

# **USDA SEWER SYSTEM IMPROVEMENTS CONTRACT A – WPCP UPGRADES**

***PREPARED FOR THE***

**CITY OF THOMASTON**

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**CONTRACT DOCUMENTS  
AND  
TECHNICAL SPECIFICATIONS**



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**USDA Sewer System Improvements  
Contract A – WPCP Upgrades**

**FOR THE  
CITY OF THOMASTON**



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## **CONTRACT DOCUMENTS**

## ADVERTISEMENT FOR BIDS

City of Thomaston  
Thomaston, Georgia  
USDA Sewer System

### General Notice

City of Thomaston (Owner) is requesting Bids for the construction of the following Project:

#### **USDA Sewer System Improvements – Contract A and Contract B T3000.115**

Bids for the construction of the Project will be received at the City Manager's Office located at 106 E. Lee Street Thomaston, GA 30286, until **Friday, January 8, 2021 at 2:00 PM and 2:30 PM respectively** local time. At that time the Bids received will be publically opened and read.

The Project includes the following Work and will be awarded in two separate contracts:

**Contract A – WPCP Upgrades- Bid Opening Jan 8<sup>th</sup> at 2:00 PM:** Town Branch WPCP Improvements will include (but is not limited to) the addition of a splitter box and new clarifier along with upgraded return activated sludge (RAS) pumps. Miscellaneous piping improvements will be required and a portable belt press and support slab will be provided.

Bell Creek Improvements will include electrical upgrades to move motor control centers out of the basement where frequent flooding occurs. Miscellaneous piping improvements will be required and a concrete pad will be poured to support a portable belt press.

One mobile trailer mounted belt press will be purchased as part of this contract and will serve Bell Creek WPCP and Town Branch WPCP.

**Contract B- Town Branch Interceptor- Bid Opening Jan 8<sup>th</sup> at 2:30 PM:** The project consists of (but is not limited to) approximately 12,000 LF of 30" gravity sewer main construction across primarily cross-country terrain. The proposed construction will include the removal of an existing 18" gravity sewer main, installation of new 30" gravity sewer, installation of associated manholes, pavement replacement at road-crossings, erosion and sediment control devices and measures, and other associated work.

Bids are requested for the following Contract: USDA Sewer System Improvements- Contract A and Contract B

### Obtaining the Bidding Documents

The Issuing Office for the Bidding Documents is:

ESG Engineering  
6400 Peake Rd  
Macon, GA 31210

Prospective Bidders may obtain or examine the Bidding Documents at the Issuing Office on Monday through Friday between the hours of 8:00 AM – 5:00 PM EST and may obtain copies of the Bidding Documents from the Issuing Office as described below. Partial sets of Bidding Documents will not be available from the Issuing Office. Neither Owner nor Engineer will be responsible for full or partial sets of Bidding Documents, including addenda, if any, obtained from sources other than the Issuing Office.

Copies of Bidding Documents for each contract may be obtained from ESG Engineering. Contact Margaret Hildebrand at [mhildebrand@esgengineering.com](mailto:mhildebrand@esgengineering.com) to procure Bidding Documents and to be added to the

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EJCDC® C-111, Advertisement for Bids for Construction Contract.

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Modified to include RD edits from RUS Bulletin 1780-26 (6/16/2020).

Bidder's List (required to bid on project). Digital documents will be provided upon a non-reimbursable payment of \$100 per contract and hard copies will be provided upon non-reimbursable payment of \$200 per contract. Upon Issuing Office's receipt of payment, printed Bidding Documents will be sent via the prospective Bidder's delivery service or electronic documents will be sent via email. **Prospective bidders must be on the official plan holders list in order for their bid to be considered responsive.**

#### **Pre-bid Conference**

If the owner elects to hold a pre-bid conference, all planholders will be notified via addendum.

#### **Instructions to Bidders.**

For all further requirements regarding bid submittal, qualifications, procedures, and contract award, refer to the Instructions to Bidders that are included in the Bidding Documents.

#### **American Iron and Steel**

**Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials.**

**The following waivers apply to this Contract:**

***De Minimis,***

**Minor Components,**

**Pig iron and direct reduced iron.**

This Advertisement is issued by:

Owner: The City of Thomaston

By: Russell Thompson

Title: City Manager

Date: **November 26, 2020**



# INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

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## ARTICLE 1—DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. *Issuing Office*—The office from which the Bidding Documents are to be issued, and which registers plan holders.

## ARTICLE 2—BIDDING DOCUMENTS

- 2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.
- 2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.
- 2.03 ~~Owner has established a Bidding Documents Website as indicated in the Advertisement or invitation to bid. Owner recommends that Bidder register as a plan holder with the Issuing Office at such website, and obtain a complete set of the Bidding Documents from such website. Bidders may rely that sets of Bidding Documents obtained from the Bidding Documents Website are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.~~
- 2.04 Bidder ~~may~~ **must** register as a plan holder and obtain complete sets of Bidding Documents, in the number and format stated in the Advertisement or invitation to bid, from the Issuing Office. Bidders may rely that sets of Bidding Documents obtained from the Issuing Office are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.
- 2.05 Plan rooms (including construction information subscription services, and electronic and virtual plan rooms) may distribute the Bidding Documents, or make them available for examination. Those prospective bidders that obtain an electronic (digital) copy of the Bidding Documents from a plan room are ~~encouraged to~~ **must** register as plan holders from the ~~Bidding Documents Website~~ or Issuing Office **for their bid to be considered responsive**. Owner is not responsible for omissions in Bidding Documents or other documents obtained from plan rooms, or for a Bidder's failure to obtain Addenda from a plan room.
- 2.06 *Electronic Documents*
- A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.

1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf) that is readable by Adobe Acrobat Reader Version DC or later. It is the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the paper copies.
- B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.06.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.
- ~~C. After the Contract is awarded, the Owner will provide or direct the Engineer to provide for the use of the Contractor documents that were developed by Engineer as part of the Project design process, as Electronic Documents in native file formats.~~
  - ~~1. Electronic Documents that are available in native file format include:
    - a. ~~[List documents that will be made available to Contractor]~~~~
  - ~~2. Release of such documents will be solely for the convenience of the Contractor. No such document is a Contract Document.~~
  - ~~3. Unless the Contract Documents explicitly identify that such information will be available to the Successful Bidder (Contractor), nothing herein will create an obligation on the part of the Owner or Engineer to provide or create such information, and the Contractor is not entitled to rely on the availability of such information in the preparation of its Bid or pricing of the Work. In all cases, the Contractor shall take appropriate measures to verify that any electronic/digital information provided in Electronic Documents is appropriate and adequate for the Contractor's specific purposes.~~
  - ~~4. In no case will the Contractor be entitled to additional compensation or time for completion due to any differences between the actual Contract Documents and any related document in native file format.~~

### ARTICLE 3—QUALIFICATIONS OF BIDDERS

- 3.01 ~~To demonstrate Bidder's qualifications to perform the Work, after submitting its Bid and within 5 days of Owner's request, Bidder must submit the following information:~~
  - ~~A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.~~
  - ~~B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.~~

- ~~C. Bidder's state or other contractor license number, if applicable.~~
  - ~~D. Subcontractor and Supplier qualification information.~~
  - ~~E. Other required information regarding qualifications.~~
- 3.02 ~~Prospective Bidders must submit required information regarding their qualifications by [insert deadline for prequalification submittals]. Owner will review the submitted information to determine which contractors are qualified to bid on the Work. Owner will issue an Addendum listing those contractors that Owner has determined to be qualified to construct the project. Bids will only be accepted from listed contractors. The information that each prospective Bidder must submit to seek prequalification includes the following:~~
- ~~A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.~~
  - ~~B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.~~
  - ~~C. Prospective Bidder's state or other contractor license number, if applicable.~~
  - ~~D. Subcontractor and Supplier qualification information.~~
  - ~~E. Other required information regarding qualifications.~~

**Deleted**

- 3.03 Bidder is to submit the following information with its Bid to demonstrate Bidder's qualifications to perform the Work:
- A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.
  - B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.
  - C. Bidder's state or other contractor license number, if applicable.
  - D. Subcontractor and Supplier qualification information.
  - E. Other required information regarding qualifications.
- 3.04 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.
- 3.05 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

**ARTICLE 4—PRE-BID CONFERENCE**

- ~~4.01 A pre bid conference will not be conducted for this Project.~~
- ~~4.02 A non-mandatory pre bid conference will be held at the time and location indicated in the Advertisement or invitation to bid. Representatives of Owner and Engineer will be present to~~

~~discuss the Project. Bidders are encouraged to attend and participate in the conference; however, attendance at this conference is not required to submit a Bid.~~

- 4.03 ~~A mandatory pre-bid conference will be held at the time and location indicated in the Advertisement or invitation to bid. Representatives of Owner and Engineer will be present to discuss the Project. Proposals will not be accepted from Bidders who do not attend the conference. It is each Bidder's responsibility to sign in at the pre-bid conference to verify its participation. Bidders must sign in using the name of the organization that will be submitting a Bid. A list of qualified Bidders that attended the pre-bid conference and are eligible to submit a Bid for this Project will be issued in an Addendum.~~
- 4.04 Information presented at the pre-Bid conference does not alter the Contract Documents. Owner will issue Addenda to make any changes to the Contract Documents that result from discussions at the pre-Bid conference. Information presented, and statements made at the pre-bid conference will not be binding or legally effective unless incorporated in an Addendum.

## **ARTICLE 5—SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE**

### **5.01 *Site and Other Areas***

- A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

### **5.02 *Existing Site Conditions***

#### **A. *Subsurface and Physical Conditions; Hazardous Environmental Conditions***

1. The Supplementary Conditions identify the following regarding existing conditions at or adjacent to the Site:
  - a. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data.
  - b. Those drawings known to Owner of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data.
  - c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
  - d. Technical Data contained in such reports and drawings.
2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in 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.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.
4. *Geotechnical Baseline Report/Geotechnical Data Report*: The Bidding Documents contain a ~~Geotechnical Baseline Report (GBR) and Geotechnical Data Report (GDR).~~
  - a. ~~As set forth in the Supplementary Conditions, the GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations ("Baseline Conditions"). The GBR is a Contract Document.~~
  - b. ~~The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.~~
  - c. ~~Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.~~
  - d. ~~As set forth in the Supplementary Conditions, the GDR is a Contract Document containing data prepared by or for the Owner in support of the GBR.~~
- B. *Underground Facilities*: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

#### 5.03 *Other Site-related Documents*

- A. In addition to the documents regarding existing Site conditions referred to in Paragraph 5.02.A, the following other documents relating to conditions at or adjacent to the Site are known to Owner and made available to Bidders for reference:
  1. **Existing Plant Drawings for Town Branch WPCP Improvements (1985)**
  2. **Existing Plant Drawings for the Bell Creek WPCP Upgrading (1987)**Owner will make **electronic** copies of these other Site-related documents available to any Bidder on request.
- B. Owner has not verified the contents of these other Site-related documents, and Bidder may not rely on the accuracy of any data or information in such documents. Bidder is responsible for any interpretation or conclusion Bidder draws from the other Site-related documents.
- C. The other Site-related documents are not part of the Contract Documents.

- D. Bidders are encouraged to review the other Site-related documents, but Bidders will not be held accountable for any data or information in such documents. The requirement to review and take responsibility for documentary Site information is limited to information in (1) the Contract Documents and (2) the Technical Data.

~~E. No other Site-related documents are available.~~

#### 5.04 *Site Visit and Testing by Bidders*

~~A. Bidder is required to visit the Site and conduct a thorough visual examination of the Site and adjacent areas. During the visit the Bidder must not disturb any ongoing operations at the Site.~~

~~B. A Site visit is scheduled following the pre-bid conference. Maps to the Site will be available at the pre-Bid conference.~~

~~C. A Site visit is scheduled for [designate, date, time and location]. Maps to the Site will be made available upon request.~~

D. Bidders visiting the Site are required to arrange their own transportation to the Site.

E. All access to the Site other than during a regularly scheduled Site visit must be coordinated through the following Owner or Engineer contact for visiting the Site: Margaret Hildebrand, [mhildebrand@esgengineering.com](mailto:mhildebrand@esgengineering.com) Bidder must conduct the required Site visit during normal working hours.

F. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

G. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site. Bidder is responsible for establishing access needed to reach specific selected test sites.

H. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.

I. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

#### 5.05 *Owner's Safety Program*

A. Site visits and work at the Site may be governed by an Owner safety program. If an Owner safety program exists, it will be noted in the Supplementary Conditions.

#### 5.06 *Other Work at the Site*

A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the

Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

## **ARTICLE 6—BIDDER’S REPRESENTATIONS AND CERTIFICATIONS**

### **6.01 *Express Representations and Certifications in Bid Form, Agreement***

- A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder’s examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications, and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.
- B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

## **ARTICLE 7—INTERPRETATIONS AND ADDENDA**

- 7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.
- 7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to Engineer in writing. Contact information and submittal procedures for such questions are as follows:
  - A. Margaret Hildebrand, [mhildebrand@esgengineering.com](mailto:mhildebrand@esgengineering.com)
- 7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than seven days prior to the date for opening of Bids may not be answered.
- 7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

## **ARTICLE 8—BID SECURITY**

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5 percent of Bidder’s maximum Bid price (determined by adding the base bid and all alternates) and in the form of a Bid bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions. Such Bid bond will be issued in the form included in the Bidding Documents. **Bid security must be at least 5% of the Bidder’s maximum Bid price.**
- 8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract and furnish the required Contract security within 15 days after the Notice of Award, Owner may



consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited, in whole in the case of a penal sum bid bond, and to the extent of Owner's damages in the case of a damages-form bond. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.

- 8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.
- 8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within 7 days after the Bid opening.

#### **ARTICLE 9—CONTRACT TIMES**

- 9.01 The number of days within which, or the dates by which, the Work is to be (a) substantially completed and (b) ready for final payment, and (c) Milestones (if any) are to be achieved, are set forth in the Agreement.
- 9.02 ~~Bidder must set forth in the Bid the time by which Bidder must achieve Substantial Completion, subject to the restrictions established in Paragraph 13.07 of these Instructions. The Owner will take Bidder's time commitment regarding Substantial Completion into consideration during the evaluation of Bids, and it will be necessary for the apparent Successful Bidder to satisfy Owner that it will be able to achieve Substantial Completion within the time such Bidder has designated in the Bid. [If applicable include the following: Bidder must also set forth in the Bid its commitments regarding the achievement of Milestones and readiness for final payment.] The Successful Bidder's time commitments will be entered into the Agreement or incorporated in the Agreement by reference to the specific terms of the Bid.~~

#### **Deleted**

- 9.03 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

#### **ARTICLE 10—SUBSTITUTE AND "OR EQUAL" ITEMS**

- 10.01 ~~The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or "or equal" items. In cases in which the Contract allows the Contractor to request that Engineer authorize the use of a substitute or "or equal" item of material or equipment, application for such acceptance may not be made to and will not be considered by Engineer until after the Effective Date of the Contract.~~

#### **Deleted**

- 10.02 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those "or-equal" or substitute or materials and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer as an "or-equal" or substitute unless written request for approval has been submitted by Bidder and has been

received by Engineer within 10 days of the issuance of the Advertisement for Bids or invitation to Bidders **bid date**. Each such request must comply with the requirements of Paragraphs 7.05 and 7.06 of the General Conditions, and the review of the request will be governed by the principles in those paragraphs. **Each such request shall include the Manufacturer's Certification for Compliance with AIS. Refer to the Manufacturer's Certification form provided in these construction Contract Documents.** The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all registered Bidders. Bidders cannot rely upon approvals made in any other manner. **Substitutes and "or-equal" materials and equipment may be proposed by Contractor in accordance with Paragraphs 7.05 and 7.06 of the General Conditions after the Effective Date of the Contract. Each such request shall include Manufacturer's Certification letter to document compliance with AIS requirements of Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents.**

- 10.03 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.

#### **ARTICLE 11—SUBCONTRACTORS, SUPPLIERS, AND OTHERS**

- 11.01 ~~A Bidder must be prepared to retain specific Subcontractors and Suppliers for the performance of the Work if required to do so by the Bidding Documents or in the Specifications. If a prospective Bidder objects to retaining any such Subcontractor or Supplier and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.~~

##### **Deleted**

- 11.02 The apparent Successful Bidder, and any other Bidder so requested, must submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work within five days after Bid opening:
- A. **Electrical**
  - B. **Concrete**
  - C. **Materials Hauling**
  - D. **Dewatering**
  - E. **Sheeting & Shoring**
  - F. **All others**
- 11.03 If requested by Owner, such list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or Supplier. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent

Successful Bidder will submit a 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.

- 11.04 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 and Suppliers. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor or Supplier, 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 subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

**11.05 – The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 7.07A.**

**ARTICLE 12—PREPARATION OF BID**

- 12.01 The Bid Form is included with the Bidding Documents.
- A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.
  - B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."
- 12.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.
- 12.03 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.
- 12.04 A Bid by a partnership must 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 must be shown.
- 12.05 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person 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.
- 12.06 A Bid by an individual must show the Bidder's name and official address.
- 12.07 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.

- 12.08 All names must be printed in ink below the signatures.
- 12.09 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.
- 12.10 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.
- 12.11 The Bid must contain evidence of Bidder's authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.
- 12.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder's licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and attach such certification to the Bid. Bidder's state contractor license number, if any, must also be shown on the Bid Form.

### ARTICLE 13—BASIS OF BID

13.01 *Lump Sum*

~~A. Bidders must submit a Bid on a lump sum basis as set forth in the Bid Form.~~

13.02 *Base Bid with Alternates*

~~A. Bidders must submit a Bid on a lump sum basis for the base Bid and include a separate price for each alternate described in the Bidding Documents and as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the base Bid if Owner selects the alternate.~~

~~B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form.~~

13.03 *Sectional Bids*

~~A. Bidders may submit a Bid on any individual section or any combination of sections, as set forth in the Bid Form.~~

~~B. Submission of a Bid on any section signifies Bidder's willingness to enter into a Contract for that section alone at the price offered.~~

~~C. If Bidder submits Bids on individual sections and a Bid based on a combination of those sections, such combined Bid need not be the sum of the Bids on the individual sections.~~

~~D. Bidders offering a Bid on one or more sections must be capable of completing the Work covered by those sections within the time period stated in the Agreement.~~

13.04 *Cost Plus Fee Bids*

~~A. Bidders must submit a Bid on the Contractor's fee, which must be in addition to compensation for Cost of the Work. Such fee must be either (1) a fixed fee, (2) percentages of specified categories of costs, or (3) a percentage applicable to the Cost of the Work as a whole, as set forth in the Bid Form.~~

- ~~B. If the Contractor's fee, as set forth in the Bid Form, is to be based on percentages of categories of cost, or on a percentage applicable to the Cost of the Work as a whole, then Bidders must enter a maximum amount limiting the total fee if required by the Bid Form to do so.~~
- ~~C. Bidders must submit a Bid on the Guaranteed Maximum Price, setting a maximum amount on the compensable Cost of the Work plus Contractor's fee, if required by the Bid Form to do so.~~

**Deleted**

13.05 *Unit Price*

- A. Bidders must submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.
- B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity", which Owner or its representative has set forth in the Bid Form, for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 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.

13.06 *Allowances*

- A. For cash allowances the Bid price must include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.

13.07 *Price-Plus-Time Bids*

- ~~A. The Owner will consider the time of Substantial Completion commitment made by the Bidder in the comparison of Bids.~~
- ~~B. Bidder must designate the number of days required to achieve Substantial Completion of the Work and enter that number in the Bid Form as the total number of calendar days to substantially complete the Work.~~
- ~~C. The total number of calendar days for Substantial Completion designated by Bidder must be less than or equal to a maximum of [number], but not less than the minimum of [number]. If Bidder purports to designate a time for Substantial Completion that is less than the allowed minimum, or greater than the allowed maximum, Owner will reject the Bid as nonresponsive.~~
- ~~D. The Agreement as executed will contain the Substantial Completion time designated in Successful Bidder's Bid, and the Contractor will be assessed liquidated damages at the rate stated in the Agreement for failure to attain Substantial Completion within that time.~~
- ~~E. Bidder must also designate the time in which it will achieve Milestones, and achieve readiness for final payment. Such time commitments must be consistent with the "Time of Substantial Completion" to which Bidder commits. The Agreement as executed will contain,~~

~~as binding Contract Times, Successful Bidder's time commitments regarding Milestones, as applicable, and readiness for final payment.~~

**Deleted**

#### **ARTICLE 14—SUBMITTAL OF BID**

- 14.01 The Bidding Documents include one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 2 of the Bid Form.
- 14.02 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must be enclosed in a plainly marked package 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, and must 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 must be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid must be addressed to the location designated in the Advertisement.
- 14.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

#### **ARTICLE 15—MODIFICATION AND WITHDRAWAL OF BID**

- 15.01 An unopened Bid may be withdrawn by an appropriate document duly executed in the same 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. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.
- 15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 15.03 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, the Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, the Bidder will be disqualified from further bidding on the Work.

#### **ARTICLE 16—OPENING OF BIDS**

- 16.01 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.
- 16.02 ~~Bids will be opened privately.~~

## ARTICLE 17—BIDS TO REMAIN SUBJECT TO ACCEPTANCE

- 17.01 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 18—EVALUATION OF BIDS AND AWARD OF CONTRACT

- 18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.
- 18.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.
- 18.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.
- 18.04 If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid.
- 18.05 *Evaluation of Bids*
- A. In evaluating Bids, Owner will consider whether 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.
  - B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form. To determine the Bid prices for purposes of comparison, Owner will announce to all bidders a “Base Bid plus alternates” budget after receiving all Bids, but prior to opening them. For comparison purposes alternates will be accepted, following the order of priority established in the Bid Form, until doing so would cause the budget to be exceeded. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions, the award may be made to said Successful Bidder on its base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award.
  - ~~C. For determination of the apparent low Bidder(s) when sectional bids are submitted, Bids will be compared on the basis of the aggregate of the Bids for separate sections and the Bids for combined sections that result in the lowest total amount for all of the Work.~~
  - D. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.
  - ~~E. For the determination of the apparent low Bidder when cost-plus-fee bids are submitted, Bids will be compared on the basis of the Guaranteed Maximum Price set forth by Bidder on the Bid Form.~~

**Deleted**

~~F. Bid prices will be compared after adjusting for differences in time of Substantial Completion (total number of calendar days to substantially complete the Work) designated by Bidders. The adjusting amount will be determined at the rate set forth in the Agreement for liquidated damages for failing to achieve Substantial Completion, or such other amount that Owner has designated in the Bid Form.~~

~~1. The method for calculating the lowest bid for comparison will be the summation of the Bid price shown in the Bid Form plus the product of the Bidder specified time of Substantial Completion in calendar days times the rate for liquidated damages [or other Owner-designated daily rate] in dollars per day.~~

~~2. This procedure is only used to determine the lowest bid for comparison and contractor selection purposes. The Contract Price for compensation and payment purposes remains the Bid price shown in the Bid Form.~~

#### **Deleted**

18.06 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

18.07 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

#### **ARTICLE 19—BONDS AND INSURANCE**

19.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds, other required bonds (if any), and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by required bonds and insurance documentation.

19.02 Article 8, Bid Security, of these Instructions, addresses any requirements for providing bid bonds as part of the bidding process.

#### **ARTICLE 20—SIGNING OF AGREEMENT**

20.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder must execute and deliver the required number of counterparts of the Agreement and any bonds and insurance documentation required to be delivered by the Contract Documents to Owner. Within 10 days thereafter, Owner will deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.



## **ARTICLE 21—SALES AND USE TAXES**

- 21.01 Owner is exempt from Georgia state sales and use taxes on materials and equipment to be incorporated in the Work. (Exemption No. **[number]**). Said taxes must not be included in the Bid. Refer to Paragraph SC-7.10 of the Supplementary Conditions for additional information.

## **ARTICLE 22—CONTRACTS TO BE ASSIGNED**

NONE

## **ARTICLE 23 – FEDERAL REQUIREMENTS**

- 23.01 If the contract price is in excess of \$100,000, provisions of the Contract Work Hours and Safety Standards Act at 29 CFR 5.5(b) apply.
- 23.02 Federal requirements at Article 19 of the Supplementary Conditions apply to this Contract.
- 23.03 American Iron and Steel requirements apply to this project.

# BID FORM FOR CONSTRUCTION CONTRACT

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

## ARTICLE 1—OWNER AND BIDDER

- 1.01 This Bid is submitted to:  
City of Thomaston  
106 E Lee Street  
Thomaston, GA 30286
- 1.02 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.

## ARTICLE 2—ATTACHMENTS TO THIS BID

- 2.01 The following documents are submitted with and made a condition of this Bid:
- A. Required Bid security;
  - B. List of Proposed Subcontractors;
  - C. List of Proposed Suppliers;
  - D. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;
  - E. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids;
  - F. Required Bidder Qualification Statement with supporting data; and
  - ~~G. [List other documents and edit above as pertinent].~~
  - G. If Bid amount exceeds \$10,000, signed Compliance Statement (RD 400-6). Refer to specific equal opportunity requirements set forth in the Supplementary Conditions of the Construction Contract (EJCDC C-800);
  - H. If Bid amount exceeds \$25,000, signed Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions (AD-1048);
  - I. If Bid amount exceeds \$100,000, signed RD Instruction 1940-Q Exhibit A-1, Certification for Contracts, Grants, and Loans.
  - ~~J. [List other documents and edit above as pertinent].~~

## ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES

### 3.01 *Lump-Sum Bids*

A. ~~Bidder will complete the Work in accordance with the Contract Documents for the following lump sum (stipulated) price(s), together with any Unit Prices indicated in Paragraph 3.02:~~

1. ~~Lump Sum Price (Single Lump Sum)~~

Lump Sum Bid Price	\$
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2. ~~Lump Sum Price (Base Bid and Alternates)~~

Lump Sum Bid Price for Base Bid	\$
Alternate A <del>{Add} {Deduct}</del>	\$
Alternate B <del>{Add} {Deduct}</del>	\$

3. ~~Lump Sum Price (Sectional Lump Sum Bids)~~

Lump Sum Bid Price for Section I only	\$
Lump Sum Bid Price for Section II only	\$
Lump Sum Bid Price for Section I and II	\$

B. ~~All specified cash allowance(s) are included in the price(s) set forth below, and have been computed in accordance with Paragraph 13.02 of the General Conditions.~~

Lump Sum for Cash Allowance 1	\$
Lump Sum for Cash Allowance 2	\$
Lump Sum for Cash Allowance 3	\$
Total for all Lump Sum for Cash Allowances	\$

C. ~~All specified contingency allowances are included in the price(s) set forth below, and have been computed in accordance with Paragraph 13.02 of the General Conditions.~~

Lump Sum Contingency Allowance 1	\$
Lump Sum Contingency Allowance 2	\$
Lump Sum Contingency Allowance 3	\$
Total for all Lump Sum Contingency Allowances	\$

**BID FORM STARTS ON NEXT PAGE**

### 3.02 Unit Price Bids

A. Bidder will perform the following Work at the indicated unit prices:

TOWN BRANCH					
ITEM				UNIT	TOTAL
NO.	QTY.	UNIT	DESCRIPTION	PRICE	PRICE
1	1	LS	CLARIFIER/SPLITTER BOX/PIPING	\$	\$
2	1	LS	RAS PUMPING SYSTEM	\$	\$
3	1	EA	PORTABLE BELT PRESS	\$	\$
4	1	LS	AERATOR REPLACEMENT	\$	\$
5	1	LS	PORTABLE BELT PRESS PAD & PIPING	\$	\$
6	1	LS	EROSION AND SEDIMENTATION CONTROL		
TOWN BRANCH WPCP SUBTOTAL (A)					\$
BELL CREEK					
ITEM				UNIT	TOTAL
NO.	QTY.	UNIT	DESCRIPTION	PRICE	PRICE
1	1	LS	ELECTRICAL UPGRADES	\$	\$
2	1	LS	PORTABLE BELT PRESS PAD & PIPING	\$	\$
BELL CREEK WPCP SUBTOTAL (B)					\$
ALLOWANCES					
ITEM				UNIT	TOTAL
NO.	QTY.	UNIT	DESCRIPTION	PRICE	PRICE
1	1	LS	Supplementary Work Agreement (SWA)	\$90,000.00	\$90,000.00
2	1	LS	Testing Allowance	\$15,000.00	\$15,000.00
ALLOWANCES SUBTOTAL (C)					\$105,000.00
TOWN BRANCH WPCP SUBTOTAL (A)					
BELL CREEK WPCP SUBTOTAL (B)					
ALLOWANCES SUBTOTAL (C)					\$105,000.00
TOTAL BASE BID (A+B+C)					

EJCDC® C-410, Bid Form for Construction Contract.

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Modified to include RD edits from RUS Bulletin 1780-26 (6/16/2020).

Bidder agrees to furnish all labor, materials, and equipment necessary to construct USDA Sewer System Improvements – Contract A for the City of Thomaston for the total base bid sum of

Dollars (\$ \_\_\_\_\_ )

B. Bidder acknowledges that:

1. each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and
2. estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Work will be based on actual quantities, determined as provided in the Contract Documents.

3.03 *Total Bid Price (Lump Sum and Unit Prices)*

Total Bid Price (Total of all Lump Sum and Unit Price Bids)	\$
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**ARTICLE 4—BASIS OF BID—COST-PLUS FEE**

4.01 The Contract Price will be the Cost of the Work, determined as provided in Paragraph 13.01 of the General Conditions, together with the following fee, and subject to the Guaranteed Maximum Price.

4.02 *Contractor's Fee*

A. Contractor's fee will be **[number]** percent of the Cost of the Work. No fee will be payable on the basis of costs itemized as excluded in Paragraph 13.01.C of the General Conditions.

1. The maximum amount payable by Owner as a percentage fee (Guaranteed Maximum Fee) will not exceed **\$(insert cap amount)**, subject to increases or decreases for changes in the Work.

B. Contractor's fee will be determined by applying the following percentages to the various portions of the Cost of the Work as defined in Article 13 of the General Conditions. No fee will be payable on the basis of costs itemized as excluded in Paragraph 13.01.C of the General Conditions:

Costs	Percent
Payroll costs (See Paragraph 13.01.B.1, General Conditions)	
Materials and Installed Equipment cost (GC 13.01.B.2)	
Amounts to be paid to Subcontractors (GC 13.01.B.3)	
Amount to be paid to special consultants (GC 13.01.B.4)	
Other costs (GC 13.01.B.5)	

1. The maximum amount payable by Owner as a percentage fee (Guaranteed Maximum Fee) will not exceed **\$(insert cap amount)**, subject to increases or decreases for changes in the Work.

C. Contractor's fee will be the fixed sum of **\$(number)**.

#### 4.03 *Guaranteed Maximum Price*

- A. ~~The Guaranteed Maximum Price to Owner of the Cost of the Work including Contractor's Fee will not exceed \$[Bidder fill in GMP].~~

Deleted

#### **ARTICLE 5—PRICE-PLUS-TIME BID**

##### 5.01 *Price-Plus-Time Contract Award (Stipulated Price Contract)*

- A. ~~The Bidder to which an award of the Contract will be made will be determined in part on the basis of the Total Bid Price and the total number of calendar days to substantially complete the Work, in accordance with the following:~~

	Description		Amount
A	1. <del>Total Bid Price</del>		<del>\$(number)</del>
	2. <del>Total number of calendar days to substantially complete the Work</del>	<del>[number] days</del>	
	3. <del>Liquidated Damages Rate (from Agreement)</del>	<del>\$(number)/day</del>	
B	4. <del>Adjustment Amount (2 x 3)</del>		<del>\$(number)</del>
A+B	5. <del>Amount for Comparison of Bids</del>		<del>\$(number)</del>

- B. ~~The purpose of the process in the table above is only to calculate the lowest price plus time (A+B) bid amount for bid comparison purposes. The price for completion of the Work (the Contract Price) is the Total Bid Price.~~

- C. ~~Bonds required under Paragraph 6.01 of the General Conditions will be based on the Contract Price.~~

##### 5.02 *Price-Plus-Time Contract Award (Cost Plus Fee with Guaranteed Maximum Price Contract)*

- A. ~~The Bidder to which an award of Contract will be made will be determined in part on the basis of the Guaranteed Maximum Price and the total number of calendar days to substantially complete the Work, in accordance with the following:~~

	Description		Amount
A	1. <del>Guaranteed Maximum Price</del>		<del>\$(number)</del>
	2. <del>Total number of calendar days to substantially complete the Work</del>	<del>[number] days</del>	
	3. <del>Liquidated Damages Rate (from Agreement)</del>	<del>\$(number)/day</del>	
B	4. <del>Adjustment Amount (2 x 3)</del>		<del>\$(number)</del>
A+B	5. <del>Amount for Comparison of Bids</del>		<del>\$(number)</del>

- B. ~~The purpose of the process in the table above is only to calculate the lowest price plus time (A+B) bid amount for bid comparison purposes. The price for completion of the Work (the Contract Price) is based on the cost of the Work, plus a fee, subject to a guaranteed maximum price, as set forth in the Agreement.~~

- C. ~~Bonds required under Paragraph 6.01 of the General Conditions will be based on the Contract Price.~~

Deleted

## ARTICLE 6—TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 ~~Bidder agrees that the Work will be substantially complete on or before [Bidder inserts date], and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before [Bidder inserts date].~~

### **Deleted**

6.03 ~~Bidder agrees that the Work will be substantially complete within [Bidder inserts number] calendar days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within [Bidder inserts number] calendar days after the date when the Contract Times commence to run.~~

### **Deleted**

6.04 Bidder accepts the provisions of the Agreement as to liquidated damages.

## ARTICLE 7—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

### 7.01 *Bid Acceptance Period*

A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

### 7.02 *Instructions to Bidders*

A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

### 7.03 *Receipt of Addenda*

A. Bidder hereby acknowledges receipt of the following Addenda: **[Add rows as needed. Bidder is to complete table.]**

Addendum Number	Addendum Date

## ARTICLE 8—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

### 8.01 *Bidder's Representations*

A. In submitting this Bid, Bidder represents the following:

1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work, **including all American Iron and Steel requirements.**
4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.
7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no 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.
8. 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.
9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

#### 8.02 *Bidder's Certifications*

##### A. The Bidder certifies the following:

1. 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 collusive agreement or rules of any group, association, organization, or corporation.
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
3. Bidder has not solicited or induced any individual or entity to refrain from bidding.



4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:
  - a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
  - b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.
  - c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.
  - d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

BIDDER hereby submits this Bid as set forth above:

Bidder:

\_\_\_\_\_  
*(typed or printed name of organization)*

By:

\_\_\_\_\_  
*(individual's signature)*

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Date:

\_\_\_\_\_  
*(typed or printed)*

*If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.*

Attest:

\_\_\_\_\_  
*(individual's signature)*

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Date:

\_\_\_\_\_  
*(typed or printed)*

Address for giving notices:

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

Bidder's Contact:

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Phone:

Email:

Address:

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

Bidder's Contractor License No.: (if applicable)

\_\_\_\_\_

## BID BOND (PENAL SUM FORM)

<b>Bidder</b> Name: _____ Address ( <i>principal place of business</i> ): _____ _____	<b>Surety</b> Name: _____ Address ( <i>principal place of business</i> ): _____ _____
<b>Owner</b> Name: <u>City of Thomaston</u> Address ( <i>principal place of business</i> ): <u>106 E Lee Street</u> <u>Thomaston, GA 30286</u>	<b>Bid</b> Project ( <i>name and location</i> ): USDA Sewer System Improvements Contract A WPCP Improvements Thomaston, Georgia  Bid Due Date: <b>[Enter date bid is due]</b>
<b>Bond</b> Penal Sum:       \$ _____ Date of Bond:     _____	
Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.	
Bidder	Surety
_____ <i>(Full formal name of Bidder)</i>	_____ <i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <div style="text-align: center;"><i>(Signature)</i></div>	By: _____ <div style="text-align: center;"><i>(Signature) (Attach Power of Attorney)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>	Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
<i>Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.</i>	

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. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs 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 will 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 of 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 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 does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will 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 the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must 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 Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will 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 of 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 will 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 governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

**SECTION C451**  
**QUALIFICATIONS STATEMENT**

**ARTICLE 1—GENERAL INFORMATION**

1.01 Provide contact information for the Business:

Legal Name of Business:			
Corporate Office			
Name:		Phone number:	
Title:		Email address:	
Business address of corporate office:			
Local Office			
Name:		Phone number:	
Title:		Email address:	
Business address of local office:			

1.02 Provide information on the Business's organizational structure:

Form of Business:	<input type="checkbox"/> Sole Proprietorship <input type="checkbox"/> Partnership <input type="checkbox"/> Corporation		
<input type="checkbox"/> Limited Liability Company <input type="checkbox"/> Joint Venture comprised of the following companies:			
1.			
2.			
3.			
Provide a separate Qualification Statement for each Joint Venturer.			
Date Business was formed:		State in which Business was formed:	
Is this Business authorized to operate in the Project location?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Pending	

1.03 Identify all businesses that own Business in whole or in part (25% or greater), or that are wholly or partly (25% or greater) owned by Business:

Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	

Address:	
----------	--

1.04 Provide information regarding the Business's officers, partners, and limits of authority.

Name:		Title:	
Authorized to sign contracts: <input type="checkbox"/> Yes <input type="checkbox"/> No		Limit of Authority:	\$
Name:		Title:	
Authorized to sign contracts: <input type="checkbox"/> Yes <input type="checkbox"/> No		Limit of Authority:	\$
Name:		Title:	
Authorized to sign contracts: <input type="checkbox"/> Yes <input type="checkbox"/> No		Limit of Authority:	\$
Name:		Title:	

## ARTICLE 2—LICENSING

2.01 Provide information regarding licensure for Business:

Name of License:			
Licensing Agency:			
License No:		Expiration Date:	
Name of License:			
Licensing Agency:			
License No:		Expiration Date:	

## ARTICLE 3—DIVERSE BUSINESS CERTIFICATIONS

3.01 Provide information regarding Business's Diverse Business Certification, if any. Provide evidence of current certification.

Certification	Certifying Agency	Certification Date
<input type="checkbox"/> Disadvantaged Business Enterprise		
<input type="checkbox"/> Minority Business Enterprise		
<input type="checkbox"/> Woman-Owned Business Enterprise		
<input type="checkbox"/> Small Business Enterprise		
<input type="checkbox"/> Disabled Business Enterprise		
<input type="checkbox"/> Veteran-Owned Business Enterprise		
<input type="checkbox"/> Service-Disabled Veteran-Owned Business		
<input type="checkbox"/> HUBZone Business (Historically Underutilized) Business		
<input type="checkbox"/> Other		
<input type="checkbox"/> None		

## ARTICLE 4—SAFETY

- 4.01 Provide information regarding Business's safety organization and safety performance.

Name of Business's Safety Officer:		
Safety Certifications		
Certification Name	Issuing Agency	Expiration

- 4.02 Provide Worker's Compensation Insurance Experience Modification Rate (EMR), Total Recordable Frequency Rate (TRFR) for incidents, and Total Number of Recorded Manhours (MH) for the last 3 years and the EMR, TRFR, and MH history for the last 3 years of any proposed Subcontractor(s) that will provide Work valued at 10% or more of the Contract Price. Provide documentation of the EMR history for Business and Subcontractor(s).

Year									
Company	EMR	TRFR	MH	EMR	TRFR	MH	EMR	TRFR	MH

## ARTICLE 5—FINANCIAL

- 5.01 Provide information regarding the Business's financial stability. Provide the most recent audited financial statement, and if such audited financial statement is not current, also provide the most current financial statement.

Financial Institution:			
Business address:			
Date of Business's most recent financial statement:		<input type="checkbox"/> Attached	
Date of Business's most recent audited financial statement:		<input type="checkbox"/> Attached	
Financial indicators from the most recent financial statement			
Contractor's Current Ratio (Current Assets ÷ Current Liabilities)			
Contractor's Quick Ratio ((Cash and Cash Equivalents + Accounts Receivable + Short Term Investments) ÷ Current Liabilities)			

## ARTICLE 6—SURETY INFORMATION

- 6.01 Provide information regarding the surety company that will issue required bonds on behalf of the Business, including but not limited to performance and payment bonds.

Surety Name:	
--------------	--

Surety is a corporation organized and existing under the laws of the state of:			
Is surety authorized to provide surety bonds in the Project location?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Is surety listed in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" published in Department Circular 570 (as amended) by the Bureau of the Fiscal Service, U.S. Department of the Treasury?			
<input type="checkbox"/> Yes <input type="checkbox"/> No			
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

## ARTICLE 7—INSURANCE

- 7.01 Provide information regarding Business's insurance company(s), including but not limited to its Commercial General Liability carrier. Provide information for each provider.

Name of insurance provider, and type of policy (CLE, auto, etc.):			
Insurance Provider		Type of Policy (Coverage Provided)	
Are providers licensed or authorized to issue policies in the Project location?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Does provider have an A.M. Best Rating of A-VII or better?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

## ARTICLE 8—CONSTRUCTION EXPERIENCE

- 8.01 Provide information that will identify the overall size and capacity of the Business.

Average number of current full-time employees:	
Estimate of revenue for the current year:	
Estimate of revenue for the previous year:	



8.02 Provide information regarding the Business's previous contracting experience.

Years of experience with projects like the proposed project:				
As a general contractor:		As a joint venturer:		
Has Business, or a predecessor in interest, or an affiliate identified in Paragraph 1.03:				
Been disqualified as a bidder by any local, state, or federal agency within the last 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Been barred from contracting by any local, state, or federal agency within the last 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Been released from a bid in the past 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Defaulted on a project or failed to complete any contract awarded to it? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Refused to construct or refused to provide materials defined in the contract documents or in a change order? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Been a party to any currently pending litigation or arbitration? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Provide full details in a separate attachment if the response to any of these questions is Yes.				

8.03 List all projects currently under contract in Schedule A and provide indicated information.

8.04 List a minimum of three and a maximum of six projects completed in the last 5 years in Schedule B and provide indicated information to demonstrate the Business's experience with projects similar in type and cost of construction.

8.05 In Schedule C, provide information on key individuals whom Business intends to assign to the Project. Provide resumes for those individuals included in Schedule C. Key individuals include the Project Manager, Project Superintendent, Quality Manager, and Safety Manager. Resumes may be provided for Business's key leaders as well.

## ARTICLE 9—REQUIRED ATTACHMENTS

9.01 Provide the following information with the Statement of Qualifications:

- A. If Business is a Joint Venture, separate Qualifications Statements for each Joint Venturer, as required in Paragraph 1.02.
- B. Diverse Business Certifications if required by Paragraph 3.01.
- C. Certification of Business's safety performance if required by Paragraph 4.02.
- D. Financial statements as required by Paragraph 5.01.
- E. Attachments providing additional information as required by Paragraph 8.02.
- F. Schedule A (Current Projects) as required by Paragraph 8.03.
- G. Schedule B (Previous Experience with Similar Projects) as required by Paragraph 8.04.
- H. Schedule C (Key Individuals) and resumes for the key individuals listed, as required by Paragraph 8.05.
- I. Additional items as pertinent.

This Statement of Qualifications is offered by:

Business:

\_\_\_\_\_  
*(typed or printed name of organization)*

By:

\_\_\_\_\_  
*(individual's signature)*

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Date:

\_\_\_\_\_  
*(date signed)*

*(If Business is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)*

Attest:

\_\_\_\_\_  
*(individual's signature)*

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Address for giving notices:

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

Designated Representative:

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Address:

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

Phone:

\_\_\_\_\_

Email:

\_\_\_\_\_

**Schedule A—Current Projects**

Name of Organization					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

**Schedule B—Previous Experience with Similar Projects**

Name of Organization					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

**Schedule B—Previous Experience with Similar Projects**

Name of Organization					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

**Schedule C—Key Individuals**

<b>Project Manager</b>			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	
<b>Project Superintendent</b>			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

<b>Safety Manager</b>			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	
<b>Quality Control Manager</b>			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

## NOTICE OF AWARD

Date of Issuance:

Owner: City of Thomaston

Engineer: ESG Engineering

Project No.: T3000.115

Project: USDA Sewer System

Improvements – Contract A

Bidder:

Bidder's Address:

You are notified that Owner has accepted your Bid dated \_\_\_\_\_ for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

USDA Sewer System Improvements – Contract A – WPCP Upgrades

The Contract Price of the awarded Contract is \$ \_\_\_\_\_. Contract Price is subject to adjustment based on the provisions of the Contract, including but not limited to those governing changes, Unit Price Work, and Work performed on a cost-plus-fee basis, as applicable.

Four (4) unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically.

☐ Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner four (4) counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions, Articles 2 and 6.

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

Within 10 days after you comply with the above conditions, Owner will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: City of Thomaston

By (signature): \_\_\_\_\_

Name (printed): \_\_\_\_\_

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

Copy: Engineer



# **AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)**

This Agreement is by and between City of Thomaston (“Owner”) and [name of contracting entity] (“Contractor”).

Terms used in this Agreement have the meanings stated in the General Conditions and the Supplementary Conditions.

Owner and Contractor hereby 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:

**Town Branch WPCP Improvements will include (but is not limited to) the addition of a splitter box and new clarifier along with upgraded return activated sludge (RAS) pumps. Miscellaneous piping improvements will be required and a portable belt press and support slab will be provided.**

**Bell Creek Improvements will include electrical upgrades to move motor control centers out of the basement where frequent flooding occurs. Miscellaneous piping improvements will be required and a concrete pad will be poured to support a portable belt press.**

**One mobile trailer mounted belt press will be purchased as part of this contract and will serve Bell Creek WPCP and Town Branch WPCP.**

## **ARTICLE 2—THE PROJECT**

- 2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: USDA Sewer System Improvements – Contract A – WPCP Upgrades

## **ARTICLE 3—ENGINEER**

- 3.01 The Owner has retained ESG Engineering (“Engineer”) to act as Owner’s representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.
- 3.02 The part of the Project that pertains to the Work has been designed by “Engineer”.

## **ARTICLE 4—CONTRACT TIMES**

- 4.01 *Time is 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 ~~Contract Times: Dates~~

- A. ~~The Work will be substantially complete on or before [date], and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before [date].~~

4.03 *Contract Times: Days*

- A. The Work will be substantially complete within 300 days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 300 days after the date when the Contract Times commence to run.

4.04 ~~Milestones~~

- A. ~~Parts of the Work must be substantially completed on or before the following Milestone(s):~~

- ~~1. Milestone 1 [event & date/days]~~
- ~~2. Milestone 2 [event & date/days]~~
- ~~3. Milestone 3 [event & date/days]~~

4.05 *Liquidated Damages*

- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the Contract Times, as duly modified. The parties also recognize the delays, expense, 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):
1. *Substantial Completion:* Contractor shall pay Owner \$200 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion, until the Work is substantially complete.
  2. *Completion of Remaining Work:* After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner \$200 for each day that expires after such time until the Work is completed and ready for final payment.
  3. ~~*Milestones:* Contractor shall pay Owner \$[number] for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for achievement of Milestone 1, until Milestone 1 is achieved, or until the time specified for Substantial Completion is reached, at which time the rate indicated in Paragraph 4.05.A.1 will apply, rather than the Milestone rate.~~
  4. Liquidated damages for failing to timely attain ~~Milestones~~, Substantial Completion, and final completion are not additive, and will not be imposed concurrently.
- B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is

precluded from recovering any other damages, whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.

- C. ~~Bonus: Contractor and Owner further recognize the Owner will realize financial and other benefits if the Work is completed prior to the time specified for Substantial Completion. Accordingly, Owner and Contractor agree that as a bonus for early completion, Owner shall pay Contractor \$[number] for each day prior to the time specified above for Substantial Completion (as duly adjusted pursuant to the Contract) that the Work is substantially complete. The maximum value of the bonus will be limited to \$[number].~~

**Deleted**

**4.06 Special Damages**

- A. Contractor shall reimburse Owner (1) for any fines or penalties imposed on Owner as a direct result of the Contractor's failure to attain Substantial Completion according to the Contract Times, and (2) for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.
- B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted pursuant to the Contract), until the Work is completed and ready for final payment.
- C. The special damages imposed in this paragraph are supplemental to any liquidated damages for delayed completion established in this Agreement.

**ARTICLE 5—CONTRACT PRICE**

- 5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:

- A. For all Work other than Unit Price Work, a lump sum of \$[number].

All specific cash allowances are included in the above price in accordance with Paragraph 13.02 of the General Conditions.

- B. ~~For all Unit Price Work, an amount equal to the sum of the extended prices (established for each separately identified item of Unit Price Work by multiplying the unit price times the actual quantity of that item).~~

Unit Price Work					
Item No.	Description	Unit	Estimated Quantity	Unit Price	Extended Price
				\$	\$
				\$	\$

Unit Price Work					
Item No.	Description	Unit	Estimated Quantity	Unit Price	Extended Price
				\$	\$
				\$	\$
				\$	\$
Total of all Extended Prices for Unit Price Work (subject to final adjustment based on actual quantities)					\$

The extended prices for Unit Price Work set forth as of the Effective Date of the Contract are based on estimated quantities. As provided in Paragraph 13.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer.

- C. Total of Lump Sum Amount and Unit Price Work (subject to final Unit Price adjustment) ~~\$(number)~~.
- D. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

## ARTICLE 6—PAYMENT PROCEDURES

### 6.01 Submittal and Processing of Payments

- A. Contractor shall submit Applications for Payment in accordance with Article 15 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 the basis of Contractor's Applications for Payment on or about the 25<sup>th</sup> day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.
  - 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 Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.
    - a. ~~(number)~~95 percent of the value of the Work completed (with the balance being retainage).
      - 1) ~~If 50 percent or more of the Work has been completed, as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and~~

**Deleted**

- b. ~~[number]~~95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
  - B. Upon Substantial Completion **of the entire construction to be provided under the construction Contract Documents**, Owner shall pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 200 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.
- 6.03 *Final Payment*
  - A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.
- 6.04 *Consent of Surety*
  - A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.
- ~~6.05 *Interest*~~
  - ~~A. All amounts not paid when due will bear interest at the rate of [number] percent per annum.~~

**ARTICLE 7—CONTRACT DOCUMENTS**

- 7.01 *Contents*
  - A. The Contract Documents consist of all of the following:
    - 1. This Agreement.
    - 2. Bonds:
      - a. Performance bond (together with power of attorney).
      - b. Payment bond (together with power of attorney).
    - 3. General Conditions.
    - 4. Supplementary Conditions.
    - 5. Specifications as listed in the table of contents of the project manual (copy of list attached).
    - 6. Drawings (not attached but incorporated by reference) consisting of **all** sheets with each sheet bearing the following general title: **USDA Sanitary Sewer Improvements – Contract A – WPCP Improvements**
    - ~~7. Drawings listed on the attached sheet index.~~
    - 8. Addenda (numbers [number] to [number], inclusive).
    - ~~9. Exhibits to this Agreement (enumerated as follows):~~
      - ~~a. [list exhibits]~~

10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
  - a. Notice to Proceed.
  - b. Work Change Directives.
  - c. Change Orders.
  - d. Field Orders.
  - e. Warranty Bond, if any.
- B. The Contract Documents listed in Paragraph 7.01.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 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

## **ARTICLE 8—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS**

### **8.01 *Contractor's Representations***

- A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:
  1. Contractor has examined and carefully studied the Contract Documents, including Addenda.
  2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
  3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
  4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
  5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
  6. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and

procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.

7. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no 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.
8. 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.
9. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

#### 8.02 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:
  1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
  2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
  3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
  4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

#### 8.03 *Standard General Conditions*

- A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the

standard wording of such published document to the Contractor, through a process such as highlighting or “track changes” (redline/strikeout), or in the Supplementary Conditions.



IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on **[indicate date on which Contract becomes effective]** (which is the Effective Date of the Contract).

Owner:

City of Thomaston

*(typed or printed name of organization)*

By:

*(individual's signature)*

Date:

*(date signed)*

Name:

Russell Thompson

*(typed or printed)*

Title:

City Manger

*(typed or printed)*

Attest:

*(individual's signature)*

Title:

*(typed or printed)*

Address for giving notices:

City of Thomaston

106 E Lee Street

Thomaston, GA 30286

Designated Representative:

Name:

*(typed or printed)*

Title:

*(typed or printed)*

Address:

Phone:

Email:

*(If [Type of Entity] is a corporation, attach evidence of authority to sign. If [Type of Entity] is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)*

Contractor:

*(typed or printed name of organization)*

By:

*(individual's signature)*

Date:

*(date signed)*

Name:

*(typed or printed)*

Title:

*(typed or printed)*

*(If [Type of Entity] is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)*

Attest:

*(individual's signature)*

Title:

*(typed or printed)*

Address for giving notices:

Designated Representative:

Name:

*(typed or printed)*

Title:

*(typed or printed)*

Address:

Phone:

Email:

License No.:

*(where applicable)*

State:

## NOTICE TO PROCEED

Owner: City of Thomaston Owner's Project No.: T3000.115  
Engineer: ESG Engineering, Inc. Engineer's Project No.: T3000.115  
Contractor: \_\_\_\_\_ Contractor's Project No.: \_\_\_\_\_  
Project: USDA Sewer System Improvements – Contract A – WPCP Upgrades  
Contract Name: Contract A – WPCP Upgrades  
Effective Date of Contract: \_\_\_\_\_

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on \_\_\_\_\_ pursuant to Paragraph 4.01 of the General Conditions.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work will be done at the Site prior to such date.

In accordance with the Agreement:

The number of days to achieve Substantial Completion is **300** days from the date stated above for the commencement of the Contract Times, resulting in a date for Substantial Completion of \_\_\_\_\_ and the number of days to achieve readiness for final payment is 300 from the commencement date of the Contract Times, resulting in a date for readiness for final payment of \_\_\_\_\_.

Owner: City of Thomaston  
By (signature): \_\_\_\_\_  
Name (printed): Russell Thompson  
Title: City Manager  
Date Issued: \_\_\_\_\_  
Copy: Engineer

## PERFORMANCE BOND

<b>Contractor</b> Name: _____ Address (principal place of business): _____ _____	<b>Surety</b> Name: _____ Address (principal place of business): _____ _____
<b>Owner</b> Name: <u>City of Thomaston</u> Mailing address (principal place of business): <u>106 E Lee Street</u> <u>Thomaston, GA 30286</u>	<b>Contract</b> Description (name and location): USDA Sewer System Improvements – Contract A WPCP Upgrades Thomaston, Georgia Contract Price: _____ Effective Date of Contract: _____
<b>Bond</b> Bond Amount:    \$ _____ Date of Bond:    _____ <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: <input type="checkbox"/> None <input type="checkbox"/> See Paragraph 16	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal	Surety
_____ <i>(Full formal name of Contractor)</i>	_____ <i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <div style="text-align: center;"><i>(Signature)</i></div>	By: _____ <div style="text-align: center;"><i>(Signature)(Attach Power of Attorney)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>	Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
<i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.
2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:
  - 3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;
  - 3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
  - 3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.
4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.
5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
  - 5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;
  - 5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;
  - 5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or
  - 5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

- 5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
  - 5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.
- 6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.
- 7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:
  - 7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
  - 7.2. 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 5; and
  - 7.3. liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
- 8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.
- 9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
- 10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
- 11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.
- 12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.
- 13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such

statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

14. Definitions

- 14.1. *Balance of the Contract Price*—The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.
  - 14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.
  - 14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.
  - 14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
  - 14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
16. Modifications to this Bond are as follows: None

## PAYMENT BOND

<b>Contractor</b> Name: _____ Address (principal place of business): _____ _____	<b>Surety</b> Name: _____ Address (principal place of business): _____ _____
<b>Owner</b> Name: <u>City of Thomaston</u> Mailing address (principal place of business): <u>106 E Lee Street</u> <u>Thomaston, GA 30286</u>  	<b>Contract</b> Description (name and location): USDA Sewer System Improvements – Contract A WPCP Upgrades  Thomaston, GA Contract Price:     \$ _____ Effective Date of Contract: _____
<b>Bond</b> Bond Amount:     \$ _____ Date of Bond: _____ <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: <input type="checkbox"/> None <input type="checkbox"/> See Paragraph 18	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal	Surety
_____ <i>(Full formal name of Contractor)</i>	_____ <i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <div style="text-align: center;"><i>(Signature)</i></div>	By: _____ <div style="text-align: center;"><i>(Signature)(Attach Power of Attorney)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>	Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
<i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond will arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond will arise after the following:
  - 5.1. Claimants who do not have a direct contract with the Contractor
    - 5.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
    - 5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).
  - 5.2. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
  - 7.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
  - 7.2. Pay or arrange for payment of any undisputed amounts.
  - 7.3. The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.



8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract will be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfying obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit will be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
16. Definitions
  - 16.1. *Claim*—A written statement by the Claimant including at a minimum:
    - 16.1.1. The name of the Claimant;
    - 16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;
    - 16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
    - 16.1.4. A brief description of the labor, materials, or equipment furnished;

- 16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
  - 16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
  - 16.1.7. The total amount of previous payments received by the Claimant; and
  - 16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
- 16.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
- 16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
- 16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
- 16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
18. Modifications to this Bond are as follows: None

### Contractor's Application for Payment

Owner:	_____	Owner's Project No.:	_____
Engineer:	_____	Engineer's Project No.:	_____
Contractor:	_____	Contractor's Project No.:	_____
Project:	_____		
Contract:	_____		

Application No.: \_\_\_\_\_ Application Period: From \_\_\_\_\_ to \_\_\_\_\_ Application Date: \_\_\_\_\_

A	B	C	D	E	F	G	H	I	J	K	L
Bid Item No.	Description	Contract Information				Work Completed		Materials Currently Stored (not in G) (\$)	Work Completed and Materials Stored to Date (H + I) (\$)	% of Value of Item (J / F) (%)	Balance to Finish (F - J) (\$)
		Item Quantity	Units	Unit Price (\$)	Value of Bid Item (C X E) (\$)	Estimated Quantity Incorporated in the Work	Value of Work Completed to Date (E X G) (\$)				
Original Contract											
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Original Contract Totals						\$ -		\$ -	\$ -	\$ -	\$ -

**Progress Estimate - Unit Price Work**

**Contractor's Application for Payment**

Owner:		Owner's Project No.:	
Engineer:		Engineer's Project No.:	
Contractor:		Contractor's Project No.:	
Project:			
Contract:			

Application No.:		Application Period:		From	to		Application Date:				
A	B	C	D	E	F	G	H	I	J	K	L
Bid Item No.	Description	Contract Information				Work Completed		Materials Currently Stored (not in G) (\$)	Work Completed and Materials Stored to Date (H + I) (\$)	% of Value of Item (J / F) (%)	Balance to Finish (F - J) (\$)
		Item Quantity	Units	Unit Price (\$)	Value of Bid Item (C X E) (\$)	Estimated Quantity Incorporated in the Work	Value of Work Completed to Date (E X G) (\$)				
Change Orders											
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### Contractor's Application for Payment

1 of 1

# CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:  
Engineer:  
Contractor:  
Project:  
Contract Name:

Owner's Project No.:  
Engineer's Project No.:  
Contractor's Project No.:

This ☐ Preliminary ☐ Final Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

**[Describe the portion of the work for which Certificate of Substantial Completion is issued]**

Date of Substantial Completion: **[Enter date, as determined by Engineer]**

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work must be as provided in the Contract, except as amended as follows:

Amendments to Owner's Responsibilities: ☐ None ☐ As follows:

**[List amendments to Owner's Responsibilities]**

Amendments to Contractor's Responsibilities: ☐ None ☐ As follows:

**[List amendments to Contractor's Responsibilities]**

The following documents are attached to and made a part of this Certificate:

**[List attachments such as punch list; other documents]**

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Engineer

By *(signature)*: \_\_\_\_\_

Name *(printed)*: \_\_\_\_\_

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

# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

## ARTICLE 1—DEFINITIONS AND TERMINOLOGY

### 1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
  2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
  3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
  4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
  5. *Bidder*—An individual or entity that submits a Bid to Owner.
  6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
  7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
  8. *Change Order*—A document 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, or other revision to the Contract, issued on or after the Effective Date of the Contract.
  9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
  10. *Claim*
    - a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the

requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.

- b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.
  - c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.
  - d. A demand for money or services by a third party is not a Claim.
- 11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
  - 12. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.
  - 13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
  - 14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.
  - 15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
  - 16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
  - 17. *Cost of the Work*—See Paragraph 13.01 for definition.
  - 18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
  - 19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
  - 20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
  - 21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.
23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.
  - a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
  - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
  - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.
28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
29. *Notice to Proceed*—A written notice 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.
30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.
32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals.
36. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
38. *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, and such other lands or areas furnished by Owner which are designated for the use of Contractor.
39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
40. *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.
41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers’ instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
42. *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 of such Work.

43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.
44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
45. *Supplier*—A manufacturer, fabricator, supplier, distributor, 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 a Subcontractor.
46. *Technical Data*
- a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.
  - b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
  - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.
47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.
48. *Unit Price Work*—Work to be paid for on the basis of unit prices.
49. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.



## 1.02 Terminology

- A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:* The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day:* The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:* The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
  - 1. does not conform to the Contract Documents;
  - 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
  - 3. 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 15.03 or Paragraph 15.04).
- E. *Furnish, Install, Perform, Provide*
  - 1. The word “furnish,” when used in connection with services, materials, or equipment, means 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, means 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, means to furnish and install said services, materials, or equipment complete and ready for intended use.
  - 4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

- F. *Contract Price or Contract Times*: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.
- G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

## ARTICLE 2—PRELIMINARY MATTERS

### 2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

- A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.
- C. *Evidence of Owner’s Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

### 2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

### 2.03 *Before Starting Construction*

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:
  - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
  - 2. a preliminary Schedule of Submittals; and
  - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work

into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work, and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.
  - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
  - 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
  - 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.
  - 4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.
- B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

## ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

### 3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.
- F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will 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.
- G. Nothing in the Contract Documents creates:
  - 1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or
  - 2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

### 3.02 *Reference Standards*

- A. *Standards Specifications, Codes, Laws and Regulations*
  - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract 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, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer 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 part of the Contract Documents prepared by or for Engineer.

### 3.03 *Reporting and Resolving Discrepancies*

#### A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

#### B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
  - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); 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 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.

- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

### 3.05 *Reuse of Documents*

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

## **ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK**

### 4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract 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 Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

### 4.02 *Starting the Work*

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

### 4.03 *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.

#### 4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 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 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
  - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

#### 4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
  - 1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
  - 2. Abnormal weather conditions;
  - 3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and
  - 4. Acts of war or terrorism.

- D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:
1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
  2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.
  3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.
- E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:
1. The circumstances that form the basis for the requested adjustment;
  2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;
  3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;
  4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and
  5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.
- Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.
- F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.
- G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

## **ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS**

### **5.01 *Availability of Lands***

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing 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.



- 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 permanent improvements are to be made 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.

## 5.02 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
  2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all 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 directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.
  - C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas 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 of 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 structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

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

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;
2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and
3. Technical Data contained in such reports and drawings.

- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

- C. *Reliance by Contractor on Technical Data:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.

- D. *Limitations of Other Data and Documents:* Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;
  2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
  3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or
  4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

#### 5.04 *Differing Subsurface or Physical Conditions*

- A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:
1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;
  2. is of such a nature as to require a change in the Drawings or Specifications;
  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 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- E. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, 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 fall within any one or more of the categories described in Paragraph 5.04.A;
  - 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 Paragraph 13.03; and,
  - c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
    - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;
    - b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
    - c. Contractor failed to give the written notice required by Paragraph 5.04.A.
  3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
  4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.
- F. *Underground Facilities; Hazardous Environmental Conditions:* Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

#### 5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:
1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
  2. complying with applicable state and local utility damage prevention Laws and Regulations;

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
  4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
  5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then 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 7.15), notify Owner and Engineer in writing regarding such Underground Facility.
- C. *Engineer's Review:* Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
  2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
  3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and
  4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- F. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. 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 Paragraph 13.03;
  - b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
  - c. Contractor gave the notice required in Paragraph 5.05.B.
2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
  3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
  4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

#### 5.06 *Hazardous Environmental Conditions at Site*

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

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;
2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures

- of construction to be employed by Contractor, and safety precautions and programs incident thereto;
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 removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. 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, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.
- H. 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, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

## **ARTICLE 6—BONDS AND INSURANCE**

### **6.01 *Performance, Payment, and Other Bonds***

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.
- B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.
- C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or



Regulations, and must be issued and signed by a surety named in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual’s authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

- D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
- E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
- F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner’s termination rights under Article 16.
- G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
- H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

#### 6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Alternative forms of insurance coverage, including but not limited to self-insurance and “Occupational Accident and Excess Employer’s Indemnity Policies,” are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.
- D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

- E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.
- F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.
- H. Contractor shall require:
  - 1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and
  - 2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.
- I. If either party does not purchase or maintain the insurance required of such party by the Contract, 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.
- J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.
- K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

- L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.
- M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.
- N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

- A. *Required Insurance:* Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.
- B. *General Provisions:* The policies of insurance required by this Paragraph 6.03 as supplemented must:
  - 1. include at least the specific coverages required;
  - 2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;
  - 3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;
  - 4. apply with respect to the performance of the Work, whether such performance is 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; and
  - 5. include all necessary endorsements to support the stated requirements.
- C. *Additional Insureds:* The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:
  - 1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;
  - 2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;
  - 3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and
5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

- A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.
- B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.
- C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.
- D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.
- E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

- A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against

Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils, risks, 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 Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.
  2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.
1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.
- C. The waivers in this Paragraph 6.05 include the waiver of rights 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 insured peril, risk, or cause of loss.
- D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

**ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES**

7.01 *Contractor's Means and Methods of Construction*

- A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *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.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall maintain good discipline and order at the Site.

- B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.
- C. 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 will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

#### 7.04 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment must 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.

#### 7.05 *"Or Equals"*

- A. *Contractor's Request; Governing Criteria:* Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item 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 is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.
  - 1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:
    - a. in the exercise of reasonable judgment Engineer determines that the proposed item:
      - 1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
  - 3) has a proven record of performance and availability of responsive service; and
  - 4) ~~is not objectionable to Owner. Deleted~~
- b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:
- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
  - 2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense. **Contractor shall include AIS compliance letter.**
- C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.
- D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.
- E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

#### 7.06 Substitutes

- A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.
1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.
  2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.



3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:
  - a. will certify that the proposed substitute item will:
    - 1) perform adequately the functions and achieve the results called for by the general design;
    - 2) be similar in substance to the item specified; and
    - 3) be suited to the same use as the item specified.
  - b. will state:
    - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;
    - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
    - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
  - c. will identify:
    - 1) all variations of the proposed substitute item from the item specified; and
    - 2) available engineering, sales, maintenance, repair, and replacement services.
  - d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

- E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.
- B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.
- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

- H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.
- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

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

#### 7.09 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. 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 the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

#### 7.10 *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.

#### 7.11 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.
- C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

#### 7.12 *Record Documents*

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

### 7.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.
- B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.
- C. 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, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.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 at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- E. 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.
- F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.
- H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

- I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
- J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as 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.

7.15 *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 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 by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

- 1. Before submitting a Shop Drawing or Sample, Contractor shall:
  - a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
  - b. determine and verify:
    - 1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;
    - 2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
    - 3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;
  - c. confirm that the Submittal is complete with respect to all related data included in the Submittal.
- 2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.

3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.
- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.
1. *Shop Drawings*
    - a. Contractor shall submit the number of copies required in the Specifications.
    - b. Data shown on the Shop Drawings must 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 7.16.C.
  2. *Samples*
    - a. Contractor shall submit the number of Samples required in the Specifications.
    - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.
  3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Engineer's Review of Shop Drawings and Samples*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. 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, comply with the requirements of 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, or to safety precautions or programs incident thereto.
  3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
  4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will

document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.
6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.
8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

*D. Resubmittal Procedures for Shop Drawings and Samples*

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.
2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

*E. Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs*

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:
  - a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
  - b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.
  - c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.



- d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
- 2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.
- F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

**7.17 Contractor's General Warranty and Guarantee**

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.
- B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:
  - 1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and
  - 2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.
- C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
  - 1. abuse, or improper modification, 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.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:
  - 1. Observations by Engineer;
  - 2. Recommendation by Engineer or payment by Owner of any progress or final payment;
  - 3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
  - 4. Use or occupancy of the Work or any part thereof by Owner;
  - 5. Any review and approval of a Shop Drawing or Sample submittal;
  - 6. The issuance of a notice of acceptability by Engineer;
  - 7. The end of the correction period established in Paragraph 15.08;
  - 8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.
- E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

#### 7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (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 from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A will 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.

#### 7.19 *Delegation of Professional Design Services*

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.
- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.
- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

- D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.
- E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:
  - 1. Checking for conformance with the requirements of this Paragraph 7.19;
  - 2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
  - 3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.
- F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.
- G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

## **ARTICLE 8—OTHER WORK AT THE SITE**

### **8.01 *Other Work***

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, 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.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

#### 8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
  - 1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
  - 2. An itemization of the specific matters to be covered by such authority and responsibility; and
  - 3. The extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

#### 8.03 *Legal Relationships*

- A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.
  - 1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.
  - 2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.
- C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all 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 damage, delay, disruption, or interference.

## **ARTICLE 9—OWNER'S RESPONSIBILITIES**

### **9.01    *Communications to Contractor***

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

### **9.02    *Replacement of Engineer***

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will be that of the former Engineer.

### **9.03    *Furnish Data***

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

### **9.04    *Pay When Due***

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *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.

9.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
- B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

## ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

### 10.01 *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.

### 10.02 *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 10.07. 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.

### 10.03 *Resident Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.
- B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

### 10.04 *Engineer's Authority*

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.
- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.
- D. Engineer's authority as to changes in the Work is set forth in Article 11.

E. Engineer's authority as to Applications for Payment is set forth in Article 15.

**10.05 *Determinations for Unit Price Work***

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

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

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

**10.07 *Limitations on Engineer's Authority and Responsibilities***

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, 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, will 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 Contractor under Paragraph 15.06.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 10.07 also apply to the Resident Project Representative, if any.

**10.08 *Compliance with Safety Program***

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs of which Engineer has been informed.



## ARTICLE 11—CHANGES TO THE CONTRACT

### 11.01 *Amending and Supplementing the Contract*

- A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
- B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.
- C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

### 11.02 *Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
  - 1. Changes in 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;
  - 2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
  - 3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and
  - 4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.
- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

### 11.03 *Work Change Directives*

- A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.

- B. If Owner has issued a Work Change Directive and:
  - 1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.
  - 2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

#### 11.04 *Field Orders*

- A. Engineer may authorize minor changes in the Work if the changes 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. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.
- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

#### 11.05 *Owner-Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.
- B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.
- C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

#### 11.06 *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, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

#### 11.07 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.
- B. 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, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
  2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or
  3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).
- C. *Contractor's Fee:* When applicable, the Contractor's fee for overhead and profit will 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 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;
    - b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 percent;
    - c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
    - d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
    - e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
    - f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

#### 11.08 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.
- B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

#### 11.09 *Change Proposals*

- A. *Purpose and Content:* Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

- B. *Change Proposal Procedures*

- 1. *Submittal:* Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.
- 2. *Supporting Data:* The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.
  - a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.
  - b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

- 3. *Engineer's Initial Review:* Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.
- 4. *Engineer's Full Review and Action on the Change Proposal:* Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change

Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- C. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
- D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

#### 11.10 *Notification to Surety*

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

### ARTICLE 12—CLAIMS

#### 12.01 *Claims*

- A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:
  1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
  2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;
  3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and
  4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.
- B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge

and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

- C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation*
  - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.
  - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.
  - 3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

## **ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK**

### **13.01 *Cost of the Work***

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
  - 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included:* Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will 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 accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will 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, which 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 will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
  4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.
  5. Other costs consisting of 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, 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.

- 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

- 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.
  - 2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.
  - 3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.
- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder's risk or other property insurance established in accordance with Paragraph 6.04), 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 include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will 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 communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
  - i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.
- C. *Costs Excluded:* The term Cost of the Work does not include any of the following items:
- 1. Payroll costs and other compensation of Contractor's officers, executives, principals, 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 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
  - 2. The cost of purchasing, renting, or furnishing small tools and hand tools.
  - 3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
  - 4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
  - 5. 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.
  - 6. Expenses incurred in preparing and advancing Claims.
  - 7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.
- D. *Contractor's Fee*
- 1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
    - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.
    - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
      - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
      - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
  - 2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

- E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

### 13.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances*: Contractor agrees that:
1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
  2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment for any of the foregoing will be valid.
- C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

### 13.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. 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, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
  - a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
  - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

**ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK**

14.01 *Access to Work*

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

14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.
- 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, obtaining, and paying for all inspections and tests required:
1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
  2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
  3. by manufacturers of equipment furnished under the Contract Documents;
  4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
  5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

#### 14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs,

losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

#### 14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

#### 14.05 *Uncovering Work*

- A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then 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, and provide all necessary labor, material, and equipment.
  - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages 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 pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
  - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, 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, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

#### 14.06 *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, then 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 will 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.

**14.07 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 defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, 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 incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

**ARTICLE 15—PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD**

**15.01 Progress Payments**

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments*
  - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.
  - 2. 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 must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

*C. Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
  - a. the Work has progressed to the point indicated;
  - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
  - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
  - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
  - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
  - a. to supervise, direct, or control the Work;
  - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
  - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
  - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or
  - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
  - a. the Work is defective, requiring correction or replacement;
  - b. the Contract Price has been reduced by Change Orders;
  - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
  - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
  - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

**D. *Payment Becomes Due***

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

**E. *Reductions in Payment by Owner***

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
  - a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;



- b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
  - c. Contractor has failed to provide and maintain required bonds or insurance;
  - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
  - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
  - f. The Work is defective, requiring correction or replacement;
  - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
  - h. The Contract Price has been reduced by Change Orders;
  - i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
  - j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
  - k. 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; or
  - l. Other items entitle Owner to a set-off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, 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, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
  3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

#### 15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

#### 15.03 *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 and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time

submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

#### 15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without

significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.
2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

#### 15.05 *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, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

#### 15.06 *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, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.
2. The final Application for Payment must be accompanied (except as previously delivered) by:
  - a. all documentation called for in the Contract Documents;
  - b. consent of the surety, if any, to final payment;
  - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

- d. a list of all duly pending Change Proposals and Claims; and
  - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
- 3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. *Engineer's Review of Final Application and Recommendation of Payment:* 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 have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. 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. *Notice of Acceptability:* In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.
- D. *Completion of Work:* The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.
- E. *Final Payment Becomes Due:* Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

#### 15.07 *Waiver of Claims*

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim,

appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

#### 15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
  - 1. correct the defective repairs to the Site or such adjacent areas;
  - 2. correct such defective Work;
  - 3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
  - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.
- B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.
- C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all 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). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.
- D. 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.
- E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, 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.

- F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

## **ARTICLE 16—SUSPENSION OF WORK AND TERMINATION**

### **16.01 *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 written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

### **16.02 *Owner May Terminate for Cause***

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and 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);
  - 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
  - 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
  - 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:
  - 1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and
  - 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, 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 complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects,

attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds 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.

- F. 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, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

#### 16.03 *Owner May Terminate for Convenience*

- A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
  - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
  - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
  - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

#### 16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 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 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 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 are not intended to preclude Contractor from submitting a Change Proposal 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 17—FINAL RESOLUTION OF DISPUTES**

### **17.01 *Methods and Procedures***

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this article:
  - 1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and
  - 2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this article, Owner or Contractor may:
  - 1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;
  - 2. agree with the other party to submit the dispute to another dispute resolution process; or
  - 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

## **ARTICLE 18—MISCELLANEOUS**

### **18.01 *Giving Notice***

- A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:
  - 1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
  - 2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
  - 3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

### **18.02 *Computation of Times***

- A. When any period of time is referred to in the Contract 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.



18.03 *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. 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.

18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Assignment of Contract*

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is 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.

18.09 *Successors and Assigns*

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

18.10 *Headings*

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

# **SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT**

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# **SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT**

These Supplementary Conditions amend or supplement EJCDC® C-700, Standard General Conditions of the Construction Contract (2018). The General Conditions remain in full force and effect except as amended.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added—for example, "Paragraph SC-4.05."

## **ARTICLE 1—DEFINITIONS AND TERMINOLOGY**

~~No suggested Supplementary Conditions in this Article.~~

**SC-1.01.A.8 – Add the following at the end of the Paragraph:**

**The Change Order form to be used on this Project is EJCDC C-941 (2018). Agency approval is required before Change Orders are effective.**

**SC-1.01.A.30 – Add the following at the end of the Paragraph:**

**For the purposes of Rural Development, this term is synonymous with the term “applicant” as defined in 7 CFR 1780.7 (a) (1), (2) and (3) and is an entity receiving financial assistance from the federal programs.**

**SC-1.01.A.50 – Add the following at the end of the Paragraph:**

**The Work Change Directive form to be used on this Project is EJCDC C-940 (2018). Agency approval is required before a Work Change Directive is issued.**

**SC-1.01.A.51 – Add the following new paragraph immediately after Paragraph 1.01.A.50:**

**51. Agency - The Project is financed in whole or in part by USDA Rural Utilities Service pursuant to the Consolidated Farm and Rural Development Act (7 USC Section 1921 et seq.). The Rural Utilities Service programs are administered through the USDA Rural Development offices; therefore, the Agency for these documents is USDA Rural Development.**

SC-1.01.A.52 – Add the following new paragraph with the title “American Iron and Steel Definitions” immediately after Paragraph 1.01.A.51:

**52.a *American Iron and Steel (AIS)*** - Requirements mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference for “iron and steel products,” meaning the following products, if made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials. AIS requirements apply in each of the several states, the District of Columbia, and each federally recognized Tribe, but not the U.S. Territories.

**52.b *Coating*** - A covering that is applied to the surface of an object. If a Coating is applied to the external surface of a domestic iron or Steel component, and the application takes place outside of the United States, said product would be considered a compliant product under the AIS requirements. Any Coating processes that are applied to the external surface of Iron and Steel components that would otherwise be AIS compliant would not disqualify the product from meeting the AIS requirements regardless of where the Coating processes occur, provided that final assembly of the product occurs in the United States. This exemption only applies to Coatings on the *external surface* of Iron and Steel components. It does not apply to Coatings or linings on internal surfaces of Iron and Steel products, such as the lining of lined pipes. All Manufacturing Processes for lined pipes, including the application of pipe lining, must occur in the United States for the product to be compliant with AIS requirements.

**52.c *Construction Materials*** - Those articles, materials, or supplies made primarily of iron and/or steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered “structural steel”. Note: Mechanical and electrical components, equipment and systems are not considered Construction Materials. See definitions of Mechanical Equipment and Electrical Equipment.

**52.d *Contractor’s Certification*** - Documentation submitted by the Contractor upon Substantial Completion of the Contract that all Iron and Steel products installed were Produced in the United States.

**52.e *De Minimis*** - Various miscellaneous, incidental low-cost components that are essential for, but incidental to, the construction and are incorporated into the physical structure of the project. Examples of *De Minimis* components could include small washers, screws, fasteners (such as “off the shelf” nuts and bolts), miscellaneous wire, corner bead, ancillary tube, signage, trash bins, door hardware etc. Costs for such *De Minimis* components cumulatively may comprise no more than a total of five percent of the total cost of the materials used in and incorporated into a project; the cost of an individual item may not exceed one percent of the total cost of the materials used in and incorporated into a project.

**52.f *Electrical Equipment*** - Typically any machine powered by electricity and includes components that are part of the electrical distribution system. AIS does not apply to Electrical Equipment.

**52.g *Engineer's Certification*** - Documentation submitted by the Engineer that Drawings, Specifications, and Bidding Documents comply with AIS.

**52.h *Iron and Steel products*** - The following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials. Only items on the above list made primarily of iron or steel, permanently incorporated into the project must be Produced in the United States. For example, trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. iron or steel.

**52.i *Manufacturer*** - A Supplier, fabricator, distributor, materialman, or vendor is an entity with which the Owner, Contractor or any subcontractor has contracted to furnish materials or equipment to be incorporated in the project by the Owner, Contractor or a subcontractor.

**52.j *Manufacturer's Certification*** - Documentation provided by the Manufacturer stating that the Iron and Steel products to be used in the project are produced in the United States in accordance with American Iron and Steel (AIS) Requirements. If items are purchased via a Supplier, distributor, vendor, etc. from the Manufacturer directly, then the Supplier, distributor, vendor, etc. will be responsible for obtaining and providing these certifications to the parties purchasing the products.

**52.k *Manufacturing Processes*** - Processes such as melting, refining, pouring, forming, rolling, drawing, finishing, and fabricating. Further, if a domestic Iron and Steel product is taken out of the United States for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the material(s), if any, being applied as a Coating are similarly not covered. Non-iron or Steel components of an Iron and Steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-Iron and Steel components do not have to be of domestic origin. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-U.S. sources.

**52.l *Mechanical Equipment*** - Typically equipment which has motorized parts and/or is powered by a motor. AIS does not apply to Mechanical Equipment.

**52.m *Minor Components*** - Components *within* an iron and/or Steel product otherwise compliant with the American Iron and Steel requirements; this waiver is typically used by Manufacturers. It differs from the *De Minimis* definition in that *De Minimis* pertains to the entire project and the minor component definition pertains to a single product. This waiver allows use of non-domestically produced miscellaneous Minor Components comprising up to five percent of the total material cost of an

EJCDC® C-800, Supplementary Conditions of the Construction Contract.

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otherwise domestically produced Iron and Steel product. However, unless a separate waiver for a product has been approved, all other Iron and Steel components in said product must still meet the AIS requirements. This waiver does not exempt the whole product from the AIS requirements only Minor Components within said product and the iron or Steel components of the product must be produced domestically. Valves and hydrants are also subject to the cost ceiling requirements described here. Examples of Minor Components could include items such as pins and springs in valves/hydrants, bands/straps in couplings, and other low-cost items such as small fasteners etc.

**52.n *Municipal Castings*** - Cast iron or Steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and solid waste infrastructure.

**52.o *Primarily Iron or Steel*** - A product is made of greater than 50 percent iron or Steel on a materials cost basis. An exception to this definition is reinforced precast concrete (see Definitions). All technical specifications and applicable industry standards (e.g. NIST, NSF, AWWA) must be met. If a product is determined to be less than 50 percent iron and/or steel, the AIS requirements do not apply. For example, the cost of a fire hydrant includes:

- ☐ The cost of materials used for the iron portion of a fire hydrant (e.g. bonnet, body and shoe); and
- ☐ The cost to pour and cast to create those components (e.g. labor and energy).

Not included in the cost are:

- ☐ The additional material costs for the non-iron or Steel internal workings of the hydrant (e.g. stem, coupling, valve, seals, etc.); and
- ☐ The cost to assemble the internal workings into the hydrant body.

**52.p *Produced in the United States*** - The production in the United States of the iron or Steel products used in the project requires that all Manufacturing Processes must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives.

**52.q *Reinforced Precast Concrete*** – Reinforced Precast Concrete structures must comply with AIS, regardless of whether or not it consists of at least 50 percent iron or steel. The reinforcing bar and wire must be Produced in the United States and meet the same standards as for any other iron or Steel product. Additionally, the casting of the concrete product must take place in the United States. The cement and other raw materials used in concrete production are not required to be of domestic origin. If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered Construction Materials and must be Produced in the United States.

**52.r *Steel*** - An alloy that includes at least 50 percent iron, between 0.02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of Steel for the purpose of enhancing properties such as

corrosion resistance, hardness, or strength. The definition of Steel covers carbon steel, alloy steel, stainless steel, tool steel, and other specialty steels.

**52.s Structural Steel** - Rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees, and zebs. Other shapes include but are not limited to, H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

## ARTICLE 2—PRELIMINARY MATTERS

### 2.01 *Delivery of Bonds and Evidence of Insurance*

SC-2.01 Delete Paragraphs 2.01.B. and C. in their entirety and insert the following in their place:

- B. *Evidence of Contractor's Insurance:* When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner copies of the policies (including all endorsements, and identification of applicable self-insured retentions and deductibles) of insurance required to be provided by Contractor in this Contract. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- C. *Evidence of Owner's Insurance:* After receipt from Contractor of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor copies of the policies of insurance to be provided by Owner in this Contract (if any). Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

### 2.02 *Copies of Documents*

SC-2.02 Amend the first sentence of Paragraph 2.02.A. to read as follows:

Owner shall furnish to Contractor ~~[number]~~**five** printed copies of the Contract Documents (including one fully signed counterpart of the Agreement), and **one** in electronic portable document format (PDF).

SC-2.02 Delete Paragraph 2.02.A in its entirety and insert the following new paragraph in its place:

- A. Owner shall furnish to Contractor **1 (one)** printed copies of conformed Contract Documents incorporating and integrating all Addenda and any amendments negotiated prior to the Effective Date of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies of the conformed Contract Documents will be furnished upon request at the cost of reproduction.

### ~~2.06—Electronic Transmittals~~

~~SC-2.06—Delete Paragraphs 2.06.B and 2.06.C in their entirety and insert the following in their place:~~

- ~~B. *Electronic Documents Protocol:* The parties shall conform to the following provisions in Paragraphs 2.06.B and 2.06.C, together referred to as the Electronic Documents Protocol ("EDP" or "Protocol") for exchange of electronic transmittals.~~

~~1.—Basic Requirements~~

- ~~a.— To the fullest extent practical, the parties agree to and will transmit and accept Electronic Documents in an electronic or digital format using the procedures described in this Protocol. Use of the Electronic Documents and any information contained therein is subject to the requirements of this Protocol and other provisions of the Contract.~~
- ~~b.— The contents of the information in any Electronic Document will be the responsibility of the transmitting party.~~
- ~~c.— Electronic Documents as exchanged by this Protocol may be used in the same manner as the printed versions of the same documents that are exchanged using non-electronic format and methods, subject to the same governing requirements, limitations, and restrictions, set forth in the Contract Documents.~~
- ~~d.— Except as otherwise explicitly stated herein, the terms of this Protocol will be incorporated into any other agreement or subcontract between a party and any third party for any portion of the Work on the Project, or any Project-related services, where that third party is, either directly or indirectly, required to exchange Electronic Documents with a party or with Engineer. Nothing herein will modify the requirements of the Contract regarding communications between and among the parties and their subcontractors and consultants.~~
- ~~e.— When transmitting Electronic Documents, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the receiving party's use of software application packages, operating systems, or computer hardware differing from those established in this Protocol.~~
- ~~f.— Nothing herein negates any obligation 1) in the Contract to create, provide, or maintain an original printed record version of Drawings and Specifications, signed and sealed according to applicable Laws and Regulations; 2) to comply with any applicable Law or Regulation governing the signing and sealing of design documents or the signing and electronic transmission of any other documents; or 3) to comply with the notice requirements of Paragraph 18.01 of the General Conditions.~~

~~2.—System Infrastructure for Electronic Document Exchange~~

- ~~a.— Each party will provide hardware, operating system(s) software, internet, e-mail, and large file transfer functions (“System Infrastructure”) at its own cost and sufficient for complying with the EDP requirements. With the exception of minimum standards set forth in this EDP, and any explicit system requirements specified by attachment to this EDP, it is the obligation of each party to determine, for itself, its own System Infrastructure.~~
  - ~~1) The maximum size of an email attachment for exchange of Electronic Documents under this EDP is [number] MB. Attachments larger than that may be exchanged using large file transfer functions or physical media.~~
  - ~~2) Each Party assumes full and complete responsibility for any and all of its own costs, delays, deficiencies, and errors associated with converting, translating,~~



updating, verifying, licensing, or otherwise enabling its System Infrastructure, including operating systems and software, for use with respect to this EDP.

- ~~b. Each party is responsible for its own system operations, security, back up, archiving, audits, printing resources, and other Information Technology ("IT") for maintaining operations of its System Infrastructure during the Project, including coordination with the party's individual(s) or entity responsible for managing its System Infrastructure and capable of addressing routine communications and other IT issues affecting the exchange of Electronic Documents.~~
- ~~c. Each party will operate and maintain industry standard, industry accepted, ISO standard, commercial grade security software and systems that are intended to protect the other party from: software viruses and other malicious software like worms, trojans, adware; data breaches; loss of confidentiality; and other threats in the transmission to or storage of information from the other parties, including transmission of Electronic Documents by physical media such as CD/DVD/flash drive/hard drive. To the extent that a party maintains and operates such security software and systems, it shall not be liable to the other party for any breach of system security.~~
- ~~d. In the case of disputes, conflicts, or modifications to the EDP required to address issues affecting System Infrastructure, the parties shall cooperatively resolve the issues; but, failing resolution, the Owner is authorized to make and require reasonable and necessary changes to the EDP to effectuate its original intent. If the changes cause additional cost or time to Contractor, not reasonably anticipated under the original EDP, Contractor may seek an adjustment in price or time under the appropriate process in the Contract.~~
- ~~e. Each party is responsible for its own back up and archive of documents sent and received during the term of the contract under this EDP, unless this EDP establishes a Project document archive, either as part of a mandatory Project website or other communications protocol, upon which the parties may rely for document archiving during the specified term of operation of such Project document archive. Further, each party remains solely responsible for its own post-Project back up and archive of Project documents after the term of the Contract, or after termination of the Project document archive, if one is established, for as long as required by the Contract and as each party deems necessary for its own purposes.~~
- ~~f. If a receiving party receives an obviously corrupted, damaged, or unreadable Electronic Document, the receiving party will advise the sending party of the incomplete transmission.~~
- ~~g. The parties will bring any non-conforming Electronic Documents into compliance with the EDP. The parties will attempt to complete a successful transmission of the Electronic Document or use an alternative delivery method to complete the communication.~~
- ~~h. The Owner will operate a Project information management system (also referred to in this EDP as "Project Website") for use of Owner, Engineer and Contractor during the Project for exchange and storage of Project related communications and information. Except as otherwise provided in this EDP or the General~~

~~Conditions, use of the Project Website by the parties as described in this Paragraph will be mandatory for exchange of Project documents, communications, submittals, and other Project related information. The following conditions and standards will govern use of the Project Website:~~

- ~~1) Describe the period of time during which the Project Website will be operated and be available for reliance by the parties;~~
- ~~2) Provide any minimum system infrastructure, software licensing and security standards for access to and use of the Project Website;~~
- ~~3) Describe the types and extent of services to be provided at the Project Website (such as large file transfer, email, communication and document archives, etc.); and~~
- ~~4) Include any other Project Website attributes that may be pertinent to Contractor's use of the facility and pricing of such use.~~

~~C. Software Requirements for Electronic Document Exchange; Limitations~~

- ~~1. Each party will acquire the software and software licenses necessary to create and transmit Electronic Documents and to read and to use any Electronic Documents received from the other party (and if relevant from third parties), using the software formats required in this section of the EDP.~~
  - ~~a. Prior to using any updated version of the software required in this section for sending Electronic Documents to the other party, the originating party will first notify and receive concurrence from the other party for use of the updated version or adjust its transmission to comply with this EDP.~~
- ~~2. The parties agree not to intentionally edit, reverse engineer, decrypt, remove security or encryption features, or convert to another format for modification purposes any Electronic Document or information contained therein that was transmitted in a software data format, including Portable Document Format (PDF), intended by sender not to be modified, unless the receiving party obtains the permission of the sending party or is citing or quoting excerpts of the Electronic Document for Project purposes.~~
- ~~3. Software and data formats for exchange of Electronic Documents will conform to the requirements set forth in Exhibit A to this EDP, including software versions, if listed.~~

**~~Guidance Notes—Requests by Contractor for Electronic Documents in Other Formats:~~** SC-2.06.B and SC-2.06.C above constitute an Electronics Document Protocol for transmittal of Electronic Documents. When the Owner desires to retain the option to allow certain documents to be made available to Contractor in formats other than those described in SC-2.06.C of the Protocol, the Owner should add the following Supplementary Condition and release language:

SC-2.06—Supplement Paragraph 2.06 of the General Conditions by adding the following paragraph:

~~D. Requests by Contractor for Electronic Documents in Other Formats~~

- ~~1. Release of any Electronic Document versions of the Project documents in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be at the sole discretion of the Owner.~~
- ~~2. To extent determined by Owner, in its sole discretion, to be prudent and necessary, release of Electronic Documents versions of Project documents and other Project information requested by Contractor ("Request") in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be subject to the provisions of the Owner's response to the Request, and to the following conditions to which Contractor agrees:~~
  - ~~a. The content included in the Electronic Documents created by Engineer and covered by the Request was prepared by Engineer as an internal working document for Engineer's purposes solely, and is being provided to Contractor on an "AS-IS" basis without any warranties of any kind, including, but not limited to any implied warranties of fitness for any purpose. As such, Contractor is advised and acknowledges that the content may not be suitable for Contractor's application, or may require substantial modification and independent verification by Contractor. The content may include limited resolution of models, not to scale schematic representations and symbols, use of notes to convey design concepts in lieu of accurate graphics, approximations, graphical simplifications, undocumented intermediate revisions, and other devices that may affect subsequent reuse.~~
  - ~~b. Electronic Documents containing text, graphics, metadata, or other types of data that are provided by Engineer to Contractor under the request are only for convenience of Contractor. Any conclusion or information obtained or derived from such data will be at the Contractor's sole risk and the Contractor waives any claims against Engineer or Owner arising from use of data in Electronic Documents covered by the Request.~~
  - ~~c. Contractor shall indemnify and hold harmless Owner and Engineer and their subconsultants from all claims, damages, losses, and expenses, including attorneys' fees and defense costs arising out of or resulting from Contractor's use, adaptation, or distribution of any Electronic Documents provided under the Request.~~
  - ~~d. Contractor agrees not to sell, copy, transfer, forward, give away or otherwise distribute this information (in source or modified file format) to any third party without the direct written authorization of Engineer, unless such distribution is specifically identified in the Request and is limited to Contractor's subcontractors. Contractor warrants that subsequent use by Contractor's subcontractors complies with all terms of the Contract Documents and Owner's response to Request.~~
- ~~3. In the event that Owner elects to provide or directs the Engineer to provide to Contractor any Contractor requested Electronic Document versions of Project information that is not explicitly identified in the Contract Documents as being available to Contractor, the Owner shall be reimbursed by Contractor on an hourly basis (at \$[number] per hour) for any engineering costs necessary to create or otherwise prepare the data in a manner deemed appropriate by Engineer.~~

## ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

### 3.01 *Intent*

SC-3.01 Delete Paragraph 3.01.C in its entirety.

## ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

### SC-4.01.A – Delete the last sentence of paragraph.

### 4.05 *Delays in Contractor's Progress*

#### SC-4.05 Paragraph is mandatory for WWD projects.

SC-4.05 Amend Paragraph 4.05.C by adding the following subparagraphs:

#### 5. *Weather-Related Delays*

- a. If “abnormal weather conditions” as set forth in Paragraph 4.05.C.2 of the General Conditions are the basis for a request for an equitable adjustment in the Contract Times, such request must be documented by data substantiating each of the following: 1) that weather conditions were abnormal for the period of time in which the delay occurred, 2) that such weather conditions could not have been reasonably anticipated, and 3) that such weather conditions had an adverse effect on the Work as scheduled. **Extreme or unusual weather that is typical for a given region, elevation, or season should not be considered abnormal weather conditions. Requests for time extensions due to abnormal weather conditions will be submitted to the Engineer within five days of the end of the abnormal weather condition event. It is the responsibility of the Contractor to provide the information listed in SC 4.05.C.5.b.**
- b. The existence of abnormal weather conditions will be determined on a month-by-month basis in accordance with the following:
  - 1) Every workday on which one or more of the following conditions exist will be considered a “bad weather day”:
    - i) Total precipitation (as rain equivalent) occurring between 7:00 p.m. on the preceding day (regardless of whether such preceding day is a workday) through 7:00 p.m. on the workday in question equals or exceeds **one-eighth (0.125) inches** of precipitation (as rain equivalent, based on the snow/rain conversion indicated in the table entitled Foreseeable Bad Weather Days; such table is hereby incorporated in this SC-4.05.C by reference.
    - ii) ~~Ambient outdoor air temperature at 11:00 a.m. is equal to or less than the following low temperature threshold: [temperature] degrees Fahrenheit; or, at 3:00 p.m. the ambient outdoor temperature is equal to or greater than the following high temperature threshold: [temperature] degrees Fahrenheit.~~
  - 2) Determination of actual bad weather days during performance of the Work will be based on the weather records measured and recorded by “Georgia

**Automated Environmental Network” weather monitoring station closest to the construction site for that particular month.**

- 3) Contractor shall anticipate the number of foreseeable bad weather days per month indicated in the table in **the following table** - Foreseeable Bad Weather Days.

<b>January</b>	<b>7</b>	<b>July</b>	<b>6</b>
<b>February</b>	<b>7</b>	<b>August</b>	<b>7</b>
<b>March</b>	<b>6</b>	<b>September</b>	<b>3</b>
<b>April</b>	<b>5</b>	<b>October</b>	<b>4</b>
<b>May</b>	<b>5</b>	<b>November</b>	<b>6</b>
<b>June</b>	<b>7</b>	<b>December</b>	<b>9</b>

- 4) In each month, every bad weather day exceeding the number of foreseeable bad weather days established in the **table above** - Foreseeable Bad Weather Days will be considered as “abnormal weather conditions.” The existence of abnormal weather conditions will not relieve Contractor of the obligation to demonstrate and document that delays caused by abnormal weather are specific to the planned work activities or that such activities thus delayed were on Contractor’s then-current Progress Schedule’s critical path for the Project.

#### **ARTICLE 5—SITE, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS**

##### **5.03 Subsurface and Physical Conditions**

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.D:

- E. The following table lists the reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data, and specifically identifies the Technical Data in the report upon which Contractor may rely:

<b>Report Title</b>	<b>Date of Report</b>	<b>Technical Data</b>
Subsurface Exploration and Geotechnical Engineering Evaluation	10/18/2019	Results of subsurface explorations and geotechnical engineering evaluation

- F. The following table lists the drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data, and specifically

identifies the Technical Data upon which Contractor may rely: **[If there are no such drawings, so indicate in the table.]**

Drawings Title	Date of Drawings	Technical Data
Existing Plant Drawings for Town Branch WPCP Improvements	1985	Existing plant drawings
Bell Creek WPCP Upgrading	1987	Plans for Bell Creek WPCP Upgrades

- G. Contractor may examine copies of reports and drawings identified in SC-5.03.E and SC-5.03.F that were not included with the Bidding Documents **electronically** during regular business hours, or may request copies from Engineer.

#### 5.06 Hazardous Environmental Conditions

SC-5.06 Add the following new paragraphs immediately after Paragraph 5.06.A.3:

4. The following table lists the reports known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and the Technical Data (if any) upon which Contractor may rely: **[If there are no such reports, so indicate in the table]**

Report Title	Date of Report	Technical Data
NONE	N/A	N/A

5. The following table lists the drawings known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and Technical Data (if any) contained in such Drawings upon which Contractor may rely: **[If there are no such drawings, so indicate in the table]**

Drawings Title	Date of Drawings	Technical Data
NONE	N/A	N/A

## ARTICLE 6—BONDS AND INSURANCE

### 6.01 Performance, Payment, and Other Bonds

**SC-6.01 – Disregard EJCDC Guidance Notes – Performance and Payment Bonds, Note 1. Performance and Payment Bonds are required for WEP projects.**

SC-6.01 Add the following paragraphs immediately after Paragraph 6.01.A:

- Required Performance Bond Form:* The performance bond that Contractor furnishes will be in the form of EJCDC® C-610, Performance Bond (2010, 2013, or 2018 edition).
- Required Payment Bond Form:* The payment bond that Contractor furnishes will be in the form of EJCDC® C-615, Payment Bond (2010, 2013, or 2018 edition).

**SC-6.01 – EJCDC Guidance Notes – “Other Bonds,” Warranty Bond, Note 1. RD does not require a Warranty Bond, and RD will not accept a Warranty Bond in place of a Performance and Payment Bond. The decision to include a Warranty Bond is made by the Owner and their counsel. Please refer to EJCDC.**

~~SC-6.01 — Add the following paragraphs immediately after Paragraph 6.01.B:~~

- ~~1. The correction period specified as one year after the date of Substantial Completion in Paragraph 15.08.A of the General Conditions is hereby revised to be **[number—either 2, 3, or other]** years after Substantial Completion.~~
- ~~2. After Substantial Completion, Contractor shall furnish a warranty bond issued in the form of EJCDC® C-612, Warranty Bond (2018). The warranty bond must be in a bond amount of **[number—either 10, 15, or other]** percent of the final Contract Price. The warranty bond period will extend to a date **[number—either 2, 3, or other]** years after Substantial Completion of the Work. Contractor shall deliver the fully executed warranty bond to Owner prior to or with the final application for payment, and in any event no later than 11 months after Substantial Completion.~~
- ~~3. The warranty bond must be issued by the same surety that issues the performance bond required under Paragraph 6.01.A of the General Conditions.~~

#### 6.02 Insurance—General Provisions

~~SC-6.02 — Add the following paragraph immediately after Paragraph 6.02.B:~~

- ~~1. Contractor may obtain worker’s compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the Project is located, (b) is certified or authorized as a worker’s compensation insurance provider by the appropriate state agency, and (c) has been accepted to provide worker’s compensation insurance for similar projects by the state within the last 12 months.~~

SC-6.02 Add the following paragraph immediately after Paragraph 6.02.H.2 of the General Conditions:

3. For the following Subcontractors, Suppliers, or categories of Subcontractor or Supplier, Contractor shall require the following specified insurance, with policy limits as stated:  
**[Identify Subcontractors, Suppliers, or categories of same, and insert specific insurance requirements and policy limits]**

#### 6.03 Contractor’s Insurance

SC-6.03 Supplement Paragraph 6.03 with the following provisions after Paragraph 6.03.C:

- D. ~~Other Additional Insureds: As a supplement to the provisions of Paragraph 6.03.C of the General Conditions, the commercial general liability, automobile liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies must include as additional insureds (in addition to Owner and Engineer) the following: **[Here list by legal name (not category, role, or classification) other persons or entities to be included as additional insureds. See GC 6.03.C.]**~~
- E. *Workers’ Compensation and Employer’s Liability:* Contractor shall purchase and maintain workers’ compensation and employer’s liability insurance, including, as applicable, United States Longshoreman and Harbor Workers’ Compensation Act, Jones Act, stop-gap

employer's liability coverage for monopolistic states, and foreign voluntary workers' compensation (from available sources, notwithstanding the jurisdictional requirement of Paragraph 6.02.B of the General Conditions).

<b>Workers' Compensation and Related Policies</b>	<b>Policy limits of not less than:</b>
<b>Workers' Compensation</b>	
State	Statutory
Applicable Federal (e.g., Longshoreman's)	Statutory
Foreign voluntary workers' compensation (employer's responsibility coverage), if applicable	Statutory
<b>Jones Act (if applicable)</b>	
Bodily injury by accident—each accident	\$N/A
Bodily injury by disease—aggregate	\$ N/A
<b>Employer's Liability</b>	
Each accident	\$ 200,000
Each employee	\$ -
Policy limit	\$ -
<b>Stop-gap Liability Coverage</b>	
For work performed in monopolistic states, stop-gap liability coverage must be endorsed to either the worker's compensation or commercial general liability policy with a minimum limit of:	\$ N/A

- F. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against claims for:
1. damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees,
  2. damages insured by reasonably available personal injury liability coverage, and
  3. damages because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- G. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy must be written on a 1996 (or later) Insurance Services Organization, Inc. (ISO) commercial general liability form (occurrence form) and include the following coverages and endorsements:
1. Products and completed operations coverage.
    - a. Such insurance must be maintained for three years after final payment.
    - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
  2. Blanket contractual liability coverage, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.



3. Severability of interests and no insured-versus-insured or cross-liability exclusions.
  4. Underground, explosion, and collapse coverage.
  5. Personal injury coverage.
  6. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.
  7. For design professional additional insureds, ISO Endorsement CG 20 32 07 04 "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- H. *Commercial General Liability—Excluded Content:* The commercial general liability insurance policy, including its coverages, endorsements, and incorporated provisions, must not include any of the following:
1. Any modification of the standard definition of "insured contract" (except to delete the railroad protective liability exclusion if Contractor is required to indemnify a railroad or others with respect to Work within 50 feet of railroad property).
  2. Any exclusion for water intrusion or water damage.
  3. Any provisions resulting in the erosion of insurance limits by defense costs other than those already incorporated in ISO form CG 00 01.
  4. Any exclusion of coverage relating to earth subsidence or movement.
  5. Any exclusion for the insured's vicarious liability, strict liability, or statutory liability (other than worker's compensation).
  6. Any limitation or exclusion based on the nature of Contractor's work.
  7. Any professional liability exclusion broader in effect than the most recent edition of ISO form CG 22 79.
- I. *Commercial General Liability—Minimum Policy Limits*

<b>Commercial General Liability</b>	<b>Policy limits of not less than:</b>
General Aggregate	\$ 2,000,000
Products—Completed Operations Aggregate	\$2,000,000
Personal and Advertising Injury	\$ 1,000,000
Bodily Injury and Property Damage—Each Occurrence	\$ 1,000,000

- J. *Automobile Liability:* Contractor shall purchase and maintain automobile liability insurance 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. The automobile liability policy must be written on an occurrence basis.

<b>Automobile Liability</b>	<b>Policy limits of not less than:</b>
<b>Bodily Injury</b>	
Each Person	\$ 1,000,000
Each Accident	\$ 2,000,000
<b>Property Damage</b>	
Each Accident	\$ 1,000,000
<b>[or]</b>	
<b>Combined Single Limit</b>	
Combined Single Limit (Bodily Injury and Property Damage)	\$ 2,000,000

- K. ~~*Umbrella or Excess Liability:*~~ Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the Paragraphs above. The coverage afforded must be at least as broad as that of each and every one of the underlying policies.

<b>Excess or Umbrella Liability</b>	<b>Policy limits of not less than:</b>
Each Occurrence	\$
General Aggregate	\$

- L. ~~*Using Umbrella or Excess Liability Insurance to Meet CGL and Other Policy Limit Requirements:*~~ Contractor may meet the policy limits specified for employer's liability, commercial general liability, and automobile liability through the primary policies alone, or through combinations of the primary insurance policy's policy limits and partial attribution of the policy limits of an umbrella or excess liability policy that is at least as broad in coverage as that of the underlying policy, as specified herein. If such umbrella or excess liability policy was required under this Contract, at a specified minimum policy limit, such umbrella or excess policy must retain a minimum limit of \$[specify amount] after accounting for partial attribution of its limits to underlying policies, as allowed above.
- M. ~~*Contractor's Pollution Liability Insurance:*~~ Contractor shall purchase and maintain a policy covering third-party injury and property damage, including cleanup costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance must be maintained for no less than three years after final completion.

<b>Contractor's Pollution Liability</b>	<b>Policy limits of not less than:</b>
Each Occurrence/Claim	\$
General Aggregate	\$

- N. ~~*Contractor's Professional Liability Insurance:*~~ If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance must cover negligent acts, errors, or omissions in the performance of professional design or related services by the insured or others for whom the insured is legally liable. The insurance must be maintained throughout the

duration of the Contract and for a minimum of two years after Substantial Completion. The retroactive date on the policy must pre-date the commencement of furnishing services on the Project.

<b>Contractor's Professional Liability</b>	<b>Policy limits of not less than:</b>
Each Claim	\$
Annual Aggregate	\$

- ~~O. *Railroad Protective Liability Insurance:* Prior to commencing any Work within 50 feet of railroad owned and controlled property, Contractor shall (1) endorse its commercial general liability policy with ISO CG 24 17, removing the contractual liability exclusion for work within 50 feet of a railroad, (2) purchase and maintain railroad protective liability insurance meeting the following requirements, (3) furnish a copy of the endorsement to Owner, and (4) submit a copy of the railroad protective policy and other railroad required documentation to the railroad, and notify Owner of such submittal.~~

~~**[Insert additional specific requirements, commonly set by the railroad, here.]**~~

<b>Railroad Protective Liability Insurance</b>	<b>Policy limits of not less than:</b>
Each Claim	\$
Aggregate	\$

- ~~P. *Unmanned Aerial Vehicle Liability Insurance:* If Contractor uses unmanned aerial vehicles (UAV commonly referred to as drones) at the Site or in support of any aspect of the Work, Contractor shall obtain UAV liability insurance in the amounts stated; name Owner, Engineer, and all individuals and entities identified in the Supplementary Conditions as additional insureds; and provide a certificate to Owner confirming Contractor's compliance with this requirement. Such insurance will provide coverage for property damage, bodily injury or death, and invasion of privacy.~~

<b>Unmanned Aerial Vehicle Liability Insurance</b>	<b>Policy limits of not less than:</b>
Each Claim	\$
General Aggregate	\$

- ~~Q. *Other Required Insurance:* **[Here list additional types and amounts of insurance that Contractor is required to carry.]**~~

#### 6.04 — *Builder's Risk and Other Property Insurance*

SC 6.04 — Delete Paragraph 6.04.A and insert the following in its place:

- ~~A. Owner shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.~~

SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provisions:

F. *Builder's Risk Requirements:* The builder's risk insurance must:

1. be written on a builder's risk "all risk" policy form that at a minimum includes insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment stored and in transit, and must not exclude the coverage of the following risks: fire; windstorm; hail; flood; earthquake, volcanic activity, and other earth movement; lightning; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; and water damage (other than that caused by flood).
  - a. Such policy will include an exception that results in coverage for ensuing losses from physical damage or loss with respect to any defective workmanship, methods, design, or materials exclusions.
  - b. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake, volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance will be provided through other insurance policies acceptable to Owner and Contractor.
2. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.
3. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of contractors, engineers, and architects).
4. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier). If this coverage is subject to a sublimit, such sublimit will be a minimum of \$[amount].
5. extend to cover damage or loss to insured property while in transit. If this coverage is subject to a sublimit, such sublimit will be a minimum of \$[amount].
6. allow for the waiver of the insurer's subrogation rights, as set forth in this Contract.
7. allow for partial occupancy or use by Owner by endorsement, and without cancellation or lapse of coverage.
8. include performance/hot testing and start-up, if applicable.

9. be maintained in effect until the Work is complete, as set forth in Paragraph 15.06.D of the General Conditions, or until written confirmation of Owner's procurement of property insurance following Substantial Completion, whichever occurs first.
10. include as named insureds the Owner, Contractor, Subcontractors (of every tier), and any other individuals or entities required by this Contract to be insured under such builder's risk policy. For purposes of Paragraphs 6.04, 6.05, and 6.06 of the General Conditions, and this and all other corresponding Supplementary Conditions, the parties required to be insured will be referred to collectively as "insureds." In addition to Owner, Contractor, and Subcontractors of every tier, ~~include as insureds the following:~~
  - a. ~~[Here list by legal name (not category, role, or classification) other persons or entities to be included on the builder's risk policy as named insureds. It is generally recommended to list the insured's full legal/contractual name, address, contact person, telephone, and e-mail address. Include only persons or entities that have property at the Site that is to be insured by the builder's risk insurance. If applicable, separately identify any mortgagee or lender required to be named as a loss payee.]~~
11. ~~include, in addition to the Contract Price amount, the value of the following equipment and materials to be installed by the Contractor but furnished by the Owner or third parties:~~
  - a. ~~[Here list or provide cross reference to specific items of Owner furnished (or third party furnished) equipment, and purchase value; do not list items whose value is already included in the Contract Price.]~~
12. ~~If debris removal in connection with repair or replacement of insured property is subject to a coverage sublimit, such sublimit will be a minimum of \$[amount].~~
13. ~~In addition to the coverage sublimits stated above, the following coverages are also subject to sublimits, as follows:~~
  - a. ~~[Here list a specific coverage, or cause of loss, that has been determined to be likely to be subject to a sublimit. If not applicable, then delete Paragraph SC-6.04.F.13 in its entirety.]~~ If this coverage is subject to a sublimit, such sublimit will be a minimum of \$[amount].

SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provision:

- G. *Coverage for Completion Delays:* The builder's risk policy will include, for the benefit of Owner, loss of revenue and soft cost coverage for losses arising from delays in completion that result from covered physical losses or damage. Such coverage will include, without limitation, fixed expenses and debt service for a minimum of 12 months with a maximum deductible of 30 days, compensation for loss of net revenues, rental costs, and attorneys' fees and engineering or other consultants' fees, if not otherwise covered.

~~SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provisions:~~

- H. ~~*Builder's Risk and Other Property Insurance Deductibles:* The purchaser of any required builder's risk, installation floater, or other property insurance will be responsible for costs not covered because of the application of a policy deductible.~~

1. ~~The builder's risk policy (or if applicable the installation floater) will be subject to a deductible amount of no more than \$[number] for direct physical loss in any one occurrence.~~

SC-6.04 ~~Delete Paragraph 6.04.A of the General Conditions and substitute the following in its place:~~

~~A. *Installation Floater*~~

1. ~~Contractor shall provide and maintain installation floater insurance on a broad form or "all risk" policy providing coverage for materials, supplies, machinery, fixtures, and equipment that will be incorporated into the Work ("Covered Property"). Coverage under the Contractor's installation floater will include loss from covered "all risk" causes (perils) to Covered Property:~~
  - a. ~~of the Contractor, and Covered Property of others that is in Contractor's care, custody, and control;~~
  - b. ~~while in transit to the Site, including while at temporary storage sites;~~
  - c. ~~while at the Site awaiting and during installation, erection, and testing;~~
  - d. ~~continuing at least until the installation or erection of the Covered Property is completed, and the Work into which it is incorporated is accepted by Owner.~~
2. ~~The installation floater coverage cannot be contingent on an external cause or risk, or limited to property for which the Contractor is legally liable.~~
3. ~~The installation floater coverage will be in an amount sufficient to protect Contractor's interest in the Covered Property. The Contractor will be solely responsible for any deductible carried under this coverage.~~
4. ~~This policy will include a waiver of subrogation applicable to Owner, Contractor, Engineer, all Subcontractors, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them.~~

## ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

### 7.03 *Labor; Working Hours*

SC-7.03 ~~Add the following new subparagraphs immediately after Paragraph 7.03.C:~~

1. ~~Regular working hours will be [Here insert schedule of regular working hours].~~
2. ~~Owner's legal holidays are [Here insert list of legal holidays].~~

SC-7.03 ~~Amend the first and second sentences of Paragraph 7.03.C to state "...all Work at the Site must be performed during regular working hours, [day of the week] through [day of the week]. Contractor will not perform Work on a [day of the week], [day of the week], or any legal holiday."~~

SC-7.03 ~~Delete Paragraph 7.03.C in its entirety, and insert the following:~~

- C. ~~In the absence of any Laws or Regulations to the contrary, Contractor may perform the Work on holidays, during any or all hours of the day, and on any or all days of the week, at Contractor's sole discretion.~~

~~SC-7.03 — Add the following new paragraph immediately after Paragraph 7.03.C:~~

- ~~D. **Contractor** shall be responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.~~

~~SC-7.03 — Add the following new subparagraph immediately after Paragraph SC-7.03.D:~~

- ~~1. For purposes of administering the foregoing requirement, additional overtime costs are defined as **[Here insert parameters for compensated overtime hours]**.~~

**SC-7.04.D – Add the following new paragraph immediately after Paragraph 7.04.C:**

- D. All Iron and Steel products must meet American Iron and Steel requirements.**

**SC-7.04.E – Add the following new paragraph immediately after Paragraph 7.04.D:**

- E. For projects utilizing a *De Minimis* waiver, Contractor shall maintain an itemized list of non-domestically produced iron or steel incidental components and ensure that the cost is less than 5% of total materials cost for project.**

**SC-7.05.A – Amend the third sentence of paragraph by striking out the following words:**

- Unless the specification or description contains or is followed by words reading that no like, equivalent, or “or-equal” item is permitted,**

**SC-7.05.A.1.a.3 – Amend the last sentence of Paragraph a.3 by striking out “and;” and adding a period at the end of Paragraph a.3.**

**SC-7.05.A.1.a.4 – Delete paragraph in its entirety and insert “Deleted.”**

**SC-7.05.B – Add the following at the end of paragraph:**

- Contractor shall include a Manufacturer's Certification letter for compliance with American Iron and Steel requirements in support data, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents.**

**SC-7.06.A.3.a.2 – Remove “and” from the end of paragraph.**

**SC-7.06.A.3.a.3 – Add “; and” to the end of paragraph.**

**SC-7.06.A.3.a.4 – Add the following new paragraph immediately after Paragraph 7.06.A.3.a.3:**

**4. Comply with American Iron and Steel by providing Manufacturer’s Certification letter of American Iron and Steel compliance, if applicable. Refer to Manufacturer’s Certification Letter provided in these Contract Documents.**

**SC-7.07.A – Amend by adding the following to the end of the paragraph:**

**The total amount of work subcontracted by the Contractor shall not exceed fifty percent of the Contract price without prior approval from the Owner, Engineer and Agency.**

**SC-7.07.B – Delete paragraph in its entirety and insert “Deleted”.**

**SC-7.07.E – Delete the second sentence of paragraph and insert the following in its place:**

**Owner may not require that Contractor use a specific replacement.**

#### **7.10 Taxes**

**SC-7.10 Add a new paragraph immediately after Paragraph 7.10.A:**

- A. Owner is exempt from payment of sales and compensating use taxes of the State of [name of state where Project is located] and of cities and counties thereof on all materials to be incorporated into the Work.**
  - 1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.**
  - 2. Owner’s exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.**

**SC-7.12.A Amend paragraph by adding the following after “written interpretations and clarifications,”:**

**Manufacturers’ Certifications,**

#### **7.13 Safety and Protection**

**SC-7.13 Insert the following after the second sentence of Paragraph 7.13.G:**

~~The following Owner safety programs are applicable to the Work: [Here expressly identify by title and/or date, any such Owner safety programs. If Owner’s safety programs are included in or addressed in the Specifications, SC 7.13 may be used to provide a cross-reference to the Specification section].~~



**SC-7.16.A.1.c – Amend paragraph by deleting the last period and adding:**

**, including Manufacturer’s Certification letter for any item in the submittal subject to American Iron and Steel requirements and include the Certificate in the submittal. Refer to Manufacturer’s Certification Letter provided in these Contract Documents.**

**SC-7.16.C.9 – Add new paragraph immediately after Paragraph 7.16.C.8:**

**9. Engineer’s review and approval of a Shop Drawing or Sample shall include review of Manufacturers’ Certifications in order to document compliance with American Iron and Steel requirements, as applicable.**

**SC-7.17.F – Add new paragraph immediately after Paragraph 7.17.E:**

**F. Contractor shall certify upon Substantial Completion that all Work and Materials have complied with American Iron and Steel requirements as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference. Contractor shall provide said Certification to Owner. Refer to General Contractor’s Certification Letter provided in these Contract Documents.**

## **ARTICLE 8—OTHER WORK AT THE SITE**

### **8.02 Coordination**

~~SC-8.02 — Add the following new Paragraph 8.02.C immediately after Paragraph 8.02.B:~~

- ~~C. Owner intends to contract with others for the performance of other work at or adjacent to the Site.~~
- ~~1. [Here identify individual or entirety] shall have authority and responsibility for coordination of the various contractors and work forces at the Site;~~
  - ~~2. The following specific matters are to be covered by such authority and responsibility: [Here itemize such matters];~~
  - ~~3. The extent of such authority and responsibilities is: [Here provide the extent].~~

## **ARTICLE 9—OWNER’S RESPONSIBILITIES**

### **9.13 Owner’s Site Representative**

**SC-9.13 Add the following new paragraph immediately after Paragraph 9.12 of the General Conditions:**

### **9.13 Owner’s Site Representative**

- A. Owner will furnish an “Owner’s Site Representative” to represent Owner at the Site and assist Owner in observing the progress and quality of the Work. The Owner’s Site Representative is not Engineer’s consultant, agent, or employee. Owner’s Site Representative will be [here**

~~identify individual or entity~~. The authority and responsibilities of Owner's Site Representative follow: **[Here describe the duties and activities of the Owner's Site Representative.]**

## ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

### 10.03 Resident Project Representative

~~SC 10.03~~ Add the following new subparagraph immediately after Paragraph 10.03.A:

- ~~1. On this Project, by agreement with the Owner, the Engineer will not furnish a Resident Project Representative to represent Engineer at the Site or assist Engineer in observing the progress and quality of the Work.~~

SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.B:

- C. The Resident Project Representative (RPR) will be Engineer's representative at the Site. RPR's dealings in matters pertaining to the Work in general will be with Engineer and Contractor. RPR's dealings with Subcontractors will only be through or with the full knowledge or approval of Contractor. The RPR will:
  1. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings (but not including Contractor's safety meetings), and as appropriate prepare and circulate copies of minutes thereof.
  2. *Safety Compliance:* Comply with Site safety programs, as they apply to RPR, and if required to do so by such safety programs, receive safety training specifically related to RPR's own personal safety while at the Site.
  3. *Liaison*
    - a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.
    - b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.
    - c. Assist in obtaining from Owner additional details or information, when required for Contractor's proper execution of the Work.
  4. *Review of Work; Defective Work*
    - a. Conduct on-Site observations of the Work to assist Engineer in determining, to the extent set forth in Paragraph 10.02, if the Work is in general proceeding in accordance with the Contract Documents.
    - b. Observe whether any Work in place appears to be defective.
    - c. Observe whether any Work in place should be uncovered for observation, or requires special testing, inspection or approval.
  5. *Inspections and Tests*

- a. Observe Contractor-arranged inspections required by Laws and Regulations, including but not limited to those performed by public or other agencies having jurisdiction over the Work.
  - b. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Work.
- 6. *Payment Requests:* Review Applications for Payment with Contractor.
- 7. *Completion*
  - a. Participate in Engineer's visits regarding Substantial Completion.
  - b. Assist in the preparation of a punch list of items to be completed or corrected.
  - c. Participate in Engineer's visit to the Site in the company of Owner and Contractor regarding completion of the Work, and prepare a final punch list of items to be completed or corrected by Contractor.
  - d. Observe whether items on the final punch list have been completed or corrected.
- D. The RPR will not:
  - 1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
  - 2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
  - 3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.
  - 4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction.
  - 5. Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
  - 6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.
  - 7. Authorize Owner to occupy the Project in whole or in part.

## **ARTICLE 11—CHANGES TO THE CONTRACT**

~~No suggested Supplementary Conditions in this Article.~~

**SC-11.02.C – Add new paragraph immediately after Paragraph 11.02.B:**

**C. The Engineer or Owner shall contact the Agency for concurrence on each Change Order prior to issuance. All Contract Change Orders must be concurred on (signed) by Agency before they are effective.**

**SC-11.03.A.2 - Add new Paragraph 11.03.A.2 immediately after Paragraph 11.03.A, which shall be renamed Paragraph 11.03.A.1:**

2. The Engineer or Owner shall contact the Agency for concurrence on each Work Change Directive prior to issuance. Once authorized by Owner, a copy of each Work Change Directive shall be provided by Engineer to the Agency.

SC-11.05.B – Add the following at the end of this paragraph:

For Owner-authorized changes in the Work, the Contractor will provide the Manufacturer's Certification(s) for materials subject to American Iron and Steel requirements except when sole-source is specified, in which case the Engineer will provide the Manufacturer's Certification(s).

SC-11.09.B.2.c – Add new paragraph immediately after Paragraph 11.09.B.2.b:

c. Change orders involving materials subject to American Iron and Steel requirements shall include supporting data (name of Manufacturer, city and state where the product was manufactured, description of product, signature of authorized Manufacturer's representative) in the Manufacturer's Certification Letter, as applicable.

## ARTICLE 12—CLAIMS

No suggested Supplementary Conditions in this Article.

## ARTICLE 13—COST OF WORK; ALLOWANCES, UNIT PRICE WORK

### 13.01 *Cost of the Work*

SC-13.01 — Supplement Paragraph 13.01.B.5.c.(2) by adding the following sentence:

~~The equipment rental rate book that governs the included costs for the rental of machinery and equipment owned by Contractor (or a related entity) under the Cost of the Work provisions of this Contract is the most current edition of [name of equipment rental rate book].~~

SC-13.01 — Supplement Paragraph 13.01.C.2 by adding the following definition of small tools and hand tools:

- a. ~~For purposes of this paragraph, "small tools and hand tools" means any tool or equipment whose current price if it were purchased new at retail would be less than \$500. [or insert other threshold price.]~~

SC-13.02.C – Delete paragraph in its entirety and insert "Deleted".

### 13.03 *Unit Price Work*

**SC-13.03** Delete Paragraph 13.03.E in its entirety and insert the following in its place:

**E. *Adjustments in Unit Price***

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
  - a. the extended price of a particular item of Unit Price Work amounts to 50 percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than 50 percent from the estimated quantity of such item indicated in the Agreement; and
  - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

**ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK**

~~No suggested Supplementary Conditions in this Article.~~

**SC-14.03.G** – Add new paragraph immediately after Paragraph 14.03.F:

- G. Installation of materials that are non-compliant with American Iron and Steel requirements shall be considered defective work.

## **ARTICLE 15—PAYMENTS TO CONTRACTOR, SET OFFS; COMPLETIONS; CORRECTION PERIOD**

### **15.01 Progress Payments**

#### **15.02 SC-15.01.B.4 – Add the following language at the end of paragraph:**

**No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage or invest the retainage for the benefit of the Contractor.**

#### **SC-15.01.B.5 – Add new paragraph immediately after Paragraph 15.01.B.4:**

**5. The Application for Payment form to be used on this Project is EJCDC® C-620. The Agency must approve all Applications for Payment before payment is made.**

#### **SC-15.01.B.6 – Add new paragraph immediately after Paragraph 15.01.B.5:**

**6. By submitting an Application for Payment based in whole or in part on furnishing equipment or materials, Contractor certifies that such equipment and materials are compliant with American Iron and Steel requirements. Manufacturer's Certification letter for materials satisfy this requirement. Refer to Manufacturer's Certification Letter provided in these Contract Documents.**

#### **SC-15.01.C.2.d – Add the following new paragraph immediately after Paragraph 15.01.C.2.c:**

**d. The materials presented for payment in an Application for Payment comply with American Iron and Steel requirements.**

#### **SC-15.01.D.1 – Delete paragraph in its entirety and insert the following in its place:**

**The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 15.01.E will become due twenty (20) days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.**

#### **SC-15.01 Add the following new Paragraph 15.01.F:**

- F. For contracts in which the Contract Price is based on the Cost of Work, if Owner determines that progress payments made to date substantially exceed the actual progress of the Work (as measured by reference to the Schedule of Values), or present a potential conflict with the Guaranteed Maximum Price, then Owner may require that Contractor prepare and submit a plan for the remaining anticipated Applications for Payment that will bring payments and progress into closer alignment and take into account the Guaranteed Maximum Price (if any), through reductions in billings, increases in retainage, or other equitable measures. Owner will review the plan, discuss any necessary modifications, and implement the plan as modified for all remaining Applications for Payment.**

**SC-15.02.A – Amend paragraph by striking out the following text: “7 days after”.**

**15.03 Substantial Completion**

**SC-15.03.A – Modify by adding the following after the last sentence:**

**Contractor shall also submit the General (Prime) Contractor’s Certification of Compliance certifying that to the best of the Contractor’s knowledge and belief all substitutes, equals, and all Iron and Steel products proposed in the Shop Drawings, Change Orders, and Partial Payment Estimates, and those installed for the Project, are either Produced in the United States or are the subject of an approved waiver under Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference.**

**SC-15.03 Add the following new subparagraph to Paragraph 15.03.B:**

1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, will be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under this Article 15.

**15.08 Correction Period**

~~SC 15.08 Add the following new Paragraph 15.08.G:~~

~~G. The correction period specified as one year after the date of Substantial Completion in Paragraph 15.08.A of the General Conditions is hereby revised to be the number of years set forth in SC-6.01.B.1; or if no such revision has been made in SC-6.01.B, then the correction period is hereby specified to be [number] years after Substantial Completion.~~

**ARTICLE 16—SUSPENSION OF WORK AND TERMINATION**

No suggested Supplementary Conditions in this Article.

**ARTICLE 17—FINAL RESOLUTIONS OF DISPUTES**

**17.02 Arbitration**

**SC-17.02 Add the following new paragraph immediately after Paragraph 17.01.**

**17.02 Arbitration**

- A. All matters subject to final resolution under this Article will be settled by arbitration administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules (subject to the conditions and limitations of this Paragraph SC-17.02). Any controversy or claim in the amount of \$100,000 or less will be

settled in accordance with the American Arbitration Association's supplemental rules for Fixed Time and Cost Construction Arbitration. This agreement to arbitrate will be specifically enforceable under the prevailing law of any court having jurisdiction.

- B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitration administrator, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the specific time required in Article 17, or if no specified time is applicable within a reasonable time after the matter in question has arisen, and in no event will any such demand be made after the date when institution of legal or equitable proceedings based on such matter in question would be barred by the applicable statute of limitations.
- C. The arbitrator(s) must be licensed engineers, contractors, attorneys, or construction managers. Hearings will take place pursuant to the standard procedures of the Construction Arbitration Rules that contemplate in-person hearings. The arbitrators will have no authority to award punitive or other damages not measured by the prevailing party's actual damages, except as may be required by statute or the Contract. Any award in an arbitration initiated under this clause will be limited to monetary damages and include no injunction or direction to any party other than the direction to pay a monetary amount.
- D. The Arbitrators will have the authority to allocate the costs of the arbitration process among the parties, but will only have the authority to allocate attorneys' fees if a specific Law or Regulation or this Contract permits them to do so.
- E. The award of the arbitrators must be accompanied by a reasoned written opinion and a concise breakdown of the award. The written opinion will cite the Contract provisions deemed applicable and relied on in making the award.
- F. The parties agree that failure or refusal of a party to pay its required share of the deposits for arbitrator compensation or administrative charges will constitute a waiver by that party to present evidence or cross-examine witness. In such event, the other party shall be required to present evidence and legal argument as the arbitrator(s) may require for the making of an award. Such waiver will not allow for a default judgment against the non-paying party in the absence of evidence presented as provided for above.
- G. No arbitration arising out of or relating to the Contract will include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:
  - 1. the inclusion of such other individual or entity will allow complete relief to be afforded among those who are already parties to the arbitration;
  - 2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration, and which will arise in such proceedings;
  - 3. such other individual or entity is subject to arbitration under a contract with either Owner or Contractor, or consents to being joined in the arbitration; and
  - 4. the consolidation or joinder is in compliance with the arbitration administrator's procedural rules.



- H. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Laws and Regulations relating to vacating or modifying an arbitral award.
- I. Except as may be required by Laws or Regulations, neither party nor an arbitrator may disclose the existence, content, or results of any arbitration hereunder without the prior written consent of both parties, with the exception of any disclosure required by Laws and Regulations or the Contract. To the extent any disclosure is allowed pursuant to the exception, the disclosure must be strictly and narrowly limited to maintain confidentiality to the extent possible.

#### 17.03 Attorneys' Fees

~~SC-17.03 — Add the following new paragraph immediately after Paragraph 17.02. [Note: If there is no Paragraph 17.02, because neither arbitration nor any other dispute resolution process has been specified here in the Supplementary Conditions, then revise this to state “Add the following new Paragraph immediately after Paragraph 17.01” and revise the numbering accordingly].~~

#### ~~17.03 Attorneys' Fees~~

- ~~A. For any matter subject to final resolution under this Article, the prevailing party shall be entitled to an award of its attorneys' fees incurred in the final resolution proceedings, in an equitable amount to be determined in the discretion of the court, arbitrator, arbitration panel, or other arbiter of the matter subject to final resolution, taking into account the parties' initial demand or defense positions in comparison with the final result.~~

### ARTICLE 18—MISCELLANEOUS

#### 18.08 Assignment of Contract

~~SC-18.08 — Add the following new paragraph immediately after Paragraph 18.08.A:~~

- ~~B. The contract dated **[date]** between Owner as “buyer” and **[identify seller]** as “seller” for procurement of goods and special services (“procurement contract”) **[is hereby] [will be]** assigned to Contractor by Owner, and Contractor **[accepts] [will accept]** such assignment. A form documenting the assignment is attached as an exhibit to this Contract.~~
  - ~~1. This assignment will occur on the **[Effective Date of the Contract]**, and will relieve the Owner as “buyer” from all further obligations and liabilities under the procurement contract.~~
  - ~~2. Upon assignment, the “seller” will be a Subcontractor or Supplier of the Contractor, and Contractor will be responsible for seller’s performance, acts, and omissions, as set forth in Paragraph 7.07 of the General Conditions just as Contractor is responsible for all other Subcontractors and Suppliers.~~
  - ~~3. Notwithstanding this assignment, all performance guarantees and warranties required by the procurement contract will continue to run for the benefit of the Owner and, in addition, for the benefit of the Contractor.~~

4. ~~Except as noted in the procurement contract, all rights, duties and obligations of Engineer to “buyer” and “seller” under the procurement contract will cease [upon the assignment to Contractor].~~

**SC-18.11 – Add new paragraph immediately after Paragraph 18.10:**

**18.11      *Tribal Sovereignty***

**A. No provision of this Agreement will be construed by any of the signatories as abridging or debilitating any sovereign powers of the any Tribe; affecting the trust-beneficiary relationship between the Secretary of the Interior, Tribe, and Indian landowner(s); or interfering with the government-to-government relationship between the United States and the Tribe.**

**SC-19 – Add the following new Article 19 immediately after Article 18:**

**Article 19 - FEDERAL REQUIREMENTS**

**19.01      *Agency Not a Party***

**A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees, is a party to this Contract.**

**19.02      *Contract Approval***

**A. Owner and Contractor will furnish Owner’s attorney such evidence as required so that Owner’s attorney can complete and execute the “Certificate of Owner’s Attorney” (Exhibit G of this Bulletin) before Owner submits the executed Contract Documents to Agency for approval.**

**B. Agency concurrence is required on both the Bid and the Contract before the Contract is effective.**

**19.03      *Conflict of Interest***

**A. Contractor may not knowingly contract with a Supplier or Manufacturer if the individual or entity who prepared the Drawings and Specifications has a corporate or financial affiliation with the Supplier or Manufacturer. Owner’s officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest or other interest in or a tangible personal benefit from the Contractor. Owner’s officers,**

employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

#### **19.04      *Gratuities***

A. If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

B. In the event this Contract is terminated as provided in paragraph 19.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

#### **19.05      *Small, Minority and Women's Businesses***

A. If Contractor intends to let any subcontracts for a portion of the work, Contractor will take all necessary affirmative steps to assure that minority businesses, women's business enterprises, and labor surplus area firms are used when possible. Affirmative steps will include:

1. Placing qualified small and minority businesses and women's business enterprises on solicitation lists;
2. Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;
3. Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises;
4. Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises;
5. Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce.

#### **19.06      *Anti-Kickback***

A. Contractor shall comply with the Copeland Anti-Kickback Act (40 USC 3145) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

**19.07      *Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended***

A. Contractor 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).

**19.08      *Equal Employment Opportunity***

A. The Contract is considered a federally assisted construction contract. 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."

**19.09      *Byrd Anti-Lobbying Amendment (31 U.S.C. 1352)***

A. Contractors that apply or bid for an award exceeding \$100,000 must file the required certification (RD Instruction 1940-Q Exhibit A-1). The Contractor certifies to the Owner and every subcontractor certifies to the Contractor 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 the Contract if it is covered by 31 U.S.C. 1352. The Contractor and every subcontractor 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 Owner. Necessary certification and disclosure forms shall be provided by Owner.

**19.10      Environmental Requirements**

**A. When constructing a Project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental conditions:**

**1. Wetlands – When disposing of excess, spoil, or other Construction Materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.**

**2. Floodplains – When disposing of excess, spoil, or other Construction Materials on public or private property, Contractor shall not fill in or otherwise convert 100-year floodplain areas (Standard Flood Hazard Area) delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, e.g., alluvial soils on NRCS Soil Survey Maps.**

**3. Historic Preservation - Applicants shall ensure that Contractors maintain a copy of the following inadvertent discovery plan onsite for review:**

**a. If during the course of any ground disturbance related to any Project, any post review discovery, including but not limited to, any artifacts, foundations, or other indications of past human occupation of the area are uncovered, shall be protected by complying with 36 CFR § 800.13(b)(3) and (c) and shall include the following:**

**i. All Work, including vehicular traffic, shall immediately stop within a 50 ft. radius around the area of discovery. The Contractor shall ensure barriers are established to protect the area of discovery and notify the Engineer to contact the appropriate RD personnel. The Engineer shall engage a Secretary of the Interior (SOI) qualified professional archeologist to quickly assess the nature and scope of the discovery; implement interim measures to protect the discovery from looting and vandalism; and establish broader barriers if further historic and/or precontact properties, can reasonably be expected to occur.**

**ii. The RD personnel shall notify the appropriate RD environmental staff member, the Federal Preservation Officer (FPO), and State Historic Preservation Office (SHPO) immediately. Indian tribe(s) or Native Hawaiian Organization (NHOs) that have an interest in the area of discovery shall be contacted immediately. The SHPO may require additional tribes or NHOs who may have an interest in the area of discovery also be contacted. The notification shall include an assessment of the discovery provided by the SOI qualified professional archeologist.**

**iii. When the discovery contains burial sites or human remains, the Contractor shall immediately notify the appropriate RD personnel who will contact the RD environmental staff member, FPO, and the SHPO. The relevant law enforcement authorities shall be immediately contacted by onsite personnel to reduce delay times, in accordance with tribal, state, or local**

laws including 36 CFR Part 800.13; 43 CFR Part 10, Subpart B; and the Advisory Council on Historic Preservation's Policy Statement Regarding treatment of Burial Sites, Human Remains, or Funerary Objects (February 23, 2007).

iv. When the discovery contains burial sites or human remains, all construction activities, including vehicular traffic shall stop within a 100 ft. radius of the discovery and barriers shall be established. The evaluation of human remains shall be conducted at the site of discovery by a SOI qualified professional. Remains that have been removed from their primary context and where that context may be in question may be retained in a secure location, pending further decisions on treatment and disposition. RD may expand this radius based on the SOI professional's assessment of the discovery and establish broader barriers if further subsurface burial sites, or human remains can reasonably be expected to occur. RD, in consultation with the SHPO and interested tribes or NHOs, shall develop a plan for the treatment of native human remains.

v. Work may continue in other areas of the undertaking where no historic properties, burial sites, or human remains are present. If the inadvertent discovery appears to be a consequence of illegal activity such as looting, the onsite personnel shall contact the appropriate legal authorities immediately if the landowner has not already done so.

vi. Work may not resume in the area of the discovery until a notice to proceed has been issued by RD. RD shall not issue the notice to proceed until it has determined that the appropriate local protocols and consulting parties have been consulted.

vii. Inadvertent discoveries on federal and tribal land shall follow the processes required by the federal or tribal entity.

4. Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.

5. Mitigation Measures – The following environmental mitigation measures are required on this Project: [*Insert mitigation measures from the Letter of Conditions here*].

#### **19.11 Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708)**

A. Where applicable, for contracts awarded by the Owner in excess of \$100,000 that involve the employment of mechanics or laborers, the Contractor will comply 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, the Contractor will 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 will be required to work in surroundings or under working conditions which 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.

**19.12      *Debarment and Suspension (Executive Orders 12549 and 12689)***

A. 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.

**19.13      *Procurement of recovered materials***

A. The Contractor will comply with 2 CFR Part 200.322, "Procurement of recovered materials."

**19.14      *American Iron and Steel***

A. Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials.

B. The following waivers apply to this Contract:

1.      *De Minimis,*
2.      *Minor Components,*

3. Pig iron and direct reduced iron, and
4. *[add project specific waivers as applicable]*.



**EXHIBIT A—SOFTWARE REQUIREMENTS FOR ELECTRONIC DOCUMENT EXCHANGE**

Item	Electronic Documents	Transmittal Means	Data Format	Note (1)
a-1	General communications, transmittal covers, meeting notices and responses to general information requests for which there is no specific prescribed form.	Email	Email	
a-2	Meeting agendas, meeting minutes, RFI's and responses to RFI's, and Contract forms.	Email w/ Attachment	PDF	{2}
a-3	Contractors Submittals (Shop Drawings, "or equal" requests, substitution requests, documentation accompanying Sample submittals and other submittals) to Owner and Engineer, and Owner's and Engineer's responses to Contractor's Submittals, Shop Drawings, correspondence, and Applications for Payment.	Email w/ Attachment	PDF	
a-4	Correspondence; milestone and final version Submittals of reports, layouts, Drawings, maps, calculations and spreadsheets, Specifications, Drawings and other Submittals from Contractor to Owner or Engineer and for responses from Engineer and Owner to Contractor regarding Submittals.	Email w/ Attachment or LFE	PDF	
a-5	Layouts and drawings to be submitted to Owner for future use and modification.	Email w/ Attachment or LFE	DWG	
a-6	Correspondence, reports and Specifications to be submitted to Owner for future word processing use and modification.	Email w/ Attachment or LFE	DOC	
a-7	Spreadsheets and data to be submitted to Owner for future data processing use and modification.	Email w/ Attachment or LFE	EXC	
a-8	Database files and data to be submitted to Owner for future data processing use and modification.	Email w/ Attachment or LFE	DB	
Notes				
{1}	All exchanges and uses of transmitted data are subject to the appropriate provisions of Contract Documents.			
{2}	Transmittal of written notices is governed by Paragraph 18.01 of the General Conditions.			
Key				
Email	Standard Email formats (.htm, .rtf, or .txt). Do not use stationery formatting or other features that impair legibility of content on screen or in printed copies			
LFE	Agreed upon Large File Exchange method (FTP, CD, DVD, hard drive)			
PDF	Portable Document Format readable by Adobe® Acrobat Reader Version {number} or later			
DWG	Autodesk® AutoCAD .dwg format Version {number}			
DOC	Microsoft® Word .docx format Version {number}			
EXC	Microsoft® Excel .xls or .xml format Version {number}			
DB	Microsoft® Access .mdb format Version {number}			

**EXHIBIT B—FORESEEABLE BAD WEATHER DAYS**

<b>Month</b>	<b>Number of Foreseeable Bad Weather Days in Month Based on Precipitation as Rain Equivalent (inches) (1)</b>	<b>Ambient Outdoor Air Temperature (degrees F)</b>	
		<b>Number of Foreseeable Bad Weather Days in Month Based on Low Temperature (at 11:00 a.m.)</b>	<b>Number of Foreseeable Bad Weather Days in Month Based on High Temperature (at 3:00 p.m.)</b>
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			
<b>Notes:</b> 1. _____ Two inches of sleet equal one inch of rain. Five inches of wet, heavy snow equal one inch of rain. Fifteen inches of “dry” powder snow equals one inch of rain.			

Exhibit B—Foreseeable Bad Weather Days.

EJCDC® C-800, Supplementary Conditions of the Construction Contract.

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Modified to include RD edits from RUS Bulletin 1780-26 (6/16/2020).

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**EXHIBIT C—GEOTECHNICAL BASELINE REPORT SUPPLEMENT TO THE SUPPLEMENTARY CONDITIONS**

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**1.01—Definitions**

SC-1.01—Add to the list of definitions in Paragraph 1.01.A by inserting the following as numbered items in their proper alphabetical positions:

- 1.—~~Geotechnical Baseline Report (GBR)—The interpretive report prepared by or for Owner regarding subsurface conditions at the Site, and containing specific baseline geotechnical conditions that may be anticipated or relied upon for bidding and contract administration purposes, subject to the controlling provisions of the Contract, including the GBR's own terms. The GBR is a Contract Document.~~
- 2.—~~Geotechnical Data Report (GDR)—The factual report that collects and presents data regarding actual subsurface conditions at or adjacent to the Site, including Technical Data and other geotechnical data, prepared by or for Owner in support of the Geotechnical Baseline Report. The GDR's content may include logs of borings, trenches, and other site investigations, recorded measurements of subsurface water levels, the results of field and laboratory testing, and descriptions of the investigative and testing programs. The GDR does not include an interpretation of the data. If opinions, or interpretive or speculative non-factual comments or statements appear in a document that is labeled a GDR, such opinions, comments, or statements are not operative parts of the GDR and do not have contractual standing. Subject to that exception, the GDR is a Contract Document.~~

**5.03—Subsurface and Physical Conditions**

SC 5.03—Delete Paragraph 5.03 in its entirety and replace with the following:

**5.03—Subsurface and Physical Conditions**

A.—~~Reports and Drawings: The Supplementary Conditions hereby identify:~~

- 1.—~~those reports of explorations and tests of subsurface conditions at or adjacent to the Site (other than any Geotechnical Data Report or Geotechnical Baseline Report) that contain Technical Data. Such reports are as follows:~~
  - a.—~~Report Title: [Exact title of the document]~~
  - b.—~~Date of Report: [Date report was issued]~~
  - c.—~~Technical Data in report upon which Contractor may rely: [Identify Technical Data (for example, "Boring Log, Test Site 3") and specify page number or other reference where Technical Data is located within the report. List multiple Technical Data line items per entry when appropriate.]~~
- 2.—~~those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data. Such drawings are as follows:~~
  - a.—~~Drawings Title: [Exact title of the drawings]~~

- b. ~~Date of Drawings: [Date drawings were issued]~~
- c. ~~Technical Data in drawings upon which Contractor may rely: [Identify Technical Data (for example, "Plan View of Rock Outcroppings") in drawings, or state "All information in drawing" if entire content is Technical Data entitled to reliance; and specify drawing number, page number, or other reference where the Technical Data is located. List multiple Technical Data line items per entry when appropriate.]~~
3. Contractor may examine copies of reports and drawings identified immediately above that were not included with the Bidding Documents at ~~[location]~~ during regular business hours, or may request copies from Engineer, at the cost of reproduction.
- B. ~~Underground Facilities: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph SC 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.~~
- C. ~~Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.~~
- D. ~~Limitations of Other Data and Documents: Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:~~
- ~~1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or~~
  - ~~2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or~~
  - ~~3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or~~
  - ~~4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.~~
- E. ~~Geotechnical Baseline Report~~
- ~~1. This Contract contains a Geotechnical Baseline Report ("GBR"), identified as follows: [Example: Geotechnical Baseline Report for Northwest Interceptor, dated February 12, 2013, prepared by ABC Geotechnical Engineers, Inc., Sacramento, California]. This Contract also contains a Geotechnical Data Report (GDR), identified as follows: [Example: Geotechnical Data Report for Northwest Interceptor, dated June 15, 2012, prepared by ABC Geotechnical Engineers, Inc., Sacramento, California].~~

- ~~2. The GBR and GDR are incorporated as Contract Documents. The GBR and GDR are to be used in conjunction with other Contract Documents, including the Drawings and Specifications. If there is a conflict between the terms of the GBR and the GDR, the GBR's terms prevail.~~
- ~~3. The GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations (referred to here in the Supplementary Conditions as "Baseline Conditions"). These may include ground, geological, groundwater, and other subsurface geotechnical conditions, and baselines of anticipated Underground Facilities or subsurface structures.~~
- ~~4. The Baseline Conditions will be used to assist in the administration of the Contract's differing site conditions clause at locations where subsurface conditions have been baselined. If a condition is baselined in the GBR, then only the pertinent Baseline Conditions will be used to determine whether there is a differing site condition; and no other indication of that condition in the Contract Documents or Technical Data, or of a condition that describes, quantifies, or measures a similar characteristic of the subsurface, will be used for the differing site condition determination.~~
- ~~5. The Baseline Conditions will not be used to make differing site conditions determinations at locations that have not been baselined in the GBR, or at any location with respect to subsurface conditions that the Baseline Conditions do not address. If Underground Facilities or Hazardous Environmental Conditions are expressly addressed in the Baseline Conditions, then comparison to such Baseline Conditions will be the primary means of determining (a) whether an Underground Facility was shown or indicated with reasonable accuracy, as provided in Paragraph 5.05 of the General Conditions, or (b) whether a Hazardous Environmental Condition was shown or indicated in the Contract Documents as indicated in Paragraph 5.06.H of the General Conditions. As indicated in Paragraph SC 5.04 below, the GDR will be the primary resource for differing site conditions determinations in cases in which the GBR is inapplicable.~~
- ~~6. The descriptions of subsurface conditions provided in the GBR are based on geotechnical investigations, laboratory tests, interpretation, interpolation, extrapolation, and analyses. Neither Owner, Engineer, nor any geotechnical or other consultant warrants or guarantees that actual subsurface conditions will be as described in the GBR, nor is the GBR intended to warrant or guarantee the use of specific means or methods of construction.~~
- ~~7. The behavior of the ground during construction depends substantially upon the Contractor's selected means, methods, techniques, sequences, and procedures of construction. If ground behavior conditions are baselined in the GBR, they are based on stated assumptions regarding construction means and methods.~~
- ~~8. The GBR will not reduce or relieve Contractor of its responsibility for the planning, selection, and implementation of safety precautions and programs incident to Contractor's means, methods, techniques, sequences, and procedures of construction, or to the Work.~~

~~5.04—Differing Subsurface or Physical Conditions~~

~~SC 5.04—Delete Paragraph 5.04 in its entirety and replace with the following:~~

~~5.04—Differing Subsurface or Physical Conditions~~

~~A.—Notice: If Contractor believes that any subsurface condition that is uncovered or revealed at the Site:~~

- ~~1.—differs materially from conditions shown or indicated in the GBR; or~~
- ~~2.—differs materially from conditions shown or indicated in the GDR, to the extent the GBR is inapplicable; or~~
- ~~3.—differs materially from conditions shown or indicated in Contract Documents other than the GBR or GDR, to the extent the GBR and GDR are inapplicable; or~~
- ~~4.—to the extent the GBR and GDR are inapplicable, is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or~~
- ~~5.—to the extent the GBR and GDR are inapplicable, is of such a nature as to require a change in the Drawings or Specifications; or~~
- ~~6.—to the extent the GBR and GDR are inapplicable, 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 conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.~~

~~B.—Engineer's Review: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph SC 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption or continuation of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.~~

~~C.—Owner's Statement to Contractor Regarding Site Condition: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption or continuation of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.~~

~~D.—Early Resumption of Work: If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.~~

~~E.—Possible Price and Times Adjustments~~

~~1.—Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, 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 fall within any one or more of the categories described in Paragraph SC 5.04.A;~~

~~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 Paragraph 13.03 of the General Conditions; and~~

~~c.—Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.~~

~~2.—Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:~~

~~a.—Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or~~

~~b.—the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or~~

~~c.—Contractor failed to give the written notice as required by Paragraph SC 5.04.A.~~

~~3.—If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment must be set forth in a Change Order.~~

~~4.—Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.~~

~~F.—Underground Facilities; Hazardous Environmental Conditions: Paragraph 5.05 of the General Conditions governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 of the General Conditions governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of~~

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Exhibit C—Geotechnical Baseline Report Supplement to the Supplementary Conditions.

EJCDC® C-800, Supplementary Conditions of the Construction Contract.

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Modified to include RD edits from RUS Bulletin 1780-26 (6/16/2020).

~~Paragraphs SC 5.03 and SC 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.~~



**CHANGE ORDER NO.: [Number of Change Order]**

Owner:

Engineer:

Contractor:

Project:

Contract Name:

Date Issued:

Owner's Project No.:

Engineer's Project No.:

Contractor's Project No.:

Effective Date of Change Order:

The Contract is modified as follows upon execution of this Change Order:

Description:

**[Description of the change]**

Attachments:

**[List documents related to the change]**

<b>Change in Contract Price</b>	<b>Change in Contract Times [State Contract Times as either a specific date or a number of days]</b>
Original Contract Price: \$ _____	Original Contract Times: Substantial Completion: _____ Ready for final payment: _____
<b>[Increase] [Decrease]</b> from previously approved Change Orders No. 1 to No. <b>[Number of previous Change Order]</b> : \$ _____	<b>[Increase] [Decrease]</b> from previously approved Change Orders No.1 to No. <b>[Number of previous Change Order]</b> : Substantial Completion: _____ Ready for final payment: _____
Contract Price prior to this Change Order: \$ _____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for final payment: _____
<b>[Increase] [Decrease]</b> this Change Order: \$ _____	<b>[Increase] [Decrease]</b> this Change Order: Substantial Completion: _____ Ready for final payment: _____
Contract Price incorporating this Change Order: \$ _____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for final payment: _____

Recommended by Engineer (if required)

Accepted by Contractor

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

\_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_

Authorized by Owner

Approved by Funding Agency (if applicable)

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

\_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_

## COMPLIANCE STATEMENT

This statement relates to a proposed contract with \_\_\_\_\_

\_\_\_\_\_  
(Name of borrower or grantee)

who expects to finance the contract with assistance from either the Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), or the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor, I represent that:

1. I ☐ have, ☐ have not, participated in a previous contract or subcontract subject to Executive Order 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.
2. If I have participated in such a contract or subcontract, I ☐ have, ☐ have not, filed all compliance reports that have been required to file in connection with the contract or subcontract.  
  
☐ If the proposed contract is for \$50,000 or more: or ☐ If the proposed nonconstruction contract is for \$50,000 or more and I have 50 or more employees, I also represent that:
3. I ☐ have, ☐ have not previously had contracts subject to the written affirmative action programs requirements of the Secretary of Labor.
4. If I have participated in such a contract or subcontract, ☐ I have, ☐ have not developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either the RHS, RBS or RUS, or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and wash rooms, restaurants and other eating areas time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

---

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays the valid OMB control number. The valid OMB control number for this information collection is 0575-0018. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

---

**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR  
CERTIFICATIONS OF NON-SEGREGATED FACILITIES**

A certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, may 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding \$ 10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

DATE \_\_\_\_\_

\_\_\_\_\_  
*(Signature of Bidder or Prospective Contractor)*

\_\_\_\_\_  
*Address (including Zip Code)*

## U.S. DEPARTMENT OF AGRICULTURE

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### **Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions**

---

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 7 CFR Part 3017, Section 3017.510, Participants' responsibilities. The regulations were published as Part IV of the January 30, 1989, **Federal Register** (pages 4722-4733). Copies of the regulations may be obtained by contacting the Department of Agriculture agency with which this transaction originated.

#### **(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE)**

- (1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
- (2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

---

Organization Name

---

PR/Award Number or Project Name

---

Name(s) and Title(s) of Authorized Representative(s)

---

Signature(s)

---

Date

## Instructions for Certification

1. By signing and submitting this form, the prospective lower tier participant is providing the certification set out on the reverse side in accordance with these instructions.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this form that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS

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 any 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 or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

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 or loan, the undersigned shall complete and submit Standard Form - LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of 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.

---

(name)

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(date)

---

(title)

oOo

ENGINEER'S CERTIFICATION OF COMPLIANCE WITH PROVISIONS OF THE  
AMERICAN IRON AND STEEL REQUIREMENTS OF SECTION 746 OF TITLE VII OF  
THE CONSOLIDATED APPROPRIATIONS ACT OF 2017 (DIVISION A - AGRICULTURE,  
RURAL DEVELOPMENT, FOOD AND DRUG ADMINISTRATION, AND RELATED  
AGENCIES APPROPRIATIONS ACT, 2017) AND SUBSEQUENT STATUTES  
MANDATING DOMESTIC PREFERENCE

DATE:

**RE: PROJECT NAME** USDA Sewer System Improvements - Contract A  
**APPLICANT** City of Thomaston  
**CONTRACT NUMBER**

I hereby certify that to the best of my knowledge and belief all iron and steel products referenced in the Plans, Specifications, and Bidding Documents for this project comply with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference or are the subject of a waiver approved by the Secretary of Agriculture or designee. This certification is not intended to be a warranty in any way, but rather the designer's professional opinion that to the best of their knowledge the documents comply.

I hereby commit that to the best of my ability all iron and steel products that will be referenced in the Bid Addenda, Executed Contracts, and Change Orders will comply with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference or will be the subject of a waiver approved by the Secretary of Agriculture or designee.

ESG Engineering  
Name of Engineering Firm (PRINT)

[Signature]  
By Authorized Representative (SIGNATURE)

Senior Vice President  
Title

This letter is to be submitted prior to Agency authorization of Advertisement for Bids.

GENERAL (PRIME) CONTRACTOR'S CERTIFICATION OF COMPLIANCE WITH  
PROVISIONS OF THE AMERICAN IRON AND STEEL REQUIREMENTS OF SECTION  
746 OF TITLE VII OF THE CONSOLIDATED APPROPRIATIONS ACT OF 2017  
(DIVISION A - AGRICULTURE, RURAL DEVELOPMENT, FOOD AND DRUG  
ADMINISTRATION, AND RELATED AGENCIES APPROPRIATIONS ACT, 2017) AND  
SUBSEQUENT STATUTES MANDATING DOMESTIC PREFERENCE

DATE:

**RE: PROJECT NAME**  
**APPLICANT**  
**CONTRACT NUMBER**

I hereby certify that to the best of my knowledge and belief all iron and steel products installed for this project by my company and by any and all subcontractors and manufacturers my company has contracted with for this project comply with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference or are the subject of a waiver approved by the Secretary of Agriculture or designee.

This certification is to be submitted upon completion of the project to the project engineer.

---

Name of Construction Company (PRINT)

---

By Authorized Representative (SIGNATURE)

---

Title



EXAMPLE OF A MANUFACTURER'S CERTIFICATION LETTER OF COMPLIANCE  
WITH PROVISIONS OF THE AMERICAN IRON AND STEEL (AIS) REQUIREMENTS OF  
SECTION 746 OF TITLE VII OF THE CONSOLIDATED APPROPRIATIONS ACT OF 2017  
(DIVISION A - AGRICULTURE, RURAL DEVELOPMENT, FOOD AND DRUG  
ADMINISTRATION, AND RELATED AGENCIES APPROPRIATIONS ACT, 2017) AND  
SUBSEQUENT STATUTES MANDATING DOMESTIC PREFERENCE

Date:

Company Name:

Company Address:

Subject: AIS Step Certification for Project (X), Owner's Name, and Contract Number

I, (company representative), certify that the (melting, bending, galvanizing, cutting, etc.) processes for (manufacturing or fabricating) the following products and/or material shipped or provided for the subject project is in full compliance with the AIS requirement as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference.

Item, Products and/or Materials, and location of delivery (City, State):

- 1.
- 2.

Such processes for AIS took place at the following location:

---

(City, State)

This certification is to be submitted upon request to interested parties (e.g. municipalities, consulting engineers, general contractors, etc.)

If any of the above compliance statements change while providing materials to this project, please immediately notify the person(s) who is requesting to use your product(s).

---

Authorized Company Representative Signature

(Note: *Authorized signature shall be manufacturer's representative not the material distributor or supplier*)

**CERTIFICATE OF OWNER'S ATTORNEY AND AGENCY CONCURRENCE****CERTIFICATE OF OWNER'S ATTORNEY**PROJECT NAME:  

---

CONTRACTOR NAME:  

---

I, the undersigned, \_\_\_\_\_, the duly authorized and acting legal representative of \_\_\_\_\_, do hereby certify as follows: I have examined the attached Contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements is adequate and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions, and provisions thereof.

---

Name

Date

**AGENCY CONCURRENCE**

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

---

Agency Representative

Date

---

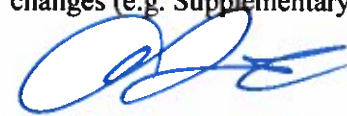
Name

### ENGINEER'S CERTIFICATION OF FINAL PLANS AND SPECIFICATIONS

PROJECT NAME: USDA Sewer System Improvements - Contract A

The final Drawings and Specifications, other assembled Construction Contract Documents, bidding-related documents (or requests for proposals or other construction procurement documents), and any other Final Design Phase deliverables, comply with all requirements of the U.S. Department of Agriculture, Rural Utilities Service, to the best of my knowledge and professional judgment.

If the Engineers Joint Contract Documents Committee (EJCDC) documents have been used, all modifications required by RUS Bulletin 1780-26 have been made in accordance with the terms of the license agreement, which states in part that the Engineer "must plainly show all changes to the Standard EJCDC Text, using 'Track Changes' (redline/strikeout), highlighting, or other means of clearly indicating additions and deletions." Such other means may include attachments indicating changes (e.g. Supplementary Conditions modifying the General Conditions).



Engineer

10/27/20  
Date



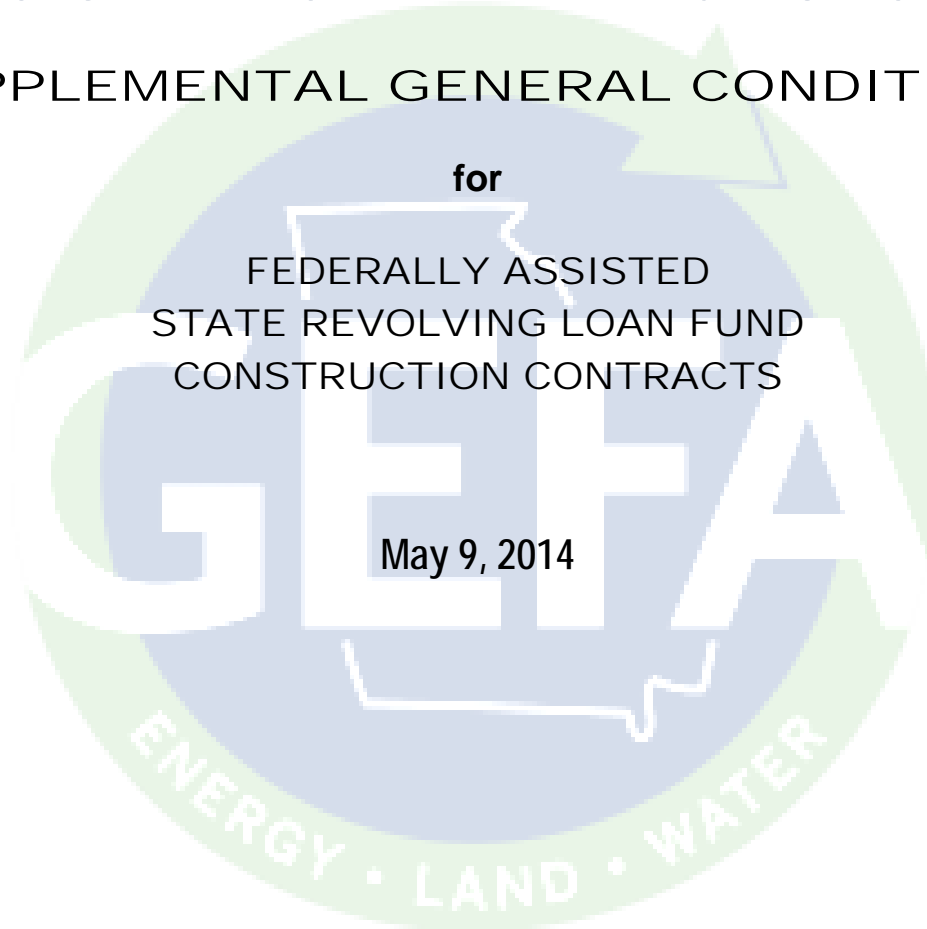
Senior VP

Name and Title



# GEORGIA ENVIRONMENTAL FINANCE AUTHORITY

## SUPPLEMENTAL GENERAL CONDITIONS



***The following standard language must be incorporated into construction contract documents and in all solicitations for offers and bids for all construction contracts or subcontracts in excess of \$10,000 to be funded in whole or in part by the Federally-assisted State Revolving Fund in the State of Georgia.***

***These Supplemental General Conditions shall not relieve the participants in this project of responsibility to meet any requirements of other portions of this construction contract or of other agencies, whether these other requirements are more or less stringent. The requirements in these Supplemental General Conditions must be satisfied in order for work to be funded with the State Revolving Fund.***

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## INSTRUCTIONS & GENERAL REQUIREMENTS

It is the policy of the State Revolving Loan Fund (SRF) to promote a fair share of subcontract, materials, equipment and service awards to small, minority, and 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. Failure on the part of the apparent successful bidder to submit required information to the loan recipient (Owner) may be considered by the Owner in evaluating whether the bidder is responsive to bid requirements.

### THE PRIME CONTRACTOR MUST SUBMIT THE FOLLOWING ITEMS TO THE OWNER:

#### A. Before beginning the work of any contract:

- 1) **DBE Compliance Form and related documentation.** The Owner must submit this information to the Georgia Environmental Finance Authority (GEFA) to demonstrate compliance with Disadvantaged Business Enterprise (DBE) requirements. GEFA concurrence is recommended prior to award of the construction contract and is required prior to commencement of any SRF-funded construction. (Pages GEFA-4&5)
- 2) **Certification Regarding Equal Employment Opportunity.** This form is required for the Prime Contractor and for all subcontractors. The Prime Contractor form should be submitted with the DBE Compliance Form, and the subcontractor forms should be submitted as the subcontracts are executed. (Page GEFA-9)
- 3) **Certification Regarding Debarment, Suspension, & Other Responsible Matters.** This form is required for the Prime Contractor and for all subcontractors. The Prime Contractor form should be submitted with the DBE Compliance Form and the subcontractor forms should be submitted as the subcontracts are executed. (Page GEFA-10)
- 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 Prime Contractor, how much the DBE subcontractor was paid, and any concerns the DBE subcontractor might have. The Prime Contractor must provide this form to each DBE subcontractor. The DBE subcontractor can, as an option, complete and submit this form to the GEFA DBE Coordinator, who will also forward the form to the EPA DBE Coordinator. (Page GEFA-11)
- 5) **\*EPA Form 6100-3 DBE Subcontractor Performance Form.** This form captures the description of work to be performed by an intended DBE subcontractor and the price of the work. This form is to be provided by the Prime Contractor to each DBE subcontractor and submitted with the DBE Compliance Form. (Page GEFA-12)
- 6) **\*EPA Form 6100-4 DBE Subcontractor Utilization Form.** This form captures intended or anticipated use of an identified DBE subcontractor by the Prime Contractor and the estimated dollar amount of the work. This form is to be completed by the Prime Contractor and submitted with the DBE Compliance Form. (Page GEFA-13)

\* 6100 FORMS ARE NOT REQUIRED WHEN ALL OF THE WORK IS SELF-PERFORMED BY THE PRIME CONTRACTOR.

#### B. During the performance of the contract:

- 7) **Changes to Subcontractors Form.** If any changes, substitutions, or additions are proposed to the subcontractors included in previous GEFA concurrences, the Owner must submit this information to GEFA for prior concurrence in order for the affected subcontract work to be eligible for SRF funding. (Page GEFA-14)
- 8) **DBE Annual Report.** The Owner must submit this information to GEFA no later than October 20<sup>th</sup> of any year that the construction contract is active. (Page GEFA-15)
- 9) **Certified Payrolls.** These should be submitted to the Owner weekly for the Prime Contractor and all subcontractors. The Owner must maintain payroll records and make these available for inspection. Use Department of Labor form WH-347 or a similar form that contains all of the information on the Department of Labor.

### THE OWNER MUST SUBMIT INFORMATION FOR GEFA REVIEW AND CONCURRENCE TO:

Georgia Environmental Finance Authority  
Attention: DBE Compliance Coordinator  
233 Peachtree Street, N.E.  
Harris Tower, Suite 900  
Atlanta, Georgia 30303  
(404)584-1000; (404)584-1069 (fax)  
[dbecompliance@gefa.ga.gov](mailto:dbecompliance@gefa.ga.gov)

# DBE COMPLIANCE FORM

ALL INFORMATION OUTLINED ON THIS FORM IS REQUIRED FOR DBE COMPLIANCE REVIEW. THE PROPOSED PRIME CONTRACTOR AND OWNER SHOULD ENSURE THAT THIS INFORMATION IS COMPLETE PRIOR TO SUBMITTAL.

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

SRF Loan Number \_\_\_\_\_

## PRIME CONTRACTOR'S AND OWNER'S CERTIFICATIONS:

*I certify that the information submitted on and with this form is true and accurate and that this firm 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 Owner's State Revolving Fund loan contract.*

\_\_\_\_\_  
(Signature of Owner or Owner's representative)

Date \_\_\_\_\_

\_\_\_\_\_  
(Printed name and title)

## CONTACT INFORMATION

Owner contact \_\_\_\_\_

Owner phone number & email \_\_\_\_\_

Consulting Engineer contact \_\_\_\_\_

Consulting Engineer phone number & email \_\_\_\_\_

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

Prime Contractor contact \_\_\_\_\_

Prime Contractor phone number & email \_\_\_\_\_

Proposed total contract amount \$ \_\_\_\_\_

Proposed total MBE participation \$ \_\_\_\_\_ Percentage \_\_\_\_\_ Goal: 4.0 percent

Proposed total WBE participation \$ \_\_\_\_\_ Percentage \_\_\_\_\_ Goal: 4.0 percent

CONTINUED ON NEXT PAGE

**Please submit the following with the DBE Compliance Form:**

- 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.
- 2) Indicate in writing if no solicitations were made because the Prime Contractor intends to use only its own forces to accomplish the work.
- 3) Proof of certification by EPA, SBA, DOT (or by state, local, Tribal, or private entities whose certification criteria match EPA criteria) for each subcontractor listed as a DBE, MBE, or WBE.
- 4) Documentation of solicitation efforts for prospective DBE firms, such as fax confirmation sheets, copies of solicitation letters and e-mails, printout of online solicitations, printouts of online search results and copies and affidavits of publication in newspapers or other publications. (see also, **"Six Good Faith Efforts"**, page GEFA-7).
  - a. The Prime Contractor shall use the necessary resources to identify and directly solicit no less than 3 certified MBE firms and 3 certified WBE firms to bid in each expected subcontract trade or area. If a diligent and documented search of the recommended directories does not identify 3 potential certified MBE firms and 3 potential certified WBE firms, then the Prime Contractor shall post an advertisement in the Owner's local legal organ, the Owner's official website, a regional newspaper in a larger community in the proximity, the Prime Contractor's website, or some other appropriate resource.
  - b. The Prime Contractor is encouraged to follow-up each written, fax, or e-mail solicitation with at least 1 logged phone call.
  - c. Whenever possible, post solicitations for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.
- 5) Written justification for not selecting a certified DBE subcontractor that submitted a low bid for any subcontract area.
- 6) Certification By Proposed Prime Contractor or Subcontractor Regarding Equal Employment Opportunity (GEFA-9)
- 7) Certification By Proposed Prime or Subcontractor Regarding Debarment, Suspension, and Other Responsible Matters. (GEFA-10)
- 8) \*EPA Form 6100-3 DBE Subcontractor Performance Form for all DBE subcontracts. (GEFA-12)
- 9) \*EPA Form 6100-4 DBE Subcontractor Utilization Form for all DBE subcontracts. (GEFA-13)

\*6100 forms are not required when all of the work is self-performed by the prime contractor.

**END OF DBE COMPLIANCE FORM**





## DBE COMPLIANCE CHECKLIST

THE PRIME CONTRACTOR MUST SUBMIT THE FOLLOWING ITEMS TO THE OWNER BEFORE THE WORK BEGINS:

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

SRF Loan Number \_\_\_\_\_

### Include in Package Submittal

PRIME CONTRACTOR ONLY	TOTAL CONTRACT AMOUNT	
ALL SUBCONTRACTORS, INCLUDING DBE FIRMS	TRADE	AMOUNT
ALL SUBCONTRACTORS, INCLUDING DBE FIRMS	TRADE	AMOUNT
DBE SUBCONTRACTORS ONLY	TRADE	AMOUNT
DBE SUBCONTRACTORS ONLY	TRADE	AMOUNT
PRIME CONTRACTOR ONLY <i>(Not applicable if self-performing all work, with no subcontracting)</i>		

1. **DBE Compliance Form.** The Owner must sign and submit this information to the Georgia Environmental Finance Authority (GEFA) to demonstrate compliance with DBE requirements. GEFA concurrence is recommended prior to award of the construction contract and is required prior to commencement of any SRF-funded construction. **(Pages GEFA-4&5)**
  
2. **Certification Regarding Equal Employment Opportunity.** This form is required for the Prime Contractor and for all subcontractors. The Prime Contractor's form should be submitted with the DBE Compliance Form and the subcontractors' forms should be submitted as the subcontracts are executed. **(Page GEFA-9)**
  
3. **Certification Regarding Debarment, Suspension, & Other Responsible Matters.** This form is required for the Prime Contractor and for all subcontractors. The Prime Contractor's form should be submitted with the DBE Compliance Form and the subcontractors' forms should be submitted as the subcontracts are executed. **(Page GEFA-10)**
  
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 Prime Contractor, how much the DBE subcontractor was paid, and any other concerns the DBE subcontractor might have. The Prime Contractor must provide this form to each DBE subcontractor. The DBE subcontractor can, as an option, submit this form to the GEFA DBE Coordinator, who will forward the form to the EPA DBE Coordinator. **(Page GEFA-11)**
  
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 Prime Contractor and the price of the work. This form is to be provided by the Prime Contractor to each DBE subcontractor and submitted with the DBE Compliance Form. **(Page GEFA-12)**
  
6. **EPA Form 6100-4 DBE Subcontractor Utilization Form.** This form captures the Prime Contractor's intended use of an identified DBE subcontractor and the estimated dollar amount of the work. This form is to be completed by the Prime Contractor and submitted with the DBE Compliance Form. **(Page GEFA-13)**

### Uncommitted Trades

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### Documentation of Good Faith Efforts

Newspaper ads	Internet Websites	Fax Confirmation	Copies of Solicitation Emails/letters	Copies of phone logs
<b>PROOF OF CERTIFICATION FOR EACH SUBCONTRACTOR LISTED AS A DBE, MBE, OR WBE</b>				

## SIX GOOD FAITH EFFORTS

These good faith efforts are required methods to ensure that DBEs have the opportunity to compete for procurements funded by EPA financial assistance dollars. Such good faith efforts 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 Department of Transportation (DOT), Small Business Administration (SBA), and the Minority Business Development Agency of the Department of Commerce (MBDA).
6. If the Prime Contractor awards subcontracts, it must take the steps described in items (1) through (5) listed above.

Please note that DBEs, MBEs, and WBEs must be certified by EPA, SBA, or DOT (or by state, local, Tribal, or private entities whose certification criteria match EPA's). DBEs must be certified in order to be counted toward the Prime Contractor's MBE/WBE goals. "Self-certified" DBE subcontractors will not be counted toward the Prime Contractor's MBE/WBE goals. Depending upon the certifying agency, a DBE may be classified as a DBE, a Minority Business Enterprise (MBE), or a Women's Business Enterprise (WBE).

The Prime Contractor must employ and document the **Six Good Faith Efforts** for all subcontracts, even if the Prime Contractor has achieved the fair share objectives.

The documentation of solicitations for the **Six Good Faith 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 and affidavits of publication in newspapers or other publications. The Prime Contractor is encouraged to follow up each written, fax, or e-mail solicitation with at least 1 logged phone call.

The Prime Contractor should attempt to identify and solicit DBEs in the geographic proximity of the project before soliciting those located farther away.

If a DBE subcontractor fails to complete work under the subcontract for any reason, the Prime Contractor must notify the 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 the approved DBE subcontractor list must be reported to the Owner and to GEFA on the *Changes to Approved Subcontractors Form* (GEFA-14) prior to initiation of the action. EPA Forms Nos. 6100-3 and 6100-4 must also be submitted to GEFA for new DBE subcontracts.

# RESOURCES FOR IDENTIFYING DBE SUBCONTRACTORS

## RESOURCES FOR IDENTIFYING DBE SUBCONTRACTOR'S FOR DIRECT SOLICITATION:

Georgia Department of Transportation (GDOT)  
Disadvantaged Business Enterprise Program  
(404) 631-1972

[http://tomcat2.dot.state.ga.us/ContractsAdministration/uploads/rptDBE\\_Directory\\_CA\\_New.pdf](http://tomcat2.dot.state.ga.us/ContractsAdministration/uploads/rptDBE_Directory_CA_New.pdf)

City of Atlanta, Georgia  
Office of Contract Compliance  
(404) 330-6010  
<http://pro.prismcompliance.com/>

DeKalb County, Georgia  
Office of Purchasing and Contracting  
(404) 371-4730  
<http://www.co.dekalb.ga.us/purchasing/pdf/supplierList.pdf>

Fulton County, Georgia  
Purchasing and Contract Compliance  
(404) 612-5800  
[http://www.fultoncountyga.gov/plugins/content/external\\_links/frameset.php?url=http%3A%2F%2Fwww.occfultoncountyga.com%2FDirectory%2FMBEDirectoryExternal.aspx](http://www.fultoncountyga.gov/plugins/content/external_links/frameset.php?url=http%3A%2F%2Fwww.occfultoncountyga.com%2FDirectory%2FMBEDirectoryExternal.aspx)

Metropolitan Atlanta Rapid Transit Authority (MARTA)  
Disadvantaged Business Enterprise Program  
(404) 848-4656  
<http://www.itsmarta.com/vendor-opportunities.aspx>

United States Environmental Protection Agency  
[http://www.epa.gov/osbp/dbe\\_team.htm](http://www.epa.gov/osbp/dbe_team.htm)  
Teree Henderson  
National DBE Program Coordinator  
(202) 566-2222  
[henderson.teree@epa.gov](mailto:henderson.teree@epa.gov)

Georgia Environmental Finance Authority  
DBE Compliance Coordinator  
(404) 584-1000  
[www.gefa.ga.gov](http://www.gefa.ga.gov)  
[db\\_compliance@gefa.ga.gov](mailto:db_compliance@gefa.ga.gov)

## NOTES:

- (1) The Prime Contractor shall use the necessary resources to identify and directly solicit no less than 3 certified MBE firms and 3 WBE firms to bid in each expected subcontract area or trade.
- (2) If a diligent and documented search of the recommended directories does not identify 3 potential certified MBE firms and 3 potential certified WBE firms, then the Prime Contractor shall post an advertisement in the Owner's local legal organ, the Owner's official website, a regional newspaper in a larger community in the proximity, the Prime Contractor's website, or some other appropriate resource. Whenever possible, post solicitation for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.
- (3) 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.
- (4) The Prime Contractor should attempt to identify and first solicit DBEs in the geographic proximity of the project before soliciting those located farther away.
- (5) Contact the GEFA DBE Compliance Coordinator at (404) 584-1000 or [db\\_compliance@gefa.ga.gov](mailto:db_compliance@gefa.ga.gov) for further assistance or resources.

**CERTIFICATION BY PROPOSED PRIME CONTRACTOR OR SUBCONTRACTOR  
REGARDING  
EQUAL EMPLOYMENT OPPORTUNITY**

Proposed Prime Contractor
Proposed Subcontractor

This certification is required pursuant to Executive Order 11246, Part II, Section 203 (b), (30 F.R. 12319-25). Any bidder or prospective prime contractor, or any of the proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicated that the prime or subcontractor has not filed a compliance report due under applicable instruction, such contractor shall be required to submit a compliance report.

(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 \_\_\_\_\_ (If YES, state what reports were filed and with what agency.)

(3) Bidder has filed all compliance reports due under applicable instructions, including SF-100 (EEO-1 Report).  
YES \_\_\_\_\_ NO \_\_\_\_\_ (If NO, please explain in detail.)

The information above is true and complete to the best of my knowledge and belief. (A willfully false statement is punishable by law – U.S. Code, Title 18, Section 1001.)

\_\_\_\_\_  
PRINTED NAME & TITLE OF AUTHORIZED REPRESENTATIVE OF CONTRACTOR OR SUBCONTRACTOR

\_\_\_\_\_  
SIGNATURE OF AUTHORIZED REPRESENTATIVE

\_\_\_\_\_  
DATE

**CERTIFICATION BY PROPOSED PRIME CONTRACTOR OR SUBCONTRACTOR  
REGARDING  
DEBARMENT, SUSPENSION, AND OTHER RESPONSIBLE MATTERS**

Proposed Prime Contractor
Proposed Subcontractor

Under Executive Order 12549 individuals or organizations debarred from participation in Federal Assistance Programs may not receive an assistance award under federal program or sub-agreement there under for \$25,000 or more. Accordingly each recipient of a State loan or a contract (engineering or construction) awarded under a loan must complete the following certification (see 40 CFR 32.510).

The prospective participant certifies to the best of its knowledge and belief that it and its principals;

- (a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency.
- (b) Have not within a three year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
- (c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1) (b) of this certification; and
- (d) Have not within a three year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause of default.

I understand that a false statement on this certification may be grounds for rejection of this proposal or termination of the award. (A willfully false statement is punishable by law – U.S. Code, Title 18, Section 1001.)

\_\_\_\_\_  
PRINTED NAME & TITLE OF AUTHORIZED REPRESENTATIVE OF CONTRACTOR OR SUBCONTRACTOR

\_\_\_\_\_  
SIGNATURE OF AUTHORIZED REPRESENTATIVE

\_\_\_\_\_  
DATE

\_\_\_\_\_ I am unable to certify to the above statements. My explanation is as follows:

**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.

## 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: ___ DOT      ___ SBA ___ Other: _____		Meets/ exceeds EPA certification standards? ___ YES   ___ NO   ___ 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.

## 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	___ YES	___ 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.



# CHANGES TO APPROVED SUBCONTRACTORS FORM

Loan Recipient \_\_\_\_\_ SRF Loan Number \_\_\_\_\_

## CERTIFICATIONS:

*I certify that the information submitted on and with this form is true and accurate and that this firm 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.*

\_\_\_\_\_  
(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 Owner's State Revolving Fund loan contract.*

\_\_\_\_\_  
(Signature of Owner or Owner's representative) Date \_\_\_\_\_

\_\_\_\_\_  
(Printed name and title)

## GENERAL INFORMATION:

- 1) If an approved subcontractor is terminated or replaced, please identify this company and briefly state reason.

Subcontractor Name::	Trade
Reason Terminated or Replaced	

- 2) For new or additional subcontractors, list name, trade, address, telephone number, contact person, dollar amount of subcontract, and DBE status.

New Subcontractor Name and Contact Person	Trade
Address	Telephone Number
Dollar Amount	DBE Status

- 1) 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.
- 2) Attach documentation of Six Good Faith Efforts solicitation effort for all new subcontracts.
- 3) Provide justification for not selecting any certified DBE subcontractor that submitted a low bid for any subcontract area.
- 4) For each subcontractor, attach certifications regarding Equal Employment Opportunity (GEFA-9) and certifications regarding Debarment, Suspension, and Other responsible Matters (GEFA-10)

**DBE ANNUAL REPORT**  
**FORM (5700-52A)**

This form must be completed by recipients of federal financial assistance for procurement of supplies, equipment, construction or services. SRF loan recipients are required to submit this report to GEFA by the 20th of October for the previous period of October 1 through September 30. Please submit a "negative" report even if \$0 is the amount paid to MBE/WBE subcontractors during the reporting period.

ANNUAL REPORT FORM (5700-52A)			
<b>1. PRIME CONTRACTOR</b>		<b>2. REPORTING PERIOD</b> (Complete date using current year.)  Period Ending    (September 30, _____)	
<b>3. SUBMIT TO:</b> Georgia Environmental Finance Authority Attention: DBE Compliance Coordinator 233 Peachtree Street, N.E. Harris Tower, Suite 900 Atlanta, Georgia 30303 dbe_compliance@gefa.ga.gov		<b>4. LOAN RECIPIENT</b> (Name, Address and Telephone)	
<b>5. LOAN RECIPIENT (OWNER) REPORTING CONTACT</b>	<b>PHONE:</b>	<b>6. TYPE OF FEDERAL FINANCIAL ASSISTANCE PROGRAM</b> (Check one) CWSRF _____ DWSRF _____	<b>7. SRF LOAN NUMBER</b>
<b>8. CONTRACTOR NAME &amp; TOTAL CONSTRUCTION CONTRACT AMOUNT</b>		<b>9. ACTUAL DOLLAR AMOUNT PAID TO MBE/WBE SUBCONTRACTORS THIS PERIOD</b>  \$ MBE _____ \$ WBE _____ <b>NEGATIVE REPORT (\$0)</b> ____	
<b>10. RECIPIENT'S MBE/WBE GOALS</b>  MBE    4.0 %        WBE    4.0 %		<b>11. TOTAL DOLLARS SPENT THIS PERIOD</b> MBE                \$ _____ WBE                \$ _____ NON MBE/WBE    \$ _____ TOTAL              \$ _____	
<b>12. NAME &amp; TITLE OF AUTHORIZED REPRESENTATIVE OF LOAN RECIPIENT (OWNER).</b>		<b>13. SIGNATURE OF AUTHORIZED REPRESENTATIVE OF LOAN RECIPIENT.</b>	<b>14. DATE</b>
<b>MBE/WBE PAYMENTS MADE DURING PERIOD</b>			
NAME & ADDRESS of DBE (SUB)CONTRACTOR (indicate if MBE or WBE firm)		TOTAL DOLLAR AMOUNT PAID & DATE PAID \$ _____ DATE _____	

## **SPECIAL PROVISIONS**

- (a) The Prime Contractor is required to pay its subcontractors in accordance with the Georgia Prompt Payment Act (OCGA 13-11).
- (b) The Prime Contractor is required to insert the entirety of the Davis Bacon contract requirements into all subcontracts
- (c) Sewer line and water line crossing of all roads and streets shall be done in accordance with the Georgia Department of Transportation (D.O.T.) Policies and Procedures and must comply with the Ga. D.O.T. Standard Specifications, Construction of Roads and Bridges, 1993 Edition.
- (c) Construction shall be carried out so as to prevent bypassing of wastewater flow and to prevent interruption of drinking water treatment during construction. EPD must receive written notification prior to any reduction in the level of treatment and must approve all temporary modifications to the treatment process prior to the activity.
- (d) Erosion and Sedimentation Control shall be accomplished in accordance with the Georgia Erosion and Sedimentation Control Act of 1975 as currently amended and NPDES General Permits (Storm Water from Construction Sites). See also [www.gaepd.org](http://www.gaepd.org) and [www.gaswcc.georgia.gov](http://www.gaswcc.georgia.gov) for information regarding permits.
- (e) Use of Chemicals: All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer reactant or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in conformance with State and local regulations as appropriate.
- (f) It is the duty of the Prime Contractor, the Owner and the Engineer to ensure the construction of the project, including the letting of contracts in connection therewith, shall comply with all applicable laws and regulations and requirements of the United States of America or any agency thereof, the state of Georgia or any agency thereof, territorial, or any local government laws or political subdivision and ordinances to the extent that such requirements do not conflict with Federal laws and this subchapter.
- (g) EPD, EPA, and GEFA shall have access to the site and the project work at all times.

### **BONDS**

Bonding requirements for Contracts of \$100,000 or less are contained in the General Conditions. Bond requirements of contracts in excess of \$100,000 are:

1. Bid guarantee equivalent to five percent of the bid price. The bid guarantee shall consist of a firm commitment such as a certified check or bid bond submitted with the bid.
2. Performance bond equal to 100 percent of the contract price and;
3. Payment bond equal to 100 percent of the contract price. Bonds must be obtained from companies holding Certificates of Authority as acceptable sureties, issued by the U.S. Treasury.

### **SPECIAL NOTICE TO BIDDERS**

By the submission of this bid, each bidder acknowledges that he understands and agrees to be bound by the equal opportunity requirements of EPA regulations (40 CFR Part 8, particularly Section 8.4 (b)), which shall be applicable throughout the performance of work under any contract awarded pursuant to this solicitation. Each bidder agrees that if awarded a contract, it will similarly bind contractually each subcontractor. In implementation of the foregoing policies, each bidder further understands and agrees that if awarded a contract, it must engage in affirmative action directed at promoting and ensuring equal employment opportunity in the workforce used under the contract (and that it must require contractually the same effort of all subcontractors whose subcontracts exceed \$10,000.00). The bidder understands and agrees that "affirmative action" as used herein shall constitute a good faith effort to achieve and maintain minority employment in each trade in the on-site workforce used on the project.

# EQUAL EMPLOYMENT OPPORTUNITY NOTICE

## NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL OPPORTUNITY (EXECUTIVE ORDER 11246)

1. The Offeror's or Bidder's attention is called to the Equal Opportunity Clause which is included in the nondiscrimination Provision and Labor Standards, EPA Form 5720-4 and the Standard Federal Equal Employment Opportunity (EEO) Construction Contract Specifications set forth herein.
2. The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

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Goals for minority participation for each trade	4.0 percent
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Goals for female participation for each trade	4.0 percent
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These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minority and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation to the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The contractor shall carry out applicable requirements of 40CFR Part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract.
4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is (insert description of the geographical area where the contract is to be performed giving the state, county and city, if any).

## **EEO Construction Contract Specifications (Executive Order 11246)**

### **EEO Specifications:**

1. As used in these specifications:
  - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
  - b. "Director" means Director, Office of Federal Contract Compliance Program, United States Department of Labor, or any person to whom the Director delegates authority;
  - c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form, 941.
  - d. "Minority" includes:
    - (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
    - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
    - (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
    - (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7(a) through (p) of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
  - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
  - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
  - c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore, along with whatever actions the Contractor may have taken.
  - d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
  - e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trained programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7(b) above.
  - f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
  - h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
  - i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
  - j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.
  - k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
  - l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
  - m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
  - n. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
  - o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
  - p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations 7(a) through (p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant may be asserted as fulfilling any one or more of its obligations under 7(a) through (p) of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes

a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation, if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).



# **Davis-Bacon and Related Acts**

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

### **Contract Provision for Contracts in Excess of \$2,000.**

#### **(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, <http://www.dol.gov/whd/govcontracts/dbra.htm> (E-tools)

(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 <http://www.dol.gov/whd/forms> 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.

**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 thereunder 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 provide a report of compliance to the Georgia Environmental Finance Authority detailing compliance efforts and results. This report will be submitted with or prior to the loan recipient's first request for funding of construction costs, prior to final disbursement of funds from the loan, and as requested by the GEFA during the project.

(f) Subrecipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB coordinator and to the appropriate DOL Wage and Hour District Office listed at <http://www.dol.gov/whd/america2.htm>.

# **INSERT WAGE RATE DETERMINATION HERE**

Wage Rates (for *Heavy Construction*) are state/county specific can be found at:

<http://www.dol.gov/whd/govcontracts/dbra.htm>

Sample Payroll Form (WH-347) is found at:

<http://www.dol.gov/whd/forms/wh347.pdf>

Labor Standards Interview Form (SF-1445) is found at:

<http://www.gsa.gov/portal/forms/download/115910>

Davis-Bacon (WH-1321) poster is found at:

<http://www.dol.gov/whd/regs/compliance/posters/fedprojc.pdf>  
(English)

<http://www.dol.gov/whd/regs/compliance/posters/davispan.pdf>  
(Spanish)

Fair Labor Standards Act Minimum Wage poster is found at:

<http://www.dol.gov/whd/regs/compliance/posters/minwagebwp.pdf>  
(English)

<http://www.dol.gov/whd/regs/compliance/posters/minwagespbwP.pdf>  
(Spanish)

“EEO Is the Law” poster is found at:

[http://www.eeoc.gov/employers/upload/eeoc\\_self\\_print\\_poster.pdf](http://www.eeoc.gov/employers/upload/eeoc_self_print_poster.pdf)  
(English)

[http://www.eeoc.gov/employers/upload/eeoc\\_self\\_print\\_poster\\_spanish.pdf](http://www.eeoc.gov/employers/upload/eeoc_self_print_poster_spanish.pdf)  
(Spanish)

“EEO Is the Law” poster supplement is found at:

[http://www.eeoc.gov/employers/upload/eeoc\\_gina\\_supplement.pdf](http://www.eeoc.gov/employers/upload/eeoc_gina_supplement.pdf)  
(English)

[http://www.eeoc.gov/employers/upload/eeoc\\_gina\\_supplement\\_spanish.pdf](http://www.eeoc.gov/employers/upload/eeoc_gina_supplement_spanish.pdf)  
(Spanish)

OSHA poster is found at:

<http://www.osha.gov/Publications/osh3165low-res.pdf>  
(English)

<http://www.osha.gov/Publications/osh3167.pdf>  
(Spanish)

# CERTIFIED PAYROLL REVIEW CHECKLIST

(This is a *recommended Certified Payroll Review Checklist for the Owner's use.*)

CONTRACT ID  City of CW/DWSRF#00 - 000	PRIME CONTRACTOR/SUBCONTRACTOR  X Construction
GENERAL WAGE DECISION AND DATE  (Insert number & date)	PAYROLL PERIOD ENDING

**INSTRUCTIONS:** This checklist is to be used in conjunction with projects requiring Davis-Bacon Wage Rates and compliance reviews. All certified payrolls are to be date stamped upon receipt from the prime contractor.

## Payroll Information Checklist:

- \_\_\_\_\_ Prime Contractor's or subcontractor's name and address
- \_\_\_\_\_ Contract ID numbers (GEFA SRF No.)
- \_\_\_\_\_ Week ending.
- \_\_\_\_\_ Project location.
  
- \_\_\_\_\_ Employee ID or Last 4 digits of Social Security Number
  - \_\_\_\_\_ Social Security Number removed
  - \_\_\_\_\_ Employee's work classification
  - \_\_\_\_\_ Identification of OJTs, apprentices and program levels (%) on payrolls.
  - \_\_\_\_\_ Verify that OJT and Apprentice Program documentation is in project files.
  
- \_\_\_\_\_ Daily and weekly employee hours worked in each job classification.
  - \_\_\_\_\_ Daily and weekly employee overtime (or premium) hours worked
  - \_\_\_\_\_ Total weekly hours worked on all jobs (prevailing and non-prevailing wage).
  - \_\_\_\_\_ Base rate shown for each employee, overtime (or premium) rate shown when worked.
  - \_\_\_\_\_ Verify correct wage rates are being paid.
  - \_\_\_\_\_ Verify overtime is being paid correctly (over 40 hrs/wk, and Time and a half)
  - \_\_\_\_\_ Week's gross wages
  - \_\_\_\_\_ Week's itemized deductions.
  - \_\_\_\_\_ Week's net wages paid
  
- \_\_\_\_\_ Compliance statement attached.
  - \_\_\_\_\_ Method of fringe benefit payment described by checking either box (4)(a) or (4)(b).
  - \_\_\_\_\_ Fringe benefit package information in file and updated as needed (if 4(a) is checked)
  - \_\_\_\_\_ Exceptions explanation for fringe benefit (4)(c).
  - \_\_\_\_\_ Signature.

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## Compliance Review Checklist (for field reviews):

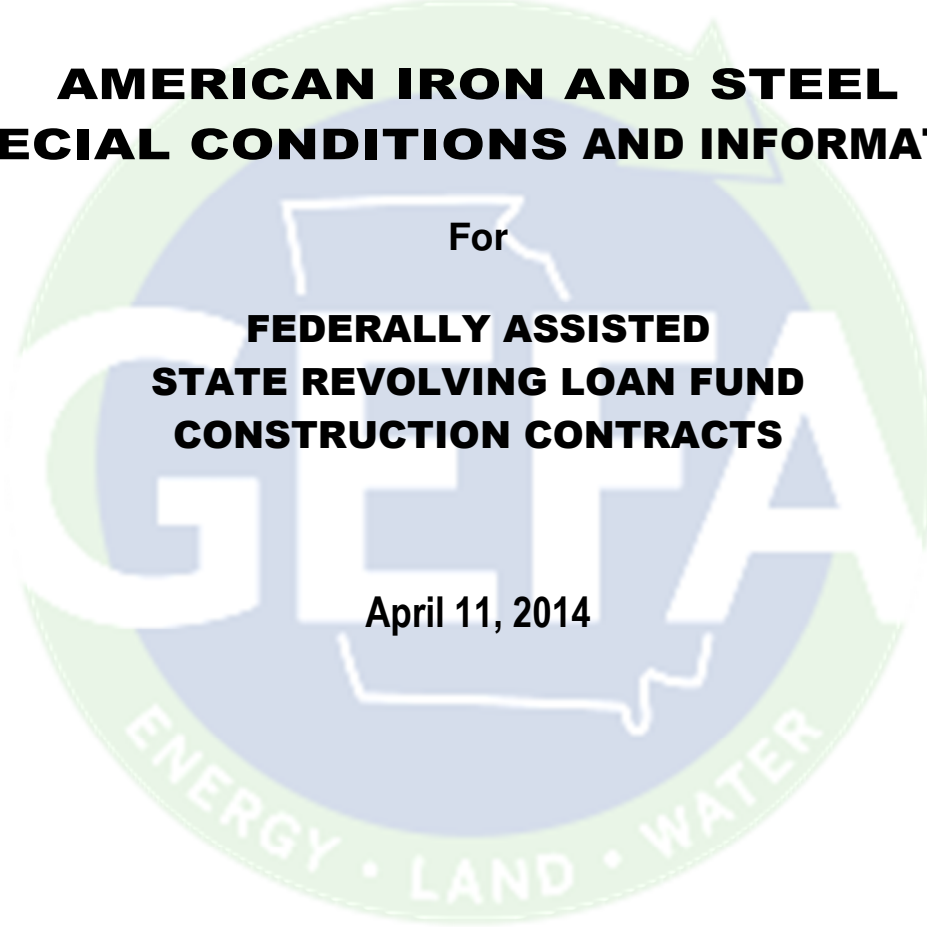
- \_\_\_\_\_ Verify work classifications reported are consistent with the work performed.
- \_\_\_\_\_ Compare payrolls with wage rate interviews when conducted.
- \_\_\_\_\_ Compare number of employees and hours worked with project documentation.

REVIEWED BY:	DATE
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# GEORGIA ENVIRONMENTAL FINANCE AUTHORITY

## **AMERICAN IRON AND STEEL SPECIAL CONDITIONS AND INFORMATION**



For

### **FEDERALLY ASSISTED STATE REVOLVING LOAN FUND CONSTRUCTION CONTRACTS**

April 11, 2014

*The following standard language must be incorporated into construction contract documents and in all solicitations for offers and bids for all construction contracts or subcontracts to be funded, in whole or in part, through the Federally-assisted State Revolving Fund in the State of Georgia for projects subject to the American Iron and Steel requirements.*

*These Special Conditions shall not relieve the participants in this project of responsibility to meet any requirements of other portions of this construction contract or of other agencies, whether these other requirements are more or less stringent. The requirements in these Special Conditions must be satisfied in order for work to be funded with the State Revolving Fund.*

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## **GENERAL REQUIREMENTS**

These Special Conditions are based on guidance provided by the United States Environmental Protection Agency (EPA). Public Law 113-76, the Consolidated Appropriations Act, 2014 (Act), includes an "American Iron and Steel" (AIS) requirement that requires State Revolving Loan Fund (SRF) assistance recipients to use iron and steel products that are produced in the United States for projects in this project. A copy of Section 436 of the Act is found in Appendix 3.

The products and materials subject to these requirements will be defined in Appendix 1 of these special conditions.

The Owner must maintain documentation of compliance with the AIS requirements. The documentation that the Owner maintains will be subject to review and audit by representatives of the state of Georgia, the EPA, the EPA Office of the Inspector General, and other federal authorities.

The Prime Contractor must provide certifications of compliance for all products subject to AIS requirements to the Owner prior to requesting payments for those products. The Owner or the Engineer may require certifications of compliance with submittals and shop drawings for these products as part of the submittal review process.

All manufacturing processes for a covered iron or steel product, as further defined in Appendix 1, must take place in the United States. If a covered product is taken out of the US for any part of the manufacturing process, it becomes foreign source material.

The EPA recommends the use of a step certification process to document the locations of the manufacturing processes involved with the production of steel and iron materials. A step certification is a process under which each handler (supplier, fabricator, manufacturer, processor, etc.) of the iron and steel products certifies that its step in the process was domestically performed. Each time a step in the manufacturing process takes place, the manufacturer delivers its work along with a certification of its origin. A certification should include the name of the manufacturer, the location of the manufacturing facility where the product or process took place (not its headquarters), a description of the product or item being delivered, and a signature by a manufacturer's responsible party. Attached in Appendix 2 is a sample step certification.

Alternatively, the final manufacturer that delivers the iron or steel product to the worksite, vendor, or contractor, may provide a certification asserting that all manufacturing processes for the product and for its iron and steel components occurred in the United States. The EPA states that additional documentation may be needed if the certification lacks important information and recommends step certification as the best practice. A sample final manufacturer certification is attached in Appendix 2.

The Prime Contractor may document that incidental and generally low cost components, as defined in Appendix 1, are compliant with AIS requirements under the De Minimis Waiver issued by the EPA. For these items, the Contractor must provide the Owner with documentation of costs for these items, including invoices, and a report of types and categories of materials to which the waiver is applied, the total cost of incidental components covered by the waiver for each category, and the calculations by which the total cost of materials incorporated into the project was determined. A sample De Minimis report is attached in Appendix 2.

Contractor, supplier, and manufacturer records are subject to review and audit by the EPA, its Inspector General, and other federal authorities.

Failure to comply with these requirements may delay, limit, or prevent the disbursement of SRF funds to the Owner. Violations of AIS requirements will require correction by the Contractor as determined by the Owner and Engineer, including replacement of deficient products with compliant products and compensation for costs and other damages that may result. Violations may also subject the Owner, the Contractor, and suppliers to other enforcement actions within the discretion of the EPA and other federal authorities.

The Act permits EPA to issue waivers for a case or category of cases in which EPA finds (1) that applying these requirements would be inconsistent with the public interest; (2) iron and steel products are not produced in the US in sufficient and reasonably available quantities and of a satisfactory quality; or (3) inclusion of iron and steel products produced in the US will increase the cost of the overall project by more than 25 percent. The Contractor should notify the Owner and Engineer immediately if it finds that a waiver may be required.

By submitting a bid for this project and by executing this construction contract, the Contractor acknowledges to and for the benefit of the Owner and the state of Georgia that it understands that the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund or the Drinking Water State Revolving Fund and that Federal law authorizing these Funds contains provisions 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 Requirement") 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 Owner and the state of Georgia 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 Owner or the state of Georgia. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Owner or the state of Georgia to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Owner or the state of Georgia resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the state of Georgia or any damages owed to the state of Georgia by the Owner). The Owner and the Contractor agree that the state of Georgia, as a lender to the Owner for the funding of its project, 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 of Georgia.

## Appendix 1 – Definitions

For purposes of the Clean Water State Revolving Fund (CWSRF) and Drinking Water State Revolving Fund (DWSRF) projects that must comply with the AIS requirement, an iron or steel product is one of the following made primarily of iron or steel that is permanently incorporated into the project:

Lined or unlined pipes or fittings;  
Manhole Covers;  
Municipal Castings (defined in more detail below);  
Hydrants;  
Tanks;  
Flanges;  
Pipe clamps and restraints;  
Valves;  
Structural steel (defined in more detail below);  
Reinforced precast concrete (defined in more detail below); and  
Construction materials (defined in more detail below).

**Product primarily of iron or steel:** The product must be made of greater than 50% iron or steel, measured by cost. If one of the listed products is not made primarily of iron or steel, United States (US) provenance is not required, except as required for reinforced precast concrete. If a product is composed of more than 50% iron or steel, but is not listed in Section 436 (a) (2) of the Act, it is not required to be produced in the US. Alternatively, the iron or steel in such a product can be sourced from outside the US.

**Steel:** An alloy that includes at least 50 percent iron and between 0.02 and 2 percent carbon and may include other elements. Other alloys of iron are not required to be produced in the US.

**Produced in the United States:** Production in the US of the iron or steel products used in the project requires that all manufacturing processes, including application of coatings, must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives. All manufacturing processes includes processes such as melting, refining, forming, rolling, drawing, finishing, fabricating and coating. Further, if a domestic iron and steel product is taken out of the US for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin.

**Municipal Castings:** Municipal castings are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and surface infrastructure. They are typically made of grey or ductile iron, or steel. Examples of municipal castings include access hatches, ballast screen, benches, bollards, cast bases, cast iron hinged hatches, cast iron riser rings, catch basin inlets, cleanout/monument boxes, construction covers and frames, curb and corner guards, curb openings, detectable warning plates, downspout shoes, drainage grates, frames & curb inlets, inlets, junction boxes, lampposts, manhole covers, rings & frames, risers, meter boxes, steel hinged hatches, steel riser rings, trash receptacles, tree grates, tree guards, trench grates, and valve boxes.

**Structural Steel:** Structural steel is rolled flanged shapes, having at least one dimension of their cross-section 3 inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees and zees. Other shapes include H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

**Reinforced Precast Concrete:** While reinforced precast concrete may not be at least 50% iron or steel, in this particular case, the reinforcing rebar must be produced in the US and meet the same standards as for any other iron or steel product. Additionally, the casting of the concrete product must take place in the US. The cement and other raw materials used in concrete production are not required to be of domestic origin. If the reinforced concrete is cast at the construction site, the reinforcing rebar is considered to be a construction material and must be produced in the US.

**Construction Materials subject to AIS:** Construction materials are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered “structural steel”. This includes, but is not limited to, the following products: welding rods, wire rod, bar, angles, concrete reinforcing bar, wire, wire cloth, wire rope and cables, tubing, framing, joists, trusses, fasteners (i.e., nuts and bolts), decking, grating, railings, stairs, access ramps, fire escapes, ladders, wall panels, dome structures, roofing, ductwork, surface drains, cable hanging systems, manhole steps, fencing and fence tubing, guardrails, doors, gates, and screens.

**Construction Materials not subject to AIS:** Mechanical and/or electrical components, equipment and systems are not considered construction materials. Mechanical equipment is typically that which has motorized parts and/or is powered by a motor. Electrical equipment is typically any machine powered by electricity and includes components that are part of the electrical distribution system.

The following examples, including their appurtenances necessary for their intended use and operation, are NOT considered construction materials: pumps, motors, gear reducers, drives, variable frequency drives (VFDs), mixers, blowers/aeration equipment, compressors, meters, electric/pneumatic/manual accessories used to operate valves (such as valve actuators), gates, motorized screens (such as traveling screens), sensors, controls, switches, supervisory control and data acquisition (SCADA), membrane bioreactor systems, membrane filtration systems, filters, clarifiers and clarifier mechanisms, rakes, grinders, disinfection systems, dewatering equipment, presses (including belt presses), conveyors, cranes, HVAC (excluding ductwork), water heaters, heat exchangers, generators, cabinetry and housings (such as electrical boxes/enclosures), lighting fixtures, electrical conduit, emergency life systems, metal office furniture, shelving, laboratory equipment, and analytical instrumentation.

Items temporarily used during construction, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel. For example, trench boxes or scaffolding are not considered construction materials subject to AIS requirements.

**Incidental Components compliant with AIS under the De Minimis Waiver:** This waiver permits the use of de minimis incidental components that may otherwise be prohibited under AIS. These de minimis items may cumulatively comprise no more than a total of 5 percent of the total cost of the materials used in and incorporated into the project. The cost of an individual item may not exceed 1 percent of the total cost of the materials used in and incorporated into the project.

These items are miscellaneous, generally low-cost components that are essential for, but incidental to, the construction and are permanently incorporated into the project. For many of these incidental components, the country of manufacture and the availability of alternatives are not always readily or reasonably identifiable prior to procurement in the normal course of business. For other incidental components, the country of manufacture may be known, but the miscellaneous character in conjunction with the low cost, individually and in total, as typically procured in bulk, mark them as properly incidental. Examples of incidental components include small washers, screws, fasteners (i.e., nuts and bolts), miscellaneous wire, corner bead, ancillary tube.

Examples of items that are not incidental and are not covered by the De Minimis Waiver include significant process fittings (i.e., tees, elbows, flanges, and brackets), distribution system fittings and valves, force main valves, pipes for sewer collection and/or water distribution, treatment and storage tanks, large structural support structures.

Items covered as compliant under this waiver must be documented in a report to the Owner to demonstrate that they are both incidental and that they fall within the cost allowances of this waiver. The costs of these items must be documented by invoices. The report must include a listing of types and categories of materials to which the waiver is applied, the total cost of incidental components covered by the Waiver for each category, and the calculations by which the total cost of materials incorporated into the project was determined.

## **Appendix 2 – Sample Certifications**

### **Step Certification**

The following information is provided as a sample letter of step certification for American Iron and Steel compliance. Documentation must be provided on company letterhead. This is to be provided by each handler (supplier, fabricator, manufacturer, processor, etc.). Each time a step in the manufacturing process takes place, the handler delivers its work along with a certification of its origin.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Step Certification for Project (Insert project name and SRF number)

I, (company representative), certify that the (melting, bending, coating, galvanizing, cutting, etc.) process for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

List of items, products and/or materials:

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative



## **Appendix 2 – Sample Certifications**

### **Final manufacturer certification**

The following information is provided as a sample letter of the final manufacturer to certify American Iron and Steel compliance for the entire manufacturing process. Documentation must be provided on company letterhead.

Date

Company Name  
Company Address  
City, State Zip

Subject: American Iron and Steel Certification for Project (Insert project name and SRF number)

I, (company representative), certify that the following products and/or materials shipped/provided to the subject project are in full compliance with the American Iron and Steel requirement of P.L. 113-76 and as mandated in EPA's State Revolving Fund Programs.

List of items, products and/or materials:

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

## Appendix 2 – Sample Certifications Contractor De Minimis Report

**Owner:** (Owner Name)

**SRF Project No:** (SRF Number)

**Project Description:** (Contract title or brief description)

**Date:** (Date of report)

**Submitted by (name & title):** (Contractor representative)  
Company Name

### LIST OF MATERIALS COST OR CATEGORIES OF MATERIALS PERMANENTLY INCORPORATED INTO THE PROJECT

Category or Item	\$1,000.00
Category or Item	\$1,000.00
Category or Item	\$1,000.00
Category or Item	\$1,000.00
Category or Item	\$1,000.00
Category or Item	\$1,000.00
Category or Item	\$1,000.00
Category or Item	\$1,000.00
Category or Item	\$1,000.00
Category or Item	\$1,000.00

**Total Permanent Materials** **\$10,000.00**

<b>1 % of total material cost</b>	<b>\$100.00</b>	<b>Maximum cost for individual item waived</b>
<b>5 % of total material cost</b>	<b>\$500.00</b>	<b>Maximum cumulative cost for category waived</b>

### LIST OF MATERIALS COST COMPLIANT OR CATEGORIES OF MATERIALS (Yes/No) COVERED BY DE MINIMIS WAIVER

Category or Item	\$100.00	Yes
Category or Item	\$100.00	Yes
Category or Item	\$100.00	Yes
Category or Item	\$100.00	Yes
Category or Item	\$100.00	Yes

**Total De Minimis Items** **\$500.00** **Yes**

**INVOICES ATTACHED FOR DE MINIMIS ITEMS.**

## **Appendix 3 – P.L. 113-76, Consolidated Appropriations Act, 2014**

The Act states:

Sec. 436 (a)(1) None of the funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j–12) shall be used for a project for the construction, alteration, maintenance, or repair of a public water system or treatment works unless all of the iron and steel products used in the project are produced in the United States.

(2) In this section, the term “iron and steel products” means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

(b) Subsection (a) shall not apply in any case or category of cases in which the Administrator of the Environmental Protection Agency (in this section referred to as the “Administrator”) finds that—

(1) applying subsection (a) would be inconsistent with the public interest;

(2) iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or

(3) inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

(c) If the Administrator receives a request for a waiver under this section, the Administrator shall make available to the public on an informal basis a copy of the request and information available to the Administrator concerning the request, and shall allow for informal public input on the request for at least 15 days prior to making a finding based on the request. The Administrator shall make the request and accompanying information available by electronic means, including on the official public Internet Web site of the Environmental Protection Agency.

(d) This section shall be applied in a manner consistent with United States obligations under international agreements.

(e) The Administrator may retain up to 0.25 percent of the funds appropriated in this Act for the Clean and Drinking Water State Revolving Funds for carrying out the provisions described in subsection (a)(1) for management and oversight of the requirements of this section.

(f) This section does not apply with respect to a project if a State agency approves the engineering plans and specifications for the project, in that agency’s capacity to approve such plans and specifications prior to a project requesting bids, prior to the date of the enactment of this Act.

## **TECHNICAL SPECIFICATIONS**

## **SECTION 01010 SUMMARY OF WORK**

### **1.01 SCOPE**

- A. This project consists of all work shown in the contract documents to put in place a new Clarifier, RAS pumps, Flow Splitter Box, and Mobile Belt Filter Press at the City of Thomaston's Town Branch WPCP as well as; Installation of Mobile Belt Filter Press facilities and replacement & relocation of electrical equipment at the Bell Creek WPCP. There will be one Mobile Belt Filter Press shared between the two plants. Facilities related to the Belt Filter Press will be installed at both plants.

The following paragraphs summarize the improvements called for in the plans:

- **Bell Creek Water Pollution Control Plant**
  - Electrical Improvements  
The existing Main electrical panel will be replaced and relocated to a higher elevation on the exterior of the operators building.
  - Mobile Belt Filter Press Facilities  
A concrete slab and necessary 6" ductile iron piping and electrical controls will be constructed for implementation of a Mobile Belt Filter Press.
- **Town Branch Water Pollution Control Plant**
  - Clarifier  
A 100-foot diameter clarifier and associated piping, controls, valving & accessories will be installed to provide redundancy to the existing 76-foot clarifier
  - Splitter Box  
A 10-foot by 6-foot Flow Splitter Box will be constructed to split flow between the existing and proposed clarifier.
  - Return Activated Sludge (RAS) Pumps  
Existing RAS pumps will be replaced and relocated to a separate, existing wet well including three (3) submersible pumps with all associated controls, piping, valving, flow meter, and accessories. The 3 proposed pumps will be tied into the existing 10" ductile iron force main pumping to the oxidation ditch.
  - Mobile Belt Filter Press Facilities

A concrete slab and necessary 6" ductile iron piping and electrical controls will be constructed for implementation of a Mobile Belt Filter Press.

- Site work – Including Grading, Drainage and, Erosion and Sedimentation Control & Monitoring
- **Mobile Belt Filter Press**

This project will require provision of a Trailer Mounted - Mobile Belt Filter Press with a 1-meter width belt.

**END OF SECTION**

## **SECTION 01020 ALLOWANCES**

### **PART 1 – GENERAL**

- A. The Contractor shall include in his bid proposal the allowances stated herein. The final amount of any allowance item listed herein shall be adjusted accordingly by change order to reflect actual cost.

### **PART 2 – PRODUCT**

- A. The Contractor shall allow the sum of \$90,000 for Supplemental Work Additions (SWA's). SWA shall be utilized to incorporate cost changes for any additional authorized work into the scope of work up to the amount budgeted above. Contract change orders shall be enforced for contract changes over and above this amount. These SWA's shall authorize the Contractor to perform additions to work, but the Contractor shall perform no work until written authorization has been delivered to the Contractor by the City. Contractor should not expect that any SWA's will be issued; SWA's shall be issued at the discretion of the City only.

The value of any work covered by a SWA shall be determined in one of the following ways:

1. Where the work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the item involved (subject to the provisions of General Conditions, paragraph 11.3).
  2. By mutual acceptance of a lump sum by Contractor and the Owner.
  3. On the basis of the cost of the work plus a Contractor's Fee for overhead and profit.
- B. The Contractor shall allow a sum of \$15,000 for Testing. The allowance will be utilized for any testing requested by the Engineer or City that is in addition to the required testing called for in Specification 01410 – Testing Services. The Testing allowance will be utilized only at the direction of the City or Engineer.

### **PART 3 – EXECUTION**

- A. Amounts stated shall include all taxes, coordination and handling that may be required to provide the equipment to the owner. Owner may choose to delay the purchase of equipment to the end of the contract.

**END OF SECTION**

**SECTION 01025  
MEASUREMENT AND PAYMENT**

**PART 1 – GENERAL**

**1.01 SCOPE OF WORK**

- A. This Section describes the methods by which measurement will be made of the quantities for which payment will be made for the Project.
- B. The Bid lists each item of the Project for which payment will be made. No payment will be made for any items other than those listed in the Bid.
- C. Required items of work and incidentals necessary for the satisfactory completion of the work which are not specifically listed in the Bid, and which are not specified in this Section to be measured or to be included in one of the items listed in the Bid, shall be considered as incidental to the work and included in the LS bid item of the bidders choice. All costs thereof, including Contractor's overhead costs and profit, shall be considered as included in the lump sum or unit prices bid for the various Bid items. The Contractor shall prepare the Bid accordingly.
- D. Work includes furnishing all labor, equipment, tools and materials, which are not furnished by the Owner and performing all operations required to complete the work satisfactorily, in place, as specified and as indicated on the Drawings.

**1.02 MEASUREMENT OF WORK**

- A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.
- B. Work shall be measured by the Engineer or his representative with assistance from the Contractor prior to preparation of a payment request by the Contractor.
- C. Unit quantities that are measured in place shall be measured monthly. The Contractor shall give the Engineer a minimum of two days' notice for making all required measurements.
- D. Materials that must be measured as delivered shall be measured at the time of delivery by the Engineer or his representative; the Contractor shall provide sufficient advance notice so that such measurements can be made.
- E. Work necessary for a complete and operational job, such as relocation of mail



boxes or fences, removal of trees, relocation of utilities, graveling / maintaining driveways, field engineering, clearing and grubbing, traffic control, etc., not specifically identified as a pay item shall be included in the unit price bid. No additional payments will be made for such activities.

### **1.03 ESTIMATED QUANTITIES**

All estimated quantities for unit price items, stipulated in the BID FORM, or other Contract Documents, are approximate and are to be used as a basis for comparing the bids submitted for the Project. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished. The Contractor agrees to make no claim for damages, anticipated profits or otherwise on account of any difference between the amounts of work actually furnished and the estimated amounts included in the BID FORM. The Contractor will not be paid for any work which exceeds the quantity set forth in the BID FORM without a change order issued before the work is performed unless specifically ordered in writing by the Engineer. The Contractor will provide assistance to the Engineer to check quantities and elevations when so requested.

### **1.04 MEASUREMENT OF QUANTITIES**

- A. Measurement by Weight – Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
- B. Measurement by Volume – Measured by cubic dimension using mean length, width and height or thickness.
- C. Measurement by Area – Measured by square dimension using mean length and width or radius.
- D. Linear Measurement – Measured by linear dimension, at the item centerline or mean chord.
- E. Stipulated Sum/Price Measurement – Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

### **1.05 PROGRESS PAYMENTS**

- A. Progress payments shall be based on percentage of work complete for lump sum pay items and units installed for unit price pay items.
- B. All items of Work not specifically listed in the Bid Schedule shall be considered

incidental to the construction, and the cost of all such work and material shall be included in the item of the Contractor's choice.

- C. All items listed for measurement and payment shall include all materials, labor, and equipment necessary to successfully and satisfactorily complete Work specified.
- D. Payment – The Contractor will receive payment only for the items listed in the Bid Schedule of his contract, and no separate payments will be made for the work under any section of the Contract Documents except as provided for in the Bid Form. Where measurements are required to be made by the Engineer, for the payment of a pay item, the failure of the Contractor to give the adequate notification or failure of the Contractor to give the engineer assistance for the measurement shall result in the forfeiture of payment for the work or item which was not measured.

#### **1.06 SUPPLEMENTAL WORK ALLOWANCE**

- A. Supplemental Work Allowance (SWA's) shall be utilized to incorporate cost changes for any additional authorized work into the scope of work up to the amount budgeted in the BID FORM. Contract change orders shall be enforced for contract changes over and above the amount budgeted as SWA. SWA's shall authorize the Contractor to perform additions to work, but the Contractor shall perform no work until written authorization has been delivered to the Contractor by the Engineer or Owner. Contractor should not expect that any SWA's will be issued; SWA's shall be issued at the discretion of the Owner only.

The value of any work covered by a SWA shall be determined in one of the following ways:

1. Where the work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the item involved (subject to the provisions of General Conditions, Article 11, paragraph 11.3 inclusive).
2. By mutual acceptance of a lump sum by Contractor and the Owner.
3. On the basis of the cost of the work plus a Contractor's Fee for overhead and profit. This basis shall be as established for Change Orders in General Conditions.

## **PART 2 – PRODUCTS**

### **2.01 STORED MATERIALS**

- A. Partial payment shall be made for approved materials stored at the project site, provided invoices for said materials are furnished in accordance with payment request submittal and shop drawings for said materials have been approved. 10% retainage will be held on stored materials.

## **PART 3 – EXECUTION**

### **3.01 RELATED DOCUMENTS**

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

### **3.02 SUMMARY**

- A. This Section includes requirements for preparing and submitting the Schedule of Values as referenced in the General Conditions. The Schedule of Values will be built upon a breakdown of the Work using specification sections and milestones. The Work also includes the preparing and submitting of updated copies of the Schedule of Values if the Schedule of Values is affected by change orders.
  - 1. A Schedule of Stored Material is a detailed cost breakdown for permanent materials that will be temporarily stored prior to their being installed and for which the Contractor seeks partial payments. The Schedule of Stored Material will be incorporated as a part of the Schedule of Values.
  - 2. Within fourteen (14) calendar days of issuance of the Notice to Proceed, the Contractor shall submit the Schedule of Values including the Schedule of Stored Material if applicable. The Schedule of Values and Schedule of Stored Material used to prepare the work/cost breakdown for the Schedule of Values will be used for the Contractor's billings.
  - 3. Any contract allowances shall be included in the Schedule of Values. Expenditure of allowances shall be done through the use of the Allowance Authorization form. Use of this form does not increase or decrease the contract value.
- B. Related Sections:
  - 1. Section 01300 "Submittals".

### **3.03 DEFINITIONS**

- A. Allowance: A monetary amount specified and included in the construction contract for a certain item of work whose details are not yet determined at the time of contracting.

### **3.04 SUBMITTAL**

- A. The Schedule of Values shall be submitted in a format approved by the Engineer.
- B. The Schedule of Values shall identify each item of work. Work items in the Schedule of Values shall represent all work and shall be referenced with the Technical Specifications section numbers, specification subparagraph, specification section title and the bid item number used for the Schedule of Prices and Quantities when applicable. The Schedule of Values shall address the subcontractor, fabricator or supplier furnishing the materials and or labor for each work item.
- C. Upon request by the City, the Contractor shall support values given with the data which will substantiate the correctness of the values.
- D. The Schedule of Values will be utilized only as a basis for review of the Contractor's application for progress payment on Lump Sum Bids.

### **3.05 REVIEW AND RESUBMITTAL**

- 1. If review by the City indicates that changes to the Schedule of Values are required, the Contractor shall revise and resubmit the Schedule of Values.

### **3.06 PRODUCTS (Not Used)**

### **3.07 PREPARING SCHEDULE OF VALUES**

- 1. Breakdown of the items used in the Schedule of Values shall include costs as follows:
  - 1. Delivered cost of product with applicable taxes paid.
  - 2. Total installation cost with overhead and profit.
  - 3. Breakdown costs of each lump sum item with a list of products and major operations for which the Contractor seeks to receive progress payments to recover his costs for that bid item.
  - 4. Each unit price item as listed in the bid Schedule of Prices and Quantities shall list products and major operations for which the Contractor seeks to receive progress payments for that bid item.

### **3.08 PREPARING SCHEDULE OF VALUES OF STORED MATERIAL**

1. The Contractor shall submit with the Schedule of Values an indication of whether products will be stored on or off the worksite. The Schedule of Stored Material shall show quantities and types of products that will be stored.
2. Material allowances consist of only the net cost of the product, the cost of delivery and unloading at the storage site, the cost of applicable sales taxes and all discounts.
3. In no case will the cost paid for a permanent material be greater than ninety percent (90%) of the contract price for the work in which they are included.

### **3.09 PAYMENT FOR STORED MATERIALS**

1. Only materials that are described in the specifications and the drawings will be considered permanent materials. Permanent materials are materials that will be left in the work after the contract is completed.
2. Nothing in these specifications shall be interpreted as requiring the City to pay for stored materials. The Project Manager shall decide on a case-by-case basis whether stored materials shall be paid for. No payment will be made for stored materials which have not been submitted and accepted.
3. The Contractor must, at all times, store permanent materials in accordance with manufacturer's recommendations. Any material not properly stored will not be paid for. Amounts will be deducted from payments for any stored permanent material previously paid for and subsequently found to be improperly stored or not present, based upon a physical inventory of stored permanent material.
4. Only the neat line quantity of material needed for the finished product may be paid for.
5. All requests for stored permanent material payment must be accompanied by paid invoices clearly showing the quantity of permanent material, the type of permanent material and discounts or rebates and the net amount paid to the supplier along with a certificate stating that the permanent material is free of any liens or judgments preventing its use by the City.
6. All permanent material stored off site, for which payment is being requested must be insured and stored in bonded, insured warehouses.
7. Any permanent material on which payment is requested must be in such a form that it cannot be used on work other than this contract, or stored in a manner acceptable to the Project Manager to ensure that the permanent material cannot be used on work other than this contract.

### **3.10 ALLOWANCE AUTHORIZATION AND PAYMENT**

1. Contractor shall request written approval for expenditure of any contract allowances PRIOR TO performing the Work involved. List work to be performed and estimated cost in the requesting correspondence.
2. Original copies of all invoices and receipts must be submitted with the Allowance Authorization as part of the request for payment.
3. Using the format provided by the City, the Contractor's request for payment of all contract allowances shall be included in the Schedule of Values.

### **3.11 MEASUREMENT AND PAYMENT**

#### **A. MEASUREMENT**

1. No separate measurement shall be made for work under this Section.

#### **B. PAYMENT**

1. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

### **3.12 BELL CREEK – PORTABLE BELT PRESS PAD AND PIPING**

Measurement and Payment for the Portable Belt Press Pad and Piping at Bell Creek shall include, but is not limited to, excavation, structural fill, concrete work, valves, piping, electrical connections, and soil bearing/concrete testing to construct in-place location for the portable belt press to receive sludge for processing and send filtrate back to the head of the plant.

Measurement for the Portable Belt Press Pad and Piping shall be on a percentage basis of the lump sum price given in the BID FORM. Payment shall be issued based on percent complete through the final day of the payment application period as estimated by the Contractor and approved by the Engineer.

### **3.13 SUPPLEMENTAL WORK ALLOWANCE**

Payment for items ordered by the City and/or Engineer through the Supplemental Work Allowance shall be paid as a percentage of the Lump Sum Allowance equal to the value of work approved and completed through the final day of the payment application period. All Supplemental Work shall be authorized in writing prior to performance of the work.

**END OF SECTION**

**SECTION 01030  
SPECIAL PROJECT PROVISIONS**

**PART 1 – GENERAL**

**1.01 SUBSTANTIAL COMPLETION**

- A. For this Project, Substantial Completion will not be certified until concrete structures have been constructed and tested, RAS pumping equipment is installed and operational, and the clarifier and bell press are completely operational with pumps, piping, valves, etc. installed and tested. In addition, all disturbed areas must be sufficiently stabilized and acceptable record drawings must be provided to the Engineer.

**1.02 QUALIFICATIONS/QUALITY CONTROL**

- A. All equipment furnished shall consist of standard equipment of proven ability, modified as required to meet these Contract Documents.
- B. All suppliers and installers shall be fully experienced, reputable, qualified and regularly engaged in the manufacturing of the equipment to be furnished.
- C. All equipment shall be designed, constructed and installed in accordance with best practices and methods and shall operate satisfactorily as determined by the Engineer when installed as shown on the Drawings and/or specified.
- D. The Contractor shall have the sole responsibility for proper functioning of the equipment.

**1.03 SUBMITTALS**

- A. Reference is made to Section 01300 and the submittal data required herein under various paragraphs.

**1.04 USE OF EXISTING PREMISES**

The Contractors work force shall not use any of the Owner's existing facilities including rest rooms, break rooms, vending machines and/or other facilities unless permission is given by the owner. The Contractor shall provide all such facilities for the use of his personnel.

Protect all existing roads from damage by construction equipment and activity. All existing roads shall remain open and usable by the public at all times. Any damage to



existing roads shall be repaired immediately to a condition equal to or better than the original condition at the Contractor's expense.

#### **1.05 PROVISIONS FOR CONTROL OF EROSION**

- A. Sufficient precautions as outlined in Section 02370 shall be taken during construction to minimize the run-off of polluting substances such as silt, clay, fuels, oils, bitumens, calcium chloride, or other polluting materials harmful to humans, fish, or other life, into the supplies and surface waters of the State. Control measures must be adequate to assure that turbidity in the receiving water will not be increased more than 10 nephelometric turbidity units (NTU), or as otherwise required by the State or other controlling body, in water used for public water supply or fish unless limits have been established for the particular water. In surface water used for other purposes, the turbidity must not exceed 25 NTU unless otherwise permitted. Special precautions shall be taken in the use of construction equipment to prevent operations which promote erosion.

#### **1.06 PROVISIONS FOR THE CONTROL OF DUST**

- A. Sufficient precautions as outlined in Section 01560 shall be taken during construction to minimize the amount of dust created. Wetting down the site may be required or as directed by the Engineer to prevent dust as a result of vehicular traffic.

#### **1.07 WATER SOURCE**

- A. For the supply of domestic water during construction and for filling and testing all pipeline, concrete structures, performing all draw down testing, and providing all other specified testing for pipe and structures requiring the use of water, the contractor shall utilize an OWNER supplied meter assembly and pay for all water consumed according to the OWNER'S existing water rate structure. The contractor shall be responsible for installing the meter and furnishing and installing a backflow prevention device after the meter.

#### **1.08 CONNECTIONS TO EXISTING SYSTEMS**

- A. The Contractor shall perform all work necessary to locate, excavate and prepare for connections to existing sanitary sewer systems as shown on the Drawings or where directed by the Owner. The cost for this work and for the actual connections to the existing gravity or pressure pipes shall be included in the bid for the project and shall not result in any additional cost to the Owner. Said connections shall be made only after approval by the Engineer.

## **1.09 WARRANTIES**

- A. All work provided under these Specifications shall be warranted by the Contractor and the equipment manufacturers for a period of one (1) year. Warranty period shall commence on the date of Owner acceptance and beneficiary use.
- B. The equipment shall be warranted to be free from defects in workmanship, design and materials. If any part of the equipment should fail during the warranty period it shall be replaced in the machine(s) and the unit(s) restored to service at no expense to the Owner.
- C. The manufacturer's warranty period shall run concurrently with the Contractor's warranty or guarantee period. No exception to this provision shall be allotted. The Contractor shall be responsible for obtaining equipment warranties from each of the respective suppliers or manufacturers.
- D. In the event that the manufacturer is unwilling to provide a one-year warranty commencing at the time of Owner acceptance, the Contractor shall obtain from the manufacturer a two (2) year warranty starting at the time of equipment delivery to the job site. This two-year warranty shall not relieve the Contractor of the one-year warranty starting at the time of Owner acceptance of the equipment.

## **1.11 SITE RESTORATION**

- A. The Contractor shall remove all excess material and shall clean up the site as construction progresses. All damage, as a result of work under this Contract, done to existing structures, pavement, driveways, fences, paved areas, curbs and gutters, sidewalks, shrubbery, grass, trees, utility poles, utility pipelines, conduits, drains, catch basins, flagstones, rocked areas, graveled areas or otherwise stabilized areas or driveways and including all obstructions not specifically named herein, shall be repaired.

## **1.12 SLEEVES AND OPENINGS**

- A. The General Contractor shall provide all opening, channels, chases, etc., and install anchor bolts and other items to be imbedded in concrete, as required to complete the Work under this Contract, together with those required by subcontractors, and shall do all cutting and patching, excepting cutting and patching of materials of a specified trade and as stated otherwise in the following paragraph except for Electrical Work. The Electrical contractor shall provide all openings necessary for his work.

- B. The General Contractor shall coordinate with the Electrical Contractor and all subcontractors to provide all sleeves, inserts, hangers, anchor bolts, etc. of the proper size and material for the execution of the Work. The General Contractor shall be responsible for any corrective cutting and refinishing required to make the necessary openings, chases, etc. In no case shall beams, lintels, or other structural members be cut without the written approval of the Engineer.

### **1.13 UTILITY CROSSINGS**

- A. It is intended that wherever existing utilities such as water, chemical, electrical or other service lines must be crossed, deflection of the pipe within recommended limits and cover shall be used to satisfactorily clear the obstruction unless otherwise indicated on the Drawings. However, when in the opinion of the Engineer this procedure is not feasible he may direct the use of fittings for a utility crossing as detailed on the Drawings.

### **1.14 PROVISIONS FOR TRAFFIC CONTROL**

- A. The Contractor shall be responsible for the proper location, installation, and arrangement of all traffic control devices. All traffic control devices used shall conform to GDOT MUTCD. The Contractor shall take all practical precautions to maintain traffic flow and reduce closure time to the shortest duration possible. If trenches are to remain open overnight, Contractor is to provide heavy-duty cover plates to allow vehicle access. Where flaggers are required, they are to be adequately trained and qualified for the job. In all actions, provide for safety of workers and the general public.

## **PART 2 – PRODUCTS**

### **2.01 MATERIAL AND EQUIPMENT – GENERAL**

- A. These Specifications call attention to certain features, but do not purport to cover all details of construction of the units. However, the Contractor shall furnish and install the mechanisms and/or systems complete in all details and ready for operation when external connections are made. Where components Standard with the manufacturer are not specifically mentioned, such components shall be provided and incorporated in the work as if they had been completely described or detailed, at no additional expense to the Owner.
- B. All steel members used in the fabrication of the equipment shall conform to the requirements of "Specifications for Structural Steel", ASTM A36.
- C. Design and fabrication of structural steel members shall be in accordance with the latest edition of AISC "Specifications for the Design, Fabrication, and Erection

of Structural Steel for Buildings". Zinc Coating (hot dip) for Steel Shapes, Bars, Plates and Strip shall be in accordance with the latest edition of ASTM A123. Zinc Coating (hot dip) for Iron and Steel Hardware shall be in accordance with the latest edition of ASTM A153. All welding shall conform to the latest standards of the American Welding Society.

- D. All parts shall be amply proportioned for all stresses which may occur during fabrication, erection, and operation. All parts of the same size and type shall be identical.

## **2.02 LUBRICANTS AND FUEL**

- A. The Contractor shall provide all mechanical equipment with a sufficient supply of correct lubricants and fuel for starting, testing, and initial 10-day operation period. All lubricants and fuel shall be of types recommended by the applicable equipment manufacturer. The Contractor, subject to the approval of the equipment manufacturer's, shall limit lubricants to the least number or types required for normal maintenance of all equipment.

## **2.03 LIFTING LUGS**

- A. Lifting lugs or lifting eye bolts shall be provided for all equipment or any component weighing 50 pounds or more, for setting of units or future removal. They shall be galvanized or zinc plated steel.

## **2.04 PROTECTION AGAINST ELECTROLYSIS**

- A. Where dissimilar metals are used in conjunction with each other, suitable insulation as acceptable to the Engineer shall be provided between adjoining surfaces so as to eliminate direct contact and any resultant electrolysis. The insulation shall be bituminous impregnated felt, heavy bituminous coatings, nonmetallic separators or washers, or other acceptable materials.

## **2.05 PROVISION FOR TEMPORARY PRESSURE GAUGE CONNECTION**

- A. Where pressure gauges are not shown on the suction and discharge piping of pumps and compressors, the Contractor shall make provision for the temporary connection of pressure gauges by providing a 1/2-inch connection and tee handle isolation ball valves or corporation stops.

## **2.06 BOLTS, NUTS AND WASHERS FOR EQUIPMENT**

- A. Bolts for the equipment assembly shall be refined bar iron, except that where the equipment body is stainless steel, aluminum or a bronze alloy, the bolts shall

be of the same corrosion resistant material. Hexagonal nuts shall be of the same metal as the bolts.

All threads shall be clean cut, coarse threads, Class II fit, and shall conform to U.S. Standard BL 1-1060 for United Screw Threads.

- B. Bolts, nuts, and washers shall be type 316 stainless steel or galvanized or zinc-coated steel, (after being threaded), by the hot-dip process in conformity with the ASTM A153.

## **PART 3 – EXECUTION**

### **3.01 FACTORY INSPECTION, TESTING AND CORRECTION OF DEFICIENCIES**

- A. The Engineer shall have the right to inspect and test all materials or equipment prior to shipment from the point of manufacture.
- B. Where a factory test is required, no materials or equipment shall be shipped until the factory test (and shop drawings) are acceptable to the Engineer (See Paragraph 3.03.G).
- C. Additional information on factory inspection and testing of pipes is included under the respective pipe Sections.
- D. Unless otherwise noted the manufacturer will furnish all necessary labor, equipment, tools, and incidentals required for proper factory testing of equipment and correction of deficiencies, at no change in Contract Price.

### **3.02 SHOP AND FIELD PAINTING/COATING**

- A. Unless otherwise specified herein or elsewhere in these Specifications, all piping, fittings, & valves installed above ground or in wetwell shall be shop primed and provided with finish paint per Specification 09900. Where surfaces have been shop painted but have been damaged during delivery to site, storage, and/or assembly, or where the shop coats have deteriorated, these surfaces shall be properly cleaned and retouched or repainted with matching paint. All submersible pumps shall be shop painted in accordance with the manufacturer's painting specifications.
- B. Galvanizing for other than bolts as noted in Part 2, shall conform to Division 5 and Section 09900. Galvanized steel or aluminum equipment and appurtenances shall not be shop primed or shop painted.

### **3.03 SHIPPING, HANDLING, DELIVERY AND STORAGE**

- A. All parts and equipment shall be properly crated, packaged, sealed and/or otherwise protected so that no damage or deterioration will occur during shipping, delivery, handling, or while stored for a prolonged period on the Site.
- B. Heavy items shall be packed for fork lift truck handling and/or with hook or sling for crane handling. All items subject to water damage shall be packed or provided with waterproof covers suitable for outdoor storage. All packing shall be strong, durable, and rugged and shall be designed to prevent uneven forces on the items. Fragile items shall be suitably protected with special padding and shall be so marked.
- C. Each package shall be delivered with a complete packing list attached. Packing lists will make reference to the respective package number and shall completely itemize, by description and quantity, the contents of each package.
- D. The finished surfaces of all exposed openings shall be protected by wooden blank flanges, strongly built and securely bolted thereto, or other protection acceptable to the Engineer. Finished iron or steel surfaces not otherwise coated shall be properly protected to prevent rust and corrosion.
- E. Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Engineer.
- F. The manufacturer's instructions and recommendations shall be followed for unloading, transporting, or otherwise handling units. Suitable slings or similar lifting devices shall be utilized to prevent strains.
- G. Items shall not be shipped until factory testing (where required) and shop drawings information is acceptable to the Engineer. The intent of this requirement is to reduce on-site storage time prior to installation and operation. Under no circumstances shall units be delivered to the Site more than one month prior to installation without written authorization from the Engineer.
- H. Site Storage
  - 1. All units having moving parts such as gears, electric motors, and instruments shall be stored in a temperature controlled building acceptable to the Engineer until such time as to be installed.
  - 2. All units shall be stored fully lubricated with oil, or grease, unless otherwise instructed by the Manufacturer.

3. Manufacturer's storage instructions shall be carefully studied by the Contractor and reviewed with the Engineer.
4. Attention is directed to the Contractor's need to manually rotate units' moving parts periodically per the manufacturers' recommendations prior to the Owner's final acceptance (including in storage).
5. Lubricants shall be changed upon completion of installation, and as frequently as required, or recommended by the Manufacturer, during the period between installation and acceptance. New lubricants shall be put in at the time of acceptance.
6. Prior to acceptance of any item, if so required by the Engineer, the Contractor, at his own expense, shall have the Manufacturer inspect and certify that the unit's condition has not been detrimentally affected by any long storage period. Such certifications by the Manufacturer shall be deemed to mean that the unit is judged by the Manufacturer to be in a condition equal to that of unit that has been shipped, installed, tested, and accepted in a minimum time period. As such, the Manufacturer will guarantee the unit equally in both instances. If such a certification is not given when requested, the unit shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

### **3.04 INSTALLATION OF EQUIPMENT**

- A. Unless otherwise noted the Contractor will furnish and pay for and coordinate all necessary labor, equipment, tools, water, and power required to install, service, and make adjustments necessary for the proper installation and shall perform the installation.
- B. Ensure proper installation of all items in accordance with manufacturer's recommendations and instructions in the locations(s) shown to produce a complete workable system; particularly to ensure the correct alignment of drivers and pumps, etc. All units shall be aligned on their foundations by qualified millwrights after their sole plates have been shimmed level at the anchor bolts. Set all anchor bolts in place and tighten all nuts against the shims. After the foundation alignments have been considered acceptable to the Engineer, securely bolt in place the bedplates or wing feet of the equipment. Make further and final alignment checks and any adjustments before grouting in the sole plates. Under no circumstances will "pipe springing" be allowed.
- C. Wedges, Shims, filling pieces, keys, packing, grout, or other materials necessary to align, level, and secure equipment in place shall be furnished and install by the

Contractor. All parts intended to be plumb, level or perpendicular must be exactly so. Any grinding required to bring parts to proper bearing shall be done at the expense of the Contractor.

- D. Normal installation procedures for all items (including Owner furnished items if any) such as: making connections, adjusting packing, aligning, connection of bases, coupling, wiring, piping, shimming, assembly of normally shipped loose components, use of drift pins, deburring, identification of wires at terminals, following manufacturer's instructions and similar items of standard installation practice shall be performed by the Contractor whether specifically mentioned herein or not. References are made to: AISC "Code of Standard Practices" Section 5-180; "Standards of the Hydraulic Institute"; American Welding Society Standards, applicable government codes.
- D. Installation shall include furnishing the grease and lubrication for testing.
- E. The contractor will be responsible for provision and placement of locks on all lockable access hatches on the Project site. Locks should all be keyed to the same key. Locks should be heavy duty, laminated and rust proof.

### **3.05 FIELD TESTING AND CORRECTION OF DEFICIENCIES**

- A. Field testing shall not be conducted until the installation is certified (in writing) as acceptable by the Manufacturer. Field testing may not be required for all items. Testing shall be conducted in accordance with the individual Specifications.
- B. The Contractor shall furnish to the Owner and Engineer, at least 10 days prior to scheduled field testing, a list of those special items needed to test the equipment and for use during normal operation and maintenance.
- B. Unless otherwise noted the Contractor will furnish and pay for all necessary labor, equipment, tools, incidentals, required for proper testing and initial operation. Unless otherwise noted the Contractor will operate the equipment and conduct the field test(s).
- D. Field testing shall be as set out in the individual Specifications and herein for vibration and noise, and shall also include the lubrication system and its components. Field testing shall be witnessed by, and acceptable to, the Manufacturer's representative and the Engineer, unless otherwise noted.
- E. All defects recorded during the above field tests and all defects and failures occurring within the Correction Period shall be corrected by and at the expense



of the Contractor, in accordance with Article 13 of the General Conditions.

- F. In the event the items or system performance does not meet the requirements of the Specifications, the necessary corrective measures shall be made at the expense of and by the Contractor, unless otherwise specifically noted, and the item or system retested. If the items or system remains unable to meet the design requirements to the satisfaction of the Engineer, they shall be removed and replaced with satisfactory items or system(s) at the Contractor's expense, unless otherwise specifically noted.
- G. The above testing and/or correction procedures shall continue until the items are acceptable to the Engineer.

**END OF SECTION**

**SECTION 01050  
SURVEYING AND FIELD ENGINEERING**

**PART 1 – GENERAL**

**1.01 SCOPE OF WORK**

- A. Work covered in this Section includes the surveying and field engineering required to complete the project and meet the provisions of this document.

**1.02 QUALITY CONTROL**

- A. Contractor will employ a Land Surveyor registered in the State of Georgia and acceptable to the Owner/Engineer.

**1.03 SUBMITTALS**

- A. Submit name, address, telephone number and registration number of surveyor prior to beginning work.
- B. Upon request, submit documentation verifying accuracy of survey work. Documentation may include, but is not limited to, original field notes, worksheets, cutsheets, etc.

**PART 2 – PRODUCTS – NOT USED**

**PART 3 – EXECUTION**

**3.01 SURVEY REQUIREMENTS**

- A. Construction Staking – The Contractor shall provide all construction staking using recognized surveying and engineering practices. The surveyor will locate lines, grades and locations called for in the contract drawings.
- B. “As Built Drawings” – Contractor shall maintain record drawings for the project. The final “as constructed” drawings will show the horizontal location of all water mains, force mains, gravity sewers, services, service lines, valves, hydrants, bends, etc. All horizontal locations shall be referenced to the established coordinate systems or to existing streets, roads or major structures. The Engineer will provide two sets of prints for the Contractor’s use in completing this work.

**END OF SECTION**

**SECTION 01200  
PROJECT MEETINGS**

**PART 1 – GENERAL**

**1.01 GENERAL**

- A. Project meetings will be held on site as often as deemed necessary by the Engineer or his representative throughout the construction period. Contractor's representatives shall attend.

The purpose of the meetings will be to discuss schedule, progress, coordination, submittals, and job-related problems and to approve Contractor's Pay Estimate.

**PART 2 – PRODUCTS: - NOT USED**

**PART 3 – EXECUTION: - NOT USED**

**END OF SECTION**

## **SECTION 01300 SUBMITTALS**

### **PART 1 – GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Submittal Procedures
- B. Construction Progress Schedules
- C. Product Data
- D. Shop Drawings
- E. Samples
- F. Design Data
- G. Test Reports
- H. Certificates
- I. Manufacturer's Instructions
- J. Manufacturer's Field Reports
- K. Erection Drawings

#### **1.02 RELATED SECTIONS**

- A. Section 01701 – Contract Closeout Procedures– Contract warranties, manufacturers' certificates, and closeout submittals.

#### **1.03 SUBMITTAL PROCEDURES**

- A. Deliver submittals to Engineer in acceptable form, either electronic copy or three (3) hard copies.
- B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix. Resubmit as specified for initial submittal. Indicate on revised drawings all changes which have been made including those requested by the Engineer.
- C. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.

- D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction work and coordination of information is in accordance with the requirements of the work and Contract Documents. Submittal without the Contractor's stamp will be returned to Contractor without Engineer's review.
- E. Make all submittals far enough in advance of scheduled dates for installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery. In scheduling, allow sufficient time for the Engineer's review following the receipt of the submittal. Coordinate submission of related items. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed work.
- G. Provide space for Contractor and Architect/Engineer review stamps.
- H. When revised for resubmission, identify all changes made since previous submission.
- I. Distribute copies of reviewed submittals to concerned parties. Instruct recipients to promptly report any inability to comply with requirements.

#### **1.04 CONSTRUCTION PROGRESS SCHEDULES**

- A. Submit initial schedule in triplicate within 15 days after date established in Notice to Proceed.
- B. After reviewed by the Engineer, revise and resubmit as required.
- C. Submit revised schedules with each Application for Payment, identifying changes since previous version.
- D. Submit a computer generated or horizontal bar chart with separate line for each major portion of work or operation, identifying first workday of each week.
- E. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
- F. Indicate estimated percentage of completion for each item of work at each submission.
- G. Indicate submittal dates required for shop drawings, product data, samples, and

product delivery dates, including those furnished by Owner and required by Allowances.

## **1.05 PRODUCT DATA**

- A. Product Data for Review:
  - 1. Submitted to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
  - 2. After review, provide copies and distribute in accordance with Submittal Procedures article above.
- B. Submit the number of copies which the Contractor requires, plus one (1) copy which will be retained by the Engineer or electronic copy.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. After review, distribute in accordance with the Submittal Procedures article above.

## **1.06 SHOP DRAWINGS**

- A. Contractor shall submit a minimum of three (3) hard copies OR an electronic copy of each shop drawing to the Engineer for review.
- B. Submitted to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents. Review of shop drawings by Engineer shall not relieve Contractor of his responsibility for the accuracy of the shop drawings for the furnishing of all materials and equipment required by the contract even though such items may not be indicated on the shop drawings reviewed by Engineer.
- C. Shop drawings shall include applicable technical information, drawings, diagrams, performance curves, schedules, templates, calculations, instructions, measurements and similar information as applicable to the specific item for which the shop drawing is prepared.
- D. Do not use Engineer's Drawings for shop or erection purposes.
- E. Each shop drawing copy shall bear a Contractor's stamp showing they have been

checked. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor without review.

- F. No review will be given to partial submittals of shop drawings for items which interconnect and/or are interdependent. It is the Contractor's responsibility to assemble the shop drawings for all such interconnecting and/or interdependent items, check them and then make one submittal to the Engineer.
- G. Schedule of Submittals – Within 30 days of Contract award and prior to any shop drawing submittal, the Contractor shall submit a schedule showing the estimated submittal date and the desired approval date for each shop drawing anticipated. Time lost due to unacceptable submittals shall be the Contractor's responsibility.

#### **1.07 SAMPLES**

- A. Samples for Review -
  - 1. Submitted to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
  - 2. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above.
- B. Samples for Information –
  - 1. Submitted for the Engineer's knowledge as contract administrator or for the Owner.
- C. Include identification on each sample, with full Product information.
- D. Submit the number of samples specified in individual specification sections; one of which will be retained by Engineer.
- E. Review samples which may be used in the Work are indicated in individual specification sections.
- F. Samples will not be used for testing purposes unless specifically stated in the specification section.

#### **1.08 DESIGN DATA**

- A. Submit for the Engineer's knowledge as contract administrator or for the Owner.
- B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

#### **1.09 TEST REPORTS**

- A. Submit for the Engineer's knowledge as contract administrator or for the owner.
- B. Submit test reports for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

#### **1.10 CERTIFICATES**

- A. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the Contractor to Engineer, in quantities specified for product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

#### **1.11 MANUFACTURER'S INSTRUCTION**

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Engineer for delivery to Owner in quantities specified for Product Data.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

#### **1.12 MANUFACTURER'S FIELD REPORTS**

- A. Submit reports for the Engineer's benefit as contract administrator or for the Owner.
- B. Submit report in duplicate within 15 days of observation to Engineer for information.
- C. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

#### **1.13 ERECTION DRAWINGS**

- A. Submit drawings for the Engineer's benefit as contract administrator or for the Owner.



- B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
- C. Data indicating inappropriate or unacceptable work may be subject to action by the Engineer or Owner.

#### **1.14 REVIEWED SHOP DRAWINGS**

- A. Engineer Review –
  - 3. Acceptable submittals will be marked “Approved.” A minimum of one (1) copy will be retained by the Engineer for Engineer’s and the Owner’s use and the remaining copies will be returned to the Contractor.
  - 4. Submittals requiring minor corrections before the product is acceptable will be marked “Furnish as Corrected.” The Contractor may order, fabricate and shop the items included in the submittals provided the indicated corrections are made.
  - 5. Submittals marked “Revise and Submit” must be revised to reflect required changes and the initial review procedure repeated.
  - 6. The “Rejected” notation is used to indicate products which are not acceptable. Upon return of a submittal so marked, the Contractor shall repeat the initial review procedure utilizing acceptable products.
  - 7. Only two copies of items marked “Revise and Submit” and “Rejected” will be reviewed and marked. One copy will be retained by the Engineer and the other copy with all remaining unmarked copies will be returned to the Contractor for resubmittal.
- B. No work or products shall be installed without a drawing or submittal bearing the “Approved” or “Furnish as Corrected” notation. The Contractor shall maintain at the job site a complete set of shop drawings bearing the Engineer’s stamp.
- C. Substitutions – In the event the Contractor obtains the Engineer’s approval for the use of products other than those which are listed first in the Contract Documents, the Contractor shall, at the Contractor’s own expense and using methods approved by the Engineer, make any changes to structures, piping and electrical work that may be necessary to accommodate these products.
- D. Use of the “Approved” or “Furnish as Corrected” notation on shop drawings or other submittals is general and shall not relieve the Contractor of the responsibility of furnishing products of the proper dimension, size, quality, quantity, materials and all performance characteristics, to efficiently perform the requirements and intent of the Contract Documents. The Engineer’s review shall

not relieve the Contractor of the responsibility of errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents.

**PART 2 – PRODUCTS: - NOT USED**

**PART 3 – EXECUTION: - NOT USED**

**END OF SECTION**

**SECTION 01410  
TESTING SERVICES**

**PART 1 – GENERAL**

**1.01 SECTION INCLUDES**

- A. Selection and Payment
- B. Contractor Submittals
- C. Testing Agency Responsibilities
- D. Testing Agency Reports
- E. Limits on Testing Authority
- F. Contractor Responsibilities
- G. Schedule of Tests

**1.02 RELATED SECTIONS**

- A. Testing and approvals required by public authorities.
- B. Section 01300 – Submittals – Manufacturer’s Certificates.
- C. Section 01701 – Contract Closeout – Project Record Documents.

**1.03 REFERENCES**

- A. ASTM C 802-87 – Practice for Conducting an Interlaboratory Test Program to Determine the Precision of Test Methods for Construction.
- B. ASTM C 1077-92 – Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
- C. ASTM C 1093-88 – Practice for Accreditation of Testing Agencies for Unit Masonry.
- D. ASTM D 290-85 – recommended Practice for Bituminous Mixing Plant Inspection.
- E. ASTM D 3740-92 – Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- F. ASTM D 4561-86 – Practice for Quality Control Systems for an Inspection and Testing Agency for Bituminous Paving Materials.

- G. ASTM E 329-93 – Practice for Use in the Evaluation of Inspection and Testing Agencies as Used in Construction.
- H. ASTM E 543-93 – Practice for Determining the Qualification of Nondestructive Testing Agencies.
- I. ASTM E 548-93 – Practice for Preparation of Criteria for Use in the Evaluation of Testing Laboratories and Inspection Bodies.
- J. ASTM E 699-79 (Reapproved 1991) – Practice for Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee E6.

#### **1.04 SELECTION AND PAYMENT**

- A. Contractor shall select, and Owner shall approved, a Testing Firm for Contractor to use and employ.
- B. Contractor shall be responsible for contracting the services of the approved independent testing agency or laboratory to perform specified testing. All coordination of testing and payment for services shall be the responsibility of the Contractor.
- C. Employment of testing agency or laboratory in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.

#### **1.05 QUALITY ASSURANCE**

- A. Comply with requirements of practices listed in paragraph 1.3.
- B. Laboratory – Authorized to operate in State in which Project is located.
- C. Laboratory Staff – Maintain a full time registered Engineer on staff to review services.
- D. Testing Equipment – Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

#### **1.06 CONTRACTOR SUBMITTALS**

- A. Prior to start of Work, submit list of preferred testing laboratory name, address, and telephone number, and names of full time registered Engineer and

responsible officer. Owner may select a firm from list or may request different firm for use in testing.

- B. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

#### **1.07 TESTING AGENCY RESPONSIBILITIES**

- A. Test samples of mixes submitted by Contractor.
- B. Provide qualified personnel at site. Cooperate with Engineer and Contractor in performance of services.
- C. Perform specified sampling and testing of Products in accordance with specified standards.
- D. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- E. Promptly notify Engineer and Contractor of observed irregularities or non-conformance of Work or Products.
- F. Perform additional tests required by Engineer.
- G. Attend Preconstruction meetings and progress meetings.

#### **1.08 TESTING AGENCY REPORTS**

- A. After each test, promptly submit three (3) copies of report to Engineer and to Contractor.
- B. Include –
  - 1. Date issued
  - 2. Project title and number
  - 3. Name of inspector
  - 4. Date and time of sampling or inspection
  - 5. Identification of product and specifications section
  - 6. Location in the Project

7. Type of inspection or test
  8. Date of test
  9. Results of tests
  10. Conformance with Contract Documents
- C. When requested by Engineer, provide interpretation of test results.

#### **1.09 LIMITS ON TESTING AUTHORITY**

- A. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Agency or laboratory may not approve or accept any portion of the Work.
- C. Agency or laboratory may not assume any duties of Contractor.
- D. Agency or laboratory has no authority to stop the Work.

#### **1.10 CONTRACTOR RESPONSIBILITIES**

- A. Deliver to agency or laboratory at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.
- B. Cooperate with laboratory personnel, and provide access to the Work.
- C. Provide incidental labor and facilities –
  1. To provide access to work to be tested
  2. To obtain and handle samples at the site or at source of Products to be tested
  3. To facilitate tests
  4. To provide storage and curing of test samples
- D. Notify Engineer and laboratory 48 hours prior to expected time for operations requiring testing services.
- E. Employ services of an independent qualified testing laboratory.

#### **1.11 SCHEDULE OF TESTS**

Section	Test *	Frequency *	Date	Performed By	Notes
02300 – Earthwork					
	Compaction				
		Unpaved & Landscaped with no traffic	1 test per horizontal layer per 10,000 sf of fill area		
		Paved & Pond Levee	1 test per horizontal layer per 5,000 sf of area		
		Building Pad & structures	1 test per horizontal layer per 1,500 sf of fill area		
		Curb & Gutter	1 test per 300 lf		
		Proof Rolling	As necessary		
02510 – Water Distribution System					
	Hydrostatic & Leakage		1.5 times the working pressure (no less than 150 psi). Conducted for 2 hours with maintained pressure of 150 psi (200 psi on fire main)		
	Bacteriological Samples		2 taken 24 hours apart after disinfection		
	Compaction				
		Traffic Areas	1 per 100 lf or less for each 4 ft. of depth		
		Non-Traffic Areas	1 per 500 lf or less for each 4 ft. of depth		
	Fire Flow		1 per permit		
02530 – Wastewater Collection System					
	Start-up		Prior to acceptance of Pump Station		
	Drawdown		Prior to acceptance of Pump Station		
* Unless specified otherwise in individual Sections.					
	Certification		Completion		
	Warranty		Completion		
	Television Inspection of Sewers		As requested		
	Leakage		As necessary		
	Compaction				
		Traffic Areas	1 per 100 lf or less for each 4 ft. of depth		
		Non-Traffic Areas	1 per 500 lf or less for each 6 ft. of depth		
	Gravity – Air		[All lines]		
	Gravity Vacuum		All manholes		
	Hydrostatic – Force Main		100 psi for 2 hours		
	Deflection		10% of system		
02630 – Storm Drainage					
	Compaction				
		Traffic Areas	1 per 100 lf or less for each 4 ft. of		

Section	Test *		Frequency *	Date	Performed By	Notes
			depth			
		Non-Traffic Areas	1 per 500 lf or less for each 6 ft. of depth			
02720 – Aggregate Base Course						
	Base Density		1 test per 5,000 sf			
02740GA – Asphaltic Concrete Base Course						
	Asphalt Extraction & Gradation		1 test per each 250 tons placed			
	Marshall Stability		1 test per each 250 tons placed			
	Core		1 test for each 250 tons placed			
	Field Density		1 test per 5,000 sf			
02740GA – Asphaltic Concrete Binder/Surface Courses						
	Asphalt Extraction & Gradation		1 test for each 250 tons placed			
	Marshall Stability		1 test for each 250 tons placed			
	Core		1 test for each 250 tons placed			
	Field Density		1 test per 5,000 sf			
02750 – Portland Cement concrete Paving						
* Unless specified otherwise in individual Sections.						
	Mix Designs		1 per mix design			
	Compressive Strength		3 test cylinders for every 30 cubic yards or less of each mix design placed daily			
			1 cylinder broken at 7 days			
			2 cylinders broken at 28 days			
	Slump		1 test for each set of cylinders taken			
03300 – Cast-in-Place Concrete						
	Materials		As necessary			
	Mix Designs		1 per mix design			
	Strength		5 test cylinders for each 50 cy or less of each mix design placed daily (min. of 5 cylinders for each days pour of less than 50 cy)			
			1 cylinder tested at 7 days			
			1 cylinder tested at 14 days			
			2 cylinders tested at 28 days			
			1 cylinder tested at 56 days			
	Slump		1 test per each set of cylinders			
	Air Content		1 test per each set of cylinders			
	Temperature		1 test per each set of cylinders			

## PART 2 – PRODUCTS – Not Used

## PART 3 – EXECUTION

### 3.1.1 Payment



The Contractor shall make payment to Testing Firm for all work as described above. Contractor shall include the cost of testing in the lump sum price bid for the item to which it relates. Any additional testing required due to failed tests shall be made at the cost of the Contractor. Any other additional testing desired by the Owner or Engineer will be paid for separately under the allowance lump sum described in Technical Specification 01020.

**END OF SECTION**

**SECTION 01560**  
**ENVIRONMENTAL CONTROLS**

**PART 1 GENERAL**

**1.01 SCOPE OF WORK**

- A. Contractor shall furnish all material and labor for the installation and maintenance of the environmental control measurements throughout the project.

**1.02 SITE MAINTENANCE**

- A. The Contractor shall keep the work site clean and free from rubbish and debris. Materials and equipment shall be removed from the site when they are no longer necessary. Upon completion of the work and before final acceptance, the work site shall be cleared of equipment, unused materials, and rubbish to present a clean and neat appearance.

**1.03 TEMPORARY DAMS**

- A. Except in time of emergency, earth dams are not acceptable at catch basin openings, local depressions, or elsewhere. Temporary dams of sand bags, asphaltic concrete, or other acceptable material will be permitted when necessary to protect the work, provided their use does not create a hazard or nuisance to the public. Such dams shall be removed from the site as soon as they are no longer necessary.
- B. Dams shall not interfere with the existing storm drainage system.

**1.04 AIR POLLUTION CONTROL**

- A. The Contractor shall not discharge smoke, dust, and other contaminants into the atmosphere that violate the regulations of any legally constituted authority. The Contractor shall also abate dust nuisance by cleaning, sweeping, and sprinkling with water, or other means as necessary. The use of water, in amounts which result in mud on public streets, is not acceptable as a substitute for sweeping or other methods.

**1.05 NOISE CONTROL**

- A. Between 7:30 PM and 7:00 AM, noise from Contractor's operations shall not exceed limits established by applicable laws or regulations and in no event shall

exceed 86 dBA at a distance of 50 feet from the noise source.

#### **1.06 EROSION CONTROL**

- A. All points of concentrated runoff from rainfall shall be visually monitored to determine that no eroded material from the construction site is being deposited in the adjacent ditches, lakes and streams. Measures shall be taken to promptly eliminate such a deposition if occurring, including the installation of detention ponds.
- B. Comply with all applicable requirements of Section 02370 – Soil Erosion and Sediment Control of these Specifications.

**PART 2 PRODUCTS: - NOT USED**

**PART 3 EXECUTION: - NOT USED**

**END OF SECTION**

**SECTION 01701**  
**CONTRACT CLOSEOUT PROCEDURES**

**PART 1 – GENERAL**

**1.01 REQUIREMENTS INCLUDED**

- A. Administrative provisions for Substantial Completion and for final acceptance.

**1.02 RELATED REQUIREMENTS**

- A. Section 01300 – Submittal
- B. Section 01720 – Record Documents
- C. Section 01740 – Warranties and Bonds

**1.03 SUBSTANTIAL COMPLETION**

- A. When the Contractor considers the work substantially complete, he shall prepare a punch list of uncompleted items and send to the Engineer for review. At the same time, the Contractor shall request in writing that the Engineer schedules a pre-final inspection.
- B. The Engineer will review the punch list submitted by the Contractor and determine if the project is substantially complete.
- C. If the Engineer determines that the project is not substantially complete, he will notify the Contractor in writing which items need to be finished before the project can be considered substantially complete. The Contractor shall continue working to complete all punch list items and resubmit a revised punch list when he considers the work is substantially complete.
- D. When the Engineer determines that the work is substantially complete, he will schedule a pre-final inspection with the Owner, Contractor and Engineer. A final punch list will be prepared at this time.
- E. After all punch list items have been completed, the Contractor shall send a request in writing to the Engineer to schedule a final inspection. When all punch list items are complete, the Engineer will issue a certificate of substantial completion.

**1.04 FINAL COMPLETION**

- A. When the Contractor considers that all of the work is complete, he shall submit the following certificates:
  - 1. All work has been completed and inspected for compliance with the Contract Documents and all deficiencies listed with the certificate of substantial completion have been corrected.
  - 2. All equipment and systems have been tested, adjusted and are fully operational.
  - 3. Owner's personnel have been fully instructed in the operation of all equipment (include sign off for each system).
  - 4. Work is complete and ready for final inspection.
- B. Should Engineer's inspection find work incomplete, he will promptly notify Contractor in writing listing observed deficiencies.
- C. Contractor shall remedy deficiencies and send a request for another final inspection.
- D. When Engineer finds work is complete, he will process final pay request documents.

#### **1.05 CLOSEOUT SUBMITTALS**

- A. Evidence of Compliance with Requirements of Governing Authorities –
  - 1. Certificate of Occupancy as required by local codes.
  - 2. Certificates of Inspection approvals required for plumbing, mechanical and electrical systems as required by local codes if applicable.
- B. Project Record Documents OR "As-built Drawings"
- C. Warranties and Bonds – Under provisions of Section 01030.
- D. Keys and Keying Schedule.
- E. Evidence of Payment and Release of Liens – In accordance with Conditions of the Contract.
- F. Consent of Surety to Final Payment – Consent of Surety is to be sent by Surety directly to ESG Engineering to the attention of the Project Engineer.

#### **1.06 APPLICATION FOR FINAL PAYMENT**

- A. Prior to application for final payment, the Contractor shall give the Engineer a list of all additions or deletions not previously approved by change order.
- B. The Engineer will review this list and prepare a final closeout change order for the items that are justified by the terms of the contract or approved by field order.
- C. After approval of the final closeout change order the Contractor may submit his application for final payment.

**PART 2 – PRODUCTS: Not Used.**

**PART 3 – EXECUTION: Not Used.**

**END OF SECTION**

## **SECTION 01710 FINAL CLEAN-UP**

### **PART 1 – GENERAL**

#### **1.01 REQUIREMENTS INCLUDED**

- A. Final clean-up of site, roadway and buildings.

#### **1.02 DESCRIPTION**

- A. Execute clean-up prior to inspection for Substantial Completion of the Work.

#### **1.03 DISPOSAL REQUIREMENTS**

- A. Remove and dispose of waste materials, rubbish, debris and trash in compliance with provisions of governing laws, codes, ordinances and regulations.
  - 1. Do not burn or bury rubbish, trash, debris and waste materials on Project site.

### **PART 2 – PRODUCTS**

#### **2.01 CLEANING MATERIALS**

- A. Use materials which will not create hazards to health or property, and which will not damage surfaces.
- B. Use only materials and methods recommended by manufacturer of material being cleaned.

### **PART 3 – EXECUTION**

#### **3.01 PERIODIC CLEANING**

- A. On a regular and frequent basis during progress of work, perform cleaning necessary to keep Project site and adjacent properties free from unsightly and unsafe accumulation of scrap and waste materials, debris, rubbish and trash resulting from construction operations.
  - 1. Provide sufficient trash bins and containers for collection of scrap and waste material, debris, rubbish and trash.

2. Provide separate, closeable top metal containers for collection of oil and paint soaked rags; empty volatile substance cans and other waste products subject to spontaneous combustion.
  3. Designate approved eating areas and provide covered containers conforming to local health codes for collection of waste paper and leftover foodstuffs. Enforce usage of containers by workmen.
- B. Dispose of scrap and waste materials, debris, rubbish and trash by one of the following optional methods –
1. Provide services of company regularly engaged in refuse disposal operations, including usage of large metal dump-type trash containers.
  2. Use own forces and equipment for loading, hauling and disposal.
- C. Remove accumulations of scrap and waste materials as bins and containers are filled and not less than once per week.
1. Remove containers containing products subject to spontaneous combustion daily.
  2. Remove containers containing waste paper and leftover foodstuff daily.
  3. Legally dispose of all waste materials, rubbish, volatile materials and cleaning materials off Project site.
  4. Dispose of no materials in waterways.

### **3.02 DUST CONTROL**

- A. Site Work – When working on unpaved or disturbed paved streets, Contractor shall maintain a water truck on site for dust control. All dusty work sites in residential areas shall be watered at least twice per day and whenever directed by the Owner's representative.
- B. During application of finished surface materials, including painting and decorating, employ dust control methods during cleaning operations to prevent dust from contaminating wet and freshly coated surfaces.

### **3.03 FINAL CLEANING**

- A. Site Work
1. All piles of dirt and rocks are to be removed from the work areas.



2. All disturbed areas are to be grassed and mulched according to these specifications.
3. All construction debris is to be removed to an approved disposal site.
4. All streets are to be swept with a mechanical sweeper.

**B. Buildings**

1. All construction debris shall be removed from the building and disposed of at an approved disposal site.
2. Remove labels, tags, stickers and unauthorized identification markings from finished surfaces.
  - (a) Do not remove permanently affixed nameplates, instructions, markings, Underwriters Laboratories Labels and approval stickers, Factory Mutual approved stickers and other identifying markings required by federal, state and local codes, ordinances and regulations.
3. Remove temporary protective coatings, tapes and films from finished aluminum surfaces and ornamental metal surfaces, clean and polish aluminum and ornamental metal in compliance with manufacturer's instructions.
4. Sweep concrete floors not less than broom clean; vacuum where necessary to remove excessive dust; thoroughly clean other hard surfaced floors.
  - (a) Remove mortar droppings, joint compound, plaster and cementitious material droppings from floors prior to final cleaning.
  - (b) Concrete floors of process areas shall be rinsed with water and broomed and allowed to dry before final inspection.

**3.04 INSPECTION**

- A. Prior to occupancy by Owner of any designated portion of Work, conduct inspection in presence of Owner to verify work is properly clean and ready for acceptance by Owner.

**END OF SECTION**

## **SECTION 02310 STORM DRAINAGE**

### **PART 1 – GENERAL**

#### **1.01 SCOPE**

- A. This section describes all labor, material, and products necessary for the construction of a storm drainage collection system which may include but is not limited to the following: pipes, drainage inlets, manholes, headwalls, and other various drainage structures.

#### **1.02 REFERENCES**

- A. ASTM 3740-94a – Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- B. ASTM E 329-93b – Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
- C. ASTM C 76-94 – Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
- D. ASTM C 443-94 – Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
- E. AASHTO M 198-75 (1990) – Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets.
- F. ASTM B 745/B 745-93 – Corrugated Aluminum Pipe for Sewers and Drains.
- G. AASHTO M 196-90 – Corrugated Aluminum Pipe for Sewers and Drains
- H. ASTM D 1056-91 – Flexible Cellular Materials – Sponge or Expanded Rubber
- I. AASHTO M 252-90 – Corrugated Polyethylene Drainage Tubing
- J. AASHTO M 294-90 – Corrugated Polyethylene Pipe, 12 to 36-inch Diameter.
- K. ASTM D 3350-93 – Polyethylene Plastics Pipe and Fittings Materials.

- L. ASTM D 1751-83 (1991) – Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous types).
- M. ASTM D 1752-84 (1992) – Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- N. ASTM D 2321-89 – Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications.
- O. ASTM C 150-95 – Portland Cement.
- P. ASTM C 144-93 – Aggregate for Masonry Mortar.
- Q. ASTM C 207-91 (1992) – Hydrated Lime for Masonry Purposes.
- R. ASTM C 62-92c – Building Brick (Solid Masonry Units Made from Clay or Shale).
- S. ASTM C 55-94a – Concrete Building Brick.
- T. ASTM C 478-94 – Precast Reinforced Concrete Manhole Sections.
- U. ASTM C 913-89 – Precast Concrete Water and Wastewater Structures.
- V. ASTM D 1557-91 – Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
- W. ASTM D 1556-90 – Test Method For Density and Unit Weight of Soil in Place By The Sand-Cone Method.
- X. ASTM D 2922-91 – Test Methods For Density of Soil and Soil Aggregate in Place By Nuclear Methods (Shallow Depth).
- Y. ASTM F 405-93 – Corrugated Polyethylene (PE) Tubing and Fittings.
- Z. ASTM F 667-95 – Large Diameter Corrugated Polyethylene Tubing and Fittings.

### **1.03 QUALITY ASSURANCE**

- A. Material Review – The Contractor will furnish the Engineer and the Owner a description of all material before ordering. The Engineer will review the Contractor's submittals and provide in writing an acceptance or rejection of material.

- B. Manufacturer – Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the products.
- C. Subcontractor – A subcontractor for any part of the work must have experience on similar work and if required, furnish the Engineer with a list of projects and the Owners or Engineers who are familiar with their competence.
- D. Design – Devices, equipment, structures and systems not designed by the Engineer that the Contractor wishes to furnish shall be designed by either a registered professional engineer or by someone the Engineer accepts as qualified. If required, complete design calculations and assumptions shall be furnished to the Engineer or Owner before ordering.
- E. Testing Agencies – Soil testing shall be done by a testing laboratory that operates in accordance to ASTM D-3740 and E-329 and be acceptable to the Engineer prior to engagement. Mill certificates of tests on materials made by the manufacturers will be accepted provided the manufacturer maintains and adequate testing laboratory, makes regularly scheduled tests that are spot checked by an outside laboratory and furnishes satisfactory certificates.

#### **1.04 SEQUENCING AND SCHEDULING**

- A. The Contractor shall arrange the work so that sections of pipes between structures are backfilled, checked, pavement replaced and the section placed in service as soon as reasonable after it is installed. In situations where there is base flow present in ditch or pipe, the Contractor shall arrange for bypassing of storm flows with proper erosion control measures employed to limit disturbed soils entry into downstream drainage structures.

#### **1.05 EXISTING UTILITIES**

- A. All known utility facilities are shown schematically on the plans and are not necessarily accurate in location as to plan or elevation. Utilities such as service lines or unknown facilities not shown on plans will not relieve the Contractor of his responsibility under this requirement. “Existing Utilities Facilities” means any utility that exists on the project in its original, relocated or newly installed position. The Contractor will be held responsible for the cost of repairs to damaged underground facilities; even when such facilities are not shown on the plans. The Contractor shall contact all utility companies prior to beginning work and request an accurate field location of their respective utility lines.

## **1.06 TESTING**

- A. Laboratory tests for moisture density relationship for fill materials shall be in accordance with ASTM D 1557, (Modified Proctor).
- B. In place density tests in accordance with ASTM D 1556 or ASTM D 2922.
- C. Testing laboratory shall operate in accordance to ASTM D 3740 and E 329 and shall be accepted by the Engineer.
- D. The testing laboratory and Project Engineer/Project Representative shall be given a minimum of 48 hours notice prior to taking any of the tests.
- E. Testing shall be the responsibility of the Contractor and shall be performed at the Contractor's expense by a commercial testing laboratory that operates in accordance with subparagraph C above.
- F. Tests shall be furnished to Engineer in duplicate.

## **PART 2 – PRODUCTS**

### **2.01 REINFORCED CONCRETE PIPE**

- A. Where called for in the Plans, Reinforced Concrete Pipe (RCP) shall meet the requirements of ASTM C-76, Class III and the latest revisions thereof. Pipe shall meet Georgia Department of Transportation Specifications.
- B. Joints shall be water tight flexible rubber gasket conforming to the requirements of ASTM C443 and AASHTO M-198. Type II or III rubber gaskets shall be used on the pipe. Joints which do not fit tightly and uniformly shall be grouted after that segment of the line has been installed. All joints under pavement shall be wrapped with a two-foot wide strip of filter fabric lapped two feet.
- C. The assembly of the gasketed joint shall be performed as recommended by the pipe manufacturer. The elastomeric gaskets may be supplied separately in cartons or prepositioned in the bell joint or coupling at the factory. In all cases, clean the gasket, the bell or coupling interior, especially the groove spigot area to remove any dirt or foreign material before assembling. Inspect the gasket, pipe spigot bevel, gasket groove, and seating surfaces for damage or deformation. When gaskets are separate, use only gaskets which are designed for and supplied with the pipe. Insert them as recommended by the manufacturer.

- D. Lubricant should be applied as specified by the pipe manufacturer. Align the spigot to the bell and insert the spigot into the bell until it contacts the gasket uniformly.

## **2.02 DRAINAGE STRUCTURES**

Drainage structures shall be of the following types, constructed of the materials specified for each type and shall comply with the most limiting and conservative requirements between Plans, Specifications, and GDOT requirements.

- A. Concrete – Reinforced and non-reinforced:
  - 1. Class “A” – Minimum compressive strength = 3,000 psi at 28 days.
  - 2. Reinforcing shall be covered by a minimum 1” of concrete for top slabs and 1 ½” for walls and bases and 3” where concrete is deposited directly against the ground.
  - 3. Expansion joint filler materials shall conform to ASTM Specification D 1751 or D 1752.
- B. Mortar: At connection of pipe and drainage structures shall be composed of one part by volume of Portland cement and two parts of fine sand. The Portland cement shall conform to ASTM C-150, Type I or II. The sand shall conform to ASTM C-144 and shall be of an approved gradation. Hydrated lime may be added to the mixture of sand and cement in an amount equal to 25% of the volume of cement used. Hydrated lime shall conform to ASTM C-207, Type S. The quantity of water in the mixture shall be sufficient to produce a workable mortar, but shall in no case exceed 7 gallons of water per sack of cement. Water shall be clean and free of harmful acids, alkalies and organic impurities. The mortar shall be used within 30 minutes from the time the ingredients are mixed with water.
- C. Brick Masonry: Brick shall conform to ASTM C-62, Grade SW or ASTM C-55, Grade S-I or S-II. Mortar for jointing and plastering shall consist of one part Portland cement and two parts fine sand. Lime may be added to the mortar in the amount not more than 25% of the volume of cement. The joints shall be completely filled and shall be smooth and free from surplus mortar on the inside of the structure. Brick structures shall be plastered with ½-inch of mortar over the entire outside surface of the walls. For square or rectangular structures, brick shall be laid in stretcher courses with a header course every sixth course,

and for round structures, brick shall be laid radially with every sixth course a stretcher course.

- D. Precast: Shall be constructed in accordance with ASTM C-478 or C-913 and conform to the details on the project drawings.
  - 1. Joints: Shall be tongue and groove sealed with flexible gaskets or mastic sealant. Gaskets shall be O-ring or Type A or B "Tylox" conforming to ASTM C443 and mastic shall be "Ram-nek" or equivalent with primer. The primer shall be applied to all contact surfaces of the manhole joint at the factory in accordance with the manufacturer's instructions.
  - 2. Steps: Shall be polypropylene equivalent to M.A. Industries, Type PS-1 or PS-1-PF. The steps shall be installed at the manhole factory and in accordance with the recommendations of the step manufacturer. Manholes will not be acceptable if steps are not installed accordingly.
  - 3. Leaks: No leaks in the manhole will be acceptable. All repairs made from inside the manhole shall be made of mortar composed of one part portland cement and two parts clean sand; the mixing liquid shall be straight bonding agent equivalent to "Acryl 60".
- E. Cast Iron: Cast iron for manhole frames and covers and catch basin frames and grates, and manhole steps shall conform to the shape and dimensions shown on the Plans, and shall be clean and perfect free from sand and blow holes or other defects. Cast iron shall conform to ASTM Designation A-48-74 for Class No. 20 gray cast iron.

## **2.03 FILTER FABRIC**

- A. Shall be non-woven heat-bonded fiber of polyethylene and nylon filaments equivalent to Mirafi 140 N. The fabric shall be finished so the filaments will retain their relative position with respect to each other. The fabric shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet and/or heat exposure. The product shall be free of flaws, rips, holes, or defects.

## **PART 3 – EXECUTION**

### **3.01 ON SITE OBSERVATION OF WORK**

- A. The line, grade, deflection and infiltration of storm sewers shall be tested by the Contractor under the direction of the Engineer. The Engineer will have the right to require that any portion of the work be done in his presence and if the work is covered up after such instruction, it shall be exposed by the Contractor for observation. However, if the Contractor notifies the Engineer that such work is scheduled and the Engineer fails to appear within 48 hours, the Contractor may proceed without him. All work done and material furnished shall be subject to review by the Engineer or Project Representative, and all improper work shall be reconstructed, and all materials which do not conform to the requirements of the specifications shall be removed from the work upon notice being received from the Engineer for the rejection of such materials. The Engineer shall have the right to mark rejected materials so as to distinguish them as such.
- B. The Contractor shall give the Project Engineer or Project Representative a minimum of 48 hours notice for all required observations or tests. Storm sewers shall be dry for observation by the Engineer. Lines being under water shall be pumped out by the Contractor prior to observation, at no additional cost to the Owner.
- C. It will also be required of the Contractor to keep accurate, legible records of the location of all storm sewer lines and appurtenances. These records will be prepared in accordance with the paragraph on "Record Data and Drawings" in the Supplementary Conditions. Final payment to the Contractor will be withheld until all such information is received and accepted.

### **3.02 HANDLING MATERIALS**

- A. Unloading: Furnish equipment and facilities for unloading, handling, distributing and storing pipe, fittings, valves and accessories. Make equipment available at all times for use in unloading. Do not drop or dump materials. All materials dropped or dumped will be subject to rejection without additional justification.
- B. Handling: Handle pipe, fittings, valves and accessories carefully to prevent shock or damage. Handle pipe by rolling on skids, forklift, or front loader. Do not use material damaged in handling.
- C. Distribution: Distribute and place pipe and materials to not interfere with traffic. Do not string pipe more than 300 feet beyond the area where pipe is being laid. Do not obstruct drainage ditches.



- D. Storage: Store all pipe which cannot be distributed along the route. Make arrangements for the use of suitable storage areas. Do not interfere with other contractors right to access.

### **3.03 CONSTRUCTION ALONG HIGHWAYS, STREETS AND ROADWAYS**

Install pipelines and accessories along highways, streets and roadways in accordance with the applicable regulations of the County, City, and/or the Department of Transportation with reference to construction operations, safety, traffic control, road maintenance and repair.

- A. Protection of Traffic: Provide and maintain suitable signs, barricades and lights for protection of traffic.

Replace all highway signs removed for construction as soon as possible. Do not close or block any highway, street, or roadway without first obtaining permission from the proper authorities.

Provide flagmen to direct and expedite the flow of traffic.

- B. Construction Operations: Perform all work along highways, streets and roadways to least interfere with traffic.

1. Stripping: Where the pipe line is laid along road shoulders, strip and stockpile all sod, topsoil and other material suitable for shoulder restoration.

2. Trenching, Laying and Backfilling: Do not open the trench any further ahead of pipe laying operations than is necessary. Backfill and remove excess material immediately behind laying operations. Complete excavation and backfill for any portion of the trench in the same day.

3. Shaping: Reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. Replace topsoil, sod and any other materials removed from shoulders.

- C. Excavated Materials: Do not place excavated material along highways, streets and roadways in a manner which obstructs traffic. Sweep all scattered excavated material off of the pavement.

- D. Drainage Structures: Keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material and free to drain at all times.

- E. Maintaining Highways, Streets, Roadways and Driveways: Maintain streets, highways, and roadways in suitable condition for movement of traffic until completion and final acceptance of the work. Use steel running plate to maintain traffic until pavement replacement is completed.

NOTE: Traffic must be maintained at all times. When one lane is closed, flagmen must be utilized to maintain traffic flow.

Repair all driveways that are cut or damaged immediately. Maintain them in a suitable condition for use until completion and final acceptance of the work.

### **3.04 EXISTING UNDERGROUND UTILITIES AND OBSTRUCTIONS**

- A. It is the responsibility of the Contractor to locate all existing utilities along the path of his construction. The drawings shall indicate underground utilities or obstructions that are known to exist. Where these or unforeseen underground utilities are encountered, the location and alignment of the utility may be changed, upon written approval of the Engineer and Owner, to avoid interference.

### **3.05 CONNECTION TO EXISTING INLETS AND/OR MANHOLES**

- A. Pipe connections to existing inlets and/or manholes shall be in such a manner that the finished work will conform as nearly as practicable to the applicable requirements specified for new inlets and/or manholes, including all necessary concrete work, cutting and shaping, and grouting.

### **3.06 EARTHWORK**

Refer to Section 1

### **3.07 PIPE HANDLING**

- A. The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of pipe. Before laying pipe, the trench bottom shall be de-watered by the use of well points or other methods. Where the nature of the soil is such that well points will not remove the water, the Contractor shall construct sumps and use sump pumps to remove all water from the bedding surface. The pipe shall be carefully bedded in a soil foundation that has been accurately shaped and rounded to conform to the lowest one-fourth (1/4) of the outside portion of circular pipe, or to the lower curved portion of arch pipe for the entire length of the pipe. When necessary, the bedding shall be

tamped to compacted 98% of optimum density. Bell holes and depressions for joints shall be only of such length, depth, and width as required for properly making the particular type joint.

### **3.08 PLACING PIPE**

- A. Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. Pipe lines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or de-watering of trenches during construction shall be provided as necessary. All pipe in place shall have been checked before backfilling. When storm drain pipe terminates in a new ditch, the headwall or end section together with ditch pavement, if specified, shall be constructed immediately as called for on the plans. Ditch slopes and disturbed earth areas shall be grassed and mulched as required. The Contractor will be responsible for maintaining these newly constructed ditches and take immediate action subject to approval to keep erosion of the ditch bottom and slopes to a minimum during the life of the contract. No additional compensation will be given to the Contractor for the required diversion of drainage and/or dewatering of trenches. Grassing of the completed earth surface of the trench backfill shall conform to the requirements of other sections.
- B. Corrugated Aluminum Pipe: Shall be laid with the separate sections joined firmly together, with the outside laps of circumferential joints pointing upstream and with longitudinal laps on the side. Lifting lugs, where used, shall be placed to facilitate moving the pipe without damage to the exterior or interior. Vertical elongation, where indicated, shall be accomplished by side-fill compaction, factory elongation, or by accepted method of strutting, as indicated.

### **3.09 JOINTS IN PIPES**

- A. Reinforced Concrete Pipe –
  - 1. Assembly of the gasketed joint shall be performed as recommended by the pipe manufacturer. Clean the gasket, the bell or coupling interior, especially the groove spigot area to remove any dirt or foreign material before assembling. Insert gasket as recommended by the manufacturer.
  - 2. Lubricant should be applied as specified by the pipe manufacturer.

3. Joints which do not fit tightly and uniformly shall be grouted after that segment of the line has been installed.
  4. All joints under pavement shall be wrapped with a two-foot wide strip of filter fabric lapped two feet.
- B. Corrugated Aluminum Pipe – Maintain pipe alignment and prevent infiltration of fill material at joints during installation.
1. Installation of Gaskets – Shall be in accordance with the recommendations of the manufacturer in regard to the use of lubricants and cements and other special installation requirements. The gasket shall be placed over one end of a section of pipe for half the width of the gasket. The other half shall be doubled over the end of the same pipe. When the adjoining section of pipe is in place, the doubled-over half of the gasket shall then be rolled over the adjoining section. Any unevenness in overlap shall be corrected so the gasket covers the ends of the pipe sections equally. Connecting bands shall then be centered over the aligning sections of pipe, and rods or bolts placed in position and nuts tightened. The band shall be tightened evenly, even tension being kept on the rods or bolts and the gaskets shall be closely observed to see that they are seating properly in the corrugations.
  2. Installation of Filter Fabric at Joint – After the connecting band has been tightened, the Contractor shall place two (2) layers of filter fabric around the joint, a minimum of four feet, centered on the joint.

### **3.11 FIELD QUALITY CONTROL**

- A. Soil and density tests shall be made by a testing laboratory approved by the Engineer and shall be made at the Contractor's expense. Laboratory tests of the soil shall be made in accordance with ASTM D 1557. In-place density tests shall be made in accordance with ASTM D 1556 or ASTM D 2922. Results of the tests shall be furnished to the Engineer. Additional tests called for by the Engineer to those below will be paid for out of the "Supplemental Work Allowance" included in the bid form. The Contractor's bid price shall include all testing referred to below.

The minimum number of tests required shall be:

Backfill over pipe  
in traffic areas.....1 per 100 lf or less for each 4 feet of depth or  
portion thereof.

Backfill over pipe  
in non-traffic areas.....1 per 500 lf or less for each 6 feet of depth or  
portion thereof.

The minimum percent of compaction of the backfill material (in accordance to  
ASTM D 1557) shall be the following:

In traffic areas.....98% of maximum laboratory density.

In non-traffic areas.....90% of maximum laboratory density,  
unless approved by the Engineer.

### **3.12 DRAINAGE STRUCTURES**

- A. Drainage structures shall be constructed of the materials specified for each type  
and in accordance with the details shown on the drawings.

**END OF SECTION**

**SECTION 02315**  
**EXCAVATION, TRENCHING AND BACKFILL FOR UTILITY SYSTEMS**

**PART 1 – GENERAL**

**1.01 SCOPE**

- A. Furnish all labor, materials, equipment and incidentals necessary to perform all excavation, trenching and back fill required to complete the work shown on the Drawings and specified herein. The work shall include, but is not limited to; excavation for manholes, wetwells, vaults, electrical manholes, hand holes, conduits, cables, raceways and ducts and pipes; all backfilling, embankment and grading; disposal of waste and surplus materials; and all related work such as sheeting, bracing and dewatering.
- B. Loam, if any, excavated under this Section may be salvaged by the Contractor for his own convenience for use as specified under Section 02920.
- C. Obtain materials required for backfill, fill, or embankments in excess of that available on the site from other sources. Include all costs of obtaining off-site materials in the contract price.

**1.02 RELATED WORK**

- A. Section 01410 – Testing Services
- B. Section 02350 – Sheeting, Shoring, & Bracing

**1.03 REFERENCES**

- A. American Society for Testing and Materials.

**1.04 TESTING SERVICES**

- A. The Contractor shall obtain the service of a certified testing service to perform all compaction tests specified herein. The cost of these services shall be at Contractor's expense.
- B. Soil testing shall be performed by an accredited testing laboratory selected by the Contractor and approved by the Owner. Tests shall be performed in accordance with applicable ASTM or AASHTO standard methods, unless otherwise specified.

- C. All materials to be used in the work shall be tested prior to the use to show conformance with the requirements of these specifications. Test reports shall be delivered to the Engineer in duplicate prior to use of any material in the work.
- D. Materials being used in the work, which have been tested previously, may be subjected to further tests from time to time and may be rejected if found defective. Rejected materials shall be removed from the project immediately, notwithstanding the results of former tests to which they have been subjected.
- E. Soil tests shall be performed on subgrades prior to the placement of fill or backfill materials. Tests shall also be performed immediately after the placement of each layer of fill or backfill materials to show conformance with the field density and optimum moisture requirements of these specifications. No additional layers shall be placed until the density of each layer has been approved.
- F. If the Engineer determines, based on tests reports and inspections, that subgrades or layers which have been placed are below the specified density, the Contractor shall provide additional compaction and testing at no additional expense to the Owner.

#### **1.05 PROTECTION**

- A. Sheeting and Bracing (see Section 02350)
- B. Dewatering and Drainage (see Section 02400)
- C. Culverts and Ditches
  - 1. Protect drainage culverts from damage. If damaged, restore to satisfactory condition at no cost to the Owner.
  - 2. If it is necessary to remove a culvert, do not replace until the proposed pipeline is installed and trench backfilled and compacted to the subgrade of the culvert. Replace culverts to the line and grade established by the Owner.
  - 3. Backfill minor drainage ditches so that the upper one foot of material between ditch banks is topsoil, loam, or clay.
  - 4. Compact this material for the full ditch width to a minimum of 95% of maximum density as determined by ASTM D 1557.
  - 5. Ditches steeper than 2:1 slope shall be protected and reinforced with a

synthetic fiber or grid material. Contractor has the option not to use reinforcement for slopes 2:1 or flatter. Correct any ditch erosion occurring as a result of pipeline construction at no cost to the Owner.

D. Water, Gas, Telephone, Power, Cable

1. Protect all other utilities from damage. Notify utility owner prior to start of excavation as directed in sub-paragraph 3-5-2 of the General Conditions. If, during the work the utility is damaged, notify the utility company and the Owner immediately. Do not attempt to repair or replace damaged utilities unless so directed by the utility company and approved by the Engineer. Payment for restoration of damaged utilities shall be the Contractor's responsibility. Call before you dig – Utilities Protection Center 1-800-282-7411.

**1.06 JOB CONDITIONS**

A. Soils

1. The contractor shall examine the site and review the available test borings or undertake his own soil borings prior to submitting his bid, taking into consideration all conditions that may affect his work. The Owner and Engineer will not assume responsibility for variations of subsoil quality or conditions at locations other than places shown and at the time the investigation was made. The Contractor shall accept the site in its existing condition, and shall assume the risk of encountering whatever materials as may occur. The soil borings furnished are indicative of the soils encountered at the particular location of the borings at the time the borings were taken. The Contractor shall make his own determination of the soil structure and site conditions as it may affect the work.

B. Existing Utilities

1. Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
2. Should uncharted, or incorrectly charted, piping appear in the excavation, consult the Engineer and the Owner of such piping or utility immediately for directions.
3. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.



4. Demolish and completely remove from site existing underground utilities indicated on the Drawings to be removed.

C. Protection of Persons and Property

1. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

## **1.07 SUBMITTALS**

- A. Submit to the Engineer for review in accordance with Section 01300 the proposed methods of construction, including dewatering, excavation, filling, compaction, and backfilling for the various portions of the work. Review shall be for method only. The Contractor shall remain responsible for the adequacy and safety of the methods.

## **PART 2 – PRODUCTS**

### **2.02 MATERIALS**

- A. Backfill materials shall be natural or processed mineral soils, blasted and crushed rock, or masonry rubble. Fill materials shall be free of all organic material, trash, snow, ice, frozen soil or other objectionable materials. Clay soils having a natural in-place water content in excess of 30 percent are considered unsuitable for stockpiling and/or future use. Fill materials to be used have been classified under categories specified below.
- B. Embedment materials listed here include a number of processed materials plus the soil types defined by the USCS Soil Classification Systems in ASTM D2487. These materials are grouped into categories according to their suitability for this application:
1. Class I: Angular 6 to 40 mm (1/4 to 1-1/2 inches), graded stone including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.
  2. Class II: Coarse sands and gravels with maximum particle size of 40 mm (1-1/2 inches), including variously graded sands and gravels containing small

percentages of fines, generally granular and non-cohesive, either wet or dry. Soil types GW, GP, SW and SP are included in this class.

3. Class III: Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil types GM, GC, SM and SC are included in this class.
  4. Class IV: Silt, silty clays and clays including inorganic clays and silts of medium to high plasticity and liquid limits. Soil types MH, CH and CL are included in this class. These materials are not to be used for bedding, haunching or initial backfill.
  5. Class V: This class includes the organic soils OL, OH and PT as well as soils containing frozen earth, debris, rocks larger than 40 mm (1-1/2 inches) in diameter, and other foreign materials. These materials shall not be used for bedding, haunching and initial backfill.
- C. Granular Fill, shall be sound, hard, durable crushed stone meeting the following gradation requirements and shall conform to ASTM C33, Size No. 57.

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
1-1/2-in	100
1-in	90-100
1/2-in	26-60
No. 4	0-7
No. 8	0-3

- D. Sand shall conform to ASTM Standard C33 for concrete sand.

### **PART 3 – EXECUTION**

#### **3.01 EXCAVATION**

- A. The Contractor shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground structures in the trench zone may be determined before being damaged. He shall be held responsible for the repair or replacement of such structures when broken or otherwise damaged because of his operations.
- B. The Contractor shall make explorations and excavations at no additional charge to the Owner to determine the location of existing underground structures.

- C. Utilities and other piping shall be laid in open trenches as shown and specified. Trenches shall be excavated to the designated lines and grades, beginning at the outlet end and progressing toward the upper end in each case. Trenches for pipe shall be shaped to the lower 1/3 of the pipe and provide uniform and continuous bearing. Bell holes shall be dug to allow ample room for working fully around each joint.
- D. Trenches shall be of minimum width to provide ample working space for making joints and shall be not less than 16 inches greater than the outer diameter of the pipe or more than 24 inches greater than the outer diameter of the pipe. Sides of trenches shall be closely vertical to top of pipe and shall be sheet piled and braced where soil is unstable nature. Above the top of the pipe, trenches may be sloped. The ridge of the trench above this level may be wider for sheeting and bracing and the performance of the work.
- E. Trenches shall be excavated on the alignments shown on the Plans, and to the depth and grade necessary to accommodate the pipes at the elevations shown. Where elevations of the invert or centerline of a pipe are shown at the ends of a pipe, the pipe shall be installed at a continuous grade between the two elevations.
- F. Excavation in excess of the depth required for proper shaping shall be corrected by bringing to grade the invert of the ditch with compacted coarse, granular material at no additional expense to the Owner. Bell holes shall be excavated to relieve bell of all load, but small enough to insure that support is provided throughout the length of the pipe barrel.
- G. Excavation in excess of the depths required for manholes and other structures shall be corrected by placing a sub-foundation of 1500 psi concrete, at no additional expense of the Owner.
- H. If trenches are excavated to widths in excess of those specified, or if the trench walls collapse, the pipe shall be laid in accordance with the next better class of bedding at the expense of the Contractor.

### **3.02 TRENCHES**

- A. Trenches shall be maintained in a safe condition to prevent hazardous conditions to persons working in or around the trench.
- B. Braced and sheeted trenches and open trenches shall comply with all State and Federal Laws and Regulations, and local ordinances relating to safety, life, health and property.
- C. The top portion of the trench may be excavated with sloping or vertical sides to any

width which will not cause damage to adjoining structures, roadways, utilities, etc. The bottom of the trenches shall be graded to provide uniform bearing and support each section of the pipe on undisturbed soil every point along its entire length, except for the portions of the pipe sections excavated for bell holes and for the sealing of pipe joints. Bell holes and depressions for joints shall be dug after the trench bottom has been graded and in order that the pipe rests upon the trench bottom for its full length and shall be only of such length, depth and width for making the particular type of joints. The bottom of the trench shall be rounded so that at least the bottom one-third of the pipe shall rest on undisturbed earth for the full length of the barrel as jointing operations will permit. This part of the excavation shall be done manually only a few feet in advance of the pipe laying by workmen skilled in this type of work.

- D. The sides of all trenches and excavation for structures shall be held by stay bracing, or by skeleton or solid sheeting and bracing according to conditions encountered, to protect the excavation, adjoining property and for the safety of personnel. Bracing and shoring may be removed then the level of the backfilling has reached the elevation to protect the pipe work an adjacent property. When sheeting or shoring above this level cannot be safely removed, it may be left in place. Timber left in place shall be cut off at least 2 feet below the surface.

### **3.03 PILING EXCAVATED MATERIALS**

- A. All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing roadways.

### **3.04 LIMIT TO LENGTH OF OPEN TRENCH**

- A. Pipe trenches shall not be excavated more than 400 feet in advance of pipe laying and all work shall be performed to cause the least possible inconvenience to the public. Adequate temporary bridges or crossings shall be constructed and maintained where required to permit uninterrupted vehicular and pedestrian traffic.

### **3.05 REMOVAL OF UNSUITABLE MATERIAL**

- A. Should overdepth excavation be necessary to remove unsuitable material and to replace with satisfactory material, the Contractor will be paid for the work in accordance with the General Conditions for removal and replacement of unsuitable material, based on the following requirements:
  - 1. When the trench excavation is excavated to the plan depth or as required by these Specifications, and soft or other material not suitable for bedding purposes is encountered in the excavation, the Contractor shall

immediately notify the Engineer for inspection and measurement of the unsuitable material to be removed.

2. No overdepth excavation or backfilling of the overdepth shall start until proper measurements have been taken by the Engineer for the determination of the quantity in cubic yards of unsuitable material excavated. Backfill material and backfilling shall conform to the requirements specified in 3.08 below.
3. No payment will be made for any overdepth excavation of soft unstable material due to the failure of the Contractor to provide adequate means to keep the hole/trench dry.
4. No payment will be made for any overdepth excavation of the unsuitable material and replacement not inspected and measured by the Engineer prior to excavation.

### **3.06 BEDDING OF CONCRETE, DUCTILE IRON OR STEEL PIPE**

- A. Pipe shall be laid on foundations prepared in accordance with ANSI/AWWA C600 as modified herein, and in accordance with the various classes of bedding required by the trench width and trench depth for the size of pipe to be laid. Typical bedding shall be included in the lump sum bid.
- B. Embedment shall be of the type shown on the plans or stated in the specifications for the utility system in which it is used.
- C. Bell Holes: Bell holes shall be provided in all classes of bedding to relieve pipe bells of all load, but small enough to insure that support is provided throughout the length of the pipe barrel.
- D. Coarse Granular Bedding: Coarse Granular Bedding material shall consist of crushed stone or pea gravel, clean and graded, 95 to 100 percent of which shall pass a 3/4 inch sieve with 95 to 100 percent retained on a No. 4 sieve. Bedding material shall be placed on a flat bottom trench and thoroughly compacted by tamping or slicing with a flat blade shovel. Compacted bedding material shall be extended up the sides of the pipe to the heights shown for the various classes of bedding.
- E. Overwidth Excavation: If trenches are excavated to widths in excess of those specified below, or if trench walls collapse, pipe shall be laid in accordance with the requirements for at least the next better class of bedding at the expense of the Contractor.

- F. Borrow Backfill: Borrow backfill will be required if there is not sufficient suitable material available from other parts of the work to backfill the trenches. Borrow backfill from approved borrow pits shall be used. Only those soils in the borrow pits that meet the specified requirements for suitable material shall be used.

### **3.07 BEDDING OF PVC PIPE AND HDPE PIPE**

- A. Pipe shall be bedded true to line and grade with uniform and continuous support from a firm base in accordance with ASTM D2321 as modified herein. Blocking shall not be used to bring the pipe to grade. Typical bedding material shall be included in the lump sum bid.
- B. Compaction of foundation, bedding, haunching and initial backfill shall extend to the trench wall.
- C. Embedment material in the area around the pipe shall be installed with care. Care shall be used to insure that sufficient material has been worked under the haunch of the pipe to provide adequate side support. Precautions must be taken to prevent movement of the pipe during placing of the material through the pipe haunch.
- D. Avoid contact between the pipe and compaction equipment. Compaction of haunching, initial backfill and backfill material shall be done in such a way so that compaction equipment will not have a damaging effect on the pipe.
- E. The trench depth shall be as shown on the plans or as required to provide the depth of cover as specified by the purchaser.
- F. Embedment shall be as shown on the plans or stated in the specifications for the utility system in which it is used.

### **3.08 BACKFILLING**

- A. Backfilling consists of placing suitable materials removed during the excavation into the excavated areas, placing embedment materials and compacting the same to a density equal to or greater than what exists before excavation or as specified herein.
- B. All backfill material shall be free of stones, concrete and clay lumps larger than 1/3 cubic foot. Roots, stumps and rubbish which will decompose will not be permitted in the backfill. Backfill material shall have its moisture content corrected, as may be necessary before being placed in the trench to bring the moisture content to approximately "optimum" for good compaction. Any rock, stone, concrete, clay lumps larger than 1/3 cubic foot in volume, rubbish and debris shall be removed

from the site and disposed of by the Contractor in a lawful manner.

- C. **Select Backfill:** Select backfill material shall be placed below, around each side, and over the top of the pipe in approximately horizontal layers not exceeding 8-inches in thickness to a minimum height of 12-inches above the pipe crown or greater as detailed herein and on the Drawings. This initial backfill shall be placed immediately after the pipes are laid and joints have been observed by the Engineer to anchor and protect the pipe from damage by subsequent backfill and ensure the uniform distribution of the loads over the top of the pipe. Select Material shall include Class I, II, III and other approved materials. If suitable select materials are not available from trench excavation, the Contractor will be required to obtain select materials elsewhere at no additional cost to the Owner. The Contractor shall backfill both sides of the pipe simultaneously to prevent side pressures and each layer shall be compacted thoroughly with mechanical tamping equipment in such manner as not to damage the pipe, pipe joints or shift the pipe alignment. Workmen shall not be permitted to walk over the pipe until at least 12 inches of compacted fill has been placed over the pipe. The Contractor shall not use water to obtain compaction except for adding water to the backfill material before placing in the trench to bring the moisture content to approximately "optimum" for good compaction.
- D. **General Backfilling:** After initial, select backfill material has been placed and tamped, the remainder of the trench may be backfilled with general excavated material, except that no rock, unless in small shattered fragments, will be permitted to be mixed with other backfill material.
  - 1. **Backfilling under buildings and structures:** Backfilling under structures and buildings consists of placing structural fill in the trench in 4 inch maximum loose lifts (if hand tamped) and 6" maximum loose lifts (if machine tamped) and compacting an area from the undercut level to the slab support level to 100% of the modified Proctor maximum dry density (ASTM D 1557). No water shall be used to secure compaction except for adding water to the backfill material before placing in the trench to bring moisture content approximately "optimum" for good compaction. Each loose lift shall be tamped before additional backfill material is placed in the excavated area.
  - 2. **Street and Road Right – of – Way, Parking Areas, **Pump Station**, Yards and Other Traveled Areas:** Backfill shall consist of placing structural fill in the trench in uniform layers not exceeding eight inches (8") in thickness, with each layer thoroughly compacted to 95% of the modified Proctor maximum dry density (ASTM D 1557) with heavy duty mechanical tampers ("Whacker" or equal) to a height of at least thirty-six inches (36") or forty-eight inches (48") above the top of the pipe barrel.

3. The remainder of the excavation may be backfilled and tamped in the same manner, or if the Contractor so elects, he may place backfill in layers not exceeding twelve inches (12") and use wheel loading or heavy duty mechanical tamping equipment ("Hydra-Hammer" or equal). Pipe shall have at least thirty-six inches (36") of cover before wheel loading and at least forty-eight inches (48") of cover before using heavy duty tamping equipment ("Hydra-Hammer" or equal). The density of the backfilled material after compaction shall be equal to 95 percent of the maximum density obtainable at optimum moisture content as determined by the Modified Proctor Test (ASTM D 1557). Except in the upper 12 inches, water shall be added to backfill material only before being placed in the trench in order to bring the moisture content to approximately "optimum" for good compaction.
- E. In other areas, including woodlands, fields, pastures, areas not open to vehicular travel, and areas where no structures are proposed or anticipated in the future, the remainder of the ditch may be backfilled by placing fill in ditch and "walking-in" with wheel loaded equipment. Backfill material may be windrowed and maintained in a suitable manner so as to concentrate and pond rainfall runoff over the trench. After sufficient settlement has been obtained, the Contractor shall complete surface dressing, remove surplus material and clean up in accordance with these Specifications. Wherever trenches have not been properly filled, or if settlement occurs, they shall be refilled, smoothed off and finally made to conform to the surface of the ground. Backfilling shall be carefully performed and the original surface restored as specified herein. Compaction in these areas shall not be less than 90% of the modified Proctor maximum dry density. Surplus material shall be disposed of by the Contractor.

### **3.09 PROTECTION OF WATER SUPPLY PIPES**

- A. Horizontal Separation: Sewers and force mains shall be laid at least 10 feet horizontally from any existing or proposed watermain. The distance shall be measured edge to edge. In cases where it is not practical to maintain a 10 foot separation, such deviation may allow installation of the sewer or force main closer to the watermain, provided that the watermain is in a separate trench or on a undisturbed earth shelf located on the side of the sewer or force main and at an elevation so the bottom of the watermain is at least 18 inches above the top of the sewer or force main.
- B. Crossings: Sewers and force mains crossing water mains shall be laid to provide a minimum vertical distance of 18 inches between the outside of the watermain and the outside of the sewer or force main. This shall be the case where the watermain is either above or below the sewer or force main. The crossing shall be arranged so that the sewer or force main joints will be equidistant and as far as possible from



the watermain joints. Where a watermain crosses under a sewer or force main, adequate structural support shall be provided for the sewer or force main to prevent damage to the watermain.

- C. Special Conditions: When it is impossible to obtain proper horizontal and vertical separation as stipulated above, the sewer or force main shall be designed and constructed equal to water pipe, and shall be pressure tested to assure water tightness prior to backfilling.

### **3.10 UTILITY CONSTRUCTION IN OTHER EXCAVATION**

- A. Where utilities are required to be constructed in areas also requiring excavation and backfill for other work, coordinate the work so that the parts come together properly and the construction of the various parts can be done without damage to other parts. Place bedding which will form bearing for pipes, using suitable material and shaping to the lower 1/3 of the pipe to provide uniform and continuous bearing. Compaction of backfill material which will form bearing shall be equal to that specified hereinbefore under "Backfilling under buildings and structures". After the pipe or other utility is placed, backfilling shall proceed as specified hereinbefore following the requirements specified under Section 3.08 as applicable.

**END OF SECTION**

**SECTION 02350**  
**SHEETING, SHORING, AND BRACING**

**PART 1 - GENERAL**

**1.01 SCOPE**

- A. This section specifies requirements for sheeting, shoring, and bracing of trenches and excavations greater than five (5) feet in depth. Where sheet piling, shoring, sheeting, bracing or other supports are necessary, they shall be furnished, placed, maintained, and except as shown or specified otherwise, removed by the Contractor.

**1.02 DESIGN REQUIREMENTS**

- A. The design, planning, installation and removal, if required, of all sheeting, shoring, sheet piling, lagging, and bracing shall be accomplished in such a manner as to maintain the required excavation or trench section and to maintain the undisturbed state of the soils below and adjacent to the excavation.
- B. The Contractor shall design sheeting, shoring, and bracing in accordance with the OSHA Safety and Health Standards as well as state and local requirements.
- C. Horizontal strutting below the barrel of a pipe and the use of pipe as support are not acceptable.
- D. When the construction sequence of structures requires the transfer of bracing to the completed portions of any new structure or to any existing structure, the Contractor shall provide the Engineer with a complete design analysis of the expected impact of that bracing on the structure. This action shall in no way absolve the Contractor of responsibility of damage resulting from said bracing.

**1.03 REFERENCES**

- A. OSHA 2207 Revised 1987 – OSHA Safety and Health Standards

**1.04 SUBMITTALS**

- A. Prior to starting any excavation work requiring sheeting, shoring, and bracing, the Contractor shall submit his plans for trench and excavation support systems to the Engineer for review and comment. No excavations shall be started until the Contractor has obtained written acceptance of the trench support system. Said acceptance will be to assure the Owner of the Contractor's general compliance

with the required codes and shall not be construed as a detailed analysis for adequacy of the support system, nor shall any provisions of the above requirements be construed as relieving the Contractor of his overall responsibility and liability for the work. Submittals shall include the following:

1. Design calculations and method of installation and removal of all sheeting, sheet piling, shoring and bracing. Calculations shall be made by a professional structural or civil engineer in the state of the project.
2. Detailed excavation support drawings.

## **PART 2 - EXECUTION**

### **2.01 GENERAL**

- A. Contractor shall be responsible for supporting and maintaining all excavations required even to the extent of sheeting and shoring the sides and ends of excavations with timber or other supports. If the sheeting, braces, shores, and stringers or walling timbers or other supports are not properly placed or are insufficient, the Contractor shall provide additional or stronger supports. The requirement of sheeting or shoring or the addition of supports shall not relieve the Contractor of his responsibility for their sufficiency. All sheeting, shoring and bracing shall have sufficient strength and rigidity to withstand the pressure exerted and to conform to OSHA Safety & Health Standard (29 CFR 1926/1910) OSHA 2207, latest edition.
- B. Excavations adjacent to existing or proposed buildings and structures or in paved streets or alleys shall be sheeted, shored and braced adequately to prevent undermining beneath or subsequent settlement of such structures or pavements. Underpinning of adjacent structures shall be done when necessary to maintain structures in safe condition. The Contractor shall be held liable for any damage resulting to such structures or pavements as a result of his operations.
- C. Trench sheeting shall be left in place until the backfilling has been completed to elevation not less than twelve (12) inches above the top of the pipe. Unless otherwise ordered in writing, sheeting shall then be cut off at the top of the lowest set of bracing and the upper section shall be removed. All voids left by sheeting along trenches shall be carefully refilled and rammed with suitable tools.
- D. In unstable ground, sheeting shall be driven to such depth below bottom of the trench or side of the excavation as required to ensure stability.
- E. The need and adequacy of sheeting, shoring, bracing, or other provisions to protect

men and equipment in a trench or other excavation shall be the sole and exclusive responsibility of Contractor.

- F. Underpin adjacent structures, which may be damaged by excavation work, including service utilities and pipe chases.
- G. Notify Engineer of unexpected subsurface conditions and discontinue work in affected area until notification to resume work.
- H. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.
- I. Grade top perimeter of excavation to prevent surface water run-off into excavation.

**END OF SECTION**

**SECTION 02370**  
**SOIL EROSION AND SEDIMENT CONTROL**

**PART 1 – GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary erosion and sediment control measures shall be employed during the construction period and shall include all measures required to prevent soil erosion at the site until permanent erosion control measures are installed. Work shall be accomplished through the use of vegetative measures, such as mulching and grassing, and structural practices including, construction exits, sediment barriers, check dams, inlet sediment traps, etc.
- B. Erosion and sediment control measures described herein shall be continued until such time as permanent planting and restoration of natural areas has provided for final stabilization at project site.
- C. Failure to install and maintain temporary erosion and sediment control measures throughout the construction period may be cause to halt construction by governing authorities until such measures are correctly installed and operational. Activity covered in this contract is regulated by Georgia's Erosion and Sedimentation Act (O.C.G.A. 12-7-1, *et seq.*).

**1.02 RELATED SECTIONS**

- A. Section 02920 – Permanent (Perennial) Grassing and Landscaping

**1.03 REFERENCES**

- A. American Society for Testing and Materials (ASTM).
- B. Georgia's Erosion and Sedimentation Act (O.C.G.A. 12-7-1, *et seq.*)
- C. "Manual for Erosion and Sediment Control in Georgia" published by the State Soil and Water Conservation Commission of Georgia. Contractor shall be responsible for the acquisition and utilization of the latest edition of the "Manual for Erosion and Sediment Control in Georgia".

**1.04 DEFINITIONS**

- A. Final Stabilization: All soil disturbing activities at the site have been completed, and that for unpaved areas and areas not covered by permanent structures, at least 70% of the soil surface is uniformly covered in permanent vegetation or equivalent permanent stabilization measures (such as the use of rip rap,

gabions, permanent mulches, or geotextiles) have been employed.

- B. Land-Disturbing Activity: Any activity which may result in soil erosion from water or wind and the movement of sediments into State waters or onto lands within the State, including, but not limited to clearing, grubbing, dredging, grading, excavating, transporting, and filling.
- C. Stabilization: 70% of the surface area of the site is covered in a uniform, vegetative cover (permanent or temporary) or anchored mulch of the appropriate thickness with 90% coverage.

## **1.05 REGULATORY REQUIREMENTS**

- A. Contractor shall comply with applicable codes, rules, ordinances, regulations, and laws of local, municipal, state and/or federal authorities having jurisdiction over project.

## **PART 2 – PRODUCTS**

### **2.01 STRUCTURAL PRACTICES**

- A. All products used must satisfy specifications set forth by the “Manual for Erosion and Sediment Control in Georgia”.

### **2.02 MULCH**

- A. Dry straw, hay, or wood cellulose fiber of good quality, free of weeds and foreign matter detrimental to plant life.

### **2.03 TEMPORARY GRASSING**

- A. All grass seed shall be certified by the Georgia Department of Agriculture.
- B. All grass seed shall be in undamaged containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

### **2.04 PERMANENT (PERENNIAL) GRASSING**

- A. See Section 02920 – Permanent (Perennial) Grassing and Landscaping.

### **2.05 FERTILIZER AND LIME**

- A. Fertilizer: Standard commercial grade grass fertilizer with a 10-10-10 (N-P-K) proportion.

- B. Lime: Natural, agricultural grade, ground or pulverized dolomitic limestone.

## **2.06 DUST CONTROL**

- A. Water, calcium chloride, anionic asphalt emulsion, latex emulsion, resin-in-water emulsion or other approved by the Georgia Department of Transportation may be used.

## **PART 3 – EXECUTION**

### **3.01 GENERAL**

- A. The Contractor shall prevent the escape of sediment from the area under construction by installing erosion and sediment control measures and practices prior to, or concurrent with, land-disturbing activities.
- B. The Contractor shall maintain erosion and sediment control measures at all times.
- C. The Contractor shall complete mulching, temporary grassing, or permanent (perennial) vegetation on all exposed areas within 14 days after disturbance.
- D. All structural and vegetative erosion and sediment control measures shall be designed, installed and maintained according to the “Manual for Erosion and Sediment Control in Georgia”.
- E. As a minimum, structural practices shall be located and installed, and all disturbed soil areas shall be stabilized using mulching and/or grassing, as specified by the Drawings. If full implementation of the Drawings does not provide for effective erosion and sediment control, the Contractor shall be responsible for the implementation of additional erosion and sediment control measures to control or treat the sediment source.
- F. No runoff from disturbed areas shall leave the site untreated.
- G. Erosion Control Schedule
  - 1. Prior to the pre-construction conference, Contractor shall submit to the Engineer his proposed erosion control plan for the project in accordance with requirements of this section. The schedule shall be based on an analysis of the project conditions and shall be in written form. This schedule shall specifically indicate the sequence of clearing and grubbing, earthwork operations, including trenching and backfilling, construction of permanent erosion control features and the proposed uses of temporary

erosion and sediment control features. Schedule shall also include proposed methods to prevent pollution of streams, lakes and rivers and other water resources.

- 2 Contractor shall outline his proposed methods of controlling erosion and preventing pollution on public and construction access roads, staging areas and waste disposal areas.
  - 3 Construction shall not commence until the Engineer has accepted the aforementioned plans and schedules. Contractor will be responsible for accomplishment of work in accordance with accepted plans and schedules. Engineer may approve changes made necessary by unforeseen circumstances that are beyond the control of Contractor.
- H. Engineer has the authority to limit the surface area of erodible earth materials exposed by clearing and grubbing, the surface area of erodible earth exposed by excavation and backfill operations, and to direct Contractor to provide immediate permanent or temporary erosion and pollution control measures to prevent contamination of adjacent land or water courses.
- I. Clearing and grubbing operations shall be so scheduled and performed that grading operations and permanent erosion control features can immediately follow thereafter, if the project conditions permit. Otherwise, temporary erosion control measures will be required between successive construction stages.
- J. Engineer will require Contractor to limit the area of excavation, trenching and pipe laying operations in progress commensurate with Contractor's capability and progress in keeping finish grading, mulching, seeding and other permanent and/or temporary measures current with accepted schedule.

### **3.02 STRUCTURAL PRACTICES**

- A. All structural practices shall be designed, installed and maintained in accordance with specifications set forth in Chapter 6, Section III of the "Manual for Erosion and Sediment Control in Georgia".
- B. Sediment accumulation at structural practices shall not exceed 50% of structure capacity or height.
- C. All structural practices shall be inspected frequently and materials promptly repaired or replaced as necessary to allow proper function of the device.
- D. Any construction vehicle passing from a disturbed area onto any paved area or public right-of-way shall pass over a gravel construction exit. If the gravel construction exit cannot adequately remove soil from the vehicle, the vehicle



shall be washed and runoff routed to a sediment trap or basin. Any mud or debris tracked or spilled onto roadway shall be immediately removed.

### **3.03 MULCHING**

- A. All mulch used as a singular method for erosion control shall be applied and anchored in accordance with specifications set forth in Chapter 6, Section II of the "Manual for Erosion and Sediment Control in Georgia".
- B. Mulch can be used for erosion control for up to six months provided that the mulch is applied at the appropriate depth (depending on the type of mulch used), anchored, and maintains a continuous 90% or greater cover of the soil surface.
- C. Where staged construction or other conditions not controlled by Contractor prohibit the completion of work in a continuous manner, Engineer may order Contractor to apply mulch to an erodible area.
- D. If the area being mulched will eventually support a cover of perennial vegetation, 20-30 pounds of nitrogen per acre shall be added in addition to the normal nitrogen application rate specified in Section 02920 – Permanent (Perennial) Grassing and Landscaping.
- E. Mulch can be applied to areas at rough grade. With the use of an appropriate anchoring method, mulch may be applied to areas as steep as 2:1 (H:V).
- F. All mulch shall be anchored. Install commercial netting according to manufacturer's specifications.
- G. Wood waste shall be anchored with netting consisting of openings no larger than the average size of the wood waste chips.

### **3.04 TEMPORARY GRASSING**

- A. Temporary grassing shall be applied in accordance with specifications set forth in Chapter 6, Section II of the "Manual for Erosion and Sediment Control in Georgia".
- B. Temporary grassing can be employed instead of mulch if an area will remain undisturbed for less than six months.
- C. Where staged construction or other conditions not controlled by Contractor prohibit the completion of work in a continuous manner; Engineer may order Contractor to apply temporary grassing to an erodible area.
- D. Temporary grassing shall consist of sowing a quick growing species of grass

suitable to the area and season. Certified temporary grass seed shall be applied at the rates and dates as indicated in the Plans

### **3.05 PERMANENT (PERENNIAL) GRASSING**

- A. See Section 02920 – Permanent (Perennial) Grassing and Landscaping.

### **3.06 GRADING OPERATIONS**

- A. Grading operations shall be scheduled so that ground surface will be disturbed for the shortest possible time before permanent construction is installed. Large areas shall be maintained as flat as possible to minimize soil transport through surface flow.
- B. Wherever steeper slopes or abrupt changes in grade are required, a compacted diversion or berm shall be constructed at the top of slope to cause surface water to flow along the diversion to a control point to be transported down slope in a slope drain. In no case shall surface water be allowed to flow uncontrolled down slopes.
- C. Unless otherwise approved in writing by Engineer, construction operations in rivers, streams and impoundments shall be restricted to those areas that must be entered for the construction of temporary or permanent structures, or at locations shown on the Drawings.
- D. Mechanized equipment shall not be operated in live streams except as may be minimally required, unless otherwise approved in writing by Engineer.
- E. Frequent fording of live streams with construction equipment shall not be permitted. Temporary bridges or other structures, designed in accordance with specifications by the “Manual for Erosion and Sediment Control in Georgia”, shall be used whenever an appreciable number of stream crossings are necessary.

### **3.08 DUST CONTROL**

- A. Dust raised from vehicular traffic shall be controlled by wetting down the access road with water. The use of a deliquescent chemical, such as calcium chloride, may be used if the relative humidity is over 30%. Chemicals shall be applied in accordance with the manufacturer’s recommendations.

### **3.09 CLEAN-UP AND REMOVAL**

- A. Temporary erosion and sediment control measures shall be removed and bare areas stabilized when all areas draining to the control(s) are no longer under construction and have reached final stabilization.

- B. All sediment accumulated at erosion and sediment control structures shall be removed and properly disposed of before the structure is removed.
- C. Sediment deposits shall be uniformly spread at an appropriate location and stabilized with mulch and grassing.
- D. All false-work, sheeting or piling which are to be removed, debris, and other obstructions shall be promptly cleared from rivers, streams and impoundments as soon as conditions permit.

**END OF SECTION**

**SECTION 02373**  
**NPDES STORM WATER PERMITTING**

**PART 1 – GENERAL**

**1.01 RELATED DOCUMENTS**

General Permit No. GAR100002 – Georgia Department of Natural Resources  
Environmental Protection Division

Manual for Erosion and Sediment Control in Georgia – State Soil and Water  
Conservation Commission

**1.02 RELATED WORK**

A. Section 02370 – Soil Erosion Control

**1.03 SCOPE OF WORK**

Comply with requirements of State of Georgia Department of Natural Resources  
Environmental Protection Division General Permit No. GAR100002. Permit governs  
storm water discharges associated with construction activity specifically construction  
projects under the National Pollutant Discharge Elimination System.

**1.04 SUBMITTALS**

Contractor shall submit a copy of the Notice of Intent (N.O.I.) to the local EPD's District  
Office and the local Soil and Water Conservation Service/EPD Water Protection Branch  
(depends on local permitting authority) in accordance with the permit on behalf of  
Owner a minimum of 14 days prior to the start of construction activities.

Contractor shall assume responsibilities and requirements of Primary Permittee once  
awarded the contract.

**1.05 QUALITY ASSURANCE**

A. Regulatory Requirements:

1. Contractor shall obtain required permits and licenses in accordance with  
requirements of Federal Clean Water Act (CWA) and Water Quality Act  
(WQA). Contractor shall file Notice of Intent (NOI) with Georgia  
Environmental Protection Division. General Contractor shall be  
Operator/Primary Permittee on Notice of Intent. Contact GA. EPD at 404-  
362-2671 for additional information and permit forms.

2. Contractor shall provide temporary and permanent erosion control systems as indicated on Drawings and as necessary to protect adjacent properties and water resources from erosion and sedimentation.
3. CWA (1972) and WQA (1987) Requirements:
  - a. Where Work on this project will disturb 1 or more acres, do not start Work without obtaining a “National Pollution Discharge Elimination System” (NPDES) permit governing discharge of storm water from project site for duration of Contract. Obtain approved Erosion, Sedimentation, and Pollution Control (ES&PC) Plan from Owner/Engineer prior to construction.
  - b. Provide storm water management in accordance with NPDES permit and for any enforcement action taken or imposed by Federal or State agencies, including cost of fines, construction delays and remedial actions resulting from failure to comply with all provisions of NPDES permit and SWP3.
  - c. Keep NOI and ES&PC Plan on site and make available for inspection by appropriate authority having jurisdiction at any time.

## **PART 2 – RESPONSIBILITIES OF THE PRIMARY PERMITTEE (GENERAL CONTRACTOR):**

### **2.01 GENERAL**

The following information generally summarizes certain requirements of the General Permit No. GAR100002. This information is not intended to represent the complete requirements to comply with the Permit for this project. The General Contractor shall assume the responsibilities and requirements of the Primary Permittee and Operator for the project.

### **2.02 NOTICE OF INTENT (NOI)**

Contractor shall submit the Notice of Intent (NOI) and any necessary supporting documentation to Georgia Environmental Protection Division (EPD) 14 days prior to the start of construction activities. General Contractor shall be the Operator/Primary Permittee on Notice of Intent.

### **2.03 EROSION, SEDIMENTATION, AND POLLUTION CONTROL (ES & PC) PLAN**

The ES & PC Plan shall be amended if a significant change in the design, construction, operation, or maintenance of the Best Management Practices (BMPs) is needed. The Primary Permittee shall be responsible for amending the plan and shall have it certified by a licensed professional. The certification and any necessary supporting documentation shall be sent to EPD.

### **2.04 SAMPLING**

- A. The Primary Permittee shall sample in accordance with the following rainfall events:
  - 1. The first rainfall event greater than or equal to 0.5-in. and allows for monitoring during normal business hours that occurs after all clearing and grubbing operations are complete in the drainage area of the location selected as the representative sampling location.
  - 2. First rain event greater than or equal to 0.5 in. that follows either 90 days after initial sampling event or after mass grading is complete in said area.
- B. If BMPs have not been properly designed, installed, or maintained, corrective action shall be defined and implemented within 2 days and samples shall be taken for each subsequent rain event greater than or equal to 0.5 in. during normal business hours until selected turbidity is attained or until post-storm event inspections determine that BMP's are properly designed, installed, and maintained.
- C. One representative outfall sampling location shall be selected by the Engineer prior to beginning construction. The Contractor is responsible for contacting Engineer to determine the location for the representative outfall sample.

### **2.05 ANALYSIS**

- A. Samples collected manually shall be collected within 45 minutes following the rain event.
- B. Samples should be analyzed immediately as required by the permit, but shall be analyzed no later than 48 hours after collection.
- C. All samples that have been analyzed shall be documented.

## **2.06 SITE INSPECTIONS BY LICENSED PROFESSIONAL (ENGINEER OF RECORD)**

- A. Within one week after initial construction begins, the licensed professional (Engineer of Record) who prepared the ES&PC Plan shall inspect the execution of the ES & CP Plan and determine if BMP's have been installed and maintained as designed. The Primary Permittee shall notify the licensed professional that the Plan has been implemented and his/her inspection is required.
- B. The Primary Permittee shall correct any deficiencies identified by the licensed professional within two business days of inspection.

## **2.07 SITE INSPECTIONS BY PRIMARY PERMITTEE**

- A. Qualified personnel, individuals who have successfully completed an approved E&SC short course approved by EPD, shall perform all site inspections.
- B. Site inspections shall be conducted in accordance with the following schedule:
  - 1. Each day when any type of construction activity has taken place, qualified personnel shall inspect (a) all areas where petroleum products are stored, used or handled and (b) all locations where vehicles enter or exit the site; and (c) measure rainfall once each twenty-four hour period at the site.
  - 2. A site inspection shall be conducted at least every fourteen (14) calendar days and within 24 hours of the end of any rainfall event that is greater than or equal to 0.5-in.
  - 3. Qualified personnel shall inspect at least once per month (until NOT is received by EPD) the areas of the site that have undergone final stabilization.
  - 4. A report summarizing each inspection should be kept on site for documentation.
- C. Any deficiencies identified during the inspection of BMPs shall be corrected within seven (7) days of the inspection.
- D. Amendments to the ES & PC Plan resulting from inadequate BMP design shall be developed and resubmitted (ES & PC Plan to EPD) by a certified professional hired by the Contractor.
- E. Any additional erosion and sedimentation control measures necessary during construction to prevent silt and sediment from leaving the site shall be the responsibility of the Contractor.

## **2.08 PERMIT VIOLATIONS AND PENALTIES**

- A. Permit violations are grounds for an enforcement action, permit termination (stop work order), or denial of a permit renewal application.
- B. Failure to properly design, install or maintain BMPs shall constitute a violation of the Permit for each day on which such a failure occurs.
- C. If BMPs are not properly designed, installed and maintained, the following will result in a second violation of the Permit:
  - 1. If monitoring receiving waters: an increase in the turbidity of downstream waters by 10 Nephelometric Turbidity Units (NTUs) for waters classified as trout streams or 25 NTUs for waters supporting warm water fisheries; or
  - 2. If monitoring outfalls: turbidity measurements that exceed the value set forth by the NTU Tables presented in Appendix B of Permit No. GAR100002.
- D. A fine or imprisonment or both shall, upon conviction, punish any person who falsifies, tampers with or knowingly renders inaccurate monitoring information, any record, or document.
- E. The Primary Permittee is not excused from compliance with the Permit even if a local government authority has approved the ES&PC Plan or failed to take enforcement action.

## **2.09 RECORD KEEPING AND REPORTING REQUIREMENTS**

- A. The Primary Permittee shall submit to EPD by the 15<sup>th</sup> of each month, a summary of storm water discharge monitoring (turbidity) results. A summary of all known violations of the Permit at the site shall be included.
- B. The following records are required by the Permit and shall be retained by the Primary Permittee at the construction site or a readily available designated alternate location:
  - 1. Copy of NOI and delivery receipt
  - 2. Copy of ES&PC (Erosion, Sedimentation, and Pollution Control (ES &PC) Plan



3. Inspection report from the licensed professional that prepared the ES&PC Plan stating that BMPs have been installed as designed
  4. Daily rainfall log
  5. Daily inspection logs of entrances and exits (when construction activity has taken place)
  6. Bi-weekly inspection logs of all disturbed areas indicating whether or not BMPs identified in the ES&PC Plan are operating correctly. The Primary Permittee shall document any and all known violations.
  7. Sampling records including date, place, and time of sampling and analyses, quality assurance program and turbidity readings.
  8. Inspection results of all areas that have undergone final stabilization
- C. For at least three years, copies of all records must be maintained at the Primary Permittee's place of business.
- D. Upon request, the Primary Permittee shall make the ES&PC Plan, CMP and/or records available to EPD or the local government within three days.

## **2.10 NOTICE OF TERMINATION (NOT)**

- A. The Primary Permittee may submit a Notice of Termination (NOT) and any necessary supporting documentation to EPD when the site undergone final stabilization and all storm water discharges associated with construction have ceased.
- B. A NOT shall be filed if the Owner or Operator of the site changes. The Primary Permittee shall notify subsequent owners of the requirements of the Permit.

**END SECTION**

## **SECTION 02400 CONSTRUCTION DEWATERING**

### **PART 1 GENERAL**

- 1.01 The Contractor shall be responsible for controlling groundwater in a manner that will preserve the strength of the foundation soils, will not cause instability of the excavation slopes, and will not result in damage to existing structures.
- 1.02 Where permeable soils are encountered at subgrade elevations the Contractor shall maintain the groundwater level a minimum of 3 feet below the prevailing excavation level.
- 1.03 The Contractor shall submit for the Engineers' approval a construction dewatering plan. The plan shall indicate the method of dewatering to be used, the location of any wells or pumps, and where pumped groundwater is to be discharged. No excavation will be allowed without an approved dewatering plan
- 1.04 The groundwater table will be continuously monitored around the proposed structures. The contractor shall be responsible for maintaining the groundwater level below structure at all times the structure is dewatered and under construction. Wells installed for dewatering during construction shall be capped and remain in place after construction is complete.

### **PART 2 PRODUCTS**

- 2.01 Equipment used for dewatering is optional to the Contractor.
- 2.02 Mechanical equipment used shall be in good working order and suitable for use under the anticipated conditions. A diesel or gasoline powered stand-by pumping unit shall be provided at all times for emergency use in case of failure of the normal system.
- 2.03 Wells and well points, if used, shall be installed with suitable screens and filters so that continuous pumping of fines does not occur.

### **PART 3 EXECUTION**

- 3.01 The Contractor shall begin dewatering operations a minimum of two weeks prior to beginning of foundation work. The system should operate 24 hours a day, 7 days a week until the permanent structure is in place.

- 3.02 No compensation for removal of unstable material below the subgrade shall be allowed if in the opinion of the Engineer, modified dewatering techniques would solve the problem and result in a suitable subgrade.
- 3.03 Dewatering discharge shall be accessible for collection of samples by the Engineer.
- 3.04 Contractor is responsible for providing back-up/emergency power for all dewatering equipment during construction. Any damage to work in place caused by insufficient dewatering shall be replaced and/or repaired at no additional cost to the Owner.
- 3.05 The Contractor shall, at all times during construction, provide and maintain proper equipment and facilities to remove all water entering excavations, and shall keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fills, structures or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural levels. The Contractor shall engage a Geotechnical Engineer, Registered in the State of Georgia, to design the dewatering system. The Contractor shall submit to the Engineer for review the design of the dewatering systems prior to commencing work. Design drawings, specifications, and calculations shall be provided as part of the submittal process.
- 3.06 The Contractor shall furnish, install, maintain, operate and remove a temporary dewatering system consisting of trenches, sump pits, deep wells, well points, or other methods as required to lower and control the groundwater level so that the pipes and/or structures may be installed in the dry. The Contractor shall assume full responsibility for the design and installation of an adequate dewatering system. The Contractor shall, at his own expense, correct all damage resulting from inadequacy of the dewatering system or from flooding of the construction site from other causes.
- 3.07 The Contractor shall start de-watering operations a minimum of two weeks prior to beginning of foundation work. The system should operate 24 hours a day, 7 days a week until construction is complete. The Contractor shall maintain the water level at least 3 feet below the excavated area for the various phases of the work continuously and shall make such provisions as may be necessary to avoid interruptions due to weather, labor strikes, power failures, or other delays. He shall provide and have ready for immediate use at all times diesel or gasoline powered standby pumping units to serve the system in case of failure of the normal pumping units.
- 3.08 Piping and boiling, or any form of uncontrolled seepage, in the bottom or sides of the excavation shall be prevented at all times. If for any reason the dewatering system is found to be inadequate to meet the requirements set forth herein, the Contractor shall at his own expense make such additions, changes and/or replacements as necessary to provide a satisfactory dewatering system.

- 3.09 Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation. Well or sump installations shall be constructed with proper sand filters to prevent drawing of finer grained soil from the surrounding ground.
- 3.010 Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and pumped from the excavation to maintain a bottom free from standing water.
- 3.011 The Contractor shall take all additional precautions to prevent uplift during construction. The Contractor shall maintain the groundwater level below the pipe or structure so flotation is prevented.
- 3.012 Drainage water shall be disposed of through a desilting basin which will prevent the discharge of sediment into any surface waters or existing drains, and to prevent flow or seepage back into the excavated area.
- 3.013 Flotation shall be prevented by the Contractor by maintaining a positive and continuous operation of the dewatering system. The Contractor shall be fully responsible and liable for all damages which may result from failure of this system.
- 3.014 For the clarifier dewatering system, the contractor shall construct system in such a way that the dewatering system shall remain for permanent use should the owner need to drain the clarifier post-construction. This shall only include wells, piping systems, etc. but does not include pumping systems, which shall be removed once construction is complete.
- 3.015 The Contractor shall take all necessary precautions to preclude the accidental discharge of fuel, oil, etc. in order to prevent adverse effects on groundwater quality.

**END OF SECTION**

## **SECTION 02500 YARD PIPING**

### **PART 1 – GENERAL**

#### **1.01 SCOPE**

- A. The Contractor shall furnish all labor, equipment, materials and incidentals necessary to install and test all yard piping and appurtenances as shown on the Drawings and as specified herein.
- B. Yard piping is generally described as all below ground process and drain piping and shall include all below ground piping including that below structures. Yard piping above ground shall begin at the outside face of structures and buildings except where there is no joint at the outside face, then yard piping shall begin at the first pipe joint beyond the structure or building.
- C. This work shall include, but not be limited to the following: ductile iron pipe, copper tubing, steel pipe, plastic pipe, valves, fittings and manholes. Concrete thrust blocks or restrained joints required for all types of piping. Also all excavation, backfilling, sheeting, slope protection, drainage, concrete work, riprap, grading and all other work necessary to complete the construction, installation and testing of the yard piping.

#### **1.02 RELATED WORK**

- A. Concrete work is included in Division 3.
- B. Interior pipe, valves and fittings are included in Division 15.
- C. Buried valves and appurtenances are included in Section 15100.
- D. Excavation, Trenching, and Backfilling to Utility Systems in Section 02315.

#### **1.03 SUBMITTALS**

- A. Submit to the Engineer within ten (10) days after receipt of Notice to Proceed, a list of materials to be furnished, the names of the suppliers, and the date of delivery of materials to the site.
- B. Submit shop drawings to the Engineer for review in accordance with Section 01300, showing a complete laying plan of all pipe, including all fittings, adapters, valves and specials along with the manufacturer's drawings and specifications indicating complete details of all items. The pipe details shall include pipe class or design and back-up computations including reinforcement; laying schedule which specifies pipe class, class coding, joints, station limits and transition

stations for the various pipe classes; and list of abbreviated terms with their full meaning. The above shall be submitted to the Engineer for approval before fabrication and shipment of these items. The locations of all pipes shall conform to the locations indicated on the Drawings. In most cases, a certain amount of flexibility in positioning of pipes will be allowed, especially where new pipes will connect to existing structures or piping. Horizontal and vertical deflections may require beveled, special deflection, or short pipe. The deflection of joints shall not exceed 75 percent of that recommended by the manufacturer.

- C. The pipe manufacturer shall inspect all pipe joints for out-of-roundness and pipe ends for squareness. The manufacturer shall furnish to the Engineer a notarized affidavit stating all pipe meets the requirements of ASTM, ASCE, ANSI, etc., these Specifications, and the joint design with respect to square ends and out-of-round joint surfaces.
- D. Furnish in duplicate to the Engineer sworn certificates that all tests and inspections required by the Specifications under which the pipe is manufactured have been satisfied.
- E. The Contractor shall submit as a Shop Drawing for review by the Engineer, detailed information showing the type of restrained joints proposed and the calculations for determining the total restrained joint pipe length for each fitting in each pipe size. No restrained joint shall be installed unless the Engineer has approved in writing the calculations for such joints.

#### **1.04 INSPECTION**

- A. All pipe and fittings to be installed under this contract may be inspected at the site of manufacture for compliance with these Specifications by an independent laboratory selected by the Owner. The manufacturer's cooperation shall be required in these inspections. The cost of inspection by an independent laboratory, will be borne by the Owner.

#### **1.05 HYDROSTATIC TESTING OF DUCTILE IRON PIPE AT FOUNDRY**

- A. Each joint of ductile iron pipe shall be hydrostatically tested at the point of manufacture to 500 psi for a duration of one minute. Testing may be performed prior to machining bell and spigot. Failure of ductile iron pipe shall be defined as any rupture of pipe wall. Certified test certificates shall be furnished in duplicate to the Engineer prior to time of shipment.
- B. All ductile iron pipe and cast iron fittings to be installed under this Contract shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured. Furnish in duplicate to the Engineer sworn certificates that all tests and inspections required by the Specifications under which the pipe is manufactured have been satisfied.

## **PART 2 – PRODUCTS**

### **2.01 STORM DRAINAGE SYSTEMS**

OMITTED

### **2.02 DUCTILE IRON PIPE AND FITTINGS**

- A. Ductile iron pipe for buried service shall meet the requirements of Section 02530 – Sanitary Sewer Collection System.
- B. Ductile iron pipe for above ground service or in below ground concrete pits shall meet the requirements of Section 15062.
- C. All ductile iron pipe fittings shall be cast iron or ductile iron with a minimum pressure rating of 350 psi, for the purpose intended. Fittings shall meet the requirements of ANSI, and AWWA standards as applicable. Rubber gasket joints shall conform to ANSI A21.11 for mechanical and push-on type joints. Flanged fittings shall conform to ANSI A21.15 and be furnished flat faced and drilled to 125 pounds template in accordance with ANSI B16.1 with full faced gaskets. Bolts, nuts, and washers shall be of mild corrosion resistant alloy steel and shall be heavily coated with two (2) coats of bituminous paint after installation.
- D. All pipe and fittings shall be coated in accordance with Section 09900.
- E. All pipe shall be given a factory hydrostatic test of not less than 500 pounds per square inch.
- F. Pipe and fittings shall be as manufactured by the American Cast Iron Pipe Company, U.S. Pipe and Foundry Company, Clow Corporation or equal.

### **2.03 PLASTIC PIPE AND FITTINGS**

OMITTED

### **2.04 STEEL PIPE AND FITTINGS**

OMITTED

### **2.05 COPPER PIPE AND TUBING**

OMITTED

### **2.06 PIPE HANGERS AND SUPPORTS**

- A. Pipe hangers and supports shall be as specified in Section 15094.

## **2.07 MANHOLES**

- A. Manholes shall conform to Section 02530 designed for a minimum of H-20 loading.
- B. Where shown on the drawings, aluminum hatches meeting the requirements of Section 05505 shall be installed.

## **2.08 UNDERDRAIN PIPE SYSTEM**

OMITTED

## **2.09 SLEEVES**

Pipes passing through floors, walls or roof slabs shall be provided with sleeves and seals as shown on the Plans and as specified herein, unless otherwise indicated.

- A. Non Watertight Sleeves

Pipes passing from one occupied area to another within the building where a watertight sleeve is not required shall have sleeves as follows:

1. Horizontal piping passing through masonry, concrete wall, partitions or beams shall be provided with sleeves made up of standard steel pipe, hot dip galvanized after fabrication, 1/2-inch larger in diameter than the outside diameter of the pipe, of length to end flush with the finish on the wall surface and centered accurately to dimensions where shown and, where not, plans are to be scaled. If the pipe has insulation specified to pass through the sleeves, the sleeves shall be enlarged accordingly.
2. Vertical piping passing through floor slabs laid on earth shall be cast in the floor slab.

- B. Watertight Seals & Sleeves

1. Watertight seals shall be modular, mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and the wall opening. The elastomeric element shall be sized and selected per manufacturer's recommendations and have the following properties as designated by ASTM. Coloration shall be throughout elastomer for positive field inspections. Each link shall have a permanent identification of the size and manufacturer's name molded into it. Seals shall be by Link-Seal Model LS-400S-316.



- a. For standard service applications = Model C -40 to +250°F (-40 to +121°C) EPDM = ASSTM D2000 M3 BA510 Color = Black.
2. Wall openings up to 24.81" diameter shall have a molded non-metallic high density polyethylene Model CS Century-Line sleeves as manufactured by PSI-Thunderline/Link-Seal. Model CS sleeves shall have integrally formed hollow water stop sized having a minimum of four inches larger than the outside diameter of the sleeve itself and allowing ½" movement between wall forms to resist pour forces. Each sleeve assembly shall have end caps manufactured of the same material as the sleeve itself and installed at each end of the sleeve so as to prevent deformation during the initial concrete pour, and to facilitate attaching the sleeve to the wall forms. End caps shall remain in place to protect the opening from residual debris and rodent entry prior to pipe insertion.
3. For wall openings larger than 29.25", the Contractor shall install Cell-Cast disks, providing a round hole in conformance with Link-Seal modular seal sizing data. Cell-Cast disks shall consist of 3" and/or 4" lightweight interlocking polyethylene cells stacked to form the thickness of the poured concrete wall. Molded into each cell shall be a cavity to accept a 2"x4" nailer.

## **PART 3 – EXECUTION**

### **3.01 GENERAL**

- A. Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe or coatings. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying, and no piece shall be installed which is found to be defective. Any damage to the pipe coatings shall be repaired as directed by the Engineer.
- B. All pipe and fittings shall be subjected to a careful inspection and hammer test just prior to being laid or installed. If any defective pipe is discovered after it has been laid it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional expense to the Owner. All pipe and fittings shall be thoroughly cleaned before laying, shall be kept clean until they are used in the work, and when installed or laid, shall conform to the lines and grades required.
- C. All buried piping shall be installed to the lines and grades as shown on the Drawings. All underground piping shall slope uniformly between joints where elevations are shown.
- D. Contractor shall exercise extreme care when constructing yard piping to shore up and protect from damage all existing underground water lines and power lines, and all existing structures.

### **3.02 REINFORCED CONCRETE PIPE**

OMITTED

### **3.03 DUCTILE IRON PIPE**

- A. Ductile iron pipe and fittings shall be installed in accordance with requirements of AWWA Standard C600 except as otherwise provided herein. A firm, even bearing throughout the length of the pipe shall be constructed by tamping selected material at the sides of the pipe up to the springline. Blocking will not be permitted.
- B. All pipe shall be sound and clean before laying. When laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by watertight plug or other approved means. Good alignment shall be preserved in laying. The deflection at joints shall not exceed that recommended by manufacturer. Fittings, in addition to those shown on the Drawings, shall be provided, if required, in crossing utilities which may be encountered upon opening the trench. Solid sleeves shall be used only where approved by the Engineer.
- C. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be used with a push-on bell shall be beveled to conform to the manufactured spigot end. Cement lining shall be undamaged.
- D. Jointing Ductile-Iron Pipe
  - 1. Push-on joints shall be made in strict accordance with the manufacturer's instructions. Pipe shall be laid with bell ends looking ahead. A rubber gasket shall be inserted in the groove of the bell end of the pipe, and the joint surfaces cleaned and lubricated. The plain end of the pipe is to be aligned with the bell of the pipe to which it is to be joined, and pushed home with a jack or by other means. After joining the pipe, a metal feeler shall be used to make certain that the rubber gasket is correctly located.
  - 2. Mechanical joints at valves, fittings, and where designated on the Drawings and/or as specified, shall be in accordance with the "Notes on Method of Installation" under ANSI Specification A21.11 and the instructions of the manufacturer. To assemble the joints in the field, thoroughly clean the joint surfaces and rubber gasket with soapy water before tightening the bolts. Bolts shall be tight to the specified torques. Under no condition shall extension wrenches or pipe over handle or ordinary ratchet wrench be used to secure greater leverage.

3. Ball joints, where designated on the Drawings and/or as specified, shall be installed in strict accordance with the manufacturer's instructions. Where ball joint assemblies occur at the face of structures or tanks, the socket end shall be at the structure or tank and the ball end assembled to the socket.
  4. Flanged joints shall be in accordance with ANSI Specifications A21.15 including its Appendix "A" and the instructions of the manufacturer. Flanged joints shall be fitted so that the contact faces bear uniformly on the gasket and then are made up with relatively uniform bolt stress.
- E. All valves, fittings and other appurtenances needed upon the pipe lines shall be set and jointed as indicated on the Drawings or as required by the manufacturer.
  - F. Unless otherwise noted, underground piping shall be push-on or mechanical joint, and above ground piping shall be flanged.
  - G. Deflected bell pipe if shown on the Drawings is shown only as an assistance in illustrating a preferred means of installation in specific locations, and is not intended to indicate all deflected bell pipe necessary to effect the installation as shown in plan and profile views. The cost of all such deflections shall be included within the bid price for furnishing and installing the pipe.

### **3.04 PLASTIC PIPE**

OMITTED

### **3.05 STEEL PIPE**

OMITTED

### **3.06 COPPER PIPE**

OMITTED

### **3.07 PIPE SUPPORTS AND THRUST BLOCKS**

#### **A. Supports**

1. All piping shall be properly and adequately supported. Hangers, supports, base elbows and tees, and concrete piers and pads shall be provided as indicated on the Drawings. If the method of support is not indicated on the Drawings, exposed piping shall be supported by hangers wherever the structure is suitable and adequate to carry the superimposed load. The Engineer shall determine if the structure is

adequate. Supports shall be placed approximately 8-feet on centers and at each fitting.

2. Hangers and supports shall be as specified in Section 15094.

- B. Where indicated on the Drawings, longitudinal thrust along pressurized pipe lines at bends, tees, reducers, and caps or plugs shall be counteracted by enough weight of concrete to counterbalance the vertical and horizontal thrust forces. Where undisturbed trench walls are not available for thrust blocking, the Contractor shall furnish and install suitable pipe harnesses or ties designed and manufactured specifically for this purpose. Harnesses and/or ties shall be approved by the Engineer.
- C. Joints shall be protected by felt roofing paper prior to placing concrete thrust block.
- D. Bearing area of thrust blocks shall be adequate to prevent any movement of the fitting and shall be of the size and dimensions as shown on the Drawings.
- E. Concrete for thrust blocking shall be no leaner than 1 part cement, 1-1/2 parts sand, and 5-1/2 parts stone. Concrete shall be placed against undisturbed material, and shall not cover joints, bolts or nuts, or interfere with the removal of any joint. Wooden side forms shall be provided for thrust blocks.
- F. Restrained joints shall be used as specified or as shown on the Drawings.

### **3.08 STRUCTURE AND MANHOLE CONNECTIONS**

- A. Pipe stubs for all structure and manhole connections shall not exceed 5 feet in length.

### **3.09 MANHOLES**

- A. Manholes shall be constructed at such points as designated on the plans. In all cases the channel shall be smooth and properly rounded. Special care shall be exercised in laying the channel and adjacent pipes to grade. The connection of the sewer with the wall and channel of the manholes shall be tight and smooth. Pipe connections shall be made to manholes using water stops, standard O-ring joints, special manhole couplings, or shall be made in accordance with the manufacturer's recommendations. The Contractor's proposed method of connection, showing materials selected and specials required, shall be submitted to the Engineer prior to installation.
- B. The top of manholes outside of roads, streets and highways shall be built to grades 3 inches above ground surface, unless otherwise shown. Manholes in roads, streets and highways shall be built to grades shown on the plans.

- C. When directed by the Engineer, the manhole shall be placed on 3,000 psi concrete footing to insure adequate bearing.

### **3.10 RESTRAINED JOINTS**

- A. Restrained joints shall be constructed using pipe and fittings with restrained "Locked-type" joints and the joints shall be capable of holding against withdrawal for line pressures 50 percent above the normal working pressure but not less than 50 psi. Restrained joints for pipe, valves and fittings shall be mechanical joints with ductile iron retainer glands or push-on type joints equivalent to "Lok-Ring", "TR Flex", or "Super Lock" and shall have a minimum rated working pressure of 250 psi. The joints shall be in accordance with the applicable portions of AWWA C111. The manufacturer of the joints shall furnish certification, witnessed by an independent laboratory, that the joints furnished have been tested at a pressure of 500 psi without signs of leakage or failure. Restrained joints shall be capable of being deflected after assembly.
- B. Restrained pipe joints that achieve restraint by incorporating cut out sections in the wall of the pipe shall have a minimum wall thickness at the point of cut out that corresponds with the minimum specified wall thickness for the rest of the pipe.
- C. Bolts and nuts for restrained joints shall be high-strength, low-alloy steel per AWWA C111.

### **3.11 PRESSURE AND LEAKAGE TESTS OF UNDERGROUND PIPING**

- A. Hydrostatic pressure and leakage tests shall conform with Section 4 of AWWA C600 with the exception that the Contractor shall furnish all gauges, meters, pressure pumps and other equipment needed to test the line.
- B. The pressure required for the field hydrostatic pressure test shall be 50 percent above the normal working pressure. The Contractor shall provide temporary plugs and blocking necessary to maintain the required test pressure. Corporation cocks at least 3/4-inches in diameter, pipe riser and angle globe valves shall be provided at each pipe dead-end in order to bleed air from the line. Duration of pressure test shall be at least 24 hours. The cost of these items shall be included as a part of testing.
- C. The leakage test shall be a separate test at the maximum operating pressure as determined by the Engineer following the pressure test and shall be of not less than 2 hours duration. All leaks evident at the surface shall be repaired and leakage eliminated regardless of total leakage as shown by test. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are complied with. Defective materials, pipes, valves and accessories shall be

removed and replaced. The pipe lines shall be tested in such sections as may be directed by the Engineer by shutting valves or installing temporary plugs as required. The line shall be filled with water and all air removed and the test pressure shall be maintained in the pipe for the entire test period by means of a force pump to be furnished by the Contractor. Accurate means shall be provided for measuring the water required to maintain this pressure. The amount of water required is a measure of the leakage.

- D. The amount of leakage which will be permitted shall be in accordance with AWWA C600 Standards for all pressure. No pipe installation shall be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD(P)^{1/2}}{133,200}$$

In which L is the allowable leakage in gallons per hour; S is the length of pipe tested, in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge.

- E. Contractor must submit his plan for testing to the Engineer for review at least ten (10) days before starting the test. The Contractor shall remove and adequately dispose of all blocking material and equipment after completion and acceptance of the field hydrostatic test, unless otherwise directed by the Engineer. Any damage to the pipe coating shall be repaired by the Contractor. Lines shall be totally free and clean prior to final acceptance.

### **3.12 DISINFECTING YARD PIPING**

- A. Yard Piping (excluding drain piping) shall be disinfected to EPD's requirements for a potable water system. See Section 2510 for specification.

**END OF SECTION**

**SECTION 02530**  
**SANITARY SEWER COLLECTION SYSTEM**

**PART 1 – GENERAL**

**1.01 SCOPE**

- A. This section of the Specifications describes products to be incorporated into the sanitary sewer and requirements for the installation and use of these items. The contractor shall furnish all products and perform all labor necessary to fulfill the requirements of these Specifications. It includes, but is not limited to the construction of the following items.
1. Sewer Pipes
  2. Force Main
  3. Connection to Existing System
  4. Fittings, Adaptors, Couplings

**1.02 RELATED WORK**

- A. Other work required for the construction of the sanitary sewer collection system is specified in the following of the specifications:

Section No.	Title
02315	Excavation, Trenching and Backfilling for Utilities
02370	Soil Erosion Control
02920	Grassing

**1.03 OPTIONS**

- A. The Contractor will furnish the Engineer and the Owner a description of all materials before ordering. The Engineer will review the Contractor's submittals and provide in writing an acceptance or rejection of material. However, an acceptance of any material by the Engineer does not relieve the Contractor of this responsibility to meet the requirements of the construction plans or these specifications.

**1.04 QUALITY ASSURANCE**

- A. Material and equipment shall be the standard product of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the project.

- B. A Subcontractor for any part of the work must have experience on similar work and if required, furnish the Engineer with a list of projects and the Owners or Engineers who are familiar with his competence.
- C. Devices, equipment, structures, and systems not designed by the Engineer that the Contractor wishes to furnish shall be designed either by a registered professional engineer or by someone the Engineer approved as qualified. If required, complete design calculations and assumptions shall be furnished to the Engineer or the Owner before acceptance.
- D. All testing of the piping shall be made by the Contractor with equipment qualified by the Owner, Engineer, or utility company and in the presence of the Engineer, Owner and utility company. The Engineer or his representative reserves the right to accept or reject testing equipment.
- E. Soil testing shall be done by a testing laboratory regularly engaged in soil testing, and shall be approved by the Engineer prior to engagement. Mill certificates of test on materials made by manufacturers will be accepted provided the manufacturer maintains an adequate testing laboratory, make regularly scheduled tests that are spot checked by an outside laboratory, and furnishes satisfactory certificates with the name of the one making the test.
- F. The details of all welded joints shall comply with all of the requirements for joints, which are accepted without qualification test under the "Code of Arc and Gas Welding in Building Construction of the American Welding Society". Workmanship shall conform to A.I.S.C. Specifications for Fabrication and Erection. All work shall be executed by skilled workmen under experienced supervision. All welding shall be done by welders who have been previously qualified by tests as prescribed in the "American Welding Society Standard Qualification Procedure" to perform the type of work required. Welders shall have passed the qualification test (Qualification tests using procedures covered in AWSS B3.0 Part II) within the preceding 12 months.

#### **1.05 ALTERNATIVES**

- A. The intention of these specifications is to produce the best system for the Owner. If the Contractor suggests that alternate material, equipment or procedures will improve the results at no additional costs, the Engineer and the Owner will examine the suggestion and if it is accepted, it may be used. The basis upon which acceptance of an alternate will be given is its value to the Owner, and not for the convenience of the Contractor.

#### **1.06 GUARANTEE**



- A. The contractor shall guarantee the quality of the materials, equipment, and workmanship for 12 months after acceptance of the completed Project. Defects discovered during that period shall be repaired by the Contractor, at no cost to the Owner. The Performance bond shall reflect this guarantee.
- B. The manufacturers of equipment, valves, pumps, controls, measuring devices and special equipment shall test the equipment shall test the equipment at field conditions for compliance with the specifications. The manufacturer shall guarantee his product to be free from defects in material and factory workmanship for a period of 1 year from date of acceptance of the completed project, provided the product is properly installed, serviced and operated under normal conditions according to the manufacturer's instructions. The manufacturer shall furnish the service of a representative of the Engineer with a certificate that the equipment meets the specifications and will perform as required. The manufacturer shall furnish four field trips to the plant by a service representative during the first year after completion of the Project at no cost to the Owner.

#### **1.07 EXISTING UTILITIES**

- A. All known utility facilities are shown schematically on plans, and are not necessarily accurate in location as to plan or elevation. Utilities such as service lines or unknown facilities not shown on plans will not relieve the contractor of his responsibility under this requirement. "Existing Utilities Facilities" means any utility that exists on the projects in its original, relocated or newly installed position. The Contractor will be held responsible for the cost of repairs to damaged underground facilities: even when such facilities are shown on the plans. The Contractor shall contact all utility companies prior to beginning work and request an accurate field location of their respective utility lines.
- B. Damage to any part of the existing water system facilities by the Contractor or Subcontractors, that is required by the user's and Owner's forces, shall be charged to the Contractor on the basis of time and material, plus 30% for overhead and administration.

#### **1.08 ACCEPTANCE OF PORTIONS OF WORK**

- A. The Owner reserves the right to accept and use any portion of the work whenever it is considered in the public interest to do so.

#### **1.09 RECORD DATA**

- A. It will be required of the Contractor to keep accurate, legible records of the location of any deviations from the construction drawings, any additional items

or structures to the construction drawings. These records will be made available to the Engineer before his inspection for incorporation into the Engineer's Record Drawings.

## **PART 2 – PRODUCTS**

Products and materials used in the work shall conform to the following:

### **2.01 SANITARY SEWER PIPE (GRAVITY SEWER)**

A. Ductile Iron Pipe – Shall conform to ANSI A21.50 (AWWA C-150) latest revision, ANSI A21.51 (AWWA C-151) latest revision, and ASTM A746. All pipe, except specials, shall be furnished in nominal lengths of 18 to 20 feet. All ductile iron pipes and fittings for buried service shall be bituminous coated on the outside and lined with Tnemec 431 on the inside. The size of the pipe shall be as indicated on the drawings. All pipe shall have a Pressure Class 350 pressure rating.

1. Coating on the outside shall be an asphaltic coating approximately 1 mil thick. The finished coating shall be continuous, smooth, neither brittle when cold or sticky when exposed to the sun, and shall be strongly adherent to the iron.
2. Tnemec Series 431 Polyamine Ceramic Epoxy is a two component, modified polyamine ceramic epoxy formulated for corrosion control and shall conform to the following:
  - a. Solids by Volume: 100%
  - b. Hazard Air Pollutants: Zero
  - c. Ceramic Hollow Microspheres: 20 % by volume (no silica fume, fly ash, or alumina dust)
  - d. Pigment volume concentration: less than 22%
  - e. Coal-Tar Content: Zero
  - f. Color- Sewer Pipe Green
  - g. Dry Film Thickness- 40 mils.

- B. Polyvinyl Chloride (PVC) Pipe – Shall be unplasturized polyvinyl chloride with integral wall bell and spigot joints with a rubber ring gasket. Pipe and fittings shall meet the requirements of ASTM-D 3034 SDR 35 ASTM F679 for use as a gravity sewer conduit, except for depths greater than ten feet (10') where ductile iron pipe must be used. All pipe must be installed in accordance with ASTM D 2321, with additional bedding as required in these specifications or project details. Sizes and dimensions shall be as shown in the following table.

Nominal Size	Outside Diameter		Minimum Wall Thickness
	Average	Tolerance	
8"	8.400	±0.010	0.240
10"	10.500	±0.013	0.300
12"	12.500	±0.016	0.360
15"	15.300	±0.017	0.437
18"	18.700	±0.019	0.719
24"	24.803	±0.032	0.954

1. Minimum pipe stiffness (F/Y) at 5% deflection shall be 46 psi for all sizes when tested in accordance with ASTM D2412.
2. PVC gravity sewer pipe shall be supplied in lengths no longer than 13 feet.
3. Each length of pipe shall be marked with the manufacturer's name, trade name, nominal size, class, hydrostatic test pressure, manufacturer's standard symbol to signify it was tested, and date of manufacture. Each rubber ring shall be marked with the manufacturer's identification, the size, the year of manufacture, and the classes of pipe with which it can be used.

## 2.02 PIPE JOINTS (GRAVITY SEWER)

- A. Ductile Iron Pipe (D.I.) – Shall be flexible rubber gasket Type II, or mechanical joint Type III, conforming to ASA Specification A21.11.
- B. Polyvinyl Chloride (PVC) Pipe – Shall be flexible gasket joints for PVC sewer pipe and shall be compression type conforming to ASTM D-3212. The gasket shall conform to ASTM F-477.
- C. Transition Joints – The transition between sewer pipes of different materials shall be made by either concrete collar or by special adapters made for that purpose. Adapters between cast iron pipe and pipe of materials will be accepted

upon approval by the Engineer. In most cases where special adapters are not available or not approved by the Engineer, concrete collars will be used.

## **2.03 FORCE MAIN**

- A. Ductile Iron Pressure Pipe (DIP) – Ductile Iron pipe shall be manufactured according to ANSI/AWWA C151/A21.51 and shall be Class 350 minimum.
  - 1. Lining for ductile iron pipe and fittings shall be Tnemec 431 Ceramic Epoxy or approved equal.
  - 2. Exterior coating shall be an approved bituminous coating one mil thick unless otherwise shown and/or specified.
  - 3. Rubber gasket joints shall conform to ANSI/AWWA C110/A21.11, push-on type, unless otherwise shown on the plans.
  - 4. Piping shall be manufactured by U.S. Pipe & Foundry Co., American Cast Iron Pipe Co., or McWane Corporation.
- B. Polyvinyl Chloride (PVC) Pipe and Fusible Polyvinyl Chloride (FPVC) Pipe – Pipe 12" and smaller shall conform to AWWA C900-DR18 and pipe larger than 12" shall conform to AWWA C905-DR18. Pipe shall be made of compounds conforming to ASTM D1784 with a cell classification of 12454. Integral bells shall incorporate gaskets meeting the requirements of ASTM F477 and be locked into the bell. The assembled joint shall meet the requirements of ASTM D3139. The nominal laying length of the pipe shall be 20 feet.
- C. HDPE Pipe – High Density Polyethylene - High density polyethylene pipe shall be manufactured in accordance with ASTM D 3035, Polyethylene (PE) Plastic Pipe and shall be so marked. Each production lot of pipe shall be tested for (from material or pipe) melt index, density, % carbon, (from pipe) dimensions and either quick burst or ring tensile strength (equipment permitting). Pipe shall be DR-17, rated at 125 psi, or as shown in the Plans. Force Main and header piping shall be DIPs - PE 4710, DR-17 or of the DR called out in the plans.
  - 1. Method of Pipe Delivery – Piping shall be delivered to the job site in 20 or 40 linear foot sections for pipe greater than or equal to 5" diameter (nominal), and shall be delivered and installed from spools for pipe less than or equal to 4" in diameter (nominal).
  - 2. Manufacturers:  
Manufacturers that are qualified and approved by the Project Engineer are listed below. Products from unapproved manufacturers are prohibited.

ISCO Industries, LLC  
Performance Pipe, Inc.  
JM Eagle

Materials used for the manufacture of polyethylene pipe and fittings shall be PE4710 high density polyethylene meeting cell classification 445574C per ASTM D 3350; and shall be listed in the name of the pipe and fitting Manufacturer in PPI1 TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds, with a standard grade rating of 1600 psi at 73°F. The Manufacturer shall certify that the materials used to manufacture pipe and fittings meet these requirements.

3. Interchangeability of Pipe and Fittings: Polyethylene pipe and fittings shall be produced by the same Approved Manufacturer. Products made by sub-contractors or Manufacturer's distributor are not acceptable. Pipe and fittings from different Approved Manufacturers shall not be interchanged.

4. Jointing Method – Butt Fusion

Pipe segments and fittings shall be joined using the butt fusion method. The fusion equipment operator shall be trained on the manufacturer's recommended procedure within the past 12 months. The contractors shall be responsible for verifying that the fusion equipment is in proper operating condition. The fusion equipment will be equipped with a datalogger and records of the welds shall be maintained for five (5) years. Fusion beads shall not be removed.

5. Service Identification Stripes

Permanent identification of piping service shall be provided by co-extending four equally spaced color stripes into the pipe outside surface. The striping material shall be the same material as the pipe material except for color. The following colors shall be used to identify piping service:

Green stripes – sanitary sewer and force mains

Stripes printed on the pipe outside surface shall not be acceptable.

6. Polyethylene Fittings & Custom Fabrications

Polyethylene fittings and custom fabrications shall be molded or fabricated by the pipe manufacturer. Butt fusion outlets shall be made to the same outside diameter, wall thickness, and tolerances as the mating pipe. All

fittings and custom fabrications shall be fully rated for the same internal pressure as the mating pipe. Pressure de-rated fabricated fittings are prohibited.

7. Molded Fittings

Molded fittings shall be manufactured in accordance with ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing, and shall be so marked. Each production lot of molded fittings shall be subjected to the tests required under ASTM D 3261.

8. X-Ray Inspection

The Manufacturer shall submit samples from each molded fittings production lot to x-ray inspection for voids, and shall certify that voids were not found.

9. Fabricated Fittings

Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock, or molded fittings. Fabricated fittings shall be rated for internal pressure service equivalent to the full service pressure rating of the mating pipe. Directional fittings 16" DIPS and larger such as elbows, tees, crosses, etc., shall have a plain end inlet for butt fusion and flanged directional outlets. Part drawings shall be submitted for the approval of the Project Engineer.

10. Polyethylene Flange Adapters

Flange adapters shall be made with sufficient through-bore length to be clamped in a butt fusion joining machine without the use of a stub-end holder. The sealing surface of the flange adapter shall be machined with a series of small v-shaped grooves to provide gasketless sealing, or to restrain the gasket against blow-out. Flanged transitions are acceptable only for above-ground connection.

11. Back-up Rings & Flange Bolts

Flange adapters shall be fitted with lap joint flanges pressure rated equal to or greater than the mating pipe. The lap joint flange bore shall be chamfered or radiused to provide clearance to the flange adapter radius. Flange bolts and nuts shall be Grade 2 or higher. Flanged transitions are acceptable only for above-ground connection.

## 12. HDPE Adapters for Buried Transitions

Buried HDPE pipe to be connected to mechanical joint, bell-type joint or restrained joint pipe shall be provided at all transitions from HDPE pipe to non-HDPE pipe. Such restrained transitions shall include clamps, adapter kits, and other manufacturer approved restraint items so that the connection is fully restrained. The transitions shall have stiffeners, shall be compatible with the pipe to be connected and shall be butt-fused to the HDPE pipe to be so connected.

- D. Fittings FOR PVC AND D.I. PIPE – All fitting shall be ductile iron, compact in weight and size, with restrained joints meeting the requirements of AWWA C110/ANSI A21.10, or AWWA C153/ANSI A21.4, and with a minimum rated working pressure of 250 psi. Fittings shall be mechanical joint and have a nominal wall thickness of Class 54 Ductile Iron Pipe. They shall be furnished with a bituminous outside coating and lined with Tnemec 431 Ceramic Epoxy or equal. Color of finish coat shall be sewer pipe green to match pipe. Special adapters shall be provided, as recommended by the manufacturer, to adapt the PVC pipe to mechanical jointing with cast or ductile iron pipe, fittings or valves.
- E. Fittings FOR HDPE PIPE – All fittings shall be butt-fused as described above.
- F. Thrust Blocking – Concrete having compressive strength of not less than 3000 psi shall be used for all bends/fittings and constructed as per details in the plans. Bends exceeding 22-1/4 degrees, crosses with one opening plugged, and all tees shall be backed with concrete as a thrust block. Blocking shall be placed between solid ground and the fitting to be anchored; the area of bearing on the pipe and on ground in each instance shall be that shown on the plans in detail. The blocking shall be so placed that the pipe fitting joints will be accessible for repair. No extra payment will be made for the thrust blocks.

### 2.04 EXPANSION JOINTS

- A. Expansion joints shall be manufactured of molded neoprene with filled triple arches. Joints shall be reinforced with galvanized 3/8-inch split steel retaining rings placed directly against the inside of the flanged to prevent damage to the rubber surface when the bolts are tightened. Expansion joints shall be suitable for buried service or above ground service. Flanges shall be drilled to ANSI 125#. Working pressures as follows:

Size	Pressure
------	----------

1"-4"	165#
5"-12"	140#
14"	85#
16"-24"	65#
26"-66"	55#

- B. Maximum temperature shall be 180 degrees F and shall be capable of a maximum 1-1/2-inch lateral movement. Expansion joints shall be Model J-I as manufactured by the Red Valve Company, or approved equal.

## **2.05 FLANGED ADAPTORS**

- A. Flanged adaptors where shown on the Drawings shall be "Uni-Flange" as manufactured by Uni-Flange Corporation, Series 400.
- B. Flange shall be ductile iron designed to meet the requirements of ANSI D16. Set screw shall be AISI 4140 steel, heat treated, zinc
- C. Where shown on the Drawings adaptor shall be harnessed.

## **2.06 FLEXIBLE COUPLINGS**

- A. Flexible couplings shall be either the split type or the sleeve Type
  - 1. Split type coupling shall be used with all interior piping and with exterior piping as noted on the Drawings. The couplings shall be mechanical type for radius groove piping. The couplings shall mechanically engage and lock grooved pipe ends in a positive couple and allow for angular deflection and contraction and expansion.
  - 2. Couplings shall consist of malleable iron, ASTM Specification A47, Grade 32510 housing clamps in two or more parts, a single chlorinated butyl composition sealing gasket with a "C" shaped cross-section and internal sealing lips projecting diagonally inward, and two or more oval track head type bolts with hexagonal heavy nuts conforming to ASTM Specification A183 and A194 to assemble the housing clamps. Bolts and nuts shall be 316 stainless steel.
  - 3. Victaulic type couplings and fittings may be used in lieu of flanged joints if approved by the Engineer. Pipes shall be radius grooved as specified for use with the Victaulic couplings. Flanged adapter connections at fittings, valves, and equipment shall be Victaulic Vic Flange Style 741, equal by Gustin-Bacon Group, Division of Certain-Teed Products, Kansas City, Kansas, or equal.



4. Sleeve type couplings shall be used where shown on the Drawings. The couplings shall be of steel and shall be Dresser Style 38, Smith Blair Style 413, Baker Allsteel, or equal. The coupling shall be provided with 316 stainless steel bolts and nuts unless indicated otherwise.
5. All couplings shall be furnished with the pipe stop removed.
6. Couplings shall be provided with gaskets of a composition suitable for exposure to the liquid within the pipe.
7. If the Contractor decides to use victaulic couplings in lieu of flanged joints, he shall be responsible for supplying supports for the joints.

## **2.07 FLEXIBLE CONNECTORS**

- A. Flexible connectors shall be constructed of bronze hose and braid with female copper tube sweat fittings brazed on each end. Connectors shall be Style BF as manufactured by Vibration Mountings and Controls, Inc., Butler, N.Y., equal by American, Waterbury, Conn., or equal.

## **2.08 PIPE SLEEVE SEALS**

- A. A watertight seal at all wall sleeves shall be obtained using expandable rubber seal rings equal to Link-Seal as shown on the Drawings. These seal rings shall be the modular mechanical type consisting of synthetic rubber links shaped to continuously fill the annular space between the pipe and wall sleeve. Links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and nut. After the seal assembly is positioned in the sleeve, tightening of the bolts shall cause the rubber sealing sleeve. The watertight seal shall be effective against a hydrostatic head of at least 40 feet. The seal shall also be constructed so as to provide electrical insulation between the pipe and wall, thus reducing chances of cathodic reaction between these two members.
- B. Mechanical seals as described above shall be provided with 316 S.S. nuts, bolts and washers.
- C. Annulus shall be grouted on both sides after installation with hydraulic cement.

## **2.09 TEES**

- A. Tees shall be the same diameter as the run of the pipe. They shall be of the same material as the sewer main.

## **2.10 LATERALS**

- A. Shall be Ductile Iron Pipe conforming to paragraph 2.1-B, with push-on joints or Polyvinyl Chloride pipe with bells and natural rubber rings for jointing, conforming, to Paragraph 2.1-A, PVC Pipe.

## **2.11 STONE BACKFILL**

- A. Shall be graded crushed granite with the following gradation:

Square Opening Size	Percent Passing
1"	100%
3/4"	90 to 100%
3/8"	0 to 65%
No. 4	0 to 25%

## **2.12 SAND BACKFILL**

- A. Shall be clean sand free of clay and organic material. Not more than 10% shall pass the No. 100 sieve.

## **2.13 BORROW**

- A. Where it is determined that sufficient suitable material is not available from the site to satisfactorily backfill the pipe to at least 2 feet above the top of the pipe, the Contractor shall furnish suitable sandy borrow material to accomplish the requirements. The materials shall have not more than 60% passing the No. 100 sieve, nor more than 20% passing the No. 200 sieve.

## **2.14 UNSUITABLE EXCAVATED MATERIAL**

- A. All unsuitable excavated material must be properly disposed of in a manner acceptable to the City Public Works Department and in a manner that will not adversely affect the environment.

## **2.16 DETECTION WIRE**

- A. Detection Wire shall be #14 gauge insulated single strand copper wire.

## **PART 3 – EXECUTION**

### **3.01 ON-SITE OBSERVATION**

- A. The Engineer shall have the right to require that any portion of the work be done in his presence and if any work is covered up after such instruction, it shall be exposed by the Contractor for observation. However, if the Contractor notifies the Engineer that such work is scheduled and the Engineer fails to appear within 48 hours, the Contractor may proceed without him. All work done and materials furnished shall be subject to review by the Engineer or Project Representative. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon notice being received from the Engineer for the rejection of such materials. The Engineer shall have the right to mark rejected materials so as to distinguish them as such.

### **3.02 HANDLING MATERIALS**

- A. Unloading: Furnish equipment and facilities for unloading, handling, distributing and storing pipe, fittings, valves and accessories. Make equipment available at all times for use in unloading. Any cracked or damaged materials cannot be used and must be properly discarded.
- B. Handling: Handle pipe, fittings, valves and accessories carefully to prevent shock or damage. Handle pipe by rolling on skids, forklift, or front loader. Do not use material damaged in handling.
- C. Distribution: Distribute and place pipe and materials to not interfere with traffic. Do not string pipe more than 300 feet beyond the area where pipe is being laid. Do not obstruct drainage ditches.
- D. Storage: Store all pipe which cannot be distributed along the route. Make arrangements for the use of suitable storage areas. Do not interfere with other contractors right to access.

### **3.03 CONSTRUCTION ALONG HIGHWAYS, STREETS AND ROADWAYS**

Install pipelines and accessories along highway, streets and roadways in accordance with the applicable regulations of the County, City and/or the Department of Transportation with reference to construction operations, safety, traffic control, road maintenance and repair.

- A. Protection of Traffic: Provide and maintain suitable signs, barricades and lights for protection of traffic.

Replace all highway signs removed for construction as soon as possible. Do not close or block any highway, street, or roadway without first obtaining permission from the proper authorities.

Provide flagmen to direct and expedite the flow of traffic.

- B. Construction Operations: Perform all work along highways, streets and roadways to least interfere with traffic.
  - 1. Stripping: Where the pipe line is laid along road shoulders, strip and stockpile all sod, topsoil and other material suitable for shoulder restoration.
  - 2. Trenching, Laying and Backfilling: Do not open the trench any further ahead of pipe laying operations than is necessary. Backfill and remove excess material immediately behind laying operations. Complete excavation and backfill for any portion of the trench in the same day.
  - 3. Shaping: Reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. Replace topsoil, sod and any other materials removed from shoulders.
- C. Excavated Materials: Do not place excavated material along highways, streets and roadways in a manner which obstructs traffic. Sweep all scattered excavated materials off of the pavements.
- D. Drainage Structures: Keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material and free to drain at all times.
- E. Maintaining Highways, Streets, Roadways and Driveways: Maintain streets, highways, and roadways in suitable condition for movement of traffic until completion and final acceptance of the work. Use steel running plate to maintain traffic until pavement is completed.

### **3.04 EXISTING UNDERGROUND UTILITIES AND OBSTRUCTIONS**

- A. It is the responsibility of the Contractor to locate all existing utilities along the path of his construction. The drawings shall indicate underground utilities or obstructions that are known to exist. Where these or unforeseen underground utilities are encountered, the location and alignment of the watermain may be changed, upon written approval of the Engineer and Owner, to avoid interference.

### **3.05 CONNECTIONS TO EXISTING PIPE LINES**

- A. Before laying pipe, the Contractor shall locate the points of connection to existing pipe lines and uncover as necessary for the Engineer and Owner to confirm the nature of the connections to be made. The Contractor shall furnish materials and make the connection to all existing pipelines. The Contractor will be observed during construction of tie-ins by the Owner and the Engineer. The Contractor shall use all available practices and resources to minimize the time the customers are without water.

### **3.06 PIPE DISTRIBUTION**

- A. Pipe shall be distributed and placed in such a manner that will not interfere with traffic.
- B. No pipe shall be strung further along the route than 1,000 feet beyond the area in which the Contractor is actually working without written permission from the Owner and/or Engineer. The Owner and/or Engineer reserves the right to reduce this distance to a maximum distance of 200 feet in residential and commercial areas based on the effects of the distribution to the adjacent property owners.
- C. No street or roadway may be closed for unloading of pipe without first obtaining permission from the proper authorities. The Contractor shall furnish and maintain proper warning signs and obstruction lights for the protection of traffic along highways, streets and roadways upon which pipe is distributed.
- D. No distributed pipe shall be placed inside drainage ditches.
- E. Distributed pipe shall be placed as far as possible from the roadway pavement, but no closer than five feet from the roadway pavement, as measured edge-to-edge.
- F. Contractor shall not excavate sanitary sewer trenches more than 400 feet in advance of pipe laying.
- G. Pipe distribution shall in no way, and shall under no circumstances, disturb wetlands (see Plans for Wetland Delineations).

### **3.07 LOCATION AND GRADE**

- A. The Drawings show the alignment and grade of the gravity sewer and the position of manholes and other appurtenances. The slope shown on the gravity sewer profile and/or called for in the Specifications is the slope of the invert of the pipe.

- B. After the Contractor locates and marks the manhole centerlines or baselines of the gravity sewer, the Contractor shall perform clearing and grubbing.

### **3.08 LAYING AND JOINTING PIPE AND ACCESSORIES**

- A. Lay all pipe and fittings to accurately conform to the lines and grades established by the construction drawings.
- B. Pipe Installation:
  - 1. Proper implements, tools and facilities shall be provided for the safe performance of the Work. All pipe, fittings and valves shall be lowered carefully into the trench by means of slings, ropes or other suitable tools or equipment in such a manner as to prevent damage to sewer materials and protective coatings and linings. Under no circumstances shall sewer materials be dropped or dumped into the trench.
  - 2. All pipe, fittings, valves and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked and held for inspection by the Owner and/or Engineer, who may prescribe corrective repairs or reject the materials.
  - 3. All lumps, blisters and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and free from dirt, sand, grit or any foreign materials before the pipe is laid. No pipe which contains dirt shall be laid.
  - 4. Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing or other materials shall be placed in the pipe at any time.
  - 5. As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.
  - 6. It is common practice to lay pipe with the bells facing the direction in which work is progressing.
  - 7. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade shall not be permitted.

8. Polyethylene Encasement: Installation shall be in accordance with AWWA C105 and the manufacturer's instructions. All ends shall be securely closed with tape and all damaged areas shall be completely repaired to the satisfaction of the Owner and/or Engineer.

C. Alignment and Gradient:

1. Lay pipe straight in alignment and gradient or follow true curves, where shown on the Drawings, as nearly as practicable. Do not deflect any joint more than the maximum deflection recommended by the manufacturer.
2. Maintain a transit, level and accessories on the job to lay out angles and ensure that deflection allowance are not exceeded.
3. The Contractor shall check the invert elevation at each manhole and the gravity sewer invert elevation at least three times daily, start, mid-day and end of day. Elevations shall be checked more frequently if more than 100 feet of pipe is installed in a day or if the gravity sewer is being constructed at minimum slope.
4. The Contractor shall check the horizontal alignment of the gravity sewer at the same schedule as for invert elevations.
5. Should any installed pipe have its alignment, grade, or joints disturbed after placement, it shall be taken up and relaid.

- D. Expediting of Work: Excavate, lay the pipe, and backfill as closely together as possible. Do not leave unjointed pipe in the trench overnight. Backfill and compact the trench as soon as possible after laying and jointing is completed. Cover the exposed end of the installed pipe each day at the close of work and at all other times when work is not in progress. If necessary to backfill over the end of an uncompleted pipe or accessory, close the end with a suitable plug, either push-on, mechanical joint, restrained joint or as approved by the Owner and/or Engineer.

E. Joint Assembly:

1. Push-on, mechanical, flange and restrained type joints shall be assembled in accordance with the manufacturer's recommendations.
2. Each restrained joint shall be inspected by the Contractor to insure that it has been "homed" 100%.

F. Cutting Pipe:

1. Cut ductile iron pipe using an abrasive wheel saw.
  2. Cut PVC pipe using a suitable saw.
  3. Remove all burrs and smooth the end before jointing.
  4. The Contractor shall cut the pipe and bevel the end, as necessary, to provide the correct length of pipe necessary for installing the fittings, valves, accessories and closure pieces in the correct location. Only push-on or mechanical joint pipe shall be cut.
- G. House Connections: Install wyes or tees in locations designated by the Owner and/or Engineer for future connection of service lines. Plug the branch of the wye or tee. Record the location of fittings installed on the Record Drawings.
- H. Valve, Fitting and Pressure Gauge Installation:
1. Prior to installation, valves shall be inspected for direction of opening, number of turns to open, freedom of operation, tightness of pressure-containing bolting and test plugs, cleanliness of valve ports and especially seating surfaces, handling damage and cracks. Defective valves shall be corrected or held for inspection by the Owner and/or Engineer. Valves shall be closed before being installed.
  2. Valves, fittings, plugs and caps shall be set and joined to the pipe in the manner specified in this Section for cleaning, laying and joining pipe, except that 12-inch and larger valves shall be provided with special support, such as treated timbers, crushed stone, concrete pads or a sufficiently tamped trench bottom so that the pipe will not be required to support the weight of the valve.
  3. A valve box shall be provided on each underground valve. They shall be carefully set, centered exactly over the operating nut and truly plumbed. The valve box shall not transmit shock or stress to the valve. The bottom flange of the lower belled portion of the box shall be placed below the valve operating nut. This flange shall be set on brick, so arranged that the weight of the valve box and superimposed loads will bear on the base and not on the valve or pipe. Extension stems shall be installed where depth of bury places the operating nut in excess of 30-inches beneath finished grade so as to set the top of the operating nut 30-inches below finished grade. The valve box cover shall be flush with the surface of the finished area or such other level as directed by the Owner and/or Engineer.



4. In no case shall valves be used to bring misaligned pipe into alignment during installation. Pipe shall be supported in such a manner as to prevent stress on the valve.

### **3.09 SEPARATION BETWEEN WATER & SANITARY SEWER**

- A. Parallel separation shall be 10 feet horizontal between sanitary sewers and any existing or proposed water mains. Deviation may be authorized for closer installation provided that the sewer is laid in a separate trench such that the bottom of the water main is at least 18 inches above the top of the sewer. Sanitary sewers crossing water mains shall be laid to provide a minimum vertical distance of 18 inches of vertical clearance, both water and sewer line. Where there is less than 18 inches of vertical clearance, both water and sewer lines shall be ductile iron for one full length each side of the crossing with the water pipe joints located as far as possible from the sewer crossing.

### **3.10 VALVES AND APPURTENANCES**

- A. All valves and appurtenances shall be installed in the locations shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the Engineer before they are installed.
- B. After installation, all valves and appurtenances shall be tested at least 2 hours at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any point proves to be defective, it shall be repaired to the satisfaction of the Engineer.
- C. Flanged and mechanical joints under water or exposed to weather shall be made with type 316 stainless steel bolts, nuts and washers.
- D. Prior to assembly of split couplings, the grooves as well as other parts shall be thoroughly cleaned. The ends of the pipes and outside of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes. The housing sections then shall be placed. After the bolts have been inserted, the nuts shall be tightened until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.
- E. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly for a distance of 8 inches. Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to

a distance of about 6 inches from the end, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint. The other pipe end shall be inserted into the middle ring and brought to proper position in relation to the pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flares. After the bolts have been inserted and all nuts have been made up fingertight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts.

- F. Pressure gauges shall not be installed until after the substantial completion date unless otherwise requested by the Owner.

### **3.11 EXCAVATING, TRENCHING AND BACKFILLING**

Refer to Section 02315

### **3.12 CONNECTION TO AN EXISTING MANHOLE**

- A. Connection to an existing manhole shall be made by mechanically coring into the wall structure of the manhole. Cored opening shall be sized to properly accommodate a rubber boot seal as specified in this section.

### **3.13 CONNECTION AND REPAIRS TO AN EXISTING SEWER MAIN**

- A. Where connections or repairs are required, Contractor shall only use solid sleeves and provide all materials and labor necessary to make the connection or repair to the existing pipeline, excluding service lines 6" or smaller.

### **3.14 CONCRETE COLLARS**

- A. Construct collars as shown on the Drawings.

### **3.15 DETECTION WIRE & DETECTION TAPE**

- A. Detection wire shall be provided over all non-ferrous pipe and properly connected to fittings and valves so that the pipeline may be located after burial. The wire should be buried one foot above the pipeline.
- B. The Contractor shall install a continuous run of plasticized metallic tape above the top of non-metallic pipe used for gravity sewer and force mains at approximately 30" below finished grade.
- C. In addition to the tape, the contractor shall install a continuous run of tracer wire attached to pipe. On pipe runs greater than 500', this tracer wire shall be

attached to a 2" galvanized pipe with a 180 degree bend at top, extending 36" above grade for connection to locator equipment. The maximum distance between 2" pipe stubs shall be 500'.

- D. Detection Tape shall be suitable for detection with metal pipe location equipment, color coded, and labeled to identify contents of pipe and brightly colored to contrast with the soil.

### **3.16 THRUST RESTRAINT**

- A. Provide restraint at all points where hydraulic thrust may develop.
- B. Retainer Glands: Provide retainer glands where shown on the Drawings and all associated fittings, valves and related piping. Retainer glands shall be installed in accordance with the manufacturer's recommendations, particularly, the required torque of the setscrews. The Contractor shall furnish a torque wrench to verify the torque on all set screws which do not have inherent torque indicators.
- C. Harnessing: Provide harness rods only where specifically shown on the Drawings or directed by the Owner and/or Engineer. Harness rods shall be manufactured in accordance with ASTM A 36 and shall have an allowable tensile stress of no less than 22,000 psi. Harness rods shall be hot dip galvanized or field coated with bitumastic before backfilling. Where possible, harness rods shall be installed through the mechanical joint bolt holes. Where it is not possible, provide 90 degree bend eye bolts. Eye bolts shall be of the same diameter as specified in AWWA C111 for that pipe size. The eye shall be welded closed. Where eye bolts are used in conjunction with harness rods, an appropriate size washer shall be utilized with a nut on each end of the harness rod. Eye bolts shall be of the same material and coating as the harness rods.
- D. Concrete Blocking:
  - 5. Provide concrete blocking for all other bends, tees, valves, and other points where thrust may develop, except where other means of thrust restraint are specifically shown on the Drawings.
  - 6. Form and pour concrete blocking at fittings as shown on the Drawings and as directed by the Owner and/or Engineer. Pour blocking against undisturbed earth. Increase dimensions when required by over excavation.
- E. Thrust Collars: Collars shall be constructed as shown on the Drawings. Concrete and reinforcing steel shall meet the requirements specified in Article 2.03G of

this Section. The welded-on collar shall be attached to the pipe by the pipe manufacturer.

### **3.17 INSPECTION AND TESTING**

- A. Clean and flush lines prior to testing. Clean and test lines before requesting final acceptance. Where any obstruction is met, clean the sewers by means of rods, swabs or other instruments. When requested by the Owner and/or Engineer, flush out lines and manholes before final inspection.
- B. Gravity Sewers: Pipe lines shall be straight and show a uniform grade between manholes. Correct any discrepancies discovered during inspection.
  - 1. Infiltration Tests: When groundwater is more than two feet above the top of the pipe, provide infiltration testing in accordance with ASTM C 969, with the exception that leakage must be limited to 25 gallons/inch of pipe diameter/mile/day.
    - a. Install suitable weirs in manholes selected by the Owner and/or Engineer to determine the leakage of ground water into the sewer. The maximum length of line for each infiltration test shall be 5,000 feet. Measure leakage only when all visible leaks have been repaired and the ground water is two feet above the top of the pipe. If leakage in any section of the sewer line exceeds 25 gallons/inch of pipe diameter/mile/day, locate and repair leaks. Repair methods must be approved by the Owner and/or Engineer. After repairs are completed, re-test for leakage.
    - b. Furnish, install, and remove the necessary weirs, plugs, and bulkheads required to perform the leakage tests. Where continuous monitoring of flow level is required, the Owner and/or Engineer will provide and operate monitoring equipment.
  - 2. Exfiltration Tests: Choose one of the following when groundwater is less than two feet above the top of the pipe.
    - a. Hydrostatic Test: Provide testing in accordance with ASTM C 969, with the exception that leakage must be limited to 25 gallons/inch of pipe diameter/mile/day.
      - 1. Test pipe between manholes with a minimum of 10 feet hydrostatic pressure, measured at the center of the pipe at the upstream manhole.

2. The ends of the pipe in the test section shall be closed with suitable watertight bulkheads. Inserted into the top of each bulkhead shall be a 2-inch pipe nipple with an elbow. At the upper end of the test section, a 12-inch riser pipe shall be connected to the 2-inch nipple. The test section of pipe shall be filled through the pipe connection in the lower bulkhead which shall be fitted with a valve, until all air is exhausted and until water overflows the riser pipe at the upper end.

Water may be introduced into the pipe 24 hours prior to the test period to allow complete saturation. House service lines, if installed, shall also be fitted with suitable bulkheads having provisions for the release of air while the test section is being filled with water.

3. During the test period, which shall extend over a period of two hours, water shall be introduced into the riser pipe from measured containers at such intervals as are necessary to maintain the water level at the top of the riser pipe. The total volume of water added during the test period shall not exceed 25 gallons/inch of pipe diameter/mile/day.

b. Low-Pressure Air Test:

1. Prior to air testing, the section of sewer between manholes shall be thoroughly cleaned and wetted. Immediately after cleaning or while the pipe is water soaked, the sewer shall be tested with low-pressure air. At the Contractor's option, sewers may be tested in lengths between manholes or in short sections (25 feet or less) using inflatable balls pulled through the line from manhole to manhole. Air shall be slowly supplied to the plugged sewer section until internal air pressure reaches approximately 4.0 psi. After this pressure is reached and the pressure allowed to stabilize (approximately two to five minutes), the pressure may be reduced to 3.5 psi before starting the test. If a 1.0 psi drop does not occur within the test time, then the line has passed the test. If the pressure drops more than 1.0 psi during the test time, the line is presumed to have failed the test, and the Contractor will be required to locate the failure, make necessary repairs, and retest the line. Minimum test time

for various pipe sizes, in accordance with ASTM F 1417 is as follows:

Nominal Pipe Size (In)	Minimum Time (Min:Sec)	Length for Min Time (Ft)	Time for Longer Length
6	2:50	398	0.427L
8	3:47	298	0.760L
10	4:43	239	1.187L
12	5:40	199	1.709L
15	7:05	159	2.671L
18	8:30	133	3.846L
21	9:55	114	5.235L
24	11:20	99	6.837L

2. Required test equipment, including inflatable balls, braces, air hose, air source, timer, rotameter as applicable, cut-off valves, pressure reducing valve, 0-15 psi pressure gauge, 0-5 psi pressure gauge with gradations in 0.1 psi and accuracy of  $\pm$  two percent, shall be provided by the Contractor. Testing equipment shall be equal to Cherne Air-Loc Testing Systems.
3. The Contractor shall perform all tests in the presence of the Owner's Representative. Copies of all records will be given to the Engineer or the Owner. Such records shall show date, line number and stations, operator, and other such pertinent information as requested by the Engineer.
4. The Contractor is cautioned to observe proper safety precautions in performance of the air testing. It is imperative that plugs be properly secured and that care be exercised in their removal. Every precaution shall be taken to avoid the possibility of over-pressurizing the sewer line.

7. Deflection Test:

- a. Test PVC gravity sewer for excessive deflection by passing a mandrel through the pipe. Deflection of the pipe shall not exceed the following:

Nominal Pipe Diameter	Maximum Allowable Deflection

$\leq$ 12-inches	5%
15 to 30-inches	4%
> 30-inches	3%

- b. The mandrel size shall be based upon the maximum possible inside diameter for the type of pipe being tested, taking into account the allowable manufacturing tolerances of the pipe. The mandrel shall have an odd number of legs, or vanes, with a quantity of such equal to or greater than nine. The legs of the mandrel shall be permanently attached to the mandrel. A mandrel with variable sizes shall not be allowed. The mandrel shall be constructed of steel aluminum or other material approved by the Owner and/or Engineer, and shall have sufficient rigidity so the legs of the mandrel will not deform when pulling through a pipe. The mandrel dimensions shall be checked by the Owner and/or Engineer before use by the Contractor.
  - c. Excavate and install properly any section of pipe not passing this test. Re-test until results are satisfactory.
  - d. The test shall be performed within the first 30 days of installation and during final inspection, at the completion of this contract.
  - e. The mandrel shall be performed in accordance with ASTM D 3034, F679, or 2122.
- 8. Closed Circuit Television: If deemed necessary by the Owner and/or Engineer, the interior of the gravity sewers shall be subjected to a televised inspection. Prior to Final Acceptance the Owner and/or Engineer shall be provided with one copy of the TV inspection report and video cassette showing the entire length of gravity sewer being tested. The report shall contain the condition of pipe, type of pipe, depth, location of services, length, type joint, roundness, and distance between manholes. Any pipe found to be cracked, leading, misaligned, bellied or otherwise defective shall be removed and replaced.
- C. Manholes: Prior to testing manholes for water tightness, all lift holes shall be plugged with a non-shrink grout, all joints between Precast sections shall be properly sealed and all pipe openings shall be temporarily plugged and properly braced. Each manhole shall pass one of the following tests:
  - 1. Exfiltration Tests: The manhole, after proper preparation as noted above, shall be filled with water. The maximum allowable leakage shall be eight gallons per foot of depth per 24 hours for 48-inch diameter

manholes. Tests shall last a minimum of eight hours. The manholes may be backfilled prior to testing.

2. Vacuum Tests: Vacuum tests shall be performed in accordance with ASTM C 1244, *Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test*. The manhole, after proper preparation as noted above, shall be vacuum tested prior to backfilling. The test head shall be placed at the inside of the top of the cone section and the compression head inflated to 40 psi to effect a seal between the vacuum base and the manhole structure. Connect the vacuum pump to the outlet port with the valve open. A vacuum of 10-inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9-inches. The manhole shall pass if the time is greater than 60 seconds for 48-inch diameter manholes. If the manhole fails the initial test, necessary repairs shall be made with non-shrink grout while the vacuum is still being drawn. Retesting shall proceed until a satisfactory test is obtained. Vacuum testing equipment shall be equal to that as manufactured by P.A. Glazier, Inc.

D. Force Main: Hydrostatic and leakage testing for force mains shall conform to Section 4 of AWWA C600 with the exception that the Contractor shall furnish all gauges, meters, pressure pumps, and other equipment needed to test the line.

1. Required Pressure - The pressure required for the field hydrostatic pressure test shall be 100 pounds per square inch at the highest point in the section being tested.
2. Duration of Test – The duration of each pressure test shall be two (2) hours.
3. Procedures: Each valved section of pipe shall be slowly filled with water to the specified test pressure (measured at the highest point in the section being tested). Pressure shall be supplied by means of a pump connected to the pipe in a satisfactory manner. The pump, pipe connection, and all necessary apparatus, gauges, and meters shall be furnished by the Contractor. The Contractor shall furnish all necessary labor and assistance in conducting the tests. The Owner will furnish, through connections made by the Contractor to existing mains, water for filling the lines for making the test.
4. Expelling Air Before Tests: Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be



made if necessary at points of highest elevation and afterward tightly plugged.

5. Examination Under Pressure: At intervals during the test (as determined by the Engineer), the route of the pipeline shall be inspected to locate any leaks or breaks. Any cracked or defective joints, cracked or defective pipe, fittings, or valves discovered in consequence of this pressure test shall be removed and replaced with sound material in the manner provided and the test shall be repeated until satisfactory results are obtained.
6. Allowable Leakage: The amount of leakage which will be permitted shall be in accordance with AWWA C600 Standards for all pressure. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, of any valved section thereof, to maintain the specified leakage test pressure after the pipe has been filled with water and the air in the pipeline has been expelled. No pipe installation shall be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD(P)^{1/2}}{133,200}$$

In which L is the allowable leakage in gallons per hour; S is the length of pipe tested, in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge.

7. Testing Schedule: Contractor must submit his plan for testing to the Engineer for review at least ten (10) days before starting the test. The Contractor shall remove and adequately dispose of all blocking material and equipment after completion and acceptance of the field hydrostatic test, unless otherwise directed by the Engineer. Any damage to the pipe coating shall be repaired by the Contractor. Lines shall be totally free and clean prior to final acceptance.
- E. Re-Testing: Any alterations made to pipeline or manholes performed after initial testing shall be re-tested and pass again, regardless of initial test results.
  - F. Notification: Owner and/or Engineer shall be notified 24-hours in advance prior to Contractor performing any testing.

### **3.18 PROTECTION AND RESTORATION OF WORK AREA**

- A. General: Return all items and all areas disturbed, directly or indirectly by work under these Specifications, to their original condition or better, as quickly as possible after work is started.
1. The Contractor shall plan, coordinate, and prosecute the work such that disruption to personal property and business is held to a practical minimum.
  2. All construction areas abutting lawns and yards of residential or commercial property shall be restored promptly. Backfilling of underground facilities, ditches, and disturbed areas shall be accomplished on a daily basis as work is completed. Finishing, dressing, and grassing shall be accomplished immediately thereafter, as a continuous operation within each area being constructed and with emphasis placed on completing each individual yard or business frontage. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.
  3. Handwork, including raking and smoothing, shall be required to ensure that the removal of roots, sticks, rocks, and other debris is removed in order to provide a neat and pleasing appearance.
  4. The Department of Transportation's engineer shall be authorized to stop all work by the Contractor when restoration and cleanup are unsatisfactory and to require appropriate remedial measures.
- B. Man-Made Improvements: Protect, or remove and replace with the Owner and/or Engineer's approval, all fences, walkways, mail boxes, pipe lines, drain culverts, power and telephone lines and cables, property pins and other improvements that may be encountered in the work.
- C. Cultivated Growth: Do not disturb cultivated trees or shrubbery unless approved by the Owner and/or Engineer. Any such trees or shrubbery which must be removed shall be heeled in and replanted under the direction of an experienced nurseryman.
- D. Cutting of Trees: Do not cut trees for the performance of the work except as absolutely necessary. Protect trees that remain in the vicinity of the work from damage from equipment. Do not store spoil from excavation against the trunks. Remove excavated material stored over the root system of trees within 30 days to allow proper natural watering of the root system. Repair any damaged tree over 3-inches in diameter, not to be removed, under the direction of an experienced nurseryman. All trees and brush that require removal shall be promptly and completely removed from the work area and disposed of by the

Contractor. No stumps, wood piles, or trash piles will be permitted on the work site.

- E. Disposal of Rubbish: Dispose of all materials cleared and grubbed during the construction of the project in accordance with the applicable codes and rules of the appropriate city and/or county, state and federal regulatory agencies.
- G. Swamps and Other Wetlands:
  - 1. The Contractor shall not construct permanent roadbeds, berms, drainage structures or any other structures which alter the original topographic features within the easement.
  - 2. All temporary construction or alterations to the original topography will incorporate measures to prevent erosion into the surrounding swamp or wetland. All areas within the easement shall be returned to their original topographic condition as soon as possible after work is completed in the area. All materials of construction and other non-native materials shall be disposed by the Contractor.
  - 3. The Contractor shall provide temporary culverts or other drainage structures, as necessary, to permit the free migration of water between portions of a swamp, wetland or stream which may be temporarily divided by construction.
  - 4. The Contractor shall not spread, discharge or dump any fuel oil, gasoline, pesticide, or any other pollutant to adjacent swamps or wetlands.

**END OF SECTION**

**SECTION 02920**  
**PERMANENT (PERENNIAL) GRASSING AND LANDSCAPING**

**PART 1 – GENERAL**

**1.01 SECTION INCLUDES**

- A. Preparation of ground surface; furnishing and application of lime, fertilizer, seed, and mulch to establish a stand of permanent, mowable grass on all disturbed areas; and placement of all disturbed shrubs, trees, and miscellaneous plants.
- B. Seed Protection.
- C. Maintenance of seeded areas until final acceptance.

**1.02 RELATED SECTIONS**

- A. Section 02370 – Soil Erosion and Sedimentation Control

**1.03 REFERENCES**

- A. “Standard Specifications, Construction of Roads and Bridges” Section 700 and 702;1993 Edition; published by the Georgia Department of Transportation; hereinafter referred to as the “Standard Specifications.”
- B. “Manual for Erosion and Sediment Control in Georgia” published by the State Soil and Water Conservation Commission of Georgia; hereinafter referred to as the “Manual”. Contractor shall be responsible for the acquisition and utilization of the latest edition of the “Manual for Erosion and Sediment Control in Georgia”.

**1.04 SUBMITTALS**

- A. Contractor shall submit list of grasses, lime, fertilizer, seeding and mulching rates; and seeding dates for Engineer’s review and approval prior to seeding.

**1.05 DEFINITIONS**

- A. Final Stabilization: All soil disturbing activities at the site have been completed, and that for unpaved areas and areas not covered by permanent structures, at least 70% of the soil surface is uniformly covered in permanent vegetation or equivalent permanent stabilization measures (such as the use of rip rap, gabions, permanent mulches, or geotextiles) have been employed.

- B. Land-Disturbing Activity: Any activity which may result in soil erosion from water or wind and the movement of sediments into State waters or onto lands within the State, including, but not limited to clearing, grubbing, dredging, grading, excavating, transporting, and filling.
- C. Rolled Erosion Control Blanket (RECB): A temporary blanket consisting of degradable plastic netting that covers and is intertwined with a natural organic or manmade mulch; or, a jute mesh that is typically homogenous in design.
- D. Soil Reinforcement Matting: A permanent non-degradable, three dimensional plastic structure which can be filled with soil prior to planting; also known as turf reinforcement matting.

## **PART 2 – PRODUCTS**

### **2.01 FERTILIZER AND LIME**

- A. Fertilizer: Standard commercial grade grass fertilizer with a 10-10-10 (N-P-K) proportion.
- B. Lime: Natural, agricultural grade, ground or pulverized dolomitic limestone.

### **2.02 MULCH**

- A. Dry straw, hay, or wood cellulose fiber of good quality, free of weeds and foreign matter detrimental to plant life.

### **2.03 GRASS SEED**

- A. All grass seed shall be certified by the Georgia Department of Agriculture.
- B. All grass seed shall be in undamaged containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.
- C. Selected grasses shall be appropriate for the season and site as specified by the Manual.
- D. Selected seed shall be equal type and grade to the previously existing grass.
- E. The Engineer reserves the right to test, reject, or accept all seed before seeding.

## **2.04 BLANKETS AND MATTING**

- A. All blanket and matting materials used shall be on the Georgia Department of Transportation Qualified Products List (QPL #62 for blankets, QPL #49 for matting).

## **2.05 SOD**

- A. Sod shall be densely rooted, good quality grass, free from noxious weeds, and appropriate for the region it is to be planted.
- B. The sod shall contain practically all of the dense root system and not be less than one (1) inch thick.
- C. Sod shall be cut in uniform strips not less than twelve (12) inches in width and not less than twenty-four (24) inches in length.

## **2.06 TREES, SHRUBBERY, AND MISCELLANEOUS PLANTS**

- A. All trees or shrubbery damaged by the Work shall be replaced with identical plants of the same general size and quality as previously existed.

## **2.07 PRODUCT REVIEW**

- A. The Contractor shall provide the Engineer with a complete description of all products before ordering. The Engineer will review all products before they are ordered.

# **PART 3 – EXECUTION**

## **3.01 GENERAL**

- A. All areas that are disturbed by the Work, including trenches and ungraded cleared areas, except areas to be paved, shall be provided with a full stand of permanent grass.
- B. Concentrated flow areas, all slopes steeper than 2.5:1 and with a height of ten feet or greater, and cuts and fills within stream buffers, shall be stabilized with sod and/or the appropriate erosion control matting or blanket. Appropriate matting or blankets shall be specified by the Engineer on the Drawings.

- C. Where sod is required to match existing conditions, the Contractor shall install sod. No separate payment will be made for sod as it will be considered a part of the final grassing bid item. Contractor will also be required to water sod until it is established.
- D. **Important Note: The Contractor is expected to provide a full coverage of permanent grass before the project will be deemed complete. Substantial retainage will be withheld if the Contractor is not preparing seed bed, seeding, and watering throughout the project to ensure a substantial stand at project completion.**

### **3.02 PREPARATION**

- A. Remove foreign materials, plants, roots, stones, and debris from surfaces to be seeded so that they are made smooth, uniform, and conform to the adjacent ground surface.
- B. Crusted soils shall be loosened to a minimum depth of 3 inches before fertilizer, lime, seed, or sod is applied.
- C. Apply fertilizer uniformly at a rate of 1,500 lbs./acre (35 lbs./1000 sq. ft.) unless otherwise directed by the Engineer.
- D. Apply lime uniformly at the rate of 2,000 lbs./acre (45 lbs./1000 sq. ft.) unless otherwise directed by the Engineer.
- E. Thoroughly mix lime and fertilizer with the first 2 to 4 inches of the soil.
- F. Roll to form a smooth, firm seedbed.

### **3.03 SEEDING**

- A. Include both temporary and permanent (perennial) grasses in all seeding of permanent grass. For additional information regarding permanent (perennial) grassing or for mixtures with temporary grassing or other perennial grasses, see Chapter 6, Section II of the Manual.
- B. Apply seed evenly on freshly prepared and rolled seedbed with a cyclone seeder, drill, cultipacker seeder, or hydroseeder.
- C. Certified grass seed shall be applied at the rates and dates indicated in the following table:

Species	Rate Per 1,000 Sq. Ft.	Rate Per Acre	PLANTING DATES		
			Mountains Limestone Valley	Piedmont	Coastal
Bermuda, Hulled	0.2 lb.	10 lbs.	-----	4/1 – 5/31	3/15 – 5/31
Bermuda, Unhulled	0.2 lb.	10 lbs.	-----	10/15 – 2/28	11/1 – 1/31
Bermuda, Sprigs	0.9 cu. ft.	40 cu. ft.		4/1 – 6/15	4/1 – 5/31
	Sod plugs 3 ft. x 3 ft.				
Crown Vetch	0.3 lb.	15 lbs.	9/1 – 10/15	9/1 – 10/15	-----
Fescue, Tall	1.1 lbs.	50 lbs.	3/1 – 4/1 or 8/15 – 9/30	8/15 – 10/15 or 2/15 – 4/15	-----
Sericea Lespedeza, Scarified	1.4 lbs.	60 lbs.	4/1 – 5/31	3/15 – 5/31	3/1 – 5/15
Sericea Lespedeza, Unscarified	1.7 lbs.	75 lbs.	9/21 – 2/28	9/1 – 2/28	9/1 – 2/28
Weeping Lovegrass	0.1 lb	4 lbs.	4/1 – 5/31	3/15 – 5/31	3/1 – 5/31

PLEASE NOTE: The preceding grassing schedule indicated optimal planting dates. However, this schedule may be expanded by several weeks to indicate a permissible, but marginal, planting period.

- D. Cover seeds lightly with soil using a rake or cultipacker. On steep slopes, cover seeds by dragging spiked chains or other satisfactory method.

### 3.04 MULCHING

- A. Immediately apply mulch to all seeded areas that do not require matting or blankets.
- B. Apply mulch in accordance with Chapter 6, Section II of the Manual.
- C. Uniformly apply mulch so as to provide a 75% soil cover.
- D. Anchor all mulch. Acceptable anchoring methods include using a disk harrow, commercial tackifier, or netting with openings not exceeding the average size of the mulching material.



### **3.05 BLANKETS AND MATTING**

- A. Contractor shall install blankets or matting according to manufacturer's specifications.

### **3.06 SODDING**

- A. Sod shall be placed within 48 hours of cutting.
- B. Sod shall be moist when laid and placed on moist ground. Place sod by hand, beginning at the toe of slopes and working upwards. The length of the strips shall be perpendicular to the flow of surface water. All joints shall be tightly butted and end joints shall be staggered at least 12 inches. The sod shall be immediately pressed firmly into the ground by tamping or rolling. Fill all joints between strips with fine-screened soil.
- C. Anchor sod on slopes steeper than 3:1 with sod pegs or other approved method.

### **3.07 SHRUBBERY, TREES, AND MISCELLANEOUS PLANTS**

- A. Plant shrubbery and trees in accordance with written recommendations of nursery supplying the plants, including mulching, fertilizing, and watering instructions.
- B. Provide an approved written guarantee from nursery for all transplanted shrubbery and trees for one year after final acceptance. Guarantee shall provide that failed plants be replaced. Guarantee shall provide for mulching, fertilizing and watering of replaced plants and shall extend the guarantee for one year from date of replacement.

### **3.08 WATERING**

- A. Apply water with fine spray immediately after each area has been sown.
- B. Provide water as necessary to achieve final stabilization.

### **3.09 MAINTENANCE**

- A. Maintenance shall consist of providing protection against traffic, watering to ensure uniform seed germination and to keep surface of soil damp, and repairing any areas damaged as a result of construction operations or erosion.
- B. If a poor stand of grass is present, re-seed as required to achieve final stabilization. Replace sod as needed.

- C. Control erosion at all times. Where damage occurs, repair landscaping work as quickly as practicable.
- D. After grass has been established, mow as often as needed to maintain height between 4 and 6 inches until final acceptance.

### **3.10 ACCEPTANCE**

- A. Prior to acceptance, the Contractor shall produce a stand of perennial grass that has fully achieved “final stabilization” as defined in the latest edition of “The Manual for Erosion and Sediment Control in Georgia” and the NPDES General Permit for Stormwater Discharges Associated with Construction Activity.

**END OF SECTION**

## **SECTION 03100 CONCRETE FORMWORK**

### **PART 1 – GENERAL**

#### **1.01 SCOPE**

- A. Under this heading shall be included designing, furnishing, constructing, adjusting and maintenance of all concrete formwork required for the reinforced concrete shown on the Plans in accordance with the requirements of the Specifications.

### **PART 2 – PRODUCTS**

#### **2.01 MATERIALS**

- A. Material used in formwork shall be selected by the Contractor on the basis of safety and the quality required in the finished work. All material and accessories shall be new and undamaged. New forms may be reused so long as they retain structural integrity and provide the required quality of the finished work. Form coatings sealers, and parting agents shall be used as required by the work and shall be of quality to insure proper function. Such agents shall be used in accordance with manufacturer's recommendations.

### **PART 3 – EXECUTION**

#### **3.01 CONSTRUCTION**

- A. General:
  - 1. Forms shall be constructed and maintained so as to insure that after removal of forms the finished concrete members will have true surfaces free of offset, waviness or bulges, and will conform accurately to the indicated shapes, dimensions, lines, elevations, and positions. Form surfaces that will be in contact with concrete shall be thoroughly cleaned before each use.
  - 2. Forms and Joints shall be sufficiently tight to prevent leakage of grout and cement paste during placing of concrete. Forms shall be fitted to accurate alignment to assure smooth completed surfaces free from irregularities. Forms shall be readily removable without impact, shock, or

damage to the concrete.

- B. Concrete Surfaces to be Exposed: Form surfaces that will be in contact with concrete shall be of material that is non-reactive with concrete and that will produce concrete surfaces equivalent in smoothness and appearance to that produced by new 4 foot by 8 foot plywood panels, exterior type, resin-impregnated or plastic faced concrete form. Cut surfaces shall be smooth and treated with form coating. Panel joints that will be in contact with concrete shall be smooth and free of offset. Form materials with defects that will impair the texture and appearance of finish surfaces shall not be used. Form lining, if used, shall be installed over solid backing.
- C. Chamfering: External corners shall be chamfered by moldings placed in the forms unless the Plans specifically show that chamfering is to be omitted.
- D. Coating: Forms shall be coated with form oil or form-release agent before reinforcement is placed. The coating shall be a commercial formulation of satisfactory and proven performance that will not bond with, stain, or adversely effect concrete surfaces, and surfaces to be cured with water or curing compounds. The coating shall be used as recommended in the manufacturer's printed or written instructions. Forms for unexposed surfaces, may be wet with water in lieu of coating immediately before placing concrete, except that in cold weather with probable freezing temperatures, coating shall be mandatory. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

### **3.02 TOLERANCES**

- A. The Contractor shall set and maintain forms to insure completed work within the following tolerance limits:
  - 1. Variations From the Plumb Columns, piers and walls:
    - a. 1/4 inch in any 10 feet of length and 1 inch maximum for entire length.
  - 2. Corner columns, control joint lines and any other conspicuous lines:
    - a. 1/4 inch in any 20 feet of length and 1/2 inch maximum for entire length.
  - 3. Variations from plan Levels or Grades Slabs, ceilings, decks and beams:

- a. 1/4 inch in any 10 feet of length 3/8 inch in any bay or any 20 feet of length, 3/4 inch maximum for entire length.
  - b. Exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines: 1/4 inch in any bay or in any 20 feet of length, 1/2 inch maximum for entire length.
- B. Variation of Distances
  - 1. Between walls, columns, partitions and beams: 1/4 inch per 10 feet of distance but not more than 1/2 inch in any one bay, and not more than 1 inch total variation.
- C. Variations in Opening Sizes and Locations Sleeves, floor openings and wall openings: Minus 1/4 inch, plus 1/2 inch.
- D. Variations in Cross-Sectional Dimensions and Thickness Columns, beams, slabs, decks and walls: Minus 1/4 inch, plus 1/2 inch.
- E. Variation in plan lines:
  - 1. Building lines, structure lines: 1 inch from established plan position.
- F. Variations in Footing and Foundation Dimensions
  - 1. Dimensions in plan: Minus 1/2 inch. Plus 2 inches (concrete only) or plus 3 inches when earth-formed.
  - 2. Misplacement or eccentricity: 2 percent of member width in the direction of misplacement but not more than 2 inches (concrete only).
  - 3. Thickness: Minus 5 percent of specified thickness.

**END OF SECTION**

## **SECTION 03150 CONCRETE ACCESSORIES**

### **PART 1 – GENERAL**

#### **1.01 WORK INCLUDED**

- A. Provide accessories for cast-in-place concrete.

#### **1.02 RELATED WORK**

- A. Section 03100, Concrete Formwork
- B. Section 03200, Concrete Reinforcement
- C. Section 03300, Cast-In-Place Concrete

#### **1.03 SUBMITTALS**

- A. None required.

### **PART 2 – PRODUCTS**

#### **2.01 MATERIALS**

- A. Precast Concrete Block Supports For Reinforcing Bars: Comply with ACI 315. Provide blocks with No. 4 dowels bent 90° to support top bars.
- B. Preformed Expansion Joint Filler:
  - 1. Bituminous type conforming to the requirements of ASTM D 994.
  - 2. Nonextruding type, self-expanding cork, ¾-inch thick or as otherwise shown on the Drawings, conforming to the requirements of ASTM D1752, Type III, and compatible with the specified joint sealant compound.

### **PART 3 – EXECUTION**

#### **3.01 INSTALLATION**

- A. Precast Concrete Block Supports For Reinforcing Bars: Provide in sufficient quantity to support reinforcing bars in slabs formed on earth at a spacing not to exceed 4-feet on centers in both directions. Provide blocks with dowels to support top bars. Blocks are not required for reinforcing bars properly supported from formwork.
- B. Expansion Joints: Provide expansion joints of size and at locations as shown on the Drawings. Place expansion joint fillers every 30 feet in straight runs of walkways, at right angle turns and wherever concrete butts into vertical surfaces, unless otherwise shown on the Drawings.

**END OF SECTION**

**SECTION 03200**  
**CONCRETE REINFORCEMENT**

**PART 1 – GENERAL**

**1.01 SCOPE**

- A. Under this heading shall be included the furnishing, fabricating, delivering and placing of reinforcement steel for all concrete work.

**1.02 SHIPPING AND STORAGE**

- A. Shipping
  - 1. Reinforcement steel shall be handled and shipped in a manner to avoid bending or other damage to the bars.
- B. Storage
  - 1. Reinforcement steel shall be stored above ground on platforms, skids or other approved supports. Contact with the soil should be avoided. Proper drainage and protection from the elements shall be provided to minimize corrosion.

**PART 2 – PRODUCTS**

**2.01 MATERIALS**

- A. General: Only new material shall be furnished, and shall be free of loose rust, mill scale, deleterious amounts of salts or coatings which reduces or destroys bond. Tight rust and mill scale or surface irregularities will be acceptable, provided the weight and the dimensions, including height of deformations and tensile properties of a test specimen which has been wire-brushed by hand, are not less than those required by the Applicable Codes and Standards.
- B. Metal Reinforcement:
  - 1. Reinforcement shall be deformed reinforcement conforming to ASTM A615, A616, A617, or A706, Grade 60, except Grade 40 bars are acceptable when shown on the Contract Plans for the following:
    - a. Rebars less than #4 diameter.



- b. Rebars used as stirrups or ties.
- C. Bar Supports and Accessories: Bar supports and accessories shall be galvanized or plastic coated wire conforming with the requirement of ACI 315, Chapter 7, and/or CRSI MSP, and shall be specifically made for the intended use by proprietary manufacturers.

## **PART 3 – EXECUTION**

### **3.01 PLACEMENT**

- A. Reinforcement shall be placed in accordance with the Plans.
- B. Only reinforcement that is free of oil, dirt, loose mortar, mud or other non-metallic coatings which reduce bonding capacity shall be installed. After placing, the reinforcement shall be maintained in a clean condition until the concrete is placed.
- C. All intersections of the reinforcement shall be securely tied with 16 gauge minimum, black annealed wire. Crossing bars shall not be tack welded.
- D. Reinforcement supports shall be as specified and shall be supported on non-corrodible metal or plastic-encased spacers, bolsters or chairs. For concrete placement on grade, reinforcement may be supported on precast concrete blocks spaced to maintain required cover, but only where the Contractor can demonstrate that the precast blocks are at least equal in quality to the class concrete specified for the work.
- E. Bars that are partially embedded in concrete shall not be field bent unless concurrence has been obtained from the Engineer. Procedure used shall be based on the Contractor's report and recommendations.

### **3.03 CONCRETE PROTECTION FOR REINFORCEMENT**

- A. Cast-in Place Concrete: Unless shown otherwise on the Plans, the following minimum concrete cover shall be provided for reinforcement:

#### Minimum Cover, Inches

- |    |  |    |
|----|--|----|
| 1. | Concrete cast against or permanently exposed to earth: | 3" |
| 2. | Formed Concrete exposed to earth, water and weather    | 2" |

- |    |                         |        |
|----|-------------------------|--------|
| a. | #6 and larger bars      | 2"     |
| b. | All #5 and smaller bars | 1-1/2" |

\* The maximum cover shall be no greater than that specified above or shown plus 3/8 inch, except as qualified below.

### **3.04 SPLICING**

- A. Reinforcing Bars: Splices shall be as shown on the Plans or the reviewed placement drawings. When welding is required, comply with Article 3.04 (B) and (C).
- B. Welded and Mechanical Connections: A full welded or mechanical splice connection shall develop, in tension or compression, as required, at least 125 percent of the specified yield strength " $f_y$ " of the bar.
- C. Welding: Welding shall be performed in accordance with AWS D12.1.
- D. Spirals: Splices in spiral reinforcement shall be lap splices of 48 diameter length, but not less than 12 inches, or welded.

**END OF SECTION**

**SECTION 03300**  
**CAST-IN-PLACE CONCRETE**

**PART 1 – GENERAL**

**1.01 SCOPE**

- A. Under this heading shall be included the furnishing of all labor, materials and equipment, tools and energy necessary to accomplish the cast-in-place concrete work to be constructed under this Contract, as shown on the Plans and hereinafter specified.

**1.02 RELATED WORK**

- A. Section 03100 – Concrete Formwork
- B. Section 03150 – Concrete Accessories
- C. Section 03200 – Concrete Reinforcement

**1.03 APPLICABLE STANDARDS**

- A. Where any material or operation is specified by reference to the following published specifications or standard or the specifications or standards of any other organizations, the referenced specification or standard shall be as much a part of this Section as if quoted in full herein.
- B. American Concrete Institute (ACI).
  - 1. 214 Recommended Practice for Evaluation of Compression Test results in Field Concrete.
  - 2. 301 Suggested Specifications for Structural Concrete Buildings.
  - 3. 305 Hot Weather Concreting
  - 4. 306 Cold Weather Concreting
  - 5. 315 Manual for Standard Practice for Detailing Reinforced Concrete Structures
  - 6. 318 Building code Requirements

7. 347 Recommended Practice for Concrete Formwork
8. 350 Concrete for Sanitary Engineering Structures
9. 605 Recommended Practice for Hot Weather Concreting
10. 613 Recommended Practice for Cold Weather Concreting
11. 614 Recommended Practice for Measuring, Mixing and Placing Concrete

B. American Society for Testing and Materials (ASTM).

1. A36 Specification for Structural Steel
2. A185 Welded Steel Fabric for Concrete Reinforcement
3. A615 Deformed and plain Billet-Steel Bars for Concrete Reinforcement
4. C31 Making and Curing Concrete Compression and Flexural Test Specimens in the Field
5. C33 Concrete Aggregates
6. C39 Test for Compressive Strength of Cylindrical Concrete Specimens
7. C42 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
8. C78 Test for Flexural Strength of Concrete
9. C94 Ready-Mix Concrete
10. C138 Test for Unit Weight, Yield and Air Content (Gravimetric) of Concrete
11. C143 Test for Slump of Portland Cement Concrete
12. C150 Portland Cement
13. C171 Sheet Materials for Curing Concrete
14. C172 Sampling Fresh Concrete

15. C192 Making and Curing Concrete Test Specimens in the Laboratory
16. C231 Air Content of Freshly Mixed Concrete by the Pressure Method
17. C260 Air-Entraining Admixture for Concrete
18. C470 Single Use Molds for Forming 6 x 12 Inch Test Cylinders
19. C494 Chemical Admixtures for Concrete

#### **1.04 QUALITY ASSURANCE**

- A. The actual acceptance of aggregates and development of mix proportions to produce concrete conforming to the specific requirements shall be determined prior to the placement of any concrete, by means of laboratory tests made with the constituents to be used on the work.
- B. Plant Qualification: Comply with all requirements of the Check List for Certification of Ready Mix Concrete production Facilities of the National Ready Mixed Concrete Association and ASTM C 94.
- C. Testing:
  1. Provide testing in accordance with the Section "Quality Control Testing During Construction" of this specification. Keep the laboratory informed of testing schedule.

#### **1.05 SUBMITTALS**

- A. Submit the following information in accordance with Section 01300.
  1. Plant Qualification: Submit satisfactory evidence indicating compliance with the specified qualification requirements.
  2. Materials: Submit satisfactory evidence indicating that materials to be used, including cement, aggregates and admixtures meet the specified requirements.
  3. Design Mix: Submit the design mix to be used as prepared by qualified persons. The design of the mix is the responsibility of the Contractor subject to the limitations of the Specifications.
  4. Submit, at least 24 hours before placing concrete, signed certification

providing the following:

- a. Exact location and portion of structure to be placed.
- b. Date and time concrete is to be placed.
- c. Type of concrete to be used (mix), and the method to be used in placing the concrete.
- d. Estimated quantity of concrete to be placed.
- e. That line and grade have been checked and grade properly compacted and tested.
- f. That location, type, size and spacing of reinforcement has been checked and conform to the Drawings.
- g. That any water stops, construction joints, or seals have been placed and conform to the Drawings.
- h. That any embedded pipes have been placed, are the correct size and type and conform to the Drawings.
- i. That any embedded conduits, grounding wires or receptacles have been placed and conform to the Drawings.
- j. That any embedded anchor bolts, bearing plates, dowels etc. are in place, are of the correct size and are located as indicated on the Drawings.
- k. That forms are properly located and adequately braced.

## **1.06 TESTS**

- A. All sampling and testing services shall be performed by a testing agency which operates in accordance to ASTM D 3740 and E 329 latest revision and accepted by the Engineer, at the Contractor's expense.
- B. The Contractor shall submit to the Engineer, for review, the concrete materials and the concrete mix designs for each class of concrete proposed for use. This submittal shall include the results of all testing performed to qualify the materials and establish the mix designs. All mix designs shall be proportioned in accordance with Section 3.9 of ACI 301, Method 1 (trial batches) or method 2 (field experience). The average strength used as the basis for selecting proportions shall be specified in paragraph 3.9.2 or ACI 301.
- C. The testing laboratory shall conduct strength tests of the concrete during construction in accordance with Section 16.3.4 of ACI 301. At least one strength test (6 test cylinders) shall be made for each 50 cubic yards or fraction thereof, of each mix design of concrete placed in any 1 day.

- D. Slump tests shall be conducted regularly during construction in accordance with Section 16.3.5 or ACI 301.
- E. The air content of the concrete sample for each strength test shall be determined in accordance with Section 16.3.6 of ACI 301.
- F. Results of all tests shall be submitted to the Engineer, with copies to the Contractor. The test reports shall include the exact location in the work at which the batch represented by a test was deposited.
- G. Evaluation of test results and acceptance of concrete shall be in accordance with chapter 17 of ACI 301.
- H. Conformity of aggregates to these Specifications, and the actual proportions of cement, aggregates, and water necessary to produce concrete conforming to the requirements set forth in **Table A**, shall be determined by tests made with representative samples of the materials to be used on the work. Tests will be made by an accredited testing laboratory selected by the Contractor and approved by the Engineer in accordance with Section 01410.
- I. Cement may be subject to testing to determine that it conforms to the requirements of this Specification. Methods of testing shall conform to the appropriate specification, but the place, time, frequency, and method of sampling will be determined by the Engineer in accordance with the particular need.
- J. Samples of fine and coarse aggregates shall be delivered to the laboratory for examination and testing at least three weeks before the Contractor proposes to use them in the work.
- K. Concrete shall be proportioned to provide an average compressive strength in accordance with ACI 318 part 3, Section 4.3, to establish a standard deviation test records. Where a concrete production facility does not have test records meeting these requirements the test required average compressive strength shall be as shown on **Table D**.

## **PART 2 – PRODUCTS**

### **2.01 MATERIALS**

- A. Cement:
  - 1. Domestic Portland cement conforming to the requirements of ASTM C 150, Type II domestic manufacture, one brand only. Construct sanitary sewer manholes, wet wells, pump stations and structures exposed to

sewage with Type II cement only.

2. Use only one brand of cement in any individual structure unless otherwise approved by the Engineer. Do not use cement which has become damaged, partially set, lumpy or caked and discard the entire contents of the sack or container which contains such cement. Do not use salvaged or reclaimed cement.

B. Aggregates:

1. ASTM C 33. Coarse aggregates shall be size No. 67, ¾-inch to No. 4 or No. 57, 1-inch to No. 4, as shown on the Drawings, unless otherwise directed by the Engineer. Use size No. 8 for filling of cells of masonry units.
2. In addition to requirements of ASTM C 33, apply the following criteria for structures exposed to sewage:
  - a. Soft particles: Not more than 2.0 percent.
  - b. Chert as a soft impurity (defined in Table 3 of ASTM C 33): Not more than 1.0 percent.
  - c. Total of soft particles and chert as a soft impurity: not more than 2.0 percent.
  - d. Flat and elongated particles (long dimension more than 5 times short dimension): Not more than 15.0 percent.

C. Water: Potable quality, clean and free from injurious amounts of deleterious materials.

D. Air Entraining Admixture: ASTM C 260.

E. Water Reducing and Retarding Admixture.

1. Concrete Without Superplasticizer:

- a. Water Reducing Admixtures: ASTM C494 Type A, equal to Eucon WR-75 by the Euclid Company, pozzolith 200N by Master Builders, Plastocrete 161 by Sika Chemical Corporation, and containing no calcium chloride.
- b. Water Reducing and Retarding Admixtures: ASTM C494 Type D, equal to Eucon Retarder-75 by the Euclid Company, Pozzoloth 100 XR by Master Builders, Plastiment by Sika Chemical Corporation, and containing no calcium chloride.
- c. Accelerating Admixtures: ASTM C494 Type C or E, equal to Accelguard 80 by the Euclid Company, Darex Set Accelerator by W.R. Grace, and containing no calcium chloride.

2. Concrete With Superplasticizer:



- a. Water Reducing, High Range Admixtures: ASTM C494, Type F or G, equal to Eucon 37 by the Euclid Company, Rheobild 716 by Master Builders, Daracem 100 by W.R. Grace, Sikament by Sika Chemical Corporation, and consisting of a second-generation admixture, free of chlorides and alkalis (except for those attributable to water) composed of a synthesized sulfonated complex polymer, enabling the concrete to maintain its rheoplastic state in excess of two hours if necessary.
  - b. Manufacturer's Job Site Representation: Provide the services of a competent field service representative from the manufacturer of each of the admixtures selected for use to provide at the job site advice and consultation on the use of the admixture materials, including the effect on the concrete in place, including recommending maximum discharge time for superplasticizer method and procedure to induce superplasticizer into mixer, quantities of admixtures to be used if variations are required because of temperature/humidity, wind, or other environmental considerations, and to be available on short call at any time requested by the Owner, Contractor, or concrete producer.
- F. Curing Compound: ASTM C 309, Type I and Type ID, Class A and Class B, containing no ingredient which would adversely affect the bond of coatings or toppings.
  - 1. For exposed concrete not to receive special finishes, protective coatings and/or concrete toppings, provide curing and sealing compound equal to Super Rez-Seal, by Euclid Chemical Co., or Burke Spartan-Cote Cure-Seal Hardener by The Burke Company.
  - 2. For exposed concrete to receive special finishes, protective coatings and/or concrete toppings, provide curing compound equal to Kurez-DR, by Euclid Chemical Co., or Burke Rez-X Curing Compound by The Burke Company.
- G. Mortar for Repair of Concrete: Same materials as used for concrete, except omit coarse aggregate and use not more than one part cement to two and one-half parts sand by damp loose volume. Use no more mixing water than is necessary for handling and placing.
- H. Burlap Mats: Conform to AASHTO Specification M182.
- I. Epoxy Bonding Agent: Euco #452, BurkEpoxy MV, Sikadur Hi Mod, Concretive

1001-LPL, or equal.

- J. Powdered Epoxy Coating For Anchor Bolts: Powdered epoxy resin as manufactured by the 3M Company, Scotchkote No. 213, Armstrong No. R349, or equal.

## **2.02 MIXES**

A. General Requirements:

1. Mix Design: Conform to ACI 318, Section 5.3. Submit data on consecutive tests and standard deviation.
2. Maximum Water-Cement Ratio:
  - .37 (lbs/lb) - Concrete with superplasticizer
  - .45 (lbs/lb) - Class A concrete without superplasticizer
  - .55 (lbs/lb) - Class A concrete without superplasticizer
3. Air Content: 5 percent plus or minus 1.5 percent.
4. Slump: 4-inches plus or minus 1-inch for Class A without superplasticizer.  
  
7-inches plus or minus 1-inch for Class A with superplasticizer  
  
8-inches plus or minus 1-inch for tremie concrete.
5. Minimum Compressive Strength at 28 days:  
  
Tremie, 4,500 psi  
  
Class A, 4500 psi  
  
Class B, 3,000 psi, concrete sub-foundations, pipe envelopes and concrete backfill  
  
Structural Drawings govern for concrete strength requirements for each structure as note.  
  
In the absence of contrary designation, concrete used for all construction shall be Class "A"

B. Production of Concrete:

1. General: use ready mixed concrete, batched, mixed and transported in accordance with ASTM C 94, unless otherwise indicated.
  2. Air Entraining Admixture: Add admixture into the mixture as a solution measured by means of an approved mechanical dispensing device, and as part of the total mixing water.
  3. Water Reducing and Retarding Admixture: Measure and add water reducing and retarding admixture as recommended by the manufacturer. Complete the addition of the admixture within one minute after addition of water to the cement has been completed, or prior to the beginning of the last three-quarters of the required mixing, whichever occurs first. Store, handle and batch admixtures in accordance with the recommendations of ACI 68.
- C. Delivery Tickets: Conform to ASTM C94, including cement content and water/cement ratio. Furnish ticket for each batch of ready-mixed concrete delivered to the site.
- D. Temperatures: Deliver concrete to site at temperature not higher than 90° F, otherwise, add ice to reduce the temperature, as recommended by ACI.
- A. Modifications to The Mix: Do not make modifications to the mix in the plant or on the job which will decrease the cement content or increase the water-cement ratio beyond that specified.

## **PART 3 – EXECUTION**

### **3.01 PREPARATION**

- A. Preparations Before Placing: Place no concrete until the approval of the Engineer has been received. Ensure that forms are thoroughly clean and reinforcing and all other items required to be set in concrete have been placed and thoroughly secured. Notify Engineer 24 hours before concrete is placed.
- B. Conveying:
1. General: Transport concrete from the truck to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of ingredients to maintain the quality of the concrete. Place no concrete more than 90 minutes after mixing has begun for that batch.

2. Buckets and Hoppers: Provide buckets and hoppers having discharge gates with a clear opening equal to no less than one-third of the maximum interior horizontal area or five times the maximum aggregate size being used, and having side slopes no less than 60 degrees. Provide controls on gates to permit opening and closing during the discharge cycle.
3. Runways: Provide runways as specified in Section 03100. Use extreme care to avoid displacement of reinforcement during the placing of concrete.
4. Elephant Trunks: Use hoppers and elephant trunks to prevent the free fall of concrete for more than 6-feet.
5. Chutes: Provide metal or metal lined chutes having a slope not exceeding one vertical to two horizontal and not less than one vertical to three horizontal. Use chutes more than 20-feet long and chutes not meeting the slope requirements only if they discharge into a hopper before distribution.
6. Pumping Equipment: If required, provide pumping equipment and procedures conforming to ACI 304.2R, placing Concrete by pumping Methods. Measure slump at the point of discharge. Do not allow loss of slump in pumping to exceed 1 ½-inches.
7. Conveying Equipment Construction: Do not use aluminum or aluminum alloy pipe for tremies or pump lines and chutes, except for short lengths at the truck mixer.
8. Cleaning: Clean conveying equipment at the end of each concrete operation.

### **3.02 MIXING**

- A. Concrete shall be ready-mixed, or transit-mixed, as produced by equipment acceptable to the Engineer. No hand mixing will be permitted. Adding water in controlled amounts during the mixing cycle shall be done only with the express approval of, and under the direction of, the Engineer.
- B. Ready-mix or transit-mixed concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of rated capacities for the respective conditions as stated on the nameplate. Discharge at the site shall be within 1-1/2 hours and within one hour when ambient temperature is above

85 degree F after cement was first introduced into the mix. Central mixed concrete shall be plant-mixed a minimum of 1-1/2 minutes per batch and then shall be truck-mixed or agitated a minimum of 8 minutes. Agitation shall begin immediately after the pre-mixed concrete is placed in the truck and shall continue without interruption until discharge. Transit-mixed concrete shall be mixed at mixing speed for at least 10 minutes immediately after charging the truck, following by agitation without interruption until discharged.

- C. All central plant and rolling stock equipment and methods shall conform to ACI 304, ASTM C 94, and the latest Truck Mixer and Agitator Standards of the Truck Mixer Manufacturers' Bureau of the National Ready-Mixed Concrete Association.
- D. The re-tempering of concrete or mortar which has partially hardened, that is, mixing with or without additional cement, aggregate, or water, will not be permitted.
- E. Attention is called to the importance of dispatching trucks from the batching plant so that they shall arrive at the site of the work just before the concrete is required, thus avoiding excessive mixing of concrete while waiting or delays in placing successive layers of concrete in the forms.
- F. Deliver to the Engineer at the time of each truckload transported to the site a mix ticket, showing at least the following: concrete plant identification, date, quantity of ingredients (including water) added at the batch plant, time of charge, and truck number.

### **3.03 INSPECTION AND CONTROL**

- A. The preparation of forms, placing of reinforcing steel, conduits, pipes, and sleeves, batching, mixing, transportation, placing, curing, and testing of concrete shall be at all times under the inspection of the Engineer.
- B. The Contractor shall engage the services of an accredited testing laboratory approved by the Engineer in accordance with Section 01340 to establish the basic mixtures of concrete as required by the specifications, to test field control cylinder specimens, and to conduct other tests as specified herein or as deemed required by the Engineer to insure the quality of concrete as specified. All tests shall be performed in accordance with the applicable ASTM standard methods.

### **3.04 APPLICATION**

- A. Placing:
  - 1. General: Deposit concrete continuously, or in layers of such thickness

(not exceeding 2-feet in depth) that no concrete will be deposited on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness. Repair any such seams or planes of weakness with injected epoxy grout and patch to match adjacent surfaces.

2. Supported Elements: Allow at least two hours to elapse after depositing concrete in columns or walls before depositing in beams, girders, or slabs supported thereon.
3. Segregation: Deposit concrete as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject the concrete to procedures which cause segregation.
4. Concrete Under Water: Place all concrete in the dry except for Tremie concrete.

B. Consolidating Concrete:

1. General: Consolidate concrete by means of internal vibrators operated by competent workmen.
2. Vibrators: Use vibrators having a minimum head diameter of at least 2-inches, a minimum centrifugal force of 700-pounds and a minimum frequency of 8,000 vibrations per second.
3. Vibrators for Confined Areas: In confined areas, use additional vibrators having a minimum head diameter of 1 ½-inches, a minimum centrifugal force of 300-pounds and a minimum frequency of 9,000 vibrations per second.
4. Spare Vibrator: Keep one spare vibrator for each three in use on the site during all concrete placing operations.
5. Use of Vibrators: Insert and withdraw vibrators at points approximately 18-inches apart. At each insertion operate vibrator for 5 to 15 seconds. Do not transport concrete in the forms by means of vibrators.

C. Protection: Do not allow rainwater to increase the mixing water or to damage the surface finish. Protect concrete from construction overloads and do not apply design loads until the specified strength has been attained.

D. Construction Joints: Except as otherwise indicated on the Drawings, provide horizontal construction joints at top of foundation members and slabs on grade and at the soffit of supported slabs and beams. Locate other horizontal and

vertical construction joints as indicated on the Drawings. Except in the locations shown, provide no other joints, unless otherwise recommended by the Contractor and approved by the Engineer.

- E. **Bonding to Recently Set Concrete:** Before depositing new concrete on or against concrete that has set, thoroughly clean the surfaces of the set concrete to expose the coarse aggregate and to ensure they are free of laitance, coatings, foreign matter and loose particles. Retighten forms. Dampen, but do not saturate hardened concrete of joints and then thoroughly cover with a coat of cement grout of similar proportions to the mortar in the concrete. Place the grout as thick as possible on vertical surfaces and at least ½-inch thick on horizontal surfaces. Place the fresh concrete before the grout has attained its initial set.
- F. **Embedded Items:** In addition to steel reinforcement, securely place pipes, inserts and other metal objects as shown, specified or ordered to be built into, set in or attached to the concrete. Take all necessary precautions to prevent these objects from being displaced, broken or deformed. Before concrete is placed, take care to determine that all embedded parts are firmly and securely fastened in place as indicated. Thoroughly clean surfaces free from paint and other coating, rust, scale, oil, and any foreign matter. Pressure test embedded pipes for leakage, as specified elsewhere, before concrete is placed. Wrap metal rainwater leaders, firelines and other such piping with at least two thicknesses of 30 lb. Roofing felt before placing concrete. Do not embed wood in concrete. Pack concrete tightly around pipes and other metal work to prevent leakage and to secure perfect adhesion. Adequately protect drains from intrusion of concrete.
- G. **Bonding To Existing Surfaces:** Clean existing concrete surfaces that are to have new concrete bonded thereto of all grease, oil, dust, dirt and loose particles and coat with an epoxy bonding agent just prior to placing of the new concrete. Apply the bonding agent as recommended by the manufacturer and allow the agent to become tacky before the new concrete is placed. Do not allow the bonding agent to overlap or be spilled on the surfaces to be exposed after the work is completed.

### **3.0???? VAPOR RETARDER INSTALLATION**

**A. General:** Place vapor retarder sheeting in position with longest dimension parallel with direction of pour.

**B. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.**

### **3.0???? PLACING REINFORCEMENT**

**A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.**

**1. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.**

**B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.**

**C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Engineer.**

**D. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.**

**E. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.**

### **3.0???? JOINTS**

**A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Engineer.**

**B. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.**

**C. Place construction joints in lieu of control joints in floor slab as shown on drawings. Do not continue reinforcement through sides of strip placements.**

**D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.**

**E. Isolation Joints in Slabs-on-Grade: Construct isolation joints in**



slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

F. Control Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated.

1. Form control joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
2. Control joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
3. If joint pattern is not shown, provide joints not exceeding 16 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).
4. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

### 3.0??? INSTALLING EMBEDDED ITEMS

A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.

B. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

### 3.0???? PREPARING FORM SURFACES

A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.

B. Do not allow excess form-coating material to accumulate in forms or come

into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

1. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

### 3.0???? CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.

C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.

E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.

1. Consolidate concrete during placement operations so that concrete is

thoroughly worked around reinforcement, other embedded items and into corners.

2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
3. Maintain reinforcing in proper position on chairs during concrete placement.

F. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

G. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.

1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

H. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Engineer.

I. Concrete slabs shall be finished with the following tolerance: True plane within 1/8" in ten feet as determined by a ten foot straightedge placed anywhere on

the slab in any direction.

### 3.05 FORM REMOVAL

- A. Maintain formwork in place for the following structural conditions until the concrete has attained the minimum percentage of indicated design compressive strength or for the period of time specified in the following table.

Note: time periods in the table include all days except those in which the temperature falls below 40 degrees F.

<u>Structural Member or Condition</u>	<u>Normal Strength Concrete</u>	<u>Normal High-Early Strength Concrete</u>	<u>Minimum Compressive Strength for Form Removal (% Design Strength)</u>
<b>Horizontal</b> Cantilevers	12 days	7 days	90
Over 20 feet between supports	12 days	7 days	90
Stairways	10 days	5 days	80
<b>Elevated</b> Floor slabs	5 days	3 days	70
<b>Permanent free</b> standing walls, column And piers	5 days	3 days	70
Walls, piers, columns, sides of beams, footings, slabs on grade, and vertical surfaces	<b>24 hours</b>	<b>12 hours</b>	70
Front face form of curbs	<b>6 hours</b>	<b>6 hours</b>	70

### 3.06 CONCRETE FINISHING

#### A. Repair of Surface Defects:

1. General: Repair surface defects, including tie holes immediately after form removal. Dampen the area to be patched and an area at least 6-inches wide surrounding it to prevent absorption of water from the patching mortar. Notify the Engineer prior to commencing operations.
2. Removal of Defective Concrete: Remove all honeycombed and other defective concrete down to sound concrete. Cut edges perpendicular to the surface or slightly under cut. Sand blast surfaces to receive repair.
3. Bonding Grout: Thoroughly dampen surfaces to be patched and apply a coat of bonding grout consisting of one part cement to one part fine sand passing a No. 30 sieve and having the consistency of thick cream.
4. Placing Patching Mortar: After the bonding grout begins to lose its water sheen, apply a premixed patching mortar, thoroughly consolidating it into place and striking it off so as to leave the patch slightly higher than the surrounding surface. Leave mortar undisturbed for one hour to permit initial shrinkage and then finally finish.
5. Tie Holes: After being cleaned and thoroughly dampened, fill the tie holes solid with patching mortar.

#### B. Concrete Finishes:

1. Formed Surfaces: After removal of forms, chip off all irregular projections, grind flush with adjacent surfaces and finish concrete surfaces in accordance with the following schedule:

Finish Designation	Area Applied
F-1	Exterior walls below grade not exposed to water: Repair defective concrete, fill depressions deeper than ½-inch, and fill tie holes.
F-2	Exterior and interior walls exposed to water: Repair defective concrete, remove fins, fill

depressions ¼-inch or deeper, and fill tie holes.

F-3 Walls of structures of buildings exposed to view and underside of formed floors or slabs: In addition to Finish F-2, fill depressions and airholes with mortar. Dampen surfaces and then spread a slurry consisting of one part cement and one and one-half parts sand by damp loose volume on the surface with clean burlap pads or sponge rubber floats. Remove any surplus by scraping and then rubbing with clean burlap.

F-4 Tops of walls, beams and similar unformed surfaces occurring adjacent to formed surfaces: Strike smooth after concrete is placed and float to a texture reasonably consistent with that of formed surfaces.

2. Slab Surfaces:

- a. General: After concrete has been consolidated, finish all concrete slabs with a floated finish. After floating, trowel finish all concrete slabs, except for areas to receive roofing, insulation, tile or topping, and immediately light broom finish. Where a finish is not indicated, provide a troweled finish.

**Finish**

**Designation**

**Area Applied**

S-1 Slabs and floors not water bearing:  
Smooth steel trowel finish.

S-2 Slabs and floors which are water bearing and slab surfaces on which mechanical equipment moves:  
Steel trowel finish free from trowel marks and

all irregularities.

- |     |  |
|-----|--|
| S-3 | Slabs, floors and stair treads of structures or buildings exposed to view:<br><br>Steel trowel finish without local depressions or high points and apply a light hair-broom finish. Do not use stiff bristle brooms or brushes. Leave hair-broom lines parallel to the direction of slab drainage. |
| S-4 | Slabs and floors at slopes greater than 10%:<br><br>Steel trowel finish without local depressions or high points. Apply a stiff bristle broom finish. Leave broom lines parallel to the direction of slope drainage.   |
| S-5 | Exposed edges of slabs, floors and tops of walls:<br><br>Finish with a $\frac{3}{4}$ -inch radius edge if a chamfer is not indicated.  |

- b. Floated Finish: After concrete has been placed, consolidated, struck off and leveled, do not work the surface further until water sheen has disappeared and the surface has hardened sufficiently to permit floating. During the first floating, check the plainness of the slab with a 10-foot straightedge applied at no less than two angles. Cut down all high spots and fill all low spots to produce a surface having the required tolerance. Then refloat the slab to a uniform sandy texture.
- c. Light Broomed Finish: After floating, power trowel slabs to receive a light broomed finish to produce a smooth surface, relatively free of defects. Before the surface sets, pass a soft broom drag over the surface to produce a surface uniform in texture and appearance.
- d. Troweled Finish: After floating, power trowel slabs to receive a troweled finish to produce a smooth surface, relatively free of defects. Hand trowel after the surface has hardened sufficiently. When a ringing sound is produced as the trowel is moved over the

surfaces, perform final troweling by hand to produce a surface which is thoroughly consolidated, free from trowel marks, uniform in texture and appearance and plane to a tolerance of 1/8 inch to 10 feet as determined by a 10-foot straightedge placed anywhere on the slab in any direction.

- e. Hardener Finish: Where indicated to receive a troweled hardener finish, water cure slabs without application of curing and sealing agent. When slab is at least 28 days old and thoroughly dry, apply the hardener in accordance with the manufacturer's recommendations. Where dry-shake hardener or slip-resistant finish is required, apply the hardener or slip-resistant product prior to complete curing and finishing, in accordance with the requirements and recommendation of the product manufacturer.
- f. Saw Cut Joints: cut joints that are to be saw cut not sooner than 2 hours after the concrete is poured and not later than 8 hours after the pour.

### **3.07 PROTECTING**

#### **A. Curing:**

- 1. Immediately after surface defects have been repaired, apply a spray coat of curing compound to all exposed surfaces, including slabs, walls, beams and columns in accordance with the manufacturer's recommendations. Protect exposed steel keyways and other embedded items from the curing compound. Water cure, as specified in paragraph B hereunder, all concrete surfaces that are to be coated with a coal tar epoxy system, and concrete floors requiring a bond for special finishes.
- 2. Do not apply curing compound during periods of rainfall. Should the film become damaged from any cause within the required curing period, immediately repair the damaged portions with additional compound. Upon removal of forms, immediately coat the newly exposed surfaces to provide a curing treatment equal to that provided for the surface.
- 3. Curing and Sealing Compound: Use clear compound conforming to Federal Specification TT-C-800A, 30% solids content minimum, having test data from an independent laboratory indicating a maximum moisture loss of 0.030 grams per sq. cm. when applied at a coverage rate of 300 sq. ft. per gallon, and equal to Super Floor Coat or Super Pliocure by The Euclid Chemical Company or Masterseal 66 by master Builders. Furnish manufacturer's



certification as required.

4. Apply specified clear curing and sealing compound to all horizontal areas so noted on the Drawings or in the Specifications. Apply immediately after final finishing. Apply this compound to non-structural construction joints of slabs on grade to act as a bond breaker prior to placement of adjacent concrete.

B. Water Curing Method: Cure all concrete that is to be water cured by either the wet burlap method, by continuous fogging or by covering with waterproof sheet.

1. Wet Burlap Method: Cover concrete surface with a double thickness of burlap, cotton mats, or other approved material, kept thoroughly saturated with water. Keep the forms wet until removed and upon removal, start the curing specified herein immediately. Cure the concrete for a period of 7 days for normal Portland cement or 4 days for high early strength cement. Do not submerge concrete poured in the dry until it has attained sufficient strength to adequately sustain the stress involved and do not subject it to flowing water across its surface until it has cured 4 days.
2. Continuous Fogging: Perform continuous fogging by fogging with a nozzle which so atomizes the flow of water that a mist, and not a spray, is formed. Fog the concrete surface regularly without allowing any part of the surface to become dry. Take all necessary precautions to prevent erosion of the concrete surface by the water.
3. Covering With Waterproof Sheet: Keep the entire area to be cured continuously wet by fogging, as specified in the fogging paragraph above, for at least 18 hours and then immediately cover with waterproofing curing sheet conforming to ASTM C171, waterproof paper and polyethylene film, free of holes or tears. Keep sheet fully flat, without wrinkles or air bubbles, held down tautly at all edges. Do not use this method on slabs which will be exposed to view.

C. Hot Weather Curing: Curing for hot weather concreting shall be limited to moist curing methods. All exposed concrete and all forms shall be covered with burlap or carpet mats, wetted before placing, and overlapped at least 6 inches. Fog sprays shall be used during finishing operations and until the burlap or carpet mats are placed. Protective mats shall remain in place in a wet condition for 7 days. Protective mats

shall remain in place for an additional 3 days without the application of water to permit gradual drying of the concrete surfaces. Forms may be removed after 3 days of moist curing provided that protective mats, in a wet condition, are replaced so as to cover all exposed concrete.

#### MISCELLANEOUS CONCRETE ITEMS AND ACCESSORIES

A. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

B. Precast Concrete Block Supports for Reinforcing Bars: Provide sufficient quantities to support reinforcing bars in slabs formed on earth at a spacing not to exceed 4 ft on centers in all directions. Provide blocks with dowels to support top bars. Block supports are not required in slabs formed on tremie concrete but may be used at the Contractor's option. Blocks are not required for reinforcing bars properly supported from formwork. At other locations refer to ACI 315 and CRSI MSP-1.

C. Membrane: Provide polyethylene film under all slabs formed on earth except for liquid containment structures. Lap membrane sheets 6" in the direction of spreading concrete. Do not puncture film.

D. Water Stops: During installation, protect water stops from dirt, oil and concrete spatter and rigidly secure in position by means of split bulkheads and by fastening to reinforcing bars in two directions at not more than 12 inches on centers. Install water stops in construction joints in hydraulic structures required to contain liquid or resist ground water entry.

If splices are required, use butt-splice water stops using thermostatically controlled electric splicing iron as recommended by the manufacturer.

E. Expansion Joints: Provide expansion joints of size and at locations as shown on

the Drawings. Place expansion joint fillers every 30 feet in straight runs of walkways, at right angle turns and wherever concrete butts into vertical surfaces unless as shown otherwise on the Drawings.

F. Joint Sealants: Provide joint sealants where indicated on the Drawings. Prepare surfaces and materials and prime all in compliance with the manufacturers recommendations and instructions.

### 3.9 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

C. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified and approved by Engineer.

D. Provide moisture curing by the following methods:

1. Keep concrete surface continuously wet by covering with water.
2. Use continuous water-fog spray.
3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to

provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.

E. Provide moisture-retaining cover curing as follows:

1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive.

Immediately repair any holes or tears during curing period using cover material and waterproof tape.

F. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:

1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application.

Maintain continuity of coating and repair damage during curing period.

2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

G. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

H. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.

1. Final cure concrete surfaces to receive finish flooring with a

moisture-retaining cover, unless otherwise directed.

### 3.10 SHORES AND SUPPORTS

A. General: Comply with ACI 347 for shoring and reshoring in multistory construction, and as specified.

B. Extend shoring from ground to roof for structures four stories or less, unless otherwise permitted.

C. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to support work without excessive stress or deflection.

D. Keep reshores in place a minimum of 15 days after placing upper tier, or longer, if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

### 3.11 REMOVING FORMS

A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimen's representative of

concrete location or members.

C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

### 3.12 REUSING FORMS

A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Engineer.

### 3.13 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Engineer.

B. Mix dry-pack mortar, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.

1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water,

and brush-coat the area to be patched with bonding agent.

Place patching mortar before bonding agent has dried.

2. For surfaces exposed to view, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching.

Compact mortar in place and strike-off slightly higher than surrounding surface.

C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Engineer. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.

1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely

through non-reinforced sections regardless of width, spalling, pop outs, honeycombs, rock pockets, and other objectionable conditions.

2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.

3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Engineer.

4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

E. Perform structural repairs with prior approval of Engineer for method and procedure, using specified epoxy adhesive and mortar.

F. Repair methods not specified above may be used, subject to acceptance of Engineer.

G. The requirements of these Specifications are to be considered the minimum with respect to strength, placement, finishing and curing. The Contractor shall extend the requirements of the Specifications as necessary to provide finished work free of defects. Defective work, including low strength, cracked concrete, surface irregularities, exceeding of tolerances, or any other defects which are caused by the Contractor's operations or construction methods shall be removed and replaced at no additional cost to the Owner.



### 3.14 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. General: The Contractor will employ a testing agency to perform tests and to submit test reports.

B. Sampling and testing for quality control during concrete placement shall include the following:

1. The testing laboratory shall conduct strength tests of the concrete during construction in accordance with ACI 301.

2. A representative of an independent testing laboratory shall be on site to sample and make test cylinders for concrete, slump test, air entrainment and concrete temperature all of which shall be included on the report for the cylinder broken, along with the truck number and date of test. The truck and load number shall be used to coordinate the test cylinder with the load sampled. All sampling, sample preparation, and field testing shall be performed by an ACI certified Concrete Field Testing Technician.

3. Concrete test cylinders for testing purposes shall be made in accordance with the procedure described in ASTM C 31, as amended to date. **At least one strength test consisting of 5 test cylinders shall be made for each 100 cubic yards** or fraction thereof, of each mix design of concrete placed in any one day. During cold weather concreting, one (1) additional test cylinder shall be taken and cured on the job site under the same conditions as the concrete it represents. When the total quantity of a given concrete mixture is less than 50 cubic yards, the strength test may be waived by the Engineer depending on the location and purpose of the concrete placement.

4. Concrete test cylinders shall be collected and transported to the testing

laboratory designated by the Owner for curing and testing in accordance with ASTM C 39 as amended to date. One (1) compression test shall be made at the age of 7 days and three (3) compression tests shall be made at 28 days with one (1) cylinder held in reserve. If early form removal is desired, a minimum of 3 compression tests shall be performed and accepted by the engineer prior to removing forms. Certified copies of the tests shall be provided to the Engineer and the Contractor.

5. When average ultimate 28-day strength of control cylinders in any set falls below the required ultimate strength or below proportional minimum 7-day strengths where proper relation between 7 and 28-day strengths have been established by tests, the proportions, water/cement ratio, or temperature conditions shall be changed to secure the required strength. Furthermore, if the evaluation of the compressive test indicate the concrete has failed to meet the specified strength, the Contractor shall obtain drilled core tests in accordance with ASTM C 42, as amended to date, of the in-place concrete. The location and number of such tests shall be at the Engineer's direction and tests shall be paid for by the Contractor. If the core tests fail to verify the strength specified, the engineer shall do one of the following:

- a. Have the Contractor remove and reconstruct that portion of the structure found to be defective.
- b. Accept the defective concrete work in place and issue a change order as set forth in the General Conditions for accepting defective Work.

6. If Contractor desires to strip forms early, additional cylinders shall be taken at the Contractors expense (not paid for by the Owner) to determine strength of concrete at the desired time of form removal.

7. Slump tests shall be conducted regularly during construction in accordance with ACI 301 using the procedure described in ASTM C143, as amended to date. Slump tests shall be made for the first batch of concrete each day,

whenever consistency of concrete appears to vary, as determined by the Engineer, and whenever strength-test cylinders are made at the jobsite. Failure to meet specified slump requirements will be sufficient cause for rejection of that batch.

8. The air content of the concrete sample for each set of test cylinders shall be determined in the field by the testing laboratory at the time of concrete deposit in accordance ACI 301 using the appropriate pressure, gravimetric or volumetric method accordance with in ASTM C 231, C 138, or C 173, respectively, as amended to date. Additional tests will be performed as necessary.

9??? The laboratory will make slump tests of Class A and Class B concrete as it is discharged from the mixer at the point of placing. Slump tests will be made of every batch of concrete placed, and failure to meet specified slump requirements will be sufficient cause for rejection of that batch. Water cannot be added to the batch after the slump tests are made.

9. The temperature of the concrete sample for each strength test shall be determined in accordance ACI 301 using appropriate procedures in ASTM C 1064 as amended to date. The concrete temperature shall be measured and recorded hourly during hot and cold weather conditions.

10. Results of all tests shall be submitted to the Engineer, with copies to the Contractor. The test reports shall include the exact location in the work at which the batch represented by a test was deposited.

11. Evaluation of test results and acceptance of concrete shall be in accordance with ACI 301.

12. The Contractor shall cooperate in the making of such tests to the extent of allowing free access to the work for the selection of samples, providing heated (when required) moist storage facilities for specimens, affording protection to the specimens against injury or loss through his operations, and furnishing material and labor required for the purpose of taking concrete cylinder

samples, curing boxes, and shipping boxes.

C. Evaluation and Acceptance of Concrete: Evaluation and acceptance of concrete will

be in accordance with ACI-318.

D. When high-early-strength Portland cement is pre-milled, the same strength requirements shall apply except that the indicated strengths shall be attained at seven (7) days instead of twenty-eight (28) days.

E. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished, the Engineer

may order such changes in proportions or materials, or both, as may be necessary

to secure the desired properties. All changes so ordered shall be made at the Contractor's expense.

F. Under special circumstances, the Engineer may allow minor deviations from the

material requirements specified, provided the resulting concrete quality is not adversely affected or provided a suitable adjustment in cement content is made to

compensate for such deviations without cost to the Owner.

G. Test results will be reported in writing to Engineer, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

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

I. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Engineer. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

J. All structures for holding or transporting water or pits below grade shall be watertight. Where the order of work requires "cold" joints (slab/wall intersections, etc.) an approved, rigid waterstop specified elsewhere shall be furnished and installed securely to the formwork and remain imbedded in the concrete to form a watertight joint with the adjacent concrete placement.

Watertight Tanks shall be tested for 24 hours with recommendations of ACI 350.1R. Water shall be allowed to stand in concrete structure for 24 hours prior to the beginning of the 24 hour test period to allow for absorption of water by the surface of the concrete in contact with the water. Accurate and precise measurements of the water level shall be made at the beginning and at the end of the 24 hour test period. The structure shall be filled with water to its maximum depth. The drop in the water surface shall not exceed ¼-inch. During the test period, close observation of the structure will be made for purpose of detecting leakage. If the leakage exceed the specified allowable limits, the point or points of leakage shall be sought out and remedied by the Contractor at no additional cost to the Owner. Repair methods must be approved by the Engineer.

### 3.18 SEALER

Apply a clear sealer to all concrete slabs that do not receive a floor finish.

**END OF SECTION**

**SECTION 03480**  
**PRECAST STRUCTURES**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Rectangular, monolithic, or sectional precast water and wastewater structures, pipe connectors, and accessories for lift station site.

**1.02 REFERENCES**

- A. Prestressed Concrete Institute: Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products.
- B. National Precast Concrete Association: Quality Control Manual for Precast Concrete Plants.
- C. American Society for Testing and Materials:
  - 1. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
  - 2. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
  - 3. ASTM C891 - Standard Practice for Installation of Underground Precast Concrete Utility Structures.
  - 4. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.
  - 5. ASTM C913 - Standard Specifications for Precast Concrete Water and Wastewater Structures.
- D. American Association of State Highway and Transportation Officials Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets (AASHTO M198).
- E. American Concrete Institute Building Code Requirements for Reinforced Concrete (ACI 318).
- F. Occupational Safety and Health Administration Standard 1926.704 – Requirements for Precast Concrete.

**1.03 SUBMITTALS**

- A. Schedule of precast concrete structure sections to be provided on the project,

charting the following:

1. Sheet number where the precast structure plan & profile is shown on the plans.
2. Line number (when there is more than one line on the project).
3. Precast Structure Station number.
4. Invert Elevation of the influent and effluent line as indicated on the plans.
5. Top Elevation of the precast structure frame as indicated on the plans.
6. Top elevation of precast structure base slab as calculated.
7. Total height of precast structure required from top of base slab to top of frame.
8. Total height of assembled base, risers and cone or top provided from top of base to top of top.
9. Manufacturer's Part No. or Catalogue No. and number required of each base, riser, and top provided for the precast structure.
10. Each Pipe size and type and its Connector's, Part No., distance from top of base slab, and horizontal distances from inner wall corners of precast structure.

B. Detail of each precast concrete structure to be provided, sealed by the Registered Professional Engineer employed by the manufacturer showing or charting the following:

1. Manufacturer's Part No. or Catalogue No.
2. Inside Dimensions
3. Lay Length excluding base slab
4. Wall thickness and base or top thickness where applicable
5. Handling Weight
6. Wire Size, Spacing and area provided per vertical foot
7. Reinforcing Bar size and spacing
8. Design loads
9. Concrete Mix No. and design strength
10. Height, width, slope and annular space of the tongue and groove

C. Pipe Connector Details and Material Specifications

D. Joint Material Detail, Material Specifications and calculations showing that the joint material cross section is greater than the joint's annular space times its height.



- E. Lifting Device and Hole Detail.
- F. At the request of the Engineer or Owner, submit the following:
  - 1. Structural analysis and design calculations for Precast Components, performed in accordance with applicable codes and standards, showing that allowable stresses will not be exceeded. All calculations must be sealed by a Registered Professional Engineer employed by the Precast Concrete Manufacturer.
  - 2. Calculations or test results verifying that the lifting device components and holes are designed in accordance with OSHA Standard 1926.704.
  - 3. Concrete 28 day compression strength results for every day production of Precast Components for the project was performed, showing the required strength according to the guidelines established in ACI 318.
  - 4. Reinforcing and Cement mill reports for materials used in the manufacture of Precast Components for this project.
  - 5. The above test reports for similar Precast Components recently produced, submitted prior to production of Precast Components for this project.

#### **1.04 QUALIFICATIONS**

- A. The Precast Manufacturer shall comply with one of the following requirements:
  - 1. Manufacture Precast components for the project in a plant certified in the Prestressed Concrete Institute's (PCI) Plant Certification Program.
  - 2. Manufacture Precast Components for the project in a plant certified in the National Precast Concrete Association's (NPCA) Plant Certification Program.
  - 3. Retain an independent testing or consulting engineering firm approved by the Engineer for Precast plant inspection. The basis for plant inspection shall be the National Precast Concrete Association Quality Control Manual or the Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products. The above firm shall inspect the precast plant 2 weeks prior to and at 1 week intervals during production of materials for this project and issue a report, certified by a Registered Engineer that materials, methods,

products, and quality control meet the requirements of the above quality control manuals.

- B. The Precast Manufacturer shall have a recognized Quality Improvement Process installed at the manufacturing facility.
- C. The Precast Manufacturer shall employ at least one Registered Professional Engineer at the manufacturing facility through the life of the project.
- D. All concrete compressive strength testing shall be performed in a laboratory inspected by the CCRL of the National Bureau of Standards.

#### **1.05 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain materials and surrounding air temperature to minimum 50 degrees F prior to, during, and 48 hours after completion of masonry, grouting or concreting work.

#### **1.06 DEFINITIONS**

- A. Wet well shall be watertight, precast reinforced air-entrained concrete structures.
- B. Lift Station wet well shall be designed to ASTM C890 A8 live loading.
- C. Honeycombed or retempered concrete is not permitted.
- D. Precast manufacturer shall coordinate with manufacturer of access hatches to provide the required hatch opening dimensions and ensure proper reinforcing is obtained between and around hatch openings to provide the specified design loading requirements.

### **PART 2 - PRODUCTS**

#### **2.01 MATERIALS**

- A. Concrete: Concrete shall conform to ASTM C913 and as follows:
  - 1. Compressive strength: 5000 psi minimum at 28 days
  - 2. Air Content: 4 percent minimum.
  - 3. Alkalinity: Adequate to provide a Life Factor,  $A_z = \text{Calcium Carbonate Equivalent times Cover over Reinforcement}$ , no less than 0.35 for bases, risers and tops.
  - 4. Cementitious Materials: Minimum of 564 pounds per c.y.
  - 5. Coarse Aggregates: ASTM C33. Sound, Crushed,

- Angular Granitic Stone only. Smooth or rounded stone shall not be used.
6. Fine Aggregates: ASTM C33. Free from organic impurities.
  7. Chemical Admixtures: ASTM C494. Calcium Chloride or admixtures containing calcium chloride shall not be used.
  8. Air Entraining admixtures: ASTM C260.
- B. Reinforcing: Reinforcing steel shall be ASTM A615 grade 60 deformed bar, ASTM A82 wire or ASTM A185 welded wire fabric.
- C. Lifting Loops: Lift loops shall be ASTM A416 steel strand. Lifting loops made from deformed bars shall not be allowed.
- D. Butyl Rubber Sealant shall conform to Federal Specification SS-S-210A, AASHTO M-198, Type B - Butyl Rubber and as follows: maximum of 1% volatile matter and suitable for application temperatures between 10 and 100 degrees F.
- E. Butyl Rubber with Bentonite Sealant shall conform to Federal Specification SS-S-210A, ASTM D-297, and containing no asphaltics as follows: maintaining 99% solids with a maximum of 1% volatile matter and suitable for application temperatures between 5 and 125 degrees F.
- F. Epoxy Gels: Epoxy Gels used for interior patching of wall penetrations shall be a 2-component, solvent-free, moisture-insensitive, high modulus, high-strength, structural epoxy paste adhesive meeting ASTM C-881, Type I and II, Grade 3, Class B and C, Epoxy Resin Adhesive.

## **2.02 COMPONENTS**

- A. Precast Component Fabrication and Manufacture shall be as described in this paragraph and as described in the paragraphs for the specific components.
1. Precast Manufacturing: Precast Structures shall be manufactured in conformance with ASTM C913. Wall and inside slab finishes resulting from casting against forms standard for the industry shall be acceptable, except form ties through the wall of the product are not allowed. Exterior slab surfaces shall have a float finish. Small surface holes, normal color variations, normal form joint marks, and minor depressions, chips and spalls will be tolerated. Edges may be tooled. Dimensional tolerances shall be those set forth in the appropriate References and specified below.
  2. Joints: Joints surfaces for joints between Precast

Structure Components shall be keyways or tongue and grooves manufactured to the joint surface design and tolerance requirements of ASTM C913.

3. Lift Inserts and Holes: If used for handling Precast Structures, lift holes and inserts shall be sized for a precision fit with the lift devices, shall not penetrate through the precast structure wall and shall comply with OSHA Standard 1926.704.
- B. Precast Base Sections: Base sections shall have the base slab cast monolithically with the walls, or have an approved galvanized or PVC waterstop cast in the cold joint between the base slab and the walls.
  - C. Precast Riser Sections: The Minimum Lay Length of Precast Riser Sections shall be 36".
  - D. Precast Top Sections: Flat Slab Top Sections shall meet or exceed the design loading requirements of the respective structures as specified in paragraph 1.03, B.8 above. Transition Top Sections shall provide for transition to other diameter risers, cones, and flat slab top sections with a joint equal to that of a riser section. Venting of top sections shall be as shown on the details.
  - E. Pipe to Manhole Connectors: Pipe to Manhole Connectors shall conform to ASTM C923. On large diameter flexible pipes, provisions for control of the pipe OD to within the tolerances of the connector shall be made.
  - F. Joint Sealing Materials: Joints shall be sealed internally between the tongue and the groove and additionally around the external perimeter of the joint. Sealants are as follows:
    1. External Seals shall consist of a cross linked, high density polyethylene membrane, Riser-Wrap™ or equal, no less than 1/16" thick and 6" wide applied per the manufacturer's instructions to the outside perimeter of the joint.
    2. Joints with a perimeter greater than or equal to 18' shall be internally sealed with Butyl Rubber/Bentonite Sealant.
    3. Joints with a perimeter less than 18' shall be internally sealed with Butyl Rubber Sealant.
  - G. Hatches: Hatches and doors, frames and grate to be provided as equal to those shown on the precast structure details. Material shall be stainless steel or aluminum as conforming to details per application. For dimensions of castings see precast top details. Hatches shall have a load capacity of 300 psf minimum. Hatches shall be provided by Halliday Products, Inc., WACO Products, Inc., or

USF Fabrication, Inc.

- H. Lifting Devices: Lifting devices complying with OSHA Standard 1926.704 for handling the Precast Components shall be provided by the Precast Manufacturer. The design of lifting devices shall comply with ASTM C913, paragraph 5.8 standards.
- I. Liners: Where shown on the plans, the interior of the precast structure shall be lined with an epoxy system (TNEMEC Company epoxy system or approved equal). The liner shall be installed in accordance with the recommendations of the liner manufacturer.
  - 1. Epoxy system: TNEMEC Company epoxy system; Equal products may be submitted that do not change the generic description, solids by volume and the number of coats. ASTM performance criteria must accompany the submittal and all test reports submitted must meet and exceed the basis of design.

Surface Preparation – Allow new concrete to dry for 28 days. Verify dryness by testing for moisture. Moisture content should not exceed 3 lbs. per 1,000 sq. ft. Abrasive sweep blast to a CSP 5 minimum. Prior to painting the substrate must be clean dry and free of all contaminants.

1<sup>st</sup> Coat – Tnemec Series 218 applied at a full skim coat at 1/16" on average  
2<sup>nd</sup> Coat – Tnemec Series 436 applied at 80 mils

The product shall have a material warranty period of 5 years against penetration of hydrogen sulfide gas and sulfuric acids.
- J. Ladders: If shown on Precast Structure Details, fixed ladders shall be provided in rectangular structures greater than 8' deep in accordance with all OSHA requirements. Ladders are not required for rectangular structures 8' deep and less.

## **2.03 CONFIGURATION**

- A. Precast Concrete Structures are to be constructed as specified.
- B. The number of joints is to be minimized. Use no more than 2 sections up to 8' depth and no more than 1 additional section for each 4' of depth.

## **PART 3 – EXECUTION**

### **3.01 EXAMINATION**

- A. Inspect precast components prior to unloading from the delivery truck.

### **3.02 PREPARATION**

- A. Product Delivery, Storage, and Handling: Coordinate delivery with the manufacturer, handle and store the Precast Components in accordance with ASTM D891 and the manufacturer's recommendations using methods that will prevent damage to the components and their joint surfaces.

### **3.03 PLACING PRECAST CONCRETE SECTIONS**

- A. Excavate to the required depth and remove materials that are unstable or unsuitable for a good foundation. Prepare a level, compacted foundation extending 6" beyond the precast base and follow ASTM C891 excavation standards.
- B. Set base plumb and level, aligning pipe opening with pipe invert.
- C. Thoroughly clean bells and spigots to remove dirt and other foreign materials that may prevent sealing. Unroll the Butyl Sealant rope directly against base of spigot. Leave prospective wrapper attached until sealant is entirely unrolled against spigot. Do not stretch. Overlap from side to side - not top to bottom.
- D. Set risers and tops, aligning internal wall surfaces, so that proper alignment is achieved, taking particular care to clean, prepare and seal joints.
- E. When recommended by the manufacturer, fill the void between horizontal joint surfaces with a sand cement grout around the outside perimeter.
- F. After joining precast sections, apply the butyl sealant sheet around the outside perimeter of the joint.
- G. Lift Holes leaving less than 2" of wall thickness shall be plugged from the outside using a sand cement mortar. Lift Holes penetrating the wall shall be additionally sealed with an interior application of an epoxy gel 1/8" thick extending 2" beyond the penetration.
- H. Perform the final finishing to the precast interior by filling all chips or fractures greater than 1/2" in length, width or depth and depressions more than 1/2" deep in inverts with a sand cement mortar. Grout joints according to Manufacturers Specifications. Clean the interior of the precast structure, removing all dirt, spills or other foreign matter.

**END OF SECTION**

**SECTION 03601  
GROUT (NON-SHRINK)**

**PART 1 – GENERAL**

**1.01 SCOPE**

- A. Under this heading shall be included the furnishing and installation of all non-shrink grouts, complete.

**PART 2 – PRODUCTS**

**2.01 MATERIALS**

- A. Non-Shrink/Non-Metallic Grout (Type "A").
1. Grout shall be factory mixed containing natural aggregates formulated to be used at any consistency from extremely fluid to damp pack. The grout shall be similar in finished appearance to concrete and mortar. The grout shall be free of gas producing agents, oxidizing catalysts and inorganic accelerators.
  2. Strength of the grout in-place shall meet or exceed the following:

4,000 psi	at	24 Hours
6,000 psi	at	72 Hours
7,500 psi	at	7 Days
9,500 psi	at	28 Days
  3. Grout shall be mater-Builders Masterflow 713 Grout, or equal.
- B. Non-Shrink/Metallic Aggregate Grout Type "B".
1. Grout shall be factory mixed, containing specially graded and processed ferrous metallic cementitious system formulated to be used at any consistency from extremely fluid to damp pack. The grout shall be free of gas producing agents, oxidizing agent and organic accelerators.
  2. Strength of the grout in-place shall meet or exceed the following:

4,000 psi	at	24 Hours
6,000 psi	at	72 Hours
8,000 psi	at	7 Days



10,000 psi                      at                      28 Days

3. Grout shall be Master-Builders Embeco 636 Grout, or equal.

C. Water: Water shall be potable.

## **2.02 GROUTING SCHEDULE**

A. Grouting under this Contract shall be done in accordance with the applicable items in the following schedule, unless noted otherwise:

<u>Grouting Applications</u>	<u>Grout Type</u>
Anchor Bolts and Dowels in Cast or Drilled Holes	"A" or "B"
Bearing Plates or angles	"A" or "B"
Aluminum Handrails	"A"
Joining Precast Concrete Elements	"A"

B. Damp pack (plastic) grout shall be used for vertical surfaces with holes having at least one surface dimension less than the hole depth and for holes left by removal of fasteners and form ties.

C. Flowable or fluid grout shall be used for all other applications.

## **PART 3 – EXECUTION**

### **3.01 SURFACE PREPARATION**

A. General:

1. Concrete surfaces to receive grout shall be rough and reasonably level. Laitance shall be removed to sound concrete. The surfaces, including bolt holes shall be saturated with water for 24 hours prior to grouting.
2. Where grout is to be used to repair damaged concrete surfaces, the damaged or honeycombed concrete shall be removed to sound concrete by chipping.

3. Metal surfaces to receive grout shall be cleaned of oil, grease and other deleterious substances by means of appropriate solvents, wire brushing or a combination of both.

**B. Formwork:**

1. Forms shall be provided for grout placed at a flowable or fluid consistency.
2. Forms shall be strong, tight and shall be braced so they will not leak or buckle under the weight of fluid grout.
3. Forms shall be caulked with grout or a sand-cement mortar to prevent leakage. Expanded polystyrene or other means shall be used to caulk between foundation and portions of the element being grouted to seal off areas where grout is not required.

### **3.02 GROUT PREPARATION**

- A. Grout shall be mixed in a paddle type mortar mixer or other suitable mechanical mixer. Hand mixing will not be permitted. Grout shall be mixed to a consistency according to the method of placement (damp pack or fluid) without overuse of water to the extent to cause bleeding. The grout manufacturer's instructions shall be strictly adhered to and the grout shall be mixed a minimum of 3 minutes and placed immediately. Mixing water temperature shall not be less than 40 Degrees F not exceed 80 Degrees F.

### **3.03 GROUT PLACEMENT**

- A. Grout shall be placed at a temperature of 65 Degrees-75 Degrees F. The contractor shall maintain this temperature range for 24 hours following installation, thereafter above 40 Degrees F. until the strength exceeds 4,000 psi.
- B. Grout shall be placed quickly and continuously and shall not be vibrated or overworked.

### **3.04 CURING**

- A. Ponding or soaking wet cloth shall be applied within 10 minutes after grouting and shall be continued for 3 hours.

**END OF SECTION**



## **SECTION 05100 STRUCTURAL STEEL**

### **PART 1 – GENERAL**

#### **1.01 SCOPE**

Under this heading shall be included the fabrication and erection of all structural steel. Also included is the furnishing of all steel not designated on the drawings as being furnished by the Owner.

#### **1.02 APPLICABLE STANDARDS**

Where any material or operation is specified by reference to the following published specifications or standards or the specifications or standards of any other organizations, the referenced specification or standard shall be as much a part of this Section as if quoted in full herein.

- A. American Institute of Steel Construction (AISC).

“Specification for the Design, Fabrication and Erection of Structural Steel for Buildings,” referred to herein as AISC Specification.

- B. American National Standards Institute (ANSI) - B27.2

- C. American Society for Testing and Materials (ASTM).

A36 Specification for Structural Steel

- D. American Welding Society (AWS).

#### **1.03 GENERAL**

Unless otherwise shown or specified the AISC Specification shall govern this work. Welding shall be in accordance with AWS D1.1-84.

- A. Detailing

Detailing of connections of the work not indicated on the Contract Plans shall be completed by the contractor and indicated on shop drawings. Such connections shall conform to the character and intent of the detailed connections. The capacity of such high strength bolted or welded connections for members shall be sufficient to transfer the indicated loads or 50 percent of the connected member's gross capacity in allowable loads and detailing requirements of the

referenced AISC Specifications. Welded connections not detailed shall conform to all of the requirements of ASW D1.1-84.

**B. Substitutions and Modifications**

If allowed, all substitutions or modifications shall be completely detailed by the Contractor and shall be submitted with and conspicuously noted on substitutions, modifications and necessary changes in related portions of the work shall be coordinated by the Contractor and shall be accomplished at no additional cost to the Owner.

**C. Fitting**

The Contractor shall be responsible for the correct fitting of all structural steel items.

**D. Welders**

Welders to be employed on the work shall have passed qualifications tests using procedures covered in the AWS d1.1-84, within the past 6 months. All sections of welds found defective shall be chipped or cut out to base metal and properly rewelded before proceeding with the work. All butt welds shall be subject to testing by the Owner to verify compliance with all requirements of AWS D1.1-84.

**PART 2 – PRODUCTS**

**2.01 MATERIALS**

Materials shall conform to the respective specifications and other requirements specified below:

**A. Structural Steel.**

All structural steel shall be new. All shape and plates shall be ASTM A36. Steel tubing shall conform to ASTM A500 or ASTM A501.

Rolled shapes not noted otherwise shall be ASTM A36.

**B. Washers**

Round washers, other than those in contact with high strength bolt heads and nuts, shall conform to ANSI B27.2, Type “B”. Beveled washers, if required, shall be square, smooth and sloped so that contact surfaces of bolt head and nut are

parallel. The diameter of hole of square beveled washers shall be 1/16 inch greater than the bolt size for bolts not larger than 1 inch.

C. Threaded Fasteners - See Section 05501.

## **2.02 MILL REPORTS**

The Contractor shall furnish two certified copies of all mill reports covering the chemical and physical properties of all new steel obtained from the mill. For all materials obtained from warehouse stock certification of compliance to the applicable ASTM Specification shall be furnished.

## **2.03 INSPECTION AND TESTS**

All new material to be furnished shall be subject to inspection and tests in the mill, shop and field by the Engineer. Inspection in the mill or shop will not relieve the Contractor of the responsibility to furnish satisfactory materials. When materials and workmanship do not conform to the specifications requirements, the Owner reserves the right to reject materials or workmanship, or both, at any time before final acceptance of the work.

## **PART 3 – EXECUTION**

### **3.01 STORAGE OF MATERIALS**

Structural materials, either plain or fabricated, shall be stored in the Contractor's secured area, above the ground upon platforms, skids, or other supports. Material shall be kept free from dirt, grease and other foreign mater and shall be protected from corrosion.

### **3.02 FABRICATION**

Structural material shall be fabricated and assembled as shown. Shearing, flame cuttings, arc air gouging and chipping shall be done carefully and accurately. Unless specifically indicated otherwise, dimensional tolerances of all welded structural steel shall conform to all of the requirements of AWS d1.1-84. All other tolerances shall be in accordance with the AISC Specifications.

A. Connections.

Connections shall be as indicated. Connection indicated shall be detailed to conform with the referenced AISC Specifications.

B. Holes.

Holes shall be drilled, punched, or sub-punched and reamed at right angles to the surface of the metal and shall not be made or enlarged by burning. Holes requiring field fit up shall be left blank and field drilled or shall be sub-punched and field reamed assembled. Holes provided in members to permit connecting the work shall be clearly indicated on the shop drawings. Holes shall be clean cut without torn or ragged edges. Outside burrs or shoulders resulting from punching, drilling or reaming operations shall be removed with a tool making 1/16 inch level.

C. Welding.

Welded connections will be permitted only where indicated on the Contract Plans unless approval for change is obtained on shop drawings. "Specifications for the Design, Fabrication and Erection of Structural steel for Buildings." Particular care shall be taken to clean all cut edges of steel or slag or other debris before welding and to clean the slag from all welds immediately after welding. All back gouging of all welds shall be done by the arc air method followed by clean-up grinding. Oxyacetylene torch shall not be used for back gouging on any weld. Each layer, except for the first and last layer, or all but welds joining plates  $\frac{3}{4}$  inch or more in thickness shall be stress relieved by opening with a power operated tool. Peening shall be sufficient to smooth out all weld ripples in each layer. Run-off bars, back-up bars and transition pieces shall be furnished and used wherever they are required by AWS d1.1-84. The Contractor shall provide sufficient equipment and/or preheating as is required on any items or weldment to minimize residual stresses or cracking of welds or parent material due to the draw of any cooling welds. Any component of any weldment which may be drawn out of alignment due to the shrinkage of the cooling metal of any eccentric weld, such as single bevel butt welds, shall be jigged out of alignment, prior to welding, in the direction and by the amount estimated to be necessary to compensate for the eccentric draw. Any remaining out of alignment shall be corrected by "flame straightening." Parts to be connected by fillet welding shall be increased in size to compensate for fit up gaps within the tolerances indicated for this condition in AWS D1.0.66. Fillet welds shall be returned around corners at ends of all members.

### 3.03 ERECTION

Members shall not be distorted, deflected, bent or placed in condition of heavy stress during erection and fastening.

A. Field Assembly

After assembly, the various members forming parts of a completed frame or structure shall be aligned and adjusted accurately before being fastened. Tolerances shall conform to AISC Code of Standard Practice except where indicated otherwise. Bearing surfaces and surfaces that will be in permanent contact shall be cleaned before the members are assembled. Splices shall be permitted only where indicated. Welding for redrilling will not be permitted. Holes shall not be more than 1/16 inch greater than the nominal size except where indicated on Plans.

B. Driftpins

Driftpins may be used only to bring together the several parts and shall not be used in such manner as to distort or damage the metal.

C. Gas Cutting

The use of gas cutting torch for correcting fabrication errors in the field will not be permitted on any member in the structure.

### **3.04 PAINTING**

A. General

All steel surfaces except faying surfaces of high-strength bolted connections, pin holes and machine finished surfaces, shall be prepared and painted as specified in Section 09900. All welded slag shall be removed from welds before any painting.

B. Surface Preparation

Remove scale, rust and other deleterious materials before the shop coat of paint is applied. Clean off heavy and loose mill scale in accordance with SSPC or SP10. Remove oil grease, and similar Contaminants in accordance with SSPC SP-1.

C. Shop Coat.

Immediately after surface preparation, dip, brush or spray on Tnemec Series 1 or approved equal metal primer paint, applied in accordance with the manufacturer's instructions and at a rate to provide a uniform dry film thickness of 2-3 mils. Use painting methods which will result in full coverage of joints, corner, edges and all exposed surfaces.

Paint shall be as specified in Section 09900 of these specifications.



**END OF SECTION**

**SECTION 05505  
MISCELLANEOUS METAL**

**PART 1      GENERAL**

**1.1      SCOPE OF WORK**

- A.      Furnish all labor, materials, equipment, and incidentals required to install all miscellaneous metal as shown on the Drawings and specified herein.

**1.2      RELATED WORK**

- A.      Anchor bolts for equipment are included in the respective sections of Divisions 11.

**1.3      COORDINATION**

- A.      The work of this Section shall be completely coordinated with the work of other Sections. Verify at the site both the dimensions and work of other trades adjoining items of work in this Section before fabrication and installation of items herein specified.
- B.      Furnish to the pertinent trades all items included under this Section that are to be built into the work of other Sections.

**1.4      SUBMITTALS**

- A.      Shop drawings, working drawings, and product data, as provided for in Section 01300, showing at least sizes of members, method of assembly, materials, anchorage, and connection to other members shall be submitted to the Engineer for review before fabrication.
- B.      Submit Drawings and data for the column covers including details, gaskets, fasteners, thickeners, dimensions, and any other pertinent descriptive literature.

**1.5      FIELD MEASUREMENTS**

- A.      Field measurements shall be taken at the site to verify or supplement indicated dimensions and to ensure proper fitting of all items.

**1.6      REFERENCE SPECIFICATIONS**

- A.      Aluminum Association:

AA 5052	Aluminum Sheet and Plate, Rolled Rod and Bar and Drawn Tube
AA 6061	T6 Aluminum Sheet and Plate
AA 6061	T5 Aluminum Extruded Shapes
AA 6063	T6 Aluminum Extruded Pipe
AA 5005	Sheet and Plate
AA M31C22A41:	M31 Mechanical Finish, Fine Satin C22 Chemical Finish, Medium Matte A41 Clear Anodic Coating, Class I

B. American National Standards Institute (ANSI):

ANSI A14.3	Safety Requirement for Fixed Ladders
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C. American Society for Testing and Materials (ASTM):

ASTM A36	Specification for Structural Steel
ASTM A48	Specification for Gray Iron Castings
ASTM A53	Specification for Pipe, Steel, Black and Hot Dipped, Zinc-Coated Welded and Seamless
ASTM A123	Specification for Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Castings, Plates, Bars, and Strips
ASTM A153	Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A307	Specification for Carbon Steel Externally Threaded Standard Fasteners
ASTM A325	Specification for High-Strength Bolts for Structural Steel Joints
ASTM A386	Specification for Zinc-Coated (Hot-Dip) on Assembled Steel Products
STM A446	Specification for Steel Sheet, Zinc-Coated Galvanized) by the Hot-Dip Process, Structural (Physical) Quality
ASTM A525	Specifications for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process
ASTM A611	Specification for Steel, Cold-Rolled Sheet, Carbon, Structural
ASTM B209	Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B221	Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes
ASTM B429	Specification for Aluminum-Alloy Extruded Structural Pipe and Tube

D. American Iron and Steel Institute (AISI):

AISI Type 316	Stainless Steel Bolts, Bars and Shapes
AISI Type 316	Stainless Steel Plate and Sheet

E. American Welding Society (AWS):

1. AWS Specification for Arc Welding (Type E70XX) Welding Rods for Steel

F. Southern Building Code Congress International, Inc. (SBCCI)

G. Federal Specification:

1. FS-FF-B-575C Bolts, Hexagon and Square

H. Military Specifications:

1. MIL-P-15145

I. National Fire Protection Association (NFPA):

1. 101 Life Safety Code

J. Occupational Safety and Health Act (OSHA):

1. Standards

## 1.7 MISCELLANEOUS STANDARDS

A. Unless otherwise specified, materials shall conform to the following:

1. Structural Steel                      ASTM A36
2. Welded and Seamless Steel Pipe    ASTM A53
3. Gray Iron Castings                  ASTM A48, Class 30
4. Galvanizing, General                ASTM A123
5. Galvanizing, Hardware              ASTM A153
6. Galvanizing, Assemblies            ASTM A386
7. Aluminum

- a. Extruded Shapes ASTM B221, Alloy 6061, T5
  - b. Extruded Pipe STM B429, Alloy 6063, T6
  - c. Sheet and Plate ASTM B207, Alloy 6061, T6
- 8. Bolts and Nuts ASTM, A307
  - 9. Stainless Steel Bolts, Bars and Shapes AISI, Type 316
  - 10. Stainless Steel Plate & Sheet AISI, Type 316
  - 11. Welding Rods for Steel AWS Specification for Arc Welding

## **PART 2 PRODUCTS**

### **2.1 ANCHORS, BOLTS, AND FASTENING DEVICES**

- A. Anchors, bolts, etc., shall be furnished as necessary for installation of the work of this Section.
- B. Compound masonry anchors shall be of the type shown or required and shall be equal to Star Slugin compounded masonry anchors manufactured by Star Expansion Industries, equal to Phillips Drill Co., Rahlplug, or equal. Anchors shall be minimum "two unit" type.
- C. The bolts used to attach the various members to the anchors shall be the sizes shown or required. Aluminum and stainless steel shall be attached to concrete or masonry by means of stainless steel machine bolts and iron or steel shall be attached with steel machine bolts unless otherwise specifically noted.
- D. Unless otherwise noted, expansion bolts shall be Phillips Drill Co. "Wedge Anchors", Hilti "Kwik-Bolt", or equal. When length of bolt is not called for on the Drawings, the length of bolt provided shall be sufficient to place the wedge portion of the bolt a minimum of 1-inch behind the reinforcing steel within the concrete. Material shall be as noted on the Drawings. If not noted, provide in galvanized steel.
- E. Adhesive anchors indicated shall be Hilti HVA Anchors or equal. Manufacturer's written installation instructions shall be supplied and followed.
- F. Bolts and nuts shall conform to Federal Specification FF-B-575C. Bolts and nuts shall be hexagon type. Stainless steel bolts, nuts, screws, washers, and related appurtenances shall be equal to AISI Type 302. All exposed portions of anchor bolts

installed in concrete shall be greased, wrapped in burlap or plastic sleeve and tied.

- G. Toggle bolts shall be Diamond, Keystone, Star, or equal.

## **2.2 ALUMINUM (OR STEEL) ITEMS**

- A. Prefabricated checkerplate aluminum (steel) pump station hatches shall be provided by the pump manufacturer and as specified in section 11310.
- B. Checkerplate aluminum or steel cover plates shall be fabricated to the details shown and installed at the locations shown.
- C. Miscellaneous aluminum (steel) shapes and plates shall be fabricated as shown. Angle frames for hatches, etc. shall be furnished complete with welded strap anchors attached. Furnish all miscellaneous aluminum (steel) shown but not otherwise specified herein.

## **2.3 STEEL MISC. ITEMS**

- A. Sleeves shall be steel or cast iron pipe in walls and floors with end joints as shown on the Drawings. All pipe sleeves shall have center anchor around circumference as shown.
- B. Miscellaneous steel shall be fabricated and installed in accordance with the Drawings and shall include: support brackets, base plates, anchor bolts and any other miscellaneous steel called for on the Drawings and not otherwise specified.

## **2.4 CAST IRON ITEMS**

- A. Frames, covers, grates for manholes and trench drains shall be of a good quality, strong, tough even grained cast iron except as otherwise specified below. Castings shall be as manufactured by the U.S. Foundry, Neenah Foundry, Mechanics Iron Foundry, or equal. Sizes shall be as shown on the Drawings. Covers to have letters "WATER", "SANITARY SEWER" or "DRAIN", as applicable, embossed on top.

# **PART 3 EXECUTION**

## **3.1 FABRICATION**

- A. All miscellaneous metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability.

- B. Connections and accessories shall be of sufficient strength to safely withstand stresses and strains to which they will be subjected. Steel accessories and connections to steel or cast iron shall be steel, unless otherwise specified. Threaded connections shall be made so that the threads are concealed by fitting.
- C. Welded joints shall be rigid and continuously welded or spot welded as specified or shown. The face of welds shall be dressed flush and smooth. Exposed joints shall be close fitting and jointed where least conspicuous.
- D. Welding of parts shall be in accordance with the Standard Code for Arc and Gas Welding in Building Construction of the AWS and shall only be done where shown, specified, or permitted by the Engineer. All welding shall be done only by welders certified as to their ability to perform welding in accordance with the requirements of the AWS Code. Component parts of built-up members to be welded shall be adequately supported and clamped or held by other adequate means to hold the parts in proper relation for welding.
- E. Welding of aluminum work shall be on the unexposed side as much as possible in order to prevent pitting or discoloration.
- F. All aluminum finish exposed surfaces, except as otherwise specified, shall have Manufacturer's standard mill finish. Aluminum handrails shall be given an anodic oxide treatment in accordance with the Aluminum Association Specification AA-C22-A41.
- G. All steel finish work shall be thoroughly cleaned, by effective means, of all loose mill scale, rust, and foreign matter before shipment and shall be given one shop coat of primer in accordance with plans and specifications, compatible with finish coats after fabrication but before shipping. Paint shall be applied to dry surfaces and shall be thoroughly and evenly spread and well worked into joints and other open spaces. Abrasions in the field shall be touched up with primer immediately after erection.
- H. Galvanizing, where required, shall be the hot-dip zinc process after fabrication. Following all manufacturing operations, all items to be galvanized shall be thoroughly cleaned, pickled, fluxed, and completely immersed in a bath of molten zinc according to ASTM A525. The resulting coating shall be adherent and shall be the normal coating to be obtained by immersing the items in a bath of molten zinc and allowing them to remain in the batch until their temperature becomes the same as the bath. Coating shall be not less than 2 ounces per square foot of surface.
- I. Zinc coating which has been burned by welding, abraded, or otherwise damaged shall be cleaned and repaired after installation. The damaged area shall be

thoroughly cleaned by wire brushing and all traces of welding flux and loose or cracked zinc coating removed prior to painting. The cleaned area shall be painted with two coats of zinc oxide-zinc dust paint conforming to the requirements of Military Specifications MIL-P-15145. The paint shall be properly compounded with a suitable vehicle in the ratio of one part zinc oxide to four parts zinc dust by weight.

### **3.2     INSTALLATION**

- A.     Install all items furnished except items to be imbedded in concrete or other masonry which shall be installed under Division 3 and Division 4, respectively. Items to be attached to concrete or masonry after such work is completed shall be installed in accordance with the details shown. Fastening to wood plugs in masonry will not be permitted. All dimensions shall be verified at the site before fabrication is started.
- B.     Where aluminum contacts a dissimilar metal, apply a heavy brush coat of zinc-chromate primer followed by two coats of aluminum metal and masonry paint to the dissimilar metal, or install PVC washers or sleeves.
- C.     Where aluminum contacts concrete, apply a heavy coat of approved alkali resistant paint to the concrete.
- D.     Where items are cast into concrete, backpaint contact areas before setting.
- E.     All steel surfaces to come in contact with exposed concrete shall receive a protective coating of an approved heavy bitumastic troweling mastic applied in accordance with the manufacturer's instructions prior to installation.

**END OF SECTION**



**SECTION 09900  
PAINTING/COATING**

**PART 1 – GENERAL**

**1.01 SECTION INCLUDES**

- A. The work of this section consists of furnishing all materials, labor, equipment and incidentals required and performing all the painting necessary to complete this Contract in its entirety.
- B. It is the intent of these Specifications to paint all exposed miscellaneous metal, pipe, fittings, supports, valves, equipment and all other work obviously required to be painted including but not limited to, building interior walls, ceilings, floors, trim, as indicated on the drawings and specified herein, except as otherwise specified. Minor items omitted in the schedule of work shall be included in the work of this Section where they come within the general intent of the specifications as stated herein.
- C. The following surfaces or items are not required to be painted:
  - 1. Portions of metal, other than aluminum, embedded in concrete. This does not apply to the back face of items mounted to concrete or masonry surfaces which shall be painted before erection. Aluminum to be embedded in or in contact with concrete or masonry shall be coated to prevent electrolysis.
  - 2. Stainless steel.
  - 3. Fencing.
  - 4. Tile.
  - 5. Finish hardware, except door closers that are not stainless steel.
  - 6. Manhole frames and covers.
  - 7. Fiberglass other than piping.
  - 8. Packing glands and other adjustable parts and nameplates of mechanical equipment.
  - 9. Galvanized conduit.

10. Copper pipe.
11. Galvanized pipe.
12. Aluminum Handrail

## **1.02 RELATED SECTIONS**

- A. Section 09865 – Surface Preparation and Shop Prime Painting

## **1.03 REFERENCES**

- A. ANSI/NSF 61 - Drinking Water System Components - Health Effects.
- B. ASTM D 16 - Terminology Relating to Paint, Varnish, Lacquer, and Related Products.
- C. ASTM D 4263 - Indicating Moisture in Concrete by the Plastic Sheet Method.
- D. ASTM F 1869 - Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- E. AWWA C 652 - Disinfection of Water-Storage Facilities.
- F. AWWA D 102 - Painting Steel Water Storage Tanks.
- G. International Concrete Repair Institute (ICRI) Guideline No. 03732 - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.
- H. SSPC-SP 1 - Solvent Cleaning.
- I. SSPC-SP 2 - Hand Tool Cleaning.
- J. SSPC-SP 3 - Power Tool Cleaning.
- K. SSPC-SP 5/NACE 1 - White Metal Blast Cleaning.
- L. SSPC-SP 6/NACE 3 - Commercial Blast Cleaning.
- M. SSPC-SP 10/NACE 2 - Near-White Metal Blast Cleaning.
- N. SSPC-SP 13/NACE 6 - Surface Preparation of Concrete.

#### **1.04 DEFINITIONS**

- A. Definitions of Painting Terms: ASTM D 16, unless otherwise specified.
- B. Dry Film Thickness (DFT): Thickness of a coat of paint in fully cured state measured in mils (1/1000 inch).

#### **1.05 SUBMITTALS**

- A. Comply with Section 01300 - Submittals
- B. Product Data: Submit manufacturer's product data for each coating, including generic description, complete technical data, surface preparation, and application instructions.
- C. Color Samples: Submit manufacturer's color samples showing full range of standard colors.
- D. Manufacturer's Quality Assurance: Submit manufacturer's certification that coatings comply with specified requirements and are suitable for intended application.
- E. Applicator's Quality Assurance: Submit list of a minimum of 5 completed projects of similar size and complexity to this Work. Include for each project:
  - 1. Project name and location.
  - 2. Name of owner.
  - 3. Name of contractor.
  - 4. Name of engineer.
  - 5. Name of coating manufacturer.
  - 6. Approximate area of coatings applied.
  - 7. Date of completion.
- F. Warranty: Submit manufacturer's standard warranty.
- G. Schedule of Painting Operations: Submit to the Engineer for review a complete Schedule of Painting Operations within 90 days after the Notice to Proceed. This

Schedule is imperative so that the various fabricators may be notified of the proper Shop prime coat to apply. Properly notify and coordinate the fabricators' surface Preparation and painting operations with these Specifications. This Schedule shall include for each surface to be painted, the brand name, the percent volume of solids, the coverage and the number of coats the Contractor proposes to use in order to achieve the specified dry film thickness, and color charts. When the Schedule has been approved, apply all material in strict accordance with the approved Schedule and the manufacturer's instructions. Wet and dry paint film gauges shall be made available to the Engineer to verify the proper application while work is in progress.

## **1.06 QUALITY ASSURANCE**

### **A. Manufacturer's Qualifications:**

1. Specialize in manufacture of coatings with a minimum of 10 years successful experience.
2. Able to demonstrate successful performance on comparable projects.
3. Single Source Responsibility: Coatings and coating application accessories shall be products of a single manufacturer.

### **B. Applicator's Qualifications:**

1. Experienced in application of specified coatings for a minimum of 5 years on projects of similar size and complexity to this Work.
2. Applicator's Personnel: Employ persons trained for application of specified coatings.

## **1.07 DELIVERY, STORAGE, AND HANDLING**

### **A. Delivery:** Deliver painting materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying coating name and manufacturer, color name and number, batch number and date of manufacture. Painting materials shall be used without adulteration and mixed, thinned and applied in strict accordance with manufacturer's directions for the applicable materials and surface and with the Engineer's approval before using.

### **B. Storage:**

1. Store materials in a clean dry area and within temperature range in accordance with manufacturer's instructions.

2. Keep containers sealed until ready for use.
  3. Do not use materials beyond manufacturer's shelf life limits.
- C. Handling:
1. Protect materials during handling and application to prevent damage or contamination.
  2. Work areas will be designated by the Engineer for storage and mixing of all painting materials. Materials shall be in full compliance with the requirements of pertinent codes and fire regulations. Proper containers outside of the buildings shall be provided and used for painting wastes, and no plumbing fixture shall be used for this purpose.
  3. All recommendations of the paint manufacturer in regard to the health and safety of workmen shall be followed.

## **1.08 ENVIRONMENTAL REQUIREMENTS**

- A. Weather:
1. Air and Surface Temperatures: Prepare surfaces and apply and cure coatings within air and surface temperature range in accordance with manufacturer's instructions.
  2. Surface Temperature: Minimum of 5 degrees F (3 degrees C) above dew point.
  3. Relative Humidity: Prepare surfaces and apply and cure coatings within relative humidity range in accordance with manufacturer's instructions.
  4. Precipitation: Do not prepare surfaces or apply coatings in rain, snow, fog, or mist.
  5. Wind: Do not spray coatings if wind velocity is above manufacturer's limit.
- B. Ventilation: Provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with AWWA D 102.
- C. Dust and Contaminants:

1. Schedule coating work to avoid excessive dust and airborne contaminants.
  2. Protect work areas from excessive dust and airborne contaminants during coating application and curing.
- D. No paint containing lead will be allowed. Oil shall be pure boiled linseed oil.
- E. Coatings in contact with potable water shall be NSF certified.

## **PART 2 – PRODUCTS**

### **2.01 MANUFACTURER**

- A. Tnemec Company Incorporated, 6800 Corporate Drive, Kansas City, Missouri 64120-1372. Toll Free (800) 863-6321. Phone (816) 483-3400. Fax (816) 483-3969. Web Site [www.tnemec.com](http://www.tnemec.com).
- B. Chemprobe Coating Systems, 2805 Industrial Lane, Garland, Texas 75041. Toll Free (800) 760-6776. Fax (972) 271-5553. Web Site [www.chemprobe.com](http://www.chemprobe.com).
- C. Materials specified are those that have been evaluated for the specific service. Products of Tnemec Company, Inc., Carblinc, Thorocoat, and Chemprobe Coating Systems are listed to establish a standard of quality. Equivalent materials of other manufacturers may be substituted on written approval of the Engineer. Requests for substitution shall include manufacturers literature for each product giving the name, product number, generic type, descriptive information, solids-by-volume, recommended dry film thickness, and certified test reports showing results to equal the performance of the specified products listed herein. In addition, a list of five projects shall be submitted in which each product has been used and rendered a minimum of five years of satisfactory service. All requests for substitution shall be made in writing in accordance with Section 01300.

### **2.02 COATING SYSTEMS FOR STEEL – STRUCTURAL, TANKS, PIPE, AND EQUIPMENT**

- A. Exterior Exposed:
1. System Type: Epoxy/epoxy/urethane.
  2. Surface Preparation: SSPC-SP 6.
  3. Primer: Series N68-1255 Beige Poxiprime II. DFT 3.0 to 5.0 mils.

4. Intermediate Coat: Series 66 Hi-Build Epoxoline. DFT 2.0 to 3.0 mils.
5. Finish Coat: Series 1075 Endura-Shield II. DFT 2.0 to 5.0 mils.
6. Total DFT: 7.0 to 13.0 mils.
7. Finish Color: As selected by Engineer from manufacturer's standard colors, and/or coating schedule Paragraph 3.20 of this Section.

B. Interior Exposed:

1. System Type: Epoxy.
2. Surface Preparation: SSPC-SP 6.
3. Primer: Series N68-1255 Beige Poxiprime II. DFT 3.0 to 5.0 mils.
4. Finish Coat: Series 66 Hi-Build Epoxoline. DFT 4.0 to 6.0 mils.
5. Total DFT: 7.0 to 11.0 mils.
6. Finish Color: As selected by Engineer from manufacturer's standard colors, and/or coating schedule Paragraph 3.20 of this Section.

C. Immersion:

1. System Type: Epoxy.
2. Surface Preparation: SSPC-SP 10.
3. Primer: Series N140-1255 Pota-Pox Plus. DFT 3.0 to 5.0 mils.
4. Finish Coat: Series N140 Pota-Pox Plus. DFT 4.0 to 6.0 mils.
5. Total DFT: 7.0 to 12.0 mils.
6. Finish Color: WH02 Tank White.

D. Below Grade:

1. System Type: Coal tar epoxy.
2. Surface Preparation: SSPC-SP 10.

3. Primer: Series 66 Hi-Build Epoxoline. DFT 3.0 to 5.0 mils.
4. Finish Coat: Series 46H-413 Hi-Build Tneme-Tar. DFT 14.0 to 20.0 mils.
5. Total DFT: 17.0 to 25.0 mils.
6. Finish Color: Black.

## **2.03 COATING SYSTEMS FOR FACTORY PRIMED STEEL – DOORS, FRAMES, AND MISCELLANEOUS EQUIPMENT**

### **A. Exterior Exposed:**

1. System Type: Epoxy/urethane.
2. Surface Preparation: Clean and dry.
3. Primer: Factory primed – Tnemec Series 1 DFT 2.0 to 3.0 mils
4. Intermediate Coat: Series 27 Typoxy. DFT 2.0 to 3.0 mils.
5. Finish Coat: Series 1075 Endura-Shield II. DFT 2.0 to 3.0 mils.
6. Total DFT: 4.0 to 6.0 mils.
7. Finish Color: As selected by Engineer from manufacturer's standard colors.

### **B. Interior Exposed:**

1. System Type: Epoxy.
2. Surface Preparation: Clean and dry.
3. Primer: Factory primed – Tnemec Series 1 DFT 2.0 to 3.0 mils
4. Intermediate Coat: Series 27 Typoxy. DFT 2.0 to 3.0 mils.
5. Finish Coat: Series 66 Hi-Build Epoxoline. DFT 2.0 to 3.0 mils.
6. Total DFT: 4.0 to 6.0 mils.
7. Finish Color: As selected by Engineer from manufacturer's standard colors.



## **2.04 COATING SYSTEMS FOR GALVANIZED STEEL AND NONFERROUS METAL - PIPE AND MISCELLANEOUS FABRICATIONS**

### **A. Exterior Exposed:**

1. System Type: Epoxy/urethane.
2. Surface Preparation: In accordance with manufacturer's instructions.
3. Primer: Series 66 Hi-Build Epoxoline. DFT 2.0 to 3.0 mils.
4. Finish Coat: Series 1075 Endura-Shield II. DFT 2.0 to 3.0 mils.
5. Total DFT: 4.0 to 6.0 mils.
6. Finish Color: As selected by Engineer from manufacturer's standard colors.

### **B. Interior Exposed:**

1. System Type: Epoxy.
2. Surface Preparation: In accordance with manufacturer's instructions.
3. Primer: Series 66 Hi-Build Epoxoline. DFT 2.0 to 3.0 mils.
4. Finish Coat: Series 66 Hi-Build Epoxoline. DFT 2.0 to 3.0 mils.
5. Total DFT: 4.0 to 6.0 mils.
6. Finish Color: As selected by Engineer from manufacturer's standard colors, and/or coating schedule Paragraph 3.20 of this Section.

### **C. Immersion:**

1. System Type: Epoxy.
2. Surface Preparation: SSPC-SP 1 followed by abrasive blast.
3. Primer: Series N140-1255 Pota-Pox Plus. DFT 3.0 to 5.0 mils.
4. Finish Coat: Series N140 Pota-Pox Plus. DFT 3.0 to 5.0 mils.

5. Total DFT: 6.0 to 10.0 mils.
6. Finish Color: WH02 Tank White.

## **2.05 COATING SYSTEMS FOR DUCTILE OR CAST IRON – PIPE, FITTINGS, AND VALVES**

### **A. Exterior Exposed (Includes - Inside Lift Station Wet Well and Valve Vault Structures and Inside Gravity Sewer Manholes):**

1. System Type: Epoxy.
2. Surface Preparation: In accordance with manufacturer's instructions.
3. Primer: Series N140-1255. DFT 3.0 to 5.0 mils.
4. Finish Coat: Tnemec Series 431 Polyamine Ceramic Epoxy. DFT 3.0 to 5.0 mils.
5. Total DFT: 6.0 to 10.0 mils.
6. Finish Color: As selected by Engineer from manufacturer's standard colors, and/or coating schedule Paragraph 3.20 of this Section.

### **B. Below Ground - Buried:**

1. System Type: Epoxy.
2. Surface Preparation: In accordance with manufacturer's instructions.
3. Primer: Series N140 Pota-Pox Plus. DFT 3.0 to 5.0 mils.
4. Total DFT: 5.0 mils.
5. Finish Color: Beige.

### **C. Interior Exposed:**

1. System Type: Epoxy.
2. Surface Preparation: In accordance with manufacturer's instructions.
3. Primer: Series 66 Hi-Build Epoxoline. DFT 3.0 to 5.0 mils.
4. Finish Coat: Series 66 Hi-Build Epoxoline. DFT 4.0 to 6.0 mils.

5. Total DFT: 7.0 to 11.0 mils.
  6. Finish Color: As selected by Engineer from manufacturer's standard colors, and/or coating schedule Paragraph 3.20 of this Section.
- D. Immersion (Includes Buried Installations Greater Than 10' Depths):
1. System Type: Epoxy.
  2. Surface Preparation: In accordance with manufacturer's instructions.
  3. Primer: Series N140 Pota-Pox Plus. DFT 3.0 to 5.0 mils.
  4. Finish Coat: Series N140 Pota-Pox Plus. DFT 4.0 to 6.0 mils.
  5. Total DFT: 7.0 to 11.0 mils.
  6. Finish Color: 1255 Beige.

## **2.06 COATING SYSTEMS FOR PVC**

- A. Exterior Exposed:
1. System Type: Epoxy/urethane.
  2. Surface Preparation: Scarify.
  3. Primer: Series 66 Hi-Build Epoxoline. DFT 2.0 to 3.0 mils.
  4. Finish Coat: Series 1075 Endura-Shield. DFT 2.0 to 3.0 mils.
  5. Total DFT: 4.0 to 6.0 mils.
  6. Finish Color: As selected by Engineer from manufacturer's standard colors, and/or coating schedule Paragraph 3.20 of this Section.
- B. Interior Exposed:
1. System Type: Epoxy.
  2. Surface Preparation: Scarify.

3. Primer: Series 66 Hi-Build Epoxoline. DFT 2.0 to 3.0 mils.
4. Finish Coat: Series 66 Hi-Build Epoxoline. DFT 2.0 to 3.0 mils.
5. Total DFT: 4.0 to 6.0 mils.
6. Finish Color: As selected by Engineer from manufacturer's standard colors, and/or coating schedule Paragraph 3.20 of this Section.

## **2.07 COATING SYSTEMS FOR INSULATED PIPE**

### **A. Interior/Exterior Exposed:**

1. System Type: Acrylic.
2. Surface Preparation: Clean and dry.
3. Primer: Series 6 Tneme-Cryl. DFT 2.0 to 3.0 mils.
4. Finish Coat: Series 6 Tneme-Cryl. DFT 2.0 to 3.0 mils.
5. Total DFT: 4.0 to 6.0 mils.
6. Finish Color: As selected by Engineer from manufacturer's standard colors, and/or coating schedule Paragraph 3.20 of this Section.

## **2.08 COATING SYSTEMS FOR CONCRETE FLOORS**

### **A. Epoxy/Chemical-Resistant Urethane:**

1. System Type: Epoxy/Chemical-Resistant Urethane.
2. Surface Preparation: ICRI CSP 2 to 3.
3. Primer: Series 66 Hi-Build Epoxoline. DFT 3.0 to 5.0 mils.
4. Finish Coats: (2) Coats - Series 291 CRU. DFT 2.0 to 3.0 mils. Include 80 – 120 mesh glass bead at a rate of 1.5 ounces (by volume) per mixed gallon.
5. Total DFT: 5.0 to 8.0 mils.
6. Finish Color: As selected by Engineer from manufacturer's standard colors.

## **2.09 COATING SYSTEMS FOR POROUS CONCRETE MASONRY UNITS**

### **A. Exterior Exposed Architectural Block:**

1. System Type: Alkylalkoxy siloxane sealer
2. Surface Preparation: SSPC-SP 13/NACE 6. Clean and dry.
3. First Coat: Series 633 Prime A Pell H<sub>2</sub>O. Spreading rate 50 to 75 square feet per gallon.
4. Second Coat: Series 633 Prime A Pell H<sub>2</sub>O. Spreading rate 50 to 75 square feet per gallon. Apply in accordance with Manufacturer's instructions.
5. Finish Color: Clear.

### **B. Interior Exposed:**

1. System Type: Epoxy.
2. Surface Preparation:
  - a. Porous Concrete Masonry Units: SSPC-SP 13/NACE 6. Clean and dry.
  - b. Concrete: SSPC-SP 13/NACE 6. Abrasive blast.
3. Surfacer: Series 54-660 Masonry Filler. Spreading rate 75 to 100 square feet per gallon.
4. Finish Coat: Series 66 Hi-Build Epoxoline. DFT 4.0 to 6.0 mils.
5. Total DFT: 8.0 to 12.0 mils, plus surfacer.
6. Finish Color: As selected by Engineer from manufacturer's standard colors.

## **2.10 COATING SYSTEMS FOR WOOD**

### **A. Interior Exposed:**

1. System Type: Alkyd/acrylic-epoxy.

2. Surface Preparation: Clean and dry.
3. Primer: Series 36 Undercoater, DFT 2.0 to 3.5 mils.
4. Finish Coat: Series 113 H.B. Tneme-Tufcoat. DFT 4.0 to 6.0 mils.
5. Total DFT: 6.0 to 9.5 mils.
6. Finish Color: As selected by Engineer from manufacturer's standard colors.

B. Interior Exposed:

1. System Type: Alkyd/acrylic.
2. Surface Preparation: Clean and dry.
3. Primer: Series 36 Undercoater, DFT 2.0 to 3.5 mils.
4. Intermediate Coat: Series 28 Tufcryn. DFT 1.5 to 2.0 mils.
5. Finish Coat: Series 28 Tufcryn. DFT 1.5 to 2.0 mils.
6. Total DFT: 5.0 to 7.5 mils.
7. Finish Color: As selected by Engineer from manufacturer's standard colors.

## **2.11 COATING SYSTEMS FOR CONCRETE STRUCTURES (INCLUDING PRECAST)**

(OMMITED)

## **2.12 ACCESSORIES**

A. Coating Application Accessories:

1. Accessories required for application of specified coatings in accordance with manufacturer's instructions, including thinners.
2. Products of coating manufacturer.

## **2.13 MISCELLANEOUS**

- A. Any surfaces not specifically named in the Schedule and not specifically excepted shall be prepared, primed and painted in the manner and with materials consistent with these Specifications. The Engineer shall select which of the manufacturer's products, whether the type is indicated herein or not, shall be used for such unnamed surfaces. No extra payment shall be made for this painting.

## **2.14 COLOR CODING FOR PIPES AND EQUIPMENT**

- A. When color coding is specified, it shall consist of color code painting and identification of all exposed conduits, trough items and pipelines for the transport of gases, liquid and semi-liquids including all accessories such as valves, insulated pipe coverings, fittings, junction boxes, bus bars, connectors and all operating accessories which are integral to be whole functional mechanical pipe and electrical conduit system. Colors shall be as noted in the Paint and Color Coding Schedules attached at the end of this Section.
- B. All hangers and pipe support floor stands shall be painted the same color and with the same paint as the pipe it supports. The system shall be painted up to but not including the flanges attached to the mechanical equipment nor the flexible conduit connected to electrical motors. When more than one pipe system is supported on the same bracket, the bracket shall be painted the same color as the adjacent wall or ceiling. Colors shall be as noted in the Paint and Color Coding Schedule.
- C. All systems which are an integral part of the equipment, that is originating from the equipment and returning to the same piece of equipment, shall be painted between and up to but not including, the fixed flanges or connections on the equipment.
- D. The color code establishes, defines and assigns a definite color for each category of pipe. Pipelines which are not listed on the Schedule of Color Code Paints shall be assigned a color by the Engineer and shall be treated as an integral part of the Contract.
- E. Banding for pipes shall be as specified in the Paint and Color Coding Schedule. Bands shall be 2 inches wide and spaced at 2 feet on center.

## **2.15 LETTERING OF TITLES**

- A. Each pipe system shall be labeled with the name of the materials in each pipeline and alongside this an arrow indicating the direction of flow of liquids. Titles shall be as so described in attached schedule. Titles shall not be located more than 20 linear feet apart and shall also appear directly adjacent to each

side of any wall the pipeline breaches, adjacent to each side of the valve regulator, flowcheck, strainer cleanout, and all pieces of equipment.

- B. Titles shall identify the contents by complete name. Identification title locations shall be determined by the Engineer but in general they shall be placed where the view is unobstructed and on the two lower quarters of pipe or covering where they are overhead. Title should be clearly visible from operating positions especially those adjacent to control valves.
- C. Titles on equipment shall be applied at eye level on machines where possible or at the upper most broad vertical surface of low equipment. Where more than one piece of the equipment item to be titled exists, the items shall be numbered consecutively as indicated on the mechanical drawings or as directed by the Engineer; for example Pump No. 1, Pump No. 2, etc. Titles shall be composed and justified on the left hand side as follows: Pump No. 1
- D. Application of titles.
  - 1. The color of the titles shall be black or white as approved, to best contrast with the color of the pipes and equipment and shall be stencil applied.
  - 2. Stencil text is to be in ALL CAPS worded exactly as shown in the Schedule. Titles are to be printed in a single line.
  - 3. Letter sizes.

<u>Outside Diameter of Pipe or Covering (inches)</u>	<u>Size of Legend Letters (inches)</u>
3/4 to 1-1/4	1/2
1-1/2 to 2	3/4
2-1/2 to 6	1-1/4
8 to 10	2-1/2
More than 10	3-1/2

Equipment titles are to be two inches high.

- 4. Arrow sizes. Where "a" is equal to 3/4 of outside diameter of pipe or covering, the arrow shaft shall be 2 "a" long by 3/8 "a" wide. The arrow head shall be an equilateral triangle with sides equal to "a." Maximum "a" dimension shall be 6 inches.



5. When using direction arrows, point arrowhead away from pipe markers and indirection of flow. If flow can be in both directions, use a double-headed directional flow.

## **2.16 METAL TAGS**

- A. For pipelines smaller than 3/4-inch in diameter, securely fasten metal tags, 2-1/2-inches x 1/2-inches, of 17 Birmingham Stubs Gage Brass with lettering etched and filled with enamel. Tags shall be approved by the Engineer.

## **2.17 FABRICATED EQUIPMENT**

- A. Unless otherwise indicated all fabricated equipment shall be shop primed and shop or field finished.
- B. All items to be shop primed shall be thoroughly cleaned of all loose material prior to priming. If, in the opinion of the Engineer, any prime coating shall have been improperly applied or if material contrary to these Specifications shall have been used, that coating shall be removed by sandblasting to white metal and reprimed in accordance with the Specifications.
- C. All shop prime coats shall be of the correct materials and applied in accordance with these Specification. Remove any prime coats not in accordance with these Specifications by sandblasting and apply the specified prime coat at no additional cost to the Owner.
- D. Shop primed surfaces shall be cleaned thoroughly and damaged or bare spots retouched with the specified primer before the application of successive paint coats in the field.
- E. Be responsible for and take whatever steps are necessary to properly protect the shop prime and finish coats against damage from weather or any other cause.
- F. A shop finish coat shall be equal in appearance and protection quality to a field applied finish coat. If, in the opinion of the Engineer, a shop finish coat does not give the appearance and protection quality of other work of similar nature, prepare the surfaces and apply the coat or coats of paint as directed by the Engineer to accomplish the desired appearance and protection quality. Submit to the Engineer substantial evidence that the standard finish is compatible with the specified finish coat.
- G. Wherever fabricated equipment is required to be sandblasted, protect all motors, drives, bearings, gears, etc., from the entry of grit. Any equipment

found to contain grit shall be promptly and thoroughly cleaned.

## **PART 3 – EXECUTION**

### **3.01 EXAMINATION**

- A. Examine areas and conditions under which coating systems are to be applied. Notify Engineer of areas or conditions not acceptable. Do not begin surface preparation or application until unacceptable areas or conditions have been corrected.

### **3.02 PROTECTION OF SURFACES NOT SCHEDULED TO BE COATED**

- A. Protect surrounding areas and surfaces not scheduled to be coated from damage during surface preparation and application of coatings.
- B. Immediately remove coatings that fall on surrounding areas and surfaces not scheduled to be coated.

### **3.03 SURFACE PREPARATION OF STEEL**

- A. Prepare steel surfaces in accordance with manufacturer's instructions.
- B. Fabrication Defects:
  - 1. Correct steel and fabrication defects revealed by surface preparation.
  - 2. Remove weld spatter and slag.
  - 3. Round sharp edges and corners of welds to a smooth contour.
  - 4. Smooth weld undercuts and recesses.
  - 5. Grind down porous welds to pinhole-free metal.
  - 6. Remove weld flux from surface.
- C. Ensure surfaces are dry.
- D. Immersion or Below Grade Surfaces: Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with SSPC-SP 10/NACE 2.
- E. Exterior Exposed or Interior Exposed Surfaces: Remove visible oil, grease, dirt,

dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with SSPC-SP 6/NACE 3.

- F. Interior or Immersion Surfaces, Severe Exposure: Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with SSPC-SP 5/NACE 1.
- G. Abrasive Blast-Cleaned Surfaces: Coat abrasive blast-cleaned surfaces with primer before visible rust forms on surface. Do not leave blast-cleaned surfaces uncoated for more than 8 hours.
- H. Shop Primer: Prepare shop primer to receive field coat in accordance with manufacturer's Instructions.

### **3.04 SURFACE PREPARATION OF GALVANIZED STEEL AND NONFERROUS METAL**

- A. Prepare galvanized steel and nonferrous metal surfaces in accordance with manufacturer's instructions.
- B. Ensure surfaces are dry.
- C. Remove visible oil, grease, dirt, dust, protective mill coatings, and other soluble contaminants in accordance with SSPC-SP 1 or manufacturer's instructions as specified for coating system.
- D. Immersion Service: Clean surfaces by abrasive blasting.
- E. Remove Rust From Galvanized Steel:
  - 1. Remove white rust from galvanized steel by hand or power brushing.
  - 2. Remove rust from old galvanized steel in accordance with SSPC-SP 2 or SP 3.
  - 3. Do not damage or remove galvanizing.
- F. Increase mechanical adhesion under moderate to severe conditions, such as exterior exposure or chemical environments, by abrasive blast and/or chemical cleaning with Oakite CrysCoat 747 LTS at a rate of 100 square feet per gallon (undiluted).

### **3.05 SURFACE PREPARATION OF DUCTILE OR CAST IRON**

- A. Prepare ductile or cast iron surfaces in accordance with manufacturer's

instructions.

- B. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.

### **3.06 SURFACE PREPARATION OF PVC**

- A. Prepare PVC surfaces in accordance with manufacturer's instructions.
- B. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
- C. Scarify PVC surfaces.

### **3.07 SURFACE PREPARATION OF INSULATED PIPE**

- A. Prepare insulated pipe surfaces in accordance with manufacturer's instructions.
- B. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.

### **3.08 SURFACE PREPARATION OF CONCRETE**

- A. Interior, Wet Substrate:
  - 1. Prepare concrete surfaces in accordance with manufacturer's instructions, SSPC-SP 13/NACE 6, and ICRI 03732.
  - 2. Allow concrete to cure for a minimum of 28 days.
  - 3. Test concrete for moisture in accordance with ASTM D 4263 and F 1869.
  - 4. Abrasive blast surface to remove laitance and solid contaminants and to provide clean, sound substrate with uniform anchor profile.
  - 5. Fill holes, pits, voids, and cracks with Tnemec 63-1500 Filler and Surfacer.
  - 6. Ensure surfaces are clean, dry, and free of oil, grease, chalk, form release agents, and other contaminants.
- B. Exterior:
  - 1. Prepare concrete surfaces in accordance with manufacturer's instructions, SSPC-SP 13/NACE 6, and ICRI 03732.

2. Allow concrete to cure for a minimum of 28 days.
3. Test concrete for moisture in accordance with ASTM D 4263 and F 1869.
4. Level concrete protrusions and mortar spatter.
5. Ensure surfaces are clean, dry, and free of oil, grease, chalk, form release agents, and other contaminants.

### **3.09 SURFACE PREPARATION OF CONCRETE FLOORS**

- A. Prepare concrete surfaces in accordance with manufacturer's instructions, SSPC-SP 13/NACE 6, and ICRI 03732. Minimum surface preparation for 1/8" and thicker floor systems to be ICRI CSP 4 (light scarification). Regardless of preparation method used, finish shall be made acceptable to Engineer.
- B. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
- C. Allow concrete to cure for a minimum of 28 days before coating.
- D. Test concrete for moisture in accordance with ASTM D 4263 and F 1869.

### **3.10 SURFACE PREPARATION OF POROUS CONCRETE MASONRY UNITS**

- A. Prepare porous concrete masonry unit surfaces in accordance with manufacturer's instructions and SSPC-SP 13/NACE 6.
- B. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
- C. Allow mortar to cure for a minimum of 28 days before coating.
- D. Level protrusions and mortar spatter.

### **3.11 SURFACE PREPARATION OF WOOD**

- A. Prepare wood surfaces in accordance with manufacturer's instructions.
- B. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, surface deposits of sap or pitch, and other contaminants.
- C. Seal knots and pitch pockets.

- D. Sand rough spots with the grain.
- E. Fill cracks and holes with approved materials after primer is dry. Sand flush with surface when filler is hard.
- F. Lightly sand between coats.

### **3.12 APPLICATION**

- A. Apply coatings in accordance with manufacturer's instructions.
- B. Mix and thin coatings, including multi-component materials, in accordance with manufacturer's instructions.
- C. Keep containers closed when not in use to avoid contamination.
- D. Do not use mixed coatings beyond pot life limits.
- E. Use application equipment, tools, pressure settings, and techniques in accordance with manufacturer's instructions.
- F. Uniformly apply coatings at spreading rate required to achieve specified DFT.
- G. Apply coatings to be free of film characteristics or defects that would adversely affect performance or appearance of coating systems.
- H. Stripe paint with brush critical locations on steel such as welds, corners, and edges using specified primer.

### **3.13 DISINFECTION**

- A. Disinfection of Water Contact Surfaces and Filling of Water Storage Tanks:
  - 1. Do not disinfect water contact surfaces or fill water storage tanks until application of coating systems is complete, coatings have fully cured, and field quality control inspection is complete.
  - 2. Allow number of days in accordance with manufacturer's instructions and as directed by Engineer for full cure of coating systems on water contact surfaces before flushing, disinfecting, or filling with water.
  - 3. Disinfection: AWWA C 652 or as directed by Engineer.

### **3.14 REPAIR**

- A. Materials and Surfaces Not Scheduled To Be Coated: Repair or replace damaged materials and surfaces not scheduled to be coated.
- B. Damaged Coatings: Touch-up or repair damaged coatings. Touch-up of minor damage shall be acceptable where result is not visibly different from adjacent surfaces. Recoat entire surface where touch-up result is visibly different, either in sheen, texture, or color.
- C. Coating Defects: Repair in accordance with manufacturer's instructions coatings that exhibit film characteristics or defects that would adversely affect performance or appearance of coating systems.

### **3.15 FIELD QUALITY CONTROL**

- A. Inspector's Services:
  - 1. Verify coatings and other materials are as specified.
  - 2. Verify surface preparation and application are as specified.
  - 3. Verify DFT of each coat and total DFT of each coating system are as specified using wet film and dry film gauges.
  - 4. Coating Defects: Check coatings for film characteristics or defects that would adversely affect performance or appearance of coating systems.
    - a. Check for holidays on interior steel immersion surfaces using holiday detector.
  - 5. Report
    - a. Submit written reports describing inspections made and actions taken to correct nonconforming work.
    - b. Report nonconforming work not corrected.
    - c. Submit copies of report to Engineer and Contractor.
- B. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for surface preparation and application of coating systems.

### 3.16 WORKMANSHIP

#### A. General:

1. Primer and paint used for a particular surface shall, in general, be as scheduled for that type of new surface. confirm with the paint manufacturer that the paint proposed for a particular repaint condition will be compatible with existing painted surface. Sample repainted areas on the actual site will be required to insure this compatibility. Finished repainted areas shall be covered by the same guarantee specified for remainder of work.
2. At the request of the Engineer, samples of the finished work prepared in strict accordance with these Specifications shall be furnished and all painting shall be equal in quality to the approved samples. Finished areas shall be adequate for the purpose of determining the quality of workmanship. Experimentation with color tints shall be furnished to the satisfaction of the Engineer where standard chart colors are not satisfactory.
3. Protection of furniture and other movable objects, equipment, fittings and accessories shall be provided throughout the painting operations. Canopies of lighting fixtures shall be loosened and removed from contact with surface, covered and protected and reset upon completion. Remove all electric plates, surface hardware, etc., before painting, protect and replace when completed. Mask all machinery name plates and all machined parts not receiving a paint finish. Dripped or spattered paint shall be promptly removed. Lay drop cloths in all areas where painting is being done to adequately protect flooring and other work from all damage during the operation and until the finished job is accepted.
4. On metal surfaces apply each coat of paint at the rate specified by the manufacturer to achieve the minimum dry mil thickness required. If material has thickened or must be diluted for application by spray gun, the coating shall be built up to the same film thickness achieved with undiluted material. One gallon of paint as originally furnished by the manufacturer shall not cover a greater area when applied by spray gun than when applied unthinned by brush. Deficiencies in film thickness shall be corrected by the application of an additional coat(s). On masonry, application rates will vary according to surface texture, however, in no case shall the manufacturer's stated coverage rate be exceeded. On porous surfaces, it shall be the painter's responsibility to



achieve a protective and decorative finish either by decreasing the coverage rate or by applying additional coats of paint.

5. Paints shall be mixed in proper containers of adequate capacity. All paints shall be thoroughly stirred before use and shall be kept stirred while using. No unauthorized thinners or other materials shall be added to any paint.
6. Only skill painters shall be used on the work and specialists shall be employed where required.

B. Field Priming:

1. Steel members, metal castings, mechanical and electrical equipment and other metals which are shop primed before delivery at the site will not require a prime coat on the job. All piping and other bare metals to be painted shall receive one coat of primer before exposure to the weather, and this prime coat shall be the first coat as specified in the painting schedule.
2. Equipment which is customarily shipped with a baked-on enamel finish or with a standard factory finish shall normally be field painted unless the prefinished equipment is specifically color selected and unless the finish has not been damaged in transit or during installation. Surfaces that have been shop painted and have been damaged, or where the shop coats or coats of paint have deteriorated, shall be properly cleaned and retouched before any successive painting is done on them in the field. All such field painting shall match as nearly as possible the original finish.

C. Field Painting:

1. All painting at the site shall be designated as Field Painting.
2. All paint shall be at room temperature before applying, and no painting shall be done when the temperature is below 50 degrees F, in dust-laden air, when rain or snow is falling, or until all traces of moisture have completely disappeared from the surface to be painted.
3. Successive coats of paint shall be tinted so as to make each coat easily distinguishable from each other with the final undercoat tinted to the approximate shade of the finished coat.
4. Finish surfaces shall not show brush marks or other irregularities. Undercoats shall be thoroughly and uniformly sanded with No. 00

sandpaper or equal to remove defects and provide a smooth even surface. Top and bottom edges of doors shall be painted and all exterior trim shall be back-primed before installation.

5. Painting shall be continuous and shall be accomplished in an orderly manner so as to facilitate inspection. All exterior concrete and masonry paint shall be performed at one continuous manner structure by structure. Materials subject to weathering shall be prime coated as quickly as possible. Surfaces of exposed members that will be inaccessible after erection shall be cleaned and painted before erection.
6. All materials shall be brush painted unless spray painting is specifically approved by the Engineer. The Contractor shall be responsible for all damage caused by overspray or drifting.
7. All surfaces to be painted as well as the atmosphere in which painting is to be done shall be kept warm and dry by heating and ventilation, if necessary, until each coat of paint has hardened. Any defective paint shall be scraped off and repainted in accordance with the Engineer's directions.
8. Before final acceptance of the work, all damaged surfaces of paint shall be cleaned and repainted as directed by the Engineer.

### **3.17 CLEANING**

- A. The premises shall at all times be kept free from accumulation of waste material and rubbish caused by employees or work. At the completion of the painting remove all tools, scaffolding, surplus materials, and all rubbish from and about the buildings and leave work "broom clean" unless more exactly specified.
- B. Upon completion, remove all paint where it has been spilled, splashed or splattered on all surfaces, including floors, fixtures, equipment, furniture, etc., leaving the work ready for inspection.

### **3.18 PROTECTION OF COATING SYSTEMS**

- A. Protect surfaces of coating systems from damage during construction.

### **3.19 ONE-YEAR INSPECTION**

- A. Owner will set date for one-year inspection of coating systems.
- B. Inspection shall be attended by Owner, Contractor, Engineer, and

manufacturer's representative.

- C. Repair deficiencies in coating systems as determined by Engineer in accordance with manufacturer's instructions.

### 3.20 SCHEDULES

- A. Coating System Schedule: All new construction and equipment shall be painted unless otherwise indicated. Items to be painted shall include, but not be limited to, concrete block, gypsum board, concrete walls, ceilings, metal doors and frames, window frames, miscellaneous metals, pumps, valves, fittings and equipment. Colors shall be selected by the Owner.
- B. Color Schedule: The following color schedule shall be used on all piping. The color of piping not listed below shall be selected from the color chart supplied by the manufacturer.

Item	Color
Raw Water	110GN Clover
Settled or Clarified Water	10GN Aqua Sky
Finished or Potable Water	11SF Safety Blue
Alum/Primary Coagulant	04SF Safety Orange
Ammonia	11WH White
Carbon Slurry	35GR Black
Caustic	02SF Safety Yellow with 09SF Safety Green band
MIOX Solution	02SF Safety Yellow
Fluoride	25BLFountainbleu with 06SF Safety Red Band
Lime Slurry	37GN Irish Spring
Ozone	02SF Safety Yellow with 04SF Safety Orange band
Phosphate Compounds	37GN Irish Spring with 06SF Safety Red band
Polymers or Coagulant Aids	04SF Safety Orange with 09SF Safety Green band
Potassium Permanganate	14SF Purple Rain/Safety
Soda Ash	37GN Irish Spring with 04SF Safety Orange band
Sulfuric Acid	02SF Safety Yellow with 06SF Safety Red band
Sulfur Dioxide	37GN Irish Spring with 02SF Safety Yellow band
Compressed Air	91GN Balsam
Gas	28RD Monterrey Tile
Other Lines	32GR Light Gray
Hoists/Trolleys	02SF Safety Yellow
Fire Protection	06SF Safety Red
Alum Sludge	84BR Weathered Bark
Salt/Brine Solution	32 GR Light Gray with 68BR Twine Band

Backwash Waste	68BR Twine
Membrane Permeate	39BL Delft Blue
Solution Tank Fill Lines	39BL Delft Blue
Solution Tank Drain/Fill & Recirculation Lines	06BR Amber Canyon
Solution Tank Process Lines	40BR Muley
Backpulse Lines	01BR Warm Sun
Other Lines	As selected by Engineer

**END OF SECTION**

**SECTION 11310**  
**SUBMERSIBLE PUMPING SYSTEM (RAS)**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

- A. The General Contractor shall furnish, install, test and place in satisfactory operation, as shown on the Plans and specified, one (1) submersible pumping system to include three (3) submersible return activated sludge pumps, discharge connections, discharge pipes, lift chains, guide bars, appurtenances, accessories, and spare parts as required to produce a complete and workable installation. To maintain unit responsibility, the pump control systems shall be furnished by the pump manufacturer as described herein.

**1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 02530 for Piping
- B. Section 15100 for Valves & Appurtenances

**1.03 SUBMITTALS**

- A. Data to be submitted:
1. The Contractor shall submit pump curves for the units which he proposes to supply, showing Total Dynamic Head, Pump Efficiency, Brake Horsepower, Power Input to Electric Drive Motor of Pumping Unit for the various conditions under which the units are to operate along with descriptive data and specifications describing in detail the construction of the complete units.
  2. The manufacturer shall have a minimum of five installations of the exact combination of pump and motor model proposed to be furnished for this project. Installations must be in operation for a minimum of five years and shall list the pump model, motor model and horsepower, date of installation, duty point, and contact information including telephone number. A list of these installations shall be furnished to the Engineer with submittals.
- B. Dimensional Data:

1. The successful bidder shall submit to the Engineer for approval, shop drawings, showing all weights and dimensions necessary for the installation of foundations, guide rails, anchor bolts, piping and valve connections. A pump outline drawing with pump dimensions should also be provided.
- C. Typical Installation Guides
- D. Technical Manuals
- E. Spare Parts List
- F. ISO 9001 Management System Certificate
- G. Equipment Storage Recommendations
- H. Printed Warranty
- I. Manufacturer's Recommended Start-up Report Form

## **PART 2 - MATERIALS**

### **2.01 MANUFACTURERS**

- A. Manufacturer:

Sewage pumps shall be manufactured by Flygt Xylem, or pre-approved equal. Pumps shall be equal to Flygt Xylem Model NP 3127 LT 426.

Any pump manufacturer, other than specified, proposing to offer the following equipment must submit sufficient information to the Engineer to determine that the equipment complies with the requirements of the Contract Documents. This information must be received by the Engineer not less than 10 days prior to the Bid Date. The Engineer will issue an addendum prior to the bid date which lists any pre-approved equipment. Contractors and manufacturers are advised that a manufacturer named as an approved supplier is not excused from meeting all of the technical and performance requirements of this specification. The pre-bid qualification package shall include complete pump performance data, evidence of compliance with the installation experience requirements of this Section and a letter from an officer of the company of the pump manufacturer listing all exceptions to the specifications. Only manufacturers with 20 or more years of experience will be considered.

B. Pump Performance:

Each pump shall be capable of the following performance:

Duty Point Flow (gallons per minute):	1190 GPM
Total dynamic head at rating point (T.D.H):	12.2 FT TDH
Minimum Hydraulic Efficiency at rating point:	55.4%
Maximum Nominal Motor HP:	7.5 HP
Maximum Motor Speed	1750 RPM
Minimum Shutoff Pressure	37 FT

**2.02 PUMP CONSTRUCTION**

- A. The pump shall be capable of handling raw domestic wastewater and storm water. The submersible pumps shall have a semi open multi vane self-cleaning impeller designed to transport wastewater with fibrous materials like wet wipes.
- B. The impeller blades shall be self-cleaning upon each rotation as they pass across a sharp relief groove in the Insert Ring and shall keep the impeller blades clear of debris. The insert ring shall have a guide pin which moves fibers from the center of the impeller to the leading edges of the impeller. The impeller shall move axially upwards to allow larger debris to pass through and immediately return to normal operating position. The clearance between the insert ring and the impeller leading edges shall be adjustable.
- C. The impeller shall be wear resistant and made of high chromium cast iron with at least 24% chrome against sand and grit which is expected to enter the pump station with the sewage or the storm water. Impellers that have surface hardening (by thermal, coating, etc.) will not be allowed.
- D. The pump shall be capable to operate without any limitation between 50% and 150% of the Best efficiency point (B.E.P) of the performance curve.

	Flow in USgpm	TDH in feet	Hydraulic efficiency %
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<b>Required Duty Point</b>	<b>1190</b>	<b>12.2</b>	<b>55.4</b>
Best efficiency point of offered pump (B.E.P.)	790	22.4	69

- E. The required shaft power (P2) at the duty point shall be less than 7.5 HP. The motor speed shall be max. : 1800 rpm. A performance chart shall be provided upon request showing curves for torque, current, power factor, input/output HP and efficiency. This chart shall also include data on starting and no-load characteristics
- F. The impeller shall be mounted on the motor shaft. Couplings shall not be accepted.
- G. The pump motor shall be induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber. It shall be permanently submersible according standard IEC 60034 and protection class IP 68.
- H. The stator windings shall be insulated with moisture resistant Class H insulation rated for 356°F.
- I. The motor shall be capable of no less than 30 evenly spaced starts per hour and be able to operate throughout the entire pump performance curve from shut-off through run-out even when the motor is not submerged
- J. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be acceptable.
- K. It shall be possible to lift and lower the pumps on parallel guide bars and connect them to wet well mounted discharge connection. There shall be no need for personal to enter the wet well when removing or reinstalling the pumps.
- L. The pump housing shall be prepared for the assembling of a sump mixing valve. The discharge flange of the pump housing shall be 6".
- M. The junction chamber containing the terminal board shall be hermetically sealed from the motor by an elastomeric compression seal. Connection between the cable conductors and stator leads shall be made with threaded compression type binding posts permanently affixed to a terminal board. The motor and the pump shall be produced by the same manufacturer.
- N. The motor shall be protected by 3 thermal switches embedded in the stator set to open at 260°F and one leakage sensor floating type located in the stator chamber. The sensor and the switches shall be connected to the



control panel which shall stop the motor and send an alarm when the sensors are activated.

- O. The pump shall be Explosion approved according FM CLASS 1. DIV 1 "C" & "D"
- P. The cable entry shall consist of dual cylindrical elastomer sleeves, flanked by washers, all having a close tolerance fit against the cable and the cable entry. Epoxies, silicones, or other secondary sealing systems shall not be considered acceptable.
- Q. The pump shaft shall rotate on two bearings. Motor bearings shall be permanently grease lubricated and have a nominal L10 lifetime of 50.000 hours. The upper bearing shall be a single deep groove ball bearing. The lower bearing shall be a two row angular contact bearing to compensate for axial thrust and radial forces. Single row lower bearings are not acceptable.
- R. The shaft shall be sealed by a tandem mechanical shaft seal system consisting of two seals, each having an independent spring system. The seals shall require neither maintenance nor adjustment and shall be capable of operating in either clockwise or counter clockwise direction of rotation without damage or loss of seal function.
- S. Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to provide lubricant expansion capacity. The drain and inspection plug, with positive anti-leak seal shall be easily accessible from the outside. The seal system shall not rely upon the pumped media for lubrication. Seal lubricant shall be non-hazardous.
- T. Where a seal cavity is present in the seal chamber, the area about the exterior of the lower mechanical seal in the cast iron housing shall have cast in an integral concentric spiral groove. This groove shall protect the seals by causing abrasive particulate entering the seal cavity to be forced out away from the seal due to centrifugal action.
- U. The Materials of construction shall be as follows:
  - a. Pump housing: ASTM A-48, Class 35B
  - b. Impeller and insert ring: A 532 ALLOY III A (25% Chrome)
  - c. Stator housing: ASTM A-48, Class 35B
  - d. Shaft: ASTM A479 S43100-T.
  - e. Shaft seal: Pump side: - Corrosion resistant Tungsten carbide WCCR
  - f. Shaft seal Motor side: - Carbon-Aluminum oxide (AL<sub>2</sub>O<sub>3</sub>)
- V. All castings must be blasted before coating. All wet surfaces are to be coated

with two-pack oxyrane ester Duasolid 50. The total layer thickness should be at least 120 microns. Zink dust primer shall not be used.

- W. The motor shall be equipped with screened cable suitable for submersible pump applications long enough to reach the termination point as indicated on design drawings. The power cable shall be sized according to NEC and ICEA. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber. The cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet.
- X. Each completed and assembled pump/motor unit shall undergo the following factory tests at the manufacturer's plant prior to shipment. The Manufacturer shall provide on demand a copy of his quality control plan for these tests and an ISO 9001 factory certificate:
  - a. Minimum 3-point hydraulic performance test
  - b. No-Leak seal integrity test
  - c. Electrical integrity test

### **2.03 EQUIPMENT FOR WET WELL INSTALLATION**

- A. For each pump the contractor shall supply and install a discharge connection made of cast iron ASTM A-48, Class 35B.
- B. The outlet flange of the discharge connection shall be 6" drilled according ANSI B16.1-89; tab.5.
- C. The pump(s) shall be automatically and firmly connected to the discharge connection, guided by no less than two parallel guide bars extending from the top of the station to the wet well mounted discharge connection. The material of the guide bars shall Stainless steel AISI 316.
- D. The length of the guide bars shall 8 feet and they shall be fasten at the top of the station with a guide bar holder made of Stainless steel AISI 316.
- E. For each pump the contractor shall supply and install a cable holder made with 4 hooks of Stainless steel AISI 316.
- F. There shall be no need for personnel to enter the wet-well.
- G. The sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal contact. Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be accepted. The entire weight of the pump/motor unit shall be borne by the pump discharge elbow. No portion of the pump/motor unit shall bear on the sump floor directly or on a sump floor mounted stand.

## **2.04 LIFTING EQUIPMENT FOR PUMPS**

- A. Each pump shall be fitted with 25 feet of stainless steel lifting chain or lifting cable. The working load of the lifting system shall be 50% greater than the pump unit weight.

## **2.05 SUMP MIXING VALVE (FLYGT 4901 OR EQUIVALENT)**

- A. One pump unit in each pump station shall be equipped with an automatically operating flush valve mounted directly to the pump volute. During the starting the valve shall redirect a portion of the pumped media into the sump to re-suspend solids and grease by the turbulent action of its discharge.
- B. The valve shall be equipped with an adjustable, wear-resistant discharge nozzle that can be used to direct flow within the sump. The valve shall operate by differential pressure across the valve and shall not require any electric or pneumatic power source to operate. The valve shall be suitable for use in Class I, Division 1 hazardous locations.
- C. The valve shall open at the beginning of each pumping cycle and shall automatically close during the pump operation after a pre-set time. A method of adjusting the valve operating time shall be provided.

## **2.06 SUBMERSIBLE CABLE CONNECTION BOX (INTEX, RALSTON OR SIMILAR)**

OMITTED

## **2.07 SHOP PAINTING**

- A. Primer and Finish Paint-Shop apply to all exterior ferrous surfaces of the pump and motor. Shop apply to exterior and interior surfaces of elbow
  - 1. Solids by volume: 97%
  - 2. Type: Solvent-free ceramic coating, impregnated with aluminum oxides
  - 3. Total Dry Film Thickness: 400 microns (15 mils) minimum
  - 4. Minimum Adhesion: 14 Newtons per square millimeter (2,030 psi) per ISO 4624.
  - 5. Minimum Hardness: 110 on Buchholz Indentation scale

6. Resistance: Level 1 (continuous duty) for sewage with pH of 6-11, Level 1 for saltwater, Level 3 (not recommended) for 10% hydrochloric acid.
- B. Surface Preparation-Prepare all surfaces to receive coating system.
1. Method: Blasting per ISO 12944-4
  2. Standard Cleanliness Grade: 2.5
  3. Minimum Peak to Valley Height: 70 microns (2.75 mils)

## **2.08 TRIPLEX PUMP CONTROL SYSTEM**

- A. The work in this section shall include furnishing and placing into operation the monitoring and control panel a pump station with 3 submersible wastewater pumps. The controller shall alternate the pumps and operate the pumps always at its best efficiency.
- B. Monitoring & Control/Pump Drive
1. The station is equipped with 3 pumps. Each pump shall be equipped with a variable speed pump drive unit sized to match the submersible electric motor and designed for a power supply from 230-480V 60 Hz 3 phase.
  2. The pump drive shall provide all control functionality as indicated on design Schematic wiring diagrams, hand/auto operation, pump alternation, pump over temperature monitoring, seal leakage monitoring, pump self-cleaning, and pipe cleaning algorithms. The pump drive shall also include capability to monitor station wetwell levels, pump speed and energy consumption in order to automatically operate the pump station at optimal energy efficiency or to match pumping rate to influent rate by maintaining a constant level.
  3. One pump drive per pump should be used to allow full redundancy and alternation.
  4. Drives shall be tested and approved in accordance with international standards, the European safety directive 98/37/EC, the Low Voltage Directive 2006/95/EC, the EMC Directive 2004/108/EC and in accordance with the European standards: EN 61800-5-1:2003; EN 61800-3; EN 55011:2007; EN60529 and EN 60204-1

5. The software shall be programmed with all parameters and settings pre-configured for an efficient operation.
6. Drives shall be installed inside of Pump Control panel cabinet installation equipped with an air ventilated system.
7. Without any limitation or derating, drive shall operate in ambient temperature of up to 40° C (104°F) at an altitude up to 1000m.
8. Drives shall include provision for external communication to higher-level system. Communication shall be via 2-wire RS-485 connection to the pump drive. Communication shall be available as MODBUS RTU.
9. Serial communication capabilities shall include, but is not limited to, set start and stop levels, pump clean interval, speed and ramp times as well as PID control parameters.
10. The communication telegram shall include process variable feed-back like wetwell level, power (kW), output speed/frequency, current (A), % torque, relay outputs, digital inputs and drive status and fault information.
11. Following function shall be provided by the equipment:
  - a) Recycle Flow rate Control:

The pumps shall operate based on one of the following parameters manually set by the plant operator:

    - Percentage of the entire plant flow as the desired recycle flow
    - Recycle flow rate value

When operator enters flow percentage value, the panel PLC should read the plant flow rate from the existing flowmeter and calculate the required recycle flow (based on percentage input) then determine the required number of operating pumps and their speed. The PLC will confirm the pumps discharge flow from the flow meter.

When operator manually sets the desired recycle flow rate, the PLC shall determine the required number of operating pumps and their speed. the PLC will confirm the pumps discharge flow from the flow meter.
  - b) Alarms & Monitoring

- i. The pump drive shall provide alarms and monitoring for the drive and, pump. Alarms shall be presented on the HMI Screen. All alarms, when occurring, shall remain active until reset.

Alarms shall have a built-in 4 second delay to prevent nuisance tripping.

Alarms shall be as follows:

- 1. Motor monitoring:
  - a. Motor Temperature too high
  - b. Leakage in stator housing
- 2. Sump monitoring:
  - a. Low level (via float switch or transducer)
  - b. Transducer sensor error(connection failure, faulty values)

#### 12. User Uninterface

- a) The pump control panel shall incorporate an Graphic Terminal to display drive operating status, alarms, liquid level and parameters.

#### C. Level Control

- 1. Station shall be equipped with 1 Float switches for backup low level control.
- 2. Float switch shall be rated for Class I Div 1 Sewage environment installations
- 3. Material of casing: Polypropylene.
- 4. Degree of protection: NEMA 6.
- 5. They shall be applicable for liquids with a density of 0.95 – 1.10 g/cm<sup>3</sup>. The level control shall include submersible cable long enough to reach termination point as per design drawings.

#### D. Level Transmitter

- 1. Station shall be equipped 1 Level transmitter
- 2. Output 4-20 mA direct current, proportional to the measured level. Low supply voltage 8-30 V DC – or battery operation.

3. Rated for Class 1, Div 1 sewage environment installations
4. It shall be suitable for waste water with a diaphragm made of ceramic.
5. Insulated > 100 MΩ at 500 V DC. Material of sensor body: Ryton PPS.
6. Degree of protection: Nema 6.
7. The transmitter shall include submersible cable long enough to reach termination point as per design drawings.

**E. Cabinet**

1. The Monitoring & Control and 3 VFD pump drives shall be assembled in a cabinet. It shall be made of stainless steel and it shall be prepared for an installation on a concrete floor.
2. Beside the Monitoring & Control unit it shall have enough space for the customer-installed telemetry equipment and include.
  - 1 backup battery for the PLC
  - Red-dome style flashing alarm light
  - Alarm Horn or Bell with Alarm silence button
  - Intrinsically safe barrier for UL 913 requirements
  - Anti-condensation heater and thermostat
  - Enclosure legs
  - Power switch, which can be locked in the off position by a pad-lock
  - 1 light group with socket
3. The inner dimension of the cabinet shall reserve at least 10% back panel space for future adjustments.
4. All components on the front of the machine should be provided with function plate.

**PART 3 - EXECUTION**

**3.01 WARRANTY**

- A. The pumps and motors will be covered by a five (5) year warranty. This warranty shall cover defects in material or workmanship and shall not be limited by hours of running time or operation from variable speed drives. The warranty shall cover the entire pump, not individual components. Upon warranty occurrence, the manufacturer's authorized service center shall remove the pump, repair,

reinstall and provide start up on the repaired pump. A detailed failure analysis shall be submitted to the Owner for their records summarizing corrective action taken.

- B. The manufacturer shall guarantee clog-free operation for a period of 24 months from the date of start-up of the pumps by the local authorized factory representative. A certificate shall be provided to the Owner on the day of start up with the local contact information and effective date. Should the impeller clog with typical solids and/or modern trash debris normally found in domestic wastewater during this period, an authorized representative shall, either travel to the jobsite, remove the pump, clear the obstruction and reinstall the pump at no cost or reimburse the Owner for reasonable cost to provide this service. A written report shall be provided to the Owner detailing the service call with pictures for verification purposes.
- C. When installed in accordance with all the provisions of this section, related sections and the supplier's installation manual, the warranty on the Monitoring and Control equipment shall be 60 months.

### **3.02 FACTORY TESTING**

#### **A. General Tests**

- 1. Mechanical and electrical integrity tests in accordance with ANSI/HI 11.6 shall be performed. All motors shall be megger tested before and after the performance tests.
- 2. All pumps shall be hydrostatically tested. The test pressure shall be a hydrostatic head of at least 150 percent of the rated shutoff head held for at least 5 minutes.

#### **B. Project Specific Hydraulic Tests**

- 1. Run each pump at full rating point for a minimum of 15 minutes prior to start of any testing. Pumps shall be tested in the configuration used for this project—wet pit pumps shall be submerged and dry pit pumps shall be tested in a dry pit configuration.
- 2. Provide certified performance curves for each pump. Pump tests to be evaluated to ANSI/HI Acceptance Level A.
- 3. Each pump test shall include a minimum of six points between shut-off and run-out points. One of the six points shall be the "Duty Point Flow". One of the six points shall also be the "Secondary Rating Point".



Complete information shall be taken to determine flow, head, motor speed, horsepower and hydraulic efficiency.

4. Should the pumps tested fail to meet the requirements of the specifications, the pump Manufacturer shall modify and/or replace the original pumps with equipment and re-test the pumps at no additional cost to the Owner. Should the Manufacturer be unable to provide pumping equipment that will meet the requirements of the specifications, the Contractor shall furnish pumps of differing manufacture as directed by the engineer. Such rejection shall not increase the contractor's completion time or subject the Owner to any additional cost.
5. A representative of the Engineer and/or the Owner shall witness all testing at the Manufacturer's facility. The Manufacturer shall provide to the Owner, through the Contractor, a schedule of testing 2 weeks prior to the beginning of the test. The Contractor shall bear all costs for travel expenses for their representatives attending the tests. The Manufacturer shall provide access to the testing facility during the testing period. The Manufacturer shall generate written testing reports and forward these after the testing for the Engineer's review prior to the shipment of the equipment.

### **3.04 FIELD QUALITY CONTROL**

#### **A. Field Testing:**

1. After the installation of the pumps, controls and all appurtenances, and when construction of other units of the pump station will permit, each complete pumping unit will be subject to field tests as specified herein under actual operating conditions.
2. The field tests shall be made by the Contractor under the direct supervision of a qualified factory trained representative, and in the presence of, and as directed by the Engineer. The Contractor shall provide, calibrate and install all temporary gauges and meters, shall make necessary tapped holes in the pipes, and install all temporary piping and wiring required for the field tests.
3. A minimum of two(2) days and two(2) trips for field testing services shall be provided by the pump manufacturer's authorized representative. Services shall include, but not be limited to, inspection of the completed pump station installation to ensure that it has been performed in

accordance with the manufacturer's instructions and recommendations, supervision of all field-testing and activation of the Pump Manufacturer's Warranty. The test shall demonstrate to the satisfaction of the Owner that the equipment meets all specified performance criteria, is properly installed and anchored, and operates smoothly without exceeding the full load amperage rating of the motor. The contractor shall be responsible for coordinating the require field services with the pump manufacturer.

The field tests shall determine the head, discharge flow and overall efficiency characteristics of each pumping unit and in addition, shall demonstrate that under all conditions of operation each unit:

- Has not been damaged by transportation or installation.
- Has been properly installed.
- Has no mechanical defect.
- Is in proper alignment.
- Has been properly connected.
- Is free of overheating of any parts.
- Is free of all-objectionable vibration and noise.
- Is free of overloading of any parts.

4. Field tests of the electrical and controls system shall be performed by a factory trained technician and shall include verify adequate grounding of the system, point to point wiring verification, utility power verification, site acceptance testing, and system demonstration.

- a. Point to Point I/O Verification

- i. After installation of the pumps and the control panel, a factory trained technician shall prepare the I/O checklist. The checklist shall include the following:
  - All inputs and outputs connected to the control panel
  - All alarms that can be generated by the control panel
- ii. The technician shall follow a test procedure to test all I/O and alarms.
  - All digital inputs shall be tested from point of origin unless it is unsafe.
  - All digital outputs shall be tested by running a simulation test from the controller or by simulating the fault condition.

- All analog inputs shall be tested from the point of origin where possible and by use of a signal generator otherwise.
  - All analog outputs shall be tested by running a simulation program or by forcing the output to a value.
- iii. The technician shall follow a test procedure to insure the system operation parameters are met.
- b. Configuration Verification
- i. The factory trained technician shall document the settings using a factory provided configuration checklist. Each parameter shall be verified prior to the beginning of testing and then again after testing is completed.
  - ii. The configuration of the pump station manager as well as the IPS gateways shall be documented.
  - iii. The pump station manager configuration shall be saved to a factory provided SD card after testing is completed.
- c. Functional test of all equipment alarms and controls.

### **3.03 TRAINING**

- A. The manufacturer's representative shall provide a minimum of four (4) additional hours on-site for training to cover the complete Pumping System and related controls.
- B. Training date and time shall be coordinated with operations staff at least one(1) week in advance.
- C. Instruction material shall be provided for four (4) trainees.

### **3.04 SERVICE & SPARE PARTS**

- A. The manufacturer shall furnish one set of the following spare parts:
  - 1. Impeller and casing wear rings
  - 2. Mechanical seal set, both upper and lower sets
  - 3. Upper and Lower Bearings set
  - 4. O-Ring Set
- B. The pump manufacturer shall have a factory certified service center within a

150-mile radius of the pump installation.

- C. A complete replacement pump or any and all pump replacement parts shall be available for delivery within 1 week of notification to the manufacturer of such requirement by the owner.

**END OF SECTION**

**SECTION 11350**  
**SLUDGE DEWATERING EQUIPMENT**

**PART 1 – GENERAL**

**1.01 SECTION INCLUDES**

- A. Belt Filter Press
- B. Press Accessories

**1.02 RELATED SECTIONS**

N/A

**1.03 SCOPE OF WORK**

- A. The manufacturer shall provide one complete trailer mounted Model 3DP 1.0m meter belt filter press dewatering system as specified herein. The system shall include the press, hydraulic unit, water supply, booster pump, discharge chute, belt conveyor, flow meter, sludge pump, polymer system, air ride trailer, soft side curtains, trailer enclosure, stainless steel sump, stainless steel catwalks with aluminum grating and all electrical controls. The belt press equipment specified in this section shall be provided by a single supplier to ensure coordination and compatibility of equipment.
- B. The belt filter press manufacturers are advised to familiarize themselves with the overall plant process in order to evaluate the compatibility of the manufacturer's equipment to dewater the particular sludge generated.
- C. The system shall consist of an independent gravity belt thickener and a continuous belt press. It shall be designed to receive municipal sludge, concentrate it and dewater the sludge by means of three belts of synthetic fiber mesh arranged to perform the conveying, pressing, and dewatering functions. The belt press, as described in this section, shall have no less than three distinct dewatering zones. The three zones shall be independent gravity drainage at operator level, wedge, and pressure/shear sections. The belt press equipment shall be as manufactured by BDP Industries, Inc. or equal.
- D. All support equipment such as pumps, polymer system etc. must have stainless drain valves for winterization purposes.

**1.04 DESCRIPTION OF SYSTEM AND PERFORMANCE CRITERIA**

- A. Belt Press Operational Requirements: The belt press shall meet the following operating parameters when processing the sludge specified.

Sludge Specifications:

1. The sludge shall be derived from an aerobically digested municipal sludge with an average consistency of 1% to 2% by weight dry solids.

Belt Press Performance Specifications:

1. The belt filter press shall be capable of dewatering 30 to 150 GPM of sludge at 1 to 2% feed solids concentration. The press shall be capable of processing up to 1,500 pounds per hour per meter of solids.
2. The belt filter press shall produce a filter cake with a minimum dry solids content of 18% at 500 lb/hour and 15% at 1,500 lb/hour.
3. The belt filter press will be required to meet the above performance specifications by only using polymer as a conditioning agent. No bulking agents are permitted.

B. Process Performance Test and Guarantee

The same model and type of dewatering equipment shall be demonstrated at the facility. The performance specified in this section shall be met by the equipment being demonstrated and shall be witnessed by the owner. The cost of the demonstration shall be at no additional cost to the owner under this contract. Any manufacturer's equipment that previously met the outlined performance at the plant will be pre approved. The owner reserves to reject or approve any bid proposals based on the on site pilot demonstration requirement.

Once a representative sludge has been established, the manufacturer shall operate the press against the design parameters. Representative samples of feed sludge, sludge cake, and filtrate shall be drawn to determine compliance. Should the press fail to meet the minimum standards specified, the following shall occur:

1. Plant operating procedures shall be reviewed to determine that the sludge is in fact representative of normal operation and within the design specifications.
2. If it is determined that the sludge is representative and within these specifications, the manufacturer shall make any modifications necessary to accomplish the specified performance levels.
3. If the sludge can be demonstrated as representative and within specified parameters and if the manufacturer cannot meet the performance, the owner may elect to have the manufacturer remove the press and refund any monies paid for the equipment.

## 1.05 QUALIFICATIONS

- A. The belt filter press equipment shall be furnished by a single supplier who has a minimum of 10 years experience in the supply of complete sludge dewatering equipment of the exact 3 belt model and 1.0m size unit. The supplier must be a company that specializes in the sales and service of dewatering equipment. The supplier shall have built a minimum of ten (10) 3-belt belt presses mounted on enclosed trailers over the past 10 years, with 10 supporting favorable references for the Owner's approval.

The supplier must have a sales/service office located within 600 miles of Thomaston, Georgia, with Factory Certified Belt Press Technicians. The belt press manufacturer shall have at least 10 years experience manufacturing three belt design belt presses. The belt press manufacturer shall have built a minimum of ten (10) 1.0m 70 PLI belt presses that are 3-belt units over the past 10 years and shall supply reference for the owner's approval. The equipment shall be designed, constructed and installed in accordance with the best practices and methods, and shall be equal to that manufactured by BDP Industries, Inc.

- B. These specifications describe equipment of a specific manufacturer and are not designed to limit competition. They are intended to describe a level of quality and process capability. There are certain areas affecting process functions, operation and maintenance reliability under which no exceptions shall be allowed. These are as follows:

High Strength Tubular Steel Construction  
Up-flow high solids across the full width of the press  
Independent Variable Speed Gravity Drainage Section at Operator Level  
Variable Speed Paddle Feedbox Distributor  
Curved Wedge Zone  
Vertical Pressure Section  
Dual, 3HP Drive Motors on Pressure Section  
Machined Bearing Pads  
Double Flange Roll Construction  
70 PLI Self-Compensating Hydraulic Tensioning System  
Hot-Dipped Galvanized Corrosion Protection System per ASTM 123  
Stainless walk way with stainless handrails and non slip aluminum  
grating at operator level - Catwalk must fold up for maintenance

The balance of this specification shall determine the quality level under which equipment shall be reviewed.

- C. Should equipment which differs from the specifications be offered and determined to be equal to that specified, such equipment will be acceptable only on the basis that any revisions in the engineering, design and/or construction of the structure, piping, appurtenant equipment, electrical work, etc., required to accommodate such a substitution, shall be made at no additional cost to the owner.
- D. The belt press manufacturer shall supply the original manufacturer part numbers for all buy-out items in the O&M manual and shall list all of the local suppliers to the owner. All suppliers shall be within a 100-mile radius.
- E. The manufacturer must supply layout drawings, P&ID drawings and electrical drawings with their equipment bid. The cost of this information shall be at no cost of the owner and must be provided with the equipment bid documents.
- F. The belt press manufacturer shall be a UL control panel shop manufacturer for the last 10 years.
- G. The belt press shall be manufactured by a US corporation. All manufacturing shall be completed in-house by the belt press manufacturer in the United States. No manufacturing shall be out sourced or purchased from outside companies.
- H. The Belt Press system described herein and shown on the drawings establishes a standard of required type, function and quality to be met. Any "or equal" equipment suppliers shall be submitted by a prime bidder for approval 14 days prior to Bid. The submittal shall include a complete equipment submittal including room layout drawings, electrical drawings, equipment design calculation, component catalog cuts, contact list and performance guarantee. All exceptions shall be clearly identified by the manufacturer with a cost to supply the component specified. Any exceptions not identified will lead to immediate rejection of the submittal by the engineer and owner. The burden of proof of merit for the proposed item is upon the prospective bidder. Any modifications to the contract drawings that are required for the alternate units shall be borne by the installation manufacturer. The engineer and owner reserve the right to reject any and all alternate requests based upon on their review.

## **1.06 WARRANTY**

- A. The manufacturer shall warrant, in writing, that all equipment supplied by them shall be free from defects in material and workmanship, for a period of twenty-four (24) months from the date of start up, not to exceed thirty-six (36) months from the date of delivery, unless noted otherwise within specifications.



## 1.07 SUBMITTALS

- A. A. The supplier shall submit a complete list of equipment and materials required for shop drawing or submittal approval. The term “shop drawing” as used herein shall be understood to include detailed arrangement drawings, foundation layout drawings, control drawings, hydraulic controls systems, catalog sheets and similar items. Unless otherwise required, these drawings shall be submitted in sufficient time to be reviewed by the ENGINEER, and to accommodate the construction schedule required under the contract.
- B. The manufacturer shall supply written bench test reports to include in the equipment submittal that have been tank two times during a minimum of 6-month period to confirm perform of the equipment. Any equipment submittals that doesn't include the bench test reports will be returned and rejected by the engineer.
- A. The manufacturer shall furnish five copies of shop drawings in three ring binders to the engineer. Submitted packages shall include a complete bill of materials for all equipment, recommended spare parts list, list of any deviations from the contract documents and a statement of machine warranties.
- B. All frame, bearing and roller calculations shall be completed and stamped by a professional engineer and must be included in the equipment bid.
- C. Submit shop drawings and product data required to establish compliance with this Section. Submittals shall include the following:
  - 1.Certified shop and erection drawings showing all important details of construction, sludge feed, wash water, drainage connections, wiring diagrams, itemized motor horsepower, dimensions and anchor bolts.
  - 2.Descriptive literature, bulletins and/or catalogues of the equipment. This material shall include, but not be limited to, the following:
    - a. Functional description of internal and external instrumentation and controls to be supplied, including list of parameters monitored, controlled or alarmed and testing plan.
    - b. Materials of construction and of all coatings of all major components, including bearings. Include sizes of materials and thickness of coatings.
    - c. Details of the drive system for belts.

- d. Details of the static sludge/polymer mixer supplied.
- e. Information on field erection requirements, including total weight of assembled components, weight of the single largest component that will require removal during the life of the unit and gross operating weight.
- f. Statement of roller, bearing, frame and belt guarantees for units furnished. Also, describe typical range of belt tension and recommended belt tension for this application.
- g. Total connected nameplate horsepower and operating horsepower for each belt press dewatering system motor. Itemize this information for each motor. Include motor data as required by Section.
- h. Statement of water requirements (flow and pressure) and any other utility requirements.
- i. Description of gravity drainage and low, medium and high pressure stages.
- j. For the baseplate of the belt filter press, furnish the loads including all horizontal and vertical components as follows:
  - 1) Dead loads due to unit weight empty.
  - 2) Dead loads due to unit weight full of sludge, drain pans full and similar circumstances.
  - 3) Dynamic loads.
  - 4) Combination of 2) and 3) above.
  - 5) Loads exerted during belt changing procedures.
- k. Control panel elevation drawings showing construction and placement of operator interface devices and other elements. Control panel data to include:
  - 1) Dimension and layout details.
  - 2) Materials of construction.

- 3) Brand names and catalog literature on all control devices such as, but not limited to:
  - a) Fused disconnects
  - b) Thermal Magnetic Circuit Breakers
  - c) Motor starters
  - d) Motor Circuit Protectors
  - e) Terminal blocks
  - f) Fuse blocks
  - g) Variable Frequency Drives
  - h) Audible and Visual Alarm Indicators.
  - i) All switches, pushbuttons and lights
  - j) Timers, relays and related equipment
  - k) Enclosures
- l. A complete total bill of materials for all equipment.
- m. A complete parts list, showing current price and delivery time for each part. Include manufacturer's recommended spare parts and a firm price quotation good for one (1) year after Substantial Completion.
- n. A maintenance schedule, showing the required maintenance, frequency of maintenance and lubricants and other items needed at each regular preventive maintenance period.
- o. Provide certified safety factor calculations as described in Paragraph 2.03 below for structural frame, roller bearings and roller shafts, as well as maximum roller and frame deflection based on maximum design belt tension of 70 PLI (lbs per lineal inch of belt width) or total of 280 PLI for both belts at a belt speed of 5 meters per minute. These calculations shall be signed and sealed by a professional engineer.

- p. Complete data on motors and controls as specified in Paragraph 2.05 below.
  - q. Addresses for alarms/data to SCADA.
  - r. Cut sheets on wash water booster pump and motor.
- B. In the event that it is impossible to conform to certain details of this Section due to different manufacturing techniques, describe completely all non-conforming aspects.
- C. Submit to the Engineer operating and maintenance data as specified. Manuals shall be provided for all BFP related equipment specified in this or other Sections. This data shall be prepared specifically for this installation and shall include all necessary Drawings, equipment lists that are required to instruct operations and maintenance personnel unfamiliar with such equipment. Approved operating and maintenance data shall be available and used during the period of operation and maintenance instructions provided by the equipment manufacturer.

## **PART 2 – BELT PRESS SPECIFICATIONS**

### **2.01 GENERAL**

- A. The equipment covered by these specifications is intended to be belt filter press dewatering equipment of proven ability as manufactured by reputable concerns having long term experience in the production of such equipment. The equipment shall be designed and constructed in accordance with the best practice and methods.
- B. All components of the sludge dewatering equipment shall be engineered for long continuous and uninterrupted service. Provisions shall be made for easy lubrication, adjustment, or replacement of all parts. Corresponding parts of multiple units shall be interchangeable. Except as otherwise specified, steel plates and shapes shall have a minimum thickness of  $\frac{1}{4}$  " and bolts shall have a minimum diameter of  $\frac{1}{2}$  ".
- C. All welding shall be in accordance with the latest acceptable codes of the American Welding Society ANSI/AWS D1.1.
- D. All material used in the construction of the sludge dewatering equipment shall be of the best quality and entirely suitable in every respect for the service required. All structural steel shall conform to the ASTM standard specification for structural steel, designation A500. All iron casting shall conform to the ASTM standard specification for gray iron casting, designation A48-76, and shall be of a class suitable for the purpose

intended. Other materials shall conform to ASTM specifications where such specifications exist; the use of such material shall be based on continuous and successful use under the similar conditions of service.

- E. Unless otherwise specified herein, all metal parts in contact with polyelectrolyte or sludge shall be type 304l stainless steel. All fasteners, pins, and anchor bolts shall be type 304l stainless steel.
- F. All fiberglass-reinforced plastics (FRP) shall be manufactured in conformance with NBS standards PS15-69.

## **2.02 SURFACE PROTECTION**

- A. Main Frame ferrous metals shall be hot-dipped galvanized per the latest revision of ASTM A123 specification. No other frame coatings will be allowed.
- B. All pre-painted purchased equipment such as electrical motors, cylinders, gear boxes, etc., are to be painted with a final coat of the below system. All miscellaneous steel items will be sandblasted and covered with the following paint system:
  - 1. First coat of Tnemec #66 epoxy of contrasting color to a minimum of four (4) dry mils thickness.
  - 2. Apply a second coat of Urethane, finished color, minimum of four (4) mils thickness. Total thickness of the two (2) coats will be a minimum of eight (8) mils dry.
- C. The control panel enclosure shall be NEMA 4X constructed of type 304 stainless steel. The inside of the control panel box shall be white.

## **2.03 BELT PRESS**

- A. Main Structural Frame
  - 1. The frame shall be fabricated from tubular structural steel members designed to adequately support all components and accessories. Steel shall meet the requirements of ASTM A500; all welding shall be performed in accordance with ANSI/AWS D1.1. Where frame components are bolted, stainless steel fasteners shall be used. The frame moment of inertia shall be a minimum of 17.4 in.<sup>4</sup> in the x-x axis and 58 in.<sup>4</sup> in the y-y axis. At a minimum the main press structural members shall be constructed of 8"x4"x1/4" tubular steel. The load bearing frame member of the pressure section shall have a moment of inertia minimum of 69 in.<sup>4</sup> in the xx axis and 9 in.<sup>4</sup> in the yy axis. Due to the importance

of structural integrity of the press, the above moments of inertia must be met or the unit will not be accepted.

2. The fabricated steel frame shall be designed to withstand the maximum stresses imposed on the individual members with a safety factor of 10. Specifically, the maximum actual stress on any member, connection, plate, etc., shall not exceed 1/10 of the yield strength of the frame material used. The deflection ratio of any structural member shall not exceed L/600 where L is the member span. The tension used for the calculations shall be at least 70 lbs. per linear inch of actual belt width.
3. Drip pans shall be fabricated of a minimum 14-gauge type 304L stainless steel and shall collect filtrate from all gravity and pressure sections.
4. The framework shall be constructed in such a manner that it will insure absolute plane parallelism of all rolling elements by machined bearing pads.
5. The framework shall be of welded and/or bolted construction. No disassembled component, excluding the belt filter frame, shall weigh more than 3500 lbs.
6. Provide adjustable leakage seals to contain the sludge on the belt through the gravity drainage zone. Seals shall be 304 stainless steel with rubber skirts, designed to provide an effective seal without causing wear to the belt.

#### B. Flocculation/Conditioning System

To achieve rapid contact between sludge particles and a solution of dilute polyelectrolyte, provide:

1. A static, in-line, adjustable energy non-clogging Venturi mixer shall be provided. The mixer shall be equipped with a Vortex polymer injection ring with four (4) tangentially mounted polymer injectors. The mixer shall be located upstream of the belt filter press. The belt filter press manufacturer shall recommend the proper layout of the system. The contractor shall provide spool pieces of the size and number shown on the drawings at alternate locations. The in-line Venturi mixer shall be fabricated entirely of 316L stainless steel with an adjustable open throat area. The mixer shall include a removable side plate for inspection and maintenance.
2. An up-flow feedbox shall be provided after the Venturi mixer to insure optimum sludge conditioning. This feedbox shall be vertically baffled and discharged into a stainless steel distributor. The feedbox assembly shall extend across the full width of the belt press and be fabricated of type 304 Stainless Steel.

#### C. Independent Gravity Drainage Area

1. The press shall be furnished with an independent gravity drainage area consisting of a variable speed belt designed to contain and drain conditioned sludge. The inlet distributor shall be utilized to evenly distribute the conditioned sludge over the face of the moving filter belt. The inlet shall

incorporate a variable speed, 6-blade paddle wheel distributor across the full width of the belt press. The paddle wheel shall be driven by a 1/3 HP AC/VFD TEFC motor and gearbox. Any units that do not incorporate the feedbox described above will not be accepted. The belt system shall be sealed to prevent leakage and shall be easily accessible for operating, viewing, cleaning, and adjusting.

2. All materials in contact with the sludge in the distributor area shall be 304L stainless steel with adjustable angle furrowing plows of UHMW plastic.
3. The gravity belt thickener shall have a minimum horizontal area of 31 ft<sup>2</sup>. The gravity drainage section shall be supported by slide strips. Supports shall be designed to prevent deflections greater than 0.05 inches with a loading of 100 lbs. per square foot. Slide strips shall be constructed of a minimum ¼" x 3" 304L stainless steel. UHMW Slide strips shall be mounted to the deck support and shall be easily removable without disassembly of any components.
4. The belt support shall be a series of UHMW wear strips within a 304 stainless frame. The strips shall be every 6" and be of a design to not only to provide support but also enhance gravity dewatering. Only systems which have been demonstrated as effective in the area shall be considered.
5. Provide adjustable leakage seals to contain the sludge on the belt through the gravity drainage zone. Seals shall be neoprene rubber with 304SS deckle supports, designed to provide an effective seal without causing wear to the belt.
6. Six rows of swing up type furrowing plow devices shall be supplied in the gravity drainage section and shall be readily removable.
7. The adjustable plows shall be mounted on a support system that can be raised for cleaning via lifting handles.
8. Plows will be high-density polyethylene with hot dipped galvanized support holders. Plow position will be adjustable from 0 to 30 degrees with respect to the direction of belt travel. All plows will be adjustable in unison for each plow row. To facilitate cleaning, each row of plows will include a single-lifting handle, designed to raise the entire row of plows at least six inches from the belt.
9. The independent gravity unit shall be equipped with a variable speed VFD drive, powered and controlled from the main press panel.
10. The gravity section provided shall incorporate an independent belt speed at operator level without the use of catwalks or rolling ladders for operating or maintaining. The gravity belt height shall not exceed four feet. All other designs will not be accepted.
11. The independent gravity section shall be provided with hydraulic tension and tracking system as specified in this specification. Manual tensioning or tracking systems will not be acceptable.

#### D. Curved Wedge Section

1. The belt filter press shall be furnished with a distribution chute to receive sludge

from the primary gravity dewatering section for purposes of even distribution of the sludge to the wedge section.

2. The wedge section shall be constructed to contain the sludge on the belts with adjustable sealed deckles. This area shall be easily accessible for operating, viewing, cleaning, and adjusting.
3. Movement through the wedge section shall be designed to insure a uniform layer of sludge across the entire working width of the belt. It further shall be adjustable to allow operator determination of proper relationship between belt speed and cake height, in order to insure optimum dewatering.
4. The materials in contact with the sludge shall be fabricated from type 304L stainless steel. All fasteners, along with mounting and adjustment hardware shall be 304L stainless steel.
5. The use of vacuum assisted drainage sections is not acceptable.
6. The wedge section shall consist of a curved wedge that allows for a gradual pressure increase on both belts to enhance dewatering. The wedge section shall be supported by construction equal to that of the gravity belt section, shall be a minimum of 2" wider than the width of the belt and so designed to reduce belt wear.
7. The wedge section shall have a minimum horizontal area of 20 ft<sup>2</sup>. This calculation is based on only one belt. Vertical wedges or non-curved wedges will not be accepted.
8. The wedge zone shall incorporate a 304 stainless steel drip pan that eliminates the filtrate from dropping on the return belt.

#### E. Vertical Pressure Zone

1. The vertical belt filter press shall be furnished with a pressure zone following the wedge section drainage area.
2. The pressure section shall become uniform at the tangent of the first low pressure, 304L stainless steel, perforated drainage roll. It shall be a minimum of 20 inches in diameter, followed by a 16" diameter reversing turn, completing a full S with each turn exceeding 200 degrees.
3. The next stage of the pressure zone shall consist of an arrangement of a minimum of five (5) rollers developing a continued 200° S-shaped belt travel. The rolls shall decrease from 12" in diameter to 10" in diameter.
4. The decreasing roll diameter is to provide an increasing pressure profile in the pressure zone, made adjustable by changing the belt tension.
5. The final or eighth roll in the pressure section shall be a 10" diameter drive roll forming the last 200° turn.
6. The minimum bearing size in the press section shall be 1-15/16" in diameter and the ends of each shaft on the rollers shall be equipped with support bearings as specified under bearings.
7. The pressure section shall have a minimum area of 60 ft<sup>2</sup>. This calculation is based on one belt in contact with the roll surface.



8. The vertical pressure zone configuration shall include a tray beneath each roll such that the filtrate is removed from the sludge cake without rewetting of the down stream cake. Each drip pan shall be directed to a final collection pan and piped to the sump area. The collection pans must eliminate filtrate from landing on the returning belt.

#### F. Dewatering Belts

1. Belts shall be seamed and fabricated of monofilament polyester, wear resistant plastic material or combination monofilament polyester and stainless steel material. The mesh design shall be selected for optimum dewatering of the sludge to be processed with a minimum blinding of the filter fabric.
2. Belt selection shall be based on the manufacturer's experience obtained at other installations dewatering similar sludge with similar polyelectrolyte conditioning chemicals.
3. The belts shall be warranted for 2,000 hours operation. Any belt that fails before that time, provided that the belt press has been operated per the instructions in the operation and maintenance manual, will be replaced on a pro rata basis.
4. Each belt and connecting splice shall be designed for a minimum tensile strength equal to five times the normal maximum dynamic tension to which the belt shall be subjected. The splice shall be designed to fail before the belt.
5. Belt shall be designed for ease of replacement with a minimum of belt filter downtime. Belt replacement shall be such that disassembly is not required.

#### G. Belt Wash System

1. Each filter belt shall be washed by a belt wash station. The belt wash system shall use high-pressure water spray nozzles equipped with manually operated wire brushes for internal nozzle cleaning. The spray assembly shall be housed in an enclosure in a manner that limits the spray pattern within the housing assembly. The housing and nozzle assembly shall be readily removable. The housing shall be fabricated from type 304l stainless steel.
2. The housing shall be sealed against the belt with rubber seals. The belt shall be protected from excessive wear by the edges of the wash station housing by replaceable guide surfaces. The belt wash station shall extend over the full width of the filter belt by a minimum of 2 inches.
3. Wash water required shall not exceed 53 GPM at 120 psig. The manufacturer shall provide a complete pressure boosting system for the press to achieve the above pressure. The water pressure at the booster pump is expected to be 0 psi.
4. The booster pump shall be a Gould Model 3656 centrifugal with replaceable stainless steel shaft sleeve and casing wear ring. The shaft shall be sealed by a ceramic/carbon mechanical seal. The motor shall be a standard NEMA frame,

C Face mounting with JM shaft, 10 HP, 3500 RPM, 230/460 volt, with a TEFC enclosure.

5. Each shower header shall be supplied through a globe valve for throttling by the manufacturer. The manufacturer shall also supply all plumbing from the booster pump to the press shall be Schedule 80 PVC pipe.

#### H. Belt Aligning System

1. The belt aligning devices shall be hydraulically operated to align each belt and locate it centrally on the rollers by means of a sensing arm, which detects the position of the belt edge. This arm shall operate a pilot valve, which in turn affects the position of the hydraulic actuator. The actuator shall be connected to a pivot belt-aligning roller, causing this roller to skew from its traverse position.
2. The alignment system shall function as a continuous automatic belt guidance system and shall be an integral part of the press. The alignment system shall operate with smooth and slow motions resulting in a minimum of belt travel from side to side. The use of electric servos shall not be acceptable.
3. Backup limit switches for the belt aligning system shall be provided on the machine with sufficient contacts to de-energize all drives and sound an alarm in case of a belt over travel.
4. A complete simplex hydraulic system shall be provided. This package shall include pump, 3 hp TEFC motor, valves, 20-gallon 304 stainless steel storage reservoir, all controls and piping as necessary to provide a complete and operating system. The pump shall be an adjustable flow and adjustable pressure vane pump. The unit shall include a low-pressure switch, system pressure gauge, temperature gauge, and tank level gauge. The system shall include a high-pressure line filter and low-pressure return filter. The hydraulic unit will be floor mounted away from the press to eliminate wash down spray. The manufacturer shall supply a minimum of 3/4" hydraulic hose from the hydraulic unit to the press.
5. The hydraulic unit shall be supplied with a 304l stainless steel support stand to allow for the tank oil to be easily drained. The tank shall also include a 304l stainless steel drain valve to allow for draining to the hydraulic oil.
6. All hydraulic lines and fittings shall be 316l stainless steel and be rigidly supported on the structural frame and be properly sized for the intended use with adequate factors of safety for the rated pressure.
7. All belt alignment control equipment shall be fabricated from corrosion resistant materials or effectively coated not to rust or stain.
8. All hydraulic cylinders shall be constructed of 316 stainless steel rods and stainless steel hardware.

#### I. Belt Tensioning System

1. Each belt shall be provided with a belt tensioning system. The belt tensioning system shall be hydraulically actuated. The design of the tensioning system shall be such that the dewatering pressure is directly proportional to belt tension and that adjustments in the tension shall result in immediate changes in dewatering pressure. Manual or electric servo tensioning systems are not acceptable.
2. Each belt tensioning shall be furnished with an individual control station such that independent adjustment for each belt is possible. The control stations shall incorporate an on/off selector, calibrated pressure regulating valve and a pressure gauge to indicate actual operating pressure on each system.
3. The design of the belt tensioning system shall insure parallel movement of the tensioning cylinders. The gravity belt tensioning roller shall be mounted on a rugged yoke assembly, with hydraulic cylinders at each end. The pressure section tensioning section shall have a stainless steel rack and pinion tensioning system with hydraulic cylinders at each end. Plastic components will not be accepted. The belt tensioning system shall accommodate a minimum of 2.5% increase in belt length.
4. Sensing devices shall be furnished to determine belt travel beyond normal operating limits. The sensing devices shall be electrically connected within the alarm system to cause "an alarm shut down". Manual reset shall be required.

#### J. Press Drives

1. The two belt drives shall be 1.5 HP and *Dual, 3 HP* respectively for the gravity and press sections. Each shall be variable speed with a variable frequency AC drive unit. The feedbox paddle wheel shall be driven by 1/3 HP AC/VFD drive. Speed indicator readout for each shall be installed in the main press control panel.
2. The gravity belt drive shall be capable of varying output speed from 8 to 75 feet per minute and the press section drive, 3 to 30 ft. per minute.
3. The nominal input horsepower rating of each gear or speed reducer shall be at least equal to the nameplate horsepower of the drive motor. Each drive unit shall be designed for 24 hour continuous service.
4. Each gear reducer shall be totally enclosed, water spray proof, oil lubricated with anti-friction bearings throughout. All motors shall be TEFC.
5. The drives shall be furnished with provisions for use on 480 volt, 60 hertz, 3-phase power supply.
6. The belt drive for the pressure section shall be driven by dual drive rollers. The gearboxes shall be shaft mounted. Spur gears or chain driven rollers shall not be acceptable.

#### K. Safety Guards

All equipment having exposed moving parts such as fans, V-belts, gears, couplings,

chains, and including the pressure roll section, shall be provided with safety guards as required by OSHA standards.

#### L. Discharge Blades

1. Discharge blades shall be provided to scrape dewatered sludge from the belt at the final discharge rollers. The doctor blade shall be made of wear resistant UHMW plastic. The blades shall be readily removable. The blade holders shall be secured in place by means of counterweights. Spring tension type fasteners are not acceptable.
2. The minimum discharge height shall be 6'6" high. The belt press shall discharge into a screw conveyor for truck loading. Belt presses that do not meet this discharge height requirement will not be accepted. Belt presses that need to be elevated to meet this requirement must be supplied with stainless steel catwalks down both sides of the gravity zone at operator level for viewing the gravity zone. The platforms and stairs must be 3' wide with aluminum grating and must meet all OSHA requirements.

#### M. Bearings

1. The shafts of all rollers shall be equipped with heavy-duty grease-able type, self-aligning roller bearings in sealed, splash proof housings. All bearings in the press section shall be spherical roller bearings. The housings shall allow the changing of the bearings without changes in the factory alignment of the roller. The housing shall be sealed to provide adequate sealing from moisture and grime. The outside of the housing on roller bearings shall also incorporate a stainless steel sealed end cap. The bearing housing seal shall incorporate a triple lip, nitrile seal mechanism to eliminate contamination.
2. All bearings shall have a minimum B-10 bearing life of 1,000,000 hours based on ANSI-B13.6-1972. The B-10 bearing life of 1,000,000 hours shall be based on the maximum summation of all forces applied to the bearing. The forces shall include both belts at a belt tension of 70 PLI each, maximum belt speed of 15 ft/min and torque of the drive motor.
3. Bearings and housings shall be US manufactured and shall be manufactured by FMC Corporation, Link-Belt Division, Indianapolis, Indiana; Reliance Electric Company, Dodge Division, Greenville, South Carolina: or equal.
4. All bearings shall be manufactured and supplied with off the shelf bearings and housings from the above manufacturers with original part numbers. Any manufacturers that supply only their belt press manufacturer part number, provide custom bearing manufacturing, or manufacture the bearing housing will not be considered.

#### N. Rollers

1. All rollers shall be of solid steel or double-separated plate stub end shaft construction. The stub end shafts and roller heads shall be welded in place. Bolted and or through shaft roll construction is unacceptable. All rollers shall be designed to have a maximum deflection of 0.05 inches at their center when under maximum loading.
2. All rollers except drive and tracking rolls shall be of carbon steel construction, coated with a minimum of 30 mils of thermoplastic nylon, selected for intended service. Drive and tracking shall incorporate 50 mils of thermoplastic nylon with a 65 Durometer surface or 3/8" vulcanized rubber for abrasion resistance and proper belt tracking and drive. Other types of roller coatings shall not be acceptable.
3. All rollers must be US manufactured at the suppliers manufacturing facility. Out sourced roll suppliers will not be accepted.

#### O. Drainage Pans

1. Drainage pans shall be supplied as necessary to contain all filtrate and wash water within the belt filter press and to reduce rewetting of down stream cake. Filtrate and wash water pans shall be constructed of minimum 14-gauge type 304l stainless steel. All drainage piping shall be furnished adequately sized for the intended service and rigidly attached to the press frame

## 2.04 DISCHARGE CONVEYOR

The Discharge conveyor system shall be capable of loading the plants existing trucks as shown on the contract drawings. The conveyor system shall include a fold up belt conveyor.

- A) The belt conveyor shall be designed and manufactured by BDP Industries. The conveyor system shall be an 11 ft.4 inches long flat belt conveyor. The conveyor system shall consist of the drive unit, pulleys and bearings, belting, idlers, frame, belt wipers, and related items. The belt conveyor shall be capable of carrying 200 cubic feet / hr. of belt press filter cake with a bulk density of 55 lbs. per cubic ft.

1. Drive Unit: The conveyor motor shall be a severe duty, hydraulic drive motor that shall be driven of the belt press hydraulic unit. The drive shall have a minimum 1.15 service factor. The hydraulic motor shall be mounted on a base attached to the belt conveyor frame. Speed reducer and motor shall be provided with the manufacturers' standard finish. The drive motor shall be variable speed and shall be controlled by a needle valve mounted to the press frame..

2. Pulleys and Bearings: The head and tail pulleys shall be grooved face type with nylon coating and mounted on AISI 1020 shafting supported by self-aligning ball bearing pillow blocks. The take-ups shall include 316 stainless steel adjusting rods with brass bearing aligning rods.
3. Belting and Splice: The belt conveyor shall incorporate a smooth transilon belt, 46" wide, with rated tension of 220 pounds per inch of width (p.i.w.). The belt shall be spliced with a stainless steel mechanical hinged fastener. The belt shall be supplied with a v- groove mounted to the back side of the belt to provide continuous belt tracking.
4. Idlers: The belt shall be supported on a 304 stainless steel slide deck.
5. Frame and Supports: Belt conveyor frame and supports shall be designed and fabricated in accordance with CEMA standards and constructed of structural 304 stainless steel channel, sized as required to limit deflection to 1/250 at the longest support span. The conveyor shall be mounted to the press frame and shall be lifted up into a discharge position with hydraulic lift cylinders. The conveyor frame shall fold up so that it allows for the rear trailer doors to close for transportation.
6. Belt Wiper: At the discharge end of the conveyor, a belt wiper shall be provided. The belt wiper shall be mounted near the head pulley allowing positive cleaning of the belt before its return travel.
7. Switches: The conveyor shall be provided with a zero speed switch.
8. Skirting: The conveyor shall be provided with skirting at the feed area, and extending the full width of the machine.

## **2.05 FLOWMETER**

- A. The belt press manufacturer shall supply a Siemens or approved equal. The flow meter shall include a 4" 150# ANSI flange connection, a digital display, and 30 feet of display cord.
- B. The electromagnetic induction flow meter shall generate a voltage linearly proportional to flow for full-scale velocity setting from 2 to 33 feet per second. Standard accuracy of plus output shall be  $\pm 0.5\%$  of rate for all meters.
- C. The meter shall incorporate a high impedance amplifier of 1012 ohms or greater, eliminating the need for electrode cleaning systems the meter shall utilize bipolar

pulsed DC coil excitation with auto-integrated zeroing each half-cycle. Manual zero adjustments shall not be required – even at start-up. Power consumption shall be no more than 15 VA, independent of meter size. Input power required will be from 85 to 260 VAC, 46-65 Hz, with DC input option available.

- D. The magnetic flow meter shall be microprocessor based with integral electronics. The electronics shall be interchangeable for all sizes from 1/12" to 78". The housing is to be powder coated cast aluminum with a NEMA 4X rating.
- E. The meter's analog and pulse outputs shall be independently selected by push buttons. The analog output shall be an isolated 4-20mA DC into 700 ohms load. The pulse output shall be an open collector output with a maximum frequency of 1,000 Hz with configurable pulse width (0.5 to 2 sec). An open collector status output shall indicate either system or process error or flow direction. An auxiliary input shall be available to positive zero return. A low flow cutoff will be standard which can be turned on or off by pushbuttons.
- F. A 2-line, 16-digit LCD backlit display shall indicate flow rate and/or total flow. The totalizer value is protected by EEPROM during power outages, and utilizes an overflow counter. The display shall also be capable of indicating error messages such as empty pipe condition, error condition and low flow cutoff.

## **2.06 POLYMER FEED SYSTEM**

The press manufacturer shall provide as a part of the total dewatering equipment package, one polymer feed system capable of automatically metering, diluting, activating and feeding a liquid polymer with water. Unit shall be a UGSI, Fluid Dynamics, Velodyne or approved equal.

### **A. Polymer Make-Down Unit**

- 1. Polymer and water shall be mixed in a chamber designed to create sufficient mixing energy. This design shall include one progressive cavity meter pump, solenoid valve and pressure regulator.
- 2. The pump shall have an adjustable speed with a variable frequency drive. The pump shall be supplied with a 1/2 hp, 120-volt AC motor.
- 3. A motor driven impeller mixer shall be provided that will mix the polymer and water into solution.

### **B. Polymer Feed Pump**

- 1. The polymer system shall be equipped with a progressive cavity pump capable of pump up to 10 GPH.
- 2. The pump shall be designed with a high viscosity wet end pump capable of

pumping neat polymer solution to the mixing chamber.

3. The pump shall be a Seepex, Moyno or equal.
4. The drive motor shall be a variable speed, 1/2 horsepower, complete with an SCR control unit. The SCR control unit shall have local speed adjustment, ON-OFF switch and running indication. The control unit shall provide adjustments of feed rate over a range of 20 to 1.

C. Dilution Capability

1. The primary dilution shall feed into the motorized mixing chamber and shall be capable of 2400 GPH.
2. The dilution capability shall be adjustable with a clear rotameter with a stainless steel float. Each flow meter shall be independently adjustable.
3. Furnish a solenoid valve or ON-OFF control of dilution water supply

D. Emulsion Unit Control Panel

1. The polymer system shall be supplied with a NEMA 4X control panel that provides an automated mixing system. The controls for the polymer make-down system shall be supplied in the belt press control panel
2. The control panel shall include all timers and relay for a complete manual and auto system. The polymer static mixer and metering pump shall turn on and the water solenoid valve shall open.
3. The polymer feed pump shall include start/stop indicating lights, potentiometer and local remote control.
4. The polymer mixer and polymer metering pump shall be provided with start/stop pushbuttons, indicating lights and motor starters.
5. Single phase, 120 volt, 60 Hertz power shall be supplied to the main control panel.
6. All devices within the panels shall be permanently identified. Nameplates shall be made of laminated phenolic materials with a black face and white core.

## **2.07 SLUDGE FEED PUMP**

- A. The flow capacity of each pump shall be an adjustable range of 25 to 170 GPM at a differential pressure of 600 PSI when operating at a maximum speed of 300 RPM. The pumps shall be sized to handle a minimum 1-5/8" diameter solid.
- B. Each pump shall be of the positive displacement, progressive cavity type consisting of helical rotor, elastic stator, flexible joint and shaft assembly, suction and discharge ports, stuffing box with lantern ring, and drive shaft with bearings and housing. The pump shall be MXQ Model E1H-1500 or approved equal and shall be



capable of continuous operation without cavitations or pulsation. It shall be capable of pumping without imparting any turbulence or shearing to the sludge being pumped.

1. The helical rotor shall be constructed of hard chrome plated stainless steel. The elastic stator shall be vulcanized Buna-N with a minimum Durometer hardness of 65 molded inside the cast iron housing.
2. A minimum of two (2) cardan type universal joints shall be used to connect the rotor to the drive shaft. Each joint shall have a minimum of two (2) pins per joint and shall be grease lubricated and sealed in a rubber boot for extended life and lower maintenance. Joints shall be connected to the drive shaft and rotor by means of solid tapered pins and sleeves for maximum torque handling capability. The drive shaft shall, be supported by both single and double row heavy duty, grease lubricated ball bearings to withstand all axial and radial loads without affecting component life expectancy.
3. Both suction and discharge ports shall be ANSI 125 pound flanges for maximum resistance to pipe bending forces and deflections. The suction flange shall be 5" diameter, and the discharge flange 4". The suction flange shall be rotatable in 90 degree increments to accommodate any piping configuration or later modification.
4. The pump shall be furnished completely assembled and mounted on a fabricated steel base, with drive assembly.

2.08 The drive shall consist of an SEW Euro drive Severe Duty rated TEFC 15 HP gear motor, with an output RPM of 300. The motor shall have Class F insulation. The motor shall be mounted above the pump to allow for a short foot pad. Connection between the motor and pump shaft shall be belt driven. Each gear motor shall be driven by a variable frequency drive, located on the control panel and shall be of equal construction to the press drive.

## **2.09 EQUIPMENT SKID**

The manufacturer shall supply a complete skid mounted dewatering system. The skid mounted unit shall be designed to be removed from the trailer so that the owner can permanently install the unit in a building in the future. The skid shall be constructed of channel and I-beam construction that is hot dipped galvanized per the latest revision of ASTM 123 specification. The skid frame will be coated with an epoxy primer and urethane top coat. The skid shall include a 304 stainless steel sump pan that feeds into a stainless steel drop box with 4" drain connections out either side of the skid. All wiring shall be PVC conduit and all plumbing shall be Schedule 80 PVC. The skid shall be by BDP Industries or MSD Environmental Services or a pre-approved equal.

1. The belt press supplier shall mount the press, control panel, polymer system, sludge pump, booster pump and air compressor on a hot dipped galvanized equipment skid. All pumps, water and sludge lines will be equipped with ball or gate valves to allow draining for freeze protection. An industrial wash hose and nozzle will be supplied. The hose and fittings will be rated at a minimum operating pressure of 200 PSI.
2. Plumbing - The skid shall be pre-plumbed with SCH 80 PVC on the sludge feed line and 1 ½" wash water line. Stainless steel plumbing and stainless steel ball valves will be supplied on all of the ¾" water feed lines. All drain pipe will be schedule 40 PVC.
3. The skid side rails shall be constructed of a minimum 10" channel iron. Internal cross supports will be 6" I beam with a 16 gage, 304 stainless steel filtrate sump. The sump will be sloped to a drop pan under the center of the press for ease of clean up. The drop pan will allow filtrate to exit out each side of the machine through 4" stainless steel nipples mounted on the press.
4. Electrical conduit will be pre wired with PVC conduit to make a complete equipment skid.
5. The HDG skid will be top coated with an epoxy primer and urethane topcoat.

## 2.10 EQUIPMENT TRAILER

The manufacturer shall supply a complete trailer mounted dewatering system. The Gooseneck 30' long, air ride trailer shall include the following items/specifications.

1. Individual leveling dolly legs on the rear of the trailer to ensure optimal operation of the press.
2. Heaters – 2 stainless steel 480 V, infra red heaters
3. Lights – 4 water-tight, 4' long, sealed LED lights
4. Stainless steel tool box for fittings
5. Curtains on each side of trailer (black color). Curtains shall have stainless steel buckles and hardware. Two curtain ratchets shall be provided. The aluminum roof shall be down the complete length of the trailer.
6. Handrails – stainless steel handrails and steps. Steps shall be designed to fold up while not in use.
7. Walk in door – An aluminum, RV style door shall be installed on the driver's side of trailer. The door shall have a "flush" handle with keys and a window.
8. Catwalk – Aluminum grating and stainless steel catwalk. Full length on both sides of press.
9. 125 foot of 4/4 SO power cord.
10. Hose Storage – The trailer shall have hose storage built in the underside of trailer to accommodate 10 x 4" hoses and 10 x 2" hoses. The hose storage will have individual 6" diameter canister to house each 4" hose.

11. Hoses – Ten new 4” Goodyear Kanaflex (Orange/clear color) hoses shall be supplied. Ten new 2” hard, suction/discharge hoses minimum of 150 PSI shall be supplied. All hoses shall have a male cam and groove fitting on one end and a female cam and groove fitting on other end.

## **2.11 ELECTRICAL REQUIREMENTS**

### **A. General Requirements**

1. The belt filter press shall be provided with a local full operating 304 stainless steel NEMA 4X panel complete with all motor control and supervisory devices for trailer-mounted equipment. The panel shall also include such ancillary drives as hereafter specified. All electrical work shall be performed in accordance with applicable local and national electric codes.
2. Three phase, 460 volt, 60 Hertz power shall be supplied to the main control panel.
3. A control transformer shall be provided in the control panel to provide a 120-volt, single phase power source for motor starter coils, lights, relays, timers, controllers, local operating panel and other related items. The transformer shall supply power for all trailer lights, outlets and heaters.
4. The local control panel shall be provided with terminal blocks for power wiring to and from the panel. The incoming terminal blocks shall be provided with a single magnetic circuit breaker disconnect switch. Fuse protected motor starters with thermal overloads shall be supplied for each motor furnished with the dewatering system.
5. All electrical equipment controls located on the belt filter press shall have NEMA 4X enclosures and wired, through PVC conduit, to a single common NEMA 4X terminal box.
6. All devices within the panel shall be permanently identified. Nameplates shall be provided on the face of the panel or on the individual devices as required. Nameplates shall be made of laminated phenolic materials with a white face and a black core.
7. The panel shall be designed for manual starting and stopping of all drives. A master run-jog switch shall be supplied to override the alarm system and allow operation of any drive through a momentary contact push button.
8. All drive stations shall be equipped with a start/stop switch and run light. The main press drive and gravity belt drive drives as herewith specified shall also incorporate a variable speed potentiometer and speed indicator. The press panel shall include start/stop pushbutton, run lights and motor starters for the booster pump, hydraulic unit and polymer system. The panel shall also include start/stop pushbuttons, and speed potentiometers for one sludge pump and one polymer pump. The variable frequency drive for the sludge pump shall be supplied by the belt press manufacturer and shall be wall mounted in a Nema

4x enclosure next to the control panel.

9. Alarm lights, sensors, and related circuitry shall be provided for the following functions: belt misalignment, belt tension system failure, emergency trip cord on each side of the press, belt conveyor zero speed switch, and low hydraulic pressure. In the event of any of the above malfunctions, the machine will shut down and an alarm will sound. The alarm system shall include an audible horn rated at 90 DBA at 10'. The system shall include silencing provisions, but the function alarm indicating light shall remain lit until the alarm condition is satisfied. A separate set of alarm contacts shall be provided for remote alarm indication and for interruption of ancillary drives such as polymer and feed sludge pumping.
10. Press control panel shall be furnished with 12" stand to elevate panel as shown on contract drawings.

B. Electric Motors furnished with this equipment shall meet the following requirements:

1. Rated for continuous duty at 40°C ambient and insulated with a minimum of Class F insulation, with Class B temperature rise. All motors shall be totally enclosed, fan cooled or non-ventilated. All motors supplied shall be rated at 150% nameplate horsepower of the required horsepower maximum service condition.

### **PART 3 – INSTALLATION**

#### **3.01 INSTALLATION SUPERVISION**

- A. The manufacturer shall provide the services of a qualified factory representative to advise the installing contractors on proper installation, setting, piping, and wiring procedures. This time shall be above and beyond the start-up services described below. These services shall include 1 day of on-site services spread over 1 trip.

#### **3.02 OPERATION & MAINTENANCE MANUALS**

- A. Three (3) copies of operation and maintenance manuals shall be furnished. The manuals shall be prepared specifically for this installation and shall include detailed operating and maintenance instructions and specifications relative to the following; assembly, alignment, checking, lubrication, placing in operation, adjustment, maintenance of each unit of equipment, auxiliaries furnished under this contract, together with complete parts lists, and copies of dimension drawings.

#### **3.03 START-UP SERVICES**

- A. Before the equipment is started, the manufacturer shall make a thorough inspection of the installation to make sure the press has been installed properly and that all equipment relating to it has been installed according to the needs of the press.
- B. The manufacturer shall provide twelve (12) days of on-site services of a qualified factory representative to place the units in operation. The owner shall assist the manufacturer by starting up and operating all support systems such as water, sludge pumping, polymer mixing and feed, electrical power and instrumentation, and other ancillary equipment as needed. This trip will be separate from training and performance. The services provided by the manufacturer shall be as detailed in the O&M manuals and shall include at a minimum the following:
  - 1. Check equipment alignment and assure that there are no unusual internal stresses.
  - 2. Calibrate all instrumentation such as hydraulic systems.
  - 3. Check hydraulic systems to insure proper operation.
  - 4. Check lubrication in all drives.
  - 5. Adjust all edge seals, discharge scraper blades, drive chains, etc.
  - 6. Adjust spray wash, cloth tension, and belt aligning system.
  - 7. Start the drives and assure they are operating properly with no binding and with correct rotation.
  - 8. Insure that all ancillary systems have been properly adjusted, including polymer and sludge feed.
- C. Start-up services shall be considered completed when the manufacturer and contractor have demonstrated that the units are operating without mechanical problems.

### **3.04 TRAINING SUPERVISION**

- A. During the start up procedures, the equipment manufacturer shall provide two separate trips, five days of on-site training to the owner's employees for proper operation and maintenance of the sludge dewatering equipment.
- B. Two (2) emergency service trips with one day of on-site service for each trip that shall be used anytime during the first five years of operation.

**END OF SECTION**

**SECTION 11400**  
**HYDRAULIC REMOVAL CLARIFIERS**

**PART 1 - GENERAL**

**1.01 SCOPE OF WORK**

- A. Furnish one (1) suction header type clarifier mechanism(s) and components as specified herein for use in removal of activated sludge.
- B. Work and Components Included (But Not Limited To):
  - 1. The Equipment Manufacturer shall furnish the items listed below:
    - a. Drive mechanism complete with a gearmotor reduction unit, micro-switch torque overload devices and shear pin
    - b. Center support pier
    - c. Center pier anchor bolt template
    - d. Tow-Bro® Unitube sludge removal header(s), manifold, seals, clamp kit and supports
    - e. Center cage, truss arm(s) and tie chord A-frame(s) with clevis assembly(ies)
    - f. Access bridge including center platform, grating, hand-railing and toe plate
    - g. One (1) surface skimmer assembly which includes scum blade and hinged skimmer assembly
    - h. One (1) scum trough with flushing device
    - i. FEDWA® energy dissipating inlet (EDI) baffle system and supports
    - j. Flocculation feedwell and supports
    - k. All associated hardware and anchor bolts
  - 2. Like items of equipment specified herein shall be the end products of one manufacturer in order to achieve standardization for operation, maintenance, spare parts and manufacturer's service.
- C. References
  - 1. American Gear Manufacturers Association (AGMA):
    - a. 201.02 - Tooth Proportions for Coarse-Pitch Involute Spur Gears.
    - b. 390.03a - Handbook - Gear Classification, Materials and Measuring Methods for Bevel, Hypoid, Fine Pitch Wormgearing and Racks Only as Unassembled Gears.

- c. 908 - Information Sheet - Geometry Factors for Determining the Pitting Resistance and Bending Strength of Spur, Helical and Herringbone Gear Teeth.
  - d. 2000 - Gear Classification and Inspection Handbook - Tolerances and Measuring Methods for Unassembled Spur and Helical Gears (Including Metric Equivalents).
  - e. 2001 - Fundamental Rating Factors and Calculation Methods for Involute Spur and Helical Gear Teeth.
  - f. 2004 - Gear Materials and Heat Treatment Manual.
  - g. 6019 - Standard for Gearmotors Using Spur, Helical, Herringbone, Straight Bevel or Spiral Bevel Gears.
  - h. 6022 - Design Manual for Cylindrical Wormgearing.
  - i. 6034 - Practice for Enclosed Cylindrical Wormgear Speed Reducers and Gearmotors.
  - j. 9005 - Industrial Gear Lubrication.
2. American Institute of Steel Construction (AISC):
    - a. Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design.
    - b. Code of Standard Practice for Steel Bridges and Buildings.
  3. American Society of Mechanical Engineers (ASME)
    - a. B29.1M - Precision Power Transmission Roller Chains, Attachments and Sprockets.
  4. American Society for Testing and Materials (ASTM):
    - a. A 36/A 36M - Standard Specifications for Structural Steel.
    - b. A 48 - Standard Specification for Gray Iron Castings.
    - c. A 148/A 148M - Standard Specification for Steel Castings, High Strength, for Structural Purposes.
    - d. A 276 - Standard Specification for Stainless Steel Bars and Shapes.
    - e. A 325 - Standard Specification for High-Strength Bolts for Structural Steel Joints.
    - f. A 536 - Standard Specification for Ductile Iron Castings.

5. American Welding Society (AWS):
  - a. D 1.1 - Structural Welding Code for Steel.
6. American Bearing Manufacturers Association (ABMA):
  - a. 9 - Load Ratings and Fatigue Life for Ball Bearings.
7. International Conference of Building Officials (ICBO):
  - a. Uniform Building Code (UBC).
8. National Electrical Manufacturers Association (NEMA):
  - a. 250 - Enclosures for Electrical Equipment (1,000 volts maximum).
9. Related Work Specified Elsewhere
  - a. The provisions of this section are a direct extension of the GENERAL MECHANICAL REQUIREMENTS, and although set forth only once within the specification, shall apply equally to this section.

## **1.02 QUALIFICATIONS**

### **A. Manufacturer**

1. It is the intention of this specification to cover minimum acceptable quality for a complete installation with the exception of the motor controls, electrical work and piping requirements.
2. Basis of Design for the material and equipment specified is the Tow-Bro® clarifier design and FEDWA inlet designed by Envirex® Products of Evoqua Water Technologies in Waukesha, WI.

### **B. Manufacturer's Experience**

1. The equipment Manufacturer shall have not less than fifteen (15) successful years of experience in the design, construction and operation of the type specified at ten (10) different plants.
2. The Engineer may require evidence, in the form of operating records, from these plants to substantiate any claims concerning the ability of the equipment to perform as required.

### **C. General**

1. The design and layout shown on the drawings are based on Evoqua Water Technologies – Envirex Equipment. If equipment other than Envirex is submitted to the Engineer for consideration as an alternate, it shall be the responsibility of



the requesting Bidder to submit the following items for the substituting piece of equipment:

- a. A revised drawing of the mechanical equipment and basin layouts. This revised drawing shall show the proposed location of the substitute unit and area required for replaceable or serviceable components. This drawing shall also show clearances of adjacent equipment and service area required by that equipment.
- b. Changes in architectural, structural, electrical, mechanical and plumbing requirements for the substitution shall be the responsibility of the Bidder wishing to make the substitution. This shall include the cost of redesign by affected designers. Any additional cost incurred by affected subcontractors shall be the responsibility of the Bidder and not the Owner.
- c. A minimum of five (5) references of identical or larger installations including:
  1. Site City, State and Project Name
  2. Clarifier size, dimensions and general description
  3. Reference drawings of each installation
  4. Contact Name, phone number and email address of individual employed by the owner of the equipment

### **1.03 SUBMITTALS**

- A. Operating instructions, manuals and shop drawings shall be submitted in accordance with GENERAL MECHANICAL REQUIREMENTS.
- B. Alternate Equipment
  - a. If the Installing and/or General Contractor desires to offer equipment as an alternate to the specified equipment, he shall submit, within 14 days after the bid opening, substantial descriptive information in order that the Engineer may determine if the proposed alternate is equal to that specified.
  - b. No alternate will be considered unless, in the opinion of the Engineer and Owner, it conforms to the specification in all respects except manufacturer and model and minor details. Material variances will not be allowed.
  - c. Alternate equipment which is a "standard product" of the Manufacturer shall be modified, redesigned, or furnished with special features or special materials as may be necessary to conform to the requirements of this specification and contract drawings.

- d. The Owner reserves the right to decide whether or not the proposed alternate will be acceptable.
2. The Contract, if awarded, will be on the basis of material and equipment specified without consideration of alternate equipment. In the event an alternate is allowed, the Contract price will be adjusted accordingly by a change order.
  - a. By submitting a bid, the Contractor agrees and understands that Contract award will be made on the basis of the specified equipment.
  - b. If an alternate is found to be not acceptable, the Contractor shall be responsible for supplying the equipment specified.
3. Descriptive information shall include the following:
  - a. List of ten (10) installations of equipment in successful operation of the design in all essential regards as specified.
  - b. Field dye performance data verifying the proposed header design proportionately removes sludge from the entire tank bottom. Test site and testing laboratory shall be identified along with test methods and apparatus used. Data shall be from an existing multiple orifice system incorporating a tapered header width operating under the following conditions.
    1. Minimum 70' diameter basin with minimum 10' side water depth.
    2. Flow and pressure head within the header shall be recorded at each orifice while the header rotates.
    3. Return sludge concentrations not less than 5,000 mg/l with not less than 1 MGD with maximum withdrawal rate at least 3 times minimum.
    4. Maximum velocity in header of 3.0 to 4.5 fps.
    5. Maximum header headloss at maximum flow not less than 1.0 feet.
    6. Actual pick-up of sludge shall be in close agreement with the ideal pick-up curve for uniform removal based on floor area swept.
    7. Calculations will not be an adequate substitute for dye verification data.
  - c. Written certification that the proposed drive meets AGMA standards. Drive mechanism calculations prepared by a registered professional engineer and shall be submitted for approval along with published torque value of the proposed drive.
  - d. General arrangement of drive unit verifying AGMA torque, overload protection system, housing and gear materials and horsepower. Provide

values used for the following AGMA design parameters per AGMA Specification 6034-B92:

1. Pitch diameter of worm gear (in.)
  2. Effective face width of gear (in.)
  3. Lead angle of threads at mean worm diameter (deg)
  4. Normal pressure angle of worm thread (deg)
  5. Sliding velocity of worm at mean diameter (fpm)
  6. Number of teeth
  7. Service factor. Use 1.25
- e. Provide the following AGMA design parameters per AGMA 2001-D04:
1. Pitch diameter of pinion and spur gear (in.)
  2. Face width of narrowest of two mating gears (in.)
  3. Pitch line velocity of pinion (fpm)
  4. Allowable bending stress ( $S_{at}$ ) of pinion and spur gear material (psi)
  5. Allowable contact stress ( $S_{ac}$ ) of pinion and spur gear material (psi)
  6. Geometry factor ( $J$ ) for bending
  7. Geometry factor ( $I$ ) for pitting resistance
  8. Load distribution factors  $C_m$  and  $K_m$
  9. Dynamic factors  $C_v$  and  $K_v$
  10. Life factors  $C_L$  and  $K_L$  at 420,000 cycles of the main gear
  11. Number of teeth
  12. Reliability factors,  $C_r$  and  $K_r$  equal to or greater than 1.0
- f. Complete assembly drawing of the collector components and List of Materials giving:
1. Type of material used for each component
  2. Dimension, thicknesses and weights of each component
  3. Header details giving orifice diameter, distance from center and cross section of header at each orifice
  4. Manifold seal detail

#### **1.04 GUARANTEE AND WARRANTY**

- A. Seller shall furnish its standard warranty against defects in material and workmanship for all Equipment provided by Seller under this Section. The Seller shall warrant the Equipment, or any components thereof, through the earlier of:
  - 1. eighteen (18) months from delivery of the Equipment or
  - 2. Twelve (12) months from initial operation of the Equipment.

### **PART 2- DESIGN**

#### **2.01 MANUFACTURERS**

- A. The OWNER and ENGINEER believe the following candidate manufacturers are capable of producing equipment and/or products that will satisfy the requirements of this section. This statement, however, shall not be construed as an endorsement of a particular manufacturer's products, nor shall it be construed that named manufacturers' standard equipment or products will comply with the requirements of this section.
  - 1. Evoqua Water Technologies, LLC - Envirex Products, of Waukesha, WI
  - 2. Or pre-approved equal

#### **2.02 EQUIPMENT**

- A. General
  - 1. Furnish and deliver suction type sludge collector(s) for installation in one (1) new concrete settling tank(s).
    - a. Tank diameter to be 100 feet with inboard effluent launder.
    - b. Tank side water depth to be 15 feet.
    - c. Tank freeboard to be 2 feet.
    - d. Floor slope to be 1/16 inch per 1 foot.
  - 2. Clarifier Mechanism
    - a. Provide a center pier supported, center feed design with peripheral overflow.
    - b. Provide a center drive mechanism that supports a walkway, maintenance platform and rotating structural steel cage.
    - c. The cage shall support the Tow-Bro® Unitube header(s), manifold and one (1) truss arm(s).

- d. One (1) surface skimmer assembly which includes scum blade and hinged skimmer assembly.
  - e. Fabricated steel structures shall be shipped in the largest sub-assemblies permitted by carrier regulations, properly match-marked and identified for ease of field erection.
3. Clarifier Mechanism Design – Hydraulics
- a. Effluent
    1. Minimum flow (MGD) 0.5 MGD
    2. Average flow (MGD) 3 MGD
    3. Peak flow (MGD) 8 MGD
  - b. Return Activated Sludge (RAS) Flow
    1. Minimum flow (MGD) 0.65 MGD
    2. Average flow (MGD) 1.0 MGD
    3. Peak flow (MGD) 2.5 MGD
  - c. Mixed Liquor Influent Flow (a+b)
    1. Minimum flow (MGD) 0.65 MGD
    2. Average flow (MGD) 4.0 MGD
    3. Peak flow (MGD) 10.5 MGD
4. Clarifier Mechanism Design – Equipment
- a. Dimensions
    1. Internal Diameter, feet 100
    2. Side-water Depth, feet 15
    3. Minimum Freeboard, feet 2
    4. Floor Slope 1/16 on 12
  - b. Center Pier
    1. Minimum outside diameter, inches 31.5
  - c. Flocculation Well
    1. Diameter 19'-9"
    2. Depth below water surface 6'-0"
    3. Number of Scum Ports 8
    4. Well Thickness 3/16"
    5. Configuration Circle
  - d. FEDWA Inlet
    1. Plate thickness 3/16"
    2. Impingement Zones 4
  - e. Skimmer and Scum Trough
    1. Number of skimmer arms One (1)
    2. Trough width 6'-0"

5. Clarifier Design – Drive Mechanism
  - a. Ball Race Diameter, inches 42
  - b. Torque Requirements
    1. AGMA Rated Torque, ft-lbs. 21900
    2. Motor Shut-Off Torque, ft-lbs. 26280
    3. Momentary Peak Torque, ft-lbs. 43800
    4. Service Factor 1.25
  - c. Drive Output Speed, RPM 0.04

B. Clarifier Design - Materials

1. Drive housing: Cast iron
2. Non-Submerged steel: A36 carbon steel
3. Skimming steel: A36 carbon steel
4. Submerged steel: A36 carbon steel
5. Grating: 1 1/4-inch aluminum grating
6. Handrails: Aluminum
7. Anchor bolts and hardware: Type 316 stainless steel.

C. Structural Members

1. Structural steel shall conform to the references listed in Part 1.01-D.
2. Structural steel components shall have minimum thickness of 1/4" unless otherwise specified.
3. Sharp corners of cut or sheared edges will be dulled with one pass of a power grinder to create a smooth edge.
4. All welding shall conform to American Welding Society Standard AWS D1.1. Structural support members shall be shop welded for bolted field assembly. Field welding shall be minimal.
5. Design components so that stresses developed do not exceed allowable stresses, as defined by current AISC standards when designed for the AGMA rated torque.
6. Panel lengths and member sizes shall be selected such that slenderness ratios do not exceed 200 for compression and 240 for tension. For strength, the controlling member force shall be used to determine member size.
7. Maximum deflection in a span under combined live and dead loads shall not exceed  $L/360$ .

## D. Drive Mechanism

### 1. General

- a. Drive mechanism consisting of primary helical gear reduction, intermediate worm gear reduction unit and enclosed final reduction unit consisting of internal spur gear and pinion in a turntable base is to be completely assembled and finish painted in the Manufacturer's shop.
- b. All gearing shall be enclosed in gray cast iron ASTM A-48 Class 40B housings. Fabricated steel housings, exposed gearing and submerged bearings will not be acceptable.
- c. The drive shall be designed to allow removal and replacement of internal gear, balls and strip liners without raising the walkway.
- d. All components of the drive mechanism shall be designed in accordance with AGMA Standard 6034-B92 "Practice for Enclosed Cylindrical Worm Gear Speed Reducers and Gearmotors", and Standard 2001-D04 "Fundamental Rating Factors and Calculation Methods for Involute Spur and Helical Gear Teeth"; for 24-hour continuous, uniform load duty and 20-year design gear life at the specified output speed. The AGMA rated torque of the drive shall be the lowest value computed for worm gear set, spur gear and pinion for strength and durability.
- e. Select conservative values for bending strength and pitting resistance life factors KI and CI based on a minimum of 420,000 cycles of the main gear. The drive AGMA torque rating shall be as specified above with a minimum 1.25 service factor.
- f. All bearings shall be designed for a minimum B-10 life of 200,000 hours.

### 2. Primary Reduction Unit

- a. Provide commercially available helical gear reducer or gearmotor in a cast housing.
- b. All bearings shall be anti-friction type running in oil.
- c. Motor shall be totally enclosed, ball bearing type, of ample power for starting and continuously operating the drive mechanism without overloading.
- d. Motor to conform to NEMA standards and be suitable for operation on 230/460 volt, 3 phase, 60 Hertz current.

- e. Primary reduction unit shall drive the intermediate reduction through a chain and sprocket arrangement with #80L self-lubricating chain and non-corrosive OSHA approved removable chain guard.
  - f. Provide proper chain tension by an adjustable steel base mounted on the intermediate reduction unit.
3. Intermediate Reduction Unit
- a. Provide worm gear speed reduction with grease and oil lubricated anti-friction type bearings in cast iron housing securely bolted on the machined top face of the final reduction unit. Worm and shaft shall be a two-piece assembly for ease of maintenance. Cycloidal and planetary gearing will not be acceptable.
  - b. Align and maintain accurate centers with the final reduction gearing. Swivel base mounting of the intermediate unit will not be acceptable.
  - c. Mount an electro-mechanical overload device on the thrust end of the worm shaft consisting of plate spring assembly, plunger, indicator dial two (2) micro-switches (one N.O. and one N.C.) and a terminal block, all enclosed in a weather tight, gray cast iron housing. Amperage metering devices will not be considered equal to the overload device specified.
  - d. Micro-switches shall be factory set to: (1) sound an alarm when the load on the mechanism reaches 100% of the AGMA torque; and (2) stop the motor when the load reaches 120% of the AGMA torque.
  - e. Provide a shear pin device mounted on the drive end of the worm shaft.
4. Final Reduction
- a. Provide internal, full depth involute tooth design, ductile iron spur gear driven by a heat treated steel pinion from the slow speed shaft of the intermediate reduction unit. Stub tooth design will not be acceptable.
  - b. Provide bearings at top and bottom of pinion to ensure complete tooth contact between mating surfaces. Pinion and pinion shaft shall be furnished as a two-piece assembly for ease of maintenance.
  - c. Provide cast iron turntable base with annular raceway to contain balls upon which the internal gear rotates. The ball race shall ensure low unit ball load, long life and stability without the use of submerged guide shoes, bumpers or steady bearings.
  - d. Provide four (4) 3/8" thick x 3/4" wide renewable special hardened (38-42 Rockwell C) steel liner strips force fitted (pins and cap screws not permitted)



into the turntable base and internal gear for balls to bear on vertically and horizontally.

- e. Provide an internal gear of split design with precision mating surfaces for ease of removal of gear, balls and liner strips without raising bridge. Drives without this feature are not acceptable.
- f. Internal gear, pinion and balls to run in an oil bath and be protected by a felt seal and vertical neoprene dust shield.
- g. Provide oil filling and level pipe along with a drain plug and sight gauge.
- h. Turntable base shall be bolted to the center column and be designed to support the bridge, internal gear and rotating mechanism.

#### E. FEDWA Flocculation Baffles

- 1. Provide inlet baffles to promote effective mixing and tapered flocculation.
- 2. Flow shall impinge three (3) overlapping vertical target baffles in secession with a series of four (4) impingement zones.
- 3. Design to provide a "Gt" (t in seconds) value in the well not exceeding 6,000 with a velocity gradient "G" within the well of at least 35 fps/ft and not exceeding 60 fps/ft at a minimum water temperature of 10 degrees-C at peak influent flow.
- 4. Provide horizontal shelf baffles to prevent downward movement in flocculation zone.
- 5. Baffles shall bolt to center cage and well support beams.
- 6. The baffles to be fabricated from minimum 3/16" thick A36 carbon steel plate.
- 7. Hydraulic calculations shall be provided showing dimensional characteristics, port area, velocity, headloss, and mixing intensity.
- 8. LA EDI system shall be the only acceptable alternative to the FEDWA design.

#### F. Flocculation Feedwell

- 1. The flocculation feedwell fabricated from 3/16" steel plate sections supported from the drive cage or bridge extensions.
- 2. Incorporate steel stiffeners at the top and bottom to maintain shape and rigidity.
- 3. Feedwell shall be of adequate size to diffuse the flow into the tank at a uniform flow through velocity.
- 4. Ports shall be cut into the flocculation feedwell to permit entrapped scum to escape.

5. Ports shall be baffled to prevent short circuiting to the weirs.
6. For the diameter of the proposed flocculation feedwell, straight segmented pieces are not allowed.

G. Center Pier

1. A cylindrical 1/4" thick steel plate center pier shall support the drive, collector mechanism and access bridge.
2. Top of pier to have a drive mounting plate set plumb with the centerline.
3. Drive to be positioned, leveled and grouted in place on top of pier with a non-shrink grout.
4. Manufacturer to provide minimum eight (8) 1" diameter anchor bolts and steel template/grout shield to accurately locate anchors.
5. Center pier shall serve as the influent pipe.
6. Center pier shall have a minimum of four (4) overflow areas at its upper end to diffuse flow into the flocculation feedwell at a velocity not to exceed 1.75 fps at maximum design mixed liquor flow.

H. Sludge Collection Header

- a. The header(s) shall be parallel to the tank floor and have a series of inlet orifices such that the entire tank bottom is swept clean in a single revolution.
- b. The header shall be designed to uniformly remove sludge in proportion to the area swept with the removal of a larger volume of sludge at greater distances from the tank center.
- c. Sludge shall be transported through the header to the center manifold, with removal being accomplished by hydrostatic pressure.
- d. Provide a fully tapered, rectangular-shaped Unitube header varying in cross section from a maximum near the tank center to a minimum at the outer wall.
- e. Fabricate header from 1/4" thick steel plate.
- f. Provide steel plate counterweights not exceeding 50# each as necessary for proper equipment balance. Field welding of galvanized header or supports will not be allowed.
- g. Longitudinal cross sectional axis to be mounted at an angle of 45 degrees to tank bottom to trap sludge.

- h. Provide a 2" fluidizing vane as an integral part of header. Attach neoprene squeegee to fluidizing vane provided with 1" vertical adjustment.
  - i. Manufacturer to size and space header inlet orifices at regular intervals not exceeding 30".
  - j. Orifice design to be proportionate to the volume of sludge withdrawn from the entire tank floor at all flows.
  - k. Provide header flange with silicone seal for bolted connection to center manifold. Tie bar shall provide header support.
  - l. Alternate Manufacturers shall submit header verification field data in accordance with the Substitute Equipment Section of this specification.
  - m. Sludge withdrawal by means of individual riser pipes or stepped header construction will not be acceptable.
- I. Center Cage, Truss Arm and Manifold
- 1. Center cage to be of an all-welded box truss construction made up of structural steel members having a minimum thickness of 1/4"
  - 2. Truss arm(s) shall be furnished with a triangular three-point contact design for ease of installation and alignment. Truss shall be constructed with 1/4" minimum thick members. Truss shall be pinned at the base for vertical adjustment and connected to the center cage through strut and adjustable clevis assembly. Tie-rod and turnbuckle designs that do not provide lateral support will not be acceptable.
  - 3. Provide a cylindrical manifold with two (2) seals for bolted connection to the sludge collection header and bottom of cage. A bottom seal plate shall be furnished by the equipment Manufacturer securely anchored to the floor and grouted in place after final adjustment.
- J. Surface Skimmer
- 1. Provide One (1) skimmer assembly consisting of scum blade and hinged wiper assembly.
    - a. The scum blade shall span the full length between the flocculation feedwell and scum trough. Scum blade shall have a height of 5-in rigidly attached to vertical pipe supports and structural A-frame. The A-frame shall be bolted to the truss arm at maximum of 15' spacing.
    - b. Mount a hinged wiper assembly on the end of the scum blade to form a pocket for trapping scum. The wiper assembly shall maintain continual contact and proper alignment between scum blade, outer scum baffle and

scum trough. The wiper blade shall have a wearing strip on its outer end which contacts the scum baffle and neoprene strip on its inner and lower edges which contact the scum trough.

- c. All springs, pivot points and threaded fasteners shall be constructed of 302 stainless steel. The hinged wiper assembly shall be hot dipped galvanized. The wiper blade shall be neoprene with Durometer range 50-60. The wiper assembly shall be the same dimension of the scum trough.
  - d. Provide a manual lockout mechanism on hinged skimmer assembly to allow for flexible independent operation for surface ice. Lockout mechanism shall raise hinged skimmer assembly above water surface without removal.
2. Provide one (1) scum trough 6'-0" wide with inclined beach of 1/4" thick plate, supported from the tank wall.
- a. Scum trough shall have an overall length of 4'-9" along the scum baffle consisting of beach plate, inner radius baffle, hopper and 6" discharge pipe. Manufacturer shall provide a loose plate flange for contractor to field weld and connect to scum drain piping.
  - b. Beach plate to slope at a nominal incline of 1-3/4" per foot to a point 5" below the maximum water elevation. The trough shall be provided with a submerged shelf extension spanning an additional 4'-0" along the scum baffle. An inner radius baffle extending 9" below and 3" above maximum water level shall run from the trough to the end of the submerged shelf.
3. Provide a counterweighted flushing device actuated by the main tank skimmer arm. Actuator arm shall pivot on a 3/4" minimum diameter stainless steel pin riding in an oil impregnated sintered bronze bushing. The actuator arm shall be counterweighted by steel plates to assure positive valve closure. The flapper valve shall be held open to allow 15 to 20 gallons of flushing water per trip.

#### K. Access Bridge

- 1. Provide a bridge of wide flange beam or pony truss construction extending from the tank wall to the stationary drive base.
- 2. Provide a bridge extension to provide access to the far-side of the drive mechanism.
- 3. Bridge to be designed for the dead load and a live load of 50#/sq. ft., with a deflection not exceeding L/360 of the span.
- 4. Provide a 3' wide walkway of 1-1/4" x 3/16" 1 1/4-inch aluminum grating that extends over the entire bridge length.

5. Provide a 2-rail handrail consisting of 1-1/2" diameter, Sch. 40 mechanically fastened Aluminum pipe for rails and Sch. 80 posts. Post spacing not to exceed 5'. Omit handrail only where truss bridge members at 21" and 42" above the walkway provide the same function.
  6. Provide a 4" high aluminum toe plate along both sides of bridge and bridge extension.
  7. Provide a minimum 8'-0" x 10'-0", rectangular platform to provide a 2' working clearance around the drive.
- L. Effluent Weirs and Scum Baffles *(to be provided by Installing Contractor)*
1. Fabricate weirs from 3/16" thick x 9" FRP.
  2. Weir shall have 90 degree, 2.5 inch deep "V" notches spaced 6" on centers.
  3. Fabricate scum baffle from 1/4" thick x 12" FRP.
- M. Anchor Bolts
1. All equipment anchor bolts shall be Type 316 stainless steel.
  2. Equipment Manufacturer shall furnish steel template and grout shield to accurately locate center pier anchors and allow for grouting beneath the pier and manifold seal plate after final plumbing.

## **2.03 SURFACE PREPARATION AND FINISHING**

- A. The center drive mechanism shall be shipped, assembled and finish painted with manufacturer's standard paint system.
- B. Fabricate header from 1/4" thick steel plate hot-dip galvanized after fabrication per ASTM-A123.
- C. Submerged components will be prepared by blasting to SSPC-SP10 and prime painted with one (1) shop coat. Finish coats are to be applied in the field by the Contractor.
- D. Non-submerged components will be prepared by blasting to SSPC-SP10 and prime painted with one (1) shop coat. Finish coats are to be applied in the field by the Contractor.
- E. Galvanized and stainless-steel components will be shipped unpainted.

## **PART 3 - TESTING**

### **3.01 CLARIFIER START-UP**

- A. A start-up inspection and test shall be performed on each clarifier to verify proper installation, alignment and operation.

B. Testing shall include the following:

1. Drive

a. Alignment and Installation

1. Check alignment of the drive and driven sprockets
2. Check chain for proper tension
3. Ensure proper fit of chain guard
4. Measure the stop block clearance and lower drive housing
5. Review and confirm the correct motor, gear reducer, and drive chain have been installed on the clarifier drive per the defined mechanism design
6. Confirm installation of the proper shear pin
7. Bump motor to confirm correct rotation

b. Lubrication

1. Check the drive mechanism for the correct lubrication levels
2. Service all lubrication points and grease fittings
3. Check the air vents in the gear reducers

c. Micro-switches

1. The torque protection micro-switches must be connected per the diagram on the drive drawing.
2. The shut-down switch must be connected: a manual reset must be wired in the circuit when the motor shut-off switch is activated.
3. Set alarm and motor shut-off torque overload gap per the drive drawing

2. Clarifier Mechanism

a. Installation

1. Confirm proper installation of all field bolt material
2. Check the bridge and platform for proper level installation
3. Ensure proper spacing has been installed on the bridge expansion end to allow for sufficient room to expand and contract
4. Run the mechanism and check the horizontal plane at four points on the wall (90 deg. apart) for tanks up to 80' in diameter, eight points (45 deg.

Apart) for large tanks. Always recheck starting point.

5. Check manifold runs concentric to center pier
6. Check the slope of the header at fluidizing blade
7. Confirm that the upper and lower manifold seals are installed properly
8. Check the elevation and scum beach level relative to the max water surface
9. Perform alignment check of the header and truss arms
10. Proper tracking and alignment of skimmer assembly with water elevation and scum trough

## **PART 4 - EXECUTION**

### **4.01 INSTALLATION AND FIELD SERVICE REQUIREMENTS**

- A. The Contractor shall install the clarifier as shown on the drawings.
- B. Equipment shall be installed in accordance with GENERAL MECHANICAL REQUIREMENTS and in accordance with the Manufacturer's recommendations to provide a complete installation.
- C. The Contractor shall complete the following:
  1. Plumb and grout the center pier
  2. Add grout beneath the manifold seal ring and adjust for horizontal plane
  3. Grout the floor in accordance with the Manufacturer's recommendations
  4. Add grout between the center pier and drive unit
- D. Operating Instructions and/or Operator Training
  1. Manufacturer to provide two (2) trips and two (2) days total of on-site field service.
  2. One day shall be dedicated to a pre-grout inspection. After installation, a post-grout inspection shall be conducted followed by a general training seminar.
  3. An additional one (1) not less than one-half day shall be provided for operation assistance of the equipment supplied.

### **4.02 ELECTRICAL CONNECTIONS AND WIRING**

- A. Control panels, wiring, conduits and instrumentation will be provided by the Electrical Contractor under DIVISION 16 - ELECTRICAL.

**END OF SECTION**



**SECTION 11410**  
**FRP WEIRS AND SCUM BAFFLES**

**PART 1 – GENERAL**

**1.01 SUBMITTALS**

A. Shop Drawings

1. Manufacturer's catalog information, descriptive literature, specifications and identification of materials of construction, including resins and glass fiber content and layout for FRP constructions.
2. Detailed drawings that show equipment fabrication dimensional layouts, bill of materials, bolt and anchor locations, method of attachment including number, locations and size of fasteners, and shall be based on field measurements by the Contractor to ensure proper installation.

B. Quality Control Submittals

1. Manufacturer's Certificate of Compliance.
2. Special shipping, storage and protection and handling instructions.
3. Manufacturer's written/printed installation instructions.
4. A list of three installations of comparable size in operation for at least three years.
5. Certified test reports of the physical and mechanical properties of the product.  
Each panel shall have the following minimum physical properties:

<u>Property</u>	<u>Test</u>	<u>Minimum Value</u>
Tensile Strength	ASTM D-638	14,000 psi
Flexural Strength	ASTM D-790	25,000 psi
Flexural Modulus	ASTM D-790	1.0 x 10 <sup>6</sup> psi
Barcol Hardness	ASTM D-2853	40
Water Absorption	ASTM D-570	0.2%

**1.02 WARRANTY**

- A. Manufacturer shall warrant the weirs and scum baffles to be free of defects in materials and workmanship for a period of one year after the date of Substantial Completion.

**1.03 COORDINATION**

- A. Manufacturer shall coordinate the weir and scum baffle design and installation requirements with the clarifier mechanism, scum box and launder effluent channel configurations.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

- A. The weirs and scum baffles in this section shall be the products of:

NEFCO Systems Inc., 8895 North Military Trail, Building C, Suite 100, Palm Beach Gardens, FL 33410

### **2.02 FRP WEIRS AND SCUM BAFFLES**

- A. Except for bolts and hardware specified herein, the weirs, scum baffles and supports shall be polyester plastic resin, reinforced with glass fiber. All weir plates, weir washers, weir splice plates, scum baffle panels, scum baffle splice plates and baffle support brackets shall be fiberglass reinforced plastic molded to produce uniform smooth surfaces. The surface shall be resin rich, free of voids and porosity, without dry spots, crazes or unreinforced areas and shall provide for increased corrosion resistance and UV protection. The weirs and scum baffles shall be green in color.
- B. The weir plates, splice plates and weir washers shall be 1/4" thick plastic laminate. Weir plates shall not exceed 12' in length unless otherwise noted. The specific dimensions of the weirs and scum baffles shall be as shown on the drawings. Oversized mounting holes in the weir plates shall be provided for vertical and horizontal alignment of at least 2" with 5" diameter FRP weir washers to cover the holes. The weirs shall be mounted with 1/2" x 4-1/4" stainless steel expansion anchors 2' on center. Cut ends of non-standard lengths shall be sealed with resin.
- C. Scum baffle panels and splice plates shall be 1/4" thick plastic laminate. The scum baffle panels shall be 12" high and shall not exceed 12' in length unless otherwise noted. Splice plates shall be 6" x 12". The scum baffle brackets shall be 6" x 6" x 3/8" FRP Angle with slotted holes to provide horizontal, vertical and radial adjustment of the baffle. The brackets shall be installed on 4' centers. Fastening holes in the scum baffle panel shall be countersunk to accommodate flat head fasteners. Cut ends of non-standard lengths shall be sealed with resin.

- D. Expansion anchors, nuts, bolts, washers and other hardware shall be Type 304 stainless steel.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION**

- A. The installation contractor shall field verify existing dimensions and install the weir and scum baffle in accordance with the Contract Drawings, approved shop drawings and manufacturer's recommendations. Field cutting of panels will be allowed to complete the structure. All field cut or drilled edges shall be sealed per the manufacturer's recommendations. All of the fasteners required for installation shall be supplied by the weir and scum baffle manufacturer.
- B. Weirs and scum baffles shall be carefully aligned and leveled to the elevations shown on the drawings. In the completed installation, no variation greater than 1/8" shall exist between any two notches of the weir plate in any one tank. In addition, the average deviation from one quadrant of the weir to any other shall not exceed 1/16". The installation contractor shall apply a suitable sealant between the weir and the wall to prevent the flow of liquid between the weir and the tank wall.

**END OF SECTION**

**SECTION 11420**  
**STAMFORD DENSITY CURRENT BAFFLE 3.0**

Stamford Density Current Baffle (SB3.0) is an advanced baffle designed to improve the performance of the clarifier by a) substantially reducing clarifier effluent solids, b) increasing the clarifier's hydraulic capacity, c) promoting blanket formation, and d) minimizing potential short-circuiting through gas vents.

**PART 1 - GENERAL**

**1.01 SUBMITTALS**

**A. Shop Drawings**

1. Manufacturer's catalog information, descriptive literature, specifications and identification of materials of construction, including resins and glass fiber content and layout for FRP constructions.
2. Detailed drawings showing equipment fabrication, dimensions, method of attachment including number, locations and size of fasteners and weights of fabrications.
3. Manufacturer's recommended baffle dimensions, deflection angle and location for each application.

**B. Quality Control Submittals**

1. Manufacturer's Certificate of Compliance.
2. Special shipping, storage and protection and handling instructions.
3. Manufacturer's written/printed installation instructions.
4. A list of five installations of comparable size in operation for at least three years.
5. Certified test reports of the physical and mechanical properties of the product. Each panel shall have the following minimum physical properties:

<u>Property</u>	<u>Test</u>	<u>Minimum Value</u>
Tensile Strength	ASTM D-638	10,000 psi
Flexural Strength	ASTM D-790	16,000 psi
Flexural Modulus	ASTM D-790	1.0 x 10 <sup>6</sup> psi
Barcol Hardness	ASTM D-2853	40
Notched Izod	ASTM D-256	12 ft-lbs/in
Water Absorption	ASTM D-570	0.2%

## **1.02 WARRANTY**

- A. Manufacturer shall warrant the Density Current Baffle to be free of defects in materials and workmanship for a period of five years after the date of Substantial Completion.

## **1.03 COORDINATION**

- A. Manufacturer shall coordinate the Stamford Density Current Baffle design and installation requirements with the clarifier mechanism, scum box and launder effluent channel configurations.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Materials, equipment and components in this section shall be the products of:  
  
NEFCO, Incorporated, 8895 North Military Trail, Building C, Suite 100.  
Palm Beach Gardens, FL 33410

### **2.02 DESIGN**

- A. The Stamford Density Current Baffle shall consist of a series of baffle panels that are attached to the wall of the clarifier to form an inclined, shelf-like surface around the entire inner periphery of the tank. Each panel shall be molded of corrosion-resistant, UV-treated fiberglass. The panel shall be a maximum of 8 feet in length and shall be curved to follow the curvature of the clarifier tank. The width, inclination angle and mounting location of the baffle shall be determined based upon the clarifier configuration in order to provide optimum baffle performance. The panels shall be designed such that adjacent panels fit together without overlapping or cutting, and the completed baffle when installed, has a well-engineered and professional appearance.
- B. The inclination angle of the baffle shall be 30 degrees as measured from the horizontal and the horizontal projection of the baffle shall be defined by the following equation:

$$\text{Horizontal Projection (Inches)} = 24 \text{ inches} + 0.4\text{in/ft} \times (\text{tank diameter (ft)} - 30)$$

Suppliers offering alternate configurations must provide CFD modeling results showing that the proposed alternate equals the performance of the specified configuration.

- C. Provision shall be made to attach the panels to the clarifier wall and support them at the proper angle using a triangular panel bracket. The panel and bracket shall be molded as an integral part of each panel, forming a baffle module, or separate panels and brackets may be supplied. If the panel and bracket are molded as an integral unit with adequate stiffeners, only one bracket is required per panel. A specially formed "free-end" bracket shall be provided to support the free end of the last panel where the run of panels is interrupted by an obstruction. Panels may be cut as required to fit around obstructions.
- D. If separate panels and brackets are supplied, the panels shall be molded of fiberglass and shall meet the specifications of this section. The brackets shall be fabricated of 3" x 3" x 1/4" stainless steel angle and shall be triangular in shape, with the corners welded. Brackets shall be installed at a maximum spacing of four (4) feet. The panels shall be fastened to the brackets with stainless steel nuts, bolts and lock washers every 8 inches.
- E. In the case of clarifiers/settling tanks with inboard launders, two scenarios are possible:
  - 1. If there is sufficient vertical clearance between the top of the blanket and the bottom of the launder to position the bottom of the baffle at least two feet above the top of blanket, then the baffle shall be mounted directly to the tank wall at or above that position.
  - 2. Where the clearance is more restricted, the baffle shall be mounted to the lower inboard corner of the launder trough. In this case, the width of the trough shall be taken into account when calculating the horizontal projection of the baffle, and the horizontal projection shall not be less than 24".
- F. A method of interconnecting adjacent panels shall be provided such that the entire assembly forms a rigid structure capable of supporting its own weight plus snow and wind loads in the event the tank is out of service. The baffle shall also be designed to withstand a buoyant force load equal to the weight of the water displaced from the volume beneath the baffle. The angled working surface of each baffle shall be sufficient in pitch and width to divert the flow and to create a self-cleaning action of the baffle itself.
- G. Provision shall also be made to vent gases that may form beneath the baffle through 3" diameter half-round openings molded into the panel at its highest point. The vents should aim radially towards the center of the tank, such that any bubbling and/or by-passing current is directed away from the weir, preventing short-circuiting. Specially in cases where the panels are to be launder-mounted, with the vents sitting directly below the weir and scum baffle.

## **2.03 MATERIALS**

- A. Each baffle panel shall be molded of fiberglass-reinforced plastic. The resins and fiberglass reinforcing material shall be consistent with the environmental conditions and structural requirements.
- B. The resin shall be an isophthalic polyester resin with corrosion-resistant properties, Corezyn COR75-AQ-010 or equivalent, suitable for use in submerged waste treatment applications. The resin shall not contain fillers except as required for viscosity control. For viscosity control, a thixotropic agent up to 5% by weight may be added to the resin. The resin shall be treated to provide UV suppression.
- C. Glass reinforcement shall consist of chemically bonded surfacing mat and chopped strand roving. Surfacing mat shall be Type C veil. The glass reinforcement shall be 357-211 PLN CTC chopped strand roving or equivalent. The glass content of the finished laminate shall not be less than 30% by weight. The nominal thickness of each baffle panel shall be 1/4"  $\pm$  1/16 inch thick with resin rich surfaces and edges to prevent migration of moisture and fiber "blooming." The baffle shall be black in color.
- D. The upper surface of each panel shall be mold smooth and no glass fibers shall be exposed. Laminations shall be dense and free of voids, dry spots, cracks or crazes. The upper surface of the baffle shall be reinforced with one layer of surfacing veil followed by 2 ounces or more of chopped strand roving. In addition, the vertical mounting flange (return flange on launder mount applications) shall be reinforced with one layer of 24 oz woven roving.
- E. No other glass product is permitted between these layers. All factory-trimmed edges shall be "hot coated" with resin to prevent wicking.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION**

- A. The installation contractor shall field verify existing dimensions and install the baffle in accordance with the contract drawings, approved shop drawings and manufacturer's recommendations. Mounting holes shall be factory drilled. Field cutting of baffle panels will be allowed to complete the structure and accommodate in-tank obstructions. All field cut or drilled edges shall be coated per the manufacturer's recommendations to prevent fiber blooming or fraying. All of the fasteners required for installation shall be supplied by the baffle manufacturer. The baffle panels shall be attached to the wall using 3/8" x 3-3/4" concrete expansion anchors with oversized 1/8" x 2-1/4" stainless steel washers, and hex nuts, Adjacent baffle panels are fastened together using 1/4"

bolts, 2 flat washers, lock washer, and hex nut. All of the installation fasteners shall be stainless steel.

- B. The density current baffle shall extend completely around the tank and shall be level, rigid and free of sway that could work anchors loose or cause undue wear.

**END OF SECTION**



## **SECTION 11430 FABRICATED WEIR GATE**

### **PART 1 - GENERAL**

#### **1.01 SCOPE OF WORK**

- A. The equipment provided under this section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with the drawings, specifications, engineering data, instructions, and recommendations of the equipment manufacturer unless exceptions are noted by the engineer.

Gates and operators shall be supplied with all the necessary parts and accessories indicated on the drawings, specified or otherwise required for a complete and properly operating installation, and shall be the latest standard product of a manufacturer regularly engaged in the production of fabricated water control gates.

- B. Unit Responsibility: To insure compatibility of all components directly related to the slide gates, unit responsibility for the slide gates, actuators and accessories as described in this section shall be the responsibility of the slide gate manufacturer unless specified otherwise.

#### **1.02 SUBMITTALS**

- A. Submittals shall be in accordance with Section 01300 and as specified herein. Submittals shall include as a minimum:
1. Shop Drawings
  2. Manufacturer's operation and maintenance manuals and information.
  3. Manufacturer's installation certificate.
  4. Manufacturer's equipment warranty.
  5. Manufacturer's performance affidavit.
  6. Design calculations demonstrating lift loads and deflection in conformance to the application requirements. Design calculations shall be approved by a licensed engineer (PE) and shall be available upon request.

#### **1.03 QUALITY ASSURANCE**

- A. Qualifications

1. All of the equipment specified under this Section shall be furnished by a single manufacturer with a minimum of 20-years of experience designing and manufacturing slide gates. The manufacturer shall have manufactured stainless steel slide gates of the type described herein for a minimum of 20 similar projects.
2. The sealing system shall be certified and tested for operation and performance to leakage specifications compliant with AWWA C-561 for a minimum of 100,000 cycles.
3. The project design is based on the Waterman SS-250 Series Fabricated Slide Gate as manufactured by Waterman Industries of Exeter, California. Proposed alternates must be pre-approved, per addendum, at least 10-days prior to close of bid. Requests for alternates must be supplemented with detailed drawings, specifications, and references. Any/all additional costs for structure modifications or other changes associated with utilizing a brand other than Waterman are to be borne by the contractor.
4. To insure quality and consistency, the slide gates listed in this section shall be manufactured and assembled in a facility owned and operated by the slide gate manufacturer. Third-party manufacturers contracted for fabrication and assembly of the slide gates will not be permitted.

## **PART 2 - EQUIPMENT**

### **2.01 GENERAL**

- A. The gates shall be either self-contained with yoke and bench stand operators, or non-self-contained with separate stem guides and operator, in accordance with the requirements of these specifications.
- B. The gates shall be compliant with the latest version of AWWA C561 as described below.
- C. Specific configurations shall be as noted on the gate schedule or as shown on the plans.
- D. Materials:

COMPONENTS	MATERIALS
Frame, Yoke, Cover Slide, Wall Thimbles	<b>Stainless Steel ASTM A240, Type 304</b>
Seat/Seals & Stem Sleeves	<b>Ultra High Molecular Weight Polyethylene (UHMWPE) ASTM D-4020</b>

Cord Seal	Choose an item.
Flush Bottom Seals	Choose an item.
Stems	<b>Stainless Steel: ASTM A-276, AISI Type 304</b>
Stem cover	<b>Clear Butyrate With Mylar Strip</b>
Stem Guides	<b>Stainless Steel (ASTM A-240 – Type 304L) UHMW Bushed</b>
Wall Brackets	<b>Stainless Steel: ASTM A-240, AISI Type 304L</b>
Pedestals	<b>Stainless Steel: ASTM A-240/A-312, AISI Type 304</b>
Fasteners and Anchor Bolts	<b>Stainless Steel: ASTM A-593 and 594, Type 304 CW</b>
Finish	Choose an item.

E. Gate Schedule:

Equipment Number	Gate Size, inch <sup>1</sup>	Gate type <sup>2</sup>	Opening Direction <sup>3</sup>	Bottom Seating <sup>4</sup>	Design Head, feet		Operator Type
					Seating	Unseating	

Notes:

1. Clear opening width by height.
2. E = embedded frame, W = wall mounted, Y = self-contained, F = flatback
3. U = upward, D = downward
4. FB = flush bottom

## 2.02 FRAME AND GUIDE RAILS

- A. The gate frame shall be composed of stainless steel guide rails with UHMW seat/seals upstream and downstream. The seat/seals shall form a tight seal between the frame and the slide (disc). The guides will be of sufficient length to support ½ the height of the slide when in the full open position.

- B. Yoke shall not deflect more than  $1/360^{\text{th}}$  of the span under full head break load.
- C. Seals shall be replaceable without removing the frame from the wall. In the case of embedded gates, they shall be constructed in a manner that allows replacement of the seals without removal of the gate frame from the embedment.

## **2.03 STEM AND STEM GUIDE**

- A. Material
  - 1. The stem shall be solid stainless steel of the specified grade.
- B. Design
  - 1. Guides shall be adjustable with split stem sleeves. Guides shall be spaced per the manufacturer's recommendations. The stem L/r ratio shall not exceed 200.
  - 2. Stem threads shall be machine-cut 29-degree full Acme or stub Acme type.
  - 3. Nominal diameter of the stem shall not be less than the crest of the threaded portion.

## **2.04 SEALS**

- A. The seals shall be self-adjusting. Seals requiring periodic maintenance and adjustments to maintain specified leakage rates will not be permitted.
- B. The top seal design on upward opening gates consisting of four side seals shall incorporate a self-cleaning wiping function that prevents debris from building-up above the top seal and causing premature wear of the seats, seals, and gate face.
- C. The UHMW seats shall impinge on the slide (disc) by way of a continuous loop cord seal. Seal designs incorporating resilient seals such as "J-bulb" or "P" seals that come in direct contact with the friction surface of the slide will not be considered.
- D. The cord seal shall function as a seal between the frame and the UHMW, and as a spring force to maintain contact between the UHMW and the slide (disc).
- E. The resilient bottom seal shall be set into the invert member of the frame which shall be formed in a manner to protect 3 sides of the seal only exposing the side that will come in contact with the slide. Disc-mounted invert seals exposing additional surface area will not be permitted.
- F. The self-adjusting seal system shall provide an allowable leakage rate of no more than  $\frac{1}{2}$  AWWA leakage rate per minute per peripheral foot of perimeter opening for seating and unseating heads.

## **2.05 SLIDE COVER (DISC)**

- A. The slide cover (disc) shall be stainless steel plate reinforced with structural shapes welded to the plate.
  - 1. The slide cover shall not deflect more than 1/720th of the span, or 1/16" at the seated sealing surface of the gate under maximum specified head.
  - 2. The stem to gate connection shall be either the clevis type, with structural members welded to the slide and a bolt or bolts to act as a securing method, or a threaded and bolted (or keyed) thrust nut supported in a welded nut pocket.
  - 3. The clevis, or pocket and yoke, of the gate shall be capable of taking, without damage, at least twice the rated thrust output of the operator at 40 pounds of pull on a hand wheel or hand crank, and at locked-rotor stall of a motor operator.
  - 4. The slide cover shall be constructed with vertical and horizontal reinforcement ribs.
  - 5. All welds shall be performed by an AWS-certified welding technician.

## **2.06 ANCHOR BOLTS**

- A. Anchor hardware shall be provided by the slide gate manufacturer.
  - 1. The size, quantity, and location of the anchor hardware shall be engineered by the slide gate manufacturer. Upon client request manufacturer shall provide calculations for anchor bolt sizing and quantity.
  - 2. Anchor hardware consisting of studs, nuts and washers shall be provided by the manufacturer.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION**

- A. Installation of the gates shall be performed in accordance with standard industry practices. It shall be the responsibility of the CONTRACTOR to handle, store, and install the equipment specified in this Section in strict accordance with the Manufacturer's recommendations.
- B. The CONTRACTOR shall review the installation drawings and installation instructions prior to installing the gates.
- C. The gate frames shall be installed in a true vertical plane, square and plumb, with no twist, convergence, or divergence between the vertical legs of the guide frame.

- D. The CONTRACTOR shall fill any void between the guide frames and the structure with non-shrink grout as shown on the installation drawing and in accordance with the grout manufacturer's recommendations.
- E. The frame cross rail shall be adjusted as required to maintain consistent seal compression across the full width of the gate.

### **3.02 FIELD TESTING**

- A. After installation, all weirs will be field tested in the presence of the ENGINEER and OWNER to ensure that all items of equipment are in full compliance with this Section. Each gate assembly shall be water tested by the CONTRACTOR at the discretion of the ENGINEER and OWNER, to confirm that leakage does not exceed the specified allowed leakage.

**END OF SECTION**

**SECTION 15062**  
**DUCTILE IRON PIPE AND FITTINGS**

**PART 1 – GENERAL**

**1.01 SCOPE OF WORK**

- A. Furnish all labor, materials, equipment and incidentals required and install, in the locations inside and under buildings and structures as shown on the Drawings, all ductile iron piping, cast iron fittings and appurtenances as specified herein.
- B. Provide ductile iron pipe as shown on the Drawings. All above ground flanged pipe shall be ductile iron pipe unless otherwise noted. This section will govern for all Process Piping. See Section 15400 for general plumbing and Section 02540 for Water System Specification.

**1.02 RELATED WORK**

- A. Excavation, backfill, fill and grading for pipe is included in Section 02315.
- B. Yard piping is included in Section 02500.
- C. Concrete work is included in Division 3.
- D. Painting, except as specified herein, is included in Section 09900.
- E. Valves and appurtenances are included in Section 15100.
- F. Pipe hangers and supports are included in Section 15094.

**1.03 DESCRIPTION OF SYSTEMS**

- A. Piping shall be installed in those locations shown on the Drawings.
- B. The equipment and materials specified herein are intended to be standard types of ductile iron pipe and cast-iron fittings for use in transporting water.

**1.04 QUALIFICATIONS**

- A. All of the ductile-iron pipe and cast-iron fittings shall be furnished by manufacturers who are fully experienced, reputable, and qualified in the manufacture of the materials to be furnished. The pipe and fittings shall be designed, constructed, installed in accordance with the best practices and methods and shall comply with these Specifications as applicable.

## **1.05 SUBMITTALS**

- A. Submit to the Engineer within thirty (30) days after execution of the Contract a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.
- B. All ductile-iron pipe and cast-iron fittings to be installed under this Contract shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured. Furnish in duplicate to the Engineer sworn certificates of such tests and their results. In addition all ductile-iron pipe and cast-iron fittings to be installed under this Contract may be inspected at the foundry for compliance with these Specifications by an independent testing laboratory selected by the Owner. The manufacturer's cooperation shall be required in these inspections. The cost of foundry inspection requested by the Owner of all pipe approved for this Contract, will be borne by the Owner.
- C. Shop Drawings including layouts within, and under buildings and structures shall be submitted to the Engineer for approval in accordance with General Conditions and Section 01300 and shall include dimensioning, fittings, locations of valves and appurtenances, joint details, methods and locations of supports and all other pertinent technical specifications for all piping to be furnished. Types and locations of pipe hangers and/or supports shall be shown on the piping layouts. Shop drawings shall be prepared by the pipe manufacturer.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Ductile-iron pipe shall meet the following requirements:
  - 1. Flanged ductile-iron pipe shall conform to current AWWA/ANSI Specification C115/A21.15 with factory applied screwed long hub flanges except as otherwise specified under AWWA/ANSI C110/A21.10. Flanges shall be faced and drilled after being screwed on the pipe, with flanges true to 90 degrees with the pipe axis and shall be flush with end of pipe conforming to ANSI B16.1, 125 pound std.
  - 2. Mechanical-joint ductile-iron pipe shall be as specified for the flanged pipe except the joints shall conform to ANSI Specification A21.11 as applicable. Mechanical-joint pipe shall be furnished with sufficient quantities of accessories as required for each joint.



3. Pipe for use with split-type flexible coupling joints shall have radius grooved ends.
4. Fittings shall be cast-iron as specified herein. Flanges and flanged fittings shall be flat face and shall conform to AWW/AANSI C110/A21.10 or AWWA/ANSI C153/A21.53 for 150 psi pressure rating. Full face type 1/16-inch thick rubber ring gaskets shall conform to AWWA C111 and equal to "Rainbow."
5. Wall castings shall be of the size and types shown on the Drawings and be hot dipped galvanized. Seal strips, where required on the Drawings, shall be Link Seal as manufactured by Thunderline Corp., Wayne, Michigan, or equal with 18-8 stainless steel bolt and nut.
6. All pipe shall have a minimum pressure rating as indicated below, unless otherwise noted:

<u>Pipe Dia. (in.)</u>	<u>Pressure Rating (psi)</u>
4 – 12	350
14 – 20	250
24	200
30 – 64	150

7. Pipe and fittings shall be standard thickness cement mortar lined and bituminous seal coated on the inside in accordance with ANSI Specification 21.4. A plus tolerance of 1/8-in will be permitted.
8. All pipe and fittings shall be coated as specified in Section 09900.
9. Bolts, washers and nuts on flanged fittings shall be Grade B, ASTM A-307, 304 stainless steel and conform to ANSI B16.1 for Class 125.

## **PART 3 - EXECUTION**

### **3.01 HANDLING PIPE AND FITTINGS**

- A. Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe or coatings. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying, and no piece shall be installed which is found to be defective. Any damage to the pipe coatings shall be repaired as directed by the Engineer.
- B. All pipe and fittings shall be subjected to a careful inspection and hammer test just prior to being laid or installed.

- C. If any defective pipe is discovered after it has been installed it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional expense to the Owner. All pipe and fittings shall be thoroughly cleaned before installation and shall be kept clean until they are used in the work.

### **3.02 INSTALLING INTERIOR DUCTILE-IRON PIPE AND FITTINGS**

- A. All piping and fittings shall be installed true to alignment and rigidly supported. Thrust anchors shall be provided where required.
- B. Sleeves shall be installed of proper size for all pipes passing through the floors or walls as shown on the Drawings. Where indicated on the Drawings or required for liquid or gas-tightness the pipe shall be sealed with a mechanical seal equal to Link-Seal as manufactured by Thunderline Corp., Wayne, Michigan.
- C. Concrete inserts for hangers and supports shall be furnished and installed in the concrete as it is placed. The inserts shall be in accordance with the requirements by the piping layout and jointing method and their locations shall be verified from approved piping layout drawings and the structural drawings. Pipe hangers and supports are specified in Section 15094.
- D. Except as otherwise shown on the Drawings flanged joints shall be used.
- E. Flanged joints shall be made with bolts, bolt studs with a nut on each end, or studs with nuts where the flange is tapped. The number and size of bolts shall conform to the same American Standard as the flanges. Bolts and nuts shall, except as otherwise specified or noted on the drawings, be Grade B conforming to the ASTM Standard Specification for Low-Carbon Steel, Externally and Internally Threaded Standard Fasteners, Designation A307-68. Bolt studs and studs shall be of the same quality as machine bolts. Gaskets shall be full ring gaskets of rubber with cloth insertion. Gaskets 12-inches in diameter and smaller shall be 1/16-inch thick; larger than 12 inches in diameter and 3/32-inch thick.
- F. Prior to assembly of split couplings, the grooves as well as other parts shall be thoroughly cleaned. The ends of the pipes and outside of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap, or graphite paste, and the gasket shall be slipped over on pipe end. After the other pipe has been brought to the correct position, against the pipes. The housing sections then shall be placed. After the bolts have been inserted, the nuts shall be tightened until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.
- G. All valves, fittings, equipment, and appurtenances needed upon the pipelines shall

be set and jointed as indicated on the Drawings or as required. Valves and appurtenances are included in Section 15100. All pipe and appurtenances connected to equipment shall be supported in such a manner as to prevent any strain being imposed on the equipment. When manufacturers have indicated requirements that piping loads shall not be transmitted to their equipment, a certification shall be submitted stating that such requirements have been complied with.

### **3.03 TESTING**

- A. Hydrostatic pressure and leakage tests of all interior pressure lines shall conform with Section 4 of AWWA C600-77 with the exception that the Contractor shall furnish all gauges, meters, pressure pumps and other equipment needed to test the line.
  - 1. The pressure required for the field hydrostatic pressure test shall be 50% above the normal working pressure but not less than 150 psi unless approved by the Engineer. The Contractor shall provide temporary plugs and blocking necessary to maintain the required test pressure. Corporation cocks at least 3/4-inches in diameter, pipe riser and angle globe valves shall be provided at each pipe dead-end in order to bleed air from the line. Duration of pressure test shall be at least 24 hours. The cost of these items shall be included as a part of testing.
  - 2. The leakage test shall be a separate test at the maximum operating pressure as determined by the Engineer following the pressure test and shall be of not less than 2 hours duration. All leaks evident at the surface shall be repaired and leakage eliminated regardless of total leakage as shown by test. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are complied with. Defective materials, pipes, valves and accessories shall be removed and replaced. The pipe lines shall be tested in such sections as may be directed by the Engineer by shutting valves or installing temporary plugs as required. The pressure shall be maintained in the pipe for the entire test period by means of a force pump to be furnished by the Contractor. Accurate means shall be provided for measuring the water required to maintain this pressure. The amount of water required is a measure of the leakage.
  - 3. The amount of leakage and pressure variation which will be permitted shall be in accordance with AWWA C600 Standards.
- B. The Contractor must submit his plan for testing to the Engineer for review at least ten (10) days before starting the test. The Contractor shall remove and adequately dispose of all blocking material and equipment after completion and acceptance of

the field hydrostatic test, unless otherwise directed by the Engineer. Any damage to the pipe coating shall be repaired by the Contractor. Lines shall be totally free and clean prior to final acceptance.

### **3.04 CHLORINATION OF POTABLE WATER PIPELINES**

OMITTED

### **3.05 SURFACE PREPARATION AND PAINTING**

- A. All piping and fittings exposed to view shall have its surface prepared and be painted as specified in Section 09900. Surface preparation and shop priming is a part of the work of this Section. Pipe marking is included in Section 09900, but it shall be part of the work of this Section to assist as required by the Engineer in identifying pipe contents, direction of flow and all else required for proper marking of pipe.

**END OF SECTION**

**SECTION 15100**  
**VALVES AND APPURTENANCES**

**PART 1 – GENERAL**

**1.01 SCOPE OF WORK**

- A. Furnish all labor, materials, equipment and incidentals required and install complete and ready for operation all valves and appurtenances as shown on the Drawings and as specified herein.
- B. All valves complete with pneumatic or manual operators as required shall be furnished by a single manufacturer and shall be coordinated with instrumentation and controls furnished under Sections 13400.

**1.02 RELATED WORK**

- A. Yard piping and valves are included in Division 2.
- B. Piping is included in the respective Sections of Divisions 2 and 15.
- C. Pipe Hangers and supports are included in Section 15094.
- D. Electrical is included in Division 16.

**1.03 DESCRIPTION OF SYSTEMS**

- A. All of the equipment and materials specified herein are intended to be standard for use in controlling the flow of water, sludge, chemicals, etc., depending on the applications.

**1.04 QUALIFICATIONS**

- A. All of the types of valves and appurtenances shall be products of well established reputable firms who are fully experienced, reputable and qualified in the manufacture of the particular equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these specifications as applicable.

**1.05 SUBMITTALS**

- A. Submit to the Engineer within 30 days after execution of the contract a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.

- B. Complete shop drawings of all valves and appurtenances shall be submitted to the Engineer for approval in accordance with the requirements by Section 01300 and the General Conditions.

## **1.06 TOOLS**

- A. Special tools, if required for normal operation and maintenance shall be supplied with the equipment.

## **PART 2 – PRODUCTS**

### **2.01 GENERAL**

- A. All valves and appurtenances shall be of the size shown on the shall be from one manufacturer.
- B. All valves and appurtenances shall have the name of the maker and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.

### **2.02 GATE VALVES**

- A. Three (3) Inches and Larger:
  - 1. Shall be cast iron or Ductile iron body, bronze mounted, resilient wedge design, with non-rising stems, conforming to AWWA C-509. They shall have ends to match the pipe to which they are attached. Valves 3" through 12" shall have a working pressure of 200 psi and be tested at 400 psi. Gate valves shall be M & H Style 4067, or approved equal.
  - 2. Valves shall be furnish with "O" ring packing. Two (2) "O" rings shall be located above the thrust collar and one (1) "O" ring below. The thrust collar shall be permanently lubricated and have an anti-frication washer on top of the thrust collar.
  - 3. Valves installed in pits or above ground shall be furnished with hand wheels. Buried valves shall be furnished with square operating nuts.
  - 4. Valve boxes and markers shall be provided for all buried valves. Boxes shall be mounted flush with ground surface.
- B. 2-1/2 Inches and Smaller:

1. Gate valves (2-1/2 inches) shall be designed for a working pressure of not less than 250 psi. They shall be a resilient wedge type with ductile iron body. Valves shall be similar in design, construction and materials to ACIPCO Series 2500 with MJ hardware provided.

### **2.03 BALL VALVES FOR PVC PIPE**

- A. Ball valves for PVC pipe shall be of PVC Type 1 with union, socket, threaded or flanged ends as required. Ball valves shall be full port, full flow, all plastic construction, 150 psi rated with teflon seat seals, O-ring and T-handles. Valves shall be double (true) union type. PVC ball valves shall be as manufactured by Celanese Piping Systems, Inc., Wallace and Tiernan Inc., Plastiline, Inc., or equal.
- B. All valves shall be mounted in such a position that valve position indicators are plainly visible when standing on the floor.

### **2.04 BALL VALVES (3-inches and smaller)**

- A. Ball valves 3-in and smaller shall be bronze, or carbon steel body; full bore, fire safe, rated for pressure of 250 psi. Valve ends shall be flanged, threaded, or soldered as required. All valves furnished shall be by the same manufacturers.
- B. The design of the valve shall provide suitable seating in both directions. To compensate for wear on the seating surfaces, the valve shall utilize a separate ball and stem design which will allow the ball to float freely under pressure against the downstream seat and seal tightly under all service conditions. The stem shall be designed to prevent blowout. Ball valves shall have Type 316 stainless steel balls and trim, RTFE seats and RTFE stem packing.
- C. The valves shall not require lubrication but shall have stuffing boxes which can be packed with the valve in service without undue leakage.
- D. Valves shall be furnished with lever actuator attached to each valve.
- E. Valves shall be "Apollo" series as manufactured by Conbraco Industries, Inc.

### **2.05 CHECK VALVES**

- A. Check valves for cast iron, ductile iron and steel pipelines shall be swing type and shall meet the material requirements of AWWA Specification C508. The valves shall be iron body, bronze mounted, single disc, 150 psi working water pressure, nonshock, and hydrostatically tested at 300 psi. Ends shall be 125 lb ANSI B16.1 flanges.

1. When there is no flow through the line the disc shall hang lightly against its seat in practically a vertical position. When open, the disc shall swing clear of the waterway.
  2. Check valves shall have bronze seat and body rings, extended bronze hinge pins and bronze nuts on the bolts of bolted covers or 304 SS.
  3. The disc seal and disc coating shall be resilient EPDM material design for drip-tight shut off. The seal shall be replaceable without special tools.
  4. Valves shall be so constructed that disc and body seat may easily be removed and replaced without removing the valve from the line. Valves shall be fitted with an extended hinge arm with outside lever and spring. Springs with various tensions shall be provided and springs approved by the Engineer shall be installed. Swing Check Valves shall be by Pratt, Val-Matic, or approved equal.
- B. Check valves 2-in and smaller for installation in copper and steel pipes shall be bronze, ball or swing type, as indicated on the drawings, 125 lb WSP with solder or screwed ends.
- C. Check valves for PVC pipe shall be of PVC Type 1, Series BC with union, socket, threaded or flanged ends as required. PVC ball check valves shall be as manufactured by Celanese Piping Systems, Inc., Wallace and Tiernan Inc., Plastiline, Inc., or equal.
- D. Dual Wafer Check Valves (if specifically referred to in drawings): Valve shall be iron body bronze mounted with Buna N Seats and aluminum bronze plates. The body shall be plain faced for installation between 2 flanges. The hinge pin and spring shall be 316 stainless steel. Dual wafer check valves shall be by Pratt, Val-Matic, or approved equal.

## **2.06 BACK PRESSURE SUSTAINING VALVE**

- A. The wastewater back pressure sustaining valve is a combination direct acting and hydraulically operated control valve using a hydraulic self-contained oil cylinder as a dampening device. The valve shall be normally closed and shall open when the inlet pressure exceeds the spring setting. The valve will modulate between 0% and 100% open in order to assure the valve's inlet pressure does not fall below the set point. The valve shall close at a slow and controlled speed, which is field adjustable, via the self-contained hydraulic oil cushioned cylinder.
- B. The back pressure sustaining valve shall be globe (inline) or angle (90 degree) body with flanged end connections. It shall contain a single full-ported seat, with seat



bore equal to size of valve. The minimum travel of the piston shall be equal to 25% of the diameter of the seat. For true alignment (to correct lateral thrust and stem binding, the piston shall be guided above the seat at a distance equal to no less than 75% of the diameter of the seat. The piston shall be cushioned and so designed as to ensure positive closure. The main valve shall be packed with a resilient seat packing and Buna o-ring seals to ensure tight closure and prevent metal to metal friction and seating. The design shall be such that repairs and dismantling internally of the main valve may be made without its removal from the line.

- C. The springs shall be enclosed in a protective chamber and shall be concentric to the valve piston to ensure proper alignment. A mechanical scraper ring shall be utilized to protect the internal seals. The valve shall be furnished with an inlet side gauge-cock for receiving gauges and testing purposes. The external controls and all associated rigid brass piping and fittings necessary for proper operation (except the oil for the hydraulic chamber) shall be factory assembled and furnished with the valve.
- D. The valve body and caps shall be constructed of gray iron castings that conform to ASTM specification A 126 Class B. Internal bronze components shall conform to ASTM Specification B-584. Internal stainless steel components shall conform to ASTM Specification A-743 Grade CF-8 or CR-8M. The control piping shall be rigid red brass, no less than 0.5" in diameter.  
The seat ring shall be grade 300 series stainless steel and shall be held in place via grade 300 series stainless steel fasteners. The seat support assembly shall be grade 300 series SS.  
The flanges assemblies shall conform to ANSI standards for wall thickness of body and caps, and flange thickness and drilling, subject to other specified standards.
- E. Ferrous surfaces of the valve shall be coated with NSF Certified Epoxy (Tnemec Series N140F) in accordance with ANSI/NSF Std. 61, and conforming to AWWA D102 Inside System No. 1.
- F. A trio of test shall be performed on the completely assembled valve prior to shipment. These shall include a hydrostatic test of up to two(2) times the working pressure (Max 500 psi test), a tight seating test, and a performance test for simulated field conditions.
- G. The valve shall be equal to Model 701SWR-BP as manufactured by Ross Valve Mfg. Co, Inc.

## **2.07 BUTTERFLY VALVES**

OMITTED

## **2.08 DIAPHRAGM VALVES (PVC)**

OMITTED

## **2.08 PLUG VALVES**

All plug valves shall be of the non-lubricated, eccentric type. Port areas shall be at least 80 percent of full pipe area. Valve body construction shall be of high tensile strength cast alloy iron conforming to ASTM A126, Class B, with a minimum working Pressure rating of 150 psi. All end connections shall be flanged and shall be faced and drilled in accordance with ANSI B16.1 for 125 pound flanges. Three way valves shall be furnished for the positions shown in the valve schedule.

Valve seats shall have a welded-in overlay of not less than 90 percent pure nickel on all surfaces contacting the plug face. All valves shall have stainless steel or phenolic backed Teflon permanently lubricated upper and lower plug stem bushings. Valves shall be of the bolted bonnet design and shall be designed so that they can be replaced without removing the bonnet from the valve. All nuts, bolts, springs and washers shall be cadmium plated.

Valve plugs shall be furnished with resilient Hycar or Buna type rubber compound facings that shall be suitable for use with sewage sludges, and shall be resistant to mineral oils, vegetable oils, and animal fats and grease.

### **A. Manual Valve Actuators:**

1. Submerged plug valves shall be equipped with an extended shaft and operating nut for operation from above the tank surface. Also furnish a tee type operating wrench for each group of valves. Furnish and install stem guides and floor boxes as required. Floor boxes shall be Clow F-5690, DeZurik Figure 348, or equal.
2. Actuators on plug valves within the structures shall be of the enclosed worm gear type suitable for running in oil. Actuators shall be submersible with seal provided on all shafts to prevent entry of water into the actuator or leakage of oil from the actuator. Gears and shafts shall be heavy duty and shaft bushing shall be heavy duty and shaft bushing shall be of corrosion-resistant, permanently-lubricated bronze.

3. Actuators shall clearly indicate valve position and an adjustable stop shall be provided to set closing torque. Valve packing adjustment shall be accessible without disassembly of the actuator.
4. Hand wheels or chain wheels shall be furnished as required and as specified hereinbefore, and floor stands for operators shall be provided as shown.

## **2.10 NEEDLE VALVES**

OMITTED

## **2.11 STEM GUIDES**

- A. Adjustable stem guides of the wall bracket type shall be provided as shown on the Drawings. The guide where the extension stem passes through shall be bronze bushed. Stem guide shall be Model F5660 as manufactured by Clow Corporation, Bensenville, Illinois, equal Rodney Hunt Company, Orange, Massachusetts, or equal.

## **2.12 AIR RELEASE VALVES**

- A. The air release valves shall be installed as shown on the Drawings. The valves shall have a cast iron body, cover and baffle, stainless steel float, 316 SS water diffuser Buna-N or Viton seat and stainless steel trim. Valves shall be provided with a vacuum check to prevent air from reentering the line. All internal components shall be 316 SS. All ferrous surfaces shall be fusion bonded epoxy coated. The fittings shall be threaded. The air release valves shall be Model 200WD as manufactured by APCO Valve and Primer Corporation, Schaumburg, Illinois; Model 45VC by Val-Matic Valve and Manufacturing Corporation, Lyons, Illinois or equal.

## **2.13 PRESSURE REDUCING VALVES**

OMITTED

## **2.14 AIR PRESSURE REGULATION STATION**

OMITTED

## **2.15 SOLENOID VALVES**

OMITTED

## **2.16 VALVE BOXES**

- A. All buried valves shall have cast iron two or three piece valve boxes with cast iron

covers. Valve boxes shall be provided with suitable heavy bonnets and to extend to such elevation at or slightly above the finished grade surface as directed by the Engineer. The barrel shall be one or two-piece, screw type, having 5-1/4-inch shaft. The bottom of the lower section shall enclose the operating nut of the valve. Covers shall have "WATER" cast into the top for all water mains and "DRAIN" cast into the top of all drain line. All valves shall have actuating nuts extended to within six inches of the top of valve box cover.

- B. Valve boxes shall be provided with concrete base and valve nameplate with suitable anchors for casting in concrete. Nameplate shall be 3-inch diameter bronze disk with raised lettering 1/8-inch high as shown on the Drawings and manufactured by Shiedow Bronze Corporation, Kingwood, W. VA; or equal.

## **2.17 CORPORATION COCKS**

- A. Corporation cocks for connections to cast-iron, ductile iron or steel piping shall be all brass or bronze suitable for 150 psi operating pressure and similar to Mueller Co. H-10046 or equal by Clow Corp., and shall be of sizes required and/or noted on the Drawings.

## **2.18 EXPANSION JOINTS**

- A. Expansion joints shall be manufactured of molded EPDM with filled triple arches. Joints shall be reinforced with galvanized 3/8-inch split steel retaining rings placed directly against the inside of the flanged to prevent damage to the rubber surface when the bolts are tightened. Expansion joints shall be suitable for buried service or above ground service. Flanges shall be drilled to ANSI 125#. Working pressures as follows:

Size	Pressure
1"-4"	165#
5"-12"	140#
14"	85#
16"-24"	65#
26"-66"	55#

- B. Maximum temperature shall be 180 degrees F and shall be capable of a maximum 1-1/2-inch lateral movement. Expansion joints shall be Model J-I as manufactured by the Red Valve Company, or provided by EVR.

## **2.19 FLANGED ADAPTORS**

- A. Flanged adaptors where shown on the Drawings shall be "Uni-Flange" as manufactured by Uni-Flange Corporation, Series 400.
- B. Flange shall be ductile iron designed to meet the requirements of ANSI D16. Set screw shall be AISI 4140 steel, heat treated, zinc
- C. Where shown on the Drawings adaptor shall be harnessed.

## **2.20 FLEXIBLE COUPLINGS**

- A. Flexible couplings shall be either the split type or the sleeve Type as shown on The Drawings.
  - 1. Split type coupling shall be used with all interior piping and with exterior piping as noted on the Drawings. The couplings shall be mechanical type for radius groove piping. The couplings shall mechanically engage and lock grooved pipe ends in a positive couple and allow for angular deflection and contraction and expansion.
  - 2. Couplings shall consist of malleable iron, ASTM Specification A47, Grade 32510 housing clamps in two or more parts, a single chlorinated butyl composition sealing gasket with a "C" shaped cross-section and internal sealing lips projecting diagonally inward, and two or more oval track head type bolts with hexagonal heavy nuts conforming to ASTM Specification A183 and A194 to assemble the housing clamps. Bolts and nuts shall be hot dipped galvanized after fabrication.
  - 3. Victaulic type couplings and fittings may be used in lieu of flanged joints if approved by the Engineer. Pipes shall be radius grooved as specified for use with the Victaulic couplings. Flanged adapter connections at fittings, valves, and equipment shall be Victaulic Vic Flange Style 741, equal by Gustin-Bacon Group, Division of Certain-Teed Products, Kansas City, Kansas, or equal.
  - 4. Sleeve type couplings shall be used where shown on the Drawings. The couplings shall be of steel and shall be Dresser Style 38, Smith Blair Style 413, Baker Allsteel, or equal. The coupling shall be provided with hot dipped galvanized steel bolts and nuts unless indicated otherwise.
  - 5. All couplings shall be furnished with the pipe stop removed.
  - 6. Couplings shall be provided with gaskets of a composition suitable for exposure to the liquid within the pipe.

## **2.21 FLEXIBLE CONNECTORS**

- A. Flexible connectors shall be constructed of bronze hose and braid with female copper tube sweat fittings brazed on each end. Connectors shall be Style BF as manufactured by Vibration Mountings and Controls, Inc., Butler, N.Y., equal by American, Waterbury, Conn., or equal.

## **2.22 STRAINERS**

- A. Strainers shall be installed as shown on the Drawings and shall be of the "Y" type. Strainers shall have bronze bodies with a removable bronze screen and shall be as manufactured by Mueller Steam, Mineola, New York, Watts Regulator Company, Lawrence, Mass., or equal.

## **2.23 ROTAMETER**

- A. Rotameters shall generally be provided by the chemical equipment supply to be installed on the drawings. The meter sight tube shall be constructed of impact resistant glass with a cast bronze body. Maximum pressure loss shall be 50 inches of water. The rotameter shall be similar to Model 10A2235A - Rotosight Catalog Number 2235597 by Fischer & Porter, Warminster, Penna. or equal.

## **2.24 DIAPHRAGM SEALS**

- A. Diaphragm seals shall be installed on pressure gauge connection to all sludge, chemical and air lines where shown on the Drawings, to protect pressure switches used to monitor excessive pressures on sludge, chemical and air lines. The diaphragm shall be "thread attached" to both piping and pressure switches. Diaphragm seals shall be constructed of cadmium plated carbon steel, except for the lower housing which shall be specifically chosen according to the fluid pressure being monitored.
- B. Diaphragm seals shall have a flushing connection and #. Type SB by Mansfield and Green; No. 877 Terice; Marshalltown; or equal.

## **2.25 SLEEVES**

Pipes passing through floors, walls or roof slabs shall be provided with sleeves and seals as shown on the Plans and as specified herein, unless otherwise indicated.

- A. Non Watertight Sleeves

Pipes passing from one occupied area to another within the building where a watertight sleeve is not required shall have sleeves as follows:

1. Horizontal piping passing through masonry, concrete wall, partitions or beams shall be provided with sleeves made up of standard steel pipe, hot dip galvanized after fabrication, 1/2-inch larger in diameter than the outside diameter of the pipe, of length to end flush with the finish on the wall surface and centered accurately to dimensions where shown and, where not, plans are to be scaled. If the pipe has insulation specified to pass through the sleeves, the sleeves shall be enlarged accordingly.
2. Vertical piping passing through floor slabs laid on earth shall be cast in the floor slab.

B. Watertight Seals & Sleeves

1. Watertight seals shall be modular, mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and the wall opening. The elastomeric element shall be sized and selected per manufacturer's recommendations and have the following properties as designated by ASTM. Coloration shall be throughout elastomer for positive field inspections. Each link shall have a permanent identification of the size and manufacturer's name molded into it. Seals shall be by Link-Seal Model LS-400S-316.
  - a. For standard service applications = Model C -40 to +250°F (-40 to +121°C) EPDM = ASSTM D2000 M3 BA510 Color = Black.
2. Wall openings up to 24.81" diameter shall have a molded non-metallic high density polyethylene Model CS Century-Line sleeves as manufactured by PSI-Thunderline/Link-Seal. Model CS sleeves shall have integrally formed hollow water stop sized having a minimum of four inches larger than the outside diameter of the sleeve itself and allowing ½" movement between wall forms to resist pour forces. Each sleeve assembly shall have end caps manufactured of the same material as the sleeve itself and installed at each end of the sleeve so as to prevent deformation during the initial concrete pour, and to facilitate attaching the sleeve to the wall forms. End caps shall remain in place to protect the opening from residual debris and rodent entry prior to pipe insertion.
3. For wall openings larger than 29.25", the Contractor shall install Cell-Cast disks, providing a round hole in conformance with Link-Seal modular seal sizing data. Cell-Cast disks shall consist of 3" and/or 4" lightweight interlocking polyethylene cells stacked to form the thickness of the poured concrete wall. Molded into each cell shall be a cavity to accept a 2"x4" nailer.

## **2.26 BLIND FLANGES**

- A. Blind flanges shall be provided at the locations shown on the Plans, and shall be installed with a full face gasket, bolts and nuts. Blind flanges shall be drilled and faced to match the flange to which they are installed, and shall be equal to Clow F-1915, American Cast Iron Pipe A-30880, or equal.

## **2.27 UNIONS**

- A. Unions on ferrous pipe 2 inches in diameter and smaller shall be 150 pounds malleable iron, zinc-coated. Unions on water piping 2-1/2 inches in diameter and larger shall be flange pattern, 125-pound class, zinc-coated. Gaskets for flanged unions shall be of the best quality fiber, plastic, or leather. Unions shall not be concealed in walls, ceilings, or partitions.

## **2.28 HOSE BIBBS**

- A. Hose bibbs shall be brass, polished chromium plated, as manufactured by Chicago Faucet Company. Potable water bibbs shall be No. 952, 3/4-inch or 1-inch with vacuum breaker as noted on the Drawings.

## **2.29 PRESSURE GAUGES**

- A. Each pressure gauge shall be direct mounted, polished stainless steel case with a 4-1/2 inch diameter dial and furnished with an acrylic plastic window, 1/2 inch shutoff valve, a 316 stainless steel snubber and be glycerin filled with bronze or stainless steel tube. All gauges shall be weatherproofed. The face dial shall be white finished aluminum with jet black graduations and figures. The face dial shall indicate the units of pressure being measured (e.g. feet, inches, etc.) or be dual scale. Socket material shall be bronze. Each gauge shall have a +/- 0.5 percent accuracy (Grade 2A).
- B. Pressure gauges shall be equal to Ashcroft, US Gauge, or approved equal. Ranges shall be suitable to the application and will be as approved by the Engineer.

## **2.30 MUD VALVES**

- A. The mud valves shall be of the nonrising stem type, with cast iron body and flanged ends. The stem, stem nut, stop collar, disc ring and seat ring shall be bronze. Bolts and nuts shall be stainless steel Type 316. Where shown on the Drawings, valves shall be equipped with Type 304 stainless steel extension stem and crank operated offset-type floor stand. The distance from the bottom face of the flange to the operator shall be as shown on the Drawings.



- B. The mud valves shall be Model OS 5002 as manufactured by Rodney Hunt Company, Orange, Massachusetts, equal by Clow Corporation, or equal.
- C. Stem guides shall be provided as required as recommended by the manufacturer to prevent damage to the valve or stem. Stem guides shall be cast iron, bronze bushed, mounted on cast iron brackets.

### **2.31 TELESCOPIC VALVES**

- A. Telescopic valves shall be of the non-rising stem type and designed to provide a vertical travel as shown on the Drawings. The valve shall consist essentially of a hot dip galvanized fabricated steel floorstand incorporating a 1-1/8" diameter brass ACME threaded nonrising lifting stem and a travel indicating device calibrated in 1/2" increments, geared down so that the full travel registers on a 3'-0" scale 18" diameter cast iron handwheel, 3/16" thick wall, fabricated type 316L stainless steel tube, and tube guide collar with Neoprene gasket.
- B. The sliding valve tube shall be accurately fabricated and arranged to slide inside of the cast iron sludge draw-off pipe as shown on the Drawings.
- C. The valve tube shall have two (2) v-notched weirs located at 180° to accurately control the rate of sludge withdrawal.
- D. Anchor bolts shall be fabricated of type 304 stainless steel and furnished by the equipment manufacturer.
- E. Telescopic valves shall be as manufactured by Amwell, Waterman, Fontaine, Walker Process Equipment, Envirex Inc. or approved equal.

### **2.32 WATER COMBINATION AIR VALVES**

- A. Water combination air valves shall be provided near points shown but always at the high point of the pipeline. If the Contractor differs his/her installation from the grades shown in the profile, he/she shall provide air release valves at all high points created from these changes. No separate payment shall be made for these items. Body shall be close grained cast iron with all internal parts and float of stainless steel. The valves shall be capable of venting air from the pipeline while the pipeline is pressurized. The water combination air valve shall be single body, double orifice design. Valves shall be by APCO, or by Val-matic.

## **PART 3 – EXECUTION**

### **3.01 INSTALLATION**

- A. All valves and appurtenances shall be installed in the locations shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the Engineer before they are installed.
- B. After installation, all valves and appurtenances shall be tested at least 2 hours at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any point proves to be defective, it shall be repaired to the satisfaction of the Engineer.
- C. Install all floor boxes, brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings that are in masonry floors or walls, and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, the Contractor shall check all plans and figures which have a direct bearing on their location and he shall be responsible for the proper location of these valves and appurtenances during the construction of the structures.
- D. Pipe for use with flexible couplings shall have plain ends as specified in the respective pipe sections in Division 15.
- E. Flanged and mechanical joints under water or exposed to weather shall be made with type 304 stainless steel bolts, nuts and washers.
- F. Prior to assembly of split couplings, the grooves as well as other parts shall be thoroughly cleaned. The ends of the pipes and outside of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes. The housing sections then shall be placed. After the bolts have been inserted, the nuts shall be tightened until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.
- G. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly for a distance of 8 inches. Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6 inches from the end, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint. The other pipe end shall be inserted into the middle ring and brought to proper position in relation to the pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flares. After the bolts have been inserted and all nuts have been made up fingertight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts.

- H. Pressure gauges shall not be installed until after the substantial completion date unless otherwise requested by the Owner.
- I. Valve boxes with concrete bases shall be installed as shown on the Drawings. Mechanical joints shall be made in the standard manner. Valve stems shall be vertical in all cases. Place cast iron box over each stem with base bearing on compacted fill and top flush with final grade. Boxes shall have sufficient bracing to maintain alignment during backfilling. Knobs on cover shall be parallel to pipe. Remove any sand or undesirable fill from valve box.

### **3.02 SHOP PAINTING**

- A. Ferrous surfaces of valves and appurtenances shall receive an exterior coating of rust-inhibitive primer as specified in Section 09900. Interior coatings shall be the manufacturer's standard except that valves on raw and potable water lines shall be coated with paints approved by both EPA and AWWA for potable water service. All pipe connection openings shall be capped after shop painting to prevent the entry of foreign matter prior to installation.

### **3.03 FIELD PAINTING**

- A. All metal valves and appurtenances specified herein and exposed to view will be painted as part of the work in Section 09900. All exposed pipe joints on pipe, valves and fittings shall be caulked 360 degrees prior to painting.

### **3.04 INSPECTION AND TESTING**

- A. Completed pipe shall be subjected to hydrostatic pressure tests for four (4) hours at full working pressure. All leaks shall be repaired and lines retested as approved by the Engineer. Prior to testing, the gravity pipelines shall be supported in an approved manner to prevent movement during tests.

**END OF SECTION**