions via terminal input points. All normal operating functions, e.g., starting, stopping, manual/automatic selection, speed control, and fault reset, shall be accessible from the control panel door mounted operator interface controls and/or the automatic pressure controls via the terminal input points and shall not require physical access to the VFD itself.
- E. Each VFD system shall include a full-voltage, across-the-line, magnetic bypass controller or solid-state bypass controller, as indicated on the plans, and a magnetic contactor connected to isolate the VFD when the bypass controller is in use. Selection of bypass operation shall be manual, by switch on the face of the control panel. Bypass controller shall work in auto.
- F. The power system will be provided with a backup engine-generator set with an automatic transfer switch and a solid-state electronic voltage regulating system. The variable speed controller shall be provided with a line reactor, isolating transformer, filter coils or other

devices on its line side, to protect the generator voltage regulating circuitry from the possible adverse effects of harmonic voltages generated in the variable speed controller.

- G. Compliance Warranty: For each product, component, and system, which requires computer-controlled facility components, provide a statement of compliance warranty for the specific equipment. The CONTRACTOR shall warrant that each hardware, software, and firmware product delivered under this contract shall be able to accurately process date and time data (including, but not limited to, calculating, comparing, and sequencing) leap year calculations to the extent that other computer-controlled components, used in combination with the computer-controlled component being furnished, properly exchange date and time data with it. If the product must perform as a system in accordance with the foregoing warranty, then that warranty shall apply to those products as a system. The duration of this warranty and the remedies available to the OWNER for breach of this warranty shall, be defined in, and subject to, the terms and limitations of the CONTRACTOR'S standard commercial warranty or warranties contained in this contract, provided that, notwithstanding any provisions to the contrary, in such commercial warranty or warranties, the remedies available to the OWNER under this warranty shall include repair or replacement of any product whose non-compliance is discovered and made known to the CONTRACTOR in writing. Nothing in this warranty shall be construed to limit any rights or remedies the OWNER may otherwise have under this contract, with respect to component defects.

## PART 2 – PRODUCTS

### 2.01 PRODUCTS

- A. This specification describes an AC variable speed Direct Torque Control or sensorless vector equivalent drive used to control the speed of a centrifugal pump power an AC induction motor, **ABB ACQ, Schneider Altivar, Allen-Bradley PowerFlex, or engineer approved equal**. Drives shall be capable of fiber optic communication between multiple drives, with internal lead/lag and pump alternation capability independent of any external control inputs.

### 2.02 VARIABLE FREQUENCY DRIVES

- A. The drive shall be solid state, with a Pulse Width Modulated (PWM) output. The drive shall be a Direct Torque Control (DTC) or sensorless vector equivalent AC to AC converter utilizing the latest isolated gate bipolar transistor (IGBT) technology. The drive must also provide an optional operational mode for scalar or V/Hz operation.
- B. The Drive shall be UL listed, Canadian UL listed, or CSA listed and comply with EMC Directive 89/336 EEC, Low Voltage Directive 73/23 EEC and Machinery Directive 98/37 EC in accordance with the European Union's CE directive.

- C. The Drive shall utilize the same communications architecture, utilizing plug-in communications cards, for high-speed noise immune connectivity throughout the entire Drive manufacturer's Power range.

D. Ratings

1. The Drive shall be rated to operate from 3-phase power at 230VAC to 500VAC  $\pm 10\%$ , 48Hz to 63Hz. The Drive shall employ a full wave rectifier to prevent input line notching and operate at a fundamental (displacement) input power factor of 0.97 at all speeds and loads. The Drive efficiency shall be 98% or better at full speed and load. An internally mounted AC line reactor or DC choke shall be provided to reduce input current harmonic content, provide protection from power line transients such as utility power factor correction capacitor switching transients and reduce RFI emissions.
2. The overload current capacity shall be 110% of rated current for one (1) minute out of five (5) minutes. Output frequency shall be adjustable between 0Hz and 180Hz.

E. Operator Control Panel (Keypad)

1. Each Drive shall be equipped with a front mounted operator control panel (keypad) consisting of a four- (4-) line by 20-character back-lit alphanumeric display and a keypad with keys for Run/Stop, Local/Remote, Increase/Decrease, reset, menu navigation and parameter select/save.
2. The control panel shall include a feature for uploading parameter settings to control panel memory and downloading from the control panel to the same drive or to another drive.
3. All Drives throughout the entire power range shall have the same customer interface, including digital display, and keypad, regardless of horsepower rating.
4. The keypad shall be removable and insert able under drive power, capable of remote mounting, and shall have its own non-volatile memory. The drive should have the option to operate normally with the keypad removed.
5. During normal operation, one (1) line of the control panel shall display the setpoint reference, run/stop and local/remote status. The remaining three (3) lines of the display shall be programmable to display the values of any three (3) operating parameters. At least 24 VFD and 18 pump related parameter selections shall be available including the following:
  - a. Pump process variable in units of psig, gpm, ft, etc.
  - b. Vibration level in units of IP/s or mm/s
  - c. Energy Savings versus a constant speed pump.

- d. RPM
- e. Output frequency, voltage, current and torque.
- f. Input voltage, power, and kilowatt hours.
- g. Heat sink temperature and DC bus voltage.
- h. Status of discrete inputs and outputs

#### F. I/O Capabilities

1. Six (6) discrete inputs shall be designed for “dry contact” inputs used with either an internal or external 24 VDC source. An option 115VAC inputs should be available.
2. Three (3) form C relay contact outputs, all independently programmable. Relay contacts shall be rated for continuous 2 Amps at 24VDC or 115/230VAC. Function selections shall include indications that the drive is ready, running, faulted. General and specific warning and pump fault indications shall be available.
3. Three (3) analog inputs, one (1) +/- 0VAC - 10VAC and two (2) 4mA - 20mA, all independently programmable. A differential input isolation amplifier shall be provided for each input. Analog input signal processing functions shall include scaling adjustments and adjustable filtering. If the input reference (4-20mA or 2-10V) is lost, the AFD shall give the user the option of the following: (1) stopping and displaying a fault, (2) running at a programmable preset speed, (3) hold the AFD speed based on the last good reference received, or (4) cause a warning to be issued, as selected by the user. The drive shall be programmable to signal this condition via a keypad warning and/or over the serial communications bus.
4. Two (2) analog, outputs providing 4mA to 20mA signals. Analog output signal processing functions shall include scaling adjustments, adjustable filtering and signal inversion. Outputs shall be independently programmable to provide signals proportional to at least 21 output function selections including output speed, frequency, current, process variable and condition monitoring levels.

#### G. Serial communications

1. Serial communication interface modules are available for a wide selection of communication protocols. Available adapters are as follows: Modbus, Modbus Plus, Profibus, DeviceNet and Ethernet.
2. Serial communication capabilities shall include, but not be limited to, run-stop control; setpoint adjustment, current limit, and accel/decel time adjustments. The drive shall have the capability of allowing the Distributed Drive Controller (DDC) to monitor feedback such as process variable feedback, output speed/frequency, current (in amps), % torque, power (kW), kilowatt hours (resettable), operating hours (resettable),

relay outputs, and diagnostic warning and fault information. Additionally, remote Local Area Network (LAN) VFD fault reset shall be possible.

3. A fiber optic communication port shall also be provided for personal computer interface. Microsoft Windows®-based software shall be available for drive setup, diagnostic analysis, monitoring, and control. The software shall provide real-time graphical displays of drive performance.

#### H. Drive Protective Functions

1. For each programmed warning and fault protection function, the drive shall display a message in complete English words or Standard English abbreviations. The sixty-four (64) most recent fault messages and times shall be stored in the drive's fault history.
2. The drive shall include internal MOV's for phase to phase and phase to ground line voltage transient protection.
3. Output short circuit and ground fault protection rated for 65,000 amps shall be provided per UL508C without relying on line fuses. Motor phase loss protection shall be provided.
4. The drive shall provide electronic motor overload protection qualified per UL508C.
5. Protection shall be provided for AC line or DC bus overvoltage at 130% of maximum rated voltage or undervoltage at 65% of min. rated voltage and input phase loss.
6. A power loss ride through feature will allow the drive to remain fully operational after losing power as long as kinetic energy can be recovered from the rotating mass of the motor and load.
7. Stall protection shall be programmable to provide a warning or stop the drive after the motor has operated above a programmed torque level for a programmed time limit.
8. Underload protection shall be programmable to provide a warning or stop the drive after the motor has operated below a selected underload curve for a programmed time limit.
9. Over-temperature protection shall provide a warning if the power module temperature is less than 5°C below the over-temperature trip level.

#### 2.03 APPLICATION PROGRAM

- A. All logic set forth in this specification must reside internally to the drive's internal microprocessor. If an external controller is required, it must be clearly stated and included in the base bid.

- B. Drive shall be preprogrammed with a pump specific application macro.
- C. The program must be designed for ease of use and come standard with a user-friendly programming manual specific for centrifugal pumps.
- D. The Control Panel (keypad) should have the ability to display pump nomenclature (PSIG, GPM, IP/s, mm/s, etc.) to allow the operator to have a better understanding of the current pump and system status.
- E. Drive shall have an internal PID to control a process variable such as pressure, flow, level, etc. The PID controller should be able to regulate speed or torque to accurately control the process variable.
  - 1. The drive shall recognize system low demand and have the option to automatically shut down in a suspended sleep mode until the process demand requires the pump to turn back on.
- F. The drive system shall have the ability to perform process control (PID) using either motor speed, or motor torque, as the manipulated variable.
- G. The drive shall have the ability to follow a speed reference through the drive's keypad, an analog input or serial bus command.

#### 2.04 MULTIPUMP PROGRAM

- A. The drive program shall have a Multipump Macro that would allow a maximum of 4 drives to communicate and control up to 4 pumps. One drive will operate one pump.
- B. Drive to drive communication shall be over a fiber optic network for maximum RFI/EMI noise suppression.
- C. The drives shall control a single process variable and automatically stage and de-stage pumps on and off depending on the process demand. The settings at which the pumps are staged and de-staged shall be field adjustable through the drives standard keypad.
- D. In the event of a drive, motor, or pump fault, the others drives will recognize this failure and shall compensate with the next available pump.
- E. When multipump pumps are running the drives shall synchronize in speed to ensure the pumps share the load evenly.
- F. In the event a pump is demonstrating wear and is not able to share the load equally a synchronous torque option will be available. This option will synchronize the torques of all the running pumps to help evenly distribute the load over all the running pumps. The motors shall be identical on all the pumps running in synchronous torque mode.



- G. The drives shall alternative the operation of the pumps based operating hours of the pumps. After a programmable time widow the lead status will transfer to the next available drive.
- H. The drives shall have a pressure boost function to compensate for additional system friction losses at higher flow rates. This function shall automatically increase the pressure setpoint when additional pumps are staged on. Alternatively, the pressure setpoint will decrease as pumps are de-staged off.

## 2.05 MOTOR CONTROLS

- A. A motor parameter ID function shall automatically define the motor equivalent circuit used by the sensorless vector torque controller.
- B. The AFD shall be capable of starting into a rotating load and accelerate or decelerate to reference without safety tripping or component damage (flying start).
- C. The AFD shall have the ability to automatically restart after an overcurrent, overvoltage, undervoltage or pump protect fault. The number of restart attempts, trial time, and time between reset attempts shall be programmable.
- D. The AFD shall have a feature that limits the output amps and/or torque to the motor to prevent overloading of the motor.
- E. Drive shall have adjustable accel/decel ramp rates to limit the in-rush current and prevent water hammer in the piping system.

## 2.06 PUMP PROTECTION FEATURES

- A. Drive shall have the ability to detect and protect against detrimental pump conditions including Dry Run, Shut Off, Dead Head, Severe Cavitation, and Low Flow without additional instrumentation.
- B. Drive shall have a minimum of two digital inputs dedicated for a secondary pump protection binary input such as level, pressure, flow, temperature switches.
- C. The drive should have the ability to distinguish between different pump faults such as Dry Running or minimum flow. The warnings & faults should be displayed on the keypad in pump nomenclature easily understood by the operator. Display of fault codes will not be acceptable.

## 2.07 FLOW ESTIMATION

- A. Flow Estimation – The drive shall have the ability to estimate the pump flow to an accuracy of  $\leq \pm 5\%$  of the total rated pump flow through a variable speed range of 50%-100% of the motor synchronous speed and without external process transmitters.

- B. The flow calculation algorithm shall be operational using commonly available pump performance curves. Factory performance tests shall not be required to attain the flow accuracy.
- C. The flow calculation algorithm shall have the ability to be field calibrated without requiring field instrumentation.

## 2.08 PUMP PROTECTION

- A. Pump Protection – The drive shall have the ability to warn and/or protect the pump against process upset conditions of dry-running (severe cavitation), operation below recommended minimum flow, and operation past recommended maximum flow throughout the anticipated variable speed range and without the need for external process transmitters.
  - 1. The pump protection feature shall be easily set up using values of flow (GPM or M3/hr).
  - 2. The pump protection feature shall have the ability to offer control reactions specific to the condition:
    - a. Dry-Run: Warn only, Warn & Stop
    - b. Min-Flow: Warn only, Warn & Control to Min Speed
    - c. Max-Flow: Warn only
  - 3. The protection logic shall account for changing load profiles due to changes in speed, including mechanical and hydraulic losses.
  - 4. The protection logic shall not false trip when the drive is reducing speed in normal control modes.

## 2.09 FLOW ECONOMY

- A. Flow Economy – The drive shall have the ability to calculate the Flow Economy ratio of pump flow divided by electrical input power.
  - 1. The pump flow shall be calculated using a sensorless flow function integral to the drive.
  - 2. The electrical power input shall be the true electrical power consumption which includes all drive and motor losses.
  - 3. The Flow Economy Ratio shall be a selectable parameter on the drives keypad and shall be available through a 4-20mA output or through a serial bus register.

## 2.10 CONDITION MONITORING

- A. Drive shall have the capability to monitor up to two (2) channels of information. These channels shall be either an external 4-20mA / 0-10VDC analog inputs or a minimum of 13 internal drive and pump signals.
  - 1. The keypad display should clearly indicate the units of the condition monitored such as Amps, Hz, IP/s or mm/s etc.
  - 2. The drive will have two programmable levels for a high condition and two programmable levels for low levels to signal a warning and alarm.
  - 3. In the event the event the alarm level is reached drive shall have the option to signal an alarm, go to a safe predetermined minimum speed, fault the pump or go into a suspended sleep mode until the level is restored above normal.

## 2.11 CAVITATION CONTROL

- A. The drive shall have the ability to monitor the suction conditions of a pump and react to prevent the onset of pump cavitation.
- B. The drive shall have the ability to monitor an external analog signal from either a suction pressure or level transmitter.
  - 1. When the suction conditions of the pump reach a critical low level, the drive will slow down to reduce the NPSH requirement of the pump.
    - a. The intensity at which the drive reduces the pump speed shall be configurable to the specific application.
  - 2. The drive shall resume normal operation above the low level limit threshold.

## PART 3 – EXECUTION

### 3.01 WORK INCLUDED

- A. The supplier for VFDs and related equipment shall be responsible for coordination of the VFDs with the pump motors, the PLC, station control center, with the level control devices, and with the electrical service as shown on the drawings.
- B. Overall system responsibility shall include programming, calibration, field testing, startup training, and successful operation of the equipment.

### 3.02 MANUFACTURER'S RECOMMENDATIONS

- A. Installation procedures shall be in accordance with the recommendations of the manufacturer of the VFD's.

3.03 FIELD TEST

- A. The equipment shall be tested in operation in the presence of the OWNER and ENGINEER to demonstrate compliance with specification requirements.

3.04 OPERATING MANUALS

- A. The VFD shall be supplied with 4 copies of an Operating Manual with detailed drawings, warranty, and component lists.

3.05 MANUFACTURER'S REPRESENTATIVE

- A. Provide manufacturer's representative in accordance with SECTION 01 91 13 – Starting of System.

END OF SECTION

**SECTION 43 01 00**  
**VERTICAL TURBINE PUMPS**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. This specification includes the supply of one (1) vertical turbine product lubricated open lineshaft pump(s). Each unit shall include a bowl assembly, suction strainer, column and open lineshaft, discharge head, sealing assembly and driver.

**1.02 QUALITY ASSURANCE**

- A. All pumping equipment furnished under this Section shall be of a design and manufacture that has been used in similar applications, and it shall be demonstrated to the satisfaction of the OWNER that the quality is equal to equipment made by that manufacturer specifically named herein.
- B. Unit responsibility. Pump(s), complete with motor, necessary guards and all other specified accessories and appurtenances shall be furnished by the pump manufacturer to ensure compatibility and integrity of the individual components and provide the specified warranty for all components.
- C. The vertical turbine pump(s) specified in this section shall be furnished by and be the product of one manufacturer.
- D. Pumps are to be engineered and manufactured under a written Quality Assurance program. The Quality Assurance program is to be in effect for at least ten years, to include a written record of periodic internal and external audits to confirm compliance with such program.
- E. Pump(s) are to be engineered and manufactured under the certification of ISO-9001:2000.

**1.03 PERFORMANCE**

- A. The pump(s) shall be designed for continuous operation and will be operated continuously under normal service.

**B. OPERATION CRITERIA**

	Flow (GPM)	TDH (ft.)	Max. Pump Speed (RPM)	Max. Solids Passage (in)	Max. Shutoff Head (ft.)	Minimum Submergence (inches)
Design Condition	550	196	1800	0.75	214 (min.)	95
Secondary Condition	750	143 (min.)	1800	0.75	214 (min.)	95

- C. Total dynamic head shall be as measured at the discharge of the pump and shall include velocity head and vertical static head from the minimum water level to the centerline of the pump discharge.
- D. Minimum water level shall be at elevation 760 feet.
- E. Pump(s) are to be mounted at approximately 779.25 feet elevation with the sump floor at 752.67 feet elevation.
- F. Pump discharge centerline shall be at approximately 780.25 feet elevation.
- G. Maximum pump speed shall not exceed 1800 RPM.
- H. Driver size shall be limited to 50 HP maximum.
- I. Liquid pumped is effluent water with a maximum temperature of 72 deg. F.

## PART 2 - PRODUCTS

### 2.01 PUMPS

#### A. Manufacturers

- 1. Pump(s) shall be the product of Fairbanks Nijhuis, Patterson Pump Company, Goulds, or ENGINEER Approved Equal.
- 2. Manufacturer shall have installations of like or similar application with a minimum of 5 years service for this pump size.

#### B. Design

##### 1. Rotation

- a. The pump will be counterclockwise rotation when viewed from the driver end looking at the pump.

##### 2. Impeller

- a. The impeller shall be of 316 stainless steel construction conforming to ASTM B584, C83600. They shall be of one-piece construction, single suction, enclosed vane, and radial flow design. The waterways through the impeller shall have extremely smooth contours, devoid of sharp corners, so as to promote maximum efficiency.
- b. The impeller is to be balanced and secured to the shaft by means of a stainless-steel drive collet for bowl shafts 1-15/16" diameter and smaller. For bowl shafts larger than 1-15/16" impellers shall be secured to the shaft

using a combination of a thrust washer, key and/or snap rings.

- c. Impellers shall be adjustable by means of a top shaft-adjusting nut.

### 3. Bowls

- a. The bowls shall be made of close-grained cast iron conforming to ASTM A48 CL30. Castings shall be free from blowholes, sand holes and shall be accurately machined and fitted to close dimensions.
- b. Bowls 8" and above shall have flange connected column pipe. Bowls below 8" nominal diameter may use either flanged or threaded connection column pipe.
- c. Bowls shall be designed with smooth passages to ensure efficient operation and their interior shall be coated with Tnemec N140 Pota-Pox Plus, or equal.
- d. The casing shall be hydrostatically tested to 1.5 times the design head or 1.25 times the shutoff head whichever is greater.

### 4. Impeller Shaft

- a. Impeller shaft shall be of stainless-steel construction conforming to ASTM A582 (416 stainless steel).
- b. The shaft shall be supported by bronze or neoprene bearings located on both sides of each impeller.
- c. Impeller shaft coupling shall be of stainless-steel construction conforming to ASTM A582 (416 stainless steel).

### 5. Wear Rings

- a. Wear rings shall be provided on both the impellers and bowls on bowls of nominal diameter of 8" or larger so that clearances can be maintained throughout the life of the rings and minimize recirculation. Bowls of 6" and 7" nominal diameter shall incorporate bowl wear rings only.
- b. Bowl wear rings shall be of the radial-type.
- c. Wear rings shall be attached to the bowls using an interference fit and Loctite.
- d. Wear rings shall be bronze conforming to ASTM, B505 C93200.

### 6. Column

- a. Total length of discharge column shall be 23 feet, minimum.

- b. Column pipe shall be not less than 6 inches inside diameter.
- c. Column pipe in sizes 4" through 12" diameter shall be furnished in interchangeable sections not over ten feet in length, and shall be connected with flanged, sleeve-type couplings.
- d. Column joints are to be butted to insure perfect column alignment after assembly.

7. Lineshafts

- a. Lineshafting shall be of ample size to transmit the torque and operate the pump without distortion or vibration.
- b. Lineshafting shall be made of carbon steel conforming to AISI 1045 and be furnished in interchangeable sections not over ten feet in length.
- c. Lineshafting shall be coupled with extra-strong threaded steel couplings machined from solid bar steel.
- d. Lineshafting shall be fitted with stainless steel replaceable sleeves at each bearing and shall conform to AISI 304 material.
- e. Lineshaft bearings shall be of neoprene material construction.
- f. Lineshaft bearings shall be retained in bronze guides that are fitted into the column coupling and secured in place by the butted column pipe ends. (for column sizes larger than 16" retainers shall be steel and fabricated into the column assembly).

8. Discharge Head Assembly (above ground, mechanical seal)

- a. The pump discharge head shall be of the above ground type of either cast iron or fabricated steel construction with an ANSI 125# discharge flange.
- b. The discharge head shall be of sufficient design to support the entire weight of the pump and driver.
- c. If the application uses a variable frequency drive, the discharge head shall be fabricated steel and specifically designed to elevate the discharge head natural frequency above the operating speed.
- d. A drive shaft of the same material as the lineshaft shall extend through the sealing assembly of the discharge head and be coupled to a vertical solid shaft driver using a spacer type coupling to permit easy field removal of the mechanical seal.



- e. The shaft sealing assembly shall consist of a cast iron packing box, bronze or stainless steel packing gland, bronze packing box bushing, stainless steel packing gland nuts and bolts and mechanical seal.
- f. A steady bushing shall be utilized in the VHS motor to minimize shaft deflection.
- g. Discharge head openings shall be fitted with guards to prevent access to the rotating shaft and/or coupling.

9. Vibration Limitations (Field)

- a. The limits of vibration as set forth in the standards of the Hydraulic Institute shall govern.

10. Testing

- a. A certified factory hydrostatic and performance test shall be performed on each pump assembly in accordance with Hydraulic Institute Standards, latest edition. Tests shall be sufficient to determine the curves of head, input horsepower, and efficiency relative to capacity from shutoff to 150% of design flow. A minimum of six points, including shutoff, shall be taken for each test. At least one point of the six shall be taken as near as possible to each specified condition.
- b. Results of the performance tests shall be certified by a Registered Professional Engineer and submitted for approval before final shipment.

END OF SECTION



**SECTION 43 02 00**  
**SELF PRIMING PUMP**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. This Section includes refurbishing the existing pumping station with new self-priming sewage pumps.

**1.03 PERFORMANCE REQUIREMENTS**

- A. Pressure Rating of Sewage Pumps and Discharge Piping Components: At least equal to sewage pump discharge pressure, but not less than 125 psig.
- B. Pressure Rating of Other Piping Components: At least equal to system operating pressure.

**1.04 SUBMITTALS**

- A. Product Data: Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories. Generic or non-specific submittals will not be considered acceptable and will be rejected.
- B. Shop Drawings: Show fabrication and installation details for each pumping station. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 1. Wiring Diagrams: Power, signal, and control wiring.
  - 2. Control Panel: Complete schematic diagrams and drawings that show the equipment to be provided and dimensions for the same.
- C. Product Certificates: For sewage pumps, signed by product manufacturer.
- D. Field quality-control test reports.
- E. Maintenance Data: For pump stations, to be included in maintenance manuals.
  - 1. The manufacturer shall supply comprehensive written instructions to enable the operator to properly operate/maintain the equipment that is supplied. Content of the instruction manuals may assume that the operator is familiar with pumps, motors, and electrical controls, but has not previously operated or maintained the

exact equipment that is supplied for this project.

2. Instruction manuals shall be applicable solely to the pump model that is provided, including any/all related devices supplied by the manufacturer, as specified herein. Instructions for equipment which the manufacturer has not supplied, but has made mounting or other provisions for shall be provided by others. Detailed as-built drawings shall be provided for the modified control panels after installation of the new components required herein.
3. Information to be provided with the instruction manuals furnished for each individual pump station shall include, but not be limited to, the following:
  - a. Instructions for operation of pumps in all intended modes.
  - b. Instructions for all/all adjustments which must be performed during initial startup of the pumping equipment, and any/all adjustments required during the course of preventative maintenance as is specified by the manufacturer.
  - c. Schematic diagrams of the pump control system, to reflect the specified equipment/components. Schematics provided shall illustrate specifically the interconnection between the panel components. The control panel manufacturer shall be responsible for providing CAD drawings of all control panels designating the motor branch, control, and alarm circuits that are provided, and the interconnections between these circuits. Schematics for individual components that are not normally repairable by the station operators need not be included. Details for such components shall not be provided in lieu of overall system schematics. Partial schematics of components, block diagrams, and simplified schematics shall not be provided in lieu of overall system diagrams.
4. All Operation & Maintenance manuals shall be specific to the actual equipment supplied in accordance with this specification. Instruction manuals applicable to many different pump configurations, and which require the operator to selectively read various portions of the manual shall not be acceptable.

F. Warranties: Special warranties specified in this Section.

## 1.05 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative of pump and control panel manufacturer shall be provided to inspect the finished installation, place the new equipment into service, and provide operating personnel with training relating to the use and maintenance of equipment required for this Project.

B. Manufacturer Qualifications: A qualified manufacturer.

### 1. Pump Manufacturer:

- a. Upon request, the pump manufacturer shall provide evidence and/or documentation of the production and shipment of no less than one hundred (100) of the specified self-priming pumps. All of the references shall be conceptually identical to the stations specified herein, with only the connection size or motor horsepower varying between the applications.
  - b. Also, upon request, the pump manufacturer shall document the existence of no less than ten (10) installations of the specified equipment that has been successfully installed and is in full-time service. All reference installations provided will be of the exact design and type as the equipment specified herein, with only motor horsepower or means of level control varying between the referenced installations and that which is specified herein.
- C. Product Options: Drawings indicate the size, profiles, and dimensional requirements of pumping stations and are based on the specific system indicated.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction, marked for intended use, and manufactured in strict accordance with the National Electric Code.
- E. Standards: Materials, physical and chemical characteristics of the components and tests or test requirements shall conform to all current AWWA, ANSI, and ADTM standards.

#### 1.06 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
- 1. Notify Engineer not less than two days in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without Engineer's written permission.

#### 1.07 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of pumping systems that fail either due to materials or workmanship within specified warranty period.
- B. Warranty Period: One year from date of Final Acceptance, except for items specifically noted otherwise.
- C. See Section 2.13 herein for specific requirements concerning manufacturer warranties.

#### 1.08 USE OF BASE BID EQUIPMENT

- A. These specifications were prepared from products manufactured and sold by Pioneer

Pump Company for the sole purpose of establishing a minimum standard of quality acceptable to the owner. This is not done, however, to eliminate other products equally as good and/or efficient.

- B. Contractors shall prepare their bids on the basis of the particular equipment specified for the purpose of determining the low bidder. Award of the Contract shall constitute a contractual obligation on behalf of the low bidder to furnish the specified equipment and materials.
  - 1. After execution of the Contract, if the contractor wishes to substitute equipment other than that specified herein, such substitution shall be considered for one reason only: that the equipment proposed for substitution is superior in construction and efficiency to that specified in the Contract, and that higher quality has been demonstrated by service in similar installation.
  - 2. In the event that the contractor obtains the Engineer's approval of equipment other than that for which the station was originally laid out, the contractor shall, at his own expense, make any required changes in the structures, buildings, or piping as may be necessary to accommodate alternate equipment, and shall furnish as-built drawings to the Engineer.
  - 3. It shall be assumed that the contractor's cost for the proposed alternate equipment is less than that of the specified equipment. If the substitution is approved, the contractor shall furnish certified vendor pricing data to the Engineer, and the Contract Price shall be reduced by Change Order in an amount equal to the savings.

## PART 2 - PRODUCTS

### 3.01 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
  - 1. Available Manufacturers: Subject to compliance with requirements, equipment manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
  - 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

### 3.02 SLUDGE REMOVAL (SELF-PRIMING SEWAGE) PUMPS

- A. Description: Field fabricated, assembled, and tested with appurtenances as noted on the Plans, for collection of sludge from the lagoon adjacent to the installation.
- B. Orientation: Horizontal belt-driven pumps with suction piping extending into the lagoon as shown on the Plans. Each pump, motor, V-belt drive, and belt guard to be mounted on a common fabricated steel base as outlined herein.

C. Piping: Ductile iron and/or 304L Schedule 40 fabricated stainless steel.

### 3.03 SCOPE OF WORK REQUIRED

- A. The Contractor shall be required to furnish and install a new sludge removal pump at the existing lagoon, in strict accordance with the requirements of these Specifications, and as shown on the Plans.
  - 1. The principal items of equipment to be furnished and installed and/or work to be performed as a part of this project shall include the installation of one (1) horizontal, self-priming centrifugal pumps, new 7.5HP drive motor, complete V-belt drive, belt guard, and other items as may be required or as shown on the Plans. A new control panel will be provided, as well as new wiring from the panel to the pump motor, and the installation of a new air release valve on the pump, with the discharge piping from each valve to be routed back to the wet well. Discharge piping shall be provided as noted on the Plans.
- B. The new sludge pump shall be designed specifically for handling of raw unscreened domestic sanitary sewage and sludge. The pumps furnished shall be "GS-Series" self-priming pump as manufactured by the Pioneer Pump Company, Inc. of Canby, OR, Phantom Pumps of Bartow, FL or engineer approved equal. Additional equipment required shall be in accordance with the specifications that follow.
- C. The Contractor's attention is directed to the provision of this Specification entitled "Use of Base Bid Equipment", which outlines specific requirements concerning preparation of the bids and approval of any alternate equipment by the Engineer prior to bidding.

### 3.04 SELF-PRIMING SEWAGE PUMPS

- A. The pump(s) described by this specification shall be the manufacturer's latest production model for the year solicited and shall be equipped with all the standard equipment in accordance with the manufacturer's pertinent literature. The pump(s) will be delivered complete, assembled accordingly, serviced, and ready for operation. The manufacturer must be ISO 9001 Certified. Pump performance criteria and solids handling capability shall be in accordance with requirements listed.
- B. The pump furnished for this application shall be provided with three (3) inch suction and discharge connections, Class 125 flanged.
- C. Each self-priming pump shall be capable of handling raw, unscreened sewage and sludge, and shall have the necessary characteristics and be selected to perform under the following conditions of service:
  - 1. Design rating: 200 GPM @ 46' TDH
  - 2. Minimum hydraulic efficiency at design: 41.56%
  - 3. Maximum operating speed at design: 1500 RPM
  - 4. Minimum shutoff head at design speed: 61'
  - 5. Total dynamic suction lift at design: 14.6'

6. Maximum priming lift at design: 11.5'
  7. Maximum condition rating: 400 GPM @ 34' TDH
  8. Minimum condition rating: 100 GPM @ 57' TDH
- D. Consideration shall be given to the use of the specified equipment in the service that is anticipated for the same, in which occasionally debris may lodge between the pump suction check valve and the seat, resulting not only in the loss of the suction leg, but also in the siphoning of liquid from the pump casing to the approximate centerline of the impeller. Such occurrences shall be considered normal with the proper installation of an air release line to atmosphere.
1. In consideration of such an occurrence and of the need for the automatic unattended operation of the equipment, each pump shall be designed to retain adequate liquid in the pump casing to ensure unattended automatic repriming of each pump while operating at its rated speed in a completely open system without suction check valves and with a dry suction leg.
- E. All openings, internal passages, impeller vanes, and recirculation ports shall be large enough to permit the passage of a sphere 2½" in diameter, as well as any trash or stringy material which may pass through the average house collection system. Smaller internal passages that create a maintenance problem or interfere with priming and/or pump performance shall not be permitted.
1. The use of screens or any other internal devices which create a maintenance nuisance or interfere with priming and performance of the pumps shall not be permitted.
  2. Certified dimensional drawings showing the size and location(s) of priming recirculation ports (or ports) shall be submitted to the Engineer for review and approval upon request.
- F. Each sewage pump shall be capable of a reprime lift of 15' while operating at the selected speed and impeller diameter. Reprime lift is defined as the static height of the pump suction centerline above the liquid that the pump will prime, and delivery within five (5) minutes on the liquid remaining in the pump casing after a delivering pump is shut down with the suction check valve removed.
- G. The pump manufacturer shall demonstrate to the Engineer's satisfaction that consideration has been given to reducing maintenance costs by including the following features into the design of the pumping equipment provided for this project:
1. No special tools shall be required for the field replacement of any components within the pumps.
  2. Pumps shall be equipped with removable suction cover plates which allow access to the pump interior for service and/or repairs, without removal of the suction or discharge piping from the pump casing. Suction cover plates shall be furnished with provisions for jack bolts so that the cover can be easily removed without need for prying on the suction cover or the pump volute.



3. The pump cover plate shall be fitted with a replaceable wear plate. Replacement of the wear plate and other pump internals as outlined herein may be accomplished via the suction cover plate. The entire rotating assembly, as described herein, will be removable as a single unit without removing the pump volute or piping.
  4. Each pump shall incorporate a suction check valve to eliminate the need of the pump to reprime on each cycle under normal operation. Pumps requiring suction check valves to prime or reprime are not acceptable.
  5. Pump shaft shall be 17-4 pH stainless steel. Carbon steel or lesser grades of stainless steel (304 S.S., 316 S.S., 410 S.S., etc...) will not be allowed.
  6. Means shall be provided for external adjustment of the clearance between the pump impeller and the wear plate. The entire rotating assembly shall move as one unit to enable the clearances to be properly adjusted. Adjustment shall be achieved only by using jack bolts on the rotating assembly. Shims are not an acceptable means of adjusting impeller vs. wear plate clearances.
- H. Pumps shall be designed for clockwise rotation about the driven end and feature design specifications as outlined herein:
- I. Pump casings shall be constructed of ASTM A48 Class 30 gray cast iron with an integral volute. Pump casings shall be provided with integral mounting feet sized to prevent tipping or binding when the pump is completely disassembled for maintenance or repair. Casings (both internal and external) shall be provided with a heavy-duty industrial primer for added protection from corrosion. Uncoated cast iron surfaces inside the pumps are not allowed.
  - J. A suitably sized fill port shall be provided to allow the operators to fill the pump casing with water for initial priming and operation after disassembly for maintenance or repair. Fill port cover plates will be fabricated of ASTM A48 cast iron, and shall incorporate a heavy-duty hook design with hand nuts for tightening and loosening. Hand nut threads shall allow for the slow release of internal pressure. Teflon gaskets shall be provided between the fill plate and the casing to prevent adhesion of the port cover to the casing. The use of vegetable fiber or cork gaskets for the fill port cover is prohibited by this specification.
  - K. Each pump shall be provided with a suction cover plate to provide complete access to the pump interior, facilitating maintenance in the event of a pump clog or jam. Removal of the cover plate shall provide ample clearance for removal of stoppages, and allow for service of the impeller, seal, wear plate, and/or suction check valve without removal of the suction or discharge piping. Cover plates shall be provided with tapped connections for jack bolts as specified elsewhere herein.
    1. The cover plate shall be constructed of ASTM A48 Class 30 gray cast iron and shall be retained by hand nuts. Jacking bolts shall be provided to allow easy removal of the cover plate without prying on the casing or cover.

2. A replaceable suction wear plate fabricated of 1020 steel (or ASTM A48 class 30 cast iron) shall be provided and shall be secured to the rear of the suction cover plate with AISI 1020 stainless steel welded studs and nuts. The wear plate shall be easily replaced in the field. The cover plate shall be sealed to the volute by means of a Viton O-ring.
- L. A pressure relief valve shall be provided on the pump casing, set to open at 75-200 psi. A casing drain plug shall also be provided on the front of the pump and shall be a minimum of 1¼" diameter.
- M. Each pump shall incorporate an integral rotating assembly which consists of an impeller, shaft, mechanical shaft seal, lip seals, bearings, seal plate and bearing housing. The rotating assembly shall be removable as a single unit without disturbing the pump casing or piping.
1. Bearing housing material shall be ASTM A48 Class 30 gray iron with heavy duty design to support the pump bearings, shaft, and seal housing. Bearings shall be oil lubricated for improved lubrication and heat dissipation. Bearing frame shall include a vent mounted on top of the frame and oil level sight gauge mounted on the side for visual bearing frame oil level indication. The bearing housing shall have external shim-less adjustment to adjust clearances between the impeller and wear plate.
  2. Separate oil filled cavities, vented to atmosphere, shall be provided for the shaft seal and bearings. The cavities shall be cooled by the liquid being pumped, and lip seals shall prevent leakage of oil from the pump.
  3. The bearing cavity shall have an oil level sight gauge and fill plug check valve. The check valve shall be designed to allow venting of the cavity but shall prevent introduction of moist air to the bearings.
- N. Pump impellers shall be constructed of ASTM A536 Grade 65-45-12 ductile iron and shall be the semi-open non-clog type with integral pump-out vanes on the back shroud. Impellers shall have a maximum of two (2) vanes, shall be capable of passing a minimum 2½" spherical solid as outlined herein, and shall include integral pump out vanes on the back shroud. The impeller shall thread onto the pump shaft and shall be secured with a stainless steel lock screw and conical washer. To maximize priming capabilities of the pumps, only full-diameter impellers shall be utilized.
- O. The pump shaft shall be fabricated of 4140 steel as specified herein. Pump bearings shall be anti-friction ball or tapered roller type, properly sized and designed to withstand all radial and thrust loads expected during normal operation. Radial bearings shall be open type single ball design, and thrust bearings shall be open type double ball design. All shaft bearings shall be oil lubricated from a dedicated reservoir. Pump designs which use the same oil to lubricate the bearings and shaft seal shall not be considered acceptable.
- P. The shaft seal shall be the oil-lubricated semi-cartridge mechanical type. Seals shall be a bellows-type two-piece ID/OD balanced design, installed over a stainless steel shaft sleeve. Stationary and rotating seal faces shall be silicon carbide and tungsten carbide,

with each mating surface lapped to a total flatness of one-half light band (5.8 millionths of an inch) as measured by an optical flat under monochromatic light. The ID/OD balanced design shall secure alignment during periods of mechanical or hydraulic shock (loads which cause shaft deflection, vibration, and/or axial/radial movement). All hardware used for mechanical seals shall be constructed of 316 and 17-4 stainless steel, with fluorelastomers for sealing machined joints. Seals shall be oil-lubricated from a dedicated reservoir, and the same oil shall not be used to lubricate both the shaft seal and the pump shaft bearings.

- Q. Adjustment of impeller face clearance (defined as the distance between the impeller and the wear plate) shall be accomplished by external adjustment and shall not require the use of external shims.
1. Provisions for hex head type bolts shall be incorporated as a part of the rotating assembly housing casting to facilitate impeller vs. wear plate adjustment, and the requirement for external shims is strictly prohibited.
  2. Clearance adjustments which require movement of the shaft only, and not the entire rotating assembly, and thereby adversely affect the seal working length or impeller back clearances, shall not be acceptable.
- R. Each pump shall be provided with a suction check valve constructed of EPDM and provided with integral steel and nylon reinforcement. A molded blow-out center shall protect the pump casing from hydraulic shock or excessive pressure. Removal and/or installation of the suction check valve shall be accomplished through the suction cover plate opening, without need for disturbing the suction piping.
1. The sole function of the check valve shall be to save energy by eliminating the need for the pump to reprime after each pumping cycle. Pumps requiring a suction check valve to assist in repriming shall not be considered acceptable.
- S. Each pump shall be provided with 3" Class 125 flanged connections to facilitate piping in the field by the contractor. Cast iron spool pieces shall be provided by the manufacturer to allow field connection of piping. 1" NPT tapped connections shall be provided on the discharge spool of each pump to facilitate the installation of air release piping as outlined elsewhere herein.
- T. The pump manufacturer shall maintain a regular inventory of replacement pumps, as well as all normally-replaced parts of the specified equipment, for immediate shipment to the customer as required. Inventory shall include all normally-replaced parts of the specified pumps, including new impellers, wear plates, O-rings and gaskets, as well as complete pumps and rotating assemblies.
1. One complete spare rotating assembly shall be provided, for storage by the Owner until needed.

### 3.05 DRIVE MOTORS

- A. Each pump shall be provided with a 10HP, 1750 RPM horizontal solid shaft foot-mounted motor suitable for operation on 460/3/60 electrical service. Motors shall be provided in totally enclosed fan cooled (TEFC) enclosures, shall be EPACT-compliant, and shall be manufactured in strict accordance with all applicable standards of NEMA, IEEE, AFBMA, NEC, & ANSI.
- B. All motors shall be premium efficiency squirrel cage induction type, with normal starting torque and slip characteristics. Frames shall be cast iron or aluminum. Acceptable manufacturers are U.S. Electric Motors, Hitachi, Baldor, General Electric, and Reliance.
- C. Motor winding insulation shall be non-hygroscopic, rated as Class F or better. The motors shall be capable of carrying full load current of the motor continuously, without injurious temperature rise in an ambient temperature of 40 degrees C. The motors will be provided with a minimum service factor of 1.15.
- D. Drive motors shall be sufficiently sized so as to be non-overloading above the rated nameplate horsepower under any condition of operation from shut-off head to runout conditions. Motor thrust bearings shall be adequate to carry continuous thrust loads under all conditions of pump operation from zero head to shut-off.
- E. TEFC motors shall be provided with 115VAC space heaters to prevent the formation of condensation within the motor enclosure, as well as normally-closed thermostats (one per phase) suitable for operation on 115VAC. The thermostats shall be wired to the pump control panel, which shall stop the operation of the motor and provide alarm indication in the event of a motor winding overtemperature condition. Space heaters shall be powered by the pump control panel as well.

### 3.06 PUMP V-BELT DRIVE ASSEMBLIES

- A. Each pump, motor, and belt drive assembly shall be mounted on the existing fabricated steel base. Power from the drive motors specified above shall be transmitted to the pump by means of adjustable V-belt drive assemblies.
- B. The V-belt drive system will utilize existing adjustable brackets to support a horizontal electric motor as specified herein. Multi-groove cast iron sheaves and composite V-belts shall be provided to transfer the power from the motor to the pump and shall be properly sized for horsepower ratings shown herein.
- C. A minimum safety factor of 1.5 shall apply to the selection of V-belt drives, based on the use of calculated brake horsepower versus motor nameplate horsepower. Not less than two (2) V-belts shall be provided on any drive assembly, regardless of the number calculated.
- D. Existing belt guards shall be modified as necessary to adapt to the new drive assembly required. The V-belt drive system shall be as manufactured by Dodge, T. B. Woods, or approved equal.

### 3.07 AIR RELEASE VALVES

- A. Each self-priming pump shall be provided with an automatic air release valve designed to release air and gases from the pump while it is priming. After the pump has primed and is beginning to deliver liquid, the valve shall close to restrict bypass flow. When the pump stops, the valve shall automatically move to the open position, positively venting the pump casing for the start of the next priming cycle.
- B. Air release valve springs shall be available in three different compression ratings, to allow matching of the valve to the specific application. Air release valves shall be a nominal 1" diameter, with standard NPT connections.
- C. Valve body and inspection cover shall be fabricated of Class 30 gray iron. The plunger rod and compression spring shall be 302 stainless steel, with a 304 stainless steel retaining washer. Spring tension shall be field-adjustable. Internal diaphragm shall be Buna-N, and all internal wetted hardware shall be 18-8 stainless steel. External hardware shall be commercially available plated steel.
- D. Air release valves shall be a production item of the pump manufacturer, who shall be responsible for maintaining a supply of complete units, as well as replacement parts, in regular inventory for use as required.

### 3.08 PRESSURE AND VACUUM GAUGES

- A. A vacuum and pressure gauge shall be provided for each pump, for installation by the contractor in the location as shown on the Plans. Pressure gauges shall be of suitable range so that the rated discharge head of that particular pump is approximately one-half of full-scale range. Gauge shall be capable of withstanding full shutoff head of the pump. Vacuum gauges shall be capable of reading +/- 30" Hg.
  - 1. Each pump shall be provided with glycerin-filled pressure gauges and diaphragm isolator assemblies to stabilize the movement and increase readability of the gauge during operation, enabling the operator to monitor pump suction or discharge pressures during operation. Gauges shall be provided with 6" diameter stainless steel cases, stainless steel movements, and stainless steel bourdon tubes, and shall be graduated to read directly in feet of water column. Bronze internals shall not be allowed.
    - a. Rated accuracy of the pressure gauges shall be 1.5 percent of full scale reading. Pressure range of the gauges shall be graduated 0 to 69 feet of water column (minimum) but shall be selected so that the normal operating pressure of the pump is approximately one-half of full scale.

- b. The gauge faces shall be white, with black numerals. Gauges shall be calibrated and scaled to read directly in feet of head.
- c. Gauges shall not be installed directly on the discharge piping but shall be provided with a diaphragm isolator to prevent contact of the gauge internals with the pumped media. Gauges and diaphragm isolators shall be pre-assembled prior to shipment to the job site, and both the gauge and interconnecting piping shall be filled with glycerin. Gauges shall be mounted with 304 stainless steel fittings and shall be provided with stainless steel ball valves for isolation and venting purposes.
- d. Pressure gauges shall be all-304 or 316 stainless steel construction. Cases shall be 304 or 316 stainless, and wetted parts shall be 316 stainless. Elastomers shall be neoprene. Diaphragm seals shall include 316 stainless steel diaphragms, as well as 316 top & bottom housings. Gaskets shall be Teflon or neoprene.
- e. Connections and all interconnecting piping, including valves, shall be 304 stainless steel, 1/2" diameter. A separate vent and isolation valve shall be provided to allow the operator to remove system pressure from the gauge assembly after use. All piping, valves, gauges, and isolators shall be installed by the contractor as shown on the Plans, and shall be provided with nipples, tees, and all other pipe fittings as required to provide pressure and vent functions. The supplier shall provide a layout drawing with the submittals to allow field-assembly and installation of all furnished piping accessories. All gauges shall be isolated and vented to atmosphere when not in use.

### 3.09 PAINTING

- A. After assembly, each pump/motor/drive assembly shall be provided with not less than two (2) coats of high quality machinery enamel prior to shipment. Belt guards shall be provided with a safety orange or yellow finish, and the pump/motor skids shall be a medium gray finish. Field finish painting shall be provided in accordance with the requirements of the Painting specifications as outlined elsewhere herein.
- B. Prior to assembly, the fabricated base and belt guard shall be blast cleaned and provided with a suitable red primer. Finish painting shall be provided after completion of all assembly work, and after the removal of any oils, grease, or other contaminants. All data plates and warning labels shall be protected during painting to preserve readability and function. Coating shall be spray-applied in not less than two (2) coats of 3-5 mils DFT each, for a minimum total finish of 6-10 mils DFT, after final assembly.
- C. Pumps and drive motors will receive one shop coat of primer and finish enamel at the respective manufacturer's facilities prior to shipment. Shop painting shall be applied as noted above. Contractor will be responsible for field finish painting of all equipment and accessories, as outlined elsewhere in these Specifications, or directed by the Engineer. Compatibility of final finish paint with the shop-applied coatings outlined above shall be the responsibility of the contractor. Finish color of all pumping

equipment and related piping, etc... shall be as selected by the Engineer or the Owner.

### 3.10 ELECTRICAL CONTROLS

- A. A complete control panel shall be furnished and installed for the specified sludge pump, to be provided with the appurtenances specified herein. The control system shall be capable of starting and stopping the pump via an internal selector switch, either in response to the output from an internal timer, or via an external contact provided by others. The panel shall be provided with adequate logic for the automatic operation of one (1) pump, as well as the indication of high motor temperature alarm.
- B. The control panel shall be suitable for operation on 460/3/60 4-wire electrical service, and must be a regular production item of the control manufacturer. Specially constructed or "one of a kind" or hybrid control systems shall not be considered an equal to the specified pump control. All components and/or systems required for automatic operation of pumps specified will be included in the control panel and no additional structures or equipment shall be required.
- C. The control panel shall utilize float switches located in the lagoon for direct indication of a low level condition in the lagoon, and shall stop the operation of the sludge pump in such an event. A pilot light shall indicate a low lagoon level. All pump start/stop functions shall be controlled from a manual selector switch on the inner door of the control panel, allowing for "hand" or "automatic" operation based on an internal 24-hour timer, or the receipt of an external "pump required" contact via SCADA (not part of this contract).
  - 1. Floats shall be secured to a common support system, which shall be easily removed for future adjustment of operating levels. The use of air bubblers, submersible transducers, ultrasonic indicators, or other forms of electronic level sensing shall not be acceptable.
- D. The pump control panel shall be wired and checked at the factory prior to shipment to the jobsite. The contractor shall field connect the power feeder lines, final connections to remote alarm devices, and the connections between the pump and the pump motor control. All wiring, workmanship, and schematic wiring diagrams shall be in strict compliance with the applicable standards and specifications set forth by the National Electric Code (NEC).
- E. All necessary wiring furnished between components shall be NEMA Class II, Type B, 14 gauge (minimum) stranded copper type THHN, MTW, or THW, rated at 600 volts. Motor branch wiring shall be 10 gauge minimum. All wiring shall conform to the requirements of the NEC as well as applicable state and local codes. Individual wires shall be routed through plastic wiring troughs with snap-on covers or shall be fastened to the subpan by means of adhesive-backed ties. Loose wiring inside the control panel will not be acceptable.
- F. All power and control wiring in the panel shall be tagged at each end by self-adhering wire markers, and no two wires having different functions within the control panel may

be provided with the same markings. Wire numbers must coincide with the schematic diagrams provided by the panel manufacturer.

1. Control components will be permanently marked by the panel manufacturer as noted herein, using the same identification as shown on the electrical diagram. Identification labels shall be engraved Bakelite plates, permanently mounted adjacent to each device. All switches, indicators and instruments will be plainly marked to indicate function, position, etc... Markings shall be mounted adjacent to and above the respective device. Press-on labels are not acceptable.
- G. Motor branch conductors and other power conductors shall not be loaded above 60° C temperature rating, on circuits of 100 amps or less. On circuits over 100 amps, the loading shall not exceed 75° C temperature rating.
- H. The control manufacturer shall provide a main ground lug and a ground lug for pump motors. The mounting surface of all ground connections shall have any paint removed before making final connections. The contractor shall make the field connections to the main ground lug and each pump motor in strict accordance with the National Electric Code.
- I. Terminal blocks shall be provided for all wiring/connection points to or from the control panel, including main power entry into the control panel. All terminal blocks will be 600VAC rated, suitable for use with #14 AWG (or larger, depending on the gauge size being secured) wire, and shall utilize captive screws and clamp bars for securing the wiring. All terminals shall be physically located at the bottom of the enclosure, with adequate clear space provided at the bottom of the enclosure to facilitate wiring connections by the electrician. All terminals shall be permanently marked with the same numbering as the wire that is connected to it and corresponding to the manufacturer's schematic diagrams. Wiring from each motor will be connected directly to the respective motor starter.
- J. Each pump motor shall be provided with a circuit breaker, motor starter, suitable overload protection, and all required timers, etc... that may be required for operation. All of the required circuitry for starting each pump motor will be contained inside a single enclosure. Motor branch circuits provided in the panel shall be of the highest industrial quality and shall be securely fastened to the removable back plate with screws and lockwashers.
1. A main circuit breaker shall be provided for the panel, to allow local isolation of the panel if desired. Properly sized heavy duty air circuit breakers shall be furnished for each pump motor, each with a symmetrical RMS interrupting rating of 18,000 amperes at 460VAC. Circuit breakers will be sealed by the manufacturer after calibration to prevent tampering or unauthorized adjustment. A lockable operating mechanism shall be installed on the main and motor circuit breaker and shall be mounted on and interlocked with the inner door. It shall not be necessary to open the inner door to switch off the pump circuit breakers, but it shall not be possible to open the inner door with the primary voltage circuit breakers in the "on" position. Simple cut-outs in the inner door for circuit breaker access will not be considered



acceptable.

2. Each pump will be provided with an open frame, across-the-line, NEMA rated magnetic motor. Starters NEMA size 1 and above shall be designed for the additional of at least two auxiliary contacts. Starters rated "0", "00", or fractional sizes shall not be considered acceptable. Power contacts shall be double-break type, made of cadmium oxide silver. All starter coils shall be epoxy molded for protection from moisture and the corrosive environment that is anticipated. Starters shall be equipped to provide undervoltage release and overvoltage protection on all three phases. Motor starter contacts and coils shall be easily replaced without removal of the starter from its mounted position in the panel. International or horsepower rated motor starters or contactors shall not be allowed.
  3. Overload relays shall be provided for each pump motor, and shall be the block type, utilizing melting alloy type spindles. Overloads shall have visual trip indication with trip free operation. Pressing the overload reset lever shall not actuate the control contact until such a time when overload spindle has reset. Reset of the overload lever will cause a snap action control contact to reset, thus reestablishing the control circuit. Overload relays will be manually-reset only and not convertible to automatic reset. All overload trip settings shall be determined by heater element selection only and not by adjustable settings. Heater elements shall provide NEMA class 10 trip times and shall be selected in accordance with the actual motor nameplate data. Electronic overload protection is also acceptable in lieu of the specified thermal protection units.
  4. An overload reset pushbutton shall be provided for each pump, and shall be mounted through the inner door of the control panel in such a manner as to permit resetting the overload relays without opening the control panel inner door.
- K. The 115VAC control circuit shall be protected by a thermal magnetic circuit breaker, which shall be connected in such a manner as to allow control power to be disconnected from all control circuits.
- L. Control relays shall be the plug-in enclosed polycarbonate type. All of the relays used for switching and latching functions within the control panel shall be identical. The relay coil windings shall be polyurethane insulated, with a minimum insulation resistance of 100 megohms minimum. Dielectric strength of the coils shall be 1500 volts RMS and all relays shall be suitable for a temperature range of from -50 to 65 degrees C. Mechanical life expectancy of relays shall be in excess of 20 million operations. Pull-in speed shall be 14 ms typical, with 10 ms typical drop-out speed. All relays shall be suitable for continuous duty cycles and shall be U.L. recognized. Relay contacts shall be rated at 10 amps resistive at 120 VAC. Each relay will be mounted in a fixed polycarbonate base with integral terminal connectors suitable for the minimum wiring size specified above.
- M. Time delay relays shall be the adjustable quelling constant type, and shall be adjustable from 1-1023 seconds in one second increments. Timer relays shall have a repeat accuracy of +0.1%, with no first shot effect. Setting accuracy will be +2%, with maximum reset time of 50 milliseconds. Recycle time will be no more than 150

- milliseconds during timing and 16 milliseconds after timing. Each timer shall be provided with two LED indicators to indicate "timing" and "on" functions. The timer output contacts will be double pole double throw type rated at 10 amperes resistive at 120 VAC. Each time delay shall be mounted in a fixed polycarbonate base with integral terminal connectors suitable for the minimum wiring size specified above. Time delay relays shall plug into the bases for ease of removal.
- N. The control manufacturer shall provide a 100 watt alarm light, suitable for 115VAC, and provided loose for field installation in the location directed by the Engineer. The alarm light shall be a vapor tight fixture, provided with a red polycarbonate or Lexan lens to attract attention and suitable mounting fixtures. The alarm light shall be designed in such a manner to permit surface mounting, without possibility of water collecting in the gasketed area of the fixture between the base and globe.
- O. A lightning arrestor shall be provided in the control panel, and shall be suitable for 460/3/60 service. The arrestor will be the silicon oxide varistor type having a case material of PVC.
- P. The control panel shall be equipped with pilot lights as outlined below. Pilot lights shall be in addition to any lights provided as a part of automatic level controller that may be specified herein. All pilot lights shall be suitable for 120VAC, and shall be mounted in keyed openings on the inner door of the control panel. Pilot lights shall be push-to-test, shall utilize LED lamps and shall be provided with jeweled glass or plastic lenses a minimum of 1" in diameter. A common push-to-test button for verifying the condition of pilot light lamps shall also be acceptable. Pilot lights shall be provided for the following conditions:
1. pump "running" (one per pump)
  2. motor overtemperature
  3. low lagoon level
  4. high lagoon level
  5. normal power "on"
- Q. A hand-Off-Automatic selector switch shall be provided on the inner door of the panel enclosure, to allow the operator to select the mode of operation for the pump. Selection of manual operation shall not bypass the internal pump protection circuitry, or the low level cutoff alarm and interlock.
- R. A duplex alternator relay shall be provided (duplex panel configuration only) to switch the lead and lag pumps after the completion of every operating cycle. The relay shall be suitable for 120VAC, and shall be a plug-in design for easy replacement in the future. Alternators shall be provided with an override selector switch mounted on the inner door to allow the operator to manually select the lead pump or automatic alternation.

- S. Six digit elapsed time meters shall be connected to the auxiliary contacts of each pump motor starter to indicate the total running time of each pump in "hours" and "tenth of hours." Elapsed time meters shall be the non-reset type, and shall be suitable for 120 VAC operation. Elapsed time meters shall be mounted on the inner door of the control panel.
- T. Dry (non-powered) contacts shall be provided to the terminal strip for connection to future SCADA equipment that is not required under this contract. Contacts provided shall include pump "on", pump "off", "high wet well level", and "normal power available". Pump monitoring contacts shall be provided for each pump in the wet well. All contacts shall be Form B design, capable of carrying a minimum of 10 amps at 120VAC. Contact closures shall be separately wired with two separate leads in the panel, and with no common wiring between functions.
- U. All required electrical control equipment shall be mounted in a single NEMA 4X dead front control enclosure fabricated of 14 gauge 304 S.S. The panel enclosure will be provided with a continuous hinge along one side and a stainless steel hinge pin. The enclosure door shall open fully to allow full operator access to all control components, and shall be sealed by means of a neoprene gasket. Locking lugs shall be provided around the periphery of the panel enclosure, and will be provided with quarter-turn quick-disconnect latches rather than screws or bolts.
  - 1. All control components shall be mounted on a removable back panel of fabricated steel. The back panel shall be secured inside the enclosure with collar studs. All controls that are normally required for operation of the pumps, including pilot lights, elapsed time meters, level controller boards, main circuit breaker, circuit breaker locking handles, overload reset pushbuttons, and other equipment normally accessed by the operator, shall be mounted on a hinged steel inner door. All operating controls and instruments shall be securely mounted on the inner door in a manner that allows full opening of the door, and shall be clearly labeled to indicate function.
  - 2. Wiring routed to door mounted devices shall be bundled and confined by means of nylon wrap, and shall be provided with adequate bundle flex provided to allow full opening of the inner door without binding or chafing of the insulation. The enclosure shall be provided with mounting lugs for installation by the contractor in the position shown on the Plans.
  - 3. The enclosure shall be provided with mounting tabs capable of supporting the full weight of the assembled panel. The control panel enclosure shall be as manufactured by Hoffman, Electromate, or equal. All required electrical control equipment shall be mounted in a single NEMA 3R dead front control enclosure fabricated of 14 gauge cold-rolled steel, and provided with a drip shield to prevent the entrance of rainwater. The panel enclosure will be provided with a continuous hinge along one side and a stainless steel hinge pin. The enclosure door shall open fully to allow full operator access to all control components, and shall be sealed by means of a neoprene gasket. A single opening handle shall be provided to permit entry into the panel, and the use of locking lugs around the periphery of the panel enclosure will not be allowed. The exterior door of the enclosure shall also be fitted

with a neoprene gasket.

### 3.11 LOW LAGOON LEVEL PROTECTION

- A. An automatic level control system shall be provided to stop the pump motor should a low lagoon level be sensed. Three float switches shall be mounted in the lagoon for “low level”, “restore”, and “high level” conditions. The control system will be designed to achieve operation as outlined herein. The anticipated sequence of operation of the controls shall be as follows:
  - 1. Normal system operation shall be to start the pump motor by manual selection of the specified H-O-A selector switch on the inner door of the control panel. The pump motor shall be energized and the lagoon pumped down until the selector switch is turned to the “off” position. An adjustable timer shall be provided to stop the operation of the pump after a period of up to six hours.
  - 2. Should the level of the lagoon reach a level that would be detrimental to the continued operation of the sludge pump, a low level float switch shall deactivate operation of the sludge pump. The pump cannot run again until a second “restore” float switch has been activated.
  - 3. An additional float switch shall be provided to detect a “high level” condition in the lagoon, and an external alarm light shall be energized whenever this level is reached. Alarm indication shall remain energized until manually reset.

### 3.12 FLOAT SWITCHES

- A. A total of three (3) float switches will be provided with the pump control panel, each with adequate cable to reach the panel without splicing. Switches shall be the direct-acting type, designed and constructed for extremely long life in severe applications. Each switch shall contain a single pole mercury switch in the normally open position, which shall close when the switch body is tilted. Switches shall be epoxy encapsulated, and the level sensors shall be impact and corrosion resistant.
- B. The switch housing shall be 316 stainless steel, with a Teflon coating to reduce the buildup of grease and other materials. #14/3 AWG Hypalon-jacketed Type SO cable shall be provided with each float switch, of the length as noted above. Cable shall have a minimum of 105 strands of copper in each conductor for maximum flexibility. A green ground wire shall also be included in the cable for each float switch, and shall be connected to the ground terminals in the pump control panel. Float switch contacts shall be rated for 20 amps @ 120VAC.
- C. Each float switch shall be provided with the necessary hardware to be securely mounted on a 1/8" diameter 316 stainless steel mounting cable. A suitable weight kit shall be attached to the bottom of the float switch suspension cable to secure both the cable and the float in the wet well, and to prevent excessive movement. The float switch connection hardware shall be adjustable to allow repositioning in the wet well as required. The entire float assembly (weight, support cable, and all switches) shall be

easily removed from the wet well for inspection, cleaning, or adjustment as required. Mounting hardware shall be included for installation of the float switches on the support cable assembly.

- D. Float switches shall be Model P40NO-SST, manufactured by Anchor Scientific, Inc. or approved equal as manufactured by Consolidated Electric. A suitable support bracket shall be provided with the wet well access cover, for securing the switch support cable to the top of the wet well. The bracket shall be fabricated of 304 stainless steel.
- E. A 304 stainless steel float mounting assembly shall be provided to secure the float switches in the lagoon, and shall pivot to allow for the adjustment or removal of the floats without having to enter the lagoon. The support system shall be fabricated of 304 stainless steel, and shall be provided by the pump and control panel supplier. Anchorage of the mounting assembly shall be the responsibility of the installing contractor.

### 3.13 VENDOR'S RESPONSIBILITIES

- A. To ensure that the materials that are provided for this project are properly sized, applied, and supported after the sale, all of the pumping equipment furnished for this project shall be provided only through the local factory-authorized representative for the municipal market sector. Manufacturer certification of this will be provided to the Engineer upon request.
- B. The pump supplier shall be required to furnish complete system head curve calculations to the Engineer for review as part of the submittal package provided for approval. Information relating to the existing station and force main piping will be provided by the Engineer as may be required to generate the necessary calculations.
  - 1. Results of the calculations shall be provided in tabular format to the Engineer as a part of the submittal package, and shall indicate the calculated values for TDSL, TDDH, line velocity, and TDH, as well as a description outlining the procedures and/or rationale used to develop the system head curve.
  - 2. Calculations shall be provided for 0-400 GPM flow range, in 20 GPM increments, with complete calculations provided for each iteration.

### 3.14 SPARE PARTS AND EQUIPMENT

- A. After successful startup of all stations, the pump manufacturer shall provide the following spare parts to the Owner for use during normal operation and maintenance:
  - 1. One (1) complete pump rotating assembly with mechanical seal
  - 2. Six (6) wear plate and rotating assembly O-rings
  - 3. Two (2) flap valves
  - 4. One (1) of each type fuse used in the control panel

5. Twelve (12) spare pilot light lamps
- B. All spare parts shall be provided packed in suitable containers for extended storage by the Owner. Any spare parts consumed during equipment startup shall be replaced by the manufacturer without cost to the Owner. The rotating assembly shall be completely filled with oil to fully submerge the bearings and shall be tagged accordingly so that the owner is aware of the need to drain oil to the correct level for operation.

### 3.15 MANUFACTURER'S WARRANTY

- A. The pump manufacturer shall warrant the equipment supplied to be quality construction, free of defects in material and workmanship, for a period of not less than one (1) year from the date of Owner acceptance, but not to exceed eighteen (18) months from the date of shipment to the job site. A written warranty shall be provided, and shall indicate the specific parts and labor covered by the manufacturer's warranty. Only those items that are normally consumed in service, such as light bulbs, oils, grease, packing, gaskets, O-rings, etc... shall be exempted from the manufacturer's warranty.
- B. It is not intended that the pump manufacturer assume the liability for any consequential damages or contingent liability that may arise from the failure of any product or parts thereof to operate properly, however caused; whether by or resulting from, or arising out of, any defects in design or manufacture, delays in delivery, replacements or otherwise.
- C. Components failing to perform as specified by the Engineer, or as represented by the manufacturer, or proven defective in service during the warranty period, will be replaced, repaired, or satisfactorily modified by the manufacturer.
- D. The pump warranty shall become effective upon the acceptance by the Owner or the Engineer, or sixty (60) days after installation, or ninety (90) days after shipment, whichever occurs first.

### 3.16 ACCESSORIES

- A. Lighting: As specified in the appropriate section of this specification, for "Lighting Materials and Methods".
- B. Electrical: As specified in the appropriate section of this specification, for "Electrical Controls"
- C. External red alarm light for indication of station high-water level, energized by separate level-detecting device, installed at location noted by Engineer in the field. Include reset switch and relay.

## PART 3 - EXECUTION

### 3.01 CLEANING

- A. Clean dirt and debris from wet wells, pumps, and piping.

- B. After completing equipment installation, inspect unit components. Remove paint splatters and other spots, dirt, and debris. Repair damaged finishes to match original finishes.
- C. After completing system installation, including outlet fitting and devices, inspect exposed finish. Remove dirt and construction debris and repair damaged finishes.

### 3.02 STARTUP AND COMMISSIONING

- A. After installation of all equipment and/or materials as outlined herein or as shown on the Plans, the pump supplier shall provide not less than one (1) day of on-site startup assistance to ensure that all equipment is working properly. After thorough checkout, all equipment shall be run and readied for full-time service and/or beneficial use by the Owner. Only factory-authorized personnel shall be allowed to provide startup and commissioning services.
- B. Complete installation and startup checks according to manufacturer's written instructions and adjust pump, accessory, and control settings, and safety and alarm devices.
- C. Electrical power to the control panel shall be confirmed and noted. Low or high voltage conditions shall be corrected before proceeding with pump operation. Voltage shall be balanced to within 10% of 460VAC.
- D. Suction piping shall be checked and vacuum tested using the pump. Leaks shall be corrected by the contractor as needed. Discharge piping shall be checked for leaks under conditions of service, with any leaks corrected.
- E. Electrical power and wiring are specified in Division 16 Sections.

### 3.01 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain pumping stations.

END OF SECTION





**SECTION 46 01 00  
FLOATING BAFFLE CURTAIN**

**PART 1 – GENERAL**

**1.01 SCOPE**

- A. SUPPLIER shall furnish all baffle curtain materials anchor forms, all hardware, and incidentals required for installing, completing, and readying for operation, the floating baffle curtains indicated on the attachments and as specified herein, except for concrete anchors and anchor posts. OWNER and SUPPLIER shall coordinate the construction and installation of the baffle curtains.

**1.02 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications:
  - 1. The manufacturer of the floating baffle curtain shall have at least ten years of experience in the construction of floating baffle curtains utilizing dielectric and / or hot wedge sealing fabrication methods. No sewn seams shall be permitted.
  - 2. The manufacturer of the floating baffle curtains shall have manufactured a of no less than five-thousand linear feet of baffle curtains for tanks, ponds, and open water applications.

**1.03 SUBMITTALS**

- A. Submittals must first be approved by the ENGINEER and shall include the following:
  - 1. Shop Drawings with construction details of each of the floating baffle curtains.
  - 2. Floating baffle curtain manufacturer including contact name, address, and telephone number.
  - 3. Product data and physical properties of the floating baffle curtain material along with fabric manufacturer name, contact, address, and telephone number.
  - 4. Product data with specifications covering all components used in the fabrication of the floating baffle curtain.
  - 5. Installation instructions.
  - 6. Operation and maintenance instructions.

**1.04 DELIVERY, STORAGE AND HANDLING**

- A. Packing, shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work. Packaging of the floating baffle curtain shall be the responsibility of the floating baffle curtain manufacturer and so that the floating baffle curtains shall not be damaged during shipment.

#### 1.05 STORAGE AND PROTECTION:

- A. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

#### 1.06 WARRANTY

- A. The baffle manufacturer shall warrant the floating baffle curtain against defects in workmanship and materials for a period of two years from the date of delivery.

### PART 2 – PRODUCTS

#### 2.01 EQUIPMENT PERFORMANCE

- A. The baffle curtains shall consist of a fabric wall that is anchored at the bottom by a galvanized chain in a sealed pocket and is floated at the top by buoyant logs that are also in a sealed pocket. The floating baffle curtains shall be constructed in multiple sections resulting in the specified dimension of each curtain. Weight and ease of handling at the job site shall be taken into account when determining the lengths of the prefabricated floating baffle sections. The floating baffle curtains shall be delivered to the jobsite ready to install and the only fabrication required at the jobsite shall be the connection of the floating baffle sections. The floating baffle curtains shall be floated into position for installation.
- B. A total of 1 floating baffle curtain is required:
  1. One 10 ft deep by approximately 183 ft long (CONTRACTOR to verify pond dimensions) floating baffle curtain with (2) tapered ends to fit a 3 to 1 slope. Ballast chain and / or cable connections to the shore anchor posts shall be constructed to a sufficient length to allow for installation.

#### 2.02 DETAILS OF CONSTRUCTION

- A. Flotation:
  1. The flotation shall consist of 6-inch diameter (minimum) flotation logs made of closed cell polyfoam logs, having a buoyancy of at least 60 pounds per cubic foot.
  2. The flotation shall be completely enclosed inside the floating baffle curtain by means of a thermal seal. Each flotation log shall be sealed in its own chamber

along the top of the floating baffle curtain.

B. Anchoring:

1. Bottom Ballast:

- a. The floating baffle curtain shall be anchored in position by a galvanized chain thermally sealed into a pocket along the bottom of the curtain.
- b. The chain shall be continuous from berm through each floating baffle curtain section, connected to each other with a 3/4" stainless steel rapid link. The ballast shall be 1/4" (minimum) galvanized proof coil chain.

2. Concrete Anchors:

- a. Concrete anchors shall be placed along the upstream side of the ballast chain at 18' intervals beginning at the toe of the levee (if required). The concrete anchors shall be attached to the ballast chain using a stainless-steel rapid link or marine grade rope. The connection shall be secured to the ballast chain through cutouts in the ballast chain pocket forming an opening exposing the ballast chain for attachment of the concrete anchors. The concrete anchors shall be made using a five-gallon bucket, filled with concrete with a 3/8" x 9-inch-long or greater galvanized eyebolt, flat washer and two nuts, inserted into the concrete at least 6" to 7" to form an attachment. The eyebolt shall be of a size to accept a 3/8" stainless steel rapid link through the eye of the eyebolt.

3. Retrieval Rope:

- a. The concrete anchors shall be made retrievable by securing one end of a 3/8" diameter marine grade rope through the ballast chain and the other end of the rope secured to a stainless-steel grommet paced in the flotation collar located at the top of the floating baffle curtain.

4. Shore Anchor Post:

- a. The shore anchors shall consist of a 4" diameter by 8' long 304 stainless steel schedule 20 pipe buried a minimum of six feet in concrete. Concrete should encase the post at a minimum diameter of 2'. The shore anchor post shall also be filled with concrete. The shore anchor posts shall be located on the levee side slope approximately 1' off the top of the levee.

C. Cable

1. Tension Cable:

- a. The cable shall be 1/4" diameter, stainless steel sealed in a pocket on the lower side of the flotation collar and shall be continuous from berm through each floating baffle curtain section, connected to each other with 3/8"

stainless steel rapid links. The cable shall have a breaking strength of at least 12,000 lb.

D. Connections:

1. End Connection:

- a. The end connections shall consist of 1/4" x 4" x 12" stainless steel predrilled plates that shall be attached to the floating baffle curtain with 3/8" diameter by 1-1/2" long stainless-steel bolts to "sandwich" the end of the floating baffle curtain between the end plates. The tension cable or connection chain shall connect the anchor posts to the stainless-steel predrilled plates at both top and bottom of the curtain. No grommets shall be used for the connections to the shore anchor posts.

2. Baffle Connection:

- a. The floating baffle curtain sections shall be joined with the use of 3/16" x 1-1/2" x 10" long stainless-steel predrilled plates and 3/8" diameter by 1-1/2" long stainless-steel bolts. The plates shall be applied to the outside of each floating baffle curtain section, then bolted together to "sandwich" the joining sections together.

3. Miscellaneous Hardware:

- a. All hardware provided for the floating baffle curtains shall be type 304 stainless steel. The galvanized ballast chain shall be the only exception.

E. Baffle Curtain Material

1. The baffle material shall be a reinforced synthetic material. The material supplied under these specifications shall be a first quality product specifically designed and manufactured for this application and demonstrated to be suitable and durable for the construction of floating baffle curtains.

2. Physical Specifications:

- |    |                                 |                                 |
|----|---------------------------------|---------------------------------|
| a. | Color:                          | Black                           |
| b. | Base Type:                      | Polyester                       |
| c. | Fabric weight:                  | 7 oz/yd <sup>2</sup>            |
| d. | Finished Coated Weight:         | 30.0 +/- 2.0 oz/yd <sup>2</sup> |
| e. | Grab Tensile:                   | 550/525 lbs/in                  |
| f. | Minimum Adhesion:               | 10 lbs/in                       |
| g. | Minimum Hydrostatic Resistance: | 500 psi                         |

3. The material shall be 6730 XR-5 as manufactured by the Seaman Corporation of Wooster, Ohio.

## 2.03 MANUFACTURERS

### A. Provide equipment from:

1. Engineered Textile Products, Inc.
2. JPS Industries, Inc.
3. Industrial & Environmental Concepts, Inc.
4. Engineer Approved Equal

## PART 3 – EXECUTION

### 3.01 INSTALLATION:

- A. OWNER to verify dimensions of the lagoon and to determine exact location of the shore anchor posts prior to ordering floating baffle curtains.
- B. The floating baffle curtains shall be installed into position as shown on the project plans. The floating baffle curtains shall be installed in accordance with the manufacturer's shop drawings, instructions and recommendations.

### 3.02 MANUFACTURER'S SERVICES

- A. Provide the ENGINEER Certification that the floating baffle curtains were installed in accordance with the Contract Documents.

END OF SECTION



**SECTION 46 02 00**  
**LAGOON AERATION SYSTEM**

**PART 1 - GENERAL**

**3.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and technical specification sections, apply to this section.

**3.02 SUMMARY**

- A. The contractor shall furnish all labor, materials, tools, equipment to perform all work and services necessary for and incidental to the furnishing and installation of a complete Lagoon Aeration System, complete and ready for operation in accordance with the provisions of the contract documents.
- B. This Section includes the following:
  - 1. Individual Static Tube Coarse Bubble + Fine Bubble Air Diffusers
  - 2. Feeder Tubing

**3.03 DEFINITIONS AND REFERENCES**

**A. Definitions:**

- 1. AOR: Actual oxygen requirements.
- 2. SOR: Standard oxygen requirements.
- 3. SCFM: Standard cubic feet per minute are understood to be air at 68°F, 14.7 PSIA and 36% relative humidity flowing at a rate of 1 cubic feet per minute.
- 4. SWD: Side water depth is understood to be the overall dimension from the high point of the lagoon bottom or basin floor to the water surface.

**B. References:** Following is a list of standards, which might be referenced in this Section:

- 1. American Society of Civil Engineers (ASCE): Standard No. 002 “Measurement of Oxygen Transfer Efficiency in Clean Water”
- 2. ASTM International (ASTM):
  - a. D1784 – Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds

- b. D1785 – Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
- c. D2466 – Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
- d. D3350 – Specification for Polyethylene Plastic Pipe and Fittings Materials
- e. F714 - Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter

#### 3.04 SYSTEM DESCRIPTION

- A. Static tube air diffuser system consists of a submerged aeration unit that combines mixing and aeration in one unit. Each unit shall consist of a coarse bubble static tube aerator surrounded by a series of fine bubble diffusers. Each unit shall be weighted with ballast and rest freely on the lagoon floor with all diffusers elevated above the floor.
- B. The static tube shall be designed to generate a flow through the base of the tube. This current shall draw sludge particles and other light organic solid particles from the bottom of the lagoon through the tube. Turbulence within the tube shall be created to maximize contact time and number of individual collisions between the air bubbles, wastewater, and particulates. As the water column emerges from the top of the static tube and continues to rise, continued interaction between the air bubbles, wastewater, and suspended particulate will continue to influence the breakdown of organic solids. After these solids have risen with and spread radially from the water column, they will circulate back to the bottom where they will meet the slower rising air bubbles from the fine bubble diffusers, inducing additional organic and biological breakdown.
- C. Each aeration unit shall be connected to the air supply system by a flexible weighted PVC tube of sufficient length to allow removal of the aeration unit from above for cleaning, maintenance, repair, or replacement.
- D. The number and size of the aeration assemblies will be determined by their oxygen transfer efficiency, mixing capacity, and the area of influence.

#### 3.05 PERFORMANCE REQUIREMENTS

- A. Design Parameters and Performance: Aeration system shall be installed in the lagoon or basin of the size and comply with the design performance as required by the OWNER.
- B. The aeration system should be designed to provide 1002.2 lb./day of oxygen.
- C. Structural Performance:



1. All equipment, air distribution system, supports, anchors and fasteners shall be of adequate size and strength to withstand loads associated with starting, turbulence, debris, thrusts from fluid movement, thermal expansion and contraction and other loads encountered under operating conditions.
2. System shall be designed for contraction/expansion over a temperature range of 120 degrees F without deforming any component.

### 3.06 SUBMITTALS

- A. Product Data: Provide construction details, material descriptions, dimensions of individual components and profiles, rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: Provide plans, elevations, sections, details, and attachments to other work.
  1. Provide dimensional layouts, materials, details of appurtenances, anchoring, installation, and operation instructions. Fabrication and installation shall be in accordance with such approved drawings.
  2. Specification cut sheets for all proposed equipment, including diffuser units and flexible self-weighted aeration tubing.
  3. Certified diffuser performance test data shall be submitted. It shall include air flow versus head loss data, and Standard Oxygen Transfer Tests conducted in clean water in accordance with the standards set forth by the ASCE Subcommittee on Oxygen Transfer Standards. Any tests must be completed in a minimum of 10' diameter tank; no single column tests will be accepted.
  4. SOTE calculations to verify the clean water oxygen transfer efficiency of the diffuser at both design and maximum airflow.
  5. Head loss Calculations for the complete aeration system from the top of the drop leg. Calculations shall include the total head loss across the membrane, balancing orifice, piping system and static head at both design and maximum airflow.
  6. Computational Fluid Dynamic modeling study proving the aeration system will provide the required mixing rate stated in the Performance Requirements Section.
- C. Information Submittals:
  1. Special shipping, storage and protection, and handling instructions.
  2. Manufacturer's instructions for installation.
  3. Qualification Data: For manufacturer and manufacturer's representative.
  4. Equipment Warranty

5. Operation and Maintenance Instructions
6. Location of nearest stocking distributor of spare parts.
7. Suggested spare parts list to maintain the equipment in service for a period of two years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current pricing information.
8. Installation list demonstrating conformance to supplier qualifications as per 1.7 B.

### 3.07 QUALITY ASSURANCE

A. Aeration equipment shall be provided by the following approved supplier: Triplepoint Environmental LLC or Engineer Approved Equal.

B. Supplier Qualifications:

1. All equipment should be the product of a supplier having at least five (5) North American installations with a lagoon aeration unit that combines static tube aeration with fine bubble diffusers in one portable unit (as per 1.04) each with a minimum of five (5) years satisfactory service.

C. Unnamed manufacturers: Alternate manufacturer offerings must be pre-qualified prior to the bid date and listed as an “approved equal” in an addendum in order to be considered. Any bids from manufacturers other than those listed in the pre-qualification addendum or named herein will be automatically disqualified and rejected.

1. Manufacturers that are unnamed and wish to be pre-qualified must be an established supplier of the system described in section 1.04, provide proof of meeting the manufacturers qualifications set out in 1.07 (B) along with full technical submittals as per section 1.06 including aeration calculations, aeration system layout, independent oxygen transfer testing, aerator specifications and all other submittals required to the project engineer twenty-one days (21) days prior to the published bid date. If approved, the manufacturer will be named as an approved alternate by the engineer in an addendum no later than fourteen (14) days prior to the bid date. Bids by manufacturers that are not pre-qualified will be rejected.

2. The ENGINEER reserves the right to select the manufacturer they decide is the best for the application, regardless of the cost of the equipment.

D. Base Bid: should the CONTRACTOR seek to bid an unnamed manufacturer who is pre-qualified as per section 1.07 C, that is not a manufacturer named in this specification, he shall furnish a base bid for the named manufacturer and include an amount of monies as an addition or a deduct to be available to the Owner for the alternate equipment. Should any additional engineering (system modifications, etc.)

be required as a result of the use of a pre-qualified alternate the cost shall be borne by the CONTRACTOR.

1. The ENGINEER reserves the right to select the manufacturer they decide is the best for the application, regardless of the cost of the equipment.
- E. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation supervision of units required for this Project.
- F. Source Limitations: Equipment units of each type specified in this section shall be supplied by a single manufacturer. This does not require that all equipment be manufactured by a single manufacturer but does require that the manufacturer of the system shall be responsible for the complete system.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS SCOPE OF SUPPLY

- A. The manufacturer shall supply all process equipment and design necessary to achieve the performance standards stated in section 1.5, this includes:
1. Aeration units
  2. Air distribution piping arrangement and sizing from air supply header
- B. In the case of systems designed for onshore manifold distribution, provided materials will include all material beginning at the edge of the basin (water level) include air distribution manifolds, control valves, hose barbs, hose clamps, flexible weighted tubing, and complete weighted aeration unit assemblies.
- C. In the case of systems design with floating lateral piping, provided materials will include material beginning at the edge of the basin (water level) including air supply laterals, saddle connections, control valves, hose barb connection, hose clamps, flexible weighted tubing, and complete weighted aeration unit assemblies.
1. All connections essential to proper installation, operation, and maintenance of aeration equipment.
  2. Shop drawings and process engineering design.
- D. Other non-process related equipment will NOT be provided by the manufacturer, items include but are not limited to:
1. Air Supply Blowers
  2. System Control Panel
  3. Floating Baffle Curtains
  4. Pond Liners

5. Air supply piping
6. Adequately sized header pipes
7. Manifold riser pipes with appropriate threaded connection (for onshore manifold systems), details per the Contract Drawings.

## 2.02 AERATION SYSTEM

### A. Design Responsibility:

1. Equipment manufacturer shall be responsible for determining the size and number of aeration units, air distribution piping arrangement and sizing from the air supply header, and other equipment required to provide the air flow rates required for the biological treatment and to assure proper mixing within the lagoon or basin.
2. Air Distribution System: Aeration System manufacturer shall provide an air distribution layout and the number of aeration assemblies required to:
  - a. Demonstrate uniform air delivery to all diffusers at design airflow in compliance with the air supply pressure requirement.
  - b. Demonstrate the oxygen transfer efficiency at standard conditions for the aeration assembly.
  - c. Demonstrate aeration assembly mixing capacity and the area of influence.
  - d. Demonstrate compliance with the air supply pressure requirement and provide baseline data for the increase in aeration assembly back pressure requirement.

## PART 3 - AERATION UNITS:

### 3.01 SUMMARY

- A. All Aeration Units shall be a combination of coarse bubble static tube diffusion and fine bubble diffusion on one portable platform.
- B. All Aeration Units shall be self-weighted, containing their own ballast.
- C. All Aeration Units shall rest unfastened, directly on the basin floor.
- D. All Aeration Units shall be retrievable from the surface of the lagoon.

### 3.02 STATIC TUBE:

- A. The vertical static tube aerator shall be factory fabricated of polyethylene and/or PVC materials.
- B. The static tube shall be mounted to rigid legs in such a way as to elevate the bottom of the tube 3" to 12" above lagoon floor, depending on lagoon depth.
- C. A coarse bubble diffuser system shall be mounted within the static tube at an elevation of 6" to 12" above the lagoon floor.
- D. The static tube shall extend 12" to 30" above the coarse bubble diffuser, depending on lagoon depth.

### 3.03 BASE

- A. Base shall be securely fastened to the static tube and provide a ground contact footprint of at least 300 square inches.
- B. Ballast material shall have a minimum specific gravity of 2.0.
- C. Means shall be provided of easily adding additional ballast to unit without removing unit from the water.
- D. Overall submerged unit weight shall have a minimum specific gravity of 1.8 under maximum airflow conditions.
- E. Manufacturer shall be responsible for ensuring compliance with minimum design densities.

### 3.04 FINE BUBBLE DIFFUSER

- A. A series of fine bubble diffusers shall be mounted on the outside of the static tube. Diffuser size and quantity shall be based on the performance requirements of the aeration system.
- B. Fine bubble diffusers shall be of Silicone or EPDM membrane type in tube style. No other fine bubble diffuser will be accepted.
- C. Fine bubble diffusers shall be securely attached to unit at an elevation of 6" to 12" above the lagoon floor.
- D. PVC or equivalent piping shall be used to supply air to each diffuser.

### 3.05 GENERAL AERATOR REQUIREMENTS:

- A. With the exception of integrated check-valves, no mechanical, moving parts shall be used.
- B. Each diffuser (including coarse bubble) shall have an integrated check-valve capable of preventing backflow of water into air distribution system.

- C. All hardware shall contain locking features to minimize likelihood of inadvertent disassembly during shipping, handling, installation, and operation.
- D. All screwed plumbing fittings that do not utilize a gasket shall use appropriate Teflon type joint sealant or equivalent to minimize leakage and loosening of parts over time.
- E. Airflow to fine bubble and coarse bubble diffusers shall be balanced by an integrated orifice plate system. Total ratio of fine bubble to coarse bubble airflow shall be maintained between 4 to 1 and 20 to 1, depending on the treatment system requirements.
- F. A single 1" to 1-1/2" hose barb shall be integrated to aerator and used as an air inlet point. Flexible weighted tubing shall be attached to said hose barb by a stainless-steel hose clamp. This hose barb shall be integral with unit to reduce likelihood of breakage or failure should someone try to drag or lift unit by hose.

### 3.06 MATERIALS

- A. All submerged hardware shall be of Type 304, 316 or better stainless steel.
- B. All non-submerged hardware shall be of Type 304, 316 or better stainless steel.
- C. All removable fittings shall be of Type 304, 316 or better stainless steel.
- D. All ballast shall be of non-corrosive and non-toxic material or shall be permanently sealed within or coated with such material.
- E. All other parts shall be of stainless steel, PVC, HDPE, GPP, EPDM or equivalent, non-corrosive, non-toxic, and non-degradable materials suitable for complete immersion in a typical wastewater environment.

### 3.07 REMOVAL

- A. Means for easily removing and replacing aeration unit from above shall be provided including:
- B. A floating marker buoy shall be permanently attached to each unit by a tether of proper length to float directly above the aeration unit.
- C. Tether shall be a 3/8" MFP float line, capable of lifting at least ten times the weight (out of water) of the installed aeration unit.

### 3.08 FEEDER TUBING

- A. Feeder tubing (flexible weighted tubing) used as the connection between the aeration unit and the header or lateral piping shall be low density, polyethylene or PVC tubing with self-contained ballast, color black, with 1 percent carbon black for ultra-violet stabilization. No tubing with external and/or intermittent ballast added will be accepted; the ballast must be integral to the tubing itself.

- B. Tubing length shall be of sufficient size to allow removal of the aeration unit from above for cleaning, maintenance, repair, or replacement.
- C. Tubing inside diameter shall be 1.5" to minimize friction loss; smaller inside diameter tubing will not be accepted except for extremely low flow applications ( $\leq 10$  scfm per unit).
- D. Tubing shall be connected at both ends with Type 304 or 316 stainless steel hose clamps to stainless steel hose barbs.
- E. In the case of systems designed with fixed, laterals that do not have the means for individually controlling airflow to each unit (such as a control valve mounted on the shore), a single, custom orifice plate shall be supplied by the manufacturer for each aerator position. This orifice plate shall be installed when the aeration unit is set in place at each lateral take-off point. The orifice plate shall be installed upstream of the flexible weighted tubing.

### 3.09 SOURCE QUALITY CONTROL

- A. Adequate testing and inspection of the factory assembled equipment shall be the responsibility of the manufacturer prior to shipment. Upon satisfactory completion of testing, the units will be disassembled into subcomponent assemblies for shipment and installation. At the manufacturer's option, the units may also be shipped to the site as complete units, providing said units can be installed as a complete assembly.

#### 1. Testing and Inspection Types:

- a. General Appearance – All units for all order sizes shall be 100% visually inspected after general assembly for missing or damaged parts and finish.
- b. Connections – Plumbing and hardware connections shall be tested for tightness.
- c. Levelness – Fine bubble diffusers and/or arms shall be tested to ensure all aerators are horizontal, level, and on the same plane.
- d. Base – Base and/or assembled unit shall be weighed for sufficient ballast.

#### 2. Defects:

- a. Major defects shall be considered any defect which would materially affect the intended life, use, or performance of the installed unit. These include, but are not limited to: missing parts, unglued PVC joints, severely damaged pipe fitting threads, fine bubble diffusers out of level by more than 3/16" between any 2 consecutive diffusers or 3/4" over any 2 diffusers, insufficiently weighted ballast, significant pressure loss (greater than 1 psi over 60 seconds).
- b. Minor defects shall be considered all other defects that would not materially affect the intended life, use, or performance of the installed

unit. These include but are not limited to: scratches in the finish, bare patches in the paint, minor variation in fine bubble diffuser levelness, minor pressure loss (less than 1 psi over 60 seconds), etc.

## PART 4 - EXECUTION

### 4.01 EXAMINATION

- A. Examine lagoon or basin areas and conditions, with Installer present, for compliance with requirements for the installation of the aeration system and other conditions affecting performance of the Work. Examine aeration system components before installation. Reject components that are damaged. Proceed with installation only after unsatisfactory conditions have been corrected.

### 4.02 INSTALLATION

- A. CONTRACTOR shall install and adjust equipment in accordance with the Drawings, approved shop drawings, and the manufacturer's instructions. Do not operate the equipment until the installation is approved by the manufacturer's representative.
- B. Prior to connecting the aeration units to the feeder tubes, CONTRACTOR shall clean all piping, headers, and accessories through which air is delivered, so that all dust, dirt, oil, grease, or other foreign material will be effectively removed from contact with the air being blown through the diffusers. This cleaning shall be done with clean water at a velocity of 2 to 3 feet per second.
- C. CONTRACTOR shall check installation prior to start-up for conformance to manufacturer's instructions. Adjust or modify equipment to ensure proper operation.

### 4.03 FIELD QUALITY CONTROL

- A. Tests and Inspections:
  - 1. General: After the installation of aeration equipment in one basin is complete and the installation is certified by the equipment manufacturer, field acceptance tests shall be conducted. The test procedures shall be generally as specified herein; specific written test procedures shall be submitted by the CONTRACTOR for review and approval by the ENGINEER. The field acceptance tests shall be conducted by the CONTRACTOR under the direct supervision of the equipment manufacturer.
  - 2. After the air distribution system is flushed, it shall be pressure tested by the CONTRACTOR to 20psi for one minute to ensure no leakage is present.
  - 3. Level Test: The basins shall be flooded with clear water to the tops of the diffusers. The level of the diffusers shall then be checked to ensure that they are at the same elevation, within +/- 3 inches.



4. Air Leakage: the aeration system shall be turned on and the header pipe shall be observed for leakage. All leaking joints shall be repaired or replaced.

#### 4.04 TEST RESULTS

- A. If the equipment fails a field acceptance test, repairs, revisions, or replacement of equipment shall be made as deemed necessary by the ENGINEER.

1. Prepare test and inspection reports.

#### 4.05 MANUFACTURER'S SERVICES

- A. Manufacturer's Representative: Present at Project site or classroom designated by OWNER, for minimum person-days listed below, in one trip, travel time excluded:

No. Person Days	Effluent
1/4	Installation assistance and inspection.
1/4	Functional and performance testing.
1/4	Facility startup.
1/4	Post-startup training of OWNER'S personnel.

- B. Services Provided:

1. Approve installation before operation.
2. Furnish start up services.
3. Furnish test forms, and procedures for field testing.
4. Inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
  - a. Furnish training of OWNER'S personnel at such times requested by OWNER.
  - b. Revisit job site within 14 calendar days of startup, if necessary, to correct any additional manufacturing defects to satisfaction of ENGINEER.

#### 4.06 FACILITY STARTUP

- A. After initial startup under the supervision of a qualified representative of the manufacturer, a preliminary "running-in" period will be provided for the MANUFACTURER, per the Contract Documents, to make field tests and necessary adjustments.

- B. The CONTRACTOR shall place each piece of equipment in the system in operation until the entire system is functioning. All components shall continue to operate without alarms or shutdowns, except as intended, for five (5) consecutive days to be considered started up.
- C. Operator shall operate the equipment through the design performance range consistent with available flows. Adjust, balance, calibrate and verify that the equipment, safety devices, controls, and process system operate within the design conditions. Each safety device shall be tested for proper setting and signal. Response shall be checked for each equipment item and alarm. Simulation signals may be used to check equipment and alarm responses.
- D. Prepare manufacturer's installation report and submit within 30 days after completion of field testing. Including the following information:
  - 1. Field testing results.
  - 2. Descriptions of installation deficiencies not resolved to the manufacturer's satisfaction.
  - 3. Description of problems or potential problems.
  - 4. Names of the OWNER'S personnel who attended operations and maintenance training sessions.
  - 5. Record copy of materials used for training session including outlined summary of course.
  - 6. Manufacturer's Certificate of Installation and Certificate of Performance.
- E. At the end of the specified period of operation, the aeration system will be accepted if, in the opinion of the ENGINEER, the system has operated satisfactorily.

#### 4.07 FIELD TESTING

- A. The Field Testing specified in this Section shall be conducted in addition to any testing procedures as required by the equipment Manufacturer and as specified in separate Sections herein.
- B. General: Contractor shall perform and furnish to Engineer and Owner a Certificate of Proper Installation (CPI), a Functional Acceptance Test (FAT), Performance Acceptance Test (PAT), and Reliability Acceptance Test (RAT), in the presence of the equipment manufacturer's qualified field service representative as specified.
  - 1. The following tests will be required:
    - a. Certificate of Proper Installation (CPI): Prior to system start-up, all equipment covered under this Specification shall be confirmed to have been installed in accordance with Manufacturer's instructions and ready for run testing. CPI shall be performed by Manufacturer's start-up

representative/technician.

- b. Functional Acceptance Test (FAT): Prior to system startup, all equipment covered under this Specification will be inspected for proper alignment, proper connection, and proper function by means of a startup check. The FAT shall be performed in the presence of and with assistance from the equipment Manufacturer's start-up representative/technician.
- c. Performance Acceptance Test (PAT): After completing the Functional Acceptance Test, the equipment Manufacturer's start-up representative/technician shall conduct a Performance Acceptance Test, in the presence of the Contractor, in order to verify that the equipment item or system performs according to the requirements identified in Part 2 – MATERIALS of this Specification.
- d. Reliability Acceptance Test (RAT): Completion of the Reliability Acceptance Testing shall be required prior to placing the specified equipment into service and prior to the Owner assuming responsibility for said equipment. The RAT shall verify that the equipment item or system performs its intended function at the specified performance level for a period of four (4) consecutive 24- hour days without failure. "Failure" as used in this Paragraph shall be defined per the discretion of the Owner based upon the absence of equipment malfunctions and alarms/faults during the RAT testing period.

#### 4.08 WARRANTY

- A. Aerator Warranty: All equipment and workmanship shall be guaranteed to be free of defects in material and workmanship within the specified warranty period.
  - 1. Warranty Period: a minimum of five (5) years from date of Substantial Completion.
  - 2. Any such defects found within the warranty period shall result in a repaired, replaced, or refunded unit by the manufacturer. All soft costs associated with warranty replacement, including onsite diagnosis, shipping costs, repair/replacement labor, are not included in manufacturer warranty.

#### 4.09 OPERATION AND MAINTENANCE MANUAL

- A. CONTRACTOR shall provide OWNER with three (3) copies of an Operation and Maintenance Manual for proper operation and maintenance of the wastewater treatment plant, IN ACCORDANCE WITH Division 1. The manual shall include description of treatment process and equipment operation; shop drawings, field reports, operation and maintenance procedures, process control guidelines, equipment specifications, schedules, and spare parts information. A recommended list of spare parts shall be provided.

END OF SECTION



**SECTION 46 03 00**  
**LAGOON GEOMEMBRANE LINER**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. 60-mil High-Density Polyethylene (HDPE) basin liner as specified by the ENGINEER and indicated on the engineer's drawings.
- B. A non-woven geotextile
- C. Sub-liner venting and drainage.
- D. Installer must be pre-approved by the ENGINEER prior to bid
- E. Safety Egress System

**1.02 SUBMITTALS**

- A. Submit in accordance with Section 01 33 00.
- B. The submittals must be approved by the ENGINEER prior to installation.
- C. The Installer shall furnish a proposed geomembrane liner panel layout which is to be approved in writing by the ENGINEER prior to the installation. The drawings shall show the extent and the direction of field seams consistent with the requirements of the project drawings.
- D. Installers must be pre-approved by ENGINEER prior to bid to ensure conformance with bid requirements.
- E. Installers shall provide supporting documentation to the ENGINEER they have completed a minimum of five hundred (500) geomembrane projects, with a minimum of one hundred (100) of the projects being geomembrane liner installations and having installed a cumulative total of one million (1,000,000) square feet or more of geomembrane.
- F. The installer or their representative shall have visited the site prior to bid for inspection of site conditions.
- G. Submittals shall include Warranty Information.
- H. Manufacturer quality control certifications shall be provided to the ENGINEER at least two (2) weeks prior to installation.

**1.03 WARRANTY**

- A. The HDPE Geomembrane Manufacturer shall confirm in writing, the material to be furnished will meet the intent of the specifications and shall guarantee the material to be free of defects in materials and workmanship at the time of sale, and against deterioration due to the effects of ozone, ultraviolet (UV) or other normal weathering on a pro-rata basis for 10 years from the date of completed installation.
- B. The HDPE Geomembrane Manufacturer shall furnish a sample warranty for review and approval prior to shipment.
- C. The Installer shall warrant the HDPE liner installation workmanship for a period of 1 year.

## PART 2 - PRODUCTS & QUALIFICATIONS

### 2.01 HIGH-DENSITY POLYETHYLENE GEOMEMBRANE LINER

- A. Geomembrane shall be manufactured of first quality ingredients, suitable for wastewater and compounded of HDPE as the principal resin. The finished compound shall be uniform in color, thickness, size and surface texture.
- B. Installer shall provide geomembrane of the thickness and type specified, and as indicated in the engineer's plans.
- C. Installer shall install boots and attach geomembrane to structures as indicated on engineer's drawings.
- D. Pre-Approved and accepted installers of the specified HDPE geomembrane liner include:
  - 1. IEC (Industrial & Environmental Concepts, Inc.)
  - 2. Chesapeake Containment Systems, Inc.
  - 3. Engineer Approved Equal
- E. Pre-Approved and accepted manufacturers of the specified HDPE geomembrane liner material are:
  - 1. Solmax – Variennes, Quebec, Canada
  - 2. Solmax -- Houston, Texas, United States
  - 3. Agru – Gergetown, SC
  - 4. Skaps – Commerce, GA
  - 5. Atarfil - Suffolk, Virginia

- F. The finished liner membrane shall be of the specified thickness and meet or exceed the physical property values as shown in the following table.

PROPERTY	TEST METHOD	FREQUENCY <sup>(1)</sup>	UNIT Imperial	Solmax 660-1000
<b>SPECIFICATIONS</b>				
Nominal Thickness	ASTM D-5199	-	mils	60
Thickness (min. avg.)	ASTM D-5199	Every roll	mils	60.0
Thickness (min.)	ASTM D-5199	Every roll	mils	54.0
HPOIT - High Pressure (avg)	ASTM D-5885	1/Batch	min	2,000
Tensile Properties (min. avg) (2)	ASTM D-638	Every 2 rolls		
Strength at Break			ppi	255
Elongation at Break			%	1,000
Tear Resistance (min. avg.)	ASTM D-1004	Every 5 rolls	lbf	35
Puncture Resistance (min. avg.)	ASTM D-4833	Every 6 rolls	lbf	90
Multi-Axial Tensile (min.)	ASTM D-5617	Per formulation	%	50
UV Resistance	ASTM D-4329	Certification		
Strength retained after 30,000 hr			%	90
Solvent Vapour Permeability	ASTM D-814	Per formulation	g(m <sup>2</sup> .hr)	
Water Vapor Transmission Rate	ASTM F-1249	Per formulation	cm/s	3 E-13
ASTM Fuel C (50:50 toluene:isooctane)				≤ 10
ASTM IRM 902 (Naphthenic distillates)				≤ 10
Coef. of linear thermal expansion	ASTM D-696	Per formulation	m/m/°C	2.2 E-4
Ozone Resistance	ASTM D-1149	Per formulation	No Cracking	Passed
Methane Permability (@1 atm)	ASTM D-1434	Per formulation	m <sup>3</sup> /(m <sup>2</sup> .day)	20 E-4
Low Temperature Impact (pass)	ASTM D-1790	Per formulation	°F	-94
<b>SUPPLY SPECIFICATIONS</b> (Roll dimensions may vary ±1%)				
Roll Dimension - Width	-		ft	26.2
Roll Dimension - Length	-		ft	459
Area (Surface/Roll)	-		sf	12,026

## NOTES

- Testing frequency based on standard roll dimensions and one batch is approximately 180,000 lbs (or one railcar).
- Meets or exceeds the GRI-GM13 - Strength is tested with machine speed of 20 "/min - Elongation is measured with a gage length of 1.5".
  - All values are nominal test results, except when specified as minimum or maximum.
  - The information contained herein is provided for reference purposes only and is not intended as a warranty of guarantee. Final determination of suitability for use contemplated is the sole responsibility of the user. SOLMAX assumes no liability in connection with the use of this information.

PROPERTY	TEST METHOD	FREQUENCY <sup>(1)</sup>	UNIT Imperial	1024122
<b>SPECIFICATIONS</b>				
Thickness (min. avg.)	ASTM D-5199	Every roll	mils	80.0
Thickness (min.)	ASTM D-5199	Every roll	mils	72.0
Resin Density	ASTM D-1505	1/Batch	g/cc	> 0.932
Melt Index - 190/2.16 (max.)	ASTM D-1238	1/Batch	g/10 min	1.0
Sheet Density (8)	ASTM D-792	Every 10 rolls	g/cc	≥ 0.940
Carbon Black Content (9)	ASTM D-4218	Every 2 rolls	%	2.0 - 3.0
Carbon Black Dispersion	ASTM D-5596	Every 10 rolls	Category	Cat. 1 & Cat. 2
OIT - standard (avg.)	ASTM D-3895	Per formulation	min	100
Tensile Properties (min. avg) (2)	ASTM D-6693	Every 2 rolls		
Strength at Yield			ppi	176
Elongation at Yield			%	13
Strength at Break			ppi	324
Elongation at Break			%	700
Tear Resistance (min. avg.)	ASTM D-1004	Every 5 rolls	lbf	56
Puncture Resistance (min. avg.)	ASTM D-4833	Every 5 rolls	lbf	156
Dimensional Stability	ASTM D-1204	Certified	%	± 2
Stress Crack Resistance (SP-NCTL)	ASTM D-5397	1/Batch	hr	500
Oven Aging - % retained after 90 days	ASTM D-5721	Per formulation		
HP OIT (min. avg.)	ASTM D-5885		%	80
UV Res. - % retained after 1600 hr	GRI-GM-11	Per formulation		
HP-OIT (min. avg.)	ASTM D-5885		%	50
<b>SUPPLY SPECIFICATIONS</b> (Roll dimensions may vary ±1%)				
Roll Dimension - Width	-		ft	22.3
Roll Dimension - Length	-		ft	400
Area (Surface/Roll)	-		sf	8,920

## NOTES

1. Testing frequency based on standard roll dimensions and one batch is approximately 180,000 lbs (or one railcar).
2. Machine Direction (MD) and Cross Machine Direction (XMD or TD) average values should be on the basis of 5 specimens each direction.
3. Correlation table is available for ASTM D792 vs ASTM D1505. Both methods give the same results.
4. Correlation table is available for ASTM D1603 vs ASTM D4218. Both methods give the same results.
  - a. All values are nominal test results, except when specified as minimum or maximum.
  - b. The information contained herein is provided for reference purposes only and is not intended as a warranty of guarantee. Final determination of suitability for use contemplated is the sole responsibility of the user. SOLMAX assumes no liability in connection with the use of this information.
5. Solmax is not a design professional and has not performed any design services to determine if Solmax's goods comply with any project plans or specifications, or with the application or use of Solmax's goods to any particular system, project, purpose, installation or specification.



PROPERTY	TEST METHOD	FREQUENCY <sup>(1)</sup>	UNIT Imperial	1032116
<b>SPECIFICATIONS</b>				
Thickness (min. avg.)	ASTM D-5199	Every roll	mils	100.0
Thickness (min.)	ASTM D-5199	Every roll	mils	90.0
Resin Density	ASTM D-1505	1/Batch	g/cc	> 0.932
Melt Index - 190/2.16 (max.)	ASTM D-1238	1/Batch	g/10 min	1.0
Sheet Density (8)	ASTM D-792	Every 10 rolls	g/cc	≥ 0.940
Carbon Black Content (9)	ASTM D-4218	Every 2 rolls	%	2.0 - 3.0
Carbon Black Dispersion	ASTM D-5596	Every 10 rolls	Category	Cat. 1 & Cat. 2
OIT - standard (avg.)	ASTM D-3895	Per formulation	min	100
Tensile Properties (min. avg) (2)	ASTM D-6693	Every 2 rolls		
Strength at Yield			ppi	220
Elongation at Yield			%	13
Strength at Break			ppi	405
Elongation at Break			%	700
Tear Resistance (min. avg.)	ASTM D-1004	Every 5 rolls	lbf	70
Puncture Resistance (min. avg.)	ASTM D-4833	Every 5 rolls	lbf	180
Dimensional Stability	ASTM D-1204	Certified	%	± 2
Stress Crack Resistance (SP-NCTL)	ASTM D-5397	1/Batch	hr	500
Oven Aging - % retained after 90 days	ASTM D-5721	Per formulation		
HP OIT (min. avg.)	ASTM D-5885		%	80
UV Resistance - % retained after 1600 hr	GRI-GM-11	Per formulation		
HP-OIT (min. avg.)	ASTM D-5885		%	50
<b>SUPPLY SPECIFICATIONS (Roll dimensions may vary ±1%)</b>				
Roll Dimension - Width	-		ft	22.3
Roll Dimension - Length	-		ft	320
Area (Surface/Roll)	-		sf	7,136

## NOTES

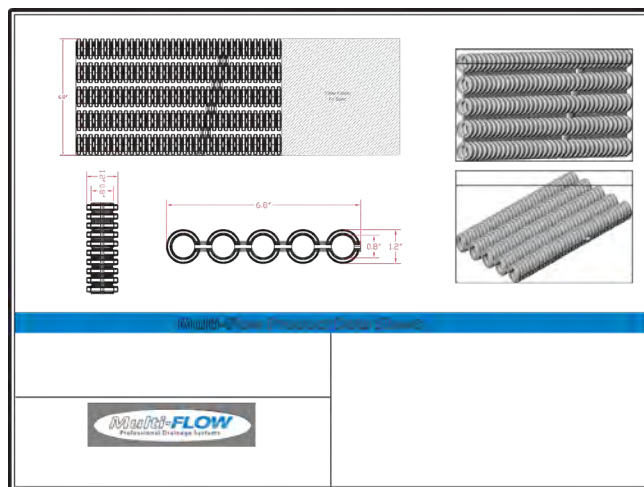
- Testing frequency based on standard roll dimensions and one batch is approximately 180,000 lbs (or one railcar).
- Machine Direction (MD) and Cross Machine Direction (XMD or TD) average values should be on the basis of 5 specimens each direction.
- Correlation table is available for ASTM D792 vs ASTM D1505. Both methods give the same results.
- Correlation table is available for ASTM D1603 vs ASTM D4218. Both methods give the same results.
  - All values are nominal test results, except when specified as minimum or maximum.
  - The information contained herein is provided for reference purposes only and is not intended as a warranty of guarantee. Final determination of suitability for use contemplated is the sole responsibility of the user. SOLMAX assumes no liability in connection with the use of this information.
- Solmax is not a design professional and has not performed any design services to determine if Solmax's goods comply with any project plans or specifications, or with the application or use of Solmax's goods to any particular system, project, purpose, installation or specification.

## 2.02 LINER TO STRUCTURE ANCHORAGE

- A. The anchorage system for the geomembrane liner shall be as described in the plans. Alternate methods of a leak-free connection must be approved by ENGINEER.
- B. The liner anchorage shall provide a leak-free liner attachment to any concrete structure and be 100% compatible with the liner material, to include HDPE embedment strips.

## 2.03 SUB-LINER VENTILATION AND DRAINAGE

- A. The sub-liner ventilation and drainage layer shall be manufactured by Varicore Technologies and shall adhere to the physical property values shown in this section.



### VENTILATION AND TUBING Property Test Method Value

Thickness, inches	ASTM D-1777	1.0
Flow Rate, gpm/ft *	ASTM D-4716	29
Compressive Strength, psf	ASTM D-1621 (sand method)	6000
Perforations / sq. ft		300
Manufactured by Varicore Technologies, Inc. - Prinsburg, MN 56281 - 800.978.8007		

### GEO-TEXTILE FILTER Property Test Method Value

Weight (oz/sq2)	ASTM D-3776	4
Tensile Strength, lb	ASTM D-4632	100
Elongation, %	ASTM D-4632	50
Puncture, lb	ASTM D-4833	50
Mullen Burst, psi	ASTM D-3786	200
Trapezoidal Tear, lb	ASTM D-4533	42
Coefficient of Perm, cm/sec	ASTM D-4491	0.1
Flow Rate, gpm/ft2	ASTM D-4491	100
Permittivity, 1/sec	ASTM D-4491	1.8
A.O.S. Max US Std Sieve	ASTM D-4751	70
UV Stability, 500 hrs., %	ASTM D-4355	70
Seam Strength, lb./ft.	ASTM D-4595	100
Fungus	ASTM G-21	No Growth

\*All values given represent minimum average roll values

## 2.04 GEOTEXTILE

- A. The geotextile shall be an 8-oz. or heavier material, non-woven needle-punched geotextile made of polypropylene.
- B. Installation of the geotextile shall be on the bottom and all side slopes of the basin, underneath the HDPE geomembrane liner.
- C. The nonwoven geotextile shall meet or exceed the physical properties as designated by Engineer. The table below shall be used for geotextile requirements.

### 1. Geotextile Product Description Nonwoven Geotextile

- D. Needle-punched nonwoven geotextile made of 100% polypropylene staple fibers, which are formed into a random network for dimensional stability.

PROPERTY	TEST METHOD	UNIT	M.A.R.V. (Minimum Average Roll Value)
Weight (Typical)	ASTM D 5261	oz/yd <sup>2</sup> (g/m <sup>2</sup> )	8.0 (271)
Grab Tensile	ASTM D 4632	lbs (kN)	205 (0.911)
Grab Elongation	ASTM D 4632	%	50
Trapezoid Tear Strength	ASTM D 4533	lbs (kN)	85 (0.378)
CBR Puncture Resistance	ASTM D 6241	lbs (kN)	535 (2.38)
Permittivity*	ASTM D 4491	sec <sup>-1</sup>	1.35
Water Flow*	ASTM D 4491	gpm/ft <sup>2</sup> (l/min/m <sup>2</sup> )	90 (3657)
AOS*	ASTM D 4751	US Sieve (mm)	80 (0.180)
UV Resistance	ASTM D 4355	%/hrs	70/500

PACKAGING	
Roll Dimensions (W x L) – ft	12.5 x 360 / 15 x 300
Square Yards Per Roll	500
Estimated Roll Weight - lbs	250

PROPERTY	TEST METHOD	UNIT	M.A.R.V. (Minimum Average Roll Value)
Weight (Typical)	ASTM D 5261	oz/sy (g/sm)	10.0 (339)
Grab Tensile	ASTM D 4632	lbs (kN)	250 (1.112)
Grab Elongation	ASTM D 4632	%	50
Trapezoid Tear Strength	ASTM D 4533	lbs (kN)	100 (.444)
CBR Puncture Resistance	ASTM D 6241	lbs (kN)	700 (3.138)
Permittivity*	ASTM D 4491	I/sec	1.2
Water Flow*	ASTM D 4491	gpm/sf (l/min/sm)	80 (3251)
AOS*	ASTM D 4751	US Sieve (mm)	100 (.150) max
UV Resistance (certified)	ASTM D 4355	%/hrs	70/500

PROPERTY	TEST METHOD	UNIT	M.A.R.V. (Minimum Average Roll Value)
Weight (Typical)	ASTM D 5261	oz/yd <sup>2</sup> (g/m <sup>2</sup> )	12.0 (407)
Grab Tensile	ASTM D 4632	lbs (kN)	300 (1.33)
Grab Elongation	ASTM D 4632	%	50
Trapezoid Tear Strength	ASTM D 4533	lbs (kN)	115 (0.511)
CBR Puncture Resistance	ASTM D 6241	lbs (kN)	850 (3.78)
Permittivity*	ASTM D 4491	sec <sup>-1</sup>	1.0
Water Flow*	ASTM D 4491	gpm/ft <sup>2</sup> (l/min/m <sup>2</sup> )	75 (3055)
AOS*	ASTM D 4751	US Sieve (mm)	100 (0.150)
UV Resistance	ASTM D 4355	%/hrs	70/500

PACKAGING	
Roll Dimensions (W x L) – ft	12.5 x 360 / 15 x 300
Square Yards Per Roll	500
Estimated Roll Weight - lbs	320

PACKAGING	
Roll Dimensions (W x L) – ft	12.5 x 360 / 15 x 300
Square Yards Per Roll	500
Estimated Roll Weight – lbs	375

A. Installer of the Geotextile shall be the same pre-approved and accepted installer as the HDPE Geomembrane liner.

a. IEC (Industrial & Environmental Concepts, Inc.)

- b. Cheseapeake Containment Systems
- c. General CONTRACTOR
- d. ENGINEER approved equal

### PART 3 - EXECUTION

#### 3.01 INSTALLATION REQUIREMENTS

- A. Factory fabrication of larger HDPE geomembrane liner panels is not permitted. The HDPE geomembrane basin liner shall be installed/fabricated with each of the liner seams (welds) completed in the field after each liner panel has been deployed from its original manufacturer factory geomembrane liner roll to its intended location in the basin.
- B. The Installer of the HDPE geomembrane liner shall have completed no less than one-thousand (1,000) geomembrane projects, with a minimum of two-hundred (200) of the projects being geomembrane liner installations, and a cumulative total of 10,000,000 square feet or more. The Installer shall provide current written documentation from the manufacturer that they are an approved Installer of the specified product. The Installer shall provide a listing, with references and phone numbers, of at least 10 comparable geomembrane projects upon request.
- C. Prior to seaming, all delivered roll goods shall be inspected by the Installer. All seams shall be made by thermal fusion methods. All seams shall have a minimum overlap as recommended or specified by the geomembrane manufacturer. Seams found to have less than the specified minimum overlap shall be corrected by adding an overlap or cap strip which does provide the minimum specified overlap or will be rejected. All seams shall be made so that the thermal fusion bond extends fully to the top edge of the sheet so that no loose edges are present on the top side of the sheet. The Installer shall have a manufacturer's approved QC/QA program for the seaming of the geomembrane liner panels.
- D. The Installer of the HDPE geomembrane liner must be pre-approved by engineer prior to bid.
  - 1. IEC (Industrial & Environmental Concepts, Inc.) -- Lakeville, MN is a pre-approved and accepted installer.

#### 3.02 INSPECTION AND TESTING OF SEAMS

- A. Inspection
  - 1. All sheets and seams shall be 100% visually inspected immediately on deployment and completion of seaming. No defective seams will be allowed.
- B. Testing

1. In addition to visual inspection, a 48-inch (1.2-metre) sample seam shall be performed using each welding unit used in the installation work at the beginning of every work shift and every four hours of production thereafter. Samples shall be non-destructive, i.e., will not require patching of fabricated panels. Test specimens shall be cut at quarter points from each 48-inch seam sample (a total of three places) and tested for seam strength and peel adhesion. The shear seam strength shall be tested in accordance with ASTM D6392 and shall have a value as stated in paragraph 2.02 B. The peel adhesion shall be tested in accordance with ASTM D6392 and shall have a value as stated in paragraph 2.02 B.
2. A log shall be maintained showing the date, time, panel number and test results.
3. Failure of the material and/or seams to meet all the requirements of these specifications may be cause for rejection of the HDPE material and/or seams as appropriate.
4. The Fabricator shall provide the test results to the Owner or Engineer.

### 3.03 CERTIFICATION AND TEST REPORTS

- A. Prior to installation of the HDPE panels, the Installer shall provide the engineer with the following certification and test reports:
  1. Written certification the material meets all requirements of bid specifications.
  2. Written certification that all seams were inspected and tested in accordance with Article 3.02.

### 3.04 GEOMEMBRANE LINER PACKAGING AND STORAGE

- A. Each delivered geomembrane liner roll shall be packaged by the manufacturer at their facility prior to shipping in accordance with North American geomembrane industry standards. Each roll shall be given prominent and unique identifying markings. The rolls shall be packaged in such a way that they are fully enclosed and protected to prevent damage during shipment and each is to be prominently marked. Until needed, packaged factory rolls shall be stored in their original unopened containers in a dry area and protected from the direct heat of the sun. Pallets should not be stacked.
- B. All roll goods shall be stored in an area that does not collect rainwater or hold standing water or will subject the membrane to punctures.

### 3.05 HDPE GEOMEMBRANE LINER INSTALLATION

- A. Subgrade Preparation – by general CONTRACTOR
  1. The surfaces on which the lining is to be placed shall be maintained in a firm, clean, dry and in a smooth condition during the lining installation. All earthen basin surfaces shall be compacted and smooth graded with anchor trenches provided as required. All subgrade surfaces shall be free of rocks, roots, gravel, grade stakes or debris that may puncture the geomembrane. The subgrade shall be compacted to a minimum of 95% of

the dry density as determined by ANSI ASTM D698. Geotextiles may be used as cushioning agent. All vegetation, if present, shall be removed and a soil sterilant applied.

2. The location of both the top and bottom of all slopes shall be completed within plus or minus 1-foot of the planned location. The completed subgrade and finished grades shall be within plus or minus 0.1-foot of the specified elevation.
3. Immediately prior to the installation of the HDPE geomembrane liner, a complete and detailed inspection of the surface condition of the embankments shall be performed by the CONTRACTOR and the HDPE geomembrane Installer to determine acceptance of the finished subgrade and elevations. Any erosion or other damage to the base material which has occurred since placement shall be corrected.

#### B. Geomembrane Installation

1. The HDPE geomembrane shall be placed over the prepared surfaces in such a manner as to ensure minimum handling and in accordance with the approved shop drawings. The lining shall be sealed to all concrete structures, piping, and other openings in accordance with details shown on the plans and shop drawings. The geomembrane lining shall be closely fitted and sealed around all inlets, outlets and other projections through the subgrade surface and liner, using prefabricated fittings where possible as shown in the construction details. Sub-liner Gas vents shall be provided around the upper perimeter of the basin as indicated on the drawings. Liner sheets, damaged from any cause, shall be removed, repaired or covered with additional sheeting.
2. Only those HDPE sheets of lining material which can be anchored and seamed together the same day shall be unpackaged and placed into position. In areas that high wind is prevalent, the lining installation should begin on the upwind side of the project and proceed downwind. The leading edge of the liner shall be secured at all times with sandbags sufficient to hold it down during high winds. The leading edges of the liner material left exposed after the day's work shall be anchored to prevent damage or displacement due to wind.
3. Materials, equipment or other items shall not be dragged across the surface of the HDPE liner or be allowed to slide down slopes on the lining. All parties walking or working on the HDPE lining materials shall wear soft-sole shoes.
4. Embedment Frames shall be used in all concrete splash guards and concrete pads that encircle influent and effluent piping. Embedment frames shall be manufactured, pre-welded and delivered to the project site by the membrane installer. A secondary membrane shall be extrusion welded over liner and embedment connection to serve as a secondary, redundant seal. Precise measurements of existing splash guards, pads, pipe protrusions, etc. shall be field collected by the CONTRACTOR and supplied to ENGINEER prior to release of liner material to production.
5. Sub-liner ventilation and drainage tubing shall be installed under the liner at distances shown on drawings. Tubing shall terminate near top of berm.

6. Liner vent openings shall be installed at the top of slope, in line with the sub-liner ventilation tubing, to allow gasses to escape to atmosphere. Openings shall be designed to prevent water from entering.
7. Pipe boots shall be extrusion-welded directly to HDPE pipes penetrating the liner whenever possible. If welding the boot to the pipe is not possible, a minimum of two stainless steel clamps shall be affixed to the boot connection to prevent leaking. If concrete is to encircle the piping, an embedment frame shall be also be used in addition to a pipe boot.

#### C. Field Seams

1. Lap joints shall be used to seal HDPE sheets together in the field. The lap joint shall be formed by overlapping the edges of the sheets four (4) to six (6) inches. The contact surfaces of the sheets shall be wiped clean of all dirt, dust, moisture and other foreign matter. A minimum one and one half inch (1.5") bond shall apply to all field seams.
2. Extreme care should be taken throughout the work to avoid fishmouths, wrinkles, folds or pleats in the seam area. Where fishmouths do occur, they should be slit out far enough from the seam to dissipate them, lapped, seamed together in the lapped area and patched over.
3. Any necessary repairs to the HDPE geomembrane shall be done using an additional piece of the specified HDPE sheeting applied as above for lap joints. CONTRACTOR – Particular care should be taken to ensure that no stones, scrap material, trash, tools or other unwanted items are trapped beneath the geomembrane liner.
5. All field seams shall be made with hot air or hot wedge welding techniques as outlined in Sections 7 and 8 of the EPA Technical Guidance Document: Inspection Techniques for the Fabrication of Geomembrane Field Seams.

#### D. Inspection and Testing of HDPE Field Seams.

1. Inspection
  - a. Upon completion of the liner installation, all seams shall be visually inspected by the CONTRACTOR for compliance with these specifications. In addition to visual inspection, all field seams shall be checked by the CONTRACTOR using an air channel pressure test via ASTM D5820, as well as destructive testing of field seams. Test samples shall be taken from trench seams to avoid patching in containment area. All sample locations shall be patched per manufacturer's recommendations. Destructive testing shall be completed for at least every 200' of seaming. Vacuum box testing shall be completed on all extrusion welds. Documentation of all field testing shall be provided to ENGINEER upon completion of testing, and again with all closeout documentation.
  - b. All field seams, on completion of the work shall be tightly bonded. Any geomembrane surface showing injury due to scuffing, penetration by foreign



objects, or distress from other causes shall be replaced or repaired.

## 2. Repairs

- a. Any repairs made to the HDPE lining shall be patched with the HDPE lining material. Patches shall be cut with rounded corners and shall extend a minimum of six (6) inches in each direction from the damaged area. The entire surface of the patch shall be bonded to the HDPE lining material.

## 3. Testing of HDPE Field Seams

- a. Test seams are to be made by each seaming crew, at the beginning of the seaming process, and every four (4) hours thereafter, or every time equipment is changed. Each seaming crew and the materials they are using must be traceable and identifiable to their test seams. The samples shall be numbered, dated, identified as to the personnel making the seam, and location made by appropriate notes on the print of the panel layout for the project. The completed field seam sample shall measure not less than 14 inches in width and 24 inches in length.
- b. The field test seams are to be tested for seam strength and peel adhesion. Seam shear strength shall be tested in accordance with ASTM D6392 and shall have a value as stated in paragraph 2.02 B. The peel adhesion shall be tested in accordance with ASTM D6392 and shall have a value as stated within bidding documents.
- c. If a test seam fails to meet the field seam design specification, then additional test seam samples will have to be made by the same seaming crew, using the same tools, equipment, and seaming materials, and retested.

END OF SECTION



**SECTION 46 04 00**  
**POSITIVE DISPLACEMENT BLOWER**

**PART 1 - GENERAL**

**1.01 MANUFACTURER & QUALITY ASSURANCE**

- A. The equipment specified herein is intended to be standard equipment for positive displacement air systems and be supplied by a single OEM to assure uniform quality and compatibility.
- B. The supplier shall have experience in providing similar equipment and shall show proof of satisfactorily operating installations in the marketplace.
- C. The blower packager must be an authorized distributor and packager of the blower being supplied and must be factory authorized to perform warranty service.

**1.02 MANUFACTURER'S FIELD REPRESENTATION**

- A. The field service representative must be a factory certified technician.
- B. Upon notification of completion of the aeration system by the contractor, the blower technician will perform the following duties as applicable: installation inspection & certification, equipment lubrication, control panel parameter setup (if furnished by blower package OEM), initial start-up and corrective adjustments. Site start-up procedures must include equipment soft-foot checks, drivetrain alignment with a laser alignment tool and a minimum one hour run under standard operating conditions.
- C. Operator Training to include but not limited to all lubrication locations, procedures, intervals and allowable lubricants. Drivetrain maintenance, filter servicing, any applicable alarm condition management and special start-up & shut-down procedures.

**PART 2 – PERFORMANCE & COMPONENTS**

**2.01 MANUFACTURER**

- A. The blower shall be manufactured by the following:
  - 1. Excelsior (Gardner-Denver)
  - 2. Hardy Pro Air
  - 3. Engineer Approved Equal

**2.02 DESIGN CRITERIA**

- A. The chart on the following page describes the design criteria:

Aeration Blowers		
Quantity		2
Discharge Pressure		6.9 PSIG
Motor HP - Minimum		25 HP
Max. Allowable BHP		12.5 BHP
Motor RPM		1800 RPM
Air Flow / SCFM		461 SCFM
Air Flow / ICFM		515 ICFM
Elevation		700' ASL
Inlet Air Temp. & RH		95°F / 36% RH
Blower RPM		1672 RPM
Max. Allowable RPM		1750 RPM
Blower Model		Sutorbilt HF514

## 2.03 ROTARY POSITIVE DISPLACEMENT BLOWER

- A. The blower shall be of the horizontal rotary twisted tri-lobe positive displacement type blower. And must provide oil-free air, suitable for heavy-duty continuous industrial service.
- B. The Impellers shall be solid 2 lobe design with integral shafting, produced from close grain ductile iron. Impellers shall be machined on all exterior surfaces to a precise contour for operating at close clearances and high efficiency operation. Impellers shall be dynamically balanced to minimize vibration. Blowers with impellers and shafts that are not of the one-piece integral design will not be accepted. Straight three lobe impellers are also acceptable.
- C. Impeller housing shall be strongly ribbed one-piece design to prevent case distortion when operating at rated pressures. The housing shall be of high strength cast iron and precision machined for close clearance operation.
- D. End plates shall be high strength cast iron with precision machined bearing fits to assure exact positioning of impellers in the main body housing.
- E. Timing gears shall be helical design and machined from high strength alloy steel for precision timing, quiet operation and long life.
- F. Bearings shall be heavy-duty spherical roller bearings for exact positioning of the impellers, to control thrust and to provide increased overhung load capacity. Bearings must be sized for a minimum B10 life of 50K hours.
- G. Lubrication of timing gears and bearings shall be a splash lubrication system. Steel splash plates shall be directly fastened to the impeller shafts to provide positive oil lubrication at all operating speeds. Grease lubrication is not allowed.
- H. Air seals of controlled flow design shall be piston ring type seals precision fitted to each

impeller shaft to minimize air leakage and maximize efficiency. Oil seals of piston ring and oil flinger design, shall be provided on each internal impeller shaft to prevent leakage from the oil reservoirs. The drive seal shall be a high temperature elastomer lip type seal to

- I. Oil drains must be plumbed to drain valves accessible from the drive side of the blower package.

## 2.04 ELECTRIC MOTORS

- A. Constant torque, TEFC (IP55), 1800 RPM, minimum 1.15 S.F., 230/460/3/60, class F insulation, certified for DOL starting and VFD service. Motors shall be manufactured by Marathon, Baldor, WEG Electric, Toshiba or equal.
- B. Motor must meet or exceed Energy Independence and Security Act (EISA 2007) standards for NEMA premium efficiency. Class 1, Division 2 Rated.
- C. Frame must be cast iron and equipped with cooling fins. The motor feet shall be solid for better mechanical strength and reduced vibration. Aluminum and steel framed motors are not allowed. Skeletonized mounting feet are not allowed.
- D. Conduit box must be cast iron and rotatable in 90° increments.
- E. Endshields shall be cast iron with fins for better thermal heat dissipation for lower bearing operating temperatures. They must be equipped with drain holes to expel water that may condense inside the frame in certain environments.
- F. VFD operated motors over 50 HP to be supplied with normally closed thermostats, insulated ND Bearing, and AEGIS Shaft Grounding Ring.

## 2.05 BLOWER PACKAGE ACCESSORIES

- A. The blower packages shall be fabricated and assembled with the following accessories and shipped complete to the extent feasible for safe shipping.
- B. Equipment Base
  - 1. The base shall be comprised of carbon steel plate and structural steel shapes and be of sufficient design to support the blower, motor, drivetrain and silencers without undue flexing. The base must be of a heavy-duty design to ensure operating vibration levels are within the blower manufacture's allowable tolerance. The blower and the motor are mounted in the horizontal configuration providing for vertical airflow and horizontally mounted silencers. The silencers may not be welded to the base in any way. All welding to be per AWS D1.1. All welders must have a current welder qualification test record for AWS D1.1 issued by and AES accredited test facility with a certification no. All welder continuity logs must be up to date.
  - 2. MTRs must be furnished showing that all structural steel products are melted and

manufactured in the United States.

#### C. Drive

1. Provide a v-belt drive assembly consisting of sheaves, quick detachable bushings, v-belts and slide-tensioning motor base. The sheaves must mount to the blower & motors shafts by use of QD type bushings, bored to size / direct-shaft-mount sheaves are not allowed. Design the drive assembly with a 1.4 service factor based on the motor nameplate horsepower.

#### D. Automatic V-belt Drive Tensioning Device

1. Drive belt tensioning must be achieved by use of a hinging structure that automatically accounts for belt stretch. The hinged tensioning structure must be integral to the main support base and must be equipped with jacking provisions to facilitate convenient belt replacement.

#### E. Drive Guard

1. All mechanical power transmission drive components must be equipped with a steel guard sufficiently designed to protect personnel from accidental contact with moving parts. Guard(s) shall be securely mounted and designed for removal without the use of special tools. All belt drive guards shall be constructed to allow visual inspection of the sheaves and belts without removal. Plastic guards are not allowed.

#### F. Filter

1. Provide each blower with a suitably sized air filter based on the filter manufacturers published airflow capacity levels. The filter element must be cleanable and reusable. The media must have a minimum efficiency of 97% on 1 micron. Filters to be equipped with a weather hood for outdoor installations. Acceptable manufactures include Excelsior Blower Systems, Universal Silencer, Stoddard, Solberg or approved equal.

#### G. Intake Silencer

1. Provide a heavy-duty steel noise attenuation unit of the chamber-absorptive (reactive-dissipative) type. The silencer must be multi-chambered for pulse control and low-frequency noise abatement. The silencer must also contain internal acoustical packing material for absorption noise control for high-frequencies. Non-packed chamber only silencers are not allowed. The silencer must be independently supported but not welded to or integral with the base structure in any way. Acceptable manufactures include Excelsior Blower Systems, Universal Silencer, Stoddard, Progentex or approved equal.

#### H. Discharge Silencer

1. Provide a heavy-duty steel noise attenuation unit of the chamber-absorptive (reactive-dissipative) type. The silencer must be multi-chambered for pulse control and low-frequency noise abatement. The silencer must also contain internal acoustical packing material for absorption noise control for high-frequencies. Non-packed chamber only silencers are not allowed. The silencer must be independently supported but not welded to or integral with the base structure in any way. Acceptable manufactures include Excelsior Blower Systems, Universal Silencer, Stoddard, Progentex or approved equal.
2. The Inlet Filter, Inlet silencer, and discharge silencer must be sized for 150% of the design airflow without exception.

#### I. Flexible Connector / Expansion Joints

1. A flex-conn / expansion joint is required directly at the discharge of the blower to provide vibration isolation, accommodate thermal expansion and eliminate loading of the blower cylinder. Three piece clamped sleeved type and one-piece arch type are both acceptable. Lateral, angular, elongation and compression tolerances must be suitable to accommodate thermal growth and component manufacturing tolerances. The elastomer's maximum pressure and temperature ratings must exceed the blower's discharge pressure and temperature at the relief valve set-point. Connector joints to be equivalent to Flex-Fab sleeve-type and General Rubber arch-type.
2. Direct mounting of the discharge silencers to the blower without the use of an expansion joint shall not be allowed.

#### J. Pressure Relief Valve

1. Provide a weighted type relief valve properly sized to protect the blower from over pressurization. Spring-type valves will not be considered due to set-point unreliability associated with spring-tension life. The valve must be located downstream of the discharge silencer for pulsation protection. Provide valves equal to the Sutorbilt weight-type.

#### K. Check Valves

1. Provide a full port dual plate 'butterfly style' check valve to be located downstream of the pressure relief valve. The body shall be Aluminum. The internals shall be corrosion resistant aluminum as a minimum. The hinge pin shall be stainless steel and the closure stop pin must be Teflon coated to provide for cushioned contact points. The valve shall be sized based on airflow as per the manufacture's recommendation to avoid chatter induced fatigue failures. Under-sized and over-sized valves are not permitted. The valve must be suitable for low pressure air. Swing checks, pump valves and valves with external levers, external springs or other control mechanisms are not permitted. Provide a valve equivalent to Flexi-Hinge Model 502M, 518, 503 or equal.

#### L. Discharge Pressure Gauge

1. Provide 0-15 or 0-30 psi scaled pressure gauge to be remote panel mounted on the noise enclosure and factory plumbed to the discharge side of the blower package. The case shall be liquid filled, weather tight and be of corrosion resistant material such as stainless steel, aluminum, polysulfone or approved equal. Minimum size is 2-1/2" diameter and minimum accuracy to be +/- 2 1/2% of full scale per ASME B40.100 Grade A. Acceptable manufactures are Wika, Ashcroft or approved equal.

#### M. Inlet Restriction Gauge

1. Provide a low vacuum or differential pressure gage to be connected to the inlet side of the blower, downstream of the filter element. Acceptable ranges are 0-15 to 0-30 Inches H2O scale. The gauge shall be remote panel mounted on the noise enclosure and factory plumbed. The case shall be weather tight and be of corrosion resistant material such as stainless steel, aluminum, polysulfone or approved equal. Minimum size is 2-1/2" diameter and minimum accuracy to be +/- 2% of full scale. Acceptable manufactures are Dwyer, Ashcroft or approved equal.

### 2.06 SHOP PAINTING

- A. Shop Prime Coating: Prime paint all components before assembly with an alkyd primer equivalent to Sherwin Williams Kem-Flash prime. Surface preparation, application and minimum DFT millage per paint manufacturers recommendation.
- B. Shop Finish Coating: Finish paint all components before assembly with an enamel paint equivalent to Sherwin Williams Sher-Kem paint. Application and minimum DFT millage to be as per the paint manufactures published recommendation. Color to be the OEM's standard color or owner requested color.

### 2.07 SPARE PARTS, LUBRICANTS & SPECIAL TOOLS

- A. The blower package OEM shall deliver the following parts with the blower package(s). Coupons or certificates for the future delivery or purchase of parts are not acceptable.
  1. One filter element per blower
  2. One v-belt set per blower
  3. Oil Case of AEON Synthetic Blower Oil for Initial Fill

### 2.08 SOUND REDUCTION ENCLOSURE

- A. Each blower assembly shall be furnished with a sound attenuating enclosure suitable for locating outdoors. The enclosure shall be manufactured of 0.063" thick formed aluminum sheet metal panels. The acoustical packing and overall design shall be sufficient to meet a free-field noise requirement of 75 dBA at any horizontal distance of 3 Feet from the exterior surface. The enclosure design shall incorporate a perforated galvanized steel inner liner to mechanically secure the acoustical foam material and to protect the foam from damage. Painted and powder coated steel enclosures do not offer sufficient weather



protection for outdoor installations.

- B. The enclosure shall be furnished with latching doors adequately positioned to view, access, and otherwise carry out all standard maintenance requirements without enclosure panel disassembly. These activities include but may not be limited to oil drain and fill, grease fitting and plug access, filter service, guard removal and drivetrain replacement & alignment. Lift-out type doors shall not exceed 50lbs.
- C. The enclosure must be equipped with a 120/1/60 forced air ventilation system. The air ventilation fan shall be pre-installed on the enclosure and sized as necessary to keep the assembly at a temperature needed to maintain proper operation as recommended by the blower package manufacturer and must be pre-wired to a thermostat. Blower shaft mounted fans are not acceptable due to hindering maintenance and troubleshooting access at the blower. Also, VFD operated turndown speeds result in reduced ventilation airflow.
- D. All exposed hardware, latches, hinges, door handles and similar must be highly weather resistant such as stainless steel, chrome or aluminum.
- E. The enclosure must ship fully factory assembled and attached to a steel sub-base. The sub-base structure must be designed to support the blower package assembly and assembled noise enclosure. Vibration isolation pads or mounts shall be installed between the blower package base and sub-base. The sub-base must contain forklift pockets for ease of truck loading, off-loading and site placement.
- F. All pipe penetration holes in the enclosure shall be sized to allow for passage of pipe fittings and/or flanges. Flashing rings shall be provided to seal all pipe penetration holes after final assembly.

END OF SECTION



**SECTION 46 05 00**  
**ELECTRIC VALVE ACTUATORS**

**PART 1 – GENERAL**

**1.01 ELECTRIC VALVE ACTUATORS**

**A. Referenced Manufacturer**

1. All actuators shall be manufactured by AUMA Actuators, Inc., Limitorque, or approved equal.

**B. Equipment Requirements**

1. The actuators shall be suitable for use on a 460 volt 3-phase 60 Hz power supply and must include motor, integral reversing starters, local controls and terminals for remote control and indication housed within a self-contained, sealed enclosure.

**C. Actuator sizing**

1. The actuator shall be sized to guarantee valve closure at the specified torque and/or thrust requirement as indicated by the valve manufacturer or supplier. The actuator must be adequately sized to provide the torque required to operate the valve at 90% of the nominal voltage with the option of operation at up to -30% undervoltage conditions.
2. The operating speed shall provide valve closing and opening at approximately 12 inches per minute for gate valves, slide or sluice gates, 4 inches per minute for globe valves and as indicated in the valve list for quarter-turn valves.
3. Quarter-turn actuators shall be furnished with mechanical stops that restrict the valve/actuator travel.

**D. Environmental**

1. Actuators shall be suitable for indoor and outdoor use. The actuator shall be capable of functioning in an ambient temperature ranging from -40°F to +158°F (-40°C to +70°C), up to 100% relative humidity.

**E. Enclosure**

1. Actuators shall be O-ring sealed, watertight to NEMA 4X/6 and submersible to IP 68-8 (26 feet (8meters) for 96 hours) in accordance with EN 60529. During submersion it must be possible to operate the actuator at least 10 times. Enclosure

must allow for temporary site storage without the need for electrical supply connection. All external fasteners shall be of stainless steel. Gear case shall be cast iron. To prevent condensation, a heater must be installed inside the actuator, suitable for continuous operation. Actuator must provide an alarm signal in case of failure of anti-condensation heater.

2. When required, actuators for hazardous locations shall be certified explosion proof for Class I, Division 1 & 2, Groups C & D or Groups B, C & D.

#### F. Motor

1. The electric motor shall be Class F insulated, with a duty rating of at least 15 minutes at 104°F (40°C) ambient temperature at an average load of at least 35% of rated actuator torque. Motor shall be specifically designed and built by the actuator manufacturer for electric actuator service characterized by high starting torque, low stall torque and low inertia. Commercially available motors shall not be acceptable. Electrical disconnection of the motor shall be by means of a plug and socket and motor removal shall be possible without loss of lubricant. The actuator must include a device to ensure that the motor runs with the correct rotation for the required direction of valve travel regardless of the connection sequence of the power supply.

#### G. Motor Protection

1. The following criteria shall be provided for motor protection:
  - a. The motor shall be de-energized without damage in the event of a stall condition when attempting to move a jammed valve.
  - b. The motor shall be de-energized in the event of an overtorque condition.
  - c. A minimum of three thermal devices imbedded in the motor windings shall be provided to de-energize the motor in case of overheating.
  - d. Lost phase protection

#### H. Gearing

1. The actuator gearing shall be totally enclosed in a grease-filled cast iron gearcase suitable for operation in any orientation. Oil lubrication is not permitted. The actuator gearing shall be hardened steel with alloy bronze worm wheel. The design should permit the opening of the gearcase for inspection or disassembly without releasing the stem thrust or taking the valve out of service. Where required per application, electric actuators will be provided with worm gearboxes. The worm gearboxes shall be supplied with full 360° bronze or ductile iron worm wheels and

end-of-travel mechanical stops on the worm shaft. Designs with segmented worm gears and end-of-travel stops in the gearbox housing will not be permitted.

#### I. Manual Operation

1. Manual operation shall be by handwheel which shall not rotate during motor operation. The handwheel declutch mechanism shall include an output contact to indicate actuator manual operation. Manual operation shall utilize the actuator worm shaft/worm wheel to maintain self-locking gearing and to facilitate changeover from motor to manual operation when the actuator is under load. Actuator designs that bypass electric actuator worm gears when declutched are unacceptable. The declutching from motor operation shall be at the motor shaft to minimize declutching effort. The amount of force required to declutch the actuator shall be the same regardless of the size of the actuator. Designs that break the valve load at the worm and worm gear are unacceptable. Return from manual to electric mode of operation will be automatic upon motor operation. A seized or inoperable motor shall not prevent manual operation.

#### J. Drive Nut and Thrust Base Assembly

1. For multi turn rising stem applications, the drive nut shall be installed in a detachable thrust base. The design shall allow actuator removal from the thrust base, leaving the thrust base attached to the valve to retain valve position. Thrust bearings shall be lubricated by means of an easily accessible grease fitting.

#### K. Valve Position and Torque Calibration

1. Limit switches shall be furnished at each end of travel. Limit switch adjustment shall not be altered by manual operation. Limit switch drive shall be by counter gear. Limit switches must be capable of quick adjustment requiring no more than five (5) turns of the limit switch adjustment spindle. One set of normally open and one set of normally closed contacts will be furnished at each end of travel where indicated. Contacts shall be of silver and capable of reliably switching low voltage DC source from the control system furnished by others.
2. Mechanically operated torque switches shall be furnished at each end of travel. Torque switches will trip when the valve load exceeds the torque switch setting. The torque switch adjustment device must be calibrated directly in engineering units of torque.

#### L. Wiring and Terminals

1. Internal wiring shall be tropical grade insulated stranded cable of appropriate size for the control and 3-phase power.

2. All external wiring shall terminate in a removable plug and socket head, which allows easy disconnection of all power and control voltages.
3. Actuators furnished without plug and socket terminal connections must have power and control disconnect switches for ease of maintenance and safety.

## 1.02 ELECTRIC ACTUATOR CONTROL (CONTACT CLOSURE/DISCRETE SIGNALS)

### A. Controls

1. All actuators will be furnished with integral actuators / motor controls. The integral controls shall be electrically connected to the actuator via a plug and socket connection. It shall be possible to re-position the integral controls at 90° increments, so that the push buttons and indication lights will face the operator.
2. In the event the actuators must be mounted in un-accessible positions, it shall be possible to separate the integral controls including all the electronic control elements from the actuator and capable of mounting up to 330 ft. from the valve/gate.

### B. Control Components

1. The following components/features shall be included with the integral controls:
  - a. Reversing contactors (mechanically and electrically interlocked).
  - b. Internal power supply / transformer for control power.
  - c. Control and signal voltage shall be either 24V DC or 115 V as indicated, internally or externally supplied.
  - d. Programmable control logic
  - e. Automatic phase correction
  - f. Control system interface:
    - 1) Control by contact closure / discrete input signals via OPEN-STOP-CLOSE signals (either 24 V DC or 115 V as indicated) potentially separated from actuator controls by opto-isolators.

### C. Local Controls

1. Local controls with 'OPEN - STOP - CLOSE' pushbutton type controls and a lockable selector switch with 'LOCAL - OFF - REMOTE' function. Local controls shall be supplied with indicating lights red for 'OPEN', yellow for 'FAULT' and green for 'CLOSED'.

### D. Output Signals and for Remote Indication

1. The following output signals shall be furnished for remote indication:
  - a. Output signals from selector switch when switch is in LOCAL or REMOTE positions via potential-free contacts.
  - b. Signals for end-of-travel positions OPEN and CLOSED shall be via potential-free contacts.
  - c. Monitor relay for collective fault signal (power failure, phase failure, thermal switch tripped, and torque switch tripped in mid travel) shall be provided.
  - d. Where required, a 4-20 mA position feedback signal via a contactless internal feedback device shall be provided.

### 1.03 ELECTRIC ACTUATOR COMMISSIONING AND TEST REPORTS

#### A. Commissioning Kit

1. Each actuator will be provided with a commissioning kit consisting of a wiring diagram and installation and operation manual. No special commissioning tools or parts will be required for start-up. To prevent the loss of screws during commissioning or maintenance, all covers shall be fixed with captive screws. In order to minimize the amount of spare parts required, parts such as covers, plug and sockets, parts must be interchangeable throughout all model sizes.

#### B. Performance Test Documentation

1. Each actuator shall be performance tested. Test documentation must be provided if requested indicating the following:
  - a. torque sensing tripping points in both the open and closed directions of travel
  - b. current at the maximum torque tripping point
  - c. actuator output speed
  - d. high voltage test

#### C. Start-up and Commissioning Services (if applicable)

1. Start-up services shall be performed by an AUMA factory authorized service technician residing in the state of the specific project location.

END OF SECTION





APPENDIX A  
NPDES PERMIT No. AL0072834  
LEXINGTON LAGOON AND SPRAYFIELD





Alabama Department of Environmental Management  
[adem.alabama.gov](http://adem.alabama.gov)

1400 Coliseum Blvd. 36110-2400 ■ Post Office Box 301463  
Montgomery, Alabama 36130-1463  
(334) 271-7700 ■ FAX (334) 271-7950

MARCH 21, 2019

Sandra Burroughs, Mayor  
Town of Lexington  
Post Office Box 147  
Lexington, AL 35648

RE: Final Permit  
NPDES Permit No. AL0072834  
Lexington Lagoon and Sprayfield  
Lauderdale County, Alabama

Dear Mayor Burroughs:

Attached is the issued copy of the above referenced permit. Please note the permit limitations and conditions with which the permittee must comply. No comments were received on the draft permit during the public comment period.

Future monitoring data should be submitted in accordance with the conditions of your permit. Please see PART I.C for your reporting requirements. To reduce the paperwork burden for both the Department and the Permittee, when submitting the required Discharge Monitoring Reports (DMRs), please **do not submit** lab worksheets, logs, reports or other paperwork not specifically required by the permit unless requested by ADEM staff.

Please be aware that Part I.C.1.c of your permit requires that you apply for participation in the Department's web-based Electronic Environmental (E2) Reporting System Program for submittal of DMRs upon issuance of this permit unless valid justification as to why you cannot participate is submitted in writing. Please also be aware that Part I.C.2.e of your permit requires that you apply for participation in the Department's web-based electronic environmental (E2) reporting system for submittal of SSOs within 30 days of coverage under this permit unless valid justification as to why you cannot participate is submitted in writing. After issuance of the permit, SSO hotline notifications and hard copy Form 415 SSO reports may be used only with the written approval from the Department. The E2 Program allows ADEM to electronically validate, acknowledge receipt, and upload data to the state's central wastewater database. This improves the accuracy of reported compliance data and reduces costs to both the regulated community and ADEM. The Permittee Participation Package may be downloaded online at <https://e2.adem.alabama.gov/npdes> or you may obtain a hard copy by submitting a written request or by emailing [e2admin@adem.alabama.gov](mailto:e2admin@adem.alabama.gov).

Please also be aware that Part IV. of your permit requires that you develop, implement, and maintain a Sanitary Sewer Overflow Response Plan.

If you have questions regarding this permit or monitoring requirements, please contact Nicholas Lowe by email at [nicholas.lowe@adem.alabama.gov](mailto:nicholas.lowe@adem.alabama.gov) or by phone at (334) 271-7811.

Sincerely,

Emily Anderson, Chief  
Municipal Section  
Water Division

EDA/NRL/mfc

Enclosure: Final Permit

cc: Environmental Protection Agency Email  
Ms. Elaine Snyder/U.S. Fish and Wildlife Services  
Ms. Janet Branch/ADEM







# NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

PERMITTEE: TOWN OF LEXINGTON  
POST OFFICE BOX 147  
LEXINGTON, ALABAMA 35648

FACILITY LOCATION: LEXINGTON LAGOON AND SPRAYFIELD (0.155 MGD)  
COUNTY ROAD 497  
LEXINGTON, ALABAMA  
LAUDERDALE COUNTY

PERMIT NUMBER: AL0072834

RECEIVING WATERS: LAND APPLICATION, UNNAMED TRIBUTARY TO MILL CREEK (STORMWATER)  
UNNAMED TRIBUTARY TO SECOND CREEK (STORMWATER)

*In accordance with and subject to the provisions of the Federal Water Pollution Control Act, as amended, 33 U.S.C. §§1251-1388 (the "FWPCA"), the Alabama Water Pollution Control Act, as amended, Code of Alabama 1975, §§ 22-22-1 to 22-22-14 (the "AWPCA"), the Alabama Environmental Management Act, as amended, Code of Alabama 1975, §§22-22A-1 to 22-22A-17, and rules and regulations adopted thereunder, and subject further to the terms and conditions set forth in this permit, the Permittee is hereby authorized to discharge into the above-named receiving waters.*

ISSUANCE DATE: MARCH 21, 2019

EFFECTIVE DATE: APRIL 1, 2019

EXPIRATION DATE: MARCH 31, 2024

*GUENNA L. DEAN*

Alabama Department of Environmental Management



**MUNICIPAL SECTION**  
**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)**  
**PERMIT**

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# **PART I** **DISCHARGE LIMITATIONS, CONDITIONS, AND REQUIREMENTS**

## **A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS**

### 1. Outfall 0011 Discharge Limits - Sprayfield

During the period beginning on the effective date of this permit and lasting through the expiration date of this permit, the Permittee is authorized to discharge from Outfall 0011, which is described more fully in the Permittee's application. Such discharge shall be limited and monitored by the Permittee as specified below:

Parameter	Discharge Limitations*					Monitoring Requirements**					
	Monthly Average	Weekly Average	Monthly Average	Weekly Average	Daily Minimum	Daily Maximum	Percent Removal	(1) Sample Location	(2) Sample Type	(3) Measurement Frequency	(4) Seasonal
pH	*****	*****	*****	*****	6.0 S.U.	9.0 S.U.	*****	E	GRAB	G	*****
00400 I 0 0											
Solids, Total Suspended	REPORT	REPORT	90.0 mg/l	135 mg/l	*****	*****	*****	E	GRAB	G	*****
00530 I 0 0											
Solids, Total Suspended	REPORT	REPORT	REPORT	REPORT	*****	*****	*****	I	GRAB	G	*****
00530 G 0 0											
Nitrogen, Total (As N)	REPORT	REPORT	REPORT	REPORT	*****	*****	*****	E	GRAB	G	*****
00600 I 0 0											
Nitrogen, Ammonia Total (As N)	REPORT	REPORT	REPORT	REPORT	*****	*****	*****	E	GRAB	G	*****
00610 I 0 0											
Nitrogen, Nitrate Total (As N)	REPORT	REPORT	REPORT	REPORT	*****	*****	*****	E	GRAB	G	*****
00620 I 0 0											
Nitrogen, Kjeldahl Total (As N)	REPORT	REPORT	20.0 mg/l	30.0 mg/l	*****	*****	*****	E	GRAB	G	*****
00625 I 0 0											
Phosphorus, Total (As P)	REPORT	REPORT	REPORT	REPORT	*****	*****	*****	E	GRAB	G	*****
00665 I 0 0											
Flow, In Conduit or Thru Treatment Plant	REPORT	*****	REPORT	REPORT	*****	*****	*****	E	GRAB	G	*****
50050 I 0 0											
Flow, In Conduit or Thru Treatment Plant	REPORT	*****	REPORT	*****	*****	REPORT MGD	*****	E	CONTIN	A	*****
50050 G 0 0											
Coliform, Fecal General	REPORT	*****	*****	*****	*****	REPORT MGD	*****	I	CONTIN	A	*****
74055 I 0 0											
BOD, Carbonaceous 05 Day, 20C	REPORT	REPORT	2000 col/100mL	*****	*****	4000 col/100mL	*****	E	GRAB	G	*****
80082 I 0 0											
BOD, Carbonaceous 05 Day, 20C	REPORT	REPORT	45.0 mg/l	67.5 mg/l	*****	*****	*****	E	GRAB	G	*****
80082 G 0 0											
BOD, Carbonaceous 05 Day, 20C	REPORT	REPORT	REPORT	REPORT	*****	*****	*****	I	GRAB	G	*****
80082 G 0 0											

\* See Part II.C.1. (Bypass); Part II.C.2. (Upset)

\*\* Monitoring Requirements

(1) Sample Location

I - Influent

E - Effluent

X - End Chlorine Contact Chamber

K - Percent Removal of the Monthly Avg. Influent Concentration

from the Monthly Avg. Effluent Concentration.

RS - Receiving Stream

US - Upstream

DS - Downstream

MW - Monitoring Well

SW - Storm Water

(2) Sample Type:

CONTIN - Continuous

INSTAN - Instantaneous

COMP-8 - 8-Hour Composite

COMP24 - 24-Hour Composite

GRAB - Grab

CALCTD - Calculated

(3) Measurement Frequency: See also Part I.B.2.

A - 7 days per week

B - 5 days per week

C - 3 days per week

D - 2 days per week

E - 1 day per week

F - 2 days per month

G - 1 day per month

H - 1 day per quarter

J - Annual

Q - For Effluent Toxicity Testing, see Provision IV.B.

(4) Seasonal Limits:

S = Summer (April - October)

W = Winter (November - March)

ECS = E. coli Summer (May - October)

ECW = E. coli Winter (November - April)

2. Outfalls 002S and 003S Discharge Limits - Stormwater

During the period beginning on the effective date of this permit and lasting through the expiration date of this permit, the Permittee shall monitor from Outfalls 002S and 003S, which are described more fully in the Permittee's application. Such outfalls shall be monitored by the Permittee as specified below:

Parameter	Discharge Limitations*					Monitoring Requirements**			
	Monthly Average	Weekly Average	Monthly Average	Weekly Average	Daily Minimum	Daily Maximum	Percent Removal	(1) Sample Location	(2) Sample Type
pH	*****	*****	*****	*****	REPORT S.U.	REPORT S.U.	*****	SW	GRAB
00400 SW 0 0	*****	*****	*****	*****	*****	*****	*****	SW	GRAB
Solids, Total Suspended	*****	*****	*****	*****	*****	*****	*****	SW	GRAB
00530 SW 0 0	*****	*****	*****	*****	*****	*****	*****	SW	GRAB
Nitrogen, Ammonia Total (As N)	*****	*****	*****	*****	*****	*****	*****	SW	GRAB
00610 SW 0 0	*****	*****	*****	*****	*****	*****	*****	SW	GRAB
Nitrogen, Kjeldahl Total (As N)	*****	*****	*****	*****	*****	*****	*****	SW	GRAB
00625 SW 0 0	*****	*****	*****	*****	*****	*****	*****	SW	GRAB
Nitrite Plus Nitrate Total 1 Det. (As N)	*****	*****	*****	*****	*****	*****	*****	SW	GRAB
00630 SW 0 0	*****	*****	*****	*****	*****	*****	*****	SW	GRAB
Phosphorus, Total (As P)	*****	*****	*****	*****	*****	*****	*****	SW	GRAB
00665 SW 0 0	*****	*****	*****	*****	*****	*****	*****	SW	GRAB
Flow, In Conduit or Thru Treatment Plant	*****	*****	*****	*****	*****	*****	*****	SW	CALCTD
50050 SW 0 0	*****	*****	*****	*****	*****	*****	*****	SW	GRAB
E. Coli	*****	*****	*****	*****	*****	*****	*****	SW	GRAB
51040 SW 0 0	*****	*****	*****	*****	*****	*****	*****	SW	GRAB
BOD, Carbonaceous 05 Day, 20C	*****	*****	*****	*****	*****	*****	*****	SW	GRAB
80082 SW 0 0	*****	*****	*****	*****	*****	*****	*****	SW	GRAB

\* See Part II.C.1. (Bypass); Part II.C.2. (Upset)

\*\* Monitoring Requirements

(1) Sample Location

I - Influent

E - Effluent

X - End Chlorine Contact Chamber

K - Percent Removal of the Monthly Avg. Influent Concentration

from the Monthly Avg. Effluent Concentration.

RS - Receiving Stream

US - Upstream

DS - Downstream

MW - Monitoring Well

SW - Storm Water

(2) Sample Type:

CONTIN - Continuous

INSTAN - Instantaneous

COMP-8 - 8-Hour Composite

COMP24 - 24-Hour Composite

GRAB - Grab

CALCTD - Calculated

(3) Measurement Frequency: See also Part I.B.2.

A - 7 days per week

B - 5 days per week

C - 3 days per week

D - 2 days per week

E - 1 day per week

F - 2 days per month

G - 1 day per month

H - 1 day per quarter

J - Annual

Q - For Effluent Toxicity Testing, see Provision IV.B.

(4) Seasonal Limits:

S = Summer (April - October)

W = Winter (November - March)

ECS = E. coli Summer (May - October)

ECW = E. coli Winter (November - April)

(5) \*F (Insufficient Flow for Sampling) should be utilized on the eDMR if the sprayfield was utilized during monitoring period but there was insufficient flow to collect a sample during the measurable storm event.

(6) No Discharge should only be used if the stormwater outfall did not discharge any water during the monitoring period.

3. Outfall 004U Discharge Limits – Upstream Monitoring

During the period beginning on the effective date of this permit and lasting through the expiration date of this permit, the Permittee shall monitor from Outfall 004U, which is a designated outfall for upstream monitoring. Such outfall shall be monitored by the Permittee as specified below:

Parameter	Discharge Limitations*					Monitoring Requirements**			
	Monthly Average	Weekly Average	Monthly Average	Weekly Average	Daily Minimum	Daily Maximum	Percent Removal	(1) Sample Location	(2) Sample Type
Oxygen, Dissolved (DO) 00300 5 0 0	*****	*****	*****	*****	REPORT mg/l	*****	*****	US	GRAB
pH 00400 5 0 0	*****	*****	*****	*****	REPORT S.U.	REPORT S.U.	*****	US	GRAB
Solids, Total Suspended 00530 5 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	US	GRAB
Nitrogen, Ammonia Total (As N) 00610 5 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	US	GRAB
Nitrogen, Kjeldahl Total (As N) 00625 5 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	US	GRAB
Nitrite Plus Nitrate Total 1 Det. (As N) 00630 5 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	US	GRAB
Phosphorus, Total (As P) 00665 5 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	US	GRAB
E. Coli 51040 5 0 0	*****	*****	*****	*****	*****	REPORT col/100mL	*****	US	GRAB
BOD, Carbonaceous 05 Day, 20C 80082 5 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	US	GRAB

\* See Part II.C.1. (Bypass); Part II.C.2. (Upset)

\*\* Monitoring Requirements

(1) Sample Location

I – Influent  
E – Effluent  
X – End Chlorine Contact Chamber  
K – Percent Removal of the Monthly Avg. Influent Concentration from the Monthly Avg. Effluent Concentration.  
RS – Receiving Stream  
US – Upstream  
DS – Downstream  
MW – Monitoring Well  
SW – Storm Water

(2) Sample Type:

CONTIN - Continuous  
INSTAN - Instantaneous  
COMP-8 - 8-Hour Composite  
COMP24 - 24-Hour Composite  
GRAB - Grab  
CALCTD - Calculated

(3) Measurement Frequency: See also Part I.B.2.

A - 7 days per week  
B - 5 days per week  
C - 3 days per week  
D - 2 days per week  
E - 1 day per week  
F - 2 days per month  
G - 1 day per month  
H - 1 day per quarter  
J - Annual  
Q - For Effluent Toxicity Testing, see Provision IV.B.

(4) Seasonal Limits:

S = Summer (April – October)  
W = Winter (November – March)  
ECS = E. coli Summer (May – October)  
ECW = E. coli Winter (November – April)

(5) \*F (Insufficient Flow for Sampling) should be utilized on the eDMR if the sprayfield was utilized during monitoring period but there was insufficient water instream to collect a sample during the monitoring period.

4. Outfall 005D Discharge Limits – Downstream Monitoring

During the period beginning on the effective date of this permit and lasting through the expiration date of this permit, the Permittee shall monitor from Outfall 005D, which is a designated outfall for downstream monitoring. Such outfall shall be monitored by the Permittee as specified below:

Parameter	Discharge Limitations*					Monitoring Requirements**			
	Monthly Average	Weekly Average	Monthly Average	Weekly Average	Daily Minimum	Daily Maximum	Percent Removal	(1) Sample Location	(2) Sample Type
Oxygen, Dissolved (DO) 00300 6 0 0	*****	*****	*****	*****	REPORT mg/l	*****	*****	DS	GRAB
pH 00400 6 0 0	*****	*****	*****	*****	REPORT S.U.	*****	*****	DS	GRAB
Solids, Total Suspended 00530 6 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	DS	GRAB
Nitrogen, Ammonia Total (As N) 00610 6 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	DS	GRAB
Nitrogen, Kjeldahl Total (As N) 00625 6 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	DS	GRAB
Nitrite Plus Nitrate Total 1 Det. (As N) 00630 6 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	DS	GRAB
Phosphorus, Total (As P) 00665 6 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	DS	GRAB
E. Coli 51040 6 0 0	*****	*****	*****	*****	*****	REPORT col/100mL	*****	DS	GRAB
BOD, Carbonaceous 05 Day, 20C 80082 6 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	DS	GRAB

\* See Part II.C.1. (Bypass); Part II.C.2. (Upset)

\*\* Monitoring Requirements

- (1) Sample Location  
I – Influent  
E – Effluent  
X – End Chlorine Contact Chamber  
K – Percent Removal of the Monthly Avg. Influent Concentration from the Monthly Avg. Effluent Concentration.  
RS – Receiving Stream  
US – Upstream  
DS – Downstream  
MW – Monitoring Well  
SW – Storm Water

(2) Sample Type:

- CONTIN - Continuous  
INSTAN - Instantaneous  
COMP-8 - 8-Hour Composite  
COMP24 - 24-Hour Composite  
GRAB - Grab  
CALCCTD - Calculated

(3) Measurement Frequency. See also Part I.B.2.

- A - 7 days per week F - 2 days per month  
B - 5 days per week G - 1 day per month  
C - 3 days per week H - 1 day per quarter  
D - 2 days per week J - Annual  
E - 1 day per week Q - For Effluent Toxicity Testing, see Provision IV.B.

(4) Seasonal Limits:

- S = Summer (April – October)  
W = Winter (November – March)  
ECS = E. coli Summer (May – October)  
ECW = E. coli Winter (November – April)

(5) \*F (Insufficient Flow for Sampling) should be utilized on the eDMR if the sprayfield was utilized during monitoring period but there was insufficient water instream to collect a sample during the monitoring period.



5. Outfalls MW11, MW21, MW31 and MW41 Discharge Limits – Groundwater Monitoring Wells

During the period beginning on the effective date of this permit, the Permittee shall monitor from Outfalls MW11, MW21, MW31, and MW41, which represent monitoring wells. Such outfalls shall be monitored by the Permittee as specified below:

Parameter	Discharge Limitations*					Monitoring Requirements**					
	Monthly Average	Weekly Average	Monthly Average	Weekly Average	Daily Minimum	Daily Maximum	Percent Removal	(1) Sample Location	(2) Sample Type	(3) Measurement Frequency	(4) Seasonal
Nitrogen, Total (As N) 00600 GW 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	MW	GRAB	Q	*****
Nitrogen, Ammonia Total (As N) 00610 GW 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	MW	GRAB	Q	*****
Nitrogen, Nitrite Total (As N) 00615 GW 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	MW	GRAB	Q	*****
Nitrogen, Nitrate Total (As N) 00620 GW 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	MW	GRAB	Q	*****
Phosphorus, Total (As P) 00665 GW 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	MW	GRAB	Q	*****
Carbon, Tot Organic (TOC) 00680 GW 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	MW	GRAB	Q	*****
Methylene Blue Active Substances 47021 GW 0 0	*****	*****	*****	*****	*****	REPORT mg/l	*****	MW	GRAB	Q	*****
E. Coli 51040 GW 0 0	*****	*****	*****	*****	*****	REPORT col/100mL	*****	MW	GRAB	Q	*****
Coliform, Fecal General 74055 GW 0 0	*****	*****	*****	*****	*****	REPORT col/100mL	*****	MW	GRAB	Q	*****
Water Level At Samp. Collection Time 85327 GW 0 0	*****	*****	*****	*****	*****	REPORT feet	*****	MW	GRAB	Q	*****

\* See Part II.C.1. (Bypass); Part II.C.2. (Upset)

\*\* Monitoring Requirements

(1) Sample Location

I – Influent

E – Effluent

X – End Chlorine Contact Chamber

K – Percent Removal of the Monthly Avg. Influent Concentration

from the Monthly Avg. Effluent Concentration.

RS – Receiving Stream

US – Upstream

DS – Downstream

MW – Monitoring Well

SW – Storm Water

(2) Sample Type:

CONTIN - Continuous

INSTAN - Instantaneous

COMP-8 - 8-Hour Composite

COMP24 - 24-Hour Composite

GRAB – Grab

CALCTD - Calculated

(3) Measurement Frequency: See also Part I.B.2.

A - 7 days per week

B - 5 days per week

C - 3 days per week

D - 2 days per week

E - 1 day per week

F - 2 days per month

G - 1 day per month

H - 1 day per quarter

J - Annual

Q – See Part IV.E.2

(4) Seasonal Limits:

S = Summer (April – October)

W = Winter (November – March)

ECS = E. coli Summer (May – October)

ECW = E. coli Winter (November – April)

(5) \*F (Insufficient Flow for Sampling) should be utilized on the eDMR if sprayfield was utilized during monitoring period but there was insufficient water in the monitoring well to collect a sample during the monitoring period.

**B. DISCHARGE MONITORING AND RECORD KEEPING REQUIREMENTS****1. Representative Sampling**

Sample collection and measurement actions shall be representative of the volume and nature of the monitored discharge and shall be in accordance with the provisions of this permit. The effluent sampling point shall be at the nearest accessible location just prior to discharge and after final treatment, unless otherwise specified in the permit.

**2. Measurement Frequency**

Measurement frequency requirements found in Provision I.A. shall mean:

- a. Seven days per week shall mean daily.
- b. Five days per week shall mean any five days of discharge during a calendar weekly period of Sunday through Saturday.
- c. Three days per week shall mean any three days of discharge during a calendar week.
- d. Two days per week shall mean any two days of discharge during a calendar week.
- e. One day per week shall mean any day of discharge during a calendar week.
- f. Two days per month shall mean any two days of discharge during the month that are no less than seven days apart. However, if discharges occur only during one seven-day period in a month, then two days per month shall mean any two days of discharge during that seven day period.
- g. One day per month shall mean any day of discharge during the calendar month.
- h. Quarterly shall mean any day of discharge during each calendar quarter.
- i. The Permittee may increase the frequency of sampling, listed in Provisions I.B.2.a through I.B.2.h; however, all sampling results are to be reported to the Department.

**3. Test Procedures**

For the purpose of reporting and compliance, Permittees shall use one of the following procedures:

- a. For parameters with an EPA established Minimum Level (ML), report the measured value if the analytical result is at or above the ML and report "0" for values below the ML. Test procedures for the analysis of pollutants shall conform to 40 CFR Part 136 and guidelines published pursuant to Section 304(h) of the FWPCA, 33 U.S.C. Section 1314(h). If more than one method for analysis of a substance is approved for use, a method having a minimum level lower than the permit limit shall be used. If the minimum level of all methods is higher than the permit limit, the method having the lowest minimum level shall be used and a report of less than the minimum level shall be reported as zero and will constitute compliance, however should EPA approve a method with a lower minimum level during the term of this permit the Permittee shall use the newly approved method.
- b. For pollutants parameters without an established ML, an interim ML may be utilized. The interim ML shall be calculated as 3.18 times the Method Detection Level (MDL) calculated pursuant to 40 CFR Part 136, Appendix B.

Permittees may develop an effluent matrix-specific ML, where an effluent matrix prevents attainment of the established ML. However, a matrix specific ML shall be based upon proper laboratory method and technique. Matrix-specific MLs must be approved by the Department, and may be developed by the Permittee during permit issuance, reissuance, modification, or during compliance schedule.

In either case the measured value should be reported if the analytical result is at or above the ML and "0" reported for values below the ML.

- c. For parameters without an EPA established ML, interim ML, or matrix-specific ML, a report of less than the detection limit shall constitute compliance if the detection limit of all analytical methods is higher than the permit limit. For the purpose of calculating a monthly average, "0" shall be used for values reported less than the detection limit.

The Minimum Level utilized for procedures a and b above shall be reported on the Permittee's DMR. When an EPA approved test procedure for analysis of a pollutant does not exist, the Director shall approve the procedure to be used.

**4. Recording of Results**

For each measurement or sample taken pursuant to the requirements of this permit, the Permittee shall record the following information:

- a. The facility name and location, point source number, date, time and exact place of sampling;
- b. The name(s) of person(s) who obtained the samples or measurements;

- c. The dates and times the analyses were performed;
  - d. The name(s) of the person(s) who performed the analyses;
  - e. The analytical techniques or methods used, including source of method and method number; and
  - f. The results of all required analyses.
5. Records Retention and Production
- a. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the above reports or the application for this permit, for a period of at least three years from the date of the sample measurement, report or application. This period may be extended by request of the Director at any time. If litigation or other enforcement action, under the AWPCA and/or the FWPCA, is ongoing which involves any of the above records, the records shall be kept until the litigation is resolved. Upon the written request of the Director or his designee, the permittee shall provide the Director with a copy of any record required to be retained by this paragraph. Copies of these records should not be submitted unless requested.
  - b. All records required to be kept for a period of three years shall be kept at the permitted facility or an alternate location approved by the Department in writing and shall be available for inspection.
6. Reduction, Suspension or Termination of Monitoring and/or Reporting
- a. The Director may, with respect to any point source identified in Provision I.,A., of this permit, authorize the permittee to reduce, suspend or terminate the monitoring and/or reporting required by this permit upon the submission of a written request for such reduction, suspension or termination by the permittee, supported by sufficient data which demonstrates to the satisfaction of the Director that the discharge from such point source will continuously meet the discharge limitations specified in Provision I.,A., of this permit.
  - b. It remains the responsibility of the permittee to comply with the monitoring and reporting requirements of this permit until written authorization to reduce, suspend or terminate such monitoring and/or reporting is received by the permittee from the Director.
7. Monitoring Equipment and Instrumentation
- All equipment and instrumentation used to determine compliance with the requirements of this permit shall be installed, maintained, and calibrated in accordance with the manufacturer's instructions or, in the absence of manufacturer's instructions, in accordance with accepted practices. At a minimum, flow measurement devices shall be calibrated at least once every 12 months.

### C. DISCHARGE REPORTING REQUIREMENTS

#### 1. Reporting of Monitoring Requirements

- a. The permittee shall conduct the required monitoring in accordance with the following schedule:
  - (1) **MONITORING REQUIRED MORE FREQUENTLY THAN MONTHLY AND MONTHLY** shall be conducted during the first full month following the effective date of coverage under this permit and every month thereafter.
  - (2) **QUARTERLY MONITORING** shall be conducted at least once during each calendar quarter. Calendar quarters are the periods of January through March, April through June, July through September, and October through December. The permittee shall conduct the quarterly monitoring during the first complete calendar quarter following the effective date of this permit and is then required to monitor once during each quarter thereafter. Quarterly monitoring should be reported on the last DMR due for the quarter (i.e. March, June, September and December DMRs).
  - (3) **SEMIANNUAL MONITORING** shall be conducted at least once during the period of January through June and at least once during the period of July through December. The permittee shall conduct the semiannual monitoring during the first complete calendar semiannual period following the effective date of this permit and is then required to monitor once during each semiannual period thereafter. Semiannual monitoring may be done anytime during the semiannual period, unless restricted elsewhere in this permit, but it should be reported on the last DMR due for the month of the semiannual period (i.e. June and December DMRs).
  - (4) **ANNUAL MONITORING** shall be conducted at least once during the period of January through December. The permittee shall conduct the annual monitoring during the first complete calendar annual period following the effective date of this permit and is then required to monitor once during each annual period thereafter. Annual monitoring may be done anytime during the year, unless restricted elsewhere in this permit, but it should be reported on the December DMR.

- b. The permittee shall submit discharge monitoring reports (DMRs) on the forms approved by the Department and in accordance with the following schedule:
- (1) **REPORTS OF MORE FREQUENTLY THAN MONTHLY AND MONTHLY TESTING** shall be submitted on a monthly basis. The first report is due on the 28th day of the month following the month the permit becomes effective. The reports shall be submitted so that they are received by the Department no later than the 28th day of the month following the reporting period, unless otherwise directed by the Department.
  - (2) **REPORTS OF QUARTERLY TESTING** shall be submitted on a quarterly basis. The first report is due on the 28th day of the month following the month the permit becomes effective. The reports shall be submitted so that they are received by the Department no later than the 28th day of the month following the reporting period, unless otherwise directed by the Department.
  - (3) **REPORTS OF SEMIANNUAL TESTING** shall be submitted on a semiannual basis. The reports are due on the 28th day of JANUARY and the 28th day of JULY. The reports shall be submitted so that they are received by the Department no later than the 28th day of the month following the reporting period, unless otherwise directed by the Department.
  - (4) **REPORTS OF ANNUAL TESTING** shall be submitted on an annual basis. Unless specified elsewhere in the permit, the first report is due on the 28th day of JANUARY. The reports shall be submitted so that they are received by the Department no later than the 28th day of the month following the reporting period, unless otherwise directed by the Department.
- c. Except as allowed by Provision I.C.1.c.(1) or (2), the permittee shall submit all Discharge Monitoring Reports (DMRs) required by Provision I.C.1.b. by utilizing the Department's web-based Electronic Environmental (E2) Reporting System.
- (1) If the permittee is unable to complete the electronic submittal of DMR data due to technical problems originating with the Department's E2 Reporting System (this could include entry/submittal issues with an entire set of DMRs or individual parameters), the permittee is not relieved of their obligation to submit DMR data to the Department by the date specified in Provision I.C.1.b., unless otherwise directed by the Department.

If the E2 Reporting System is down on the 28<sup>th</sup> day of the month in which the DMR is due or is down for an extended period of time, as determined by the Department, when a DMR is required to be submitted, the permittee may submit the data in an alternate manner and format acceptable to the Department. Preapproved alternate acceptable methods include faxing, e-mailing, mailing, or hand-delivery of data such that they are received by the required reporting date. Within five calendar days of the E2 Reporting System resuming operation, the permittee shall enter the data into the E2 Reporting System, unless an alternate timeframe is approved by the Department. An attachment should be included with the E2 DMR submittal verifying the original submittal date (date of the fax, copy of dated e-mail, or hand-delivery stamped date), if applicable.
  - (2) The permittee may submit a request to the Department for a temporary electronic reporting waiver for DMR submittals. The waiver request should include the permit number; permittee name; facility/site name; facility address; name, address, and contact information for the responsible official or duly authorized representative; a detailed statement regarding the basis for requesting such a waiver; and the duration for which the waiver is requested. Approved electronic reporting waivers are not transferrable.

A permittee with an approved electronic reporting waiver for DMRs may submit hard copy DMRs for the period that the approved electronic reporting waiver request is effective. The permittee shall submit the Department-approved DMR forms to the address listed in Provision I.C.1.e.
  - (3) If a permittee is allowed to submit a hard copy DMR, the DMR must be legible and bear an original signature. Photo and electronic copies of the signature are not acceptable and shall not satisfy the reporting requirements of this permit.
  - (4) If the permittee, using approved analytical methods as specified in Provision I.B.2, monitors any discharge from a point source for a limited substance identified in Provision I.A. of this permit more frequently than required by this permit, the results of such monitoring shall be included in the calculation and reporting of values on the DMR and the increased frequency shall be indicated on the DMR.
  - (5) In the event no discharge from a point source identified in Provision I.A. of this permit and described more fully in the permittee's application occurs during a monitoring period, the permittee shall report "No Discharge" for such period on the appropriate DMR.
- d. All reports and forms required to be submitted by this permit, the AWPCA and the Department's Rules and Regulations, shall be electronically signed (or, if allowed by the Department, traditionally signed) by a "responsible official" of the permittee as defined in ADEM Administrative Code Rule 335-6-6-.09 or a "duly authorized representative" of such official as defined in ADEM Administrative Code Rule 335-6-6-.09 and shall bear the following certification:



"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

- e. Discharge Monitoring Reports required by this permit, the AWPCA, and the Department's Rules that are being submitted in hard copy shall be addressed to:

**Alabama Department of Environmental Management  
Environmental Data Section, Permits & Services Division  
Post Office Box 301463  
Montgomery, Alabama 36130-1463**

Certified and Registered Mail containing Discharge Monitoring Reports shall be addressed to:

**Alabama Department of Environmental Management  
Environmental Data Section, Permits & Services Division  
1400 Coliseum Boulevard  
Montgomery, Alabama 36110-2400**

- f. All other correspondence and reports required to be submitted by this permit, the AWPCA, and the Department's Rules shall be addressed to:

**Alabama Department of Environmental Management  
Municipal Section, Water Division  
Post Office Box 301463  
Montgomery, Alabama 36130-1463**

Certified and Registered Mail shall be addressed to:

**Alabama Department of Environmental Management  
Municipal Section, Water Division  
1400 Coliseum Boulevard  
Montgomery, Alabama 36110-2400**

- g. If this permit is a reissuance, then the permittee shall continue to submit DMRs in accordance with the requirements of their previous permit until such time as DMRs are due as discussed in Part I.C.1.b. above.

## 2. Noncompliance Notifications and Reports

- a. The Permittee shall notify the Department if, for any reason, the Permittee's discharge:
- (1) Does not comply with any daily minimum or maximum discharge limitation for an effluent characteristic specified in Provision I.A. of this permit which is denoted by an "(X)";
  - (2) Potentially threatens human health or welfare;
  - (3) Threatens fish or aquatic life;
  - (4) Causes an in-stream water quality criterion to be exceeded;
  - (5) Does not comply with an applicable toxic pollutant effluent standard or prohibition established under Section 307(a) of the FWPCA, 33 U.S.C. Section 1317(a);
  - (6) Contains a quantity of a hazardous substance that may be harmful to public health or welfare under Section 311(b)(4) of the FWPCA, 33 U.S.C. Section 1321(b)(4);
  - (7) Exceeds any discharge limitation for an effluent parameter listed in Part I.A. as a result of an unanticipated bypass or upset; or
  - (8) Is an unpermitted direct or indirect discharge of a pollutant to a water of the state. (Note that unpermitted discharges properly reported to the Department under any other requirement are not required to be reported under this provision.)

The Permittee shall orally or electronically provide notification of any of the above occurrences, describing the circumstances and potential effects, to the Director or Designee within 24-hours after the Permittee becomes aware of the occurrence of such discharge. In addition to the oral or electronic notification, the Permittee shall submit a report to the Director or Designee, as provided in Provision I.C.2.c. or I.C.2.e., no later than five days after becoming aware of the occurrence of such discharge or occurrence.

- b. If, for any reason, the Permittee's discharge does not comply with any limitation of this permit, then the Permittee shall submit a written report to the Director or Designee, as provided in Provision I.C.2.c below. This report must be submitted with the next Discharge Monitoring Report required to be submitted by Provision I.C.1 of this permit after becoming aware of the occurrence of such noncompliance.
- c. Except for notifications and reports of notifiable SSOs which shall be submitted in accordance with the applicable Provisions of this permit, the Permittee shall submit the reports required under Provisions I.C.2.a. and b. to the Director or Designee on ADEM Form 421, available on the Department's website (<http://www.adem.state.al.us/DeptForms/Form421.pdf>). The completed Form must document the following information:
  - (1) A description of the discharge and cause of noncompliance;
  - (2) The period of noncompliance, including exact dates, times, and duration of the noncompliance. If the noncompliance is not corrected by the due date of the written report, then the Permittee shall provide an estimated date by which the noncompliance will be corrected; and
  - (3) A description of the steps taken by the Permittee and the steps planned to be taken by the Permittee to reduce or eliminate the noncompliant discharge and to prevent its recurrence.
- d. Immediate notification

The Permittee shall provide notification to the Director, the public, the county health department, and any other affected entity such as public water systems, as soon as possible upon becoming aware of any notifiable sanitary sewer overflow. Notification to the Director shall be completed utilizing the Department's web-based electronic environmental SSO reporting system in accordance with Provision I.C.2.e.

- e. The Department is utilizing a web-based electronic environmental (E2) reporting system for notification and submittal of SSO reports. **If the Permittee is not already participating in the E2 Reporting System for SSO reports, the Permittee must apply for participation in the system within 30 days of coverage under this permit unless the Permittee submits in writing valid justification as to why it cannot participate and the Department approves in writing utilization of verbal notifications and hard copy SSO report submittals.** Once the Permittee is enrolled in the E2 Reporting System for SSO reports, the Permittee must utilize the system for notification and submittal of all SSO reports unless otherwise allowed by this permit. The Permittee shall include in the SSO reports the information requested by ADEM Form 415. In addition, the Permittee shall include the latitude and longitude of the SSO in the report except when the SSO is a result of an extreme weather event (e.g., hurricane). To participate in the E2 Reporting System for SSO reports, the Permittee Participation Package may be downloaded online at <https://e2.adem.alabama.gov/npdes>. If the E2 Reporting System is down (i.e., electronic submittal of SSO data cannot be completed due to technical problems originating with the Department's system), the Permittee is not relieved of its obligation to notify the Department or submit SSO reports to the Department by the required submittal date, and the Permittee shall submit the data in an alternate manner and format acceptable to the Department. Preapproved alternate acceptable methods include verbal reports, reports submitted via the SSO hotline, or reports submitted via fax, e-mail, mail, or hand-delivery such that they are received by the required reporting date. Within five calendar days of the E2 Reporting System resuming operation, the Permittee shall enter the data into the E2 Reporting System, unless an alternate timeframe is approved by the Department. For any alternate notification, records of the date, time, notification method, and person submitting the notification should be maintained by the Permittee. If a Permittee is allowed to submit SSO reports via an alternate method, the SSO report must be in a format approved by the Department and must be legible.
- f. The Permittee shall maintain a record of all known wastewater discharge points that are not authorized as permitted outfalls, including but not limited to SSOs. The Permittee shall include this record in its Municipal Water Pollution Prevention (MWPP) Annual Reports, which shall be submitted to the Department each year by May 31st for the prior calendar year period beginning January 1st and ending December 31st. The MWPP Annual Reports shall contain a list of all known wastewater discharge points that are not authorized as permitted outfalls and any discharges that occur prior to the headworks of the wastewater treatment plant covered by this permit. The Permittee shall also provide in the MWPP Annual Reports a list of any discharges reported during the applicable time period in accordance with Provision I.C.2.a. The Permittee shall include in its MWPP Annual Reports the following information for each known unpermitted discharge that occurred:
  - (1) The cause of the discharge;
  - (2) Date, duration and volume of discharge (estimate if unknown);
  - (3) Description of the source (e.g., manhole, lift station);
  - (4) Location of the discharge, by latitude and longitude (or other appropriate method as approved by the Department);
  - (5) The ultimate destination of the flow (e.g., surface waterbody, municipal separate storm sewer to surface waterbody). Location should be shown on a USGS quad sheet or copy thereof; and

(6) Corrective actions taken and/or planned to eliminate future discharges.

#### **D. OTHER REPORTING AND NOTIFICATION REQUIREMENTS**

1. Anticipated Noncompliance

The permittee shall give the Director written advance notice of any planned changes or other circumstances regarding a facility which may result in noncompliance with permit requirements.

2. Termination of Discharge

The permittee shall notify the Director, in writing, when all discharges from any point source(s) identified in Provision I. A. of this permit have permanently ceased. This notification shall serve as sufficient cause for instituting procedures for modification or termination of the permit.

3. Updating Information

a. The permittee shall inform the Director of any change in the permittee's mailing address or telephone number or in the permittee's designation of a facility contact or office having the authority and responsibility to prevent and abate violations of the AWPCA, the Department's Rules and the terms and conditions of this permit, in writing, no later than ten (10) days after such change. Upon request of the Director or his designee, the permittee shall furnish the Director with an update of any information provided in the permit application.

b. If the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information with a written explanation for the mistake and/or omission.

4. Duty to Provide Information

The permittee shall furnish to the Director, within a reasonable time, any information which the Director or his designee may request to determine whether cause exists for modifying, revoking and re-issuing, suspending, or terminating this permit, in whole or in part, or to determine compliance with this permit.

#### **E. SCHEDULE OF COMPLIANCE**

1. Compliance with discharge limits

The permittee shall achieve compliance with the discharge limitations specified in Provision I. A. in accordance with the following schedule:

COMPLIANCE SHALL BE ATTAINED ON THE EFFECTIVE DATE OF THIS PERMIT

2. Schedule

No later than 180 days from the issuance date of this permit, the permittee shall install an additional monitoring well west/southwest of the storage pond at the facility. The additional monitoring well is designated as MW41 in the permit. Until the complete installation of the additional monitoring well, “\*9” (monitoring is not required this monitoring period) shall be utilized on the eDMR for outfall MW41.

No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

## **PART II OTHER REQUIREMENTS, RESPONSIBILITIES, AND DUTIES**

### **A. OPERATIONAL AND MANAGEMENT REQUIREMENTS**

#### **1. Facilities Operation and Maintenance**

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of the permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities only when necessary to achieve compliance with the conditions of the permit.

#### **2. Best Management Practices**

- a. Dilution water shall not be added to achieve compliance with discharge limitations except when the Director or his designee has granted prior written authorization for dilution to meet water quality requirements.
- b. The permittee shall prepare, implement, and maintain a Spill Prevention, Control and Countermeasures (SPCC) Plan in accordance with 40 C.F.R. Section 112 if required thereby.
- c. The permittee shall prepare, submit for approval and implement a Best Management Practices (BMP) Plan for containment of any or all process liquids or solids, in a manner such that these materials do not present a significant potential for discharge, if so required by the Director or his designee. When submitted and approved, the BMP Plan shall become a part of this permit and all requirements of the BMP Plan shall become requirements of this permit.

#### **3. Certified Operator**

The permittee shall not operate any wastewater treatment plant unless the competency of the operator to operate such plant has been duly certified by the Director pursuant to AWPCA, and meets the requirements specified in ADEM Administrative Code, Rule 335-10-1.

### **B. OTHER RESPONSIBILITIES**

#### **1. Duty to Mitigate Adverse Impacts**

The permittee shall promptly take all reasonable steps to mitigate and minimize or prevent any adverse impact on human health or the environment resulting from noncompliance with any discharge limitation specified in Provision I. A. of this permit, including such accelerated or additional monitoring of the discharge and/or the receiving waterbody as necessary to determine the nature and impact of the noncomplying discharge.

#### **2. Right of Entry and Inspection**

- a. The permittee shall allow the Director, or an authorized representative, upon the presentation of proper credentials and other documents as may be required by law to:
  - (1) Enter upon the permittee's premises where a regulated facility or activity or point source is located or conducted, or where records must be kept under the conditions of the permit;
  - (2) Have access to and copy, at reasonable times, any records that must be kept under the conditions of the permits.
  - (3) Inspect any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under the permit; and
  - (4) Sample or monitor, for the purposes of assuring permit compliance or as otherwise authorized by the AWPCA, any substances or parameters at any location.

### **C. BYPASS AND UPSET**

#### **1. Bypass**

- a. Any bypass is prohibited except as provided in b. and c. below:
- b. A bypass is not prohibited if:
  - (1) It does not cause any discharge limitation specified in Provision I. A. of this permit to be exceeded;
  - (2) It enters the same receiving stream as the permitted outfall and;
  - (3) It is necessary for essential maintenance of a treatment or control facility or system to assure efficient operation of such facility or system.
- c. A bypass is not prohibited and need not meet the discharge limitations specified in Provision I. A. of this permit if:

- (1) It is unavoidable to prevent loss of life, personal injury, or severe property damage;
  - (2) There are no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime (this condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance); and
  - (3) The permittee submits a written request for authorization to bypass to the Director at least ten (10) days prior to the anticipated bypass (if possible), the permittee is granted such authorization, and the permittee complies with any conditions imposed by the Director to minimize any adverse impact on human health or the environment resulting from the bypass.
- d. The permittee has the burden of establishing that each of the conditions of Provision II. C. 1. b. or c. have been met to qualify for an exception to the general prohibition against bypassing contained in a. and an exemption, where applicable, from the discharge limitations specified in Provision I. A. of this permit.
2. Upset
- a. A discharge which results from an upset need not meet the discharge limitations specified in Provision I. A. of this permit if:
    - (1) No later than 24-hours after becoming aware of the occurrence of the upset, the Permittee orally reports the occurrence and circumstances of the upset to the Director or his designee; and
    - (2) No later than five (5) days after becoming aware of the occurrence of the upset, the Permittee furnishes the Director with evidence, including properly signed, contemporaneous operating logs, or other relevant evidence, demonstrating that:
      - (i) An upset occurred;
      - (ii) The Permittee can identify the specific cause(s) of the upset;
      - (iii) The Permittee's facility was being properly operated at the time of the upset; and
      - (iv) The Permittee promptly took all reasonable steps to minimize any adverse impact on human health or the environment resulting from the upset.
  - b. The Permittee has the burden of establishing that each of the conditions of Provision II C. 2. a. of this permit have been met to qualify for an exemption from the discharge limitations specified in Provision I. A. of this permit.

#### **D. DUTY TO COMPLY WITH PERMIT, RULES, AND STATUTES**

##### **1. Duty to Comply**

- a. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the AWPCA and the FWPCA and is grounds for enforcement action, for permit termination, revocation and reissuance, suspension, modification; or denial of a permit renewal application.
- b. The necessity to halt or reduce production or other activities in order to maintain compliance with the conditions of the permit shall not be a defense for a permittee in an enforcement action.
- c. The discharge of a pollutant from a source not specifically identified in the permit application for this permit and not specifically included in the description of an outfall in this permit is not authorized and shall constitute noncompliance with this permit.
- d. The permittee shall take all reasonable steps, including cessation of production or other activities, to minimize or prevent any violation of this permit or to minimize or prevent any adverse impact of any permit violation.
- e. Nothing in this permit shall be construed to preclude or negate the Permittee's responsibility to apply for, obtain, or comply with other Federal, State, or Local Government permits, certifications, or licenses or to preclude from obtaining other federal, state, or local approvals, including those applicable to other ADEM programs and regulations.

##### **2. Removed Substances**

Solids, sludges, filter backwash, or any other pollutant or other waste removed in the course of treatment or control of wastewaters shall be disposed of in a manner that complies with all applicable Department Rules.

##### **3. Loss or Failure of Treatment Facilities**

Upon the loss or failure of any treatment facilities, including but not limited to the loss or failure of the primary source of power of the treatment facility, the permittee shall, where necessary to maintain compliance with the discharge limitations specified in Provision I. A. of this permit, or any other terms or conditions of this permit, cease, reduce, or otherwise control production and/or all discharges until treatment is restored. If control of discharge



during loss or failure of the primary source of power is to be accomplished by means of alternate power sources, standby generators, or retention of inadequately treated effluent, the permittee must furnish to the Director within six months a certification that such control mechanisms have been installed.

#### 4. Compliance With Statutes and Rules

- a. This permit has been issued under ADEM Administrative Code, Chapter 335-6-6. All provisions of this chapter, that are applicable to this permit, are hereby made a part of this permit. A copy of this chapter may be obtained for a small charge from the Office of General Counsel, Alabama Department of Environmental Management, 1400 Coliseum Boulevard Montgomery, Alabama 36110-2059.
- b. This permit does not authorize the noncompliance with or violation of any Laws of the State of Alabama or the United States of America or any regulations or rules implementing such laws. FWPCA, 33 U.S.C. Section 1319, and Code of Alabama 1975, Section 22-22-14.

### E. PERMIT TRANSFER, MODIFICATION, SUSPENSION, REVOCATION, AND REISSUANCE

#### 1. Duty to Reapply or Notify of Intent to Cease Discharge

- a. If the permittee intends to continue to discharge beyond the expiration date of this permit, the permittee shall file a complete permit application for reissuance of this permit at least 180 days prior to its expiration. If the permittee does not intend to continue discharge beyond the expiration of this permit, the permittee shall submit written notification of this intent which shall be signed by an individual meeting the signatory requirements for a permit application as set forth in ADEM Administrative Code Rule 335-6-6-.09.
- b. Failure of the permittee to apply for reissuance at least 180 days prior to permit expiration will void the automatic continuation of the expiring permit provided by ADEM Administrative Code Rule 335-6-6-.06 and should the permit not be reissued for any reason any discharge after expiration of this permit will be an unpermitted discharge.

#### 2. Change in Discharge

Prior to any facility expansion, process modification or any significant change in the method of operation of the permittee's treatment works, the permittee shall provide the Director with information concerning the planned expansion, modification or change. The permittee shall apply for a permit modification at least 180 days prior to any facility expansion, process modification, any significant change in the method of operation of the permittee's treatment works or other actions that could result in the discharge of additional pollutants or increase the quantity of a discharged pollutant or could result in an additional discharge point. This condition applies to pollutants that are or that are not subject to discharge limitations in this permit. No new or increased discharge may begin until the Director has authorized it by issuance of a permit modification or a reissued permit.

#### 3. Transfer of Permit

This permit may not be transferred or the name of the permittee changed without notice to the Director and subsequent modification or revocation and reissuance of the permit to identify the new permittee and to incorporate any other changes as may be required under the FWPCA or AWPCA. In the case of a change in name, ownership or control of the permittee's premises only, a request for permit modification in a format acceptable to the Director is required at least 30 days prior to the change. In the case of a change in name, ownership or control of the permittee's premises accompanied by a change or proposed change in effluent characteristics, a complete permit application is required to be submitted to the Director at least 180 days prior to the change. Whenever the Director is notified of a change in name, ownership or control, he may decide not to modify the existing permit and require the submission of a new permit application.

#### 4. Permit Modification and Revocation

- a. This permit may be modified or revoked and reissued, in whole or in part, during its term for cause, including but not limited to, the following:
  - (1) If cause for termination under Provision II. E. 5. of this permit exists, the Director may choose to revoke and reissue this permit instead of terminating the permit;
  - (2) If a request to transfer this permit has been received, the Director may decide to revoke and reissue or to modify the permit; or
  - (3) If modification or revocation and reissuance is requested by the permittee and cause exists, the Director may grant the request.
- b. This permit may be modified during its term for cause, including but not limited to, the following:
  - (1) If cause for termination under Provision II. E. 5. of this permit exists, the Director may choose to modify this permit instead of terminating this permit;

- (2) There are material and substantial alterations or additions to the facility or activity generating wastewater which occurred after permit issuance which justify the application of permit conditions that are different or absent in the existing permit;
- (3) The Director has received new information that was not available at the time of permit issuance and that would have justified the application of different permit conditions at the time of issuance;
- (4) A new or revised requirement(s) of any applicable standard or limitation is promulgated under Sections 301(b)(2)(C), (D), (E), and (F), and 307(a)(2) of the FWPCA;
- (5) Errors in calculation of discharge limitations or typographical or clerical errors were made;
- (6) To the extent allowed by ADEM Administrative Code, Rule 335-6-6-.17, when the standards or regulations on which the permit was based have been changed by promulgation of amended standards or regulations or by judicial decision after the permit was issued;
- (7) To the extent allowed by ADEM Administrative Code, Rule 335-6-6-.17, permits may be modified to change compliance schedules;
- (8) To agree with a granted variance under 301(c), 301(g), 301(h), 301(k), or 316(a) of the FWPCA or for fundamentally different factors;
- (9) To incorporate an applicable 307(a) FWPCA toxic effluent standard or prohibition;
- (10) When required by the reopener conditions in this permit;
- (11) When required under 40 CFR 403.8(e) (compliance schedule for development of pretreatment program);
- (12) Upon failure of the state to notify, as required by Section 402(b)(3) of the FWPCA, another state whose waters may be affected by a discharge permitted by this permit;
- (13) When required to correct technical mistakes, such as errors in calculation, or mistaken interpretations of law made in determining permit conditions; or
- (14) When requested by the permittee and the Director determines that the modification has cause and will not result in a violation of federal or state law, regulations or rules; or

#### 5. Termination

This permit may be terminated during its term for cause, including but not limited to, the following:

- a. Violation of any term or condition of this permit;
- b. The permittee's misrepresentation or failure to disclose fully all relevant facts in the permit application or during the permit issuance process or the permittee's misrepresentation of any relevant facts at any time;
- c. Materially false or inaccurate statements or information in the permit application or the permit;
- d. A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge;
- e. The permittee's discharge threatens human life or welfare or the maintenance of water quality standards;
- f. Permanent closure of the facility generating the wastewater permitted to be discharged by this permit or permanent cessation of wastewater discharge;
- g. New or revised requirements of any applicable standard or limitation that is promulgated under Sections 301(b)(2)(C), (D), (E), and (F), and 307(a)(2) of the FWPCA that the Director determines cannot be complied with by the permittee.
- h. Any other cause allowed by the ADEM Administrative Code, Chapter 335-6-6.

#### 6. Suspension

This permit may be suspended during its term for noncompliance until the permittee has taken action(s) necessary to achieve compliance.

#### 7. Stay

The filing of a request by the permittee for modification, suspension or revocation of this permit, in whole or in part, does not stay any permit term or condition.

### F. COMPLIANCE WITH TOXIC POLLUTANT STANDARD OR PROHIBITION

If any applicable effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the FWPCA, 33 U.S.C. Section 1317(a), for a toxic pollutant discharged by the permittee and such standard or prohibition is more stringent than any discharge limitation on the pollutant specified in Provision I. A. of this permit, or controls a pollutant not limited in Provision I. A. of this permit, this

permit shall be modified to conform to the toxic pollutant effluent standard or prohibition and the permittee shall be notified of such modification. If this permit has not been modified to conform to the toxic pollutant effluent standard or prohibition before the effective date of such standard or prohibition, the permittee shall attain compliance with the requirements of the standard or prohibition within the time period required by the standard or prohibition and shall continue to comply with the standard or prohibition until this permit is modified or reissued.

#### **G. NOTICE TO DIRECTOR OF INDUSTRIAL USERS**

1. The permittee shall not allow the introduction of wastewater, other than domestic wastewater, from a new direct discharger prior to approval and permitting, if applicable, of the discharge by the Department.
2. The permittee shall not allow an existing indirect discharger to increase the quantity or change the character of its wastewater, other than domestic wastewater, prior to approval and permitting, if applicable, of the increased discharge by the Department.
3. The permittee shall report to the Department any adverse impact caused or believed to be caused by an indirect discharger on the treatment process, quality of discharged water or quality of sludge. Such report shall be submitted within seven days of the permittee becoming aware of the adverse impacts.

#### **H. PROHIBITIONS**

The permittee shall not allow, and shall take effective enforcement action to prevent and terminate, the introduction of any of the following into its treatment works by industrial users:

1. Pollutants which create a fire or explosion hazard in the treatment works;
2. Pollutants which will cause corrosive structural damage to the treatment works, or dischargers with a pH lower than 5.0 s.u., unless the works are specifically designed to accommodate such discharges;
3. Solid or viscous pollutants in amounts which will cause obstruction of flow in sewers, or other interference with the treatment works;
4. Pollutants, including oxygen demanding pollutants, released in a discharge of such volume or strength as to cause interference in the treatment works;
5. Heat in amounts which will inhibit biological activity in the treatment plant resulting in interference or in such quantities that the temperature of the treatment plant influent exceeds 40°C (104° F) unless the treatment plant is designed to accommodate such heat;
6. Pollutants in amounts which exceed any applicable pretreatment standard under Section 307 of FWPCA or any approved revisions thereof.



## **PART III ADDITIONAL REQUIREMENTS, CONDITIONS, AND LIMITATIONS**

### **A. CIVIL AND CRIMINAL LIABILITY**

#### **1. Tampering**

Any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained or performed under the permit shall, upon conviction, be subject to penalties as provided by the AWPCA.

#### **2. False Statements**

Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be subject to penalties as provided by the AWPCA.

#### **3. Permit Enforcement**

- a. Any NPDES permit issued or reissued by the Department is a permit for the purpose of the AWPCA and the FWPCA and as such any terms, conditions, or limitations of the permit are enforceable under state and federal law.
- b. Any person required to have a NPDES permit pursuant to ADEM Administrative Code Chapter 335-6-6 and who discharges pollutants without said permit, who violates the conditions of said permit, who discharges pollutants in a manner not authorized by the permit, or who violates applicable orders of the Department or any applicable rule or standard of the Department, is subject to any one or combination of the following enforcement actions under applicable state statutes.
  - (1) An administrative order requiring abatement, compliance, mitigation, cessation, clean-up, and/or penalties;
  - (2) An action for damages;
  - (3) An action for injunctive relief; or
  - (4) An action for penalties.
- c. If the permittee is not in compliance with the conditions of an expiring or expired permit the Director may choose to do any or all of the following provided the permittee has made a timely and complete application for reissuance of the permit:
  - (1) Initiate enforcement action based upon the permit which has been continued;
  - (2) Issue a notice of intent to deny the permit reissuance. If the permit is denied, the owner or operator would then be required to cease the activities authorized by the continued permit or be subject to enforcement action for operating without a permit;
  - (3) Reissue the new permit with appropriate conditions; or
  - (4) Take other actions authorized by these rules and AWPCA.

#### **4. Relief from Liability**

Except as provided in Provision II. C. 1. (Bypass) and Provision II. C. 2. (Upset), nothing in this permit shall be construed to relieve the permittee of civil or criminal liability under the AWPCA or FWPCA for noncompliance with any term or condition of this permit.

### **B. OIL AND HAZARDOUS SUBSTANCE LIABILITY**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities or penalties to which the permittee is or may be subject under Section 311 of the FWPCA, 33 U.S.C. Section 1321.

### **C. PROPERTY AND OTHER RIGHTS**

This permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to persons or property or invasion of other private rights, or any infringement of federal, state, or local laws or regulations, nor does it authorize or approve the construction of any physical structures or facilities or the undertaking of any work in any waters of the state or of the United States.

### **D. AVAILABILITY OF REPORTS**

Except for data determined to be confidential under Code of Alabama 1975, Section 22-22-9(c), all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department. Effluent data shall not be considered confidential.

**E. EXPIRATION OF PERMITS FOR NEW OR INCREASED DISCHARGES**

1. If this permit was issued for a new discharger or new source, this permit shall expire eighteen months after the issuance date if construction of the facility has not begun during the eighteen-month period.
2. If this permit was issued or modified to allow the discharge of increased quantities of pollutants to accommodate the modification of an existing facility and if construction of this modification has not begun during the eighteen month period after issuance of this permit or permit modification, this permit shall be modified to reduce the quantities of pollutants allowed to be discharged to those levels that would have been allowed if the modification of the facility had not been planned.
3. Construction has begun when the owner or operator has:
  - a. Begun, or caused to be begun as part of a continuous on-site construction program:
    - (1) Any placement, assembly, or installation of facilities or equipment; or
    - (2) Significant site preparation work including clearing, excavation, or removal of existing buildings, structures, or facilities which are necessary for the placement, assembly, or installation of new source facilities or equipment; or
  - b. Entered into a binding contractual obligation for the purpose of placement, assembly, or installation of facilities or equipment which are intended to be used in its operation within a reasonable time. Options to purchase or contracts which can be terminated or modified without substantial loss, and contracts for feasibility, engineering, and design studies do not constitute a contractual obligation under this paragraph.
4. Final plans and specifications for a waste treatment facility at a new source or new discharger, or a modification to an existing waste treatment facility must be submitted to and examined by the Department prior to initiating construction of such treatment facility by the permittee.
5. Upon completion of construction of waste treatment facilities and prior to operation of such facilities, the permittee shall submit to the Department a certification from a registered professional engineer, licensed to practice in the State of Alabama, that the treatment facilities have been built according to plans and specifications submitted to and examined by the Department.

**F. COMPLIANCE WITH WATER QUALITY STANDARDS**

1. On the basis of the permittee's application, plans, or other available information, the Department has determined that compliance with the terms and conditions of this permit should assure compliance with the applicable water quality standards.
2. Compliance with permit terms and conditions notwithstanding, if the permittee's discharge(s) from point sources identified in Provision I. A. of this permit cause or contribute to a condition in contravention of state water quality standards, the Department may require abatement action to be taken by the permittee in emergency situations or modify the permit pursuant to the Department's Rules, or both.
3. If the Department determines, on the basis of a notice provided pursuant to this permit or any investigation, inspection or sampling, that a modification of this permit is necessary to assure maintenance of water quality standards or compliance with other provisions of the AWPCA or FWPCA, the Department may require such modification and, in cases of emergency, the Director may prohibit the discharge until the permit has been modified.

**G. GROUNDWATER**

Unless specifically authorized under this permit, this permit does not authorize the discharge of pollutants to groundwater. Should a threat of groundwater contamination occur, the Director may require groundwater monitoring to properly assess the degree of the problem, and the Director may require that the permittee undertake measures to abate any such discharge and/or contamination.

**H. DEFINITIONS**

1. Average monthly discharge limitation - means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month (zero discharge days shall not be included in the number of "daily discharges" measured and a less than detectable test result shall be treated as a concentration of zero if the most sensitive EPA approved method was used).
2. Average weekly discharge limitation - means the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week (zero discharge days shall not be included in the number of "daily discharges" measured and a less than detectable test result shall be treated as a concentration of zero if the most sensitive EPA approved method was used).
3. Arithmetic Mean -- means the summation of the individual values of any set of values divided by the number of individual values.

4. AWPCA - means the Alabama Water Pollution Control Act.
5. BOD – means the five-day measure of the pollutant parameter biochemical oxygen demand.
6. Bypass - means the intentional diversion of waste streams from any portion of a treatment facility.
7. CBOD – means the five-day measure of the pollutant parameter carbonaceous biochemical oxygen demand.
8. Daily discharge - means the discharge of a pollutant measured during any consecutive 24-hour period in accordance with the sample type and analytical methodology specified by the discharge permit.
9. Daily maximum - means the highest value of any individual sample result obtained during a day.
10. Daily minimum - means the lowest value of any individual sample result obtained during a day.
11. Day - means any consecutive 24-hour period.
12. Department - means the Alabama Department of Environmental Management.
13. Director - means the Director of the Department.
14. Discharge - means "[t]he addition, introduction, leaking, spilling or emitting of any sewage, industrial waste, pollutant or other waste into waters of the state". Code of Alabama 1975, Section 22-22-1(b)(9).
15. Discharge Monitoring Report (DMR) - means the form approved by the Director to accomplish reporting requirements of an NPDES permit.
16. DO – means dissolved oxygen.
17. 8HC – means 8-hour composite sample, including any of the following:
  - (a) The mixing of at least 8 equal volume samples collected at constant time intervals of not more than 1 hour over a period of not less than 8 hours between the hours of 6:00 a.m. and 6:00 p.m. If the sampling period exceeds 8 hours, sampling may be conducted beyond the 6:00 a.m. to 6:00 p.m. period.
  - (b) A sample continuously collected at a constant rate over period of not less than 8 hours between the hours of 6:00 a.m. and 6:00 p.m. If the sampling period exceeds 8 hours, sampling may be conducted beyond the 6:00 a.m. to 6:00 p.m. period.
18. EPA - means the United States Environmental Protection Agency.
19. FC – means the pollutant parameter fecal coliform.
20. Flow – means the total volume of discharge in a 24-hour period.
21. FWPCA - means the Federal Water Pollution Control Act.
22. Geometric Mean – means the Nth root of the product of the individual values of any set of values where N is equal to the number of individual values. The geometric mean is equivalent to the antilog of the arithmetic mean of the logarithms of the individual values. For purposes of calculating the geometric mean, values of zero (0) shall be considered one (1).
23. Grab Sample – means a single influent or effluent portion which is not a composite sample. The sample(s) shall be collected at the period(s) most representative of the discharge.
24. Indirect Discharger – means a nondomestic discharger who discharges pollutants to a publicly owned treatment works or a privately owned treatment facility operated by another person.
25. Industrial User -- means those industries identified in the Standard Industrial Classification manual, Bureau of the Budget 1967, as amended and supplemented, under the category "Division D – Manufacturing" and such other classes of significant waste producers as, by regulation, the Director deems appropriate.
26. MGD – means million gallons per day.
27. Monthly Average – means the arithmetic mean of all the composite or grab samples taken for the daily discharges collected in one month period. The monthly average for flow is the arithmetic mean of all flow measurements taken in a one month period.
28. New Discharger – means a person, owning or operating any building, structure, facility or installation:
  - (a) From which there is or may be a discharge of pollutants;
  - (b) That did not commence the discharge of pollutants prior to August 13, 1979, and which is not a new source; and
  - (c) Which has never received a final effective NPDES permit for dischargers at that site.
29. NH3-N – means the pollutant parameter ammonia, measured as nitrogen.

30. Notifiable sanitary sewer overflow - means an overflow, spill, release or diversion of wastewater from a sanitary sewer system that:
- (a) Reaches a surface water of the State; or
  - (b) May imminently and substantially endanger human health based on potential for public exposure including but not limited to close proximity to public or private water supply wells or in areas where human contact would be likely to occur.
31. Permit application - means forms and additional information that is required by ADEM Administrative Code Rule 335-6-6-.08 and applicable permit fees.
32. Point source - means "any discernible, confined and discrete conveyance, including but not limited to any pipe, channel, ditch, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, . . . from which pollutants are or may be discharged." Section 502(14) of the FWPCA, 33 U.S.C. Section 1362(14).
33. Pollutant - includes for purposes of this permit, but is not limited to, those pollutants specified in Code of Alabama 1975, Section 22-22-1(b)(3) and those effluent characteristics specified in Provision I. A. of this permit.
34. Privately Owned Treatment Works – means any devices or system which is used to treat wastes from any facility whose operator is not the operator of the treatment works, and which is not a "POTW".
35. Publicly Owned Treatment Works – means a wastewater collection and treatment facility owned by the State, municipality, regional entity composed of two or more municipalities, or another entity created by the State or local authority for the purpose of collecting and treating municipal wastewater.
36. Receiving Stream – means the "waters" receiving a "discharge" from a "point source".
37. Severe property damage - means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
38. Significant Source – means a source which discharges 0.025 MGD or more to a POTW or greater than five percent of the treatment work's capacity, or a source which is a primary industry as defined by the U.S. EPA or which discharges a priority or toxic pollutant.
39. TKN – means the pollutant parameter Total Kjeldahl Nitrogen.
40. TON – means the pollutant parameter Total Organic Nitrogen.
41. TRC – means Total Residual Chlorine.
42. TSS – means the pollutant parameter Total Suspended Solids.
43. 24HC – means 24-hour composite sample, including any of the following:
- (a) The mixing of at least 8 equal volume samples collected at constant time intervals of not more than 2 hours over a period of 24 hours;
  - (b) A sample collected over a consecutive 24-hour period using an automatic sampler composite to one sample. As a minimum, samples shall be collected hourly and each shall be no more than one twenty-fourth (1/24) of the total sample volume collected;
  - (c) A sample collected over a consecutive 24-hour period using an automatic composite sampler composited proportional to flow.
44. Upset - means an exceptional incident in which there is an unintentional and temporary noncompliance with technology-based permit discharge limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
45. Waters - means "[a]ll waters of any river, stream, watercourse, pond, lake, coastal, ground or surface water, wholly or partially within the state, natural or artificial. This does not include waters which are entirely confined and retained completely upon the property of a single individual, partnership or corporation unless such waters are used in interstate commerce." Code of Alabama 1975, Section 22-22-1(b)(2). Waters "include all navigable waters" as defined in Section 502(7) of the FWPCA, 22 U.S.C. Section 1362(7), which are within the State of Alabama.
46. Week - means the period beginning at twelve midnight Saturday and ending at twelve midnight the following Saturday.
47. Weekly (7-day and calendar week) Average – is the arithmetic mean of all samples collected during a consecutive 7-day period or calendar week, whichever is applicable. The calendar week is defined as beginning on Sunday and ending on Saturday. Weekly averages shall be calculated for all calendar weeks with Saturdays in the month. If a

calendar week overlaps two months (i.e., the Sunday is in one month and the Saturday in the following month), the weekly average calculated for the calendar week shall be included in the data for the month that contains the Saturday.

**I. SEVERABILITY**

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

## **PART IV SPECIFIC REQUIREMENTS, CONDITIONS, AND LIMITATIONS**

### **A. SLUDGE MANAGEMENT PRACTICES**

1. Applicability
  - a. Provisions of Provision IV.A. apply to a sewage sludge generated or treated in treatment works that is applied to agricultural and non-agricultural land, or that is otherwise distributed, marketed, incinerated, or disposed in landfills or surface disposal sites.
  - b. Provisions of Provision IV.A. do not apply to:
    - (1) Sewage sludge generated or treated in a privately owned treatment works operated in conjunction with industrial manufacturing and processing facilities and which receive no domestic wastewater; and
    - (2) Sewage sludge that is stored in surface impoundments located at the treatment works prior to ultimate disposal.
2. Submitting Information
  - a. If applicable, the Permittee must submit annually with its Municipal Water Pollution Prevention (MWPP) report the following:
    - (1) Type of sludge stabilization/digestion method;
    - (2) Daily or annual sludge production (dry weight basis); and
    - (3) Ultimate sludge disposal practice(s).
  - b. The Permittee shall provide sludge inventory data to the Director as requested. These data may include, but are not limited to, sludge quantity and quality reported in Provision IV.A.2.a as well as other specific analyses required to comply with State and Federal laws regarding solid and hazardous waste disposal.
  - c. The Permittee shall give prior notice to the Director of at least 30 days of any change planned in the Permittee's sludge disposal practices.
3. Reopener or Modification
  - a. Upon review of information provided by the Permittee as required by Provision IV.A.2. or, based on the results of an on-site inspection, the permit shall be subject to modification to incorporate appropriate requirements.
  - b. If an applicable "acceptable management practice" or if a numerical limitation for a pollutant in sewage sludge promulgated under Section 405 of FWPCA is more stringent than the sludge pollutant limit or acceptable management practice in this permit, this permit shall be modified or revoked or reissued to conform to requirements promulgated under Section 405. The Permittee shall comply with the limitations no later than the compliance deadline specified in applicable regulations as required by Section 405 of FWPCA.

### **B. EFFLUENT TOXICITY TESTING REOPENER**

Upon notification under Part II. G of any newly introduced toxic industrial wastewaters, the Director may reopen the permit to include effluent toxicity limitations and testing requirements.

### **C. SANITARY SEWER OVERFLOW RESPONSE PLAN**

#### **1. SSO Response Plan**

Within 120 days of the effective date of this Permit, the Permittee shall develop a Sanitary Sewer Overflow (SSO) Response Plan to establish timely and effective methods for responding to notifiable sanitary sewer overflows. The SSO Response Plan shall address each of the following:

- a. General Information:
  - (1) Approximate population of City/Town, if applicable
  - (2) Approximate number of customers served by the Permittee
  - (3) Identification of any subbasins designated by the Permittee, if applicable
  - (4) Identification of estimated linear feet of sanitary sewers
  - (5) Number of Pump/Lift Stations in the collection system
- b. Responsibility Information:

- (1) The title(s) and contact information of key position(s) who will coordinate the SSO response, including information for a backup coordinator in the event that the primary SSO coordinator is unavailable. The SSO coordinator is the person responsible for assessing the SSO and initiating a series of response actions based on the type, severity, and destination of the SSO, except for routine SSOs for which the coordinator may pre-approve written procedures. Routine SSOs are those for which the corrective action procedures are generally consistent.
  - (2) The title(s), and contact information of key position(s) who will respond to SSOs, including information for backup responder(s) in the event the primary responder(s) are unavailable (i.e., position(s) who provide notification to the Department, the public, the county health department, and other affected entities such as public water systems; position(s) responsible for organizing crews for response; position(s) responsible for addressing public inquiries)
- c. SSO and Surface Water Assessment
- (1) Identification of locations within the collection system at which an SSO is likely to occur (e.g., based upon historical SSOs, lift stations where electricity may be lost, etc.)
  - (2) A map of the general collection system area, including identification of surface waterbodies and the location(s) of public drinking water source(s). Mapping of all collection system piping, pump stations, etc. is not required; however, if this information is already available, it should be included.
  - (3) Identification of surface waterbodies within the collection system area which are classified as Swimming according to ADEM Admin. Code chap. 335-6-11. References available to assist in this requirement include: <http://www.adem.state.al.us/alEnviroRegLaws/files/Division6Vol1.pdf> and [http://gis.adem.alabama.gov/ADEM\\_Dash/use\\_class/index.html](http://gis.adem.alabama.gov/ADEM_Dash/use_class/index.html)
  - (4) Identification of surface waterbodies within the collection system area which are not classified as Swimming as indicated in paragraph c above, but are known locally as areas where swimming occurs or as areas that are heavily recreated
- d. Public Reporting of SSOs
- (1) Contact information for the public to report an SSO to the Permittee, during both normal and outside of normal business hours (e.g., telephone number, website, email address, etc.)
  - (2) Information requested from the person reporting an SSO to assist the Permittee in identifying the SSO (e.g., date, time, location, contact information)
  - (3) Procedures for communication of the SSO report to the appropriate positions for follow-up investigation and response, if necessary
- e. Procedures to immediately notify the Department, the county health department, and other affected entities (such as public water systems) upon becoming aware of notifiable SSOs
- f. Public Notification Methods for SSOs
- (1) A listing of methods that are feasible, as determined by the Permittee, for public notifications (e.g., flyers distributed to nearby residents; signs posted at the location of the SSO, where the SSO enters a water of the state, and/or at a central public location; signs posted at fishing piers, boat launches, parks, swimming waterbodies, etc.; website and/or social media notifications; local print or radio and broadcast media notifications; "opt in" email, text message, or automated phone message notifications)
    - (a) If signage is a feasible method for public notification, procedures for use and removal of signage (e.g., availability and maintenance of signs, appropriate duration of postings)
  - (2) Minimum information to be included in public notifications (e.g., identification that an SSO has occurred, date, duration if known, estimated volume if known, location of the SSO by street address or other appropriate method, initial destination of the SSO)
  - (3) Procedures developed by the Permittee for determining the appropriate public notification method(s) based upon the potential for public exposure to health risks associated with the SSO
- g. Standard Procedures shall be developed by the Permittee and shall include, at a minimum:

- (1) General SSO Response Procedures (e.g., procedures for dispatching staff to assess/correct an SSO; procedures for routine SSO corrective actions such as those for sewer blockages, overflowing manholes, line breakages, pump station power failure, etc.; procedures for disinfection of affected area, if applicable);
  - (2) Procedures for collection and proper disposal of the SSO, if feasible.
  - (3) General procedures for coordinating instream water quality monitoring, including, but not limited to, procedures for mobilizing staff, collecting samples, and typical test methods should the Department or the Permittee determine monitoring is appropriate following an SSO. Identification of a contractor who will collect and analyze the sample(s) may be listed in lieu of the procedures.
  - (4) References to other documents (such as Standard Operating Procedures for SSO Responses) may be acceptable for this section; however, the referenced document shall be identified and shall be reviewed at a frequency of at least that required by the Administrative Procedures Section.
- h. Date of the SSO Response Plan, dates of all modifications and/or reviews, the title and signature of the reviewer(s) for each date and the signature of the responsible official or the appropriate designee.
2. SSO Response Plan Implementation

Except as otherwise required by this Permit, the Permittee shall fully implement the SSO Response Plan as soon as practicable, but no later than 180 days after the effective date of this Permit.
3. Department Review of the SSO Response Plan
  - a. When requested by the Director or his designee, the Permittee shall make the SSO Response Plan available for review by the Department.
  - b. Upon review, the Director or his designee may notify the Permittee that the SSO Response Plan is deficient and require modification of the Plan.
  - c. Within thirty days of receipt of notification, or an alternate timeframe as approved by the Department, the Permittee shall modify any SSO Response Plan deficiency identified by the Director or his designee and shall certify to the Department that the modification has been made.
4. SSO Response Plan Administrative Procedures
  - a. The Permittee shall maintain a copy of the SSO Response Plan at the permitted facility or an alternate location approved by the Department in writing and shall make it available for inspection by the Department.
  - b. The Permittee shall make a copy of the SSO Response Plan available to the public upon written request within 30 days of such request. The Permittee may redact information which may present security issues, such as location of public water supplies, identification of specific details of vulnerabilities, employee information, etc.
  - c. The Permittee shall provide training for any personnel required to implement the SSO Response Plan and shall retain at the facility documentation of such training. This documentation shall be available for inspection by the Department. Training shall be provided for existing personnel prior to the date by which implementation of the SSO Response Plan is required and for new personnel as soon as possible. Should significant revisions be made to the SSO Response Plan, training regarding the revisions shall be conducted as soon as possible.
  - d. The Permittee shall complete a review and evaluation of the SSO Response Plan at least once every three years. Documentation of the SSO Response Plan review and evaluation shall be signed and dated by the responsible official or the appropriate designee as part of the SSO Response Plan.

#### **D. PLANT CLASSIFICATION**

The Permittee shall report to the Director within 30 days of the effective date of this permit, the name, address and operator number of the certified wastewater operator in responsible charge of the facility. Unless specified elsewhere in this permit, this facility shall be classified in accordance with ADEM Admin. Code R. 335-10-1-.03.

#### **E. OTHER REQUIREMENTS FOR LAND APPLICATION**

1. Flow Monitoring
  - a. Influent flow to the treatment plant shall be recorded continuously. This data is subject to the records retention requirements of this permit. The monthly average and daily maximum flows shall be reported on the DMRs in accordance with Part I.A. of this permit.



- b. Wastewater flow to the sprayfield shall be recorded continuously. This data is subject to the records retention requirements of this permit. The monthly average and daily maximum flows shall be reported on the DMRs in accordance with Part I.A. of this permit.

## 2. Groundwater Monitoring

- a. All sprayfield groundwater monitoring wells identified in the approved "Semi-Annual Groundwater Monitoring Plan" shall be monitored in accordance with the following schedule:

MEASUREMENT PARAMETER	SAMPLE FREQUENCY	SAMPLING TYPE	POINT
Total Organic Carbon (TOC)	Semiannual	Grab	Monitoring Wells
Ammonia (N)	"	"	"
Nitrite (N)	"	"	"
Nitrate (N)	"	"	"
Nitrogen, Total	"	"	"
Phosphorus, Total	"	"	"
Coliform, Fecal	"	"	"
E. coli	"	"	"
Methylene-Blue Active Substances	"	"	"
Static Water Level	"	"	"

- b. All groundwater monitoring wells should be sampled prior to initiating any application of treated wastewater to the land application site. Groundwater sampling after commencement of land application shall be conducted during the months of **March and September**.
- c. The Permittee must determine if there is a statistically significant increase in contaminant levels in comparison to background water quality at each well. Should groundwater monitoring reveal that the concentration of parameters listed in Part IV. E. 2. statistically exceed background (upgradient) concentrations; or that the concentration exceeds primary or secondary drinking water standards promulgated under ADEM Administrative Code Division 335-7; or that the concentrations exceed EPA Region 9 preliminary remediation goals, the Department may require the Permittee to revise the groundwater monitoring program to conduct a groundwater assessment and/or to implement a groundwater corrective action program.
- d. Groundwater samples must be analyzed using EPA approved analytical methods.
- e. The Permittee must submit an annual report in the month of **January** summarizing the collective semi-annual groundwater sampling results. The annual report should include the following:
- The nature and the extent of groundwater contamination (if any). Include contour maps showing the groundwater flow direction;
  - Discussion of all analytical results;
  - Discussion of concentration trends in each monitoring well;
  - All potentiometric data collected during each monitoring event including top casing elevations, measured water level, total well depths, and calculated groundwater elevations;
  - A potentiometric map illustrating the groundwater flow direction for each monitoring event;
  - All field parameter data collected during the well purging activities;
  - The specific dates that the groundwater sampling activities were conducted; and
  - The report shall be prepared by and bear the signature and the license number of a licensed professional geologist or professional engineer registered in the State of Alabama.
- f. The Permittee shall submit and adhere to the schedule of compliance in accordance with Part I. E.

## 3. Stream Monitoring Requirements

The Permittee shall sample all surface streams immediately upstream and downstream of the land application site in accordance with Parts I.A.3 and I.A.4 of this permit. Samples shall be collected at mid-channel and at a depth of 5 ft. or mid-depth, whichever is less. The sampling locations shall be approved by the Department. Results shall be reported on DMR forms provided by the Department.

## 4. Sprayfield Operation Requirements

- a. A healthy cover crop shall be maintained at all times during land application of wastewater. If necessary, the cover crop shall be maintained by fertilization, reseeding, re-planting, etc.
- b. Best management practices erosion control measures shall be implemented to minimize soil loss.
- c. Wastewater shall not be applied to the sprayfield during periods of rain and/or high winds that may cause release of wastewater flow or any wastewater mist or residual to any off site location. Wastewater shall not be applied to the sprayfield when the ground is saturated, prior to periods of rain, when the ground is frozen or at any similar time when percolation will not readily occur.

- d. Wastewater shall not be applied to fields with a slope greater than 30% and shall not be applied within 100 feet of any creeks, drainage ways, sinkholes, and springs.
- e. All spray equipment and monitoring provisions shall be properly operated and maintained at all times to prevent leaks and spills. The equipment shall be installed so that there is no overlap of spray patterns from individual sprinklers.
- f. As a minimum, the following records shall be maintained by the permittee and will be subject to inspection by the Department:
  - (1) All information required by land application monitoring reports;
  - (2) Field, date, and time span of application and volume applied;
  - (3) Field, date, quantity, and type of fertilizer applied;
  - (4) Date and amount of rainfall; and
  - (5) Daily nitrogen loading (ppd) for each field or zone/pivot
- g. The Permittee shall not apply wastewater to areas where depth to groundwater is less than 5 feet or where land application sites are located within the 100 year floodplain.
- h. Excessive rainwater run-on must be diverted from the land application area.
- i. The following buffer zones shall be maintained along ditches, gulleys, swales, and other features that have any potential to convey storm water to an adjacent stream or sink hole:
  - (1) 100 feet from all property lines
  - (2) 100 feet from all sinkholes
  - (3) 100 feet from any perennial stream or lake
  - (4) 300 feet from public or private wells
  - (5) 300 feet from existing habitable residences

The buffer zone around sinkholes will also include terracing or another appropriate method of diversion to prevent any potential runoff from entering the area.
- j. Wastewater shall be applied in such a manner that surface run-off does not occur.

#### **F. STORMWATER MONITORING REQUIREMENTS**

- 1. The permittee shall sample all storm water outfalls in accordance with Part I.A.2 of this permit. The locations of these stormwater outfalls must be approved by the Department. A grab sample shall be collected during the first thirty minutes of the discharge (or as soon thereafter as practicable).
- 2. The total volume of stormwater discharged for the event must be monitored, including the date and duration (in hours) and rainfall (in inches) for storm event(s) sampled. The duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event must be a minimum of 72 hours. This information must be recorded and is subject to the records retention requirements of this permit.
- 3. The stormwater volume may be measured using flow measuring devices and/or estimations using a modification of the Rational Method and appropriate considerations of total depth of rainfall, size of the drainage area serving each storm water outfall, and the estimated runoff coefficient for the drainage area. This information must be recorded as part of the sampling procedure and is also subject to the records retention requirement of this permit.

## NPDES PERMIT RATIONALE

NPDES Permit No:	<b>AL0072834</b>	Date:	9/21/2018
Permit Applicant:	Town of Lexington Post Office Box 147 Lexington, Alabama 35648		
Location:	Lexington Lagoon and Sprayfield County Road 497 Lexington, Alabama 35648		
Draft Permit is:	Initial Issuance: Reissuance due to expiration: X Modification of existing permit: Revocation and Reissuance:		
Basis for Limitations:	Water Quality Model: N/A Reissuance with no modification: pH, TSS, TKN, FC, CBOD5 Instream calculation at 7Q10: N/A Toxicity based: N/A Secondary Treatment Levels: N/A Other (described below): pH, TSS, TKN, FC, CBOD5		
Design Flow in Million Gallons per Day:	0.155 MGD		
Major:	No		
Description of Discharge:	Outfall Number 001; Effluent discharge to a Land Application.  Outfall Number 002; Stormwater discharge to a UT to Mill Creek, which is classified as Fish & Wildlife.  Outfall Number 003; Stormwater discharge to a UT to Second Creek, which is classified as Fish & Wildlife.  Outfall Numbers 004U and 005D; Stream monitoring on a UT to Mill Creek, which is classified as Fish & Wildlife.  Outfall Numbers MW11, MW21, MW31, and MW41; Groundwater Monitoring.		

Discussion: This is a reissuance due to expiration.

The limits for Carbonaceous Biochemical Oxygen Demand (CBOD5), Total Suspended Solids (TSS), and pH are established based upon best professional judgment (BPJ) to be consistent with 40 CFR part 133.105. The monthly average CBOD5 and TSS limits are 45.0 mg/L and 90.0 mg/L, respectively. The pH limits are 6.0 s.u. (daily minimum) and 9.0 s.u. (daily maximum).

Monitoring and reporting requirements for Total Phosphorus (TP), Total Nitrogen (TN), Total Nitrate-Nitrogen (NO3-N), and Total Ammonia-Nitrogen (NH3-N) have been imposed in this permit. A monthly average Total Kjeldahl Nitrogen (TKN) limit of 20 mg/L is being imposed to maintain consistency with other land application permits in the state. These results will provide an overall indication of the total nutrient loading to the spray field.

Fecal Coliform (FC) limits are imposed in the permit in accordance with the Municipal Section disinfection strategy for land application facilities. The FC limits for the restricted site are 2000 col/100mL (monthly average) and 4000 col/100mL (daily maximum).

No toxicity testing is required because the facility is a land application system. This land application site treats domestic wastewater.

The monitoring frequency for most parameters is monthly. Flow to the treatment facility or to the holding pond is to be monitored daily. Flow to the sprayfield is also to be monitored daily.

In order to monitor the potential for the land application system to impact nearby waterways, the Department is requiring that the Permittee monitor the quality of the stream adjacent to the land application site. Upstream and downstream water quality at the UT to Mill Creek shall be monitored quarterly at designated Outfalls 004U and 005D. This monitoring is being required in order to provide an indication of whether the sprayfield is being properly maintained and operated such that the sprayfield application does not impact the nearby streams. The Permittee has indicated that the UT to Second Creek, also adjacent to the sprayfield, does not have an accessible upstream monitoring point and is impacted by cattle. Therefore, the UT to Second Creek would not be representative of whether the sprayfield is being properly maintained and operated.

In the permit application, the Permittee reported two storm water outfalls from the sprayfield area. The storm water outfalls listed as Outfalls 002S and 003 on EPA Form 2F in the Permittee's application will be designated as Outfalls 002S and 003S respectively in the permit. Storm water monitoring at these outfalls will be required on a quarterly basis. This monitoring is being required in order to provide an indication of whether the sprayfield is being properly maintained and operated such that the sprayfield application does not impact the nearby streams during storm events.

The Permittee has indicated that there are three groundwater monitoring wells at the facility. In order to monitor potential impacts of the sprayfield on the groundwater, monitoring at these wells will be required twice per year, during the months of March and September at designated outfalls MW11, MW21, MW31 and MW41.

ADEM Administrative Rule 335-6-10-.12 requires applicants for new or expanded discharges to Tier II waters demonstrate that the proposed discharge is necessary for important economic or social development in the area in which the waters are located. The application submitted by the facility is not for a new or expanded point source discharge to a Tier II water, so the applicant is not required to demonstrate that the discharge is necessary for economic and social development.

Prepared by: Nicholas Lowe