PROJECT MANUAL

Board of Water and Sewer Commissioners of the City of Mobile, Alabama

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Mobile, Alabama

for

WRIGHT SMITH WWTP PRIMARY DIGESTOR NO. 1 COVER REPLACEMENT
(SRF Funding)

SRF Project No: CS010281-23

October 2025

CONSTRUCTION DOCUMENTS



Prepared By

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GMC PROJECT NUMBER: CMOB250034

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ARCHITECTURE■ENGINEERING■ENVIRONMENTAL■GEOTECHNICAL■INTERIOR DESIGN
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BOARD OF WATER AND SEWER COMMISSIONERS

OF THE

CITY OF MOBILE, ALABAMA

STANDARD SPECIFICATIONS

FOR

WATER MAINS, SANITARY SEWERS

AND

SEWAGE PUMPING STATIONS

APRIL 1993

UPDATED MAY 2012

UPDATED MAY 2021

WRIGHT SMITH WWTP PRIMARY DIGESTER
NO. 1 COVER REPLACEMENT
SRF PROJECT NO. CS010281-23
GMC PROJECT NO. CMOB250034
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GENERAL INFORMATION AND REQUIREMENTS

1.0 BOARD'S STANDARD SPECIFICATIONS:

Copies of these Standard Specifications for Water Mains, Sanitary Sewers and Sewage Pumping Stations may be purchased from the offices of the Board of Water and Sewer Commissioners of the City of Mobile, Alabama, 4725 A Moffett Road, Mobile, AL 36618.

The standards are intended to provide a basis for system improvements that will result in facilities that will efficiently perform their intended purpose over a useful life that can be expected from the application of quality workmanship and the latest available materials and technology.

As such the standards will change from time to time. Suggestions for improving the Standards should be submitted to the Director. Complaints regarding Standards thought to be unreasonable should also be submitted to the Director, with proposed changes.

2.0 DISPOSITION OF PREVIOUS STANDARD SPECIFICATION:

Upon adoption of these Standard Specifications for Water Mains, Sanitary Sewers and Sewage Pumping Stations contained herein by the Board of Water and Sewer Commissioners of the city of Mobile, Alabama, all previously issued Standard Specifications for Water Mains, Sanitary Sewers and Sewage Pumping Stations shall be null and void. The previous Standard Specifications (dated January 1975) shall remain applicable to contracts that have been bid and for which an award has been or will be made on said Specifications.

3.0 JURISDICTION:

These Standard Specifications shall apply to all proposed water and wastewater mains to be owned, operated or maintained by the Board of Water and Sewer Commissioners of the City of Mobile, Alabama.

4.0 PURPOSE:

These Standards and Specifications are adopted to establish minimum acceptable standards for the design and construction of water distribution and transmission facilities and wastewater collection and transmission facilities owned, operated or maintained by the Board of Water and Sewer Commissioners of the City of Mobile, Alabama. Such facilities include water mains, gravity sewers, wastewater force mains, wastewater pump stations, and miscellaneous related appurtenances associated with such systems.

5.0 STANDARDS FOR PLANS:

Plans for water lines, sanitary sewers, and other appurtenances to the Board's water and sewer systems shall clearly define the Work and all details shall be in conformance with the Board's Standards.

A. Datum: All elevations on Plans are to refer to the NGV Datum, in lieu of the old Mobile City Datum. All plans submitted to the Board shall clearly state that the datum reference to NGV.

B. Locality Maps: Locality maps, showing the area of the City in which the project is located, shall be included in all sets of Plans.

C. Review and Approval of Plans: Copies of all Plans must be submitted to the Board of Water and Sewer Commissioners and to the appropriate state, federal and local agencies for review and approval before advertising and receiving bids.

D. Record Drawings: On completion of the project, the Plans are to be revised to show the work as it was actually constructed. The locations of all tees, laterals, fire hydrants, valves and other appurtenances are to be clearly shown and dimensioned and their GPS coordinates provided. Copies of the record plans and videotape as described in Section 12 are to be furnished to the Board at the time of or prior to, the Board's acceptance of the facilities.

6.0 SUBDIVISION SUBMITTAL REQUIREMENTS:

The following requirements apply to water and sanitary sewer facilities for residential and commercial subdivisions submitted to the Board for review, approval and maintenance. The Board reserves the right to accept only those developments which are connected to both water and sewer provided by MAWSS. Consideration may be made for those areas where providing both services is deemed economically unfeasible.

A. General:

1. Submit three sets of Plans which have an Alabama Registered Engineer's Seal and/or Signature and Registration Number affixed to the cover sheet of each set.

2. All material and construction shall be in strict conformance with the Board's Standard Specifications, latest revision.

3. The Board shall be furnished with permanent easements for water and sewer facilities not located in public right-of-way. The easement shall be exclusively for the use of water and sewer lines, and shall not be joint easements with drainage facilities or other utilities. The minimum width of easements shall be 20 feet for water, 30 feet for sewer, and a combined water and sewer minimum will be 30 feet. Easements shall be submitted in a form satisfactory to the Board. Easement descriptions shall be prepared by a professional land surveyor licensed in the State of Alabama, and shall conform to the Minimum Surveying Technical Standards for Land Surveying as adopted by the Alabama Board of Registration for Professional Engineers and Land Surveyors.

4. Permits required for construction of water or sewer facilities located in public right-of-way shall be obtained from the city, county or state and a copy delivered to the Board's office. Permits are to be submitted and approved prior to the start of construction.

5. The following shall be provided on submittal cover sheet:

   a. The cover sheet of the Record Drawings submitted to the Board shall include a list indicating, by line size, the length of new water and sewer lines, and number of new fire hydrants and manholes actually installed. Also, calculated peak wastewater flows from the development shall be included on Preliminary and Record Drawings. Preliminary Drawings submitted to the Board shall include calculations showing how peak flows were derived.

   b. A vicinity map showing the location of the project shall be included on the Cover Sheet.

   c. An estimated construction cost for the Project.

6. Where future phases of construction are planned, two copies of the Master Development Plan shall be submitted to the Board.

7. The Board requires that water and sewer facilities serving commercial and residential properties be designed and constructed such that they may be extended to serve any future development as a result of cutouts from or additions to the initial and subsequent developments. The total cost of water and sewer facilities to serve such cutouts, subdivisions or additions shall be at the expense of the developer. Should redesign of these facilities be required, the revised Plans shall be submitted for review and approval by the Board.

8. Record Drawings shall be provided to the Board and shall include the certification of a professional engineer registered in the State of Alabama. This certification shall state that the Work is constructed in accordance with the Record Drawings and these Standard Specifications. Internal videotape documentation of sewers shall be provided, as specified in Paragraph 12.32, "Internal Video Inspection", of these Specifications.

B. <u>Water Facilities:</u>

1. Adequate cover and clearance shall be provided for water lines where they cross sanitary and storm drainage lines. Horizontal separation provided between water and sewer lines shall comply with ADEM regulations. Maintain a 5-foot horizontal separation between water lines and storm drains.

2. Water line sizes shall be adequate for proposed and future service.

3. Fire flow calculations, and expected pressures in the line, for the proposed water system shall be submitted to the Board. The system shall be designed to maintain a minimum pressure of 20 psi at all points in the distribution system under all conditions of flow. The minimum design flow at fire hydrants in residential subdivisions shall be 1,000 GPM. Higher design flows may be required at commercial, industrial and high density residential areas. The normal working pressure in the distribution system shall be approximately 55 psi, but in no case less than 35 psi on the downstream side of a meter. For pressures greater than 90 psi, special provisions may be required.

4. Location of fire hydrants shall be in accordance with AWWA Manual M31, latest edition.

5. Tapping of the water mains, installation of service tubing, curb stops and meter boxes in new subdivisions shall be performed by the developers Contractor and must be coordinated with the Board's Water Service Engineer. Testing and disinfection shall be performed both on the mains and service lines. The Contractor shall perform all removing and replacing of pavement and incidentals necessary for the taps.

6. Where possible, looped water systems shall be considered rather than dead end runs.

7. Portable water supply lines shall not be tied into fire lines or 6-inch fire hydrant lines.

8. Valves shall be installed on all fire line branches off the water main.

9. In cases where individual water meters are installed by other than Board, they shall comply with current purchasing standards of the Board for domestic water meters. Where water meters are installed on private drinking water wells for purposes of calculating sewer bills, the meter location shall be accessible to the Board's meter reading personnel.

10. Water pressure varies throughout the service area. Where water pressure within a building exceeds 80 psi (552kPa) static, an approved water-pressure reducing valve conforming to ASSE 1003 with strainer shall be installed to reduce the pressure in the building water distribution piping to 80 psi or less. (International Plumbing Code paragraph 604.8)

C. Sanitary Sewer Facilities: [1]

Sanitary Sewer Design

Corrosion control measures should be addressed in the design of sanitary sewer facilities. A Best Management Practice (BMP) for design of new sanitary sewer systems is to control corrosion by reducing buildup of sulfides or preventing formation of Hydrogen Sulfide. The purpose of this BMP is to emphasize proactive solutions to potential corrosion in sanitary sewer systems. Limiting the use and length of force mains is probably the single most important factor in minimizing sulfide in collection systems. Closed conduit systems, e.g. force mains, siphons, and surcharged sewers are prime generators of the reduced sulfur compounds that can lead to sulfide buildup and hydrogen sulfide formation. Often times limiting the lengths of force mains is not an option; consequently, force mains should be designed with properly placed air release and/or vacuum valves.

The most significant factor in successful interceptor design is the velocity of the wastewater. Adequate velocity is necessary to assure that deposits do not form in interceptors. The slope of gravity sewer lines shall be sufficient to provide a velocity of 2.1 fps. Minimum slopes are identified in the "Ten States Standards"; however, slopes greater than those (and velocities higher than 2.1 fps) are desirable. The pipe diameter and slope shall be selected to obtain the greatest practicable velocities to minimize settling problems. Oversize sewers will not be approved to justify using flatter slopes.

Turbulence can improve the oxygenation of wastewater flowing through a sewer system and consequently oxidize sulfide to dilute sulfate, rendering it harmless within the flow. However, turbulence can also result in severe localized sulfide release when significant concentrations of sulfide are already present in the wastewater. Turbulence in gravity sewers should generally be avoided. Potential sources of turbulence include manholes with sewer pipe discharges (both gravity and force main) above the invert, manholes with colliding flows from opposite directions, manholes with sharp bends, and sections with slopes producing critical or near-critical flow.

Odor control is not necessarily the same as corrosion control. Localized hydrogen sulfide control can be effective in controlling odors without effective, total control of sulfides downstream of the odor problem. There are numerous different chemicals that can be utilized to control hydrogen sulfide in sanitary sewer systems, and there are several different chemical reactions by which hydrogen sulfide can be controlled. However, there are two general ways to control hydrogen sulfide with chemicals: prevent sulfide formation, or react with sulfides in the stream to prevent the release of hydrogen sulfide. When designing a new gravity sewer or force main, consider the route and detention time of flow from the new sewer facilities through the existing collection system and evaluate the benefits of chemical addition for corrosion control.

Revised & adopted 1/6/03.

Pipe Materials

Where potentially corrosive situations cannot be avoided due to constraints of a particular application, the Best Management Practice (BMP) is to control corrosion with corrosion-resistant materials. Section 12 identifies 4 different pipe materials for use in sanitary sewers.

- Ductile Iron Pipe
- PVC Pipe
- Reinforced Concrete Pipe
- Polyethylene Pipe

Ductile Iron Pipe can be used in gravity sewers and force mains. Ductile Iron Pipe and fittings for gravity sewers and force mains must have a corrosion-resistant interior lining in accordance with specification in Section 12. Ductile Iron Pipe is suitable for many gravity sewer and force main applications. Ductile Iron Pipe is specifically required for all gravity sewers and force mains more than 14 feet deep, for all gravity sewers with slopes greater than 10 percent and gravity sewers and force mains located in easements not adjacent to Rights of Way which pass between existing structures or is reasonably anticipated to pass between future structures. .

The PVC Pipe material specified for gravity sewers is for 8-inch, 10-inch, 12-inch, and 15-inch diameters only. PVC Pipe can be used for all gravity sewers in these diameters in applications where Ductile Iron Pipe is not required. C900 PVC Pipe may be used in easement provided the depth and slope do not exceed requirements mandating ductile iron use.

The PVC Pipe material specified for force mains is for diameters 4 inches through 12 inches. PVC Pipe can be used for all force mains in these diameters in applications where Ductile Iron Pipe is not required. Because PVC will not corrode, it is a good choice of materials for force mains that convey less than full pipe flow. Fittings for PVC Pipe, if necessary, are the same as Ductile Iron Pipe fittings. Fittings in any portion of a force main that conveys less than full pipe flow should have the same corrosion-resistant interior lining required for gravity sewers.

Reinforced Concrete Pipe (RCP) can be used in large diameter gravity sewers. The calcareous aggregate specified for all RCP will extend the time necessary to corrode a given thickness of concrete wall. The use of calcareous aggregate is not a substitute for a corrosion-resistant lining. The ceramic epoxy lining specified for all RCP is a corrosion-resistant interior lining similar to that specified for Ductile Iron Pipe. PVC lining is a corrosion-resistant lining installed in 270 degrees of arc rather than the full circumference of the RCP. PVC lining can be a substitute for ceramic epoxy lining in applications where interior corrosion is anticipated above the normal water surface. If the wastewater contains chlorides, for example, corrosion can be anticipated over the full circumference of the pipe and a full circumference lining such as ceramic epoxy is preferred. A holiday test is required for each type of lining, and it is necessary to perform field welding and subsequent testing at each joint in an RCP sewer. In order to provide sufficient space for a worker inside the pipeline, RCP smaller than 36 inches in diameter should not be used for gravity sewers.

Polyethylene (PE) Plastic Pipe can be used in gravity sewers and force mains. Where pipelines are installed by Horizontal Directional Drilling, PE Plastic Pipe is the material of choice. PE plastic pipe is also the material of choice for gravity sewer rehabilitation by the Pipe Bursting and Trenchless Pipe Replacement Method. Butt fusion welding is used to join PE Plastic Pipe into one continuous pipeline which is ideal for Horizontal Directional Drilling and Pipe Bursting. Depending on the circumstances of installation, this material might be appropriate for installation in an open-cut trench. If pipe sections are joined on top of the ground, the length of open trench is greater than for pipe sections joined in the trench. The trench depth and proposed method of protecting workers in the excavation, e.g. shoring system, trench shield, benching, etc. should be considered when evaluating PE plastic pipe for installation in an open-cut trench.

Manhole Materials

Section 12 specifies that all manholes are precast concrete with calcareous aggregates. The calcareous aggregate specified for all precast concrete manholes will extend the time necessary

to corrode a given thickness of concrete wall. The use of calcareous aggregate is not a substitute for a corrosion-resistant lining, but a corrosion-resistant lining is not necessary in all manholes. Turbulence and splashing are almost impossible to avoid in manholes with discharges from force mains. Where turbulence cannot be avoided, manholes should have a corrosion-resistant lining. Per section 12.1.10 of specifications, the urethane based material specified for rehabilitation of manholes in Section 19 is also an acceptable corrosion resistant lining for new precast concrete manholes.

Additional Requirements

1. Adequate cover and clearance shall be provided for sanitary sewers where they cross water and storm drainage lines. Where vertical clearance between sanitary and storm drainage lines is less than 1.5 feet, one section of ductile iron sanitary sewer pipe shall be installed.

2. Sewer lines shall be on grade to allow for future expansion.

3. Manholes shall be a minimum depth of 4 feet.

4. Where a drop occurs between the influent and effluent inverts at a manhole, a full joint section of ductile iron pipe shall be installed on the influent side of the manhole.

5. Where applicable, stubouts of adequate size shall be provided for future expansion.

6. A maximum of 2 laterals may be connected to any manhole, provided that the invert elevation of said laterals matches the invert elevation of the terminating manhole.

7. The Board will accept only 8-inch gravity sewer lines and larger for maintenance.

8. Where a new sewer line connects to an existing manhole, a wing nut plug shall be required in the end of the new pipe. When construction is complete, the manhole shall be plugged upstream and downstream and all debris and water pumped out of the manhole prior to placing it into service.

9. Air testing of sewer lines shall be performed at the time of the Board's final acceptance inspection in the presence of the Board's inspector and after installation of all other utilities.

10. Some lots in subdivisions may be subject to sewage back-ups. The following verbiage, as found in the standard plumbing code, shall be placed on subdivision plats and be recorded as subdivision covenants. "Where a plumbing drainage system may be subject to backflow of sewage (e.g., below the level of the nearest upstream manhole cover), suitable provisions shall be made to prevent its overflow in the building. It shall be the property owner's responsibility to install and maintain suitable devices in accordance with the plumbing code."

11. All new subdivision sewers shall be inspected by internal video in accordance with the construction specifications to document lateral locations. Where developers use existing sewers, the internal video inspection shall also include existing sewers to document lateral location.

7.0 PRIVATE FIRE PROTECTION SYSTEMS:

Fire protection systems shall generally consist of fire hydrants, standpipes or sprinkler systems which are connected to the municipal water supply by means of fire lines. Fire hydrants have threaded outlets for fire department connection, are free standing and are usually located around a building. Standpipes are

constructed within a building and provide fire department hose connections. Sprinkler systems can be either connected to standpipes, or connected directly to fire lines. Sprinkler systems can be either wet type or dry type.

Fire protection systems constructed on private property for the protection of privately owned commercial or industrial facilities are generally not eligible for acceptance by the Board for maintenance. Under certain circumstances, the Board will consider acceptance of privately constructed water lines serving commercial or industrial development for maintenance. To be considered for acceptance, the water line shall be of some benefit to the Board, shall be constructed in accordance with Board's standards, shall be provided with an easement, and shall have no dead ends. Water service connections installed on such a line shall be subject to trunk water line service charges, as set forth in the Board's published rates.

Any water line which serves fire protection systems and which connects to the existing municipal water supply, or which connects to a private water line proposed for acceptance by the Board, shall be considered to be a fire line and shall be subject to the fire line connection fee as set forth in the Board's published rates. All fire sprinkler systems, standpipes and fire hydrants are subject to annual rates as set forth in the Board's published rates.

All requests for fire line connections shall be made in writing to the Board. The requests shall be accompanied by drawings showing the connection of the fire line to the municipal water supply, the proposed fire line, and any proposed fire hydrants, standpipes, or connections to sprinkler systems. The requests shall also be accompanied by data sheets showing the number of sprinkler heads, the required fire flow and required minimum pressure. The drawings and data sheets shall bear the seal and/or the signature and registration number of a professional engineer in the State of Alabama.

All fire lines, fire hydrants and standpipe hose connections shall comply with, as a minimum, the materials standards published by the Board. The developer shall bear the responsibility to comply with the local, state or federal regulations which apply to fire protection systems.

All fire lines shall be provided with backflow prevention devices and with fire line master detection meters, all meeting FM and UL approval. Backflow prevention devices shall be either double check valve type or reduced pressure principal type in accordance with the Board's Cross-Connection Policy, see Appendix G.

8.0 ACCEPTABLE PRODUCTS AND APPROVED MANUFACTURERS:

A list of materials and approved manufacturers for the various products specified in this manual is included in Appendix A. It is the intent of the Board to review and update Appendix A, as appropriate, to ensure efficient operation of the services and facilities under the jurisdiction of these Standard Specifications. For this purpose, the Board shall evaluate technical submittals from interested manufacturers or suppliers periodically.

9.0 STANDARD FORMS FOR INVITATION, PROPOSAL AND CONTRACT DOCUMENTS:

Copies of the latest version of these forms will be included in the Bid Documents issued for each project.

INVITATION FOR BIDS

Sealed bids will be received by the Board of Water and Sewer Commissioners of the City of Mobile, Alabama ("Board"), at the Wesley A. James Operations Center, 4725 Moffett Road, Suite A, Mobile, AL 36618-0249 until **12:00 p.m.,** Local Time, on **December 1, 2025**, and then publicly opened and r**ead at 1:00 p.m.**, for furnishing all labor, materials, and performing all work for the following project: Contract No.: **CMOB250034 Project Name: WRIGHT SMITH WWTP PRIMARY DIGESTER NO.1 COVER REPLACEMENT SRF CS010281-23.**

Plans and Specifications may be inspected at the Board's office at 4725 Moffett Road, Suite A, Mobile, AL, or at the office of Goodwyn, Mills & Cawood LLC (GMC)., Consulting Engineers, 11 N. Water St. Suite 19290, Mobile, AL 36602. Attn: Ashley.Nobles@gmcnetwork.com , (251) 460-4006. For the list of plan holders on this project visit http://www.gmcnetwork.com. Scroll to the bottom of the page and click on Project Bids.

Copies of the Plans, Specifications, and other Contract Documents may be obtained from Consulting Engineer, upon a non-refundable payment of $20.00 for digital plans or $150.00 for each printed set. Checks should be made payable to "GMC." Bid documents will be mailed upon receipt of deposit. No Contract Documents will be issued later than twenty-four (24) hours prior to bid submission time.

A **Pre-Bid Conference** will be held on **Thursday, November 13, 2025 at 10:00 a.m.**, Local Time, to discuss bidding and project requirements. The meeting will be held at the Wright Smith WWTP, 1879 Conception St. Rd., Mobile, AL., 36610. Prospective bidders and subcontractors are encouraged to attend.

This project is being funded by SRF Project No.: CS010281-23 and will require DBE documentation from the low, responsive, responsible bidder no later than 10 days after the bid opening.

All participants must comply with all federal requirements applicable to the Loan (including those imposed by the 2014 Appropriations Act and related SRF Policy Guidelines) which the Participant understands includes, among other, requirements that all of the iron and steel products used in the Project are to be produced in the United States ("American Iron and Steel Requirement") and those imposed by the Build America, Buy America (BABA) requirements.

Bids must be submitted on the standard forms included with the Contract Documents. The following contract bid documents, Bid Proposal, Bid Bond, Subcontracting Plan, SSO and Unpermitted Discharge Prevention Notification, and any addendum attachments shall be printed on yellow color paper and tabbed. The Contractor shall be responsible for preparing its bid package in accordance with this guideline.

Envelopes containing bids must be sealed and delivered to the Director, Board of Water and Sewer Commissioners of the City of Mobile, Alabama, at 4725 Moffett Road, Mobile, Suite A, Mobile, Alabama 36618-0249: "Bid for constructing Contract No.: CMOB250034 Wright Smith WWTP Primary Digester No. 1 Cover Replacement SRF CS010281-23 to be opened at 1:00 p.m., Local Time, December 1, 2025." The Bidder's Alabama State Contractor's License Number and discipline shall be on the envelope.

Bid guarantee in the form of certified check, bid bond, or Irrevocable Letter of Credit acceptable to the Boardwill be required for at least 5% of the bid amount, not to exceed $10,000.

The Board reserves the right to reject any and all bids and to waive any informality in bids received.

THIS INVITATION FOR BIDS IS CONDENSED FOR ADVERTISING PURPOSES. ADDITIONAL INFORMATION/REQUIREMENTS FOR BIDDERS CAN BE FOUND IN THE CONTRACT DOCUMENTS.

THE BOARD OF WATER AND SEWER COMMISSIONERS
OF THE CITY OF MOBILE, ALABAMA

MEMO

To: ALL PLAN HOLDERS

From: Denise King, PE

Subject: WRIGHT SMITH WWTP PRIMARY DIGESTOR NO. 1 COVER REPLACEMENT
FOR THE BOARD OF WATER AND SEWER COMMISSIONERS OF THE CITY OF MOBILE, ALABAMA
SRF PROJECT NO. CS010281-23
GMC PROJECT NO. CMGM250034

Date: OCTOBER 2025

Please be advised that all questions or comments for the above subject project will be accepted in writing from plan holders who have obtained bid documents from GMC. All questions or comments must be received in this office by 12:00 p.m., Tuesday, November 18, 2025.

You can EMAIL your questions or comments to dustin.till@gmcnetwork.com. Appropriate responses will be issued only to those items considered necessary by the Engineer via an addendum.

PROPOSAL

TO: BOARD OF WATER AND SEWER COMMISSIONERS

OF THE CITY OF MOBILE, ALABAMA

Submitted:_____
(Date)

The undersigned, as Bidder, hereby declares that he has examined the site of the Work and informed himself fully in regard to all conditions pertaining to the place where the Work is to be done; that he has examined the Plans and Specifications for the Work and all Contract Documents relative thereto, and has read the Board's Standard Specifications and all General Conditions and Special Provisions furnished; and that he has satisfied himself relative to the Work to be performed.

The Bidder proposes and agrees, if this Proposal is accepted, to contract with the Board of Water and Sewer Commissioners of the City of Mobile, Alabama, in the form of contract specified to furnish all materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the following Work:

WRIGHT SMITH WWTP PRIMARY DIGESTER
NO. 1 COVER REPLACEMENT CS010281-23
PROJECT NO. CMOB250034

in full and complete accordance with the shown, noted, described and reasonably intended requirements of the Plans, Specifications and all other Contract Documents to the full and entire satisfaction of the Board of Water and Sewer Commissioners of the City of Mobile, Alabama with a definite understanding that no money will be allowed for extra work except as set forth in the attached General Conditions and other Contract Documents for the lump sum or unit prices listed opposite each item.

It is agreed that the description under each item, being briefly stated, implies, although it does not mention, all incidentals and that the prices stated are intended to cover all such work, materials and incidentals as constitute Bidder's obligations as described in the Specifications and any details not specifically mentioned, but evidently included in the Contract shall be compensated for the item in which it most logically is included.

The quantities for bid items listed on the Proposal sheet are estimated quantities only for the purpose of comparing bids. Any differences between these estimated quantities and actual quantities required for this Contract shall not be taken as a basis for claims by the Contractor for extra compensation. Compensation will be based on the lump sum or unit prices and actual construction quantities.

The Bidder further proposes and agrees hereby to commence the Work with an adequate force, plant and equipment at the time stated in the notice to the Contractor from the Engineers to proceed, and fully complete performance within 365 consecutive calendar days from and after the date stated in said notice.

The undersigned further agrees that, in case of failure on his part to execute the said Contract and the bond within 10 consecutive calendar days after written notice being given of the award of the Contract, the check or bid bond in the amount of 5 percent of this bid accompanying this bid, and the monies payable thereon, shall be paid into the funds of the Board of Water and Sewer Commissioners of the City of Mobile, Alabama as liquidated damages for such failure; otherwise the check or bid bond accompanying this Proposal shall be returned to the undersigned:

Attached hereto is a certified check on the _____

_____ Bank of _____

or a Bid Bond for the sum of _____

_____ Dollars ($_____)

made payable to the Board of Water and Sewer Commissioners of the City of Mobile, Alabama.

By_____
(Legal Signature)

_____
(Printed Name and Title)

Witness:_____
(Legal Signature)

Witness:_____
(Legal Signature)

ADDRESS:

_____

_____

CONTRACTOR'S LICENSE NO:

_____

BIDDER acknowledges receipt of the following ADDENDA:

_____

_____

_____

BID PROPOSAL

PROJECT: **Wright Smith WWTP**
Primary Digester #1 Cover Replacement
Mobile Area Water and Sewer System
Mobile, Alabama
SRF PROJECT NO. CS010281-23
GMC PROJECT NO. CMOB25034

BIDDER: _____

Bidder agrees to perform the work described in the plans and specifications for the following lump sum prices:

BASE BID

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
1	1	LS	Mobilization & General Conditions	$ LS	$
2	1	LS	Demolition	$ LS	$
3	1	LS	Furnish and Install Fixed Digester Cover	$ LS	$
4	1	LS	Furnish and Install Plunger Mixer	$ LS	$
5	1	LS	High Performance Coatings	$ LS	$
6	1	LS	Metal Stairs	$ LS	$
7	1	LS	Electrical	$ LS	$
8	1	LS	Erosion Control & Site Restoration	$ LS	$
9	50	DRY TONS	Sludge Removal & Disposal from Digester	$	$
10	2,500	CU. FT.	Sand and Rock Removal & Disposal from Digester	$	$
11	1	LS	All Other Items	$ LS	$
12	1	LS	SCADA & Integration Allowance	$ LS	$ 9,000.00
13	1	LS	Owner's Contingency Allowance	$ LS	$ 100,000.00
			TOTAL BASE BID		$

ACCOUNTING OF SALES TAX
Attachment to Proposal Form

To: Board of Water and Sewer Commissioners of the City of Mobile, Alabama (Awarding Authority) Date: _____

NAME OF PROJECT

Wright Smith WWTP Primary Digester No. 1 Cover Replacement CS010281-23 CMOB250034

SALES TAX ACCOUNTING

Pursuant to Act 2018-234, the Contractor accounts for the sales tax NOT included in the bid proposal form as follows:

	ESTIMATED SALES TAX AMOUNT
BASE BID	$_____

Failure to provide an accounting of sales tax shall render the bid non-responsive. Other than determining responsivement, sales tax accounting shall not affect the bid pricing nor be considered in the determination of the lowest responsible and responsive bidder.

Legal Name of Bidder _____

Mailing Address _____

_____

_____

***By (Legal Signature)** _____

*Name (type or print) _____ (Seal)

*Title _____

Telephone Number _____

PROPOSED SUBCONTRACTING PLAN

SUBCONTRACTORS

The Bidder further proposes that the following subcontracting firms or businesses may be awarded subcontracts for the following portions of the Work in the event that the Bidder is awarded the Contract (use additional sheets, if required):

Mechanical

_____
Name % of Contract

_____
Street City

Instrumentation and Control (Shall be Agent and/or representative of the computer system supplier, requires total system responsibility for control devices and system)

_____
Name % of Contract

_____
Street City

Electrical

_____
Name % of Contract

_____
Street City

Others

_____
Name % of Contract

_____
Street City

_____
Name % of Contract

_____
Street City

_____
BIDDER/COMPANY

_____
BY (Signature)

Failure to fully complete this page and include a handwritten signature may be cause for rejection of bid.

SSO AND UNPERMITTED DISCHARGE PREVENTION NOTIFICATION:

Sanitary Sewer Overflows (SSOs) and unpermitted discharges of wastewater to the environment are a violation of Federal and State laws, as well as a breach of this Contract. The Contractor and associated subcontractors, vendors, and other entities and persons chosen to complete this Work shall not, through act or omission, discharge untreated wastewater to the environment or cause wastewater to back up into a building. The Contractor hereby agrees to indemnify the Owner if the Owner is assessed penalties or fines, receives regulatory actions, or has claims, actions, or suits filed against it by any person or entity as a result of SSOs or unpermitted discharges caused by act or omission of the Contractor and/or any entity or person performing Work in the Contractor's behalf under this Contract. The Contractor shall reimburse the Owner for all damages, losses, penalties, fines, judgments, interest, costs, and expenses of every nature incurred by the Owner, including but not limited to reasonable attorney's fees, arising from or associated with each SSO or unpermitted discharge. In addition, the Contractor shall pay the following penalties to the Owner for SSOs and unpermitted discharges caused by the Contractor or any entity or person performing Work in the Contractor's behalf, regardless of whether such SSOs or discharges reach waters of the State.

Estimated Volume Spilled	Penalty Amount
0 to 10,000 gallons	$1,000
10,001 to 25,000 gallons	$2,000
25,001 to 50,000 gallons	$2,500
50,001 to 150,000 gallons	$3,000
More than 150,000 gallons	$6,000

I, having authority to execute this document, have reviewed the above Notification, therein.

_____

Contractor Name

_____

Street City

_____

Signature

BID BOND

KNOW ALL MEN BY THESE PRESENTS:

That we,_____
(Name of Bidder)

_____, as Principal,
(Address)

and _____
(Name of Surety)

of_____, as Surety,
(Address)

jointly and severally, hereby bind ourselves, our heirs, executors, administrators, successors, and assigns to the **Board of Water and Sewer Commissioners of the City of Mobile, Alabama**, as the Owner, in the **PENAL SUM of five percent (5%) of the amount of the Principal's bid, but in no event more than Ten Thousand Dollars ($10,000.00).**

THE CONDITION OF THIS OBLIGATION is that the Principal has submitted to the Owner the attached bid, which is incorporated herein by reference, for the Project identified as:

_____Project No._____

NOW, THEREFORE, if, within the terms of the Bid Documents, the Owner accepts the Principal's bid and the Principal thereafter either:

(a) executes and delivers a Construction Contract with the required Contract and Labor and Material Bonds (each in the form contained in the Bid Documents and properly completed in accordance with the bid) and delivers evidence of insurance as prescribed in the Bid Documents, or

(b) fails to execute and deliver such Construction Contract with such Bonds and evidence of insurance, but pays the Owner the difference, not to exceed the Penal Sum of this Bond, between the amount of the Principal's Bid and the larger amount for which the Owner may award a Construction Contract for the same Work to another bidder,

then, this obligation shall be null and void, otherwise it shall remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that the obligation of the Surety under this Bond shall not in any manner be impaired or affected by any extension of the time within which the Owner may accept the Principal's bid, and the Surety does hereby waive notice of any such extension.

SIGNED AND SEALED this_____ day of_____,_____.

ATTEST:

_____

PRINCIPAL:

_____

By_____
Name and Title

ATTEST:

_____

SURETY:

_____

By_____
Name and Title

MEMO

TO: ALL PLAN HOLDERS

FROM: ASHLEY MORRIS, CONTRACT ADMINISTRATOR

SUBJECT: UTILIZATION OF DISADVANTAGED BUSINESS ENTERPRISES (DBES)

DATE: OCTOBER 2025

a. This project is being funded by SRF Project No. CS010281-23 and will require **DBE documentation from the low, responsive, responsible bidder no later than 10 days after the bid opening**. Prime contractors must solicit DBE subcontractors if they are planning to use subs. DBE solicitations should be documented; with a summary table of DBEs contacted along with the supporting correspondence (email, letter, phone log, etc.) including the response received, if any, from the DBE subcontractor. Sample summary table can be found on page 00122. Excel file is available upon request. Prime Bidders are required to submit a letter on company letterhead listing all subcontractors (DBE and non-DBE) with the following information for each subcontractor: company name, type of work performed, DBE/WBE/MBE or non-DBE, address, telephone number, contact person, and estimated dollar amount of subcontract.

Resources for Identifying MBE-WBE (DBE) Subcontractors:

ALUCP

Office of Minority Business Enterprise – ADECA (alabama.gov)

SBA - Dynamic Small Business Search

Additional resources can be found on page 7 of the SRF Supplemental General Conditions.

EPA Forms for DBE Documentation – submit the following with your bid

VIII 6-100-2 Subcontractor Participation Form ..... Page SGC-10
IX 6-100-3 Subcontractor Performance Form ..... Page SGC-12
X 6-100-4 Subcontractor Utilization Form ..... Page SGC-14
XIII Certification Regarding Equal Employment Opportunity ..... Page SGC-24
XIV Debarred Firms Certification page ..... Page SGC -25

Additional information can be found in the Supplemental General Conditions for SRF Assisted Public Drinking Water and Wastewater Facilities Construction Contracts found in this Project Manual. Please email ashley.morris@gmcnetwork.com if you have any questions regarding DBE solicitation.

EPA Guidance for Good Faith Effort in Soliciting DBE (6/5/2024)

Recipients are required to make the following good faith efforts whenever procuring construction, equipment, services, and supplies under an EPA financial assistance agreement. A Native American recipient or prime contractor must follow the six good faith efforts only if doing so would not conflict with exiting Tribal or Federal law, including but not limited to the Indian Self-Determination and Education Assistance Act.

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

In addition, good faith efforts are required for all contracts even if the fair share objectives (under 40 CFR Part 33 Subpart D) have been achieved with previous contracts on the same project.

DBE/MBE/WBE Solicitation List

_____
(SRF Project Name)

_____
(SRF Contract #/Name - If different from Project Name)

	COMPANY	CONTACT	EMAIL	ADDRESS	PHONE	FAX	CERTIFICATE (Woman-Owned, SDB, etc.)	DATE CONTACTED	NOTES/RESULTS (Email Received, Response/No Response, Phone Number Not Working, Etc.)
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

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

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

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

Supplemental General Conditions

for SRF Assisted

Public Drinking Water and Wastewater
Facilities Construction Contracts

Clean Water
State Revolving Fund

Protect Our Health from Source to Tap
Drinking Water State Revolving Fund

SRF Project Number: _CS010281-23____

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XX	Project Review and Cost Summary…….....	SGC-39

I – ADEM Special Conditions

1. Construction within State rights-of-way shall be in accordance with the Alabama Department of Transportation policies and procedures.

2. Construction is to be carried out in compliance with applicable NPDES permits and in a manner that prevents bypassing of raw wastewater flows during construction. If bypassing is anticipated, the ADEM NPDES Enforcement Branch (334-271-7975) shall be advised in advance and the contractor shall take all necessary steps to minimize the impacts of bypassing.

3. Siltation and soil erosion shall be minimized during construction. The contractor shall obtain an NPDES storm water permit for construction if required.

4. The owner shall provide and maintain competent and adequate supervision and inspection.

5. ADEM and EPA shall have access to the site and the project work at all times.

6. These Special Conditions shall supersede any conflicting provisions of this contract.

7. **A project sign is required.** See **Parts XVII and XVIII, pages SGC-36 – SGC-37**, for more information.

II – Bonds and Insurance

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

1. Bid Bond – Not less than 5% of either the owner's estimated cost or of the proposed prime contractor's bid up to a maximum of $10,000. The bid guarantee shall consist of a cashier's check drawn on an Alabama bank or a bid bond executed by a surety company duly authorized and qualified to make bonds in the State of Alabama.

2. Performance Bond – In an amount not less than 100% of the contract price.

3. Payment Bond – Payable to the awarding authority, shall be executed in an amount not less than 50% of the contract price.

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

III – Utilization of Disadvantaged Businesses Enterprises (DBEs)

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

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

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

For purposes of clarification:

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

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

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

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

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

2. Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitation for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.

3. Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs. This will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process.

4. Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.

5. Use the resources, services, and assistance of the AL Department of Transportation (ALDOT), Small Business Administration (SBA), and the Minority Business Development Agency of the Department of Commerce (MBDA).

6. If the Contractor awards subcontracts, it must take the steps described in items (1) through (5) listed above.

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

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

1. SRF project number and project name/loan name*. (*not contract name)

2. List of **all** subcontractors (DBE **and** non-DBE) with name, address, telephone number, estimated contract dollar amount and duration. If there are to be no subcontractors, please indicate such in a letter on company letterhead.

3. List of any subcontract work yet to be committed with estimate of dollar amount and duration of contract.

4. MBE-WBE (DBE) Documents - See **Part V, page SGC-6**.

5. Debarred Firms Certification – See **Part XIV, page SGC-25**.

6. Certification Regarding Equal Employment Opportunity – See **Part XIII, page SGC-24.**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The following organizations may provide assistance in soliciting DBE participation:

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

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

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

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

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

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

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

NOTE:

(1) The Loan Recipient (Owner) and the proposed Prime Contractor shall use the necessary resources to identify and directly solicit no less than three (3) certified DBE/MBE/WBE companies to bid in each expected contract/subcontract area. If a diligent and documented search of ALDOT, SBA, and MBDA directories does not identify three (3) potential certified DBE/MBE/WBE firms, then the proposed Prime Contractor shall post an advertisement in, at least, one (1) of the other online or print resources. Whenever possible, post solicitation for bids or proposals should be posted/advertised for a minimum of 30 calendar days before the bid or proposal closing date.

(2) Expenditures to a DBE that acts merely as a broker or passive conduit of funds, without performing, managing, or supervising the work of its subcontract in a manner consistent with normal business practices may not be counted.

(3) The proposed Prime Contractor should attempt to identify and first solicit DBEs in the geographic proximity of the project before soliciting those located farther away.

(4) In addition, our SRF DBE Compliance Staff is readily available for assistance, as follows: Laketa Ross at (334) 271-7727 or laketa.ross@adem.alabama.gov OR Diane Lockwood (DBE Coordinator) at (334) 271-7815 or dpl@adem.alabama.gov.

VII – DBE Compliance Form

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

Loan Recipient: Mobile Area Water & Sewer System SRF Loan (Project) Number: CS010281-23

CERTIFICATIONS:

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

_____ Date_____
(Proposed Prime Contractor Signature)

_____
(Printed Name and Title)

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

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

_____ Date_____
(Signature of Loan Recipient (Owner))

OR**

_____ Date_____
(Loan Recipient's (Owner's) Representative's Signature, (**P.E.**))

Denise King, P.E. Project Manual
(Printed Name and Title)

GENERAL INFORMATION:

Loan Recipient (Owner) Contact: _____

Loan Recipient (Owner) Phone Number/Email: _____

Consulting Engineer Contact: Denise King, P.E.

Consulting Engineer Phone Number/Email: 251-460-4006 Denise.King@gmcnetwork.com

Proposed Prime Contractor: _____

Proposed Prime Contractor Contact: _____

Proposed Prime Contractor Phone Number/Email:_____

Proposed Prime Contract Amount: $ _____

Proposed Total DBE/MBE Participation: $ _____ Percentage: ____% Goal: 2.5%

Proposed Total WBE Participation: $ _____ Percentage: ____% Goal: 3.0%

_____

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

(1) **List of all committed and uncommitted subcontractors** by trade, including company name, address, telephone number, contact person, dollar amount of subcontract, and DBE/MBE/WBE status. Indicate in writing if no solicitations were made because the contractor intends to use only its own forces to accomplish the work.

(2) **Proof of certification (certificate or letter)** by EPA, SBA, DOT (or by state, local, Tribal, or private entities whose certification criteria match EPA's) for each subcontractor listed as a DBE, MBE, or WBE.

(3) **Documentation of solicitation effort for prospective DBE firms**, such as fax confirmation sheets, copies of solicitation letters/emails, printout of the online solicitations, printouts of online search results, affidavits of publication in newspapers, etc. The prime contractor is strongly encouraged to follow up each written, fax, or email solicitation with at least 1 logged phone call. Whenever possible, post solicitation for bids or proposals should be for a minimum of 30 calendar days before the bid or proposal closing date.

(4) **Justification for not selecting a certified DBE subcontractor** that submitted a low bid for any subcontract area.

(5) **Certification By Proposed Prime Contractor or Subcontractor Regarding Equal Opportunity Employment. (Page SGC-24**)

(6) **Debarred Firms Certification**. (**Page SGC-25**)

(7) **EPA Form 6100-2 DBE Subcontractor Participation Form** for **each** proposed **certified** DBE subcontractor.* (**Page SGC-10**) (*This form is completed by the proposed prime contractor. It is signed by **each** proposed subcontractor **only**.)

(8) **EPA Form 6100-3 DBE Subcontractor Performance Form** for each DBE subcontractor.** (**Page SGC-12**) (**This form is completed by the proposed prime contractor and signed by each proposed certified subcontractor and the proposed prime contractor per subcontract.)

(9) **EPA Form 6100-4 DBE Subcontractor Utilization Form** to summarize all DBE subcontracts/subcontractors.*** (**Page SGC-14**) (***This form is completed and signed by the proposed prime contractor **only**.)

NOTE:

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

Loan Recipient (Owner) DBE Submittal

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

Prime Contractor DBE Submittal

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

United States Environmental Protection Agency

OMB Control No: 2090-0030

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Participation Form

An EPA Financial Assistance Agreement Recipient must require its prime contractors to provide this form to its DBE subcontractors. This form gives a DBE[1] subcontractor[2] 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 Wright Smith WWTP Primary Digester No. 1 Cover Replacement	
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
Address		
Telephone No.	Email Address	
Prime Contractor Name	Issuing/Funding Entity: ADEM	

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

[1] 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.

[2] 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.

EPA FORM 6100-2 (DBE Subcontractor Participation Form)

EPA United States Environmental Protection Agency

OMB Control No: 2090-0030

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Participation Form

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

Subcontractor Signature	Print Name
Title	**Date**

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

EPA FORM 6100-2 (DBE Subcontractor Participation Form)

EPA United States Environmental Protection Agency

OMB Control No: 2090-0030

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form

This form is intended to capture the DBE[1] subcontractor's[2] 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: Wright Smith WWTP Primary Digester No. 1 Cover Replacement
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
Address		
Telephone No.		Email Address
Prime Contractor Name		Issuing/Funding Entity: ADEM

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: O DOT O SBA O Other: _____	Meets/ exceeds EPA certification standards? O YES O NO O Unknown

[1] 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.

[2] 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.

EPA FORM 6100-3 (DBE Subcontractor Performance Form)

EPA United States Environmental Protection Agency

OMB Control No: 2090-0030

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form

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

Prime Contractor Signature	Print Name
Title	**Date**

Subcontractor Signature	Print Name
Title	**Date**

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

EPA FORM 6100-3 (DBE Subcontractor Performance Form)

EPA United States Environmental Protection Agency

OMB Control No: 2090-0030

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Utilization Form

This form is intended to capture the prime contractor's actual and/or anticipated use of identified certified DBE[1] subcontractors[2] 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

[1] 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.

[2] 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.

EPA FORM 6100-4 (DBE Subcontractor Utilization Form)

EPA United States Environmental Protection Agency

OMB Control No: 2090-0030

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Utilization Form

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

Prime Contractor Signature	Print Name
Title	**Date**

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

EPA FORM 6100-4 (DBE Subcontractor Utilization Form)

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

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

FOR COOPERATIVE AGREEMENTS OR OTHER FEDERAL FINANCIAL ASSISTANCE WHERE THE COMBINED TOTAL OF FUNDS BUDGETED FOR PROCURING SUPPLIES, EQUIPMENT, CONSTRUCTION OR SERVICES EXCEED $150,000.

PART 1: PLEASE REVIEW INSTRUCTIONS BEFORE COMPLETING

1A. FEDERAL FISCAL YEAR (Oct 1- Sep 30)	1B. REPORT TYPE
20_____	☐ Annual ☐ Last Report (Project completed)

1C: REVISION OF A PRIOR YEAR REPORT? ◯ No ◯ Yes, Year_____

IF YES, BRIEFLY DESCRIBE THE REVISIONS YOU ARE MAKING:

2A. EPA FINANCIAL ASSISTANCE OFFICE ADDRESS (ATTN: DBE COORDINATOR)	3A. RECIPIENT NAME AND ADDRESS
2B. EPA DBE COORDINATOR Name: Email: Phone: Fax:	3B. RECIPIENT REPORTING CONTACT Name: Address: Phone: Email:
4A. FINANCIAL ASSISTANCE AGREEMENT ID NUMBER (SRF State Recipients, refer to Instructions for Completion of blocks 4A, 5A and 5C)	4B. FEDERAL FINANCIAL ASSISTANCE PROGRAM TITLE OR CFDA NUMBER:
5A. TOTAL ASSISTANCE AGREEMENT AMOUNT EPA Share: $ _____ Recipient Share: $ _____ ☐ **N/A (SRF Recipient)/Loan Amount: $_____**	5B. If NO procurements and NO accomplishments were made this reporting period (by the recipients, sub-recipients, loan recipients, and prime contractors), **CHECK and SKIP to Block No. 7**. (Procurements are all expenditures through contract, order, purchase, lease or barter of supplies, equipment, construction, or services needed to complete Federal assistance programs. Accomplishments, in this context, are procurements made with MBEs and/or WBEs.) ☐

5C. Total Procurements This Reporting Period (Only include amount not reported in any prior reporting period)

Total Procurement Amount $_____

(Include total dollar values awarded by recipient, sub-recipients and SRF loan recipients, including MBE/WBE expenditures.)

5D. Were sub-awards issued under this assistance agreement? Yes ◯ No ◯

Were contracts issued under this assistance agreement? Yes ◯ No ◯

5E. MBE/WBE Accomplishments This Reporting Period

Actual MBE/WBE Procurement Accomplished (Include total dollar values awarded by recipient, sub-recipients, SRF loan recipients and Prime Contractors.)

	Construction	Equipment	Services	Supplies	Total
$MBE:	_____	_____	_____	_____	0.00
$WBE:	_____	_____	_____	_____	0.00

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

7. NAME OF RECIPIENT'S AUTHORIZED REPRESENTATIVE	TITLE
8. SIGNATURE OF RECIPIENT'S AUTHORIZED REPRESENTATIVE	DATE

EPA FORM 5700-52A available electronically at https://www.epa.gov/sites/production/files/2014-09/documents/epa_form_5700_52a.pdf

If reporting DBE procurement, please enter the Loan Project Number and the information in the grid below, as applicable.
If no additional DBE procurement to report, please enter the Loan Project Number and enter 'N/A' in the black box below.

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

PART II.

MBE/WBE PROCUREMENTS MADE DURING REPORTING PERIOD

SRF Financial Assistance Agreement Number: _____

1. Procurement Made By			2. Business Enterprise		3. $ Value of Procurement	4. Date of Procurement MM/DD/YY	5. Type of Product or Service (Enter Code)	6. Name/Address/Phone Number of MBE/WBE Contractor or Vendor
Recipient	Sub-Recipient and/or SRF Loan Recipient	Prime	Minority	Women				

Type of Product or Service Codes: 1 = Construction 2 = Supplies 3 = Services 4 = Equipment

Note: Recipients are required to submit MBE/WBE reports to EPA beginning with the Federal fiscal year the recipients receive the award, continuing until the project is completed.

Instructions:

A. General Instructions:

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

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

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

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

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

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

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

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

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

B. Definitions:

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

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

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

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

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

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

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

Good Faith Efforts

A recipient is required to make the following good faith efforts whenever procuring construction, equipment, services, and supplies under an EPA financial assistance agreement. These good faith efforts for utilizing MBEs and WBEs must be documented. Such documentation is subject to EPA review upon request:

1. Ensure DBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For Indian Tribal, State and Local and Government recipients, this will include placing DBEs on solicitation lists and soliciting them whenever they are potential sources.

2. Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitations for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.

3. Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs. For Indian Tribal, State and local Government recipients, this will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process.

4. Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.

5. Use the services and assistance of the SBA and the Minority Business Development Agency of the Department of Commerce.

6. If the prime contractor awards subcontracts, require the prime contractor to take the steps in paragraphs (a) through (e) of this section.

C. Instructions for Part I:

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

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

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

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

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

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

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

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

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

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

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

5B. Self-explanatory.

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

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

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

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

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

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

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

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

D. Instructions for Part II:

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

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

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

3. Dollar value of procurement.

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

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

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

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

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

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

XII – Changes to Approved DBE Compliance Form

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

Loan Recipient: _____ Loan (Project) Number: _____

CERTIFICATIONS:

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

_____ Date_____
(Prime Contractor Signature)

_____
(Printed Name and Title)

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

_____ Date_____
(Signature of Loan Recipient (Owner))

OR*

_____ Date_____
(Loan Recipient's (Owner's) Representative's Signature, (**P.E.**))

_____
(Printed Name and Title)

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

(1) If an approved subcontractor is terminated or replaced, please identify this company and briefly state the reason.

(2) For new or additional subcontractors, list name, trade, address, telephone number, contact person, dollar amount of subcontract and DBE status.

(3) Attach proof of certification by EPA, SBA, DOT (or by state, local, Tribal or private entities whose certification criteria match EPA's) for each subcontractor listed as a DBE, MBE or WBE.

(4) Attach documentation of solicitation effort for prospective DBE firms, such as fax confirmation sheets, copies of solicitation letters/emails, printouts of the online solicitations, printouts of online search results, affidavits of publication in newspapers, etc. The prime contractor is strongly encouraged to follow up each solicitation with, at least, one (1) logged phone call. Whenever possible, post solicitation for bids or proposals should be for a minimum of 30 calendar days before the bid or proposal closing date.

(5) Provide justification for not selecting a certified DBE subcontractor that submitted a low bid for any subcontract area.

_____

XIII – Certification Regarding Equal Employment Opportunity

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

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

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

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

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

PRIME CONTRACTOR'S CERTIFICATION:

Prime Contractor's Name: _____

Address: _____

_____

_____

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause. Yes____ No____
2. Compliance Reports were required to be filed in connection with such contract or subcontract. Yes____ No____
3. Bidder has filed all compliance reports due under applicable contract requirements. Yes____ No____

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

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

Signature of Prime Contractor: _____

Title: _____

Date: _____

XIV – Debarred Firms Certification

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

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

Project Name/Loan Name*: Wright Smith WWTP Primary Digester No. 1 Cover Replacement

(*not **Contract** Name)

SRF Project No.: CS010281-23

The undersigned hereby certifies that the firm of _____

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

Signature of Prime Contractor: _____

Title: _____

Date: _____

XV – Davis-Bacon and Related Acts

Labor Standards Provisions for Federally Assisted Contracts

Wage Rate Requirements Under FY 2013 Continuing Appropriation

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

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

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

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

2. Obtaining Wage Determinations.

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

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

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

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

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

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

3. Contract Subcontract Provisions.

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

(1) Minimum wages.

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

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

Subrecipients may obtain wage determinations from the U.S. Department of Labor's web site, www.dol.gov.

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

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

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

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

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

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

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

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

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

(2) Withholding.

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

(3) Payrolls and basic records.

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

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

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

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

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

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

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

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

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

(4) Apprentices and trainees.

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

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

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

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

(5) Compliance with Copeland Act requirements.

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

(6) Subcontracts.

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

(7) Contract termination: debarment.

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

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

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

(9) Disputes concerning labor standards.

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

(10) Certification of eligibility.

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

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

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

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

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

(1) Overtime requirements.

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

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

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

(3) Withholding for unpaid wages and liquidated damages.

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

(4) Subcontracts.

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

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

5. Compliance Verification

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

(b) The subrecipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, the subrecipient should conduct interviews with a representative group of covered employees within two weeks of each contractor or subcontractor's submission of its initial weekly payroll data and two weeks prior to the estimated completion date for the contract or subcontract. Subrecipients must conduct more frequent interviews if the initial interviews or other information
indicates that there is a risk that the contractor or subcontractor is not complying with DB. Subrecipients shall immediately conduct necessary interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence.

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

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

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

(Insert applicable wage rate determination here.)

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

"General Decision Number: AL20250110 01/03/2025

Superseded General Decision Number: AL20240110

State: Alabama

Construction Type: Heavy

County: Mobile County in Alabama.

HEAVY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least $13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at http://www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2025

ENGI0653-013 06/03/2024

	Rates	Fringes
POWER EQUIPMENT OPERATOR (PIPELINE)		
Backhoe, Excavator, Trackhoe	$ 48.89	18.00
Bulldozer	$ 48.89	18.00

SUAL2015-038 08/02/2017

	Rates	Fringes
CARPENTER, Includes Form Work	$ 19.05	7.86
CEMENT MASON/CONCRETE FINISHER, Includes Water Sewer Lines	$ 13.78 **	0.00
ELECTRICIAN	$ 19.56	0.00
LABORER: Common or General, Includes Water Sewer Lines	$ 15.21 **	6.16
LABORER: Pipelayer, Includes Water Sewer Lines	$ 11.95 **	0.00
OPERATOR: Backhoe/Excavator/Trackhoe, Includes Water Sewer Lines (Excludes, PIPELINE)	$ 13.56 **	0.00
OPERATOR: Loader, Includes Water Sewer Lines	$ 17.64 **	2.14
TRUCK DRIVER: Dump Truck, Includes Water Sewer Lines	$ 12.56 **	2.12

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 ($17.75) or 13658 ($13.30). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons

resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by

computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

a) a survey underlying a wage determination
b) an existing published wage determination
c) an initial WHD letter setting forth a position on a wage determination matter
d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division

U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

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END OF GENERAL DECISION"

XVI – American Iron and Steel Requirement

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

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

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

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

XVII – Build America, Buy America (BABA) Requirement

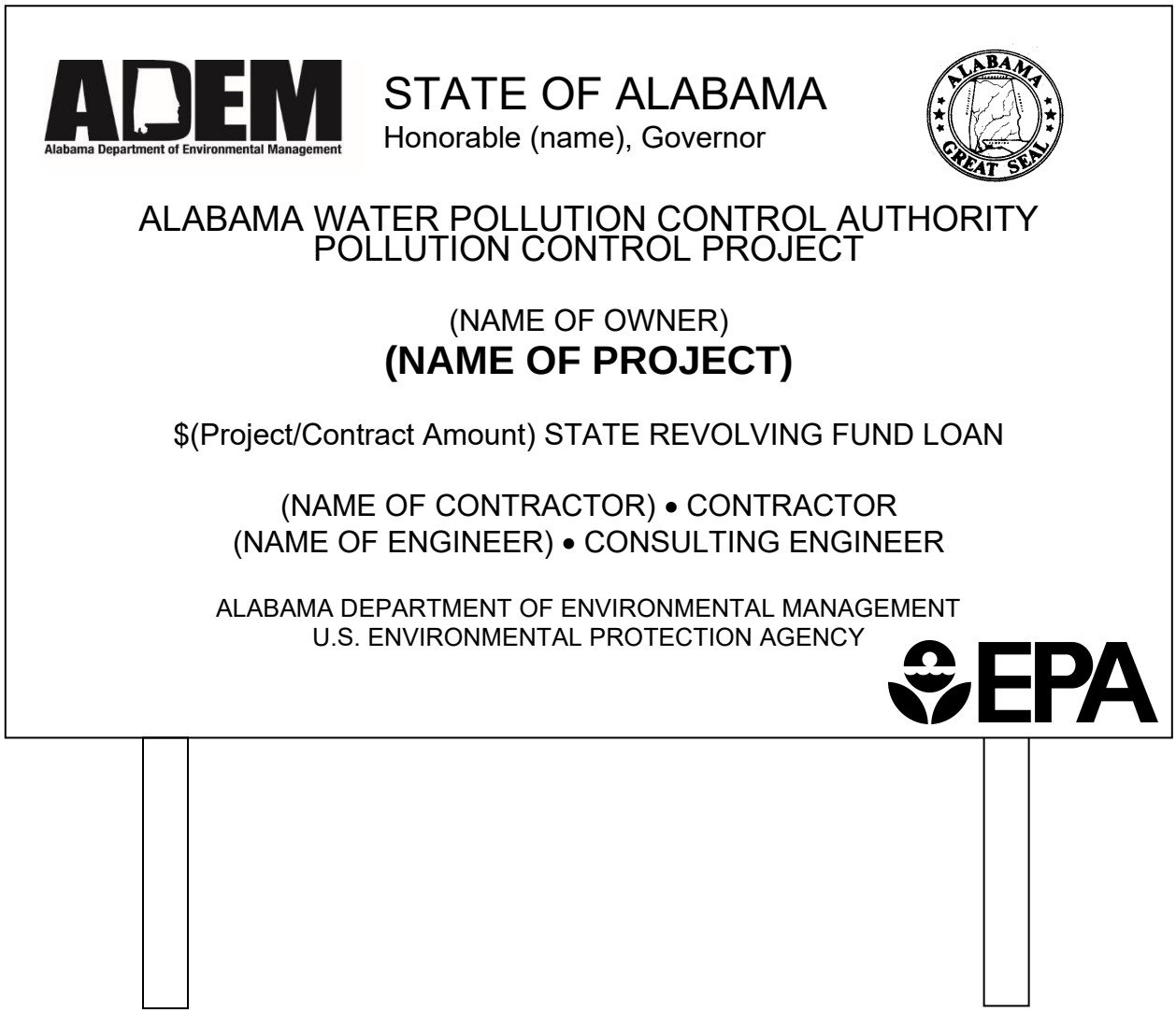
Comply with all federal requirements applicable to the assistance received (including those imposed by the Infrastructure Investment and Jobs Act ("IIJA"), Public Law No. 117-58) which the Participant understands includes, but is not limited to, the following requirements: that all of the iron and steel, manufactured products, and construction materials used in the Project are to be produced in the United States ("Build America, Buy America Requirements") unless (i) the Participant has requested and obtained a waiver from the cognizant Agency[1] pertaining to the Project or the Project is otherwise covered by a general applicability waiver; or (ii) all of the contributing Agencies have otherwise advised the Participant in writing that the Build America, Buy America Requirements are not applicable to the Project. Comply with all record keeping and reporting requirements under all applicable legal authorities, including any reports required by the funding authority (such as EPA and/or a state), such as performance indicators of program deliverables, information on costs and project progress. The Participant understands that (i) each contract and subcontract related to the Project is subject to audit by appropriate federal and state entities and (ii) failure to comply with the applicable legal requirements and this Agreement may result in a default hereunder that results in a repayment of the assistance agreement in advance of the maturity of the Bonds, termination and/or repayment of grants, cooperative agreements, direct assistance or other types of financial assistance, and/or other remedial actions.

ALL CONSTRUCTION CONTRACTS MUST HAVE A CLAUSE REQUIRING COMPLIANCE WITH THE BABA REQUIREMENTS. The loan recipient agrees to cause all contractors and subcontractors to comply with (through the inclusion of appropriate terms and conditions in all contracts, subcontracts, and lower tiered transactions) such terms and conditions to be in substantially the form set forth in connection with the development and construction of the project.

The Contractor acknowledges to and for the benefit of the Mobile Area Water & Sewer System ("Owner") and the ADEM (the "Funding Authority") that it understands the goods and services under this Agreement are being funded with federal monies and have statutory requirements commonly known as "Build America, Buy America;" that requires all of the iron and steel, manufactured products, and construction materials used in the project to be produced in the United States ("Build America, Buy America Requirements") including iron and steel, manufactured products, and construction materials provided by the Contactor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Owner and Funding Authority (a) the Contractor has reviewed and understands the Build America, Buy America Requirements, (b) all of the iron and steel, manufactured products, and construction materials used in the project will be and/or have been produced in the United States in a manner that complies with the Build America, Buy America Requirements, unless a waiver of the requirements 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 Build America, Buy America Requirements, as may be requested by the Owner or the Funding Authority. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Owner or Funding Authority to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Owner or Funding Authority resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the Funding Authority or any damages owed to the Funding Authority by the Owner).

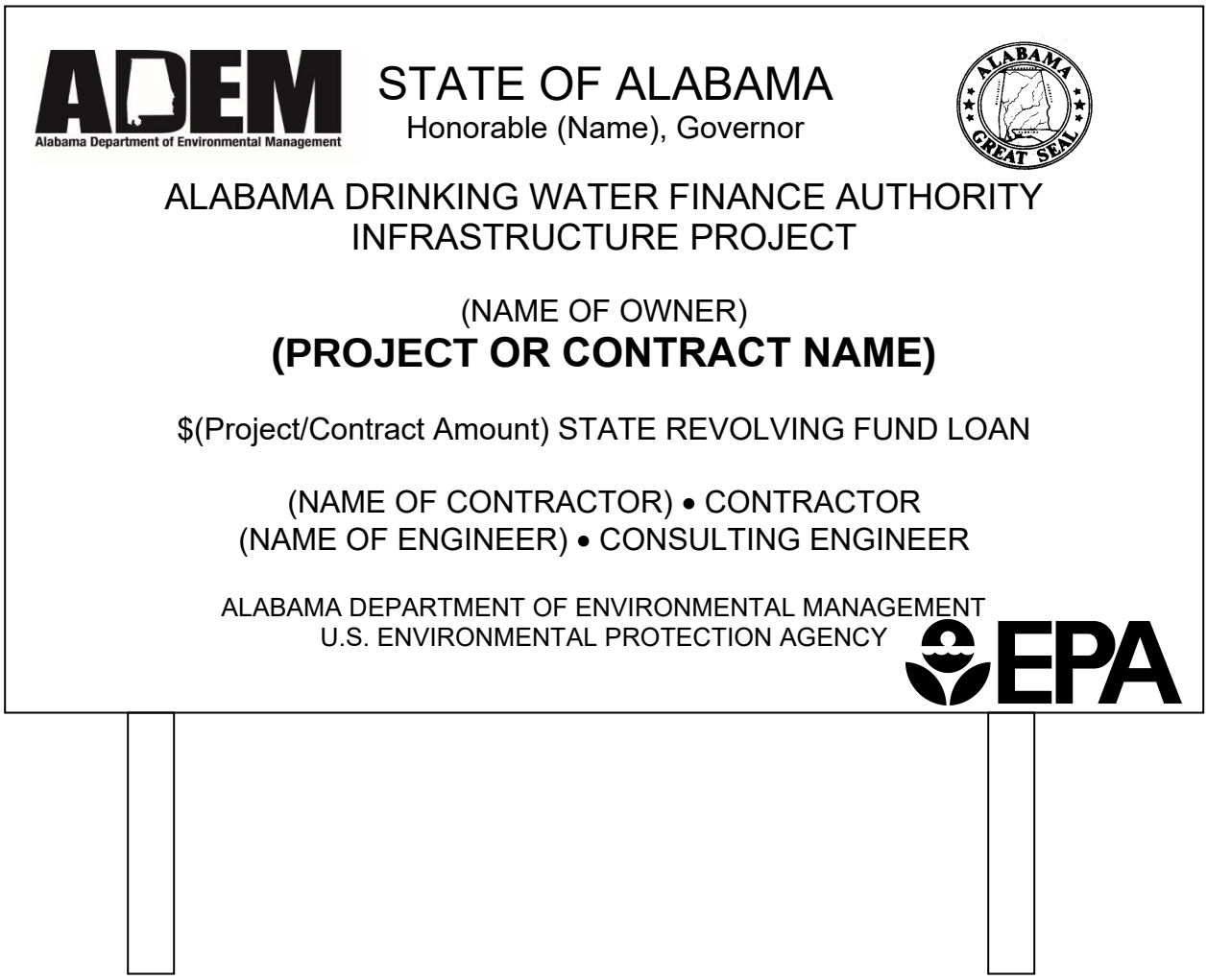
If the Contractor has no direct contractual privity with the Funding Authority, as a lender or awardee to the Owner for the funding of its project, the Owner and the Contractor agree that the Funding Authority is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the Funding Authority.

XVII – Project Sign Detail - CWSRF



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

XVIII – Project Sign Detail - DWSRF



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

XIX – Construction Contract Requirements

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

Contract Page No.	Satisfied Yes/No	
C-111	Yes	Bid Advertisement (including date, time, and location of bid opening).
C-430	Yes	Bid Bond.
C-610	Yes	Performance Bond (100%).
C-615	Yes	Payment Bond (Not less than 50%).
C-520	Yes	Contract Length.
C-520	Yes	Liquidated Damages.
C-800	Yes	Liability Insurance (including workman's comp, public liability, and builder's risk, if applicable).
C-200	Yes	Method of Award (i.e. lowest, responsive, responsible bidder).
		Air testing of gravity sewers (if applicable).

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

NOTE:

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

XX – Project Review and Cost Summary

ADEM Alabama Department of Environmental Management	SRF Project Review and Cost Summary	Form Revised **07-2021**

This form is to be completed and submitted (with supporting documentation) to the SRF Section within 14 days after bid opening. Following satisfactory review, an ATA (Approval-to-Award) letter will be issued. After the ATA is issued/ award of the contract, a pre-construction conference should be scheduled (**with the SRF Project Manager in attendance**). *A complete, bound set of the executed contract documents manual should be forwarded to the SRF Section for review and written approval following the pre-construction conference.*

Loan Recipient: _____ Project Number: _____

Project Name: _____

Contract Number: _____ Contract Name: _____

1. Date of plans and specifications concurrence letter from ADEM-SRF Section: _____

   Date of construction permit issuance from ADEM-DW Branch: _____

2. Attach copies of the following documents:

___ a. Bid advertisement with certification by publisher and date(s) of publication.

___ b. Certified bid tabulation.

___ c. Proposal of the selected bidder.

___ d. Bid bond.

___ e. Engineer's letter to the loan recipient recommending award of the contract. If the award is made to other than the low bidder, provide justification.

___ f. Site certificates for the project, if not previously submitted with the SRF loan application.

___ g. DBE Documentation from **the loan recipient (owner) and the prime contractor**. Utilization, solicitation and documentation requirements (with a list of required documents) are discussed in detail in Parts III - V (pages SGC-3 - SGC-23) of the ADEM *SRF Supplemental General Conditions* for SRF Assisted Public Drinking Water and Wastewater Facilities Construction Contracts.

___ h. Copy of the wage determination used in bidding.

___ i. Any addenda that have been issued after ADEM review of the plans and specifications.

Comments:

_____

_____

PREFERRED USE



The EPA logo is the primary logo for internal and external communication. Using these two versions (preferred and alternate) of the EPA logo will generate equity in the symbol, assure consistency across products, and maintain a unified image. It is important that the EPA logo always be reproduced with consistent high quality (in vector file format when possible). When using other symbols or graphic elements in addition to the EPA logo, be careful not to create a disjointed image of the Agency and cause stakeholder confusion.

ALTERNATE USES



Signature below



Signature beside



Signature beside on one line

For best results, the preferred presentation of the logo should be used on products that do not have enough space for the logo with text (pens, name badges, lapel pins, Web site banners, etc.).

It may also be used on partnership publications in the presence of other logos. Without the text underneath, the logo should be made the same relative size as the other logos on the page.

CLEAR SPACE



To ensure high visibility and an uncluttered presentation, always maintain clear space around the EPA logo. To determine the clear space, measure the width of the "E" in the logotype. The clear space will change depending on scale.

MINIMUM SIZE



It is important that all parts of the EPA logo be readable. For this reason, the EPA logo should not be reproduced at sizes any smaller than those specified here. There are no maximum size restrictions as long as the clear space requirements are met.

ACCEPTABLE



PMS 362

The entire logo must appear in black, gray, any uniform color or knock out white on a dark background. The flower and text may NOT be different colors, nor may the flower itself contain more than one color.



PMS 660

The relationship between the flower portion of the logo and Helvetica type should never be shifted or adjusted.

Always use approved artwork when reproducing the EPA identity. Available for download on the intranet at: epa.gov/protrac



Process Black at 70%



Process Black 100%



Knock out on a dark color

Incorrect Use

1 Never delete elements of the logo.

2. Never add elements to the logo.

3. Never distort the logo.

4. Never add a color to any element of the one-color logo.

5. Never blur or fade the logo.

6. Never incorporate other text into the logo.

7. Never change the typeface of the logo.

8. Never position the logo on a busy area of an image.

9. Never place an image over the logo.

UNACCEPTABLE







ACCEPTABLE

U.S. EPA

U.S. Environmental Protection Agency

United States Environmental Protection Agency

Too close



UNACCEPTABLE

USEPA

US EPA

U.S.E.P.A.





Basic Elements · EPA Seal Usage

ACCEPTABLE









Per EPA Order 1015.2A, the EPA seal is reserved for official communication, flags, and building signs. For more information on the EPA logo and seal, go to EPA's Product Review Web site: www.epa.gov/productreview.

The EPA logo has replaced the seal as the identifier on marketing and communication outreach. The seal is reserved for official communication for the Administrator's Office, legal and ceremonial use, speaker podiums, awards and plaques. Promotional outreach is not an award nor official communication and therefore may not use the seal.

SAMPLE WALLPAPER & PODIUM



CONTRACT

THIS CONTRACT is made and entered into the_____day _____of 20_____, by and between

_____,

(Contractor)

Hereinafter "Contractor," and the Board of Water and Sewer Commissioners of the City of Mobile, Alabama, hereinafter "Owner."

WITNESSETH:

The Contractor, for the consideration hereinafter fully set out hereby agrees with the Owner, as follows:

1. The Contractor shall furnish all materials and perform all Work as set forth in the following Contract Documents: Invitation for Bids, and any Addenda thereto; Proposal and all Documents submitted therewith; Standard Specifications of the Board of Water and Sewer Commissioners of the City of Mobile, Alabama; any Specifications of the Owner provided with the Invitation for Bids which are specific to this Contract; General Conditions; Special Provisions; Detailed Specifications; this Contract form; Bonds; Drawings and Addenda; all of which are attached hereto and made a part of the parties' Contract, as if fully set forth herein:

WRIGHT SMITH WWTP PRIMARY DIGESTOR NO. 1 COVER REPLACEMENT

SRF PROJECT NO. CS010281-23 CMOB250034

2. The Contractor shall commence performance of this Contract on a date to be specified in a written order of the Owner, and shall fully complete all Work hereunder within **365** consecutive calendar days from and after said date. "Work" shall include all construction, delivery of materials and items, and other obligations of the Contractor under this Contract.

3. The Owner hereby agrees to pay to the Contractor for the faithful performance of the Contract, subject to additions and deductions as provided in the Specifications or Proposal, in lawful money of the United States, as follows:

Approximately_____Dollars ($_____), in accordance with lump sum and unit prices set forth in the Proposal.

4. The Owner shall make monthly partial payments to the Contractor on the basis of a duly certified and approved estimate of Work performed during the preceding calendar month by the Contractor. The Owner may retain five percent (5%) of the amount of such estimate until fifty percent (50%) of the Work has been completed. The Owner may hold this retainage until all Work has been performed strictly in accordance with this Contract and until all Work has been accepted by the Owner and all obligations of the Contractor under this Contract have been satisfied.

5. Upon submission by the Contractor of evidence satisfactory to the Owner that all payrolls, material bills, and other costs incurred by the Contractor in connection with the performance of this Contract have been paid in full, and upon satisfaction by the Contractor of all other obligations under this Contract, final payment on account of this Contract shall be made within thirty (30) days after the completion by the Contractor of all Work covered by this Contract and the acceptance thereof by the Owner.

6. The parties hereto acknowledge and agree that time is of the essence for performance of this Contract. The parties agree that in the event the Work is not completed within the time herein specified, the Owner may retain from the compensation otherwise to be paid to the Contractor the sum of $ 500.00 per day for each day thereafter, Sundays and holidays included, that the Work remains uncompleted. The parties agree that this dollar amount represents their agreed upon stipulation as to the damages which the Owner will have sustained per day due to the failure of the Contractor to complete the Work within the time stipulated, and that this amount is not a penalty.

7. Sanitary Sewer Overflows (SSOs) and unpermitted discharges of wastewater to the environment are a violation of Federal and State laws, as well as a breach of this Contract. The Contractor and associated subcontractors, vendors, and other entities and persons chosen to complete this Work shall not, through act or omission, discharge untreated wastewater to the environment or cause wastewater to back up into a building. The Contractor hereby agrees to indemnify the Owner if the Owner is assessed penalties or fines, receives regulatory actions, or has actions, suits, or claims filed against it by any person or entity as a result of SSOs or unpermitted discharges caused by act or omission of the Contractor and/or any entity or person performing work in the Contractor's behalf under this Contract. The Contractor shall reimburse the Owner for all damages, losses, penalties, fines, judgments, interest, costs, and expenses of every nature incurred by the Owner, including but not limited to reasonable attorney's fees, arising from or associated with each SSO or unpermitted discharge. In addition, the Contractor shall pay the penalties identified in the Contract Documents to the Owner for SSOs and unpermitted discharges caused by the Contractor and/or any entity or person performing Work in the Contractor's behalf, regardless of whether such SSOs or discharges reach waters of the State.

8. The parties hereto further agree hereto that if at any time after the execution of this Contract and the Contract Bond hereto attached for its faithful performance, the Owner shall deem the surety or sureties upon such bond to be unsatisfactory, or if, for any reason, such bond ceases to be adequate to cover the performance of the Work, the Contractor shall at its expense, within five (5) days after the receipt of notice from the Owner to do so, furnish an

additional bond or bonds in such form and amount and with such surety or sureties as shall be satisfactory to the Owner. In such event, no further payment to the Contractor shall be due under this Contract until such new or additional security for the faithful performance of the Work shall be furnished in manner and form satisfactory to the Owner.

9. The parties acknowledge that the Contract Documents governing the Contract between them for this project include, but may not be limited to, this Contract form; all other materials furnished with the Invitation for Bids; the Contractor's Proposal and all documents and items submitted with Contractor's bid for this project; the Owner's Standard Specifications, General Conditions, and Special Conditions; all plans and drawings for the project; other documents which may be incorporated into any of the foregoing by reference; and Change Orders for the project, if any.

10. In addition to the Indemnity obligations set forth in the Contract Documents, in the event that legal action is brought by any person or entity against the Owner, its employees, or agents, asserting negligent act(s) or omission(s), violation of law or regulation, or other legally culpable conduct of the Contractor, the Contractor's employees, subcontractors, successors, or anyone for whose acts or omissions the Contractor may be legally liable, whether said action be for property damage, personal or bodily injury, wrongful death, environmental harm, or anything else, the Contractor shall reimburse the Owner for the Owner's reasonable attorneys' fees, costs, and expenses incurred in defending against same, through all trial and appeals relative to thereto, including but not limited to cost of bonds and interest in the event of an appeal, whether filed by the Owner or by another party.

11. Should the Owner employ legal counsel to prevent a breach of this Contract, or to otherwise assert or protect its rights under this Contract, the Contractor shall reimburse the Owner for the Owner's reasonable attorneys' fees, costs, and expenses incurred, including those incurred through any appeal, if the Owner is the prevailing party.

12. The Contractor acknowledges that the Contractor has had an opportunity to fully review with Contractor's legal counsel all requirements of this Contract, including this Contract form and all other Contract Documents. The Contractor acknowledges that the Contractor is fully familiar with the requirements for the project which is the subject hereof.

13. The Contractor shall comply with all laws, ordinances, and regulations applicable to the project.

14. The Contractor shall maintain in full force and effect all insurance required by the Contract Documents.

15. The parties hereto acknowledge that the Contract Documents reflect their complete understanding as to the provisions of this Contract and shall supersede all prior understandings, representations, and communications between them, whether oral or written, as to its subject matter.

IN WITNESS WHEREOF, the representatives of the parties hereto have executed this Contract by signing below, with full authority as the act of each party, to be effective as of the day and date first above written in two (2) counterparts, each of which shall, without proof or accounting for the other counterpart, be deemed an original Contract.

BOARD OF WATER AND SEWER COMMISSIONERS OF THE CITY OF MOBILE, ALABAMA

ATTEST

By_____ By_____
(Legal Signature) (Legal Signature)

_____ Bud McCrory, Director
(Printed Name and Title) (Printed Name and Title)

CONTRACTOR: _____

By_____ By_____
(Legal Signature) (Legal Signature)

_____ _____
(Printed Name and Title) (Printed Name and Title)

(SEAL)

NOTARY ACKNOWLEDGEMENTS

STATE OF_____
COUNTY OF_____

Before me, the undersigned Notary Public in and for the above County and State, personally appeared_____, whose name as_____ for the above Owner is signed above, and who, after being by me first duly sworn, acknowledged before me that he/she signs this Contract with full authority as the act of the Owner.

Given under my hand and seal this_____day of_____, 20____.

_____
[Print Name]: _____

My Commission Expires: _____

STATE OF_____
COUNTY OF_____

Before me, the undersigned Notary Public in and for the above County and State, personally appeared_____, whose name as_____ for the above Contractor is signed above, and who, after being by me first duly sworn, acknowledged before me that he/she signs this Contract with full authority as the act of the Contractor.

Given under my hand and seal this_____day of_____, 20____.

_____
[Print Name]: _____

My Commission Expires: _____

CONTRACT BOND

KNOW ALL MEN BY THESE PRESENTS that we _____
_____
(hereinafter the "Principal")

and _____
(hereinafter the "Surety")

are held and firmly bound unto the Board of Water and Sewer Commissioners of the City of Mobile, Alabama (hereinafter the "Board") in the penal sum of _____
_____
_____Dollars ($_____)
for the faithful performance of a certain written Contract dated the ____ day of _____, 20_____, entered into between the Principal and the Board, for the following construction project or other work (hereinafter the "Contract"):

WRIGHT SMITH WWTP PRIMARY DIGESTER
NO. 1 COVER REPLACEMENT CS010281-23
PROJECT NO. CMOB250034

a copy of which said Contract is incorporated herein by reference and made a part hereof as if fully set out.

NOW THEREFORE, this Bond and all obligations hereof shall remain in full force and effect until all covenants, terms, and conditions of the Contract for the work referenced above have been fully performed. The conditions of this Bond and its obligations are further described as follows:

The Principal shall faithfully perform all terms and conditions of the Contract and shall fully pay all obligations incurred in connection therewith. The Principal shall honor all obligations of every nature relative to the Contract.

The Principal shall save the Board harmless from any and all liability of every nature, kind, and character which may be incurred in connection with the performance or fulfillment of the Contract and from any and all other such liability resulting from negligence or otherwise on the part of the Principal and/or any entity performing work or providing materials on the Principal's behalf for the Contract. The Principal shall further save the Board harmless from all costs and damages which may be suffered by reason of the failure to fully and completely perform said Contract. The Principal shall fully reimburse and repay the Board for all expenditures of every kind and description which may be incurred by the Board in making good any and every default which may exist on the part of the Principal in connection with the performance of said Contract. The Principal shall pay all lawful claims of persons, firms, partnerships, corporations, and other entities for all labor performed and material furnished in connection with the performance of the Contract. Failure to pay any such claims of persons, firms, partnerships, or corporations shall give them a direct right of action against the Principal and Surety under this obligation.

Any alterations or additions which may be made under the Contract or in the Work to be done under it, or the giving by the Board of any extensions of time for the performance of the Contract, or any other forbearance on the part of either the Board or the Principal shall not, in any way, release the Principal and Surety, or either of them, their heirs, executors, administrators, successors, or assigns for their liability hereunder, notice to the Surety of any such alteration, extension, or forbearance being expressly waived.

All obligations of this Bond shall remain in full force and effect until the performance of all covenants, terms, and conditions herein stipulated, and after such performance in full, it shall become null and void.

IN TESTIMONY WHEREOF witness the hands and seal of the parties hereto on this _____ day of _____, 20_____.
Executed in two (2) counterparts.

By _____
(Principal)

Witness: _____ _____
(Legal Signature) (Printed Name and Title)

_____ By _____
(Surety)

Witness: _____ _____
(Legal Signature) (Printed Name and Title)

LABOR AND MATERIAL BOND

KNOW ALL MEN BY THESE PRESENTS: That we _____,

as Principal, and_____and

_____, as Surety, are held and firmly bound unto the Board of Water and Sewer Commissioners of the city of Mobile, Alabama, hereafter called the "Obligee", in the penal sum of _____Dollars **($**_____), lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, personal representatives, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Principal has entered into a certain Contract with said Obligee, dated the _____, day of _____ 20_____, (hereinafter called the "Contract) for the construction of:

WRIGHT SMITH WWTP PRIMARY DIGESTER
NO. 1 COVER REPLACEMENT
SRF PROJECT NO. CS010281-23
PROJECT NO. CMOB250034

which Contract and the Specifications for said Work shall be deemed a part hereof as fully as if set out herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH that if said Principal and all subcontractors to whom any portion of work provided for in said Contract is sublet and all assignees of said Principal and of such subcontractors, shall promptly make payments to all persons supplying him or them with labor, materials, feed-stuffs or supplies for or in the prosecution of the Work provided for in such Contract, or in any amendment or extension of or additions to said Contract, and for the payment of reasonable attorney's fees, incurred by the claimant or claimants in suits on each bond, then the above obligations shall be void; otherwise to remain in full force and effect. PROVIDED, however that this bond is subject to the following conditions and limitations.

(a) Any person, firm or corporation that has furnished labor, materials, feed-stuffs, or supplies for or in the prosecution of the Work provided for in said Contract shall have a direct right of action against the Principal and Surety on this bond, which right of action shall be asserted in a proceeding instituted in the County in which the Work provided for in said Contract

is to be performed or in any county in which said Principal and Surety does business. Such right of action shall be asserted in a proceeding instituted in the name of the claimant or claimants for his or their use and benefit against said Principal and Surety or either of them (but not later than one year after the final settlement, including warranties, of said Contract) in which action such claim or claims shall be adjudicated and judgment rendered thereon.

(b) The Principal and Surety hereby designate and appoint

_____

(Chief Executive Officer of Surety Company)

as the agent of each of them to receive and accept service of process or other pleading issued or filed in any proceeding instituted on this bond and hereby consent that such service shall be the same as personal service on the Principal and/or Surety.

(c) The Surety shall not be liable hereunder for damage or compensation recoverable under any Workmen's Compensation or Employer's Liability Statute.

(d) In no event shall the Surety be liable for a greater sum than the obligation of this bond, or subject to any suit, action or proceeding thereon that is instituted later than one year after the final settlement, including warranties, of said Contract.

(e) This bond is given pursuant to the terms of Act No. 39, General Laws of Alabama, approved February 8, 1935, entitled "An Act to Further Provide for Bonds of Contractors on State and Other Public Works and Suits Thereon."

Executed in two (2) counterparts.

SIGNED, SEALED AND DELIVERED THIS _____day
of _____, 20____.

By _____
(Principal)

(Seal)

Witness: _____ _____
(Legal Signature) (Printed Name and Title)

By _____
(Surety)

Witness: _____ _____
(Legal Signature) (Printed Name and Title)

By _____
(Resident Agent)

_____
(Printed Name and Title)

Board of Water and Sewer Commissioners
of the
City of Mobile, Alabama

Update of Standard Specifications
Section 1

Definition of Terms

Updated 05.2021

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SECTION 1

DEFINITION OF TERMS

1.01 DEFINITIONS:

Whenever in these Specifications, or in any documents or instruments in construction operations where these Specifications govern, the following terms, or pronouns in the place of them, are used, the intent and meaning shall be interpreted as follows:

1.02 AASHTO:

The American Association of State Highway and Transportation Officials. Any reference to AASHTO standards shall be taken to mean the most recently published revision unless otherwise specified.

1.03 ANSI:

The American National Standards Institute. Any reference to ANSI standards shall be taken to mean the most recently published revision unless otherwise specified.

1.04 ADDENDUM:

An Addendum is a document which is added to the original Contract Documents during the bidding period to clarify, revise, add to, or delete from the original Contract Documents or previous Addenda.

1.05 ADEM:

The Alabama Department of Environmental Management.

1.06 ADVERTISEMENT FOR BIDS:

A document which briefly describes to prospective Bidders the title and location of Project, location of bid opening, brief description of nature and scope of Project, identities of Owner and Engineer, how to obtain Bid Documents, deposit requirements, statement of bid security, and method of submitting bids.

1.07 AGREEMENT:

The written agreement between Owner and Contractor covering the Work to be performed; other Contract Documents are attached to the Agreement.

1.08 ASTM:

The American Society for Testing Materials. Any reference to ASTM standards shall be taken to mean the most recently published revision unless otherwise specified.

1.09 AWWA:

The American Water Works Association. Any reference to AWWA standards shall be taken to mean the most recently published revision unless otherwise specified.

1.10 BID:

The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

1.11 BIDDER:

Any individual, firm or corporation submitting a Proposal for the Work contemplated, acting directly or through a duly authorized representative.

1.12 BOARD:

The Board of Water and Sewer Commissioners of the City of Mobile, Alabama.

1.13 CONTRACT:

The written agreement between the Owner and the Contractor, covering the performance of the Work and the furnishing of the labor and materials in the construction thereof. The Contract shall include, but shall not be limited to the "Invitation for Bids," "Proposal," "Plans," "General Conditions," "Standard Specifications," "Supplemental Specifications," "Special Provisions" (if any), "Contract Agreement" and "Contract Bonds," together with all the "Supplemental Agreements," "Addenda," and "Extra Work Orders" that are required to complete the Work in a substantial and acceptable manner.

1.14 CONTRACT BID PRICE:

The sum of the products of the quantities of the items of the Work listed in the Proposal, and the respective lump sum or unit prices bid in the Proposal.

1.15 CONTRACT BONDS:

The approved bonds furnished by the Contractor and his surety to guarantee completion of the Contract in accordance with its terms and prompt payment to all persons supplying him or them with labor, materials, or supplies.

1.16 CONTRACTOR:

The individual, firm, or corporation that has entered into a Contract awarded him by the Owner for any work covered by these Specifications, acting directly or through his agents or employees.

1.17 COUNTY:

The county in which the Project is being constructed.

1.18 DEVELOPER:

The person, firm or corporation engaged in developing or improving real estate for use or occupancy.

1.19 DEVELOPER'S ENGINEER:

An Engineer registered with the Alabama State Board of Registration for Professional Engineers, retained by the developer to provide professional engineering services for a project.

1.20 DIPRA:

The Ductile Iron Pipe Research Association.

1.21 ENGINEER:

An Engineer registered with Alabama State Board of Registration for Professional Engineers or his authorized representative, acting as the Owner's agent within the scope of the authority and/or the particular duties entrusted to it.

1.22 EQUIPMENT:

All machinery and equipment, together with the necessary supplies for upkeep and maintenance, and also all tools and apparatus necessary for the proper construction and acceptable completion of the Work.

1.23 EXTRA WORK:

Performance or furnishing of work or materials which is found necessary for proper completion of the improvement and which in principle is an obligation of the Contractor, but which is not covered by any item in the bid schedule in the Proposal and for which no means of payment, direct or indirect, has been provided in the Contract, and which is an obligation for which special remuneration, by an "Extra" price or by other consideration, in any case to be duly negotiated, or by "Force Account," shall be paid to the Contractor.

1.24 EXTRA WORK ORDERS:

Written orders approved by the Owner to the Contractor concerning the performance of work or furnishing of materials involving Extra Work as defined in these Specifications.

1.25 LABORATORY:

Any laboratory authorized by the Owner to test materials and work involved in the Contract.

1.26 MATERIAL:

Any substance proposed to be used in connection with the construction of any part of the Work and its appurtenances.

1.27 NEMA:

The National Electrical Manufacturers Association. Any reference to NEMA standards shall be taken to mean the most recently published revision unless otherwise specified.

1.28 NOTICE TO PROCEED:

Written notice from the Engineer or the equivalent thereto giving the Contractor notice of the date on which he is to begin the prosecution of the Work for which he has contracted.

1.29 OSHA:

The Federal Occupational Safety and Health Administration.

1.30 OWNER:

The Board of Water and Sewer Commissioners of the City of Mobile, Alabama.

1.31 OWNER CONTINGENCY ALLOWANCE:

A cash allowance amount established in the bid proposal for the owner's use in the event there are additions and/or changes to the work in the contract.

1.32 PLANS (DRAWINGS):

All official, approved Plans (Drawings), which are on file with the Owner, or exact reproductions thereof, showing details of the Work covered by the Contract.

1.33 PRODUCT:

The term "product" as used in these Contract Documents includes materials, systems and equipment.

1.34 PROJECT:

The entire Work to be performed pursuant to the Contract Documents.

1.35 PROPOSAL:

The written offer for the Work contemplated, when submitted by the Bidder in the required manner on the prescribed Proposal Form, properly signed and guaranteed.

1.36 PROPOSAL FORM:

The approved prepared form on which the Owner requires the formal bids to be submitted for the Work contemplated.

1.37 PROPOSAL GUARANTY:

The certified check or bid bond designated in the Invitation for Bids, or in the Proposal Form, to be furnished by the Bidder to ensure execution of the Contract and furnishing of the bonds for the Work contemplated, if it be awarded to him.

1.38 RECORD DRAWINGS:

Drawings which show details of the Work as on the Plans but which revise the Plans to include any modifications or deviations which have been approved by the Board or the Engineer and incorporated into the Work.

1.39 RESIDENT PROJECT REPRESENTATIVE:

The authorized representative of the Engineer who is assigned to the Project site or any part thereof.

1.40 SAHD:

The State of Alabama Highway Department.

1.41 SHOP DRAWINGS:

All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by Contractor, a subcontractor, manufacturer, supplier, distributor or other person on behalf of the Contractor, and which illustrate the equipment, material or some portion of the Work.

1.42 SPECIFICATIONS:

The general term comprising all the directions, provisions and requirements contained herein, together with such as may be added or adopted as General Conditions, Supplemental General Conditions, Supplemental Specifications or Special Provisions.

1.43 STATE:

The state in which the Project is being constructed.

1.44 SUBCONTRACTOR:

Any properly qualified individual, firm, or corporation undertaking the performance of any part of the Work under the terms of the Contract by virtue of an agreement between himself and the Contractor previously approved by the Owner.

1.45 SUPERINTENDENT:

The representative for the Contractor present on the Work site at all times during progress, authorized to receive and fulfill instructions from the Engineer or Owner.

1.46 SUPPLEMENTAL AGREEMENT:

A written agreement executed by the Owner and the Contractor with the consent of the Surety covering major changes and/or revised or new prices and items and supplementing the original Contract.

1.47 SURETY:

The corporate body, licensed under the laws of the state, bound with and for the Contractor for the acceptable performance of the Contract and also for the payment of claims recoverable under the Contract Bonds.

1.48 WORK:

The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

END OF SECTION

Board of Water and Sewer Commissioners
of the
City of Mobile, Alabama

Update of Standard Specifications
Section 2

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2.01 GENERAL QUALIFICATIONS OF BIDDERS:

All bidders acknowledge that a bidder's financial stability, its ability to furnish the necessary equipment and materials throughout the project, and the knowledge, training, and experience of its employees are important to prevent interruption of service and inconvenience to Owner, to protect the environment and public health, and to ensure completion of a quality product in the allotted time.

Bidders shall be licensed as Contractors when required by law, and shall have appropriate specialty designation(s) if required for the project.

Each bidder must be able to submit proof that bidder as an entity [whether the bidder is a person, corporation, partnership, firm, company, or other entity] as well as bidder's supervisory employees [including project superintendent, project manager, and forepersons] have had a minimum of two (2) years' experience immediately preceding the submission of the bid, performing work of a similar scope and complexity. Bidder must be able to present proof that Bidder and its supervisory employees completed this similar work in a satisfactory and safe manner.

Each bidder acknowledges that failure to present proof that Bidder as an entity and Bidder's supervisory employees have satisfactorily performed similar work for at least two (2) years immediately preceding the submission of this bid shall result in rejection of bid.

Each bidder must be able to furnish proof that it owns, or has in its possession and control, appropriate and sufficient equipment to properly and efficiently perform all work required under this contract.

2.02 CONTENTS OF PROPOSAL FORMS:

The Owner will furnish to Bidders, Specifications containing a blank Proposal Form showing description of the Work contemplated, the approximate estimate of the various quantities of the pay items of the Work to be performed and materials to be furnished, the amount of the Proposal Guaranty, and the date, time, and place of opening of Proposals, and the time in which the Work must be completed. All papers bound with or attached to the Proposal Form are a necessary part thereof and must not be detached or altered.

Failure to submit a subcontracting plan will result in your bid being considered non-responsive.

All bidders shall submit a plan for the use of small and small disadvantaged businesses as subcontractors. The form provided with the Proposal shall be used for this purpose.

2.03 INTERPRETATION OF APPROXIMATE ESTIMATES:

Although the estimate of quantities of work listed in the Proposal Form are the results of calculations made from field surveys or other available information, they are to be considered as only approximate estimates of the quantities of the different pay items and are to be used only as a basis for comparing bids for awarding the Contract.

Such quantities, including the classification thereof, may or may not be representative of the actual conditions encountered during construction and the Owner does not guarantee that the approximate quantities given will hold strictly in the construction of the Work.

Final payment to the Contractor will be made for only the actual quantities of the respective pay items of the Work performed, at the Contract unit prices bid in the Proposal, in accordance with the Plans and Specifications, as finally determined from actual measurements made during the progress or after completion of the Work, and if, upon completion of the Work, the actual quantities of the respective pay items performed shall be more or less than the quantities estimated in the Proposal, the Contract unit prices bid in the Proposal will still prevail, except as otherwise hereinafter provided.

2.04 EXAMINATION OF PLANS AND SPECIFICATIONS, SPECIAL PROVISIONS AND SITE OF WORK:

All Bidders are required to examine carefully the site of the proposed Work, the Proposal Form, Plans, General Conditions, Standard Specifications, Supplemental Specifications, Special Provisions, and the Contract and Bond Forms, and it is mutually agreed that the submission of a Proposal shall be prima-facie evidence that the Bidder has made such examination and has judged for and satisfied himself as to the conditions to be encountered as to the character, quality, and quantities of work to be performed and materials to be furnished, and as to the requirements of Plans, General Conditions, Standard Specifications, Supplemental Specifications, Special Provisions, Contract and Bonds, and as to the contingencies. Bidders shall satisfy themselves that the Work can be completed within the time set forth in the Contract. Bidders shall also familiarize themselves with and shall comply with the requirements of all federal, state, and local laws and ordinances which may directly or indirectly affect the Work or its prosecution, persons engaged in or employed on the Work, and the materials or equipment used in the Work. No adjustments or compensations will be allowed for losses caused by failure to comply with the above requirements.

2.05 PREPARATION OF PROPOSAL:

The Bidder's Proposal must be submitted on the Proposal Form furnished him by the Owner.

The Bidder must specify, with figures, a unit price for each of the separate items for which a quantity is given in the Proposal Form (except when alternate bids are called for on items) and shall show the products of the respective unit prices and the estimated quantities in the columns provided for that purpose, as well as the gross sum for which he will perform all of the estimated work required by these Standard Specifications, Supplemental Specifications, Special Provisions, and the Plans. The Engineer will check the gross sum given in the Proposal, and in case of error or discrepancy, the gross sum obtained by adding the products of the unit prices and the various estimated quantities listed in the Proposal shall prevail and this shall be the Contract Bid Price. The Proposal shall be properly signed by the Bidder.

2.06 IRREGULAR PROPOSALS:

Proposals may be rejected if they contain any omissions, alterations of form, additions not called for, conditional bids, alternate bids unless called for, incomplete bids, erasures or irregularities of any kind. Proposals in which the unit or lump sum prices bid are obviously unbalanced may be rejected.

No alteration of the terms and conditions of the sealed bid which are written upon or appended to the outside of the bid will be accepted or considered.

2.07 PROPOSAL GUARANTY:

No Proposal will be considered unless accompanied by a properly certified check or bid bond made payable to the Owner in the amount indicated in the Invitation for Bids. Cashier's checks will not be accepted in lieu thereof. The full amount of the Proposal Guaranty of a Bidder whose Proposal is accepted shall be forfeited to the Owner, in liquidation of damages, in the event of failure of the Bidder to execute Contract and Contract Bonds as stipulated herein.

2.08 DELIVERY OF PROPOSALS:

Each Proposal shall be placed, together with the Proposal Guaranty, in a sealed envelope, on the outside of which is written in large letters "Proposal for (Name of Project)" and so marked as to indicate the Project and the name of the Bidder, and the Bidder General Contractor's license number (where applicable). Proposals may be delivered in person or by mail. When sent by mail, preferably registered, the sealed Proposal, marked as indicated above, shall be enclosed in another envelope for mailing. Proposals will be received by the Owner until the hour of the date set in the Invitation for Bids for the opening thereof. No Proposal will be accepted or considered which has not been received prior to the hour of the opening date.

2.09 WITHDRAWAL OR REVISION OF PROPOSAL:

A Proposal may be withdrawn at any time prior to the hour fixed in the Invitation for Bids for opening of Proposals, provided a request in writing executed by the Bidder or his duly authorized representative is filed with the Owner prior to that time. When such Proposal is reached, it will be returned to the Bidder unopened. No Proposal can be withdrawn, modified or corrected after the hour set for opening such Proposals. Proposals received after the hour set for opening will be returned unopened.

2.10 OPENING OF PROPOSALS:

Proposals will be opened and read publicly, except when directed otherwise by the Owner, at the time and place indicated in the Invitation for Bids. Bidders or their authorized representative are invited to be present at public opening of bids.

2.11 DISQUALIFICATION OF BIDDERS:

If there is reason to believe that collusion exists among the Bidders, any or all Proposals may be rejected, and participants in such collusion may not be considered in future Proposals for the same work.

2.12 LIQUIDATED DAMAGES:

Time is an essential element in the Contract. As the prosecution of the Work will inconvenience the public, obstruct traffic, and interfere with business, it is important that the Work be pressed vigorously to completion. Also, the cost to the Owner for the administration of the Contract, observation, and engineering for the Work under construction will be increased if the time occupied in the Work is lengthened. Therefore, for each day that the Work remains uncompleted after the time specified in the

Contract, or additional time may be allowed by the Owner for the completion of the Work when extra or additional work is ordered by the Owner, the amount specified in the Contract shall be paid by the Contractor to the Owner as liquidated damages for the loss sustained by the Owner because of failure of the Contractor to complete the Work within the specified time. Liquidated damages will be deducted from partial payments otherwise due the Contractor. The amount of liquidated damages shall be the amount set forth in the Contract.

END OF SECTION

Board of Water and Sewer Commissioners
of the
City of Mobile, Alabama

Update of Standard Specifications
Section 3

Award and Execution of Contract

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SECTION 3

AWARD AND EXECUTION OF CONTRACT

3.01 CONSIDERATION OF BIDS:

After the Proposals are opened and read, the approximate estimated quantity of each item multiplied by the unit price bid for that item, the products calculated, and the gross sums bid obtained in each of the acceptable Proposals, the Contract Bid Prices will be compared and the results of such comparison will be made available to each Bidder on request. Until the final award of the Contract, however, the Owner reserves the right to reject any and all Proposals, and to waive all technicalities.

3.02 AWARD OF CONTRACT:

The award of the Contract, if it is to be awarded, will be by the Owner to the lowest responsible Bidder whose Proposal shall comply with all the requirements necessary to render it formal. The successful Bidder will be notified by letter, mailed to the address shown on his Proposal, that his bid has been accepted and that he has been awarded the Contract. Award will be made within 60 days after bids are received unless otherwise stated in the Special Provisions. This period may be extended if mutually agreeable to Owner and Contractor.

The Owner, before awarding the Contract, may require a reviewed financial statement. If, in the opinion of the Owner, this statement does not justify the award, the Owner reserves the right to reject the low bid. The reviewed financial statement shall contain, as a minimum, a review of financial statements including performing inquiry and analytical procedures that provide the Owner with a reasonable basis for expressing limited assurance that there are not material modifications that should be made to the statements in order for them to be in conformity with generally accepted accounting principles or, if applicable, with any other comprehensive basis of accounting. The financial statement shall be submitted within 10 days of the Owner's request.

Should it be necessary to eliminate part of the Work in order to award the Contract within the funds available for construction, the Owner reserves the right to designate the portion of the Work to be omitted. The amount of deduction will be determined by multiplying the quantity of items omitted by the unit price or lump sum bid for such items, or by negotiation.

3.03 RETURN OF PROPOSAL GUARANTEE:

All Proposal Guarantees will be returned, if requested, within 30 days following the opening of Proposals; except those of the three lowest Bidders, which will be returned, if requested, after satisfactory bonds have been furnished and the Contract has been executed. The Owner reserves the right to return all Proposal Guarantees by mail and its responsibility shall end upon the mailing thereof.

3.04 EXECUTION OF CONTRACT:

The Contract shall be signed by the successful Bidder and returned to the Engineer with satisfactory Contract Bonds within 10 days after the date of Notice of Award.

05/19
[1]Revised 02/03
[2]Revised and adopted 07/24/06
[3]Revised and adopted 07/24/06
[4]C3.1 Revised 4/4/11

3.05 FAILURE TO EXECUTE CONTRACT:

Failure to execute a Contract and file acceptable Contract Bonds within 10 days after the date of Notice of Award shall be just cause for the annulment of the award and the forfeiture of the Proposal Guaranty[1] as liquidation of damages sustained. Award may then be made to the next lowest responsible Bidder or the Work may be readvertised or constructed by day labor, or otherwise contracted as the Owner may decide.

3.06 REQUIREMENTS OF CONTRACT BONDS:

Prior to award of the Contract, the Contractor shall submit to the Owner the name and address of the bonding company for the approval of the Owner.

A Contract Bond, and a Labor and Material Payment Bond, in the forms which are included in the Contract Documents, and each in the sum as herein specified, to be duly executed at the proper time sequence by the successful Bidder as Principal and by a surety company licensed to do business under the laws of the State in which the Work is located, and satisfactory to the Owner, will be required for the faithful performance of the Contract, and the payment for labor and materials. Sureties to be acceptable must be named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U. S. Treasury Department. In addition, the surety company must have a rating of A- or better, as rated by A. M. Best Company.[2]

To insure the faithful performance of each and every condition, stipulation, and requirement of the Contract, and to indemnify and save harmless the Owner from any and all damages, either directly or indirectly, arising out of any failure to perform the same, the successful Bidder, to whom the Contract is awarded shall, within 10 days from the date of the award, furnish and file with the Owner an acceptable Contract Bond in the amount equal to 100 percent of the Contract Bid Price of the Contract awarded. In case of default on the part of the Contractor, all expenses incident to ascertaining and collecting losses suffered by the Owner under the bond, including both engineering and legal services, shall lie against the Contract Bond for performance of the Work.

In addition thereto, the successful Bidder to whom the Contract is awarded shall, within 10 days, furnish and file with the Owner an acceptable surety bond for payment of labor, materials, feed-stuffs or supplies payable to the Owner in an amount not less than 100 percent of the Contract Price, with the obligation that the Contractor shall promptly make payment to all persons furnishing him or them with labor, materials, feed-stuffs, or supplies for or in the prosecution of the Work, and for the payment of reasonable attorney's fees incurred by successful claimants or plaintiffs in suits on said Bond.

If at any time, the Owner, for justifiable cause, shall be or become dissatisfied with any surety or sureties upon the Performance or Payment Bonds, the Contractor shall, within 5 days after notice from the Owner, substitute an acceptable bond (or bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on such bond shall be paid by the Contractor. No further payments to the Contractor shall be deemed due nor shall be made until the new surety or sureties shall have furnished acceptable bond to the Owner.

05/19
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[2]Revised and adopted 07/24/06
[3]Revised and adopted 07/24/06
[4]C3.1 Revised 4/4/11

In lieu of a Contract Bond and a Labor and Material Bond, the Contractor may submit an irrevocable letter of Credit (Appendix K). The letter must be completed and certified by a lending institution satisfactory to the Board. The letter shall be in the amount of 100% of the Contract amount.

3.07 INSURANCE:[3]

A. **General:** The Contractor shall provide insurance in accordance with the required specifications.

B. **Contractor Coverage:** The Contractor shall not commence work under this Contract until he has obtained all insurance required under the following paragraphs and until such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been obtained and approved. If the subcontractor does not take out insurance in his own name, the principal contractor shall provide such insurance protection for the subcontractor and such subcontractor's employees.

C. **Casualty Insurance:** The following insurance coverages (with limits not less than specified herein) shall be maintained by the Contractor for the duration of the Contract, affording coverage for any claim arising out of Contractor's operations herein, whether by the Contractor or by any subcontractor or by any Employee or Agent of either:

1. Claims of Employees under Worker's Compensation and other similar employee benefit acts, including claims because of bodily injury, occupational sickness or disease, or death.[4]

2. Claims arising out of bodily injury, sickness, disease, or death of any person other than employee.

3. Claims for damages arising out of libel, slander, false arrest, detention or imprisonment, malicious prosecution, defamation or violation of right of privacy, wrongful entry or eviction or other right of private occupancy, including claims as a result of an offense related to the employment of a claimant by Contractor (so-called "Personal Injury").

4. Claims arising out of damage to or destruction of tangible property, including loss of use.

5. The Contractor shall furnish certification of insurance and policies verifying that the above coverages are in effect before commencing any work, and that each policy is endorsed to give the Owner 30 days notice in writing in the event of cancellation or material change therein.

   Policies of Insurance shall state that the Owner and the Owner's employees be named as additional insureds on the Contractor's Automobile Liability and Commercial General Liability policies.

   In respect to Worker's Compensation, a Waiver of Subrogation shall be issued in favor of the Owner. Where applicable, the U.S. Longshore and Harborworkers Compensation Act Endorsement shall be attached to the policy. Where applicable, the Maritime Coverage Endorsement (to include coverage under Jones Act) shall be attached to the policy. Both the U.

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[4]C3.1 Revised 4/4/11

S. Longshore and Harborworkers and the Maritime Coverage shall have limits equal to or greater than the employer's liability coverage.

6. Rated by AM Best – A- or better. For non-admitted companies, a rating of A or better by AM Best.

   a. At the discretion of the Board, worker's compensation insurance may be placed through a qualified worker's compensation self-insurance fund.

   b. Limits of Liability:

Type of Insurance	**Bodily Index**
Worker's Compensation	Statutory
Employers' Liability	$500,000 Each Accident, $500,000 By Disease, Policy Lmt $500,000 Disease, Each Employee
Commercial Automobile	$1,000,000 Each Accident Bodily Injury and Property Damage Combined Business auto includes all owned, leased, hired and non-owned automobiles.

Commercial General Liability:

$1,000,000 per Occurrence
$1,000,000 Personal & Advertising Injury
$2,000,000 General Aggregate per project
$2,000,000 Products & Completed Operations Aggregate
$100,000 fire damage liability

Umbrella Liability:

In addition to the basic limits previously set out for Commercial General Liability, Products and Completed Operations, Automobile Liability and Worker's Compensation and Employer's Liability, Contractors shall provide Umbrella Liability limits of $5,000,000 per occurrence and aggregate.

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[4]C3.1 Revised 4/4/11

Coverage shall be issued with a "pay on behalf of" wording, including Personal Injury and other extensions, and provide coverage at least as broad as that afforded by the primary insurance policies.

Extensions:

Blanket Contractual Liability
Personal Injury
Blanket Collapse and Underground Coverage
Broad Form Property (including Completed Operations)
Employees as Additional Insureds
Host Liquor Liability
Non-owned Watercraft Liability
Worldwide Products
Fire Legal Liability
Incidental Medical Malpractice
Extended Bodily Injury (Assault and Battery)
Newly Acquired Organizations

When and if the use of explosives for blasting purposes appears necessary or desirable, such methods shall not be undertaken without written authorization of the Owner, and then only provided that acceptable extensions of liability coverage have been obtained specifically to include the explosion ("X") hazard and the collapse ("C") hazard.

The policy of general liability shall include the special underground property damage coverage (providing the so-called "U" hazard) on a blanket basis.

D. **Owner's Protective Liability:**

The Contractor shall furnish from a carrier acceptable to the Owner, a policy of liability insurance, commonly called "Owner's Protective Liability" in the name of the Board of Water and Sewer Commissioners of the City of Mobile, d/b/a MAWSS, providing "Independent Contractor's Coverage" for the operations embraced by this Contract with limits of $1,000,000 bodily injury and $1,000,000 property damage. Policy shall be endorsed that the premium is to be paid by the named Contractor.

E. **Property Insurance – Contractor:**

1. The Contractor shall assume complete responsibility for safe-guarding all portions of the Work in progress, whether completed or not, until such work has been accepted by the Owner, and shall maintain such insurance to protect himself against perils which may cause such property to be damaged or destroyed. This coverage shall be similar to the former All Risks of Physical Loss Form, including, if available, Collapse. Title to such work in progress, whether completed or not, shall remain vested in the Contractor until finally accepted by the Owner.

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[2]Revised and adopted 07/24/06
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[4]C3.1 Revised 4/4/11

2. **Coverage Form-** Coverage shall be provided on an actual completed value Builder's Risk Form or, if more appropriate, an installation floater in the joint name of the Contractor and Owner for the duration of the Contract.

3. The Owner has the option of providing Builder's Risk coverage for any projects undertaken by a Contractor. If the Owner exercises this option, the Contract Proposal will appropriately indicate this and provide for separately showing the cost of the Builder's Risk coverage in the bid.

3.08 INDEMNITY PROVISIONS:

The Contractor shall indemnify and hold harmless the Owner and the Engineer and their agents and employees from and against all claims, damages, losses, demands, payments, suits, actions, recoveries and judgments of every nature and description and expenses including attorney's fees arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense: (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom; and (2) is caused in whole or in part by a negligent act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

The Contractor shall assume all risk and bear any loss or injury to property or persons occasioned by neglect or accident during the progress of Work until the same shall have been completed and accepted. He shall also assume all blame or loss by reason of neglect or violation of any state or federal law or municipal rule, regulation or order. The Contractor shall give to the proper authorities all required notices relating to the Work, obtain all official permits and licenses and pay all proper fees. He shall make good any injury that may have occurred to any adjoining building, structure or utility in consequence of the Work.

In any and all claims against the Owner or the Engineer or any of their agents or employees by any employee of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under the "INDEMNITY PROVISIONS" shall not be limited in any way by any limitation on the amount or types of damages, compensation or benefits payable by or for the Contractor or any subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts.

The obligations of the Contractor under Paragraph 3.08 shall not extend to the liability of the Engineer's negligent acts, errors or omissions, or those of his employees or agents.

END OF SECTION

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Board of Water and Sewer Commissioners
of the
City of Mobile, Alabama

Update of Standard Specifications
Section 4

Scope of Work

Updated May 2021

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SECTION 4

SCOPE OF WORK

4.01 INTENT OF PLANS AND SPECIFICATIONS:

The true intent of the Plans, Specifications, and Special Provisions is to prescribe a complete Work or improvement which the Contractor undertakes to do, complete in every detail, in full compliance with the Plans, General Conditions, these Specifications, the Supplemental Specifications, the Special Provisions, Proposal, Contract and Invitation for Bids, together with all authorized alterations, Supplemental Agreements and Extra Work Orders. The Contractor shall perform all items of the Work covered and stipulated in the Contract, Specifications, and Plans, shall remove all obstructions from the right of way, and shall do such special, additional, extra, and incidental work as may be considered necessary to complete the Work and its appurtenances, or structures, to the finished lines, grades, cross sections and dimensions shown on the Plans or as modified by written orders of the Engineer, in a satisfactory and acceptable manner. The Contractor shall furnish, unless definitely and expressly provided to the contrary in the Proposal, Special Provisions or Plans, all material, implements, machinery, equipment, tools, supplies, transportation and labor necessary to the prosecution and completion of the Work.

4.02 UNDERGROUND AND EXISTING UTILITIES:

The Plans show structures, certain features of the topography, and certain underground utilities, but they do not purport to show all features, lines, or obstructions. Such topography and notes in the Plans were inserted from records available, and are for the Contractor's convenience only. The Contractor shall verify the existence and location of surface topography, underground structures, and utilities to assure conflicts will be avoided in the construction of this Work. The Contractor shall conduct prudent underground explorations in advance of his work in order to make adjustments to the Work if necessary. The Contractor shall protect, maintain and keep in service all existing utilities and service connections during construction operations. Any existing utility lines cut or damaged shall be repaired immediately and the service restored at the Contractor's expense.

4.03 ALTERATION OF PLANS OR CHARACTER OF WORK:

The Owner or his authorized representative may without notice to the Surety make, without change in the unit prices, alterations in the Plans or in the nature of the Work which they may consider necessary or desirable during the progress of the Work to complete fully and acceptably the proposed construction, provided that such alterations do not materially change the general features of the original Plans and Specifications. Material changes shall be understood to mean those changes in the original Plans and Specifications made necessary by the exigencies of the Work resulting in the alteration of cost to the Contractor by an amount which could not have been foreseen at the time of his bidding upon the Work. The Owner reserves the right for the Engineer to revise any part of the alignment, grades, structures, width, and other dimensions on the Work, if the Engineer deems it advisable and such changes shall not be considered material changes. The Owner also reserves the right for the Engineer to increase or decrease the quantity of any or all of the items listed in the estimate of approximate quantities in the Proposal Form

and such increase or decrease shall not be considered as a waiver of any of the conditions of the Contract or Contract Bonds.

4.04 EXTRA WORK:

In connection with the Work covered by the Contract, the Owner or his authorized representative may at any time during its progress order other work or materials incidental thereto. If any such work and material is not listed as a pay item with a Contract Unit Bid Price or if compensation therefore is not included in the Contract unit prices bid for other pay items under the terms of the Contract, it will be designated as Extra Work, and shall be performed by the Contractor as directed, provided, however, that before any Extra Work is started the Engineer shall furnish the Contractor a Proposal Form, stating the location, kind and estimated quantity of Extra Work to be done. The Contractor shall indicate on this Proposal Form the compensation (unit price, or lump sum) for which he will perform the Extra Work and this Proposal shall be submitted to the Owner for approval. The Owner may approve the Proposal, in which case it shall be an authorization for doing the Work and shall become a part of the Contract, but if the Owner considers the price submitted for any item of the Extra Work excessive and a satisfactory adjustment price cannot be reached for such item, it shall be optional with the Owner to terminate the Contract insofar as it applies to such item or Extra Work in question and perform such Extra Work by other agents or other means or to direct that the Contractor performs the Work on a "Force Account" basis. Claims for payment for Extra Work not so authorized may be rejected by the Owner.

4.05 CONSTRUCTION AND MAINTENANCE OF DETOURS:

No road or section of road shall be closed to traffic except with the written permission of the Engineer and the governing authority, and no construction operations that will in any way inconvenience the traveling public shall be started until adequate provisions have been made to detour or bypass traffic in safety and comfort. All detours shall be approved by the Highway Department, City Engineer or the official having jurisdiction over the roads or streets.

The Contractor shall maintain all detours for traffic over the Work. Unless otherwise provided in the Special Provisions, the road, while undergoing improvement, shall be kept continuously open to public traffic and in passable and safe condition.

When the Contractor hauls materials over any detour or public road, he shall so regulate his loads that the capacity of the road and its structures is not exceeded and he shall be responsible for any specific damage that may result to the road or its structures from failure to observe regulations governing traffic thereon.

4.06 REMOVAL AND DISPOSAL OF STRUCTURES AND OBSTRUCTIONS:

Unless otherwise provided, the Contractor shall remove at his expense any existing above or below-ground structure or part of structure, fence, building, or other encumbrance or obstruction upon or within the limits of the Work, which interferes in any way with the new construction. Compensation for the removal of any structure not listed as a pay item in the Proposal with a Contract Bid Price shall be included in the Contract unit prices bid for the pay items of the Work.

4.07 FINAL CLEAN-UP:

Upon completion and before Work will be finally accepted and final payment made, the Contractor shall clean and remove from the Work and adjacent property, stream channels, sites of structures, and all areas occupied by him in connection with the Work, all weeds, shrubs, stumps, portions of trees, and all other forms of objectionable organic matter; all useless, surplus, excavated or discarded materials; and all loose rock, boulders, falsework, temporary structures, machinery and equipment. He shall restore in an acceptable manner all property, both public and private, which has been damaged during the prosecution of the Work, and shall leave the Work and sites of structures in a neat presentable condition throughout the Project. Depositing any material on abutting property with or without the consent of the property owner will not be considered a satisfactory method of disposal.

4.08 MAINTENANCE OF THE WORK DURING CONSTRUCTION:

The Contractor shall be required to maintain the Work from the date of the approval of his Contract until the Work is completed and shall maintain it in first-class condition for 30 days after it is completed and until the Work is finally accepted.

The maintenance shall consist of continuous and effective work prosecuted day by day, with adequate equipment and forces to the end of the Project, keeping the entire work site in satisfactory and acceptable condition at all times. The Contractor shall take adequate precautions to protect trees, shrubs, plants, and existing site improvements from injury during construction operations and shall maintain adequate drainage and utility service during his work.

Compensation for maintenance work during construction and before the Work is finally accepted shall be included in the Contract unit prices bid on the pay items of the Work and the Owner will not pay additional for such work.

4.09 FAILURE TO MAINTAIN WORK:

The failure of the Contractor, at any time, to comply with the above provisions for maintenance of the Work will result in the following:

First: The Owner, or his authorized representative, will immediately notify the Contractor, his superintendent or employees to comply with the required maintenance provisions.

Second: In the event the Contractor fails to remedy his lack of or unsatisfactory maintenance within 24 hours after the date of issuance of this notice, the Owner may proceed immediately with adequate forces and equipment to maintain in a satisfactory and acceptable manner the Work site, and the entire cost of this maintenance will be deducted from monies due or that become due the Contractor on this Contract.

Third: As an alternate to the Owner's taking over the maintenance, all the quantities of the Work performed which are not properly maintained may be deducted from the Contractor's current payment request even if such quantities have been allowed on a previous estimate.

END OF SECTION

Board of Water and Sewer Commissioners
of the
City of Mobile, Alabama

Update of Standard Specifications
Section 5

Control of Work

Updated May 2021

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SECTION 5

CONTROL OF WORK

5.01 AUTHORITY OF THE ENGINEER

To prevent misunderstandings, disputes, and litigation, the Engineer shall decide any and all questions which arise concerning the quality and acceptability of materials furnished and work performed, the rate of progress of the Work, interpretation of the Plans and Specifications, and the acceptable fulfillment of the Contract on the part of the Contractor. The Engineer will determine the amount, quantity, classification, and quality of the several kinds of work performed and materials furnished which are to be paid for under the Contract and his decision and estimate shall be conclusive and binding on both parties thereto and such decision and estimate of the Engineer, in case any questions arise, shall be a condition precedent to the right of the Contractor to receive any money due him under the Contract. Explanations concerning the meaning of the Plans and Specifications and Contract, all directions necessary to complete or make definite the Plans, Special Provisions, Specifications or Contract and to give them due effect, will be given by the Engineer and his findings shall be final and binding on both parties hereto. The Engineer shall have authority to enforce and make effective decisions and orders as apply to conformance with the Contract. He shall decide disputes and mutual rights between Contractors.

Notwithstanding any general clauses, wording, paragraphs, or other references contained in the Plans, Specifications, General Conditions, or elsewhere in the Special Provisions, the Engineer and his Resident Project Representative are not charged with the responsibility of directing the actual procedures and detail methods of construction to be used by the Contractor in accomplishing the Work contained in the Contract between the Owner and the Contractor; nor is the Engineer responsible to act as superintendent, foreman, or safety engineer for the Contractor, nor for the safety of the Contractor's personnel.

5.02 PLANS AND SHOP DRAWINGS:

General drawings, showing such details as are necessary to give a comprehensive idea of the construction contemplated will be included in the approved Plans. The approved Plans will be supplemented by such working drawings as are necessary to adequately define the Work. It is mutually agreed that all authorized alterations affecting the requirements and information given on the approved Plans shall be in writing.

After checking and verifying all field measurements, Contractor shall submit to Engineer for review, five copies of all Shop Drawings, plus the number of copies Contractor wishes to have returned to him after Engineer's review, collated according to the organization of the accepted schedule of Shop Drawings, which will bear a stamp or specific written indication that Contractor has satisfied Contractor's responsibilities under the Contract with respect to Contractor's review of the submission. All submissions will be identified as "Shop Drawings" on the outermost enclosure and show Project name and Engineer's Project number. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, descriptive data, diagrams specified performance, design criteria, materials, and similar data to enable Engineer to review the information as required.

Contractor shall also submit to Engineer for review and approval, with such promptness as to cause no delay in Work, all samples required by the Contract. All samples will have been checked by and

accompanied by a specific written indication that Contractor has satisfied Contractor's responsibilities under the Contract with respect to the review of the submission and will be identified clearly as to material, supplier, pertinent data such as catalog numbers, and the use for which intended.

Before submission of each Shop Drawing or sample, Contractor shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the Work and the Contract.

At the time of each submission, Contractor shall give Engineer specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract, in addition, shall cause a specific notation to be made on each Shop Drawing submittal to Engineer for review and approval of each such variation. When the Contractor does call such deviation to the attention of the Engineer, the Contractor shall state in his letter whether or not such deviations involve deductions or extra cost adjustments.

Engineer will review with reasonable promptness Shop Drawings and samples, but Engineer's review will be only for conformance with the design concept of the Project and for compliance with the methods, techniques, sequences, or procedures of construction (except where a specific means, method, technique, sequence, or procedure of construction is indicated in or required by the Contract Documents). The review of a separate item will not indicate approval of the assembly in which the item functions. 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. Contractor shall direct specific attention in writing to revisions other than the corrections called for by the Engineer on previous submittals.

Engineer's review of Shop Drawings or samples shall not relieve Contractor from responsibility for any variation from the requirements of the Contract unless Contractor has, in writing, called Engineer's attention to each such variation at the time of submission, and Engineer has given written approval of such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawings or sample; nor will any review by Engineer relieve Contractor from responsibility for errors or omissions in the Shop Drawings.

The Contractor shall furnish five complete sets of the corrected copies of Shop Drawings including parts list, operation and maintenance manuals, lubrication charts and descriptive literature for all equipment. No payment shall be made to the Contractor for any specialties or equipment unless Shop Drawings have been approved by the Engineer. Final payment under the Contract will not be made until all specified documents have been submitted for equipment.

Compensation for furnishing all Shop Drawings and samples shall be included in the Contract Unit Prices for the pay items of the Work and such Drawings and samples shall be furnished by the Contractor without additional compensation.

5.03 MANUFACTURER'S DRAWINGS:

The manufacturer's drawings of any special materials required for the job shall be submitted to the Engineer for review prior to installation.

5.04 MANUFACTURER'S CERTIFICATION

To assure that manufacturers and suppliers are aware of the use to which their equipment and products will be subjected, the Contractor shall require the manufacturer or manufacturer's representative to place the following certification on submittal data transmittals.

MANUFACTURER'S CERTIFICATION

"This is to certify that we have examined the Plans and Specifications for this Project and have ascertained that this equipment or material is suitable for the Purpose and use intended."

_____

Authorized Signature – Title/Date

5.05 CONFORMITY WITH PLANS AND ALLOWABLE DEVIATIONS:

Finished work in all cases shall conform with lines, grades, sections, details and dimensions of the Work contemplated as shown on the approved Plans except as modified in writing by the Engineer. Any deviation from the approved Plans and working drawings that may be required by the exigencies of the construction will be determined by the Engineer and authorized in writing.

In cases where minor deviations within the limits shown on the Plans or contained in the Specifications will be in the best interest of the Owner or present a more finished or aesthetic appearance, then the Contractor shall notify the Engineer or his representative before the Work progresses to a point where the change cannot be effected without incurring additional expense to the Owner.

5.06 COORDINATION OF PLANS, SPECIFICATIONS, AND SPECIAL PROVISIONS:

The Specifications, Supplemental Specifications, General Conditions, Plans, Special Provisions, and all supplementary documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete Work. In case of discrepancy, figured dimensions, unless obviously incorrect, shall govern over the scaled dimensions. Supplemental Specifications shall govern over the Standard Specifications. Plans shall govern over Specifications; Special Provisions shall govern over both Specifications, Supplemental Specifications and Plans.

The Contractor shall take no advantage of, and shall promptly notify the Engineer if he discovers, any error or omission of dimensions in the Plans, or of any discrepancy between the Plans and Specifications. The Engineer will make such corrections and supply omitted dimensions as may be necessary and his interpretation shall be final.

When supplementary specifications such as Federal, ASTM, ANSI, AASHTO, AWWA, etc., are referenced in these Specifications, such references shall be the latest edition of such supplementary specifications.

5.07 COOPERATION OF THE CONTRACTOR:

The Contractor will be supplied with no more than four copies of the Plans, Specifications, Supplemental Specifications, and Special Provisions. If additional copies of documents are required, the Contractor shall reimburse the Engineer for the actual cost of reproduction of documents as requested.

The Contractor shall have available on the Work, at all times, one copy of each of said Plans, Specifications, Supplemental Specifications, and Special Provisions. He shall give the Work the constant attention necessary to facilitate the progress thereof and shall cooperate with the Engineer, Engineer's Resident Project Representative, and with other Contractors in every way possible.

The Contractor shall at all times have a competent Superintendent on the Work, capable of reading and thoroughly understanding the Plans and Specifications, as his agent on the Work, with full authority to execute the Work without delay and to supply promptly such materials, tools, plant equipment, and labor as may be required. Such Superintendent shall be furnished irrespective of the amount of work subcontracted and shall have authority over all subcontract work.

The Contractor shall schedule and conduct his work and dispose of his material as to avoid causing unnecessary inconvenience and delay to other Contractors engaged on adjacent work and so as to join his work to that of other Contractors in a proper manner, and in accordance with the spirit of the Plans and Specifications, and so as to perform his work in the proper sequence in relation to that of other adjacent work. Each Contractor shall so conduct his operation and maintain the Work in such condition that adequate drainage shall be effected at all times.

It is mutually agreed that in case of a dispute arising between two or more Contractors engaged on the same work as to the respective rights of each under these Specifications, the Engineer shall determine the matters at issue and shall define the respective rights of the various interests involved in order to secure completion of all parts of the Work in general harmony and with satisfactory results, and his decision shall be final and binding on all parties concerned and shall not in any way be a cause for claims for extra compensation by any of the parties.

5.08 CONSTRUCTION SURVEYS:

The Engineer will establish bench marks and horizontal control points. From these points, Contractor shall lay out the Work by establishing all lines and grades at the site necessary to control the Work, and shall be responsible for all measurements that may be required for the execution of the Work. Second order leveling shall be used by the Contractor in establishing elevations, and all levels shall be looped in or closed. All survey data shall be recorded in accordance with standard and approved methods. All field notes, sketches, and computations made by the Contractor in establishing control points for his work shall be available to the Engineer at all times.

The Contractor shall furnish, at his expense, all stakes, pins, platforms, equipment and labor as may be required in laying out any part of the Work from the control points established by the Engineer. It shall be the responsibility of the Contractor to maintain and preserve all stakes and other markers established by him until authorized to remove them. If any of the control points established by the Engineer are destroyed by or through negligence of the Contractor, they may be replaced by the Engineer, and the expense of replacement will be deducted from any amount due or which may become due the Contractor.

5.09 RESIDENT PROJECT REPRESENTATIVES:

The Engineer may appoint such Representatives as he desires, and they shall be granted full access to the Work and to mills and factories in which material is being prepared for use under the Contract. They shall have authority to request compliance with terms of the Contract, to approve or reject materials, to make measurements of quantities, to keep records of costs, and otherwise represent the Engineer. The Contractor may appeal from their decisions to the Engineer, pending settlement but no work shall be done in any manner contrary to the Contract on items affected by such appeal. If the Contractor refuses to comply with instruction of the Representative to fulfill the requirements of the Contract, the Representative shall, if possible, immediately notify his immediate superior and obtain instructions. Failing in this, if the Contractor refuses to suspend operations on verbal order, he shall issue a written order suspending the Work on items affected, giving in detail the reasons for suspension. Immediately after placing the order in the hands of the person in charge for the Contractor, he shall report to his immediate superior, or in his absence to the Engineer, for further instructions.

Representatives shall not be authorized to revoke, alter, enlarge, relax or release any requirements of the Special Provisions, Specifications, or Contract; to approve or accept any portion of the Work; nor to issue instruction contrary to the Plans and Specifications; nor shall they act as superintendent, foreman, or safety engineer for the Contractor nor for the safety of the Contractor's personnel; or interfere with the management of the Work. Any advice which they may give the Contractor shall not be construed as binding the Owner in any way, nor releasing the Contractor from fulfilling all the terms of the Contract.

5.10 INSPECTION:

All materials and workmanship shall be subject to inspection, examination, and test by the Representatives of the Owner, or the Engineer, at any and all times. The Owner, or the Engineer, shall have the right to reject defective materials and workmanship or require correction thereof. Rejected materials shall be promptly and satisfactorily replaced with proper materials and rejected workmanship shall be promptly and satisfactorily corrected. If the Contractor fails to proceed at once with the replacement of rejected materials or the correction of rejected workmanship, the Owner may, by Contract or otherwise, replace such materials or correct such workmanship and charge the cost thereof to the Contractor. Failure of Representatives to find defects or to request removals shall in no way relieve the Contractor of responsibility.

The Contractor shall furnish the Engineer with every reasonable facility for ascertaining whether or not the Work performed and materials used are in accordance with the requirements and intent of the Specifications and Contract. At any time before final acceptance of the Work, the Contractor shall, if the Engineer requests, remove and uncover such portions of the finished work as the Engineer may direct. After the examination, the Contractor shall restore said portions of the Work to the standard required by the Contract. If the work thus exposed or examined proves acceptable, the uncovering or removing and replacing of the covering or making good of the parts removed, shall be paid for as Extra Work, but, if the work so exposed or examined proves unacceptable, no compensation will be allowed the Contractor for the uncovering or removing and the replacing of the covering or making good of the parts removed. No work shall be done nor material used without suitable inspection by the Engineer, or his representative.

Failure to find or reject any defective work or material shall not prevent later rejection when such defect be discovered, or obligate the Owner to Final Acceptance.

5.11 REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK:

All work which has been rejected shall be remedied, or else removed and replaced in an acceptable manner by the Contractor at his own expense, and no compensation shall be allowed him for such removal or replacement. Any work done without the lines and grades shown on the Plans or as given, as herein provided, or any Extra Work done without written authority will be considered as unauthorized and at the expense of the Contractor and will not be measured or paid for. Unauthorized work shall be removed and replaced at the Contractor's expense. Upon failure on the part of the Contractor to immediately comply with any order of the Engineer made under the provisions of the Section, the Owner shall have authority to cause defective work to be remedied, or removed and replaced, and unauthorized work to be removed and to deduct the cost from any monies due or to become due the Contractor. In case no such monies are available, the amount shall be charged against the Contractor's Surety.

5.12 DISPUTED CLAIMS:

In any case where the Contractor wishes to make claim to the Owner for extra compensation for work or materials he deems not clearly covered in the Contract or not ordered by the Engineer as Extra Work, the Contractor shall notify the Engineer or the Owner in writing, of his intention to make claim for such extra compensation, before he begins the work on which he bases his claim. If such notice is not given, or if the notice is given and the Engineer is not afforded proper facilities for keeping strict account of the actual cost to the Contractor, then the Contractor hereby agrees to waive claim for such extra compensation. Such notice by the Contractor, and the fact that the Engineer has kept account of the cost shall in no way be construed as establishing the validity of the claim. When the work has been completed, the Contractor shall immediately file his claim with the Engineer.

5.13 CONTRACTOR INITIATED CHANGES:

The Contractor and his subcontractor must submit in writing any requests for modifications to the Plans and Specifications. Shop Drawings that are submitted to the Engineer for his review do not constitute "in writing" unless it is brought to the attention of the Engineer that specific changes are being suggested.

5.14 PROJECT COMPLETION:

The Work shall be complete when all pay items and any Extra Work to be performed under this Contract is performed in its entirety and in accordance with contractual requirements.

5.15 FINAL CONSTRUCTION INSPECTION:

Whenever the Engineer considers the Work provided and contemplated by the Contract is nearing completion, or within 10 days after being notified by the Contractor that the Work is completed, the Engineer will inspect all the Work included in the Contract. If the Engineer finds that the Work has not been satisfactorily completed at the time of such inspection, he shall advise the Contractor in writing as to the Work to be done or the particular defects to be remedied. When these defects have been remedied and the Work has been satisfactorily completed the Engineer shall make the Final Inspection, and shall notify the Contractor in writing that the Final Inspection has been made and that time charges end on the day of Final Inspection. Maintenance Period shall start on the day after this Final Inspection.

5.16 FINAL ACCEPTANCE:

After the Final Inspection is made as outlined above, the Contractor shall maintain the Work for 30 days in the same manner as set forth under "Maintenance of the Work During Construction." The Work will be finally accepted at the end of the 30 day maintenance period provided all work has been satisfactorily maintained.

The Contractor, immediately after receiving the letter of Final Inspection, shall give notice of said completion of Work by an advertisement in some newspaper of general circulation published within the city or county wherein the Work has been done for a period of four successive weeks. Proof of publication of said notice shall be made by the Contractor to the Owner, by affidavit of the publisher and a printed copy of the notice published. If no newspaper is published in the county where the Work is done, the notice may be given by posting at the Court House for 30 days and proof of same shall be made by the probate judge or sheriff and the Contractor.

In no instance shall a final settlement be made upon the Contractor until the expiration of the Maintenance Period and until the Contract is completed and Project accepted by the Owner.

5.17 MAINTENANCE GUARANTEE AFTER ACCEPTANCE:

Neither the final certificate of payment nor any provisions in the Contract, nor partial or entire use or occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with the Contract or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall remedy any defects in the Work and pay for any damage to other work resulting therefrom which shall appear within a period of two years from the date of final acceptance of the Work unless specified otherwise by the Owner. The Owner will give notice of observed defects with reasonable promptness and the Contractor shall repair the defects immediately. The Contractor's Performance or Contract Bond shall remain in effect and cover this guarantee. After completion of the Project and prior to final acceptance, the Contractor shall provide a statement addressed to the Owner from his/her Surety acknowledging that the Contract Bonds will remain in effect during the two year warranty period or as otherwise required by the Owner. Final payment under the contract will not be made until this statement is received.

For projects involving the lining of sewer mains and laterals, a ten year warranty shall be provided in lieu of a two year warranty. The requirements stated above for a two year warranty shall also hold true for the ten year warranty.

5.18 CONTRACT CLOSEOUT DOCUMENTS:

The Contractor shall complete and submit to the Engineer the following contract closeout requirements:

A. The Contractor's advertisement of Notice of Completion.

B. The Contractor's Affidavit of Payment of Claims and Debts.

C. The Contractor's Consent of Surety Company to Final Payment.

D. The Contractor's letter acknowledging that acceptance of final payment constitutes a

waiver of all claims, present or future, in connection with the referenced project.

E. The Contractor's Letter of Warranty for all defects in materials and workmanship shall be in effect for a period of two years and shall contain the stipulated start date and stipulated end date established by contractor, and shall also contain an acknowledgement that the Contractor's Material and Performance Bond shall remain in effect to cover this warranty period.

F. One set of Record Drawings and video, where required, neatly marked with all changes for quantity computation for all changes.

END OF SECTION

Board of Water and Sewer Commissioners
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Update of Standard Specifications
Section 6

Control of Material

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SECTION 6

CONTROL OF MATERIAL

6.01 SOURCE OF SUPPLY AND QUALITY OF MATERIALS:

All materials proposed to be used may be inspected or tested at any time during their preparation and use. Only materials conforming to the requirements of the Specifications shall be incorporated in the Work. Material which has become in any way unfit for use shall not be used in the Work. Any material which has become mixed with or coated by dirt or other foreign substance shall not be used in the Work.

The source of supply of each of the materials shall be approved by the Owner's representative before the delivery is made to any section of the Work. When so indicated or directed, representative preliminary samples of character and quality shall be submitted for examination or test, and written approval of the quality of such samples must be received by the Contractor prior to obtaining materials from the respective sources of supply.

6.02 SAMPLES AND TESTS:

Inspection and tests will be conducted promptly but the Contractor shall notify the Owner's Representative, in writing, immediately on the placing of orders for materials, giving the source and the dates when shipments are to be made. Materials to be tested will be sampled by the authorized representative, upon delivery, or at any time before use and acceptance or rejection will be based on the test of such samples.

In any event, material actually incorporated in the construction must meet the requirements of the Contract. The Contractor shall afford such facilities for collecting and forwarding samples; but shall not make use of nor incorporate in the Work any material represented by the samples until the tests have been made and the materials found acceptable in accordance with the requirements of the Contract. The Contractor in all cases shall furnish the required samples without charge.

When tests are made at the source of production, the producer shall furnish every reasonable facility for the protection of testing equipment and supplies, and shall permit the Owner's representative to have free access to all parts of the plant to enable adequate inspection and selection of samples. Sources of supply of bituminous material shall have adequate testing facilities and satisfactory laboratory equipment, which equipment shall meet the requirements of the standard methods mentioned in the Specifications.

6.03 STORAGE OF MATERIALS:

Materials shall be stored so as to insure the preservation of their quality and fitness for the Work in a manner as recommended by the manufacturer and approved by the Engineer. Materials in storage shall be so arranged as to facilitate prompt inspection. Stored materials even though approved before storage may be inspected prior to their use in the Work and shall meet the requirements of the Specifications at the time they are incorporated in the Work.

Materials shall be stored only where specifically permitted. Stockpiling of construction materials shall be confined to such cleared areas as may be approved. Private property shall not be used without written permission of the property owner or lessee.

6.04 DEFECTIVE MATERIALS:

All materials not conforming to the requirements of the Contract shall be considered as defective and all such materials, whether in place or not, shall be rejected and shall be removed immediately from the site of the Work. Defective materials discovered in the process of the Work will be rejected. All defective material shall be replaced by the Contractor at his expense. No rejected materials, the defects of which have been subsequently corrected, shall be used until written approval has been given by the Owner's representative. Upon the failure of the Contractor to comply at once with any order under the provisions of this Section, the Owner shall have authority to remove and replace defective material and to deduct cost of removal and replacement from any monies due or which may become due the Contractor or his Surety.

6.05 CONTRACTOR'S TITLE TO MATERIALS:

No materials or supplies for the Work shall be purchased by the Contractor or by any subcontractor subject to any chattel mortgage or order and conditional sale contract or other agreement by which an interest is retained by the seller. The Contractor warrants that he has good title to all materials and supplies used by him in the Work, free from all liens, claims or encumbrances.

END OF SECTION

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Section 7

Legal Relations & Responsibility to Public

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SECTION 7

LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

7.01 LAWS TO BE OBSERVED:

The Contractor shall at all times observe and comply with all federal, state, and local laws, ordinances, orders, decrees, and regulations existing or enacted subsequently to the execution of the Contract which in any manner affect the prosecution of the Work. The Contractor and his Surety shall indemnify and save harmless the Owner and all their representatives, agents, and employees against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by himself, his employees, or his subcontractors.

7.02 PERMITS, TAXES, LICENSES, LAWS AND ORDINANCES:

The Contractor shall procure all permits, certificates, and licenses, pay all charges, royalties and fees, and give all notices necessary and incident to the due and lawful prosecution of the Work. The Contractor shall pay all applicable federal, state, and local sales, use or other category of tax that may be imposed. He shall comply with all federal, state and local laws, ordinances or rules and regulations relating to the performance of the Work.

A permit must be obtained from the MAWSS engineering department prior to any construction activity taking place within easements or rights-of-way which contain water and/or sanitary sewer mains. Application for the permit must be in the form specified. A detailed set of plans and specifications must be submitted with the application. Following a review of the plans, MAWSS will issue a permit for the construction activity. The permit may be issued subject to the modification of the plans to include provisions to safeguard the sanitary sewer system from damage during construction and to minimize the possibility of future maintenance activities.

7.03 PATENTED DEVICES, MATERIALS AND PROCESSES:

If the Contractor is required or desires to use any design, device, material, or process covered by letters, patents or copyrights, he shall arrange and provide for such use by suitable agreement with the patentee or owner, and a copy of the agreement shall be filed with the Owner. Whether or not such agreement is made or filed, the Contractor and the Surety shall indemnify and save harmless the Owner, the Engineer, and all their authorized representatives from any and all suits, costs, penalties, or claims for infringement by reason of the use of any such patented design, device, material, or process, or any trademark or copyright in connection with the Work agreed to be performed under the Contract, and shall indemnify the Owner, the Engineer and all their authorized representatives for any costs, expenses, and damages which he or they may be obligated to pay by reason of such infringement or alleged infringement at any time during the prosecution or after the completion of the Work.

7.04 SANITARY PROVISIONS:

The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of his employees as may be necessary to comply with the rules and regulations of the State Board of Health or of other authorities having jurisdiction, and shall permit no public nuisance.

7.05 PUBLIC CONVENIENCE AND SAFETY:

No road or street shall be closed by the Contractor to the public except by written permission of the authority having jurisdiction, and except while so closed, the Contractor shall maintain traffic over, through or around the Work included in this Contract, with the maximum practical convenience, for the full 24 hours of each day of the Contract, whether or not work has ceased temporarily. The Contractor shall notify the Engineer at the earliest possible date after the Contract has been executed, and in any case before the starting of any construction that might in any way inconvenience or endanger traffic, so that the necessary arrangements may be determined.

The convenience of the general public and of residents along the road shall be provided for in a reasonably adequate and satisfactory manner. Where existing roads are not available for use as detours, unless otherwise provided in the Special Provisions, all traffic shall be permitted to pass through the Work. The Contractor shall provide and maintain at his own expense such temporary roads as may be necessary to provide convenient access to driveways, houses, buildings, or other property abutting the Work under construction, as well as temporary approaches to, and crossings of, intersecting roads.

The Contractor shall arrange his work so that no undue and prolonged blocking of business establishments will occur.

Whenever possible all materials unloaded on the job sites will be placed in an area well away from the traveling public in order to avoid hazardous conditions.

Materials and equipment stored on the roads shall be so placed and the Work at all times shall be so connected as to insure minimum danger and obstruction to the traveling public.

In order that all unnecessary delay to the traveling public may be avoided, the Contractor shall provide and station competent flagmen whose sole duties shall consist of directing and controlling the movement of public traffic either through or around the Work.

Fire hydrants shall be accessible at all times to the Fire Department. No materials or other obstruction shall be placed closer to a fire hydrant than permitted by ordinances, rules or regulations, or within 5 feet of a fire hydrant, in the absence of such ordinances, rules, or regulations. In case of city or town work, the Contractor shall give the Chief of the Fire Department, City Engineer, and other appropriate local officials at least 24 hours notice in writing before it becomes necessary to obstruct a cross street.

7.06 CROSSING RAILROADS:

No work of any character shall be commenced on the railroad right of way until the Railroad Company has been duly notified by the Contractor of the date he proposes to begin work and until an authorized representative of the Railroad Company is present, unless the Railroad Company waives such requirement.

7.07 INGRESS AND EGRESS:

In areas where there is access to residences, businesses, public and private buildings, and other facilities, the Contractor shall plan his work to afford access to property abutting the Work at all times except when absolutely necessary, including providing immediate backfill of pipe, shells for temporary surfacing, and adequate signing and flagmen to control and direct traffic. The Contractor shall submit his method of operation for approval before starting work on the Project. There will be no direct payment for this Work, with payment included in the bid for other items of work in the Contract.

7.08 BARRICADES, DANGER, WARNING AND DETOUR SIGNS:

The Contractor shall at his own expense, provide, erect, paint and maintain all necessary barricades of the material and design to meet the requirements of the State Highway Department, Public Works Department, City Engineering Department, or other officials having jurisdiction. Also, at his own expense, the Contractor shall provide suitable and sufficient red lights, torches, reflectors or other danger signals and signs, provide a sufficient number of watchmen and take all the necessary precautions for the protection of the Work and safety of the public.

The Contractor shall erect warning signs beyond the limits of the Project as required, but at least 300 feet beyond each end of the Project and at least 300 feet in advance of any place on the Project where operations interfere with the use of the road by traffic. Barricades shall be kept well painted, and suitable warning signs shall be placed thereon. All barricades and obstructions shall be illuminated at night and all lights or devices for this purpose shall be kept burning from sunset to sunrise.

7.09 PRESERVATION AND RESTORATION OF PROPERTY, TREES, MONUMENTS, ETC:

The Contractor shall not enter upon private property for any purpose without first obtaining permission from the Owners and the lessees. The Contractor shall be responsible for the preservation of all public and private property, monuments, signs, telephone lines, roads, highways, streets, other utilities, etc., along and adjacent to the Project; shall use every precaution necessary to prevent damage to pipes, conduits and other underground structures; and shall protect carefully from disturbance or damage all land monuments and property marks until an authorized agent has witnessed or otherwise referenced their location and shall not remove them until directed. The Contractor must obtain all necessary information in regard to existing utilities and shall give notice in writing to the Owners or proper authorities in charge of streets, gas and water pipes, electric and other conduits, railways, poles and pole lines, manholes, catch basins, fixtures, appurtenances, and all other property that may be affected by the Contractor's operations at least 48 hours before his operations will affect such property. The Contractor shall not hinder or interfere with any person in the protection of such work, or with the operation of utilities at any time.

The Contractor shall not remove, injure, cut or destroy trees, shrubs, or plants that are to remain on the streets or those which are privately owned without proper authority.

When or where any direct or indirect damage or injury is done to public or private property by or as a result of any act, omission, neglect, or otherwise of the Contractor, he shall make good such damage or injury in an acceptable manner.

The Contractor shall examine all bridges and culverts, on or near the Work, over which he will move his materials, implements or equipment and shall take such precautions as are necessary to properly strengthen such structures to prevent damage before he uses them. The Contractor shall be responsible for any and all damages, caused by his operation to such bridges and culverts.

7.10 RESPONSIBILITY FOR DAMAGE CLAIMS, ETC.:

The Contractor and Surety shall save harmless the Owner and all his representatives from all suits, actions, or claims of any character brought on account of any injuries or damages sustained by any person or property in consequence of performing any work in connection with this Project, or of any neglect in safeguarding the Work, or of any delay in completing the Work or of the use of any unacceptable or defective materials, or of any other act or omission either similar or dissimilar to the above enumerated acts, by said Contractor or his agent by which any person or property is injured through the fault of the said Contractor or his agents.

The Contractor shall report to the Owner all accidents occurring on the Work within 48 hours after their occurrence. The report shall contain complete information on the accident including names, addresses of persons involved and names and addresses of witnesses.

7.11 RIGHT-OF-WAY:

All right-of-way easements for the Work will be provided without cost to the Contractor unless otherwise specified with ingress and egress at public roads and streets. If the Contractor desires other points of entry, he shall secure the written permission of the property owners and pay any cost relative thereto.

7.12 INTERFERENCE OF CONTRACTORS:

The right is reserved by the Owner to award any work not included in the Contract to another for performance during the progress of this Contract, or to perform such work with their own forces, and the Contractor for this Contract shall so cooperate and conduct his operation as to minimize the interference therewith. Where two or more Contractors are employed on related or adjacent work, each shall conduct his operations in such a manner as not to cause any unnecessary delay or hindrance to the other. Each Contractor shall be responsible to the other for any damage, injury, loss or expense which may be suffered on account of interference of operations, neglect or failure to finish the Work at the specified time, or for any other cause.

If, through acts of neglect on the part of the Contractor, any other Contractor, subcontractor or vendor shall suffer loss or damage or assert any claim on the Work, the Contractor agrees to settle with such other Contractor, subcontractor or vendor by agreement or arbitration if such other Contractor, subcontractor or vendor will so settle. If such other Contractor, subcontractor or vendor shall assert any claim against the Owner on account of any damage alleged to have been sustained, the Owner shall notify the Contractor, who shall indemnify and save harmless the Owner against any such claim.

7.13 CONTRACTOR'S RESPONSIBILITY FOR WORK:

Until the final acceptance of the Work by the Owner as evidenced in writing, it shall be in the custody and under the charge and care of the Contractor and he shall take every necessary precaution against injury or

damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the nonexecution of the Work. The Contractor shall rebuild, repair, restore and make good at his own expense all injuries or damages to any portion of the Work occasioned by any cause before its completion and acceptance and shall bear the expenses thereof.

7.14 CONTRACTOR'S RESPONSIBILITY FOR COMPLETION:

The Contractor shall accept ultimate responsibility for completion and final acceptance of the overall Project including work done by subcontractors and material and equipment provided by vendors and suppliers. The Contractor shall be responsible for coordination of Project execution in order to prevent duplication of Work, omissions, and other intercontract conflicts. References to duties and responsibilities of subcontractors, vendors, suppliers, etc., within the Specifications are intended to be addressed through the general Contractor's overall responsibility.

7.15 PERSONAL LIABILITY OF PUBLIC OFFICIALS:

In carrying out any of the provisions of the Contract or in exercising any power or authority granted thereby, there shall be no liability upon the Engineer or his representatives, either personally or as officials of the Owner, it being understood that in such matters they act as agents and representatives of the Owner.

7.16 NO WAIVER OF LEGAL RIGHTS:

The Owner or the Engineer shall not be precluded or stopped by any measurement, estimate or certificate made or given by either of them before or after the completion and acceptance of the Work and payment therefore, pursuant to any measurement, estimate or certificate, from showing the true and correct amount and character of the Work performed and materials furnished by the Contractor; or from showing at any time that any such measurement, estimate or certificate is untrue or incorrectly made in any particula; or from showing at any time that the Work or materials or any part thereof, do not conform in fact to the Contract. The Engineer shall have the right to reject the whole or any part of the aforesaid work or materials should the said measurements, estimate or payment be found, or be known, to be inconsistent with the terms of the Contract, or otherwise improperly given; and the Owner shall not be precluded from demanding and recovering from the Contractor and his Surety such damages as it may sustain by reason of the Contractor's failure to comply with the terms of the Contract. Neither the acceptance by the Engineer, or any representative, or employee; nor any certificate by the Engineer for payment of money; nor any payment for nor acceptance of the whole or any part of the Work by the Owner, or Engineer; nor any extension of time; nor any possession taken by the Owner or its employees, shall operate as a waiver of any portion of the Contract or of any power herein reserved by the Owner or of any right to damages herein provided, nor such any breach of the Contract be held to be a waiver of any other or subsequent breach.

7.17 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 be clearly identified and show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with manufacturer's instructions or government regulations as applicable.

7.18 DUST CONTROL:

The Contractor shall at all times provide for the control of dust within residential areas and such other areas where dust is a nuisance to the public by sprinkling with water or by other approved dust control measures. Water shall be provided by the Contractor. No direct compensation will be made for water or other dust control measures, payment for which shall be included in the price bid for other items of work except where a specific pay item is included in the Proposal.

7.19 SAFETY AND HEALTH REQUIREMENTS FOR CONSTRUCTION:

The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (P.L. 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (P.L. 91-54) and any amendments or additions thereto, where excavation and trenching are required the contractor shall comply with the requirements of OSHA Excavation and Trenching Safety Regulations (29 CFR Part 1926 – Excavation, Final Rule), and any amendments or additions thereto.

The Contractor shall be familiar and comply with the Board's Safety Rules Handbook in so far as it augments the specific regulation referred to in this Section.

The Contractor alone shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor shall take all necessary precautions for the safety of, and shall provide necessary protection to prevent damage, injury or loss to:

A. All employees on the Work and other persons and organizations who may be affected thereby.

B. All the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

C. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal relocation or replacement in the course of construction.

The Contractor shall comply with all applicable Laws and Regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. The Contractor shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury, or loss to any property referred to above in Paragraphs 2 and 3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by the Contractor.

The Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor that the Work is acceptable.

The Contractor shall designate a responsible representative at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the Owner. The Contractor shall procure the referenced safety and health regulations, shall keep them on file at the job site, and shall require all supervisory personnel to become familiar with them.

7.20 BRACING:

In the event that the Contractor or his Surety deems it necessary, desirable, or for other reasons to open sheet or close sheet the trenches, the sheeting shall be accomplished in such a manner that the pipe will be protected at all times. Such sheeting shall remain in place until the backfill is carried to a point at least 2 feet above the top of the pipe. The Contractor shall exercise every precaution in removing the sheeting in order to avoid damaging the pipe. Should there be evidence that the removal of sheeting would damage the pipe, the sheeting shall be left in place. The top of sheeting left in place shall be at least 12 inches below the finished ground. There will be no payment for this item.

7.21 WETLANDS:

The Contractor shall have a thorough knowledge of all wetland regulations and shall be able to determine if wetland areas are encountered during construction. If construction is determined to be in a wetland area or adjacent to a wetland area, the Contractor shall comply with all wetland regulations.

END OF SECTION

Board of Water and Sewer Commissioners
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Update of Standard Specifications
Section 8

Prosecution and Progress

Updated May 2021

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SECTION 8

PROSECUTION AND PROGRESS

8.01 SUBLETTING OR ASSIGNING OF CONTRACT; SUBCONTRACTORS

a. Subletting or Assignment.

The Contractor shall not sublet, assign, transfer, convey, sell or otherwise dispose of any portion of the Contract, his right, title, or interest thereon or his power to execute such Contract, to any person, firm, or corporation without written consent of the Owner, and such written consent shall not be construed to relieve the Contractor of any responsibility for the fulfillment of the Contract. In case the Contractor assigns all or any part of any monies due or to become due under the Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior liens of all persons, firms, and corporations for services rendered or materials supplied for the performance or the Work called for in the Contract.

b. Subcontractors.

The Contractor may utilize the service of Specialty Subcontractors on those parts of the work which, under normal contracting practices, are performed by the Specialty Subcontractors.

The Contractor shall not award any Work to any subcontractor without prior written approval of the Owner. As part of the submittals with the Contractor's bid for award of the Contract, the Contractor must include a Subcontracting Plan form with a brief description of the proposed award to each subcontractor, including such information as the Owner may require. Award of the Contract by the Board is acceptance of the submitted Subcontracting Plan unless Contractor is notified otherwise by the Board's authorized designated representative.

The Owner reserves the right to decline to approve a subcontractor proposed on a bidder's Subcontracting Plan if the Owner, in its sole discretion, has concerns as to the quality of past work performed by the subcontractor on any job; the subcontractor's willingness or ability to adhere to ordinances, other laws, and/or court orders affecting the environment or other matters relative to the Work; or any other matter which may adversely affect the Owner's customers, the general public, or the Owner's systems, facilities, or property.

If the Owner, acting through its authorized designated representative, declines to approve a subcontractor proposed in a Subcontracting Plan submitted by an otherwise responsible and responsive bidder, the bidder will be given an opportunity as set forth herein to propose a different subcontractor or to withdraw the bid without penalty. The Owner's representative will provide the bidder with written notice [via e-mail, certified mail, or hand delivery] that the proposed subcontractor is not approved, and the bidder will then have five (5) business days from receipt of the notice in which to deliver to the Owner's representative an amended Subcontracting Plan proposing a different subcontractor. The contractor shall not change the amount of his bid when submitting a revised Subcontracting Plan. If the bidder delivers an amended Subcontracting Plan, the Owner's representative will have authority to accept the amended

Subcontracting Plan and recommend award of the Contract, or to decline to accept the substitute subcontractor and recommend award to the next lowest responsible and responsive bidder. Or, the bidder may withdraw its bid without penalty prior to the end of this 5-day period. This opportunity to propose a new subcontractor within the 5-day period as set forth herein is ONLY for situations in which the Owner has rejected a proposed subcontractor for reasons stated in the preceding paragraph. In no other circumstances will a bidder be permitted to change a proposed contractor after bid opening but before contract award. **This provision shall not be interpreted to allow a bidder to add a DBE subcontractor to its Subcontracting Plan after bids have been opened but before contract award.**

The Contractor acknowledges the Owner's responsibilities for providing water and sewer services to its customers, complying with environmental and other laws, and protecting its systems, facilities and properties. The Contractor will ensure that its contracts with all subcontractors incorporate by reference the Standard Specifications, General Conditions, and other Contract Documents of the contract between the Owner and the Contractor, including but not limited to this Section 8.01.

Nothing herein is intended to limit the responsibilities of the Contractor for directing the work and performance of its subcontractors or for the quality of work, compliance with laws and court decrees, safety, or any other responsibilities of the Contractor as reflected in the Contract and or as required by construction industry standards.

The Contractor shall be as fully responsible to the Owner for the acts and omissions of the subcontractors, and of personnel either directly or indirectly employed by them, as the Contractor is for the acts and omissions of persons directly employed by Contractor.

The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind subcontractors to the Contractor by the terms of the General Conditions and other Contract Documents insofar as applicable to the Work of subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise of the Contractor under any provision of the Contract Documents.

Nothing contained in this Contract shall create any contractual relation between any subcontractor and the Owner, nor shall it create any obligation on the part of the Owner to pay or to see to the payment of any moneys due any subcontractor, except as may be otherwise required by law.

8.02 NOTICE TO PROCEED:

The Owner will, after executing the Contract, issue to the Contractor in writing or by wire a Notice to Proceed. The beginning of the time allotted for the Contract completion will be 10 days after the date of the Notice to Proceed, or the day on which Work is actually started, whichever occurs first.

8.03 NOTICE AND SERVICE THEREOF:

Any notice to any Contractor from the Owner relative to any part of this Contract shall be in writing to the said Contractor at his last given address, or delivered in person to said Contractor or his authorized representative on the Work.

8.04 PROSECUTION OF WORK:

The Contractor shall begin the Work to be performed under the Contract within 10 days after issuance of the Notice to Proceed, and he shall give the Engineer definite notice of his intention to start work at least 72 hours in advance of beginning work. During the progress of the Work, the Contractor shall notify the Engineer at least 24 hours before he expects to be ready to undertake any particular features of the Work in order that proper inspection may be provided.

The Contractor must continuously and diligently prosecute the Work in such order and manner to complete the Work in the specified time. The Contractor shall employ an ample force of men and provide construction plant properly adapted to the Work and of sufficient capacity and efficiency to accomplish the Work in a safe and workmanlike manner at the rate of progress deemed necessary to insure its completion within the time set forth in the Contract. Each operation shall be begun as soon after the Contract is awarded as conditions will permit. Each class of work will be expected to progress from the date it is begun until completed. All plant and equipment shall be maintained in good working order and provision shall be made for immediate emergency repairs.

Should the Contractor fail to maintain a satisfactory rate of progress, the Owner will require that additional men and/or plant be placed on the Work, or a reorganization of plant layout be effected in order that the Work be brought up to the required progress schedule and maintained there. Should the Contractor fail to furnish suitable or sufficient tools, machinery, equipment or force for the proper prosecution of the Work, the Owner may withhold all estimates which are or may become due until their orders are complied with or the Contract may be annulled as hereinafter provided.

Should the prosecution of the Work be discontinued by the Contractor, with the consent of the Owner, the Contractor shall notify the Engineer in writing at least 24 hours before resuming operations.

8.05 CONSTRUCTION SCHEDULE AND PERIODIC ESTIMATES:

Immediately after execution and delivery of the Contract, and before the first partial payment is made, the Contractor shall deliver to the Owner an estimated construction progress schedule in the form satisfactory to the Owner, showing the proposed dates of commencement and completion of each of the various subdivisions of work required under the Contract Documents and the anticipated amount of each monthly payment that will become due the Contractor in accordance with the progress schedule. The Contractor shall also furnish the Owner: (a) a detailed estimate giving a complete breakdown of lump sum prices; (b) periodic itemized estimates of work done for the purpose of making partial payments thereon; and (c) a schedule of Shop Drawings submissions. The cost incurred in making up any of these schedules will be used only for determining the basis of partial payments and will not be considered as fixing a basis for additions to or deductions from the Contract Price.

8.06 LIMITATIONS OF OPERATIONS:

The Contractor shall at all times conduct the Work in such manner and in such sequence as will insure the least practicable interference with traffic. He shall not open up work to the prejudice of work already started. The Contractor shall finish the section on which work is in progress before work is started on any additional section.

Whenever work being done by other Contractors is contiguous or related to the Work included in the Contract, the respective rights of the various interests involved shall be established by the Engineer in order to secure the completion of the various portions of the Work in general harmony.

8.07 CHARACTER OF WORKMEN AND EQUIPMENT:

All subcontractors, superintendents, foremen, and workmen employed by the Contractor shall be competent and reliable. All workmen must have sufficient skill and experience to properly perform the Work assigned them. All workmen engaged on special work or skilled work, or in any trade shall have had sufficient experience and ability in such work to properly and satisfactorily perform it and operate the equipment involved, and shall make due and proper effort to execute the Work in the manner prescribed in the Contract. The Owner may demand the dismissal of any person employed by the Contractor in, about, or upon the Work who misconducts himself or is incompetent or negligent in the due and proper performance of his duty, or who neglects or refuses to comply with the Contract; and such person shall not again be employed thereon without the written consent of the Owner. Should the Contractor continue to employ or re-employ any such person, the Owner may withhold all estimates, which are or may become due or he may suspend the Work until the Contractor complies with such orders.

The methods and appliances used, the labor employed, and the machinery and equipment used shall be of sufficient size and in such mechanical condition as to meet the requirements and produce a satisfactory quality and quantity of work, shall be adequate to complete the Contract within the time specified in the Contract. No change in the machinery and equipment employed on the Work, which shall have the effect of decreasing its capacity, shall be made. The measure of the capacity of machinery and equipment shall be its actual performance on the Work.

In case the actual progress shall fall behind the estimated progress at any time, or should it become apparent that the Contractor will be unable to complete the Contract at the time and in the manner specified in the Contract, the Owner may require that additional equipment be placed on the Work.

Should the Contractor fail to furnish suitable or sufficient tools, machinery, equipment or force for the proper prosecution of the Work, the Owner may withhold all estimates which are or may become due until their orders are complied with or the Contract may be annulled as hereinafter provided.

Equipment used on any portion of the Work shall also be such that no injury to the roadway, adjacent property, utilities, structures or other highways will result from its use.

8.08 TEMPORARY SUSPENSION OF WORK:

The Owner shall have the authority to suspend the Work wholly or in part for such period as may be deemed necessary, due to unsuitable weather, or other essential conditions which are unfavorable for the suitable prosecution of the Work, or for failure on the part of the Contractor to carry out instructions, or to perform any provision of the Contract or on account of any other conditions, which make it impracticable to secure satisfactory work. No additional compensation shall be paid the Contractor because of such suspension. The Contractor shall immediately respect the written order of the Owner or his authorized representative to suspend the Work, wholly or in part. Upon suspension, the Work shall be put in proper and satisfactory condition, carefully covered and properly protected. The Contractor

shall not suspend the Work without such authority and the Work shall be resumed when conditions are favorable and methods are corrected when instructed in writing, and the Contractor shall notify the Engineer when he proposes to resume work, sufficiently in advance of such time, so as to afford the Engineer opportunity to re-establish field representation.

Should the progress of the Work be stopped by a temporary injunction, court or restraining order, process or judgment of any kind directed to either of the parties hereto, then such period of delay shall not be charged against the Contract Time nor shall the Owner be liable to the Contractor because of such delay or termination of Work.

If for any reason it should become necessary to stop work for an indefinite period, the Contractor shall store all materials in such a manner that they will not obstruct or impede the traveling public or become damaged in any way, and he shall provide suitable drainage and take every precaution to prevent damage to or deterioration of the Work performed.

8.09 DETERMINATION AND EXTENSION OF CONTRACT TIME FOR COMPLETION OF WORK:

A. When the time for completion of the Work in the contract is based upon working days, the number of working days will be specified in the Proposal Form.

A working day is defined as any day when, in the opinion of the Engineer, soil and weather conditions are such as would permit effective work on any of the current major or controlling operations of the Project with at least 80% of the labor and equipment normally engaged on such major or controlling operations for at least 5 hours or more. If conditions are such as to stop work in less than this time, the day will not be counted as a working day. If adverse weather conditions are the basis for a claim for additional time, such claim shall be documented by data substantiating that the weather conditions were abnormal for the period of time it occurred, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction. The 10-year historic average of rainfall per month, as reported at the Mobile Municipal Airport, will be used as a basis to assess the number of rain days allowed. No rain days will be considered when the average rainfall amount is less than 0.1 inches in a day. Sundays, national holidays, and holidays legal in the State shall be excluded from the count of working days. Contract working days shall start on the date stipulated in the Notice to Proceed and the Engineer shall be the sole judge of working days that elapse between the date stipulated in the Notice to Proceed and the actual commencing of operations by the Contractor. In computing the time required by the Contractor in the execution of the Work, allowance will be made for days not considered working days. However, no allowance shall be made for delays or suspension of the Work due to fault of the Contractor. Each week the Engineer shall give written notice to the Contractor, or to his representative in charge of the Work, of the number of working days the Engineer has determined there were in the weekly period covered by such notices. Any objection by the Contractor to such weekly decision shall be deemed waived, shall not thereafter be made the basis for any claim, unless the Contractor shall within 3 days of receipt of such notice file with the Engineer written protest setting forth his objections and specifying the reason therefore.

In case the final estimate exceeds the Contract Bid Price an extension in the work days will be granted the Contractor. This extension shall be in direct proportion to the amount of total overrun in dollars, that

is, the percentage of overrun shall first be computed and the Working Days shall be increased by the same percentage.

B. When time set for completion of the Work is based upon calendar days, working days are not applicable and no extension of time beyond the calendar date will be made, except that where the final estimate exceeds the Contract Bid Price, and extension in calendar days will be granted the Contractor. This extension shall be in direct proportion to amount of total overrun in dollars as above provided.

Time shall not be charged for maintenance after the Final Construction Inspection in case of either A or B.

8.10 FAILURE OR DELAY IN COMPLETING WORK ON TIME:

Time is an essential element in the Contract, as delay in the prosecution of the Work will inconvenience the public, obstruct traffic, and interfere with business. It is important that the Work be pressed vigorously to completion. Should the Contractor, or, in case of default, the Surety fail to complete the Work within the time stipulated in the Contract, or within such extra time as may be allowed as herein above provided, a deduction of the amount stipulated in the Contract for Liquidated Damages will be made for each and every calendar day that such Contract remains uncompleted after the calendar date specified for completion or after the expiration of the number of working days allowed for completion. The said amount stipulated in the Contract is hereby mutually agreed upon as liquidated damages.

Permitting the Contractor to continue and finish the Work or any part of it after the calendar date specified for completion or after the expiration of the number of Working Days allowed for completion, after any extension of time, shall not operate as a waiver on the part of the Owner of the rights of the Owner under this Contract.

In any suit for collection of, or involving the assessment of, liquidated damages, the reasonableness of the amount per day stipulated in the Contract shall be presumed. The liquidated damages referred to herein are intended to be and are cumulative, and shall be in addition to every other remedy now or hereafter enforceable at law, in equity, by statute, or under the Contract.

8.11 DEFAULT OF CONTRACT:

If the Contractor fails to begin the Work under Contract within the time specified, or fails to perform the Work with sufficient workmen, equipment, or materials, to insure its prompt completion, or performs the Work unsuitably, or neglects or refuses to remove materials or perform anew such work as shall be rejected as defective and unsuitable, or discontinues the prosecution of the Work, or from any other cause whatsoever does not carry the Work in an acceptable manner, or becomes insolvent or is adjudicated as bankrupt, or commits any act of bankruptcy or insolvency, or allows any final judgment to stand against him unsatisfied for a period of 10 days, the Owner or his representative may give notice in writing by registered mail to the Contractor and the Surety of such delay, neglect, or default. If within 10 days after such notice the Contractor does not proceed to remedy to the satisfaction of the Owner the fault specified in said notice, or the Surety does not proceed to take over the Work for completion, the Owner shall have full power and authority, without impairing the obligation of the Contract or the Contract Bonds, to take over the completion of the Work; to appropriate or use any or all material and equipment on the ground that may be suitable and acceptable; to enter into agreements with others for the completion of the

Contract according to the terms and provisions thereof; or to use such other methods as in its opinion may be required for the completion of the Contract. The Contractor and his Surety shall be liable for all costs and expenses incurred by the Owner in completing the Work, and also for the liquidated damages in conformity with the terms of the Contract. In case the sum of such liquidated damages and the expense so incurred by the Owner is less than the sum which would have been payable under the Contract if it had been completed by the Contractor or his Surety, the Contractor or his Surety shall be entitled to receive the difference; and in case the sum of such expense and such liquidated damages exceeds the sum which would have been payable under the Contract, the Contractor and his Surety shall be liable and shall pay to the Owner the amount of such excess. Notice to the Contractor shall be deemed to be served when delivered to the person in charge of any office used by the Contractor, his representative at or near the Work or by registered mail addressed to the Contractor at his last known place of business.

8.12 TERMINATION FOR FAILURE OF PERFORMANCE:

In the event of failure by the Contractor to perform any and all of the Contractor's obligations in a prompt and efficient manner satisfactory to the Owner, the Owner will have the right to summarily terminate this agreement, including all work covered hereby, by giving the Contractor written notice of such termination, after which the Owner may employ contracting services of his choice to complete the Work under this Contract and the Contractor and it's Sureties will reimburse the Owner any additional costs which may result from such termination and employment of other contracting services. Failure by the Owner to exercise this right to so terminate this Contract for any such default by the Contractor shall not constitute a waiver by the Owner of its right to so terminate this Contract for any subsequent default.

8.13 PAYMENTS TO CONTRACTOR:

The Contractor shall submit a payment estimate on or before the 1st day of each calendar month for work performed the preceding calendar month. Within ten (10) days of receipt of the estimate, the Engineer will review, approve, and forward the estimate to the Owner, or return the estimate to the Contractor for needed corrections. Upon receipt of an estimate which has been reviewed and approved by the Engineer, the Board will consider the estimate at its next scheduled meeting, and within ten (10) calendar days after Board approval, will make a partial payment to the Contractor on the basis of an approved and certified estimate. To ensure the proper performance of this Contract, the Owner will retain five (5%) percent of the amount of each estimate until fifty percent (50%) of the Contract amount is reached and no further retainage will be withheld (unless a different amount is stipulated in the Special Provisions) until final completion and acceptance of all Work covered by the Contract. All material and work covered by partial payments made shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and work upon which payments have been made or the restoration of any damaged work, or as a waiver of the right of the Owner to require the fulfillment of all of the terms of the Contract.

The Contractor agrees that he will indemnify and save the Owner harmless from all claims growing out of the lawful demands of subcontractors, laborers, workmen, mechanics, materialmen, and furnishes of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this Contract. The Contractor shall furnish satisfactory evidence that all obligations of the nature herein above designated have been paid, discharged, or waived. If the Contractor fails so to do, then the Owner may, after having served written notice on the said Contractor,

either pay unpaid bills of which the Owner has written notice, direct, or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged, whereupon payment to the Contractor shall be resumed, in accordance with the terms of this Contract, but in no event shall the provisions of this sentence be construed to impose any obligations upon the Owner to either the Contractor or his Surety. In paying any unpaid bills of the Contractor, the Owner shall be deemed the agent of the Contractor, and any payment so made by the Owner shall be considered as a payment made under the Contract by the Owner to the Contractor and the Owner shall not be liable to the Contractor for any such payment made in good faith.

All material and work covered by partial payments made shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and Work upon which payments have been made or the restoration of any damaged Work, or as a waiver of the right of Owner to require the fulfillment of all the terms of the Contract.

8.14 PAYMENT FOR MATERIAL STORED:

Material delivered to the Project site, but not incorporated in the completed work will be paid for (less retainage) in the month following delivery when substantiated by invoices from the manufacturer. This includes materials delivered to storage prior to issuance of Notice to Proceed. Invoices for materials delivered during the month shall be included with the estimate on which the materials are shown. On monthly estimates subsequent to the first estimate submitted that includes invoices for stored materials for which payment to the Contractor has been made, there shall be a signed statement that the invoices have been paid by the Contractor. The statement shall read as follows:

> "This is to certify that payment has been made for invoiced materials included in Previous monthly estimates No._____through_____.
>
> Signed_____"

In the event that such statement is not furnished or the manufacturer's or material suppliers notify the Owner in writing that they have not been paid for materials included on previous estimates, the Owner will make payment to the manufacturers or material suppliers in accordance with the provisions of these Specifications and the amount of such payments shall be deducted from the amount then due the Contractor. It is the intent that payment for materials delivered to the Project are to be paid for as promptly as possible and that the Contractor is to make remittance for such materials to the manufacturers or materials suppliers promptly upon receipt of funds from the Owner. The Owner reserves the right to take such steps as deemed appropriate pursuant to the provisions of these Specifications to assure that materials are paid for promptly.

8.15 PAYMENT BY CONTRACTOR:

The Contractor shall pay: (a) for all transportation and utility services not later than the 20th day of the calendar month following that in which services are rendered; (b) for all materials, tools, and other expendable equipment to the extent of 90 percent of the cost thereof, not later than the 20th day of the

calendar month following that in which such materials, tools, and equipment are delivered at the site of the Project; (c) for major items of equipment to be installed in the Work, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the equipment furnished; and (d) to each of his subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his subcontractors to the extent of each subcontractor's interest therein.

8.16 FURNISHING OF UTILITIES:

The Contractor, at his own expense, shall provide water, sewer, gas, electricity and telephone lines for construction. The Contractor shall provide all necessary temporary piping and wiring as required to perform his work. After completion of the permanent utility connections, the Contractor shall be required as a part of this Work to secure all utility services from the respective utility companies and shall pay all monthly bills until final acceptance. The Contractor shall then have the respective utility companies transfer their billing to the Owner's name. If the Owner obtains beneficial use prior to final acceptance, the billing may be transferred at that time. Utility services required for testing of equipment or other use of the Contractor will be paid for by the Contractor regardless of whether equipment has been placed in service. Unless specified elsewhere within these Specifications and/or noted on the Plans, costs associated with the providing of permanent utilities including water and electricity requiring work beyond the point of connection of the utility company will be considered outside the scope of work defined for this Contract. Costs, charges, fees, etc., assessed by utility companies for work or services beyond the point of connection shall not be the responsibility of the Contractor unless specifically included by other portions of these Specifications and Plans. Utility services required for testing of equipment will be paid for by the Contractor regardless of whether equipment has been placed in service.

8.17 MONTHLY ESTIMATES:

For the purpose of making partial monthly estimates only work that has been completed will be measured for payment. On each monthly estimate, the Contractor shall place the following certification:

> "I hereby certify that the Work covered by this estimate was performed in accordance with the Contract, that prevailing scales of wages were paid and that this estimate is true and that payment therefore has not been received.
>
> Number of Days in Contract _____ Days
>
> Number of Days Elapsed _____ Days
>
> Percent of Time Elapsed _____ %
>
> Percent of Contract Completed _____ %
>
> By_____"

8.18 EXTRA AND FORCE ACCOUNT WORK:

Extra Work as hereinbefore defined, when authorized and accepted will be paid for in accordance with

the following:

A. The Contractor shall submit to the Owner or its authorized representative a written agreement for the Work to be done and basis of payment (lump sum, force account or unit price), and submit the same to the Owner for authorization to perform such Extra Work.

1. When Extra Work is authorized to be paid for on a lump sum basis, the Contractor shall compute the percentage done each month and submit with the monthly estimate, a detail sheet showing this percentage and the amount due.

2. When Extra Work is authorized to be paid for on a unit price basis, the Contractor shall include on each monthly estimate the amount of Work done that month.

3. When Extra Work is authorized to be paid for on a Force Account basis, the Contractor shall furnish itemized statements to the Engineer of the cost of all Force Account work, which shall include a certified copy of the weekly payroll and original receipted bills for all materials used and freight charges paid on same, provided that where materials used are not specifically purchased for use on Extra Work but are taken from the Contractor's stock, the Contractor shall submit an affidavit of the quantity, price, and freight on such materials in lieu of original bills and invoices, which affidavit must be approved by Engineer.

   With each monthly estimate on Work paid for on a Force Account basis, the Contractor shall submit in duplicate a detailed statement showing the following:

   a. Name, class, date, number of hours worked each day, total hours, rate and extension for each laborer and foreman engaged.

   b. Designation, number of hours worked each day, total hours, rental rate and extension for each truck, and unit of machinery engaged.

   c. Quantity of materials, price and extension.

   d. Freight on materials.

   e. When the Extra Work is complete, the cost of Property Damages, Liability, Worker's Compensation and Unemployment Insurance.

B. All Extra Work done by Force Account will be paid for in the following manner:

1. For all labor, and foreman in direct charge of the specific work, the Contractor shall receive the current local rate of wage, to be agreed upon in writing before beginning work, for each and every hour that said labor, teams and foreman are actually engaged in such work; to which shall be added an amount equal to 10 percent thereof. No allowance shall be made for general superintendent and use of small tools and ordinary equipment.

2. For the cost of Property Damage, Liability, Worker's Compensation and Unemployment Insurance required for Force Account Work, the Contractor shall receive the actual cost to which no percentage shall be added. The Contractor shall furnish satisfactory evidence of the rate or rates paid for such insurance.

3. For materials, the Contractor shall receive the actual cost of such material delivered to the Work, including the freight charges, as shown by original receipted bills; to which shall be added an amount equal to 10 percent of the sum thereof.

4. For any machinery or special equipment other than small tools, including pertinent fuel and lubricants, which it may be deemed necessary or desirable to use, the Contractor shall be allowed a reasonable rental price to be agreed upon in writing before such work is begun, for the time that such equipment is in use on the Work and to which sum no percentage shall be added.

   No Extra Work will be paid for unless unit prices or wages have been agreed upon in writing before such work is started.

   The compensation as above provided in 1, 2, 3, and 4 shall be accepted by the Contractor as payment in full for Extra Work done on a Force Account basis including superintendence, general expense, overhead, use of tools and equipment for which no rental is allowed, Contract Bonds and profit.

8.19 OWNER CONTINGENCY ALLOWANCE

The Owner Contingency Allowance shall be a cash allowance for the Owner's use. In the event there are additions and/or changes to the work in the contract, the Owner will have the ability to use funds out of the Contingency Allowance to pay the Contractor for these items of work. Items included under the Contingency Allowance shall be first approved by the Owner and the Engineer prior to commencing the work. Any work completed without approval from the Owner/Engineer is at risk of non-payment.

8.20 ACCEPTANCE OF FINAL PAYMENT CONSTITUTES RELEASE:

The acceptance by the Contractor of final payment shall be and shall operate as a release to the Owner of all claims and all liability to the Contractor for all things done or furnished in connection with this Work and for every act and neglect of the Owner and other relating to or arising out of this Work. No payment, however, final or otherwise, shall operate to release the Contractor or his Sureties from any obligations under this Contract or the Contract Bonds.

8.21 DISTURBED AREAS:

All areas that are disturbed due to direct or indirect construction operations shall be restored by the Contractor to a condition equal or better than the condition of the area prior to the operations.

END OF SECTION

Board of Water and Sewer Commissioners
of the
City of Mobile, Alabama

Update of Standard Specifications
Section 9

Testing Materials

Revised May 2019

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SECTION 9

TESTING MATERIALS

9.01 INSPECTION AND TESTING OF MATERIALS:

The following will be the minimum test requirements. All tests are to be performed by a recognized testing laboratory subject to the approval of the Owner.

Materials of construction, particularly those upon which strength and durability of the structure may depend, shall be inspected and tested to establish conformity with the Contract and suitability for uses intended. The following are differentiations of minimum service desired to protect the interest of the Owner. Other materials, not listed, shall also receive attention consistent with the importance of the use to which they are to be put.

The judgment of the Engineer shall prevail where it appears advisable to deviate from the limitations set forth hereinafter because of nonavailability of the material required other than concrete materials and concrete.

When so specified in the Special Provisions, the Owner will pay for testing; but when not specified, the testing shall be performed, at no cost to the Owner, by an approved independent testing laboratory.

9.02 PORTLAND CEMENT:

A. Where the total Project requirement is less than 200 barrels (one car):

Cement shall have been shipped from the mill not more than three months previous to receipt on the Work. Manufacturer's certificate required.

B. Where the total Project is between 200 barrels and 800 barrels:

Manufacturer's test and certificate of inspection conformance for each shipment shall be furnished except where, for special reasons, independent laboratory testing as for Condition C is required.

C. Where the total Project requirement exceeds 800 barrels; also, where cement other than a standard ASTM, or a Federal Specification Portland Cement, is used:

Tests shall be made on the entire cement requirement by an approved independent laboratory on car samples, or bin (sealed) samples, as may be required. (ASTM Specification C150).

Cement Testing shall be conducted under ASTM Specification C150 where not in conflict with Project Specifications.

9.03 AGGREGATES FOR USE IN CEMENT CONCRETE:

A. Concrete aggregates shall conform to "Standard Specifications for Concrete Aggregates", ASTM Serial Designation C33.

B. In the absence of test records indicating suitability, or of a satisfactory service record for a period of 5 or more years, the test requirements for fine and coarse aggregates shall be made.

C. The maximum size of the aggregate shall not be larger than one-fifth of the narrowest dimension between forms of the member for which the concrete is to be used, nor larger than three-fourths of the minimum clear spacing between reinforcing bars.

9.04 FINE AGGREGATE:

Conformity with ASTM C33. Tests shall be made periodically as the Work progresses to assure uniformity.

9.05 COARSE AGGREGATE:

Conformity with ASTM C33.

9.06 SLUMP TESTS OF CONCRETE:

Where 25 or more cubic yards of concrete are placed, also as necessary to maintain desired consistency of the concrete, a slump test shall be made per ASTM C143. Not less than one such test shall be made for each 50 cubic yards of concrete placed at one operation. Such test shall also be made on each sample of concrete used in making test specimens.

9.07 ADVANCE CONCRETE TESTS:

A. Where more than 50 and less than 500 cubic yards are required:

Before the start of concreting, make a single batch of a set of four standard 6-inch cylinders per ASTM C31 and cure. Test two at 7 days and two at 28 days per ASTM C39. Report as for "Concrete Control Test (Laboratory Curing)" below.

B. Where a total of more than 500 cubic yards of concrete is required:

Advance tests of concrete shall be made in an independent laboratory in accordance with ASTM C39. Six standard 6-inch compression cylinders, three to be tested at 7 days and three at 28 days, shall be made with the proportioning and materials, including cement, of the type, brand and mill source proposed to be used in the major part of the Project. The slump should not be less than the greatest slump expected to be used in the structure. The tests made on aggregates, as required above, may be made a part of these tests if suitably referenced on the reports which shall be issued at 7 and 28 days to interested parties. These tests shall be repeated if necessary because of changes in materials or unsatisfactory results. Strength requirements will be stated in the Contract.

9.08 CONCRETE DESIGN MIX AND TESTS:

A. The Contractor shall submit to the Owner for approval a design concrete mix by an approved commercial testing laboratory before placing any concrete.

B. All on-site concrete testing shall be at the Owner's expense.

9.09 CONCRETE CONTROL TESTS (LABORATORY CURING):

Where a total of more than 500 cubic yards of concrete is required:

During the progress of the Work, and for each different mix of concrete, a set of two standard 6-inch concrete cylinders shall be made and tested, where from 25 to 100 cubic yards of concrete are placed, during each and every day's operations. Also, an additional set of tests shall be made for each 100 cubic yards or major fractions thereof over and above the first 100 cubic yards. The cylinders of each set shall be molded from the same sample of concrete and tested 7 days or at 28 days, as may be specifically desired. ASTM C31 shall govern. Testing shall be done per ASTM C39.

9.10 REINFORCING STEEL:

A. Where less than 50 tons are required:

Field inspection for section, rust, shape and dimensions. Manufacturer's certificate required.

B. Where 50 or more tons are required:

Inspection and tests by an approved laboratory for conformance with governing specification.

9.11 STRUCTURAL STEEL:

A. Where less than 100 tons are required:

Field inspection for rust, dimensions, riveting, welding, painting, etc. Manufacturer's certificate required.

B. Where 100 or more tons are required:

Mill and shop inspection by an independent laboratory.

9.12 STEEL BAR JOISTS:

Where more than 100 joists are required:

There shall be furnished the manufacturer's test data proving the efficiency of the design of his joists for the purpose intended, and in addition there shall be furnished certificates that the joists as furnished are in accordance with Project requirements and with the Standard Specifications for Steel Joists as given in the handbook "Steel Joists Construction" published by the Steel Joists Institute.

9.13 BRICK:

A. Where less than 50,000 are required:

Visual inspection as set forth in ASTM or other designated specification.

B. Where 50,000 or more are required:

Visual inspection and tests, as set forth in ASTM or other designated specification, by an independent laboratory.

9.14 BUILDING BLOCK AND STONE:

A. Where less than 1,000 pieces are required:

Visual inspection as set forth in ASTM or other designated specification.

B. Where 1,000 or more pieces are required:

Visual inspection and tests, as set forth in ASTM or other designated specification, by an independent laboratory.

9.15 CONCRETE SEWER PIPE:

Inspection and testing, as set forth in ASTM or other designated specification, by an independent laboratory. Inspection shall be made at the factory and each joint of approved pipe and fitting shall be stamped by the laboratory. Except when so specified in the Special Provisions, the supplier may use his own quality control program and provide an affidavit as to conformance with Contract requirements.

9.16 CAST IRON, DUCTILE IRON PIPE AND SPECIAL CASTINGS:

Each piece of pipe shall bear the manufacturer's serial number and shall be certified by the manufacturer to have met the requirements of the governing Standard Specifications. Also, each piece shall be visually inspected in the field for Specification conformance.

9.17 OTHER MATERIALS AND EQUIPMENT:

Materials other than the foregoing, including equipment, shall of course, also be suitably specified, and shall be inspected and tested to assure conformance with the Specifications and with manufacturer's certificates.

END OF SECTION

Board of Water and Sewer Commissioners
of the
City of Mobile, Alabama

Update of Standard Specifications
Section 10

Special Provisions

Updated May 2021

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PART 1 GENERAL

10.1.01 ALABAMA ACT NO. 84-228

A. Contractors shall comply with the requirement of Act No. 84-228 of the Legislature of the State of Alabama. Particular attention is directed to Section 2 of Act. No. 84-228 which requires submission of certain documents with the bid documentation and failure to submit such documents may be cause for rejection of the Contractor's bid.

B. As a convenience to bidders, the law is presented below; however, it shall be the Contractor's responsibility to satisfy himself as to the responsibilities under the law.

1. ALABAMA LAW (Regular Session, 1984) - Act No. 84-228 - S. 135-Senators Foshee, and Teague - AN ACT

C. Relating to contracts and contractors; to give preference to resident contractors who bid on public work projects except where federal funds are involved.

D. Be it Enacted by the Legislature of Alabama:

1. Section 1. In the letting of public contracts in which any state, county or municipal funds are utilized, except those contracts funded in whole or in part with funds received from a federal agency, preference shall be given to resident contractors and a nonresident bidder domiciled in a state having laws granting preference to local contractors shall be awarded Alabama public contracts only on the same basis as the nonresident bidder's state awards contracts to Alabama contractors bidding under similar circumstances; and resident contractors in Alabama as defined in Section 39-2-12, Code of Alabama 1975, be they corporate, individuals or partnerships, are to be granted preference over nonresidents in awarding of contracts in the same manner and to the same extent as provided by the laws of the state of domicile of the nonresident.

2. Section 2 Nonresident bidders must accompany any written bid documents with a written opinion of an attorney at law licensed to practice law in such nonresident bidder's state of domicile, as to the preferences, if any or none, granted by the law of that state to its own business entities whose principal places of business are in that state in the letting of any or all public contracts.

3. Section 3. A summary of this law shall be made a part of the advertised Specifications of all projects affected by this law.

4. Section 4. The provisions of this Act are severable. If any part of this Act is declared invalid or unconstitutional, such declaration shall not affect the part which remains.

5. Section 5. All laws or parts of laws which conflict with this Act are hereby repealed.

6. Section 6. This Act shall become effective immediately upon its passage and approval by the Governor, or upon its otherwise becoming law.

a. Approved April 30, 1984 Time: 4:30 P.M.

10.1.02 REVISIONS

A. These specifications will be modified and updated as required to keep abreast of current technologies, industry standards, regulatory agency requirements, and best management practices. It shall be the responsibility of the end user of these Guide Specifications to insure the latest and most current revision is applied to the project.

10.1.03 REFERENCED SECTIONS

A. Section 5 – Control of Work

B. Section 8 – Prosecution and Progress

C. Section 12 – Sanitary Sewer Standard Specifications

D. Appendix F – Project Sign Detail

E. Appendix I – Trench Widths and Paving Cut-Backs

10.1.04 REFERENCED CODES AND STANDARDS

A. State of Alabama Highway Department - Standards for Accommodating Utilities on Highway Rights-of-Way

B. Federal Specification QQ-B-71a – Steel for Concrete Reinforcement

C. AWWA C105 – Polyethylene Encasement for Ductile Iron Pipe Systems

10.1.05 SMALL AND SMALL UNDERUTILIZED BUSINESSES

A. The Board's Small and Underutilized Business office will assist Bidders upon request in meeting the requirements of the Contract.

10.1.06 STATE HIGHWAY OR RAILROAD PERMITS

A. Where a pipe is to be laid along or under a State Highway or railroad, the Contractor shall furnish the Highway Department or railroad company with bonds and insurance as required to secure a permit. The cost of bonds and insurance will be borne by the Contractor.

10.1.07 PERMITS, CERTIFICATES, LAWS AND ORDINANCES

A. The Contractor shall, at his own expense, procure all permits, certificates and licenses required of him by law for the execution of his work. He shall comply with all federal, state, and local laws, ordinances and rules and regulations relating to the performance of the Work.

B. The Contractor shall also comply with Ordinance 55-012 "An Ordinance Regulating All Excavation Work of Existing Streets and Improvements Within Public Rights-of-Ways," adopted by the Board of Water and Sewer Commissioners of the City of Mobile, Alabama, April 3, 1970.

10.1.08 WAGE RATES

A. The construction of said Project shall in all respects conform to all applicable requirements of federal, state and local laws and ordinances.

10.1.09 SEQUENCE OF OPERATIONS

A. The Contractor shall start at the point or points designated by the Owner and shall proceed with the sequence of construction as the Owner directs. The Contractor shall provide sufficient crews to lay pipe and complete the job within the time specified. In general, each line shall be laid, tested and placed in service before another line is started.

10.1.10 PROJECT DOCUMENTATION

A. General: Prior to start of construction, the project right-of-way or easement shall be documented by the use of photographs or videotapes. Pictures (photo or video), in color, shall be taken at 100 feet on centers and shall be taken along the centerline of the Project looking up station. At least one station marker shall be visible for identification purposes and station markers shall be set up by the Contractor. During the course of documentation, any features or items of interest or importance which may be encountered shall be photographed or videotaped. Prints or tapes shall be delivered to the Engineer within one week after they are made.

B. Photographs: Clear, legible photographs shall be taken by a skilled technician using a wide angle lens. Each photograph shall be identified on the back with Project number, location, date and time of day that photograph was taken. One color print approximately 4” x 6” and the negative shall be delivered to the Engineer.

C. Videotapes: The purpose of the videotape recordings shall be a supply of continuous visual and audio record of problem areas, items, and features found within any particular area. This videotape record may be supplemented with photographs to exactly identify and locate specific bad features or items.

1. The videotape recordings shall be capable of recording and reproducing a picture having not less than 500 lines of resolution. The videotape recorder shall be one on which both sound and video information can be recorded utilizing a VHS video cassette system. The videotape recording shall be made on magnetic tape which shall produce a visual image equal to or better than the quality of the picture on a television monitor. The replay of the recorder video information, when reviewed on a monitor/receiver, shall be free of electrical interference and shall produce clear, stable images. To ascertain that the equipment to be used in this Work meets the stated minimum requirements, a videotape of a suitable test pattern will be required prior to initiation of Work.

2. The audio portion of the composite signal shall be sufficiently free of electrical interference and background noise to provide an oral report that is clear and completely and easily discernible. The audio portion of the tape report shall be recorded by the operating technician on the audio-video tapes as they are being produced and shall include the location or identification of the section being viewed, the station-to-station direction of travel, the distance traveled on the specific run, and any problems encountered.

3. Videotape recordings shall be enclosed in a vinyl plastic container which shall clearly indicate the date the tape was taken, and the designated section(s) of the Project contained on the tape.

4. There shall be no separate payment for photographic and/or videotape work.

10.1.11 REPORTS, RECORDS AND DATA

A. The Contractor and each of his subcontractors shall submit to the Owner such schedules of quantities and costs, progress schedules, payrolls, reports, estimates, records, and other data as the Owner may request concerning work performed or to be performed under this Contract.

10.1.12 SIGNS

A. Before starting and during construction on any Project, the Contractor shall place at both ends of the section signs approximately 8 feet long by 4 feet high. The signs shall be worded approximately as shown in Appendix F.

10.1.13 CONSTRUCTION WITHIN STATE HIGHWAY RIGHT-OF-WAY

A. The requirements of the State of Alabama Highway Department "Standards for Accommodating Utilities on Highway Rights-of-Way" are hereby made a part of these Specifications for all utility construction within rights-of-way for roads or highways under the jurisdiction of the State of Alabama Highway Department.

10.1.14 CUTTING OF TREES WITHIN PUBLIC RIGHTS-OF-WAY

A. The Contractor shall obtain a permit from the Mobile Tree Commission prior to trimming or removing any trees located within public rights-of-way. When large tree limbs and roots are encountered, the Contractor shall take precautions to protect by tunneling, or pushing the pipe under the roots so as not to damage them. No additional payment shall be made for this Work, but it shall be included in the unit price bid for related items.

10.1.15 DEWATERING

A. The Contractor shall remove any water which may be found or may accumulate in the trenches and shall perform all work necessary to keep them clear of water while the foundations are being laid, the masonry being constructed, or pipe laying is in progress. Such removal shall be accomplished by means of a well point system or other approved means. Comprehensive plans for dewatering operations, if used, shall be submitted prior to installation. No extra payment will be made for dewatering.

10.1.16 WEATHER CONDITIONS

A. In the event of temporary suspension of work or during inclement weather, or whenever the Owner shall direct, the Contractor will, and will cause his subcontractor to protect carefully his and their Work and materials against damage or injury from weather. If any work or materials shall have been damaged or injured by reason of failure on the part of the Contractor or any of his subcontractors to protect his work, such materials shall be removed and replaced at the expense of the Contractor.

10.1.17 LOCKS AND KEYS

A. All locks to be furnished under this Contract shall be keyed alike and 5 keys shall be delivered to the Engineer for distribution to the Owner. Padlocks shall be furnished by the Owner except where noted otherwise on the Plans and in these Specifications.

10.1.18 TIGHTNESS OF WATER CONTAINING WALLS

A. All basins and tanks are hydraulic structures and shall be watertight. Each tank shall be filled with water to full depth and kept full 24 hours for observation. The Contractor shall exercise every precaution to secure watertightness by careful mixing and placing of the concrete so as to obtain a homogeneous mixture at maximum density, without air pockets or voids, using the minimum practical amount of water in the mix. Extreme care shall be used to secure continuity of water stops at expansion and construction joints, sealing off holes from wall ties, etc., and thoroughly placing concrete about wall sleeves, wall pipes and other obstructions. The Contractor shall fix all leaks. The Contractor shall furnish test water at his own expense.

10.1.19 EXTENSION OF CONTRACT TIME

A. Unless specifically waived by the Owner, when an extension of contract time is granted by the Owner to the Contractor to complete the Work under this Contract, the Contractor shall pay any additional engineering Cost or other Cost accrued to the Owner as a result of the extension of time granted.

B. The requirements of Specification Paragraph 5.14, Paragraph 5.15 and Paragraph 8.10 will be strictly adhered to upon completion of the Work.

10.1.20 CLEAN-UP

A. The job shall be kept clean at all times. Loose dirt shall not be allowed to clog ditches or cover sidewalks. Soft clay or other undesirable material removed from the trenches shall be removed from the streets, sidewalks or ditches. The Owner reserves the right to demand that the Contractor's forces be diverted to this clean-up at any time that condition of streets, driveways, sidewalks, or private property warrants such diversion. Such diversion of Contractor's forces will not entitle the Contractor to any extension of time or additional compensation.

10.1.21 BRANDS OF EQUIPMENT AND MATERIALS

A. When referenced the name of a certain brand, make or manufacturer is to denote the quality standard of the equipment or material, and is to convey the general style, type, character and quality. Whenever a material or article required is specified or shown on the Plans by using the proprietary product or of a particular manufacturer or vendor, any material or article which will meet the design criteria and is equal in function and durability as determined by the Engineer will be considered.

10.1.22 AFFIDAVIT OF COMPLIANCE

A. Suppliers of pipe and fittings shall furnish in triplicate to the Owner, an affidavit stating that all pipe and fittings furnished under this Contract conform to the

requirements as set forth in these Specifications. Unless specified otherwise, all materials shall be new, unused and without defect.

10.1.23 SUPERVISION OF INSTALLATION AND THE GUARANTEE

A. The Contractor shall employ a factory trained engineer to supervise the installation and alignment of all items of mechanical and electrical equipment. He shall see that all items of equipment are installed, piped, and wired, meeting the requirements of the Plans and Specifications and in accordance with the manufacturer's recommendations. The Contractor shall place all equipment in satisfactory operation and demonstrate such. The Contractor shall guarantee the satisfactory operation of all apparatus and machinery against defects in workmanship, material, and installation for a period of one year from the date of final acceptance. The Owner will give notice of observed defects with reasonable promptness and the Contractor shall remedy any defects in the Work and pay for any damage to other work resulting therefrom. Neither the final certificate of payment nor any provision in the Contract Documents nor partial or entire use or occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with the Contract Documents, or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship.

B. The manufacturer's representatives shall submit to the Engineer in writing a document stating the Contractor has installed the equipment properly and in accordance with the manufacturer's recommendations.

10.1.24 MANUFACTURER'S CERTIFICATION

A. To assure that manufacturers and suppliers are aware of the use to which their equipment and products will be subjected, the Contractor shall require the manufacturer or manufacturer's representative to place the following certification on submittal data transmittals:

1. "This is to certify that we have examined the Plans and Specifications for this Project and have ascertained that this equipment or material is suitable for the Purpose and use intended. _____Authorized Signature"

10.1.25 MAXIMUM TRENCH WIDTH:

A. The maximum trench widths set the limit of payment for various items listed in Paragraph 10.1.26, "Basis of Payment and Method of Measure." The maximum trench widths and typical paving cut-backs which are applicable to these Specifications are shown in Appendix I.

10.1.26 BASIS OF PAYMENT AND METHOD OF MEASURE:

A. General:

1. The lump sum and unit price bid for the various items shall be compensation in full for furnishing all materials, labor, equipment, and incidentals for the item in place complete in every detail. There will be no direct payment for clearing, excavating, bracing, caulking, backfilling, clean-up, restoration of property, testing or other items of work necessary for the installation of the item.

B. Bid Items

1. **Mobilization and General Conditions:** The price bid for this item shall include all costs associated with mobilization, bonds, insurance, and other general conditions.

2. **Demolition:** The price bid for this item shall include all costs associated with removal of the existing digester cover.

3. **Furnish and Install Fixed Digester Cover:** The price bid for this item shall include all costs associated with the purchase and installation of the digester cover.

4. **Furnish and Install Plunger Mixer:** The price bid for this item shall include all costs associated with the purchase and installation of the plunger mixer.

5. **High Performance Coatings:** The price bid for this item shall include all costs associated with the application, inspection and testing of coatings applied in this project.

6. **Metal Stairs:** The price bid for this item shall include all costs associated with the installation of the new stairs for the digester.

7. **Electrical:** The price bid for this item shall include all electrical work in the project.

8. **Erosion Control & Site Restoration:** The price bid for this item shall include all costs associated with erosion control measures and returning the site to original condition.

9. **Sludge Removal & Disposal from Digester:** The unit price bid for this item shall include the removal, dewatering, and landfill disposal of 1 dry ton of sludge in the digester.

10. **Sand and Rock Removal & Disposal from Digester:** The unit price bid for this item shall include the removal and disposal of 1 cubic foot of sand, grit and rock from the digester.

11. **All Other Items:** The price bid for this item shall include any other item not included in Items 1 – 10, including, but not limited to, special inspections (welding, painting, etc.), testing, cleaning of the digester, piping, building permit and electrical permit.

10.1.27 SPECIAL HANDLING OF PURCHASE ORDERS[1]

A. The Board of Water and Sewer Commissioners is exempt from City, County, State and Federal sales tax for any hardware, equipment, and materials purchased for the installation of Capital projects. Contractors shall take this into consideration when preparing bids for capital projects. To ensure there are no taxes charged, Contractors are directed to do the following:

B. Contractor shall contact the Alabama Revenue Department and apply for a tax exempt certificate for the specific project. The phone number for the Mobile office is 334-344-4737. The web site that explains the rules and regulations for tax exemption is

www.ador.state.al.us, rule number 810-6-5.02.

1. Contractor shall mail copies of the tax exempt certificate to all suppliers of all hardware, equipment, and material.

C. Contractor shall state on each purchase order to the supplier that material, equipment, and hardware for installation owned and operated by the Board of Water and Sewer Commissioners of the City of Mobile are exempt from County and State sales tax as per the number on the certificate of exemption.

10.1.28 BYPASS PUMPING

A. The Contractor shall submit three (3) copies of a Bypass Pumping Plan as required in Section 12.1.26 to the Engineer for review prior to proceeding with bypassing operations. Bypassing operations shall not commence until a Bypass Pumping Plan is reviewed by the Engineer.

B. The Contractor shall be responsible for and shall indemnify and hold the Owner harmless for any sanitary sewer overflow occurring as the result of the work performed. The Contractor is responsible for any sewer discharge to the surface due to failure in bypass hose, piping or other equipment. Any discharge from air release valves shall be contained. The Contractor shall ensure that raw sewage will not spill on the ground or into any bodies of water, channel, or conduits of conveyance of storm water during the performance of this work. Prior to removal of the bypass pumping pipe, the Contractor shall empty all sewage into the sewer system. The Contractor is responsible for and shall indemnify and hold the Owner harmless for any sanitary sewer discharge to the environment due to a failure in the equipment and/or bypassing operation.

C. In the event of a sanitary sewer overflow, the Contractor shall contact the Owner's representative immediately and complete the Contractor Unpermitted Discharge Reporting Form provided by the Owner. If there is a sanitary sewer discharge to the environment due to a failure in the equipment and/or bypassing operation, the Contractor shall reimburse the Owner all costs related in any way to compliance with laws, regulatory requirements, and/or court orders and decrees associated with the overflow or discharge event. The costs include, but not limited to, water quality

monitoring, signage, cleanup, fines, legal fees, claims, and reporting. In the event that the peak flows during the bypass pumping operation exceed the projected peak flow figures previously provided by the Owner and a sanitary sewer overflow event occurs when the Contractor's equipment is operating correctly, the Contractor will not be held liable for the sanitary sewer overflow or discharge.

D. The Contractor shall be liable for and shall indemnify and hold the Owner harmless for any other claims made as a result of the sanitary sewer discharge or sanitary sewer overflow due to a failure in the equipment and/or bypassing operation and shall be responsible for all requirements imposed by the regulatory agencies. In addition, the Contractor shall provide notification consisting of one (1) quarter page advertisement published in the Mobile Register within 3 days of the sanitary sewer overflow. The advertisement shall be written in a manner reasonably designed to inform fully the customers of the Owner. The notice shall be conspicuous and shall not use unduly technical language, unduly small print or other methods which would frustrate the purpose of the notice. The notice shall disclose all material facts regarding the subject including the amount of the overflow, when the overflow occurred, any potential adverse health effects, the population at risk, reasonably known methods of mitigation known, and steps being taken to mitigate problems with the by-pass pumping operation. Each notice shall contain the name, business address, and telephone number of the Contractor.

END OF SECTION

Board of Water and Sewer Commissioners
of the
City of Mobile, Alabama

Update of Standard Specifications
Section 16

Erosion Control

Updated June 2019

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PART 1 GENERAL

16.1.01 SCOPE

A. These Specifications form a part of the Contract Documents and shall govern the erosion control requirements for water mains, sanitary sewers, sewage pumping stations, and appurtenances. These Specifications, in addition to applicable regulatory requirements, shall be accommodated to ensure that the lands in the construction project area are not adversely affected as a result of the constructed improvements.

16.1.02 REVISIONS

A. These specifications will be modified and updated as required to keep abreast of current technologies, industry standards, regulatory agency requirements, and best management practices. It shall be the responsibility of the end user of these Guide Specifications to insure the latest and most current revision is applied to the project.

16.1.03 REFERENCED SECTIONS

16.1.04 REFERENCED CODES AND STANDARDS

A. State of Alabama Department of Transportation Standard Specifications for Highway Construction

B. ASTM G94 – Standard Guide for Evaluating Metals for Oxygen Service

16.1.05 EROSION CONTROL AND PROPERTY PROTECTION

A. The Contractor shall adhere to the following provisions at all times for the related construction and maintenance activities:

B. Flow of Drains and Sewers Maintained:

1. Adequate provisions shall be made for the flow of sewers, drains and watercourses encountered during construction. Lines and structures disturbed during construction shall be immediately restored to their original condition.

C. Property Protection: Trees, grass, fences, signboards, poles and all other property shall be protected unless their removal is authorized. Any property damage shall be satisfactorily restored by the Contractor.

D. Maintenance of Erosion Control Measures: The Contractor shall at all times take necessary precautions to prevent erosion or transportation of soil due to natural or induced water flows. Spoil banks and soil stockpiles shall be contained to prevent transportation of soil by run-off waters. All temporary erosion control measures installed and paid for shall be properly maintained for the entire duration of construction. Failing to maintain these structures will be grounds for the Engineer to recommend to the Owner the halting of construction until the measures are properly restored.

E. Topsoil: The Contractor shall remove a minimum of 4 inches of existing grass and topsoil from within the limits of the new construction. Topsoil obtained from this stripping operation that meets or exceeds topsoil requirements in Section 16.1.06.J shall be stockpiled on the site in areas approved by the Engineer. Stripped material not suitable for use as topsoil or embankment material shall be disposed of away from the construction site by the Contractor at no cost to the Owner. The stockpiled topsoil from the stripping operation shall be used to cover disturbed areas of construction to a minimum thickness of 2 inches, prior to temporary and permanent grassing.

F. Grading: The Contractor shall perform grading of every description regardless of the character of material encountered, within the limits and to the lines and grades shown on the Plans. Minor changes in grades shown on the Plans may be required to allow for final grassing, soil stabilization, and drainage as the work progresses.

G. Permits: The NPDES permit applications will be completed by the Engineer. It will be the Contractor's responsibility to submit this permit application to ADEM and pay necessary fees, unless otherwise specified. Construction shall not begin until all applicable permits have been obtained. The Contractor shall comply with all provisions of construction permits obtained. Contractor shall indemnify Owner in event there is a failure to comply with all provisions of NPDES permit.

16.1.06 MATERIALS AND CONSTRUCTION REQUIREMENTS

A. Erosion Control Plan (Item No. EC-1): The purpose of the Erosion Control Plan is to ensure the Contractor's compliance with state and federal non-point source pollution legislation. Prior to commencement of construction, the Contractor shall submit a detailed erosion control plan to the Engineer for approval. The Contractor shall be responsible for providing a general location drawing of the project with the following items clearly indicated:

1. Locations where construction limits will adjoin or cross drainage paths,

2. Locations where materials for construction will be stockpiled including soils, aggregate, piping, manholes, etc., and

3. Proposed erosion control measures to be employed at the locations identified in (1) and (2) above. These erosion control measures shall include those measures expressly required on the Plans as well as additional Best Management Practice (BMP) items that were included as contingency in the Plans.

    a. The Engineer will recommend payment of this item upon receipt of an acceptable Erosion Control Plan. Should the Engineer find the submitted Erosion Control Plan unacceptable, the Contractor shall resubmit the Erosion Control Plan incorporating any comments from the Engineer.

    b. Maintenance and erosion control of the construction site is the sole responsibility of the Contractor at all times during the construction and maintenance periods.

B. Temporary Grassing for Erosion Control (Item No. EC-2): As directed on the Plans, the Contractor shall seed the project according to these seeding requirements. Temporary

grassing shall be installed in all areas of the project where clearing and grubbing will be completed at least seven (7) days before the installation of the sewer/water lines. Temporary grassing shall take place immediately after the clearing and grubbing operations in order to reduce the erosion from the construction location.

1. General: The disturbed areas shall be temporarily grassed for erosion control as hereinafter specified. The disturbed areas shall be prepared for grassing by grading and removing and disposing of roots, stumps, or other materials which might be harmful to grass growth. Topsoil shall be spread over the entire area to be grassed to the extent that topsoil along and adjacent to the trench lines is available.

2. Seeding: The areas to be grassed shall be seeded with quality seed in the following minimum quantities per acre:

    a. Kentucky 31 Fescue 34 pounds

    b. Common Bermuda 10 pounds

    c. White Dutch Clover 10 pounds

    d. In some areas, it may be necessary to vary the concentrations of various seed to suit local conditions and the Owner reserves the right to change proportions of the various seed so long as the total amount of seed does not exceed 74 pounds per acre at no change in Contract Price.

    e. Seed shall be broadcast with hand-operated equipment. When broadcast, seed shall be sown over the areas and raked or dragged and covered to the desired depth. Hydro seeding may, at the Contractor's option, be used in lieu of the above.

    f. Unless specifically noted otherwise, Pensacola Bahia shall not be used.

    g. When the grassing operation is accomplished after the month of August and before the month of March, in addition to the seeding as outlined above, the entire grassed areas shall also be overseeded with Italian Rye Grass Seed at the uniform rate of 40 pounds per acre at no additional cost to the Owner.

3. Maintenance: The Contractor shall obtain a stand of grass and maintain all temporarily grassed areas until permanent grassing is performed. A satisfactory stand of grass is defined as a cover of living grass in which gaps larger than 12 inches do not occur. Maintenance shall consist of watering, preserving, protecting, replacing dead grass, filling washes and generally maintaining the area until final grassing occurs.

C. Silt Fence (Item No. EC-3): Silt fences shall be constructed at locations approved by the Engineer and installed in accordance with the State of Alabama Department of Transportation Standard Specifications for Highway Construction, latest edition Type A or Type B, as specified on the Plans, shall be provided by the Contractor.

D. Hay Bales (Item No. EC-4): Hay bales shall be a native hay or any other approved material. The bales shall be securely anchored by the use of stakes and wire or other approved method.

E. Temporary Steel Sheet Pile for Erosion Control (Item No. EC-5): All construction for this item shall be in accordance with the State of Alabama Department of Transportation Standard Specifications for Highway Construction, 1992 Edition, Section 505, Piling. Sheet piling shall be used in locations where the stockpiling of materials or the existing banks of watercourses are unstable and potential erosion could occur due to a storm event. The temporary sheet pile structure shall be installed prior to the Contractor constructing a stockpile of material that is erodible or moving equipment on or near an unstable bank. The temporary sheet pile structure shall be left in place until either (1) the stockpile of material has been removed, or (2) No more construction or equipment will be in the vicinity of the unstable watercourse bank.

F. Turbidity Barriers (Item EC-6): Turbidity barriers shall be utilized in locations where specifically required by the Engineer and installed in accordance with the manufacturer's recommendations.

1. Materials: Turbidity barriers shall be composed of polyester reinforced vinyl laminate and shall be Tough Guy floating or staked turbidity barriers as manufactured by AER-FLO Canvas Products, Inc., or approved equal.

2. Installation: Installation shall be in accordance with the manufacturer's specifications. Terminal end anchor points should be located well out of the range of the watercourse on shore and must be strong enough to hold the barrier in place throughout the construction period.

3. The method of furling shall be used to aid in installation and removal of the turbidity barrier, in all cases where the barrier is to be installed in a watercourse. Furling is accomplished by placing light polyester rope ties around the curtain from top to bottom at approximately five (5) feet intervals. Since furling the barrier will also expedite its removal after the work is finished, the lines should be left in place.

G. Clearing and Grubbing (Item No. EC-7): The Contractor shall clear and grub trench lines. Clearing and grubbing shall be confined to the limits of the easements and to the minimum width required for installation of the pipe. All trees, stumps, roots and debris shall be disposed of in an approved manner by the Contractor in accordance with local, state and federal regulations. Burying of stumps and other debris on the site will not be permitted. Where trees within the easements are indicated on the Plans or designated in the field to be retained, such trees shall be protected from damage at all times. Should, by accident or otherwise, such trees be damaged, they shall be repaired, at the Contractor's expense, by a Certified Arborist.

H. Final Grassing for Erosion Control (Item No. EC-8): The trench lines and other areas disturbed by construction of water and sanitary sewer lines shall be grassed as hereinafter specified where indicated on the Plans or where directed by the Engineer.

1. General: Upon completion of construction of the project, the disturbed areas shall be prepared for permanent grassing by grading to the final grade and removing and disposing of roots, stumps, or other materials which might be harmful to grass

growth. Care shall be taken to spread topsoil over the entire area to be grassed to the extent that topsoil along and adjacent to the trench lines is available.

2. Fertilizer: After the surface has been prepared for grassing and before any grass or seeds are planted, the soil shall be loosened by harrowing or other approved methods, and the areas specified to be grassed shall be fertilized at a uniform rate of 1,500 pounds per acre with a standard commercial 8:8:8 fertilizer and 3,000 pounds of agricultural lime per acre.

3. Seeding: The areas to be grassed shall be seeded with quality seed in the following minimum quantities per acre:

   a. Kentucky 31 Fescue 34 pounds

   b. Common Bermuda 10 pounds

   c. White Dutch Clover 10 pounds

   d. In some areas, it may be necessary to vary the concentrations of various seed to suit local conditions and the Owner reserves the right to change proportions of the various seed so long as the total amount of seed does not exceed 74 pounds per acre at no change in Contract Price.

   e. Seed shall be broadcast with hand-operated equipment. Broadcast, seed shall be sown over the areas and raked or dragged and covered to the desired depth. Hydro seeding may, at the Contractor's option, be used in lieu of the above.

   f. Unless specifically noted otherwise, Pensacola Bahia shall not be used.

   g. When the grassing operation is accomplished after the month of August, and before the month of March, in addition to the seeding as outlined above, the entire grassed area shall also be over seeded with Italian Rye Grass Seed at the uniform rate of 40 pounds per acre.

4. Maintenance: The Contractor shall maintain all grassed areas for a minimum two (2) year period following the date of project acceptance unless specified otherwise. If, during the course of the final inspection, the Engineer determines that all work has been satisfactorily completed except for a substantial stand of grass on all or part of the work, he may recommend acceptance if the Contractor provides a bond covering all erosion control and related items. The amount of the bond shall equal replacement costs of the erosion control items as determined by the Engineer. The time period to be covered by the bond will be no longer than the time period of the warranty for the project. It shall be understood by all that such a bond is to ensure replacement of the erosion control items should it become necessary and will in no way relieve the Contractor from the responsibility of damages caused by the lack of erosion control growth.

   a. The Contractor shall reseed and remulch as hereinafter specified in areas in which an established stand of grass is not obtained at no additional cost to the Owner. A satisfactory stand of grass is defined as a cover of living grass in which gaps larger than 12 inches do not occur. Maintenance shall consist of

watering, preserving, protecting, replacing dead grass, filling washes and generally maintaining the area.

I. Mulching (Item No.EC-9): In areas shown in the Plans or as directed by the Engineer, the surface of sprigged and over seeded slopes of the roadway or embankments shall be protected by the application of a mulch. The mulch shall be spread uniformly in a continuous blanket by hand or by suitable approved equipment, at a rate of 2 tons to the acre. Mulching material which, in the opinion of the Engineer, is too coarse or too short for proper securing in the surface soil will be rejected. Mulching shall be started at the windward side of relatively flat areas or at the upper part of a steep slope and continued uniformly over the entire area.

1. The mulch material shall be anchored to the soil by spraying a light coating of emulsified asphalt over the straw or hay after these materials have been placed. The asphalt shall be applied by hand sprayers attached by hoses to an asphalt spreader or other approved methods. The asphalt adhesive shall be applied to the mulch at a rate of 150 gallons of undiluted (straight emulsion) asphalt per ton of straw or hay (300 gallons per acre). When the straight emulsion is further diluted with water in the ratio of 60 (straight emulsion) to 40 (water), the application rate shall be 250 gallons of asphalt emulsion per ton of straw or hay (500 gallons per acre). This will secure the mulch on the ground to form a soil binding mulch and prevent loss or bunching by wind or water.

2. The asphalt adhesive shall be a bituminous soil cover suitable for mulching of seeded areas and shall contain no petroleum solvents or other diluents which would be toxic to plant growth. Asphaltic adhesive shall be a homogenous emulsification of especially refined petroleum asphalt suitable for spray application with or without dilution with water. Laykoid Soil Cover, manufactured by American Bitumuls and Asphalt Company, or other commercial types of asphalt specifically designed for mulching of seeded areas for erosion protection against rain or wind, will be acceptable. Cost of the item shall be included in unit price bid for mulching.

J. Topsoil (Item No. EC-10): As indicated on the Plans or specifically required in the Specifications, additional good quality topsoil shall be provided by the Contractor within the construction limits. The required topsoil for this item shall be material obtained from an offsite source. Topsoil shall be workable, friable, loamy soil free from hard lumps, stiff clay, gravel, noxious weeds, brush and other deleterious materials. Lime shall be added to reduce the possibility of odor. Topsoil shall be placed in all areas disturbed by construction, prior to grassing. The topsoil shall be placed to the compacted depth specified on the Plans, but shall not, in any case, be placed at a compacted thickness of less than 2 inches.

1. It is intended that the grassing operation shall follow immediately after the placing of topsoil in which case such grassing operation would require satisfactory compaction in order to prevent erosion. In the event that grassing operations are delayed, the layer of topsoil shall be compacted until satisfactory.

2. The Contractor shall maintain the topsoil that has been placed, without extra compensation, in connection with any seeding, sodding, planting, or other work, until final completion of the project. Maintenance shall consist of preserving,

protecting, and such other work as may be necessary to keep the work in a satisfactory condition.

K. Erosion Control Netting (Item No. EC-11): Erosion control netting shall be utilized in locations where specifically required by the Engineer and installed in accordance with the Manufacturer's recommendations using ¾ inch x 2-1/2 inch x 12 inch wedge shaped wooden stakes and/or staples.

1. Materials: The netting material shall be Curlex Excelsior Blanket manufactured by American Excelsior Company. Excelsior Blanket manufactured by Erosion Control Systems, Enkamat 7220 manufactured by AKZO, or approved equal.

2. Installation: All surfaces to be protected shall be graded, fertilized, limed, and seeded or sodded, as specified and where shown on the Plans, so as to be stable and firm.

   a. Erosion Control netting used as a ditch liner shall be applied with the length of roll laid parallel to the flow of the water. Where a synthetic mat is used and where more than one width is required, a multi-width welded mat shall be supplied in multiples of 3 feet. All lap joints and upslope edges shall be staked at intervals of 3 feet or less. Where three-wide mat is required, lap joints to be limited to one every nine feet of width.

   b. All wood stakes shall be driven to within 2 inches of the ground surface.

   c. An anchor slot shall be placed at the upslope and downslope ends of the mat placement. At least 12 inches of the end of the mat shall be buried vertically in a slot dug in the soil. The mat shall be secured in the anchor slot by staples or stakes at intervals of 3 feet or less prior to burying, except when the ditch is located above the erosion control netting, in which case no stakes or staples shall be used in the anchor slot unless 6 inches separation is maintained between the point of the installed stake or staple, and the netting. The soil shall be firmly tamped against the mat in the slot.

   d. Successive lengths of netting shall be overlapped at least 3 feet, with the upstream length on top. Stake or staple the overlap in 3 places evenly spaced across the end of each of the overlapping lengths and in 3 places across the width of the center of overlap area. Check slots shall be spaced so that a check slot occurs within 30 feet.

   e. Stake or staple the netting in the check slot at each edge overlap and in the center of the mat, except when the ditch is located above the netting, in which case no stakes or staples shall be used in the check slot, unless 6 inches separation is maintained between the point of the installed stake or staple and the synthetic liner. Beginning and terminal ends to be staked in accordance with installation manual.

   f. Upslope edges of netting used as ditch lining shall terminate on 4-inch wide horizontal shelves running parallel to the axis of the ditch for the full length of the ditch. Edges of the netting shall be staked at 3-foot intervals, backfilled with soil, and tamped to original slope.

g. Erosion control netting damaged by the Contractor during installation shall be repaired immediately.

h. The Contractor shall maintain the netting until all work on the Contract has been completed and accepted. Maintenance shall consist of the repair of areas where damaged by any cause.

L. Solid Sod (Item No. EC-12)

1. Materials: Solid sod may be obtained from any sod producer specializing in sod production harvesting with a minimum of three years' experience. The sod shall be St. Augustine or Centipede and shall be placed as suitable growing conditions may require. The sod shall be live, fresh growing grass, free of weeds and rocks. Solid sod removed from construction site and preserved during construction may be used with the Engineer's approval.

2. Preparation: The Contractor shall prepare the subsoil to a sufficiently loose or pulverized condition and all uneven areas and low spots shall be eliminated prior to planting. All foreign materials and undesirable plants and their roots must be removed from the area. Topsoil shall be spread to a minimum depth of 2 inches over the area to be sodded. Areas to be sodded must be fertilized initially with agricultural limestone and with the type of fertilizer recommended by the sod provider for either Centipede or St. Augustine grass. The fertilizer shall be distributed into the planting areas by approved methods to a depth of at least 2 inches. If the soil is dry, water shall be applied until it is in a workable condition. Immediately following this, the sod shall be placed.

3. Laying Sod: Moisten prepared surface immediately prior to laying sod. To prevent deterioration the sod shall be planted within three days from the time of harvesting.

a. However, should inclement weather alter this procedure, the grass may be kept in temporary storage if the sod is spread out in a shaded area with the grass side up and kept moist. Any sod allowed by the Contractor to dry out shall be rejected and no payment for such sod will be made.

b. The sod shall be placed on the prepared surface tightly with no open joints visible and no overlapping. The sod shall be smooth and align with adjoining grassed areas. After installation is complete, the newly sodded areas shall be tamped in place in a satisfactory manner and watered as necessary to enhance growth.

4. Maintenance: The Contractor shall mow grass at regular intervals to maintain a maximum height of 2-1/2 inches. The edges will be neatly trimmed and clipped where necessary. Immediately after mowing and trimming all clippings shall be removed. Watering of the sodded areas shall be applied in the form of a spray or sprinkle, without erosive force in sufficient amounts that will keep the sod in a living and growing condition.

a. The application of herbicides in accordance with manufacturer's instructions shall be applied for weed control. All sod showing deterioration or bare spots

shall be replaced by the Contractor without additional compensation. Additional fertilizer shall be applied after the sod has shown growth (usually approximately forty days).

b. The Contractor shall be responsible for satisfactory growth of the grass until final acceptance of the sod. Should a grassing bond be required for a particular project, the sod shall be covered under the same terms as the grassing.

5. Acceptance: Acceptance of sodded areas will be based on verification of the establishment of a well knitted, living, growing sod covering the areas designated to be sodded. If an acceptable stand of living and growing sod is not obtained, the area shall be re-sodded at no additional cost to the Owner.

M. Riprap (Item No. EC-13): All stone for riprap shall consist of rough unhewn quarry stone as nearly rectangular in section as practicable. The stone shall be resistant to the action of air, temperature changes, and water. The stone shall be sound and dense, and suitable in all other respects, for the purpose intended. The stone shall be a well-graded mixture with individual classified stones ranging in weight in accordance with Section 814 of the Alabama Department of Transportation Standard Specifications, latest edition.

1. Riprap shall be placed in a manner as to ensure that the larger pieces are distributed uniformly and that the smaller pieces will fill the spaces between the larger pieces. After placing, the riprap shall present a reasonably smooth surface to the thickness shown on the Plans.

N. Filter Blanket for Riprap (Item No. EC-14): Where indicated on the Plans or directed by the Engineer, a filter blanket of crushed stone or a geotextile filter fabric shall be placed as a bed for riprap. Crushed stone and geotextile filter fabric shall be as specified in this Section.

1. Crushed Slag or Crushed Stone: Crushed slag or crushed stone shall be screened, washed and shall be 100 percent retained by a ¼ inch screen. One hundred percent shall pass a 1-1/2 inch opening and shall be uniformly graded from maximum size to minimum size. Foreign matter shall not exceed 3 percent by weight when dry.

2. Geotextile: Geotextile filter blanket shall be Terratex GS or approved equal and shall be installed in accordance with the State of Alabama Department of Transportation Standard Specifications for Highway Construction, latest edition.

O. Riprap Gabions (Item No. EC-15): The work under this section consists of furnishing, assembling, typing and filling with approved stones, open mesh wire baskets, constructed in accordance with these Specifications, manufactured by either Maccaferri Gabions, Inc. or Modular Gabion Systems; and placed in reasonably close conformity to the lines, grades, and dimensions shown on the Plans or directed by the Engineer. Other work specified in this section shall include, placing stone (specified for gabion baskets) in the irregular shaped void areas of the ditch between gabions and grouting them.

1. Material:

a. Stone Fill – Stone used in the gabions shall be sound and durable, from any source approved by the Engineer. No stone shall be less than four inches, minimum dimension, nor greater than eight inches. The stone shall be crushed and shall be reasonably well graded between the limiting sizes.

b. Baskets – PVC coated galvanized steel wire gabion basket units shall be of non-raveling construction, fabricated from a triple-twisted hexagonal mesh of hot dipped galvanized steel wire having a minimum diameter of 0.105 inches after galvanization; and additionally, shall be coated with a minimum of 0.020 inches of PVC. The steel wire used shall be galvanized and PVC coated prior to fabrication into mesh. The core wire of all gabion diaphragm and frame components shall equal or exceed Fed. Spec. QQ-W-461H, possess medium tensile strength and Finish 5 Class 3 zinc coating of not less than 0.80 oz/sq. ft. of uncoated wire surface. Mesh openings shall be hexagonal in shape and uniform in size, measuring not more than 3-1/4 inches by 4-1/2 inches. Coated wire used for lacing or as internal connecting wire within gabion cells may be of soft tensile strength and an overall diameter (core wire plus PVC coating) of 0.127 inches. The PVC coated wire of all gabion components shall be resistant to the destructive effect of immersion in acidic, salt, or polluted water, exposure to ultraviolet light and abrasion, and retain these characteristics after a period of not less than 3,000 hours under test in accordance with ASTM Test Designation G-23.

    i. Gabions shall be fabricated in such a manner that the sides, ends, lid and diaphragms can be assembled at the construction site into rectangular baskets of the sizes specified by the Plans. Gabions shall be of single unit construction. The base, lid, ends, and sides shall be either woven into a single unit or one edge of these members connected to the base section of the gabion in such a manner that strength and flexibility at the point of connection is at least equal to that of the mesh.

    ii. Where the length of the gabion exceeds its horizontal width, the gabion shall be equally divided by diaphragms of the same mesh and gauge as the body of the gabions, into cells whose length does not exceed the horizontal width. The diaphragms shall be secured into proper position on the base in such a manner that no additional tying at this junction will be necessary.

    iii. The field connections between adjacent wire baskets shall be made as recommended by the manufacturer and shall develop a connection strong enough that the failure under test shall occur in the mesh rather than the lacing.

Table for Minimum Strength of Gabion Baskets

Min. Strength	# Linear Feet
Wire mesh pulled parallel to wire test	3,400
Wire mesh pulled perpendicular to wire test	1,000
Connection of selvedge wire to mesh	2,200
Connection of end panels to gabion mesh	1,500

iv. The gabions shall be supplied in the various sizes shown on the Plans and shall be shipped flat. The gabion dimensions are subject to a tolerance limit of ± 3% of the specified sizes. All gabion baskets shall have a width of 3.0 feet; heights of 3.0 feet, 1.5 and 1.0 feet; and lengths of 6.0 feet, 9.0 feet or 12.0 feet.

v. Each shipment of gabions to a job site shall be accompanied by a certification, on company letterhead, and signed by an officer of the company, which states that the material conforms to the requirements of the Contract Specifications.

c. Grout - Grout shall consist of Portland cement concrete. Concrete shall conform to the requirements of ASTM G94 and shall have a minimum compressive strength of 3,000 psi, a maximum nominal aggregate size of ¾ inch, and sufficient admixture to provide from 5 to 7 percent entrained air. At the Contractor's option, a water-reducing admixture, proportioned as per the manufacturer's recommendation, may be used to increase the penetration of the grout. The grout shall be designed to produce a mixture having a consistency such as to permit gravity flow into the interstices of the stone-filled gabion baskets with the help of limited brooming and vibrating.

i. The grout shall be used in the work within a period of one (1) hour after mixing. Retempering of grout will not be permitted. Gabion baskets shall not be grouted when the ambient temperature is below 35 degrees F. or above 89 degrees F., unless approved by the Engineer in writing; nor when the grout, without special preparation, is likely to be subjected to freezing temperatures before final set has occurred. Prior to grouting, all surfaces of gabion baskets shall be wetted.

ii. The gabion baskets shall be grouted in successive longitudinal strips, approximately ten (10) feet in length, commencing at the furthest in-channel edge and working back towards the top-of-bank. Each batch of grout shall be dumped onto the ungrouted part of the strip and worked into the voids between the stones. Grout shall be brought to the place of final deposit by approved means, and in no case will grout be permitted to flow on the gabion basket surface a distance in excess of ten (10) feet.

iii. Immediately after dumping the batch of grout, it shall be distributed over the surface of the strip by the use of brooms, and the grout worked into place between stones with suitable spades, trowels or vibrating equipment. The grout shall penetrate the gabion basket surface to provide a cap having a thickness of not less than six (6) inches. As a final operation, a stiff stable broom shall be used to give the grout cap a broomed finish; however, the wire of the gabion shall not be uncovered during the finishing operation.

iv. After completion of any strip as specified, no workman or any load shall be permitted on the grouted surface for at least twenty-four (24) hours. The surface of all grouted gabion baskets shall be cured by

keeping the surface continuously wet for a period of not less than seven (7) days, during which time the ground surface shall also be protected from flowing water and mechanical injury.

2. Construction Requirements:

   a. Foundation Material – Foundation material shall be spread in-the-dry, uniformly on nonwoven plastic filter fabric within the limits and to thicknesses shown on the drawings, or as directed in the field by the Engineer, to form a backing for the gabions. A tolerance of ± one (1) inch from the full depth shown on the drawings will be allowed on the finished surface of the bedding layer, except that either extreme of such tolerance shall not be continuous over an area greater than 200 square feet. Placing of bedding material by methods which will tend to segregate particle sizes will not be permitted. Any damage to the filter fabric or prepared foundation surface during bedding placement shall be repaired before proceeding with the work. Compaction of the bedding material will not be required, but it shall be finished to present a reasonably even surface free from mounds, windrows or depressions.

   b. Gabion Assembly and Installation – Gabion baskets shall be assembled in such a manner that the sides, ends, lids and diaphragms can be assembled at the construction site into rectangular baskets of the sizes specified and shown on the drawings. Gabions shall be of single unit construction, i.e., the base, lid, ends and sides shall be either woven into a single unit or one edge of these members connected to the base section in such a manner that strength and flexibility at the point of connection is at least equal to that of the mesh.

      i. Gabions shall be divided into cells by diaphragms of the same mesh and gauge as the gabion body. Diaphragms shall be placed at three (3) foot nominal spacings in the long direction and shall extend the full width and height of the basket. The gabions shall be furnished with the necessary diaphragms secured in proper position on the base in such a manner that no additional tying at this junction will be necessary.

      ii. All perimeter edges of the mesh forming the gabion shall be securely selvedged so that the joints formed by tying the selvedges have at least the same strength as the body of the mesh. Lacing wire or connecting wire shall be supplied in sufficient quantity for securely fastening all diaphragms and edges of the gabion.

      iii. Empty gabion baskets shall be installed according to manufacturer's recommendations and to the details of the Plans. They shall be individually placed in-the-dry on the approved surface to the lines and grades as shown on the drawings or as directed by the Engineer, with the sides, ends and diaphragms erected in a manner that will insure the correct position of all creases and that the tops of all sides are level. All adjoining empty gabion units must be connected by tie wire lacing along the perimeter of their contact surfaces in order to obtain a monolithic structure. Lacing of adjoining basket units shall be accomplished by continuous stitching with alternating single and

double loops at intervals of not more than five (5) inches. All lacing wire terminals shall be securely fastened. The use of clip connections for this purpose and for final lid closing will not be permitted.

iv. The initial line of basket units shall be placed on the prepared bedding layer surface in a direction parallel to stream flow, unless otherwise shown on the drawings, and shall be partially filled with stones by hand to provide anchorage against deformation and displacement during the remainder of the filling operation. After adjoining empty basket units are set to the line and grade, and common sides with adjacent units thoroughly laced, they shall be placed in tension and stretched to remove any kinks from the mesh and to obtain a uniform alignment. The stretching of empty basket units shall be accomplished in such a manner as to prevent any possible unraveling.

v. Stone filling operations shall carefully proceed with placement by hand or machine so as not to damage any galvanized or PVC wire coating, to assure a minimum of voids between the stones, and to assure the maintenance of alignment throughout the filling process. Undue bulging of the mesh shall be avoided. To avoid localized deformation, the gabion units in any row are to be filled in stages consisting of maximum twelve (12) inch courses, and at no time shall any cell be filled to a depth exceeding one (1) foot more than any adjoining cell. The maximum height from which the stone may be dropped into the gabion units shall be thirty-six (36) inches. For gabion units in excess of two (2) feet in thickness, a minimum of two (2) uniformly spaced connecting wires shall be placed between each stone layer in all cells, connecting compartment faces across the short dimension of the cells. Connecting wires shall be looped around one (1) mesh opening at each basket face and the wire terminals shall be securely twisted to prevent their loosening.

vi. Along all exposed faces, the outer layer of stone shall be carefully placed and arranged by hand to insure a neat and compact appearance. The last layer of stone shall be leveled with the top of the gabion basket to allow for the proper closing of the lid and to provide an even surface that is uniform in appearance. Units that become damaged due to placing operations shall be replaced by the Contractor at no additional expense to the Owner. Lids shall be stretched tight over the stone filling using crowbars or lid closing tools, until the lid meets the perimeter edges of the front end panels. The lid shall then be tightly laced with tie wire along all edges, ends and internal cell diaphragms by continuous stitching with alternating single and double loops at intervals of not more than five (5) inches. Special attention shall be given to see that all projections or wire ends are turned into the baskets.

vii. Where shown on the drawings, or as directed by the Engineer, or where a complete gabion unit cannot be installed because of space limitations, the basket unit shall be cut, folded and wired together to suit existing site conditions. The mesh must be cleanly cut and the

surplus mesh cut out completely or folded back and neatly wired to an adjacent basket face. The assembling, installation, filling, lid closing and lacing of the reshaped gabion basket units shall be carried out as specified above.

c. Grouted Gabions – Gabions installed as specified herein shall be grouted in areas indicated on the drawings. All grouting of gabions shall be done in-the-dry. Stone for grouted gabion baskets shall conform to the requirements specified hereinbefore. The stone shall be placed in conformance with the general requirements for ungrouted gabion basket units as specified hereinbefore. The Contractor shall take special care to maintain the surface of the gabion units free from becoming choked with any material, such as spilled bedding material, until grouted, so as not to hamper the penetration of the grout. When such choking does occur, the Contractor shall remove the contaminating material to a minimum depth of 6 inches prior to grouting.

d. Stone – Filled Voids –Irregular shaped areas in the ditch bottom or sides not conforming to an area that will accommodate a gabion basket as shown in the Plans as "stone filled voids" shall be filled with stones in the manner specified for gabion and grouted.

P. Timber Ditch Checks (Item EC-16): Timber ditch checks shall be 2" x 6" rough cut untreated timber and shall be installed as shown on the Erosion Control Details plan sheet.

Q. Temporary Sedimentation Basin (Item No. EC-17): A temporary sedimentation basin is a settling pond with a controlled stormwater release structure used to collect and store sediment produced by construction activities. The purpose of the sedimentation basin is to eliminate transport of sediments off of the construction site during storm events or any events in which stormwater may carry sediments off site.

1. The sedimentation basin shall be constructed before clearing and grading is undertaken and shall be constructed to the dimensions shown on the Plans. The embankment forming the berm shall be well-compacted and stabilized with vegetation. The sedimentation basin shall remain in operation and be properly maintained until the site area is permanently stabilized by vegetation and/or when permanent structures are in place.

2. The Contractor shall maintain access to the sedimentation basin for periodic maintenance and sediment removal. Basins shall be inspected by the Contractor after each rainfall event and shall be cleaned out when half the stormwater storage capacity volume has been filled with sediment.

16.1.07 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

A. The unit price bid for the various items shall be compensation in full for furnishing, installing, and maintaining each item, complete in place, including all materials, labor, equipment, and incidentals necessary for the completion of the item.

1. EC-1 Erosion Control Plan: The lump sum price bid for this item shall be compensation in full for furnishing and modifying, as required, a complete Erosion

Control Plan. Payment shall be made upon approval of the Erosion Control Plan by the Engineer.

2. EC-2 Temporary Grassing for Erosion Control: The unit price for this item shall be compensation in full for one (1) acre of temporary grassing for erosion control complete in place including maintenance until the permanent grassing is installed. Measurement will be made to the nearest tenth of an acre of the area within the project limits actually grassed.

3. EC-3 Silt Fence: The unit price bid for this item shall be compensation in full for furnishing, installing, maintaining, and removing one (1) linear foot of the type of silt fence specified i.e., Type A or B, properly installed for temporary erosion control.

4. EC-4 Hay Bales: The unit price bid for this item shall be compensation in full for furnishing, installing, maintaining, and removing one (1) each hay bale properly installed for temporary erosion control.

5. EC-5 Temporary Steel Sheet Pile for Erosion Control: The unit price bid for this item shall be compensation in full for furnishing, installing, maintaining, and removing one (1) square foot of Temporary Steel Sheet Piling. The sheet pile installation shall be made to the depth and width indicated on the Plans. Payment shall be made for actual square footage installed by the Contractor. Mobilization, equipment, materials, etc. shall be considered subsidiary obligations of this item and no additional compensation shall be provided.

6. EC-6 Turbidity Barriers: The unit price for this item shall be compensation in full for furnishing, installing, maintaining, and removing one (1) linear foot of turbidity barrier properly installed for erosion control and for reducing the turbidity in adjacent water courses.

7. EC-7 Clearing and Grubbing: Where specified on the construction plans, the unit price bid for this item will be compensation in full for furnishing all materials, equipment, tools, labor and incidentals necessary to perform one (1) acre of clearing and grubbing of project limits as described in Section 16.1.06.G. Measurement will be made to the nearest tenth of an acre of the area within the project limits actually cleared and grubbed. Removal and hauling of debris from site shall be considered a subsidiary obligation of this item, and no additional compensation will be provided.

8. EC-8 Final Grassing for Erosion Control: The unit price bid for this item shall be compensation in full for one (1) acre of grassing for erosion control complete in place including ground preparation, fertilizing, seeding and maintenance. Measurement will be made to the nearest tenth of an acre of the area actually grassed except that grassing areas outside of the construction easements will be considered the responsibility of the Contractor and will not be measured for payment.

9. EC-9 Mulching: The unit price bid for this item shall be compensation in full for one (1) acre of mulching complete in place. Measurement will be made to the nearest tenth of an acre of the area actually mulched except that mulching of areas

outside of the construction easements will be considered the responsibility of the Contractor and will not be measured for payment.

10. EC-10 Topsoil: The unit price bid for this item shall be compensation in full for furnishing, hauling, spreading, shaping and compacting in its final position one (1) cubic yard of acceptable topsoil ready for incorporating fertilizer and seed, and for furnishing all equipment, tools, labor and incidentals necessary to complete the work. Measurement of the topsoil shall be made per cubic yard, loose measure, in the delivery vehicle at the point of delivery to the project.

11. EC-11 Erosion Control Netting: The unit price bid for this item will be compensation in full for furnishing and properly installing one (1) square yard of erosion control netting, including all materials, equipment, tools, labor, and incidentals required to complete the item.

12. EC-12 Solid Sod: The unit price bid for this item shall be compensation in full for one (1) square yard of solid sod properly installed and maintained where specified for erosion control.

13. EC-13 Riprap: The unit price bid for this item shall be compensation in full for one (1) square yard, one (1) foot in thickness, of the specified riprap classification complete in place i.e., Class 1, 2, etc. Where depths greater than one (1) foot are shown on the Plans or directed the quantity to be paid for will be increased in the proportions that the thickness bears to one (1) foot i.e., if thickness is 1.5 feet, then the surface area will be multiplied by 1.5 to determine the quantity to be paid.

14. EC-14 Filter Blanket for Riprap: The unit price bid for this item shall be compensation in full for all labor, materials, equipment, and incidentals necessary for the installation of one (1) square yard of filter blanket for riprap complete in place. For crushed stone filter blankets, payment shall be for one (1) square yard of filter blanket complete in place with a thickness of at least 6 inches.

15. EC-15 Riprap Gabions: The unit price bid for this item shall be compensation in full for all labor, materials (including wire mesh and stone), equipment, tools, and incidentals necessary for the installation of one (1) cubic yard of wire-mesh, stone filled gabion or stone-filled voids complete in place.

16. EC-16 Timber Ditch Checks: The unit price bid for this item shall be compensation in full for one (1) each timber ditch check as detailed, complete in place.

17. EC-17 Temporary Sedimentation Basin: The lump sum price bid for this item shall be compensation in full for furnishing all equipment, installing complete in place, maintaining, and removing (if required) one temporary sedimentation basin as shown on the Plans and described in the Specifications. Mobilization, equipment, materials, etc., shall be considered subsidiary obligations of this item and no additional compensation shall be provided.

B. Partial Payment – A percentage of the unit price bid shall be payable in accordance with the following schedule:

1. After the temporary sedimentation basin has been constructed and accepted, 50 percent of the lump sum price bid for the temporary sedimentation basin will be paid.

2. When 50 percent of the original Contract amount is earned, including any payment previously made for the item of temporary sedimentation basin is earned, an additional 25 percent of the lump sum price bid for the temporary sedimentation basin will be paid.

3. Upon completion of all work of the project, payment of the remaining 25 percent of the lump sum price bid for the temporary sedimentation basin will be paid.

C. The sum of all payments shall not exceed the original contract amount bid for the item of temporary sedimentation basin, regardless of the fact that the Contractor may have, for various reasons, cleaned or otherwise maintained the sedimentation basin on as many occasions as required by the Specifications or by the Engineer to properly maintain the capacity of the basin.

END OF SECTION

SECTION 05 51 19 - METAL GRATING STAIRS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes industrial-type, straight-run stairs with aluminum-grating treads and railings attached to aluminum grating stairs.

B. Related Requirements

1. Section 05 52 13 – Pipe and Tube Railings

1.2 COORDINATION

A. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Coordinate pipes and other various mechanical devices that may conflict with the structural stairway. Modify stair structure to accommodate and approve modifications with the Engineer.

1.3 ACTION SUBMITTALS

A. Product Data: For metal grating stairs

B. Shop Drawings: Include plans, elevations, sections, details, and attachments.

C. Delegated-Design Submittal: For stairs, including analysis data signed and sealed by the qualified professional Engineer responsible for their preparation.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional Engineer to design stairs and railings.

B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Uniform Load: 100 lbf/sq. ft.
2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.
3. Uniform and concentrated loads need not be assumed to act concurrently.
4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
5. Limit deflection of treads, platforms, and framing members to L/360.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Aluminum Plates, Shapes, and Bars: ASTM A 429, Alloy 6063-T5.

C. Corrugated Nosings: Extruded aluminum, with an integral corrugated non-slip finish.

2.3 FASTENERS

A. General: Provide type 316 stainless steel fasteners with coating complying with ASTM F 593. Select fasteners for type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers.

C. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.4 MISCELLANEOUS MATERIALS

A. Bituminous Paint: Cold applied asphalt emulsion complying with ASTM D1187.

B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION, GENERAL

A. Provide complete stair assemblies, including metal framing, hangers, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.

1. Join components by welding unless otherwise indicated.
2. Use connections that maintain structural value of joined pieces.

B. Form exposed work with accurate angles and surfaces and straight edges.

C. Weld connections to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Weld exposed corners and seams continuously unless otherwise indicated.
5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 4 welds: good quality, uniform undressed weld with minimal splatter.

D. Fabricate joints that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.6 ALUMINUM-FRAMED STAIRS

A. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," Industrial Class, unless more stringent requirements are indicated.

B. Stair Framing:

1. Fabricate stringers of structural aluminum channels.

    a. Provide closures for exposed ends of channel stringers.

2. Construct platforms of aluminum channel headers and miscellaneous framing members as needed to comply with performance requirements.
3. Weld or bolt stringers to headers; weld or bolt framing members to stringers and headers.

C. Metal Bar-Grating Stairs: Form treads and platforms to configurations shown from metal bar grating; fabricate to comply with NAAMM MBG 531, "Metal Bar Grating Manual."

1. Fabricate treads and platforms from pressure-locked aluminum grating with 1-1/4-by-3/16-inch bearing bars at 15/16 inch o.c. and crossbars at 4 inches o.c.
2. Fabricate treads and platforms from pressure-locked steel grating with openings in gratings no more than 1/2 inch in least dimension.
3. Surface: Serrated.
4. Finish: Mill finish.
5. Fabricate grating treads with non-slip nosing and with aluminum angle or aluminum plate carrier at each end for stringer connections. Secure treads to stringers with bolts.
6. Fabricate grating platforms with nosing matching that on grating treads. Provide toeplates at open-sided edges of grating platforms. Mechanically attach grating to platform framing.

2.7 STAIR RAILINGS

A. Comply with applicable requirements in Section 05 52 13 - Pipe and Tube Railings.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.

3.2 INSTALLING METAL STAIRS WITH GROUTED BASEPLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of baseplates.

B. Set steel-stair baseplates on wedges, shims, or leveling nuts. After stairs have been positioned and aligned, tighten anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with edge of bearing plate before packing with grout.

1. Use nonmetallic, nonshrink grout unless otherwise indicated.
2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

END OF SECTION 05 51 19

SECTION 05 52 13 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aluminum pipe and tube railings.

B. This section shall be used for areas where stairs and handrail are congruent.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Related Requirements:

1. Section 05 51 19 - Metal Grating Stairs

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

D. Coordinate railings with gate and valve operators, as well as electrical components.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
2. Railing brackets.
3. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed finish required.

1. Sections of each distinctly different linear railing member, including handrails, top rails, and posts.
2. Fittings and brackets.

D. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

D. Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code - Steel."
2. AWS D1.2, "Structural Welding Code - Aluminum."
3. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Aluminum Pipe and Tube Railings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. ATR Technologies, Inc.
    b. Thompson Fabricating, LLC.
    c. Tubular Specialties Manufacturing, Inc.
    d. Or Equal

B. Source Limitations: Obtain each type of railing from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 - Quality Requirements, to design railings, including attachment to building or structural construction.

B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Uniform horizontal load of 50 lbf/ft applied in any direction to the top rail
2. Concentrated load of 200 lbf applied in any direction

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 ˚F, ambient; 180 ˚F.

2.3 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

1. Provide type of bracket with flange tapped for concealed anchorage to threaded hanger bolt and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

2.4 ALUMINUM

A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.

B. Extruded Bars and Tubing: ASTM B 221, Alloy 6063-T5/T52.

C. Extruded Structural Pipe and Round Tubing: ASTM B 429, Alloy 6063-T6.

1. Provide Standard Weight (Schedule 40) pipe unless otherwise indicated.

D. Drawn Seamless Tubing: ASTM B 210, Alloy 6063-T832.

E. Plate and Sheet: ASTM B 209, Alloy 6061-T6.

F. Die and Hand Forgings: ASTM B 247, Alloy 6061-T6.

G. Castings: ASTM B 26, Alloy A356.0-T6.

2.5 FASTENERS

A. General: Provide the following:

1. Aluminum Railings: Type 316 stainless-steel fasteners.
2. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Fasteners for Interconnecting Railing Components:

1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
2. Provide Phillips OR square or hex socket flat-head machine screws for exposed fasteners unless otherwise indicated.

D. Post-Installed Anchors: Torque-controlled expansion anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.6 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

1. For aluminum railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

C. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

1. Water-Resistant Product: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.7 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with either welded or nonwelded connections unless otherwise indicated.

H. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.

I. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

J. Form Changes in Direction as Follows:

1. As detailed.
2. By flush bends or by inserting prefabricated flush-elbow fittings.

K. Close exposed ends of railing members with prefabricated end fittings.

L. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

O. For railing posts set in concrete, provide stainless-steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.

P. For removable railing posts, fabricate slip-fit sockets from stainless-steel tube or pipe whose ID is sized for a close fit with posts; limit movement of post without lateral load, measured at top, to not more than $1/40^{th}$ of post height. Provide socket covers designed and fabricated to resist being dislodged.

1. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.

Q. Toe Boards: Where indicated or required by OSHA, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.8 ALUMINUM FINISHES

A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

B. Clear Anodic Finish: AAMA 611, AA-M12C22A31.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.

D. Adjust railings before anchoring to ensure matching alignment at abutting joints.

E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.4 ANCHORING POSTS

A. Use metal sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Cover anchorage joint with flange of same metal as post, attached to post with set screws.

C. Leave anchorage joint exposed with anchoring material flush with adjacent surface.

D. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:

1. For aluminum pipe railings, attach posts using fittings designed and engineered for this purpose.

E. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

3.5 ATTACHING RAILINGS

A. Secure wall brackets and railing end flanges to building construction as follows:

1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
2. For hollow masonry anchorage, use toggle bolts.
3. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.
4. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.6 ADJUSTING AND CLEANING

A. Clean aluminum by washing thoroughly with clean water and soap and rinsing with clean water.

3.7 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION 05 52 13

SECTION 26 - SECTION 09 96 00 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: High-performance coatings and special preparation of surfaces.

1. Use high performance coating systems specified in this section to finish digester cover components, unless otherwise indicated. Without restricting volume or generality, work to be performed under this section may include, but is not limited to:

   a. Exterior steel
   b. Interior steel
   c. Exterior Exposed (Non-Immersion) Ductile Iron Pipe
   d. Interior (Immersion) Ductile Iron Pipe

2. Painting or finishing is not needed for following:

   a. Surfaces or materials specifically scheduled or shown on Drawings to remain unfinished
   b. Items provided with factory finish.
   c. Equipment nameplates, fire rating labels, and operating parts of equipment

3. Materials and products having factory-applied primer shall not be considered factory finished.

1.2 REFERENCE STANDARDS

A. American Society for Testing and Materials:

1. ASTM D16 - Terminology Relating to Paint, Varnish, Lacquer, and Related Products

B. SSPC: The Society for Protective Coatings:

1. SSPC - Painting Manual, Volume 2: Systems and Specifications.
2. SSPC-Paint 16 - Coal Tar Epoxy-Polyamide Black (or Dark Red).
3. SSPC-SP 2 - Hand Tool Cleaning.
4. SSPC-SP 3 - Power Tool Cleaning.
5. SSPC-SP 5 - White Metal Blast Cleaning.
6. SSPC-SP 6 - Commercial Blast Cleaning.
7. SSPC-SP 7 - Brush-Off Blast Cleaning.
8. SSPC-SP 10 - Near-White Metal Blast Cleaning.
9. SSPC-SP 11 - Power Tool Cleaning to Bare Metal.

C. National Association of Pipe Fabricators

1. NAPF 500-03-01 Solvent Cleaning

2. NAPF 500-03-02 Hand Tool Cleaning
3. NAPF 500-03-03 Power Tool Cleaning
4. NAPF 500-03-04 Abrasive Blast Cleaning of Ductile Iron Pipe
5. NAPF 500-03-05 Abrasive Blast Cleaning of Cast Ductile Iron Fittings

1.3 PREINSTALLATION MEETINGS

A. Convene minimum two weeks prior to commencing Work of this Section.

B. Schedule a conference and inspection to be held on-site before field application of coating systems begins.

C. Conference shall be attended by Contractor, Owner's Representative, Engineer, coating applicators, and a representative of coating material manufacturer.

D. Topics to be discussed at meeting shall include:
   1. A review of Contract Documents and accepted shop drawings shall be made and deviations or differences shall be resolved.
   2. Review items such as environmental conditions, surface conditions, surface preparation, application procedures, and protection following application.
   3. Establish which areas on-site will be available for use as storage areas and working area

E. Pre-construction conference and inspection shall serve to clarify Contract Documents, application requirements and what work should be completed before coating application can begin.

1.4 SUBMITTALS

A. Product Data:

   1. Submit manufacturer information indicating coating materials, manufacturer’s name, product name, product number, performance ratings, curing times, mixing, thinning and application requirements.
      a. Provide material analysis, including vehicle type and percentage by weight and by volume of vehicle, resin and pigment.
      b. Submit manufacturer's Material Safety Data Sheets (MSDS) and other safety requirements.

B. Samples: Submit one color chart/color samples, illustrating colors for selection.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Manufacturer Instructions: Submit special procedures, perimeter conditions requiring special attention.

E. Quality Assurance Submittals:

   1. Certificates:

a. Coatings manufacturer shall certify that coating materials utilized are "non-lead" (less than 0.06% lead by weight in dried film) as defined in Part 1303 of Consumer Product Safety Act.
b. Provide certification that specialized equipment as may be required by manufacturer for proper application of coating materials shall be utilized for work of this Section.
c. Provide manufacturer's certification that products to be used comply with specified requirements and are suitable for intended application.

2. Manufacturer's Instructions:

a. Submit manufacturer's installation procedures which shall be basis for accepting or rejecting actual installation procedures.

F. Qualifications Statements:

1. Submit qualifications for manufacturer and applicator.
2. Submit manufacturer's approval of applicator.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit maintenance and cleaning requirements for coatings, repair and patching techniques.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials:

1. Furnish 1 gal of each color of each type of coating specified, for Owner's maintenance use.
2. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

1.7 QUALITY ASSURANCE

A. Conform to applicable codes and ordinances for flame, fuel, smoke, and volatile organic compound (VOC) ratings requirements for finishes at time of application.

1.8 QUALIFICATIONS

A. Provide products from a company specializing in manufacture of high performance coatings with a minimum of 10 years' experience.

B. Applicator shall be trained in application techniques and procedures of coating materials and shall demonstrate a minimum of 2 years successful experience in such application.

1. Maintain, throughout duration of application, a crew of painters who are fully qualified to satisfy specified qualifications.

C. Single Source Responsibility:

1. Materials shall be products of a single manufacturer or items standard with manufacturer of specified coating materials.
2. Provide secondary materials which are produced or are specifically recommended by coating system manufacturer to ensure compatibility of system.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Container Labeling: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

B. Inspection:

1. Accept materials on Site in manufacturer's sealed and labeled containers.
2. Inspect for damage and to verify acceptability.

C. Store materials in ventilated area and otherwise according to manufacturer instructions.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.10 AMBIENT CONDITIONS

A. Minimum Conditions: Do not install materials when temperature is below 35 ºF or above 110 ºF.

B. Refer to specific product information sheets for minimum surface temperature requirements. Surface temperatures shall be at least 5 ºF (15 ºC) above dew point and in a rising mode.

C. Subsequent Conditions: Maintain above temperature range, 24 hours before, during, and 72 hours after installation of coating.

D. Relative humidity shall be no higher than 85%.

E. For exterior spray application, wind velocity shall be less than 15 mph (25 kph).

F. Atmosphere shall be relatively free of airborne dust.

G. Restrict traffic from area where coating is being applied or is curing.

1.11 WARRANTY

A. Include coverage for bond to substrate, and degradation of chemical resistance.

PART 2 - PRODUCTS

2.1 HIGH-PERFORMANCE COATINGS

A. Manufacturers:

1. Tnemec Company, Inc.
2. Sherwin-Williams Company.
3. Or Approved Equal.

2.2 COMPONENTS

A. Coatings:

1. Description:

a. Complete multicoat systems formulated and recommended by manufacturer for intended applications and in indicated thicknesses.
b. Specified number of coats does not include primer or filler coat.

2. Lead content: None.
3. Chromium Content as Zinc Chromate or Strontium Chromate: None.
4. Maximum VOC Content: As required by applicable regulations.
5. Colors: As selected from manufacturer's standard colors.

B. Epoxy Coating:

1. Modified Polyamine Epoxy

a. Usage: A thick film, 100% solids, abrasion-resistant lining designed for wastewater immersion and fume environments. Provides low permeation to H2S gas, protects against MIC and provides chemical resistance to severe wastewater environments.
b. Exposure: Severe.
c. Number of Coats: See schedule in Section 3.6.
d. Finish: Gloss.
e. Minimum Solids Content: 100% (mixed).
f. Minimum Dry Film Thickness Per Coat: See schedule in Section 3.6.
g. Perma-Glaze, Series 435, as manufactured by Tnemec or DuraPlate 5900, as manufactured by Sherwin Williams.
h. Primer: See schedule in Section 3.6

2. High-Build Epoxy Coating – Pure Polyamide Epoxy

a. Usage: Application characteristics in adverse and varied conditions.
b. Exposure: Moderate.
c. Number of Coats: See schedule in Section 3.6.
d. Finish: Satin.
e. Minimum Solids Content: 56.0% +/- 2.0% (mixed).

f. Minimum Dry Film Thickness Per Coat: See schedule in Section 3.6.
g. Hi-Build Epoxoline, Series 66 or 66HS, as manufactured by Tnemec or Macropoxy 646 Fast Cure, as manufactured by Sherwin Williams.
h. Primer: See schedule in Section 3.6

3. Aromatic Urethane, Zinc-Rich Primer

a. Usage: A two-component, moisture-cured, zinc-rich urethane primer for the interior and exterior steel surfaces. Exposure: Moderate.
b. Color: Greenish-gray.
c. Minimum Solids Content: 63.0 ± 2.0% (mixed).
d. Metallic Zinc Content: 83% minimum in dried film. ASTM D 522 Type III Zinc dust.
e. Standard of Quality: Hydro-Zinc, Series 91-H_20, as manufactured by Tnemec or Corothane 1 Galva Pac 1K or 2K, as manufactured by Sherwin Williams.
f. Primer: See schedule in Section 3.6

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which application of coating systems shall be performed for conditions that will adversely affect execution, permanence, or quality of coating system application.

B. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes until moisture content of surface is below following limits:

1. Masonry Surfaces: 12% maximum
2. Vertical Concrete Surfaces: 12% maximum
3. Horizontal Concrete Surfaces: 8% maximum

C. Correct conditions detrimental to timely and proper execution of Work.

D. Do not proceed until unsatisfactory conditions have been corrected.

E. Commencement of installation constitutes acceptance of conditions and responsibility for satisfactory performance.

3.2 PREPARATION

A. Protection:

1. Take precautionary measures to prevent fire hazards and spontaneous combustion. Remove empty containers from Site.
2. Place cotton waste, cloths and hazardous materials in containers, and remove from Site daily.
3. Provide drop cloths, shields, and other protective equipment.

4. Protect elements surrounding work of this section from damage or disfiguration.
5. As Work proceeds, promptly remove spilled, splashed, or splattered materials from surfaces.
6. During application of coating materials, post Wet Paint signs.
7. During application of solvent-based materials, post No Smoking signs.

B. Clean surfaces of loose foreign matter.

C. Remove substances that would bleed through finished coatings; if removal is not possible, seal surface with shellac.

D. Remove finish hardware, fixture covers, and accessories and store.

E. Existing Painted and Sealed Surfaces:

1. Remove loose, flaking, and peeling paint, and feather edge and sand smooth edges of chipped paint.
2. Clean with mixture of trisodium phosphate and water to remove surface grease and foreign matter.

F. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Surfaces shall be mechanically cleaned to remove passivation and to provide a uniform 1.0 mil anchor profile.

G. Ferrous Metal:

1. Surfaces shall be free of residual deposits of grease, rust, scale, dirt, dust, and oil.

    a. Immersion Service: SSPC-SP 10 Near White Blast Cleaning
    b. Non-Immersion Service: SSCP-SP 6 Commercial Blast Cleaning

2. Field Repair of Shop Primed Surfaces:

    a. Non-Immersion Service: Remove all dirt, dust, chalk, oil, grease, as well as any other foreign matter by solvent cleaning (SSPC-SP 1) and/or power washing. All areas damaged during transportation, construction or installation shall be cleaned in accordance with SSPC-SP 11 Power Tool Cleaning to Bare Metal or SSPC-SP 6 Commercial Blast Cleaning. All edges shall be feathered. All surfaces shall be clean and dry prior to coating
    b. Immersion Service: Remove all dirt, dust, chalk, oil, grease, as well as any other foreign matter by solvent cleaning (SSPC-SP 1) and/or power washing. All areas damaged during transportation, construction or installation shall be cleaned in accordance with SSPC-SP 10 Near White Blast Cleaning. All edges shall be feathered. The remainder of the intact shop primer shall be cleaned in accordance with SSPC-SP 7 Brush-Off Blast Cleaning to provide a minimum, uniform, anchor profile of at least 1.0 mil. In order to prevent injury to surrounding painted areas, blast cleaning may necessitate use of lower air pressure, small nozzle and abrasive particle sizes, short blast nozzle distance from surface, shielding and masking. If damage is too extensive to touch-up, item shall be re-cleaned and coated or painted. All surfaces shall be clean and dry prior to receiving the specified finish coat(s).

3. For surfaces not shop primed, surfaces shall be cleaned in compliance with specifications of Steel Structures Painting Council as indicated in Schedule of Coating Systems below.

H. Coatings Manufacturer shall provide field verification that surface is prepared appropriately for coating application.

3.3 APPLICATION

A. Comply with SSPC standards and codes

B. Apply primer to each surface, unless specifically not required by coating manufacturer.

C. Apply coating systems in compliance with manufacturer's instructions and using application method best suited for obtaining full, uniform coverage of surfaces to be coated.

D. Apply primer, intermediate, and finish coats to comply with wet and dry film thickness and spreading rates for each type of material as recommended by manufacturer.

1. Application rates in excess of those recommended and fewer numbers of coats than specified shall not be accepted.

E. Number of coats specified shall be minimum number acceptable. Apply additional coats as needed to provide a smooth, even application.

1. Closely adhere to re-coat times recommended by manufacturer. Allow each coat to dry thoroughly before applying next coat. Provide adequate ventilation for tank interior to carry off solvents during drying phase.

F. Employ only application equipment that is clean, properly adjusted, and in good working order, and of type recommended by coating manufacturer.

G. After surface preparation, interior weld seams shall receive a stripe coat applied by brush.

H. Make edges of paint adjoining other materials or colors sharp and clean, without overlapping.

I. Apply coatings to specified thicknesses.

J. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish.

K. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

3.4 INSPECTION, PAINTERS LOG, AND TESTING EQUIPMENT

A. Daily Log

1. The Contractor shall keep a daily log in which the following information shall be recorded.

a. Air Temperature: Air temperature readings shall be taken at intervals throughout the day's work. Readings shall be taken at the start of the mornings work, mid-day, and afternoon. Should environmental conditions change, additional reading shall be taken to assure that coatings are being applied under the conditions as outlined by the coatings manufacturer.
b. Surface Temperature: Surface temperatures shall be taken in areas where work is being performed. Surface temperature shall be that as specified by the coatings manufacturer.
c. Material Temperature: Material temperature reading shall be taken prior to the application of the paint.
d. Batch Number: batch numbers for each material used during the days painting operation shall be recorded.
e. Relative Humidity: Relative humidity readings shall be taken at intervals throughout the day's work. Readings shall be taken at the start of the mornings work, mid-day, and afternoon. Should environmental conditions change, additional reading shall be taken to assure that coatings are being applied under the conditions as outlined by the coatings manufacturer.
f. Dew Point: Dew point readings shall be taken at intervals throughout the day's work. Readings shall be taken at the start of the mornings work, mid-day, and afternoon. Should environmental conditions change, additional reading shall be taken to assure that coatings are being applied under the conditions as outlined by the coatings manufacturer.
g. Detail or Work Performed During the Day: Area where work was performed and the extent of the work performed shall be included in the daily log.

B. Testing Equipment

1. In addition to the equipment required to take measurements which will be included in the daily log, The Contractor shall have on the project site the following testing equipment. Equipment shall be in calibration and proper working order.

a. Dry Film Thickness Measurements Gauge: Dry film thickness reading shall be taken with a properly calibrated (per the manufacturer's instructions) Type 1 (magnetic) or Type 2 (electromagnetic) instrument. Dry film thickness reading will be taken and recorded in the in a frequency and manner as dictated by the Engineer.
b. Low Voltage Holiday Detection Equipment: Interior surfaces, following a minimum of 96 hours cure, shall be holiday detected in accordance with ASTM G 62 low voltage holiday detection. Holiday detector shall be a Tinker & Rasor Model M-1 or equal. Areas found to have holidays shall be marked and repaired in accordance with the paint manufacturer's instructions. The Engineer shall be notified of time of testing so that he might be present to witness testing.
c. High Voltage Holiday Detection Equipment: Interior surfaces, following a minimum of 96 hours cure, shall be holiday detected in accordance with NACE SP0188-99 high voltage holiday detection. Holiday detector shall be a Tinker & Rasor model AP/W Holiday D or equal. Areas found to have holidays shall be marked and repaired in accordance with the paint manufacturer's instructions. The Engineer shall be notified of time of testing so that he might be present to witness testing.

C. Third Party Inspection

1. The Contractor shall engage the services of an independent, third party coatings inspector to monitor the interior and exterior coating work.

    a. The inspector shall be NACE Level III Certificated and have a minimum of 5 years' experience.
    b. The coatings inspector's credentials shall be submitted to the Owner for approval. The Owner shall reserve the right to approve the submitted inspection firm.
    c. The NACE Inspector shall not have ever been an employee by the Contractor.

2. Hold Point Inspections

    a. Exterior Hold Point Inspections (The number of inspections will vary depending on the progress of the Contractor.

        1) Surface preparation shall be inspected prior to the installation of the prime coat. Primer will be checked from previous installation as well. Note This will be multiple inspections and the quantity will depend on the contractor's progress.
        2) Primer: The primer installation and dry film thickness verification shall be inspected prior to the application of the stripe coat.
        3) Stipe coat installation shall be inspected and verified.
        4) Intermediate coat installation shall be inspected and dry film thickness verified.
        5) Discontinuity Testing: After the intermediate coat has been installed all surfaces shall be checked for holidays with low voltage holiday detection equipment in accordance with the manufacturer's instructions. All holidays shall be repaired prior to the installation of the finish coat.
        6) Finish coat installation shall be inspected and dry film thickness verified.

    b. Interior Hold Point Inspections (The number of inspections will vary depending on the progress of the Contractor.

        1) Surface preparation shall be inspected prior to the installation of the prime coat. Primer will be checked from previous installation as well. Note This will be multiple inspections and the quantity will depend on the Contractor's progress.
        2) Primer: The primer installation and dry film thickness verification shall be inspected prior to the application of the stripe coat.
        3) Stipe coat installation shall be inspected and verified.
        4) Finish coat installation shall be inspected and dry film thickness verified.
        5) Discontinuity Testing: After the intermediate coat has been installed all surfaces shall be checked for holidays with high voltage holiday detection equipment in accordance with the manufacturer's instructions. All holidays shall be repaired prior to the installation of the finish coat.

3.5 CLEANING

A. Collect waste material that may constitute fire hazard, place in closed metal containers, and remove daily from Site.

B. Clean surfaces immediately of overspray, splatter, and excess material.

C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.6 SCHEDULE

A. EXTERIOR SERVICE

*All coating thickness are expressed in dry film thickness (DFT.)

1. Exterior Exposed Ferrous Metals: Digester Covers

   a. Field applied system
   b. Surface Preparation: SSPC SP10 Near White Commercial Cleaning

      1) Primer/Shop Coat: Series 91 H20 Hydro-Zinc or Corothane 1 Gala Pac 1K or 2 K **Note (1)**

         a) Dry Film Thickness: 2.5 to 3.5 mils

      2) First Intermediate Coat: Series 66 Epoxoline or Macropoxy 646 Fast Cure **Note (2),(3)**

         a) Dry Film Thickness: 3.0-5.0 mils

      3) Finish Coat: Series 700-35GR HydroFlon Endura-Shield II or FluoroKem HS

         a) Dry Film Thickness: 2.0-3.0 mils

      4) Total Dry Film Thickness: 6.5 to 9.5 mils

Note (1) Coordinate shop cleaning and primer coat with appropriate Metals Specifications
Note (2) Series 66 may be interchanged with Series 161 when surface temperature is below 50 degrees (21degrees C) or when faster recoat is desired.
Note (3) 66HS Epoxoline may be substituted for 66 Epoxoline.

2. Non-Submerged Ductile Iron (Coastal Exposure/Extreme UV):

   a. Surface Preparation: Abrasive blast to remove all contaminants.

      1) Primer: Series N140-1211 Pota-Pox Plus or Macropoxy 5500LT

         a) Dry Film Thickness: 6.0 – 8.0

      2) 1st Intermediate: Series 66 Epoxoline or Macropoxy 646 Fast Cure **Note (1)**

         a) Dry Film Thickness: 3.0 – 5.0

      3) 2nd Intermediate: Series 73 Endura-Shield or Acrolon 218 HS

a) Dry Film Thickness: 3.0 – 5.0

4) Finish Coat: Series 700 HydroFlon or FluoroKem HS

a) Dry Film Thickness: 2.0 – 3.0

5) Total Dry Film Thickness: 13.0 – 19.0

Note (1) Series 66 may be interchanged with Series 161 when surface temperature is below 50 degrees (21degrees C) or when faster recoat is desired

B. IMMERSION OR VAPOR ZONE SERVICE

1. Ferrous Metals Submerged or Intermittently Submerged in Wastewater (Closed Top / Head Space Exposure in Digesters)

a. Surface Preparation: SSPC SP10 Near White Blast Cleaning

1) Primer/Shop Coat: Series 20-1255 Pota-Pox, as manufactured by Tnemec or Macropoxy 240 (Shop primed surfaces shall be prepared in accordance with Section 3.2-H-2-b above)

a) Dry Film Thickness: 4.0 – 6.0 mils

2) Lining: Series 435 Perma-Glaze or Dura Plate 5900

a) Dry Film Thickness 30.0 – 40.0

3) Total Dry Film Thickness: 34.0 - 46.0 mils.

4) Holiday Detection: All surfaces shall be tested for discontinuities (holidays) utilizing a Tinker & Rasor AP/W High Voltage Holiday Detector in accordance with the instructions of Tnemec Technical Services. Holidays shall be repaired in accordance with the instructions of the manufacturer.

2. Ductile Iron Pipe (Outside Diameter - OD) Submerged or Intermittently Submerged in Wastewater

a. Surface Preparation: Uniformly abrasive blast the entire exterior surface using angular abrasive to an NAPF 500-03-04: “External Pipe Surface Condition”. When viewed without magnification, the exterior surfaces shall be free of all visible dirt, dust, loose annealing oxide, loose mold coating, rust and other foreign matter.

1) Primer/Shop Coat: Series N140-1211 Pota-Pox Plus or Macropoxy 5500LT (Shop primed surfaces shall be prepared in accordance with Section 3.2-H-2-b above)

a) Dry Film Thickness: 6.0 – 8.0 mils

2) Intermediate: Series 20-39BL Pota-Pox or Macropoxy 646 Fast Cure

a) Dry Film Thickness: 4.0 – 6.0

3) Finish: Series 142 Epoxoline or Macropoxy 5500LT

a) Dry Film Thickness: 10.0 – 12.0

4) Total Dry Film Thickness: 20.0 - 26.0 mils.

5) Holiday Detection: Interior surfaces, following a minimum of 96 hours cure, shall be holiday detected in accordance with ASTM G 62 low voltage holiday detection. Holiday detector shall be a Tinker & Rasor Model M-1 or equal. Areas found to have holidays shall be marked and repaired in accordance with the paint manufacturer's instructions. The Engineer shall be notified of time of testing so that he might be present to witness testing.

3.7 COLORS

A. Colors shall be selected by Owner.

END OF SECTION 09 96 00

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JRA PROJECT NO. 225163
WRIGHT SMITH WWTP PRIMARY
DIGESTER NO. 1 COVER REPLACEMENT
MAWSS
MOBILE, AL
CLIENT JOB NO. CMOB250034
BASED ON CLIENT TEMPLATE: "A_GMC Municipal 2022.docx"
PRINTED ON: October 7, 2025

ELECTRICAL SPECIFICATION INDEX:

SECTION NO.....SECTION DESCRIPTION
26 05 00 .....BASIC ELECTRICAL MATERIALS AND METHODS
26 05 19 .....POWER CONDUCTORS AND CABLES 51V-600V
26 05 26 .....GROUNDING
26 05 33 .....RACEWAYS
26 05 34 .....OUTLET BOXES, JUNCTION BOXES, WIREWAYS
26 05 53 .....ELECTRICAL IDENTIFICATION
26 27 26 .....WIRING DEVICES
26 28 16 .....SAFETY SWITCHES AND FUSES
26 29 00 .....MANUFACTURED CONTROL PANELS
27 05 00 .....AUXILIARY SYSTEM CABLES, 0-50V
27 10 00 .....FIBER OPTIC CABLING SYSTEM

SECTION 26 05 00 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 DESCRIPTION

A. General Conditions:

1. The accompanying General Conditions (front-end specifications) shall apply to and form a part of this section.

B. General Requirements:

1. Carefully examine General Conditions, other specification sections, and other drawings (in addition to Electrical) in order to be fully acquainted with their effect on electrical work.
2. Do all work in compliance with all applicable codes, laws, and ordinances, the National Electrical Safety Code, the National Electrical Code (hereinafter referred to as "Code"), applicable energy codes, and the regulations of the local utility companies. Obtain and pay for any and all required permits, inspections, certificates of inspections and approval, and the like.
3. Cooperate with other trades and contractors at job. Perform work in such manner and at such times as not to delay work of other trades. Complete all work as soon as the structure and installations of equipment will permit. Patch, in a satisfactory manner and by the proper craft, any work damaged by electrical workmen.
4. The Owner shall be provided access to all software to include copies of software for all systems provided under this division of the specifications. Software shall be password protected where applicable.
5. Only qualified electrical sub-contractors will be allowed to submit proposals for this project. In order to be considered qualified, contractor shall have completed a minimum of five (5) projects of similar type/scope and equal or greater magnitude and complexity within the last ten (10) years. Sub-contractors without qualifications will be rejected. If desired, potential electrical sub-contractors may submit qualification evidence for review and pre-bid approval a minimum of ten (10) days prior to bid. Previous projects used to meet this experience requirement must have included similar (or greater) scopes of work for each of the following areas:

    a. Power Systems.
    b. Control Systems.
    c. Instrumentation Systems.

C. Electrical Contractor Experience Requirements:

1. Electrical contracting firm shall be licensed as an electrical contractor in the state where work will be performed.
2. Only qualified electrical sub-contractors will be allowed to submit proposals for this project. In order to be considered qualified, electrical contractor shall have successfully completed, under his/her present firm name, not less than five (5) projects of similar size and scope within the last ten (10) years. For example, electrical contractors proposing on water/wastewater projects shall have completed the specified quantities/types of

water/wastewater projects. Similarly, the Electrical Project Manager and Electrical Foreman to be assigned to this project must meet the following minimum requirements:

a. Minimum of 5 years of experience (in their current/respective role) with projects of similar size and scope.
b. The Electrical Project Manager and Electrical Foreman should be assigned to the project for its duration. Any changes made shall be done with two weeks minimum notice and include the following:

1) Reason for change in personnel.
2) Proposed Replacement with resume and work history on similar type projects meeting the requirements listed above.
3) Must meet Owner approval before being assigned to the project.

3. Previous projects used to meet the experience requirement above must have included similar (or greater) scopes of work for each of the following areas:

a. Power Systems.
b. Control Systems.
c. Instrumentation Systems.

4. Sub-contractors without qualifications will be rejected. If desired, potential electrical sub-contractors may submit qualification evidence for review and pre-bid approval a minimum of ten (10) days prior to bid.

1.2 GENERAL SCOPE OF ELECTRICAL WORK (REFER TO DRAWINGS FOR OTHER SPECIFIC SCOPE ITEMS)

A. Furnish all labor and materials to complete electrical work as shown on drawings and/or herein specified.

B. Remove all existing electrical equipment and wiring made obsolete by this project and remove or relocate all electrical services located on or crossing through the project property, either above or below grade, which would obstruct the construction of the project or conflict in any manner with the completed project or any code pertaining thereto. Dispose of salvageable materials as directed by the Engineer. Contractor shall schedule meeting to review scope of electrical demolition and to confirm scope and phasing of proposed demolition with the owner in the presence of the prime consultant prior to start of any electrical demolition.

C. Furnish and install complete power distribution system as shown on drawings and/or specified herein.

D. Furnish and install disconnect switches for motors as shown on drawings and/or specified herein.

E. Furnish and install complete electrical grounding systems as shown on drawings and/or specified herein.

F. Install and connect electrical equipment mentioned in Division 26/27/28 Specifications or noted in drawings, whether furnished by electrical contractor or by others.

1. Where shown or specified, equipment furnished by others shall be installed and connected under this Contract.
2. Where shown or specified, Contractor shall receive, unpack, check and assume custody of equipment furnished by Others. Contractor shall assume responsibility for care and safekeeping of this equipment, when delivered into his custody. He shall protect it from moisture, dust and damage during construction and until Owner acceptance of project.

G. Furnish and install all electrical items shown on drawings and/or herein specified, unless shown or specified otherwise.

H. Furnish and install complete controls, instrumentation & auxiliary systems as shown on drawings and/or specified herein.

I. Procure and pay for permits and certificates as required by local and state ordinances and fire underwriter's certificate of inspection.

J. Balance loads as equally as practicable on services, distribution feeders, circuits and buses. Provide typewritten directory for each panel.

K. Unless specifically indicated or required otherwise, terminate all circuitry/cabling provided within this contract at associated equipment/devices/etc. in accordance with all applicable codes, standards and supplier requirements, whether associated equipment/device/etc. is furnished within this contract or by others.

L. Complete field testing, adjustment & startup of all systems listed above as shown on drawings and/or specified herein.

PART 2 - PRODUCTS

2.1 APPROVED MATERIALS AND DEVICES

A. Where not otherwise specified, provide only new, standard, first-grade materials/systems throughout, conforming to standards established by Underwriter's Laboratories, Inc., and so marked or labeled, together with manufacturer's brand or trademark. All equipment/systems subject to approval of Engineer before installation. All like items and associated equipment/systems shall be of one manufacturer.

B. To ensure proper coordination, it is intended that all electrical equipment and materials specified in Division 26/27/28 of these specifications and shown on the electrical drawings be furnished and installed by the electrical sub-contractor. It will not be permissible for any of these items to be furnished directly by the general contractor without the electrical contractor's coordination.

2.2 SUBMITTALS

A. All submittals to the design team shall be accompanied by a letter summarizing all proposed deviations from specified products or pre-approved substitutions. The absence of such a letter shall be understood to indicate that the contractor intends to meet all contract requirements,

regardless of cut-sheets/data-sheets provided within the submittal.

B. Submit to Engineer ten (10) days prior to bid date three (3) copies of any items and/or manufacturers which are proposed as substitutes for those specified.

C. Submit to Engineer promptly after award of Contract and prior to purchasing, the number of copies required by the contract. All drawings of a specific item or system shall be made in one submittal, and within thirty (30) days after award of Contract. Shop drawings of all power equipment shall contain exact details of device placement, phasing and numbering, in form of elevations, for each major piece of equipment. Shop drawings shall be submitted on the following:

1. SECTION 26 28 16: SAFETY SWITCHES AND FUSES
2. SECTION 26 29 00: MANUFACTURED CONTROL PANELS
3. SECTION 27 10 00: STRUCTURED CABLING SYSTEM
4. ALL POWER DISTRIBUTION EQUIPMENT (i.e. SWITCHBOARDS, PANELBOARDS, DRY TYPE TRANSFORMER, ETC.)
5. ALL ELECTRICAL AND TELECOMMUNICATION EQUIPMENT LAYOUTS - Submittals shall include ¼" = 1'-0" CAD drawings (hand drawn sketches will not be accepted) of each electrical room, IT room, electrical equipment stand, generator area, or any other similar area with electrical equipment. Drawings shall indicate all panelboards, transformers, switchboards, generators, equipment racks, control panels, HVAC equipment, etc. that are located in each electrical/IT area. Layouts shall show that each piece of electrical equipment has the clearances, working space and dedicated equipment space required by applicable codes. No conduits to equipment within these areas shall be installed until submittals have been provided and returned without exception by the design team.
6. ALL CONTROL ITEMS & SYSTEMS

D. The contractor shall fully review, comment upon and correct all shop drawings as required to assure compliance with contract documents prior to submittal to Engineer. The failure of the contractor to properly review and correct shop drawings prior to submittal will result in rejection of shop drawings by the engineer. Review by the Engineer will be for general conformance with contract documents. The contractor shall be fully responsible for correctness of all submitted dimensions, details, quantities and locations.

E. None of the above items shall be installed until shop drawings or catalog data have been reviewed by Engineer without rejection or required resubmittal. Any listed item not submitted, even if specified, shall be considered not acceptable and shall be removed if directed.

F. Any required resubmittal will be reviewed by the Engineer for conformance with previously issued comments only. The contractor shall be responsible for verifying that all items not specifically requiring resubmittal have not been altered from the previously reviewed submittal.

G. Material proposed for substitution shall be of the same quality, perform the same functions, conform to such physical dimensions and appearance as are required by the Engineer. All material proposed for substitution is subject to the approval of the Engineer and his authority for approval is final. No material proposed for substitution will be considered unless all submittal data complies with the drawings and specifications of Section 16 as to time of submission, number of copies of submittal, and detail requirements.

H. Samples of material shall be furnished where required by drawings or Division 26/27/28

Specification, or as requested by the Engineer on items proposed as substitutes.

I. Submit to Engineer a certificate of final inspection from local inspection department.

PART 3 - EXECUTION

3.1 SITE VISIT

A. The Contractor shall visit the site to determine existing dimensions and conditions affecting electrical work. Failure to do so in no way relieves Contractor of his responsibility under Contract.

3.2 WORKMANSHIP

A. All work shall be in accordance with the latest editions of NFPA 70 (National Electrical Code), NFPA 101 (Life Safety Code), National Electric Safety Code, International Building Code, applicable NECA standards and the rules and regulations of State and Local Authorities Having Jurisdiction.

B. All work shall be executed in a workmanlike manner and shall present a neat and mechanical appearance upon completion.

C. All equipment, devices, etc. shall be installed in accordance with manufacturer's recommendations.

D. All items shall be installed straight and plumb in a workmanlike manner and care shall be exercised so that like items are mounted the same position, heights and general location.

E. Keep site clean of accumulation of cartons, trash and debris.

3.3 SAFETY

A. The contractor is solely responsible for all job safety. Engineer assumes no responsibility for job safety. Maximum consideration shall be given to job safety and only such methods as will reasonably ensure the safety of all persons shall be employed. The codes and regulations of OSHA shall be given strict compliance as well as such other codes, laws, and regulations as may be applicable.

3.4 CONTRACT DOCUMENTS

A. Contract documents indicate diagrammatically, extent, general character and approximate location of work. Where work is indicated but minor details omitted, furnish and install it complete so as to perform its intended functions. For details and mechanical equipment, follow drawings provided by other disciplines (Architectural, Mechanical, Structural, Civil, etc.) and fit electrical work thereto.

B. Contract documents consist only of the hardcopy documents issued by the Prime Engineer. Electronic documents issued directly by the electrical engineer to the contractor and/or its sub-contractors/vendors are issued for convenience only (electronic documents are not formal contract documents).

C. If the contractor and/or one of its suppliers require a one-time transfer of electronic files of the current electrical construction documents to prepare shop drawings (or for another similar purpose), it shall:

1. Sign a waiver prepared by the electrical engineer prior to the transmittal of these files.
2. Agree to pay the electrical engineer a fee of $50.00 per drawing, up to a maximum of $400 per transfer, payable upon receipt of the files.
3. To the fullest extent permitted by law, indemnify, hold harmless, and defend JRA from all claims, damages, losses and expenses, including attorneys' fees arising out of or resulting from the use of the CAD files.

D. Take finish dimensions at job in preference to scaled dimensions.

E. Except as above noted, make no changes in or deviations from work as shown or specified except on written order of Engineer.

3.5 UNDERGROUND UTILITY/EQUIPMENT COORDINATION

A. Prior to commencement of work, verify exact locations of all existing or proposed underground utilities and/or underground equipment and verify that proposed electrical installation does not conflict with these items. Notify Engineer immediately if any conflict is found.

3.6 EQUIPMENT STORAGE

A. Store all electrical equipment in dry, covered locations as directed by equipment manufacturers. Contractor shall be responsible for replacing or repairing improperly-stored equipment as directed by Engineer.

3.7 EXCAVATION, CUTTING AND PATCHING

A. Perform all cutting and excavating as necessary for installation of electrical systems, unless specifically covered under another section. After Engineer's observation, complete all excavation, filling and backfilling as directed under specifications for preparation of site and earthwork. Foundations for equipment shall be as specified under concrete section. Concrete pads shall be minimum of 6" thick; unless greater thickness required by equipment manufacturer. Obtain specific approval of Engineer before cutting into any structural members.

B. For all such work employ competent workmen, and finish up in neat and workmanlike manner, equal to quality and appearance to adjacent work.

3.8 PENETRATIONS

A. All penetrations in water tight barriers shall be made so that barrier rating is not compromised. Furnish roof flashing for all equipment installed under Division 26/27/28 that penetrates through the roof. Appropriate flashing is specified under roofing and sheet metal section. Supply these flashings for installation under roofing and sheet metal section.

B. All fire/smoke barrier penetrations shall be made in accordance with a U.L. listed assembly to maintain the fire/smoke rating of the associated membrane.

C. Where penetrations are required through structural elements, verify penetration locations and sizes with structural engineer. In no case shall the structural integrity be compromised without written approval from structural engineer.

3.9 INSTALLATION OF EQUIPMENT - GENERAL

A. Care shall be exercised in exact routing and location of all items so as not to obstruct access to equipment, personnel walkways, or expose it to potential mechanical damage.

B. Items shall be securely anchored and/or fastened. Provide proper support for all equipment, devices, conduits, boxes, panels, etc. as required by code and for a workmanlike installation. Provide guy wiring for wood poles where required to prevent leaning. All construction shall meet the seismic design requirements of the building code. Items (especially transformers, light fixtures, equipment racks, freestanding gear, etc.) installed in seismic zones C, D, E or F shall be supported and braced per applicable codes and standards.

C. All wall, pole or frame-mounted electrical equipment shall be mounted to metal unistrut (or similar) frames of same material as electrical equipment. For example, pole-mounted stainless steel disconnect switches shall be mounted to stainless steel unistrut frames.

D. All electrical equipment, furnished by Contractor or by others shall be covered and protected during construction.

E. All control cabinets, panels, motor control centers and other electrical cabinets and enclosures shall have all trash removed and be vacuumed clean. All foreign paint, etc., shall be removed from exterior and all scratches in finish touched up with same color and material as original. Any rusted areas shall be sanded, primed and repainted.

F. All relays, starters, push-button and other control devices shall be cleaned and if necessary, lubricated with CRC 2-26 to assure free operation.

3.10 MOTORS, STARTERS AND CONTROLS

A. Unless otherwise specified or shown, all motors will be furnished and installed under other sections of this specification.

B. Electrical Contractor shall install all starters and all electrical power wiring and connections to motors and starters.

C. Unless otherwise specified or shown, all control items for motors shall be furnished, installed and wired in conduit by the electrician.

3.11 CIRCUITS AND BRANCH CIRCUITS

A. Outlets shall be connected to branch circuits as indicated on drawings by circuit numbers. No more outlets than are indicated shall be connected to a circuit.

B. Branch circuit homeruns shall be installed as shown on drawings. Multiple homerun conduits shall not be combined by contractor into larger, single homerun conduits unless specific permission is granted by the Engineer.

3.12 LUG/TERMINAL RATINGS

A. All lug/terminal ratings, sizes, locations, types, etc. shall be coordinated with the associated conductor sizes, types, routings, etc. by the contractor.

B. All lugs/terminals/etc. shall be rated for 75 degree C terminations (minimum, unless specified otherwise).

3.13 EQUIPMENT FAULT CURRENT RATINGS

A. All equipment and breakers shall meet the minimum RMS symmetrical interrupting capacity ratings shown on plans for the associated distribution equipment. All interrupting ratings shall be full ratings. Where new devices or breakers are added to existing distribution equipment, the new devices/breakers shall have interrupting ratings matching or exceeding that of the existing distribution equipment.

3.14 OUTLET LOCATION

A. Symbols shown on drawings and mounting heights indicated on drawings and in specifications are approximate only. The exact locations and mounting height must be determined on the job and it shall be the Contractor’s responsibility to coordinate with other trades to ensure correct installation.

3.15 IDENTIFICATION

A. Each panel shall have each circuit identified. Panels without branch circuit nameplates shall have typewritten directories.

B. Each individually mounted switch, circuit breaker, starter and/or any other control or protective device shall identify equipment fed and fuse size, if any, by engraved plastic nameplate, white with black letters, screw attached.

C. See Specification Section 26 05 53 for additional requirements.

3.16 GROUNDING

A. All equipment shall be grounded and bonded in accordance with all state/local regulations, The

National Electrical Code and as specified herein.

3.17 PAINTING

A. Refer to Painting/Finishing specifications for requirements regarding field painting of exposed conduit. Any scratches, dents or rust spots in conduit electrical enclosures, panels, motor control or any other electrical items shall have the dents removed, and they, along with any rust spots or scratches, sanded and touched up with the same exact color paint as original finish.

3.18 ACCEPTANCE TESTING

A. Upon completion of work, the entire electrical system installed within this project shall be tested and shall be shown to be in perfect working condition, in accordance with the intent of the specifications and drawings. It shall be the responsibility of the Electrical Contractor to have all systems ready for operation and to have an electrician available to operate same in accordance with and under the supervision of the observation representative(s) of the Engineer. The Electrician shall be available to assist in removal of panel fronts, etc., to permit inspection as required.

B. The electrical sub-contractor shall include in bid price start-up assistance and training from a certified representative of the manufacturer for the following systems:

1. SECTION 27 10 00: STRUCTURED CABLING SYSTEM

3.19 OPERATION AND MAINTENANCE DATA

A. One set of marked “AS BUILT” drawings, three (3) sets of all equipment catalog and maintenance data and three (3) sets of all final shop drawings, on all equipment requiring same shall be turned over to owner. These items shall be bound in hard back book. Contractor shall explain and demonstrate all systems to Owner’s representative.

3.20 GUARANTY-WARRANTY

A. Furnish a written Guarantee-Warranty, countersigned and guaranteed by General Contractor, stating:

1. That all work executed under this section will be free from defects of workmanship and materials for a period of one (1) year from date of final acceptance of this work.
2. Above parties further agree that they will, at their own expense, repair and replace all such defective work, and all other work damaged thereby, which becomes defective during the term of the Guaranty-Warranty.

END OF SECTION 26 05 00

SECTION 26 05 19 - POWER CONDUCTORS AND CABLES 51V-600V

PART 1 - GENERAL

1.1 DESCRIPTION

A. Power Wires and Cables

B. Low Voltage Wires and Cables

PART 2 - PRODUCTS

2.1 POWER WIRES AND CABLES - 600 VOLT

A. General: Conductors shall have current carrying capacities as per N.E.C. and with 600 volt insulation, #12 minimum except for controls and fixture wire. Conductors shall be copper.

B. General Application (see below for exceptions):

1. At or Below Grade (including within slab-on-grade):

   a. #8 or larger conductors:

      1) XHHW or RHH/RHW/USE stranded (in conduit).

   b. #10 or smaller conductors for circuits terminating at motors:

      1) THHN/THWN or XHHW stranded (in conduit).

   c. #10 or smaller conductors (excluding circuits terminating at motors):

      1) THHN/THWN or XHHW solid (in conduit).

2. Above Grade:

   a. #8 or larger conductors:

      1) THHN/THWN, XHHW or RHH/RHW/USE stranded (in conduit).

   b. #10 or smaller conductors for circuits terminating at motors:

      1) THHN/THWN, XHHW or RHH/RHW/USE stranded (in conduit).

   c. #10 or smaller conductors (excluding circuits terminating at motors):

      1) THHN/THWN, XHHW or RHH/RHW/USE solid (in conduit).

3. Power Wire and cable shall be as manufactured by Southwire, Rome, Encore Wire, American Insulated Wire, Okonite, Phelps-Dodge, Amercable, Aetna or approved equal.

C. Class 1 Control Cabling (120VAC Control Circuits, Etc.)

1. Unless specified otherwise, Class 1 control cabling shall:

   a. Be rated for exposed cable tray installation.
   b. Be plenum rated (Class 1 Control cabling and Instrumentation cabling installed in conduit or exposed in cable tray in non-plenum areas is not required to be plenum-rated).
   c. Be UL-rated for the proposed application.
   d. Be multi-conductor with overall outer sheath as required by the application. The insulation of each conductor within the overall multi-conductor cable shall be uniquely color-coded. Ground conductors (when provided) within the multi-conductor cable shall have green insulation. Conductors with green insulation shall not be used for conductors other than ground.
   e. Utilize copper conductors.
   f. Have wire gauge as required to limit voltage drop to acceptable limits determined by the system supplier and to meet all applicable code requirements.
   g. Where installed underground, within slab-on-grade or in exterior locations, be rated for wet locations.
   h. Where required for specific systems, meet the specific requirements (conductor quantity, wire gauge, insulation type, shielding, etc.) of the system supplier.
   i. Be rated for 600V.
   j. Be industrial grade.
   k. Have stranded conductors.
   l. Have sunlight/oil-resistant PVC/Nylon insulation and jacket with ripcord.

2. Control cabling shall be as manufactured by Belden, AlphaWire or General Cable.

D. Fixture Wiring

1. Conductor Types:

   a. Type TFFN or XFF.

2. Minimum Sizes:

   a. For fixtures up to 300 watts: #16.
   b. For fixtures over 300 watts up to 1500 watts: #14.
   c. For fixtures over 1500 watts: as required.
   d. Conductors to concrete pour fixtures: #12.

3. Fixture wire shall extend only from fixture to first junction, and not over 6 feet, except for concrete pour units.

2.2 WIRE CONNECTIONS:

A. All connector types:

1. Shall be properly rated for the proposed application by UL and per the manufacturer.

B. At Motor Connections (within motor terminal boxes):

1. On Unshielded Wire:

   a. Single conductor per phase: shall be made with insulated set screw connectors or 3M 5300 Series 1kV Motor Lead Connections kits with mechanical lugs as required.
   b. Multiple conductors per phase: shall be made with insulated mechanical lugs, rated for the associated motor cable types, by Polaris or Ilsco.

2. On Shielded Power Wire:

   a. The braided shields and internal grounding conductors of shielded power (not instrumentation) cables shall be grounded at BOTH ends (at VFD/starter and at motor) with a termination kit provided by the cable supplier. This termination kit shall include a connection ring that makes contact around the full circumference of the braided shield, and connects all internal grounds to a common external ground point.

3. Cabling within motor terminal boxes shall be trained such as to prevent any splice/termination/connection kits from contacting inside edge(s) of the motor terminal boxes (to prevent chaffing of the insulation/splice/wiring which could lead to faults). Contractor shall carefully coordinate all required motor terminal box sizes to ensure proper capacity for all required conductors/splices.

C. Other Dry locations:

1. On Wire larger than #10: shall be made with solderless, non-insulated compression-type connectors meeting requirements of Federal Specification WS-610e for Type II, Class 2 and shall be covered with Scotch #33 electrical tape so that insulation is equal to 150% of conductor insulation.
2. On Wire #10 and smaller: shall be made with one of the following:

   a. Ideal Wing Nuts or equal by 3M .
   b. Ideal Push-In Wire Connectors (for #12 and smaller only).

D. Other Wet/Damp locations:

1. On Wire larger than #10: shall be made with underground/direct-burial, waterproof rated EPDM or TPE-insulated connectors by Ilsco, Burndy or T&B.
2. On Wire #10 and smaller: shall be made with one of the following:

   a. Ideal Weatherproof or Underground Wire Connectors pre-filled with 100% silicone sealant as required by the application.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

A. All wires and cables shall be installed in conduit unless specifically noted otherwise.

B. All joints and splices on wire shall be made with solderless connectors, and covered so that insulation is equal to conductor insulation.

C. No splices shall be pulled into conduit.

D. No conductor shall be pulled until conduit is cleaned of all foreign matter.

E. Wire and cable shall be neatly formed, bundled and tied in all panelboards, wireways, disconnect switches, pullboxes, junction boxes, cabinets and other similar electrical enclosures.

F. All wires and cables installed in underground or other wet locations shall be rated by the manufacturer for wet locations.

G. Network cabling shall be continuous from endpoint to endpoint and shall not be spliced unless specifically noted otherwise.

H. All conductors/cabling (including spare conductors) shall be properly terminated unless specifically directed otherwise. See above for general termination hardware requirements.

3.2 POWER WIRE AND CABLE INSTALLATION:

A. No power conductor shall be smaller than #12 except where so designated on the drawings or hereinafter specified.

B. Multi-wire lighting branches shall be used as indicated.

C. Where more than three current-carrying conductors are installed in a single raceway or cable, conductors shall be derated as indicated in NEC Table 310.15(B)(3)(a).

D. Raceways/cables shall generally not be installed exposed to sunlight on roofs unless specifically required. Where raceways or cables are installed exposed to sunlight on roofs, conductors shall be derated with ampacities adjusted per NEC Table 310.15(B)(3)(c).

E. In installing parallel power conductors, it is mandatory that all conductors making up the feeder be exactly the same length, the same size, the same type of conductor with the same insulation. Each group of conductors making up a phase or neutral must be bonded at both ends in an approved manner.

F. In installing overhead main power services, a minimum of 5’-0” of cable per run shall be extended beyond the weatherhead(s) for connection to service drop. Confirm exact requirements with local utility company.

3.3 WIRE CONNECTIONS

A. See Part 2 above for material types.

B. Aluminum Wire Connections:

1. Where aluminum wiring is allowed, connections shall utilize compression fittings, no exceptions (Anderson Versa Crimp or equal).

C. Any stranded wire connection to wiring devices shall be made with crimp type terminals.

D. All electrical connections and terminals shall be tightened according to manufacturer's published torque-tightening values with calibrated torque wrenches as required to clearly indicate final torque value to the contractor. Where manufacturer's torque values are not provided, those specified in UL 486A & 486B shall be used.

E. All connections and connector types shall be installed in strict compliance with all requirements of the connector manufacturer.

F. Under no condition shall the specified conductors be connected to terminals rated less than 75°C. Where conductors sized #1 or smaller are shown to be terminated at equipment and the terminals of that equipment are rated for less than 75°C, contractor shall install junction box near equipment to capture the specified conductors, splice with compression connections (rated for a least 75°C) and extend conductors with ampacity rating as required by NEC (based on terminal temperature rating) to equipment terminals. The length of the conductors to be terminated shall be as directed by the AHJ but not less than 48 inches.

3.4 SHIELDED CABLE INSTALLATION

A. Shielded instrumentation (low voltage) cables:

1. The outer foil of shielded instrumentation cables shall be grounded at the PLC/control panel end only (not at the field device end) with a termination kit as directed by the PLC/control panel supplier.

3.5 LOW VOLTAGE (LESS THAN 50V) CONTROL AND NETWORK CABLE INSTALLATION:

A. All wires and cables shall be installed in conduit unless specifically noted otherwise. Low voltage control and/or network cabling located within concealed, accessible ceiling spaces (such as above lay-in ceilings) may be run without conduit if the following requirements are met:

1. Cabling shall be plenum-rated, multi-conductor.
2. Cabling shall be supported by cable tray or with J-hook supports on intervals not to exceed 5'-0" on center. Cabling shall be supported solely from the cable tray or j-hooks supported from the building structure, without using piping, ductwork, conduit or other items as supports.
3. Cabling shall be properly bundled with plenum-rated Velcro straps on intervals not to exceed 30" on center.
4. Properly-sized conduit(s) shall be provided wherever cabling enters an inaccessible or exposed area (such as above gyp board ceilings or through walls). End bushings shall be provided on both ends of all raceway terminations. All fire/smoke barrier penetrations shall be made in accordance with a U.L. listed assembly.

3.6 CIRCUITS AND BRANCH CIRCUITS

A. Outlets shall be connected to branch circuits as indicated on drawings by circuit number adjacent to outlet symbols, and no more outlets than are indicated shall be connected to a circuit.

3.7 LABELING AND COLOR CODING OF WIRE AND CABLE

A. Refer to Specification Section 26 05 53 for all labeling requirements.

B. A color coding system as listed below shall be followed throughout the network of branch power circuits as follows:

PHASE	120/208/240/ COLOR	120/240 HIGH LEG DELTA COLOR	277/480 VOLT COLOR
A	BLACK	BLACK	BROWN
B	RED	ORANGE (FOR HI-LEG)	ORANGE
C	BLUE	BLUE	YELLOW
NEUTRAL	WHITE	WHITE	GRAY
GROUND	GREEN	GREEN	GREEN

C. Where dedicated neutrals are installed for multi-wire branch circuits, the neutral conductors shall be color coded as follows:

PHASE	120/208/240/ COLOR	120/240 HIGH LEG DELTA COLOR	277/480 VOLT COLOR
NEUTRAL A	WHITE W/ BLACK TRACER	WHITE W/ BLACK TRACER	GRAY W/ BROWN TRACER
NEUTRAL B	WHITE W/ RED TRACER	WHITE W/ ORANGE TRACER (FOR HI-LEG NEUTRAL)	GRAY W/ ORANGE TRACER
NEUTRAL C	WHITE W/ BLUE TRACER	WHITE W/ BLUE TRACER	GRAY W/ YELLOW TRACER

D. Control Conductors: Shall be color coded by use of colored “tracers”. No control circuit shall contain two identical conductors. For example, a set of five (5) control conductors for a pushbutton station represents one (1) control circuit which would require five (5) uniquely-colored control conductors.

3.8 TESTING

A. The insulation resistance of all feeder conductors (feeding electrical distribution equipment such as switchboards, panelboards, transfer switches, transformers, etc.) shall be tested at the load side of the feeder breaker with a 1000-volt DC Megger Tester prior to energization or final termination. Any feeder conductor with an insulation resistance less than the recommended minimums in the latest version of NETA Acceptance Testing Specification (“ATS”) standard shall be replaced by the contractor at the contractor’s expense. All final test results shall be

clearly documented (with date, time, feeder, results, test equipment, etc.), and the final test results shall be submitted to the design team for review.

END OF SECTION 26 05 19

SECTION 26 05 26 - GROUNDING

PART 1 - GENERAL

1.1 GENERAL

A. THE WORK UNDER THIS SECTION INCLUDES BUT IS NOT LIMITED TO GROUNDING OF THE FOLLOWING:

1. Service Equipment.
2. Transformers.
3. Non-current carrying conductive surfaces of equipment.
4. Metal Buildings.
5. Structures.
6. Other Equipment.

1.2 GENERAL REQUIREMENTS

A. All equipment, building steel, and main service shall be effectively and permanently grounded with a conductor cross section as required by the National Electrical Code and of capacity sufficient to ensure continued effectiveness of the ground connections for fault current. Ground conductors shall be as short and straight as possible, protected from mechanical injury and, if practicable, without splice or joint.

B. All grounding connections shall be installed in accordance with the National Electrical Code and all local codes and requirements. Such codes shall be considered minimum requirements and the installation of the grounding system shall ensure freedom from dangerous shock voltage exposure and provide a low impedance ground fault path to permit proper operation of overcurrent and ground fault protective devices.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. All grounding conductors shall be insulated with green colored, 600 volt insulation unless noted otherwise.

B. Motors having power supplied by single conductor wire in conduit shall be grounded through the conduit system. Flexible conduit shall be “jumpered” by an appropriate bonding conductor.

C. Supplemental grounding system conductors shall be bare, softdrawn, stranded, single conductor copper wire, and generally sized as follows (unless shown otherwise on plans):

1. Switchgear, motor control centers, and power transformer #4/0 minimum or as shown on plans.
2. Power panels, #2/0.

3. Control panels and consoles, #4.
4. Process Motors, #1/0.
5. Building Columns, #4/0.
6. Light Poles, #2.
7. Telephone Backboard & Cabinet ground busses, #2.

2.2 GROUNDING ELECTRODES

A. Grounding electrodes shall be copper-clad steel rods 3/4 inch in diameter and ten feet long. Where longer electrodes are necessary to reduce the ground resistance, Contractor shall provide sectional rods, connectors, drive heads, etc.

2.3 CONNECTIONS

A. All conductor-to-conductor, conductor-to-ground rod, conductor-to-structure, conductor-to-fence connections of #6 and larger sized conductors and underground ground connections shall be permanent exothermic welded connections (Cadweld or equal) unless otherwise noted on applicable drawings.

B. Connections to equipment shall be by bolted compression type lugs (except for motors). When the conductor is #6 and larger, the lug shall be joined to the conductor by an exothermic weld (Cadweld or equal).

C. Motors to be grounded by the grounding conductors run with the power conductors shall have a split-post grounding stud installed in the connection box.

D. Each cast pull box or junction box shall have a ground lug, connected to largest ground conductor to enter box.

E. Ground connections at conduit terminations shall be made by approved grounding bushings (see Raceways Specification Section for additional requirements).

2.4 MANUFACTURERS

A. Conduit clamps and connectors shall be manufactured by Raco, OZ., or Ercon.

B. Lugs shall be as manufactured by Square “D”, Burndy, or T and B.

C. Exothermic weld connections shall be as manufactured by Cadweld, or approved equal.

D. Ground rods shall be as manufactured by Joslyn or McGraw Edison.

E. Split post grounding shall be as manufactured by Burndy or T and B.

PART 3 - EXECUTION

3.1 MAIN SERVICE GROUND

A. The main service grounding electrode system shall consist of the following items bonded together by the grounding electrode conductor:

1. The main underground cold water pipe (metal).
2. The metal frame of the building.
3. Driven ground rods. Ground rods shall be embedded at the lowest point in the building and below the permanent moisture level. Ground rods shall be spaced a minimum of ten (10) feet apart and connected in parallel until resistance to ground does not exceed five (5) ohms.

B. The grounding electrode system shall be connected to the grounded conductor (neutral) on the supply side of the service disconnecting means by a grounding electrode conductor not smaller than that shown in Table 250.66 of the N.E.C. The main service equipment grounding conductor shall be connected to the grounding conductor on the supply side of the service disconnecting means in accordance with Table 250.122 of the N.E.C. for the ampere rating of the service entrance equipment. Where in a service entrance switchboard, the equipment grounding conductor shall not be less than 25% of the main bus rating. These connections shall be made inside the service entrance equipment enclosure.

3.2 TRANSFORMER GROUNDS

A. Dry type insulation transformers with a grounded conductor in the secondary shall be grounded in accordance with N.E.C. Section 250-30.

3.3 EXPOSED NON-CURRENT-CARRYING METAL PARTS

A. General: Ground connections to equipment or devices shall be made as close to the current carrying parts as possible, that is, to the main frame rather than supporting structures, bases or shields. Grounding connections shall be made only to dry surfaces that are clean and dry. Steel surfaces shall be ground or filed to remove all scales, rust, grease, and dirt. Copper and galvanized steel shall be cleaned to remove oxide before making welds or connections. Code size ground conductors shall be run in all power conduits and properly terminated at each end.

B. Ground conductors shall be routed as straight as possible. Where possible, ground conductors shall be routed such as to avoid bends exceeding 90 degrees or with a radius of less than 8”.

C. Motors: Exposed non-current-carrying metal parts, shall be grounded by a grounding conductor either run with power conductors, and/or separate grounding conductors. Drawings will show method(s) to be used. The ground conductors with all motor conductors shall be connected to the ground buss in the motor connection box. Jumper connections shall be installed between frames and rigid conduit for equipment having flexible conduit connections (sealtight). All AC motor grounds shall provide a low impedance path to ground. Connections from the supplemental grounding system (when specified) shall be made directly to the motor frame. Additionally, utilization equipment connected to the motor (pump, fan, mixer, etc.) shall be bonded to the motor with flexible braid-type bonding strap to ensure equalization of ground potentials.

D. Raceways & boxes: All raceways, conduits, armored or shielded cable and all exposed non-

current carrying metal parts shall be grounded. Such items shall be bonded together and permanently grounded to the equipment ground buss. Metallic conduits shall be connected by grounding or clamps to ground buss. Flexible "jumpers" shall be provided around all raceway expansion joints. Bonding straps for steel conduit shall be copper. Jumper connections shall be provided to effectively ground all sections or rigid conduit connected into plastic pipe. No metallic conduit shall be left ungrounded. In conduit systems interrupted by junction or switch boxes where locknuts and bushings are used to secure the conduit in the box, the sections of conduit and box must be bonded together. If conduit, couplings or fittings have a protective coating or non-conductive material, such as enamel, such coating must be thoroughly removed from threads of both couplings and conduit and the surface of conduit or fitting where the ground clamp is secured.

E. Enclosures: Metal conduits entering free standing motor control centers, switchboards or other free standing equipment shall be grounded by bare conductors and approved clamp. Any conduits entering low voltage (480 volts or below) equipment through sheet metal enclosure and effectively grounded to enclosure by double locknut or hub need not be otherwise bonded.

F. Equipment: In addition to equipment grounding provisions mandated by code requirements, additional equipment grounding provisions (including local ground rods, connections, etc.) shall be provided by the contractor as directed by equipment suppliers.

G. Both ends of ground busses in motor control centers, switchboards, etc., shall be separately connected to the main ground buss to form two separate paths to ground.

H. Fences and Grills: Fences and metal grills around equipment carrying voltage above 500 volts between phases shall be bonded together and to ground. Fences and grill work shall be grounded at every post, column, or support, and on each side of every gate.

3.4 ACCEPTANCE DOCUMENTATION AND TESTING

A. Contractor shall take and store photographs of all underground grounding system connections prior to burial of connections, for review by Engineer.

B. Upon completion of work, the entire ground system shall be shown to be in perfect working condition, in accordance with the intent of the Specifications.

C. Contractor shall measure the resistance between the main ground bonding jumper to true earth ground using the Fall of Potential method as described by ANSI/IEEE Standard 81 ("Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of an Earth System"). If the measured value is greater than five ohms, additional grounding electrodes shall be installed as described in Part 3.1 above. The final ground resistance value shall be submitted in writing, and documented via picture of the meter reading from the Fall of Potential test, to the Engineer prior to the final observation, and shall be included in final O&M documentation.

END OF SECTION 26 05 26

SECTION 26 05 33 - RACEWAYS

PART 1 - GENERAL

1.1 DESCRIPTION

A. THE WORK UNDER THIS SECTION INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

1. Conduits
2. Conduit Fittings
3. Couplings & Connectors
4. Bushings
5. Raceway Hardware, Conduit Clamps & Supports
6. Watertight Entrance Seal Devices

PART 2 - PRODUCTS

2.1 CONDUITS

A. PVC-Coated Rigid Steel:

1. The PVC coated rigid metal conduit must be UL Listed. Hazardous location fittings, prior to plastic coating must be UL listed. All conduit and fittings must be new, unused material. Applicable UL standards may include: UL 6 Standard for Safety, Rigid Metal Conduit, UL514B Standard for Safety, Fittings for Conduit and Outlet Boxes.
2. The PVC-coated rigid metal conduit shall be ETL PVC-001 listed.
3. The conduit shall be hot dip galvanized inside and out with hot galvanized threads.
4. Form 8 Condulets®, 3/4" through 2" diameters, shall have a tongue-in-groove “V-Seal" gasket to effectively seal against the elements. The design shall be equipped with a positive placement feature to ease and assure proper installation. Certified results confirming seal performance at 15 psig (positive) and 25 in. of mercury (vacuum) for 72 hours shall be available.
5. A PVC sleeve extending one pipe diameter or two inches, whichever is less, shall be formed at every female fitting opening except unions. The inside sleeve diameter shall be matched to the outside diameter of the conduit.
6. The PVC coating on the outside of conduit couplings shall have a series of longitudinal ribs 40 mils in thickness to protect the coating from tool damage during installation.
7. Form 8 Condulets® shall be supplied with plastic encapsulated stainless steel cover screws.
8. A urethane coating shall be uniformly and consistently applied to the interior of all conduit and fittings. This internal coating shall be a nominal 2 mil thickness. Conduit or fittings having areas with thin or no coating shall be unacceptable.
9. The PVC exterior and urethane interior coatings applied to the conduit shall afford sufficient flexibility to permit field bending without cracking or flaking at temperatures above 30deg.F (-1deg.C).
10. All male threads on conduit, elbows and nipples shall be protected by application of a urethane coating.

11. All female threads on fittings or conduit couplings shall be protected by application of a urethane coating.
12. Independent certified test results shall be available to confirm coating adhesion per ETL PVC-001 standards under the following conditions:

    a. Conduit immersed in boiling water with a minimum mean time to adhesion failure of 200 hours. ASTM D870)
    b. Conduit and condulet exposure to 150deg F (65deg C) and 95% relative humidity with a minimum mean time to failure of 30 days. (ASTM D11513.
    c. The interior coating bond shall be confirmed using the Standard Method of Adhesion by Tape Test (ASTM D3359).
    d. No trace of the internal coating shall be visible on a white cloth following six wipes over the coating which has been wetted with acetone (ASTM D1308).
    e. The exterior coating bond shall be confirmed using the methods described in Section 3.8, NEMA RN1.
    f. After these tests the physical properties of the exterior coating shall exceed the minimum requirements specified in Table 3.1, NEMA RN1.

13. Water tight flex connectors used in areas where PVC coated metal conduit is utilized shall be PVC coated also.
14. Shall be as manufactured by Perma-Cote, Plastibond, Korkap, Ocal or Okote.

B. Rigid Galvanized Steel and I.M.C.:

1. Shall be galvanized outside and inside by hot dipping.
2. Shall be as manufactured by Republic, Wheatland, Pittsburg Standard, Youngstown, Allied or equal.

C. Rigid Aluminum:

1. Shall be manufactured of 6063 Alloy, T-1 temper.
2. Shall be manufactured by Republic (Nucor), Wheatland, Allied (Atkore), Penn or equal.

D. Schedule 40 and 80 PVC:

1. Shall be composed of polyvinyl chloride and shall be U.L. rated type 40 or 80 for use with 90 degree rated conductors. Conduit shall conform to NEMA Standards and applicable sections of N.E.C.
2. The conduit manufacturer shall have had a minimum of 5 years experience in the manufacture of the products. Non-metallic raceways shall be as manufactured by Carlon, Triangle, Can-Tex, Allied or equal.

E. HDPE Innerduct

1. Shall be composed high density polyethylene and shall be orange in color, unless noted otherwise.
2. Shall be corrugated unless noted otherwise.
3. Shall be manufactured by Carlon, Ipex or equal.

F. Liquidtight Flexible Metallic Conduit:

1. Shall be galvanized steel-core sealtite, code approved for grounding.
2. Shall have an outer liquidtight, nonmetallic, sunlight-resistant jacket over an inner flexible metal core.
3. Shall be as manufactured by Electric-Flex, Anaconda or equal.

2.2 FITTINGS, COUPLINGS & CONNECTORS

A. Rigid Galvanized Steel and I.M.C. couplings and connectors shall be standard threaded type, galvanized outside and inside by hot dipping. Threadless and clamp type are not acceptable. Couplings/connectors shall be as manufactured by Raco, Efcor, or Appleton or equal.

B. All fittings, conduit bodies, couplings and connectors (**including, but not limited to, condulettes, conduit couplings, connectors, hubs, nipples, unions, expansion fittings, explosion proof seal-offs, threaded hole closures, and seal-tight connectors, etc.**) used in areas where PVC-Coated Rigid conduit is used shall also be PVC-coated.

C. All fittings, conduit bodies, couplings and connectors (**including, but not limited to, condulettes, conduit couplings, connectors, hubs, nipples, unions, expansion fittings, explosion proof seal-offs, threaded hole closures, and seal-tight connectors, etc.**) installed in other wet, exterior or process areas where PVC-coated conduit systems are not required, shall be aluminum or stainless steel type. Standard steel fittings will not be acceptable.

D. All rain tight connectors shall be threaded Myers or approved equal, rated for outdoor application.

E. Rigid Aluminum couplings and connectors shall be standard threaded type, of the same alloy as the associated conduit. Threadless and clamp type are not acceptable. Fittings shall be as manufactured by Thomas & Betts, Crouse-Hinds, Appleton, Pyle-National or equal.

F. All PVC couplings, adapters, end bells, reducers, etc., shall be of same material as conduit.

G. Liquidtight Flexible Metallic Conduit connectors shall be liquidtight with insulating throat or end bushing, designed for application with Liquidtight Flexible Metallic Conduit. Fittings shall be as manufactured by Efcor, Raco, Midwest or equal.

H. All LB unilets sizes 1 ¼” or larger shall have rollers.

I. Miscellaneous conduit fittings shall be as manufactured by Appleton, Crouse-Hinds, Pyle-National, Russell & Stoll or equal.

2.3 BUSHINGS

A. All non-grounding rigid bushings 1-1/4” and larger shall be the insulating type (O-Z/Gedney type “BB” or equal by T&B, Midwest Electric or Penn Union).

B. All non-grounding rigid bushings 1” and smaller shall be threaded malleable iron with integral noncombustible insulator rated for 150°C. Non-grounding rigid conduit bushings shall be O-Z/Gedney type “B” or equal by T&B, Midwest Electric or Penn Union.

C. All grounding rigid bushings shall be threaded malleable iron with integral noncombustible insulator rated for 150°C. All grounding rigid conduit bushings shall be O-Z/Gedney type "BLG" or equal by T&B, Midwest Electric or Penn Union.

2.4 HARDWARE, CONDUIT CLAMPS AND SUPPORTS

A. All hardware such as expansion shields, machine screws, toggle bolts, "U" or "J" bolts, machine bolts, conduit clamps and supports shall be of corrosion resistant materials (stainless steel, aluminum, galvanized or plated steel, or other approved materials).

B. Hardware in contact with aluminum handrails, plates or structural members and all hardware in exterior, wet or corrosive areas shall be type 316 stainless steel or aluminum (with bitumastic paint coating to isolate aluminum from contact with concrete where necessary) unless specifically noted otherwise.

C. Supports in exterior, process, wet or corrosive locations shall be type 316 stainless steel or aluminum (with bitumastic paint coating to isolate aluminum from contact with concrete where necessary) unless specifically noted otherwise.

D. Supports in extremely corrosive environments (such as chlorine or fluoride storage rooms) shall be PVC-Coated steel unless specifically noted otherwise.

E. Hardware and conduit clamps shall be as manufactured by Efcor, Steel City, G.A., Tinnerman or equal.

2.5 WATERTIGHT ENTRANCE SEAL DEVICES

A. For new construction, seal devices shall consist of oversized sleeve and malleable iron body with sealing rings, pressure rings, sealing grommets and pressure clamps as required (O-Z/Gedney type FSK/WSK or equal).

B. For cored-hole applications, seal devices shall consist of assembled dual pressure disks with neoprene sealing rings and membrane clamps as required (O-Z/Gedney type CSM or equal).

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Minimum Diameter: 3/4-inch.

B. Raceway Type: Raceway types shall be as specified below, unless indicated otherwise on drawings:

1. Exterior, Exposed: Rigid Aluminum unless otherwise noted.
2. Exterior, Used for Instrumentation Circuits: See Below.
3. Other Exterior (Concrete-Encased or Direct Earth Buried): Schedule 40 PVC. PVC conduit shall convert to metallic conduit prior to exiting concrete-encasement or direct earth

burial. See "transition" items below for additional requirements. Conduits shall be left exposed until after Engineer's observation.

4. Interior:

    a. Rigid Aluminum .

5. Raceways used for Instrumentation Circuits:

    a. Typical Dry or Wet Locations: Rigid Aluminum .
    b. Underground or Locations Embedded inside Poured Concrete: PVC-Coated Rigid Steel.
    c. Extremely Corrosive Locations (Chlorine Storage Rooms, Fluoride Storage Rooms and other similar areas): PVC-Coated Rigid Steel.

6. Terminations at motors, transformers and other equipment which has moving or vibrating parts:

    a. Liquidtight Flexible Metallic Conduit (shall generally not exceed 24 inches in length) with watertight fittings.

7. Terminations at instruments:

    a. Liquidtight Flexible Metallic Conduit (shall generally not exceed 12 inches in length) with watertight fittings.

8. Transition from underground or concrete-encased to exposed:

    a. Convert PVC to PVC-Coated Rigid Steel utilizing PVC-Coated Rigid Steel 90 degree bends (and vertical conduits as required by application) prior to exiting concrete/grade (except at outdoor pull boxes and under freestanding electrical equipment, where terminations shall be by PVC end bells installed flush with top of slab). Exposed portions of these coated conduits shall extend a minimum of 6" above floor level, and shall be installed at uniform heights.

3.2 RACEWAY INSTALLATION

A. General:

1. Follow methods which are appropriate and approved for the location and conditions involved. Where not otherwise shown, specified, or approved in a particular case, run all wiring concealed.
2. Where conduit crosses a structural expansion joint an approved conduit expansion fitting shall be installed.
3. Where any run of rigid aluminum conduit (including bends) exceeds 50' in length, an approved conduit expansion fitting shall be installed (beginning at center of run) at intervals not to exceed 50' on center.
4. A non-conductive polypropylene pull string, properly tied/secured at either end, shall be installed in all empty conduits.
5. Metal conduit field-cuts shall be cut square with a hacksaw and the ends reamed after threading.

6. PVC conduit field-cuts shall be made with hacksaw, and ends shall be deburred.
7. All PVC joints shall be made as follows:

    a. Clean the outside of the conduit to depth of the socket, and the inside of socket with an approved cleaner.
    b. Apply solvent cement as recommended by the conduit manufacturer to the interior of the socket and exterior of conduit, making sure to coat all surfaces to be joined.
    c. Insert conduit into the socket and rotate 1/4 to 1/2 turn and allow to dry.

8. All metallic conduit installed below grade or within concrete shall be coated with two (2) spiral-wrapped layers of 3M Scotchrap 50 PVC tape or two coats of asphaltum paint prior to installation.
9. Install ground wire sized per N.E.C. Table 250.122 in all conduits.
10. Use of running threads is absolutely prohibited. Conduit shall be jointed with approved threaded conduit couplings. Threadless and clamp type not acceptable.
11. Conduits shall be sized in accordance with latest National Electrical Code except when size shown on drawings.
12. Exposed, field-cut threads on all metal conduits shall be painted with zinc primer (for Galvanized Rigid or I.M.C.) or urethane paint (for PVC-Coated Rigid Steel) as recommended by conduit manufacturer .
13. Installation of PVC coated conduit systems shall be performed in strict accordance with the manufacturer's installation instructions. Damage to PVC coated conduit coating shall be touched up with patching compound as directed by manufacturer. To assure correct installation, the installer shall be certified by the manufacturer to install coated conduit.

B. Routing/Locating:

1. Exposed conduit runs shall be run level and plumb and shall, on interior of buildings, be run parallel and/or at right angles to building walls and/or partitions.
2. Conduit with an external diameter larger than 1/3 the thickness of a concrete slab shall not be placed in the slab. Conduits in slab shall not be spaced closer than 3 diameters on center.
3. Conduit run in ceiling spaces shall be run as high as possible, all at same level, and shall be supported from building structure. Do not support conduit from any other installation.
4. Conduit run within exterior CMU, concrete or other similar walls shall be run within the CMU cells / concrete structure / etc. Conduits shall not be run on the outside surface of CMU cells / concrete structure / etc. underneath exterior veneers / etc., which could cause a thermal break in the wall insulation or a future water intrusion problem.
5. Install conduit runs to avoid proximity to steam or hot water pipes. In no place shall a conduit be run within 6" of such pipes except where crossing is unavoidable, then conduit shall be kept at least 3" from the covering of the pipe crossed.
6. Before installing raceways for motors, HVAC equipment and other fixed equipment, check location of all equipment connections/terminal boxes with equipment supplier and locate and arrange raceways appropriately.
7. No conduit for instrumentation shall be run closer than 12 inches to parallel power conduits.
8. A minimum of 12" of clearance (or more as required by associated utility companies) shall be provided between the finished lines of exterior, underground conduit runs and exterior, underground utilities (gas, water, sewer, etc.).
9. Where any portion of raceway is installed in a wet environment (such as below grade) and located at a higher elevation than the raceway termination point in a dry environment, install watertight compound inside raceway at termination around cabling to prevent transfer of water through conduit system. Watertight compound shall be rated for the

potential water head pressure, based on the assumption that ground water level would be at grade level.

C. Bends:

1. Do not make bends (in any raceway, including flexible conduits) that exceed allowable conductor bending radius of cable to be installed or that significantly restrict conductor flexibility.
2. All bends within concrete-encased ductbanks installed in exterior locations shall be long radius bends (24" minimum bending radius – varies with conduit diameter).
3. All bends in raceways containing multi-conductor power cables (such as shielded VFD cables) shall be long radius bends (24" minimum bending radius – varies with conduit diameter).
4. Where numerous exposed bends or grouped together, all bends shall be parallel, with same center and shall be similar in appearance
5. All PVC elbows, bends, etc., shall be either factory bends or made with an approved heat bender.

D. Support:

1. Anchor conduit securely in place by means of approved conduit clamps, hangers, supports and fastenings. Arrangement and methods of fastening all conduits shall be subject to Engineer's direction and approval. All conduits shall be rigidly supported (wire supports may not be used in any location). Use only approved clamps on exposed conduit.
2. Rigid Aluminum Conduits shall be supported at intervals not to exceed 5' on center.
3. Conduit in riser shafts shall be supported at each floor level by approved clamp hangers.
4. Right angle beam clamps and U bolts shall be specially formed and sized to snugly fit the outside diameters of conduits.
5. Where installed in seismic zones, suspended raceways shall be braced in two (2) directions as required to prevent swaying and excessive movement.
6. Raceways installed on top of flat roofing shall be supported a minimum of 3 ½" above roof with rubber block supports (Cooper B-Line Dura-Blok or equal). Installation shall be in strict accordance with support manufacturer's instructions and recommendations.

E. Terminations:

1. All conduit connections to sheet metal cabinets or enclosures located in exterior or wet locations shall terminate by use of rain tight (Meyers) hubs.
2. In wet, exterior or process areas, conduits shall NOT enter tops of enclosures. All conduits shall enter enclosures from bottom, left or right sides of the enclosure (utilizing rain-tight Meyers hubs as indicated above).
3. Where rigid or I.M.C. conduits enter sheet metal boxes, they shall be secured by approved lock nuts and bushings.
4. Where metal conduits enter outdoor pull boxes, manholes, under freestanding electrical equipment or other locations where direct metal-to-metal contact does not exist between enclosure and conduit, grounding bushings shall be installed. Each grounding bushing shall be connected to the enclosure ground and all other grounding bushings with properly sized grounding conductors.
5. Where PVC enters outdoor pull boxes, manholes or under freestanding electrical equipment, PVC end bells shall be installed.

6. Contractor shall be responsible for coordinating required conduit sizes with equipment hubs/conduit entry provisions (such as at motor tap boxes) prior to installation of conduit systems. Contractor shall field adjust final conduit sizes at terminations where so required (only as allowed by code) from those indicated on plans to coordinate with equipment hubs/conduit entry provisions.
7. Where conduit terminates in free air such that associated cabling/circuitry becomes exposed (such as at cable trays, etc.), conduit shall generally terminate in a horizontal orientation (to prevent dust/debris/etc. from entering conduit system). Where vertical conduit termination is necessary, the termination shall be provided with cord-grip conduit terminations to seal the conduit system.
8. Conduit ends shall be carefully plugged during construction.
9. Permanent, removable caps or plugs shall be installed on each end of all empty raceways with fittings listed to prevent water and other foreign matter from entering the conduit system.

F. Penetrations:

1. All fire/smoke barrier penetrations shall be made in accordance with a U.L. listed assembly. Refer to drawings and other specifications for additional requirements.
2. All penetrations shall be at right angles unless shown otherwise.
3. Structural members (including footings and beams) shall not be notched or penetrated for the installation of electrical raceways unless noted otherwise without specific approval of the structural engineer.
4. Dry-packed non-shrink grout or watertight seal devices shall be used to seal openings around conduits at all penetrations through concrete walls, ceilings or aboveground floors.
5. All raceways entering structures, or where water is otherwise capable of entering equipment/devices through the raceway system, shall be sealed (at the first box or outlet) with foam duct sealant to prevent the entrance of gases or liquids from one area to another or into equipment/devices.

    a. Where the elevation of the raceway penetration (into the structure) is no more than 15’ below the other (higher) end of the same raceway, Polywater FST sealant (rated to hold back up to 22’ of continuous water head pressure), or pre-approved equal, shall be used.
    b. Where the elevation of the raceway penetration (into the structure) is between 15’ and 75’ below the other (higher) end of the same raceway, Polywater PHRD Custom Mechanical Seals (rated to hold back up to 36psi or 83’ of continuous water head pressure), or pre-approved equal, shall be used.
    c. Where the elevation of the raceway penetration (into the structure) is more than 75’ below the other (higher) end of the same raceway, the contractor shall propose a custom solution designed to hold back or to drain the possible water within the associated raceway. Submittals shall be provided to the engineer for review/approval, including a summary of the anticipated elevations/PSIs, details of the proposed installation, cut-sheets of devices/materials, etc.

6. Additionally, where necessary to ensure that water does not enter equipment/devices through the raceway system (where raceways extend to equipment/devices from wet areas), junction boxes with drain assemblies in bottom shall be located at low point of raceway system near equipment/devices (to drain water out of raceway system before it enters equipment/devices). Contractors shall provide drains in raceway systems where so necessary to prevent water entry into equipment/devices. In special applications (such as to instruments, etc.,), where cabling rated for exposed application is provided, contractor may

propose short air gaps (approximately 6" or less) between the end of the conduit system and the equipment/device cable entry (to be made with cable gland connectors) to prevent water in conduit system from entering equipment/devices in lieu of drained junction boxes.

7. All raceways passing through concrete roofs or membrane-waterproofed walls or floors shall be provided with watertight seals as follows:

    a. Where ducts are concrete encased on one side: Install watertight entrance seal device on the accessible side of roof/wall/floor as directed by equipment manufacturer.
    b. Where ducts are accessible on both sides: Install watertight entrance seal device on each side of roof/wall/floor as directed by equipment manufacturer.

8. All raceways passing through walls of rooms containing/storing noxious chemicals (chlorine, ammonia, etc.) or through hazardous locations shall be sealed with conduit seals (Crouse-Hinds type EYS or equal).
9. All raceways terminating into electrical enclosures/devices/panels/etc. located in hazardous locations shall be sealed with conduit seals (Crouse-Hinds type EYS, EZS or equal) within 18" of the termination.

END OF SECTION 26 05 33

SECTION 26 05 34 - OUTLET BOXES, JUNCTION BOXES, WIREWAYS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Outlet and Junction Boxes

B. Pull Boxes

C. Wireways

PART 2 - PRODUCTS

2.1 OUTLET BOXES & JUNCTION BOXES (THROUGH 4-11/16")

A. Sheet Metal: Shall be standard type with knockouts made of hot dipped galvanized steel as manufactured by Steel City, Raco, Appleton, Bowers or equal.

B. Cast: Shall be type FS, FD, JB, GS, or SEH as required for application as manufactured by O-Z/Gedney, Appleton, or equal.

C. Nonmetallic: Shall be type Polycarbonate/ABS construction as required for application with non-metallic quick-release latches as manufactured by Hoffman, O-Z/Gedney, Appleton, or equal.

2.2 JUNCTION AND PULL BOXES (LARGER THAN 4-11/16")

A. Oil-Tight JIC: Shall be Hoffman Type CH box or approved equal.

B. Galvanized Cast Iron or Cast Aluminum: Shall be O-Z/Gedney or approved equal.

C. Stainless Steel: Shall be as manufactured by O-Z/Gedney, Hoffman or approved equal. Boxes shall have continuous hinges, seamless foam-in-place gaskets and screw-down clamps.

D. Nonmetallic: Shall be type Polycarbonate/ABS construction as required for application with non-metallic quick-release latches as manufactured by Hoffman, O-Z/Gedney, Appleton, or equal. Boxes shall have hinged covers and screw-down clamps.

E. Wireways: Shall be standard manufacturer's item as manufactured by Hoffman, Square "D", Burns, B & C or equal. Wireways shall have hinged covers and screw-down clamps.

F. Pre-cast Polymer Concrete Below-Grade Hand Holes & Pull Boxes:

1. Enclosures, boxes and cover are required to be UL Listed and conform to all test provisions of ANSI/SCTE 77 “Specifications For Underground Enclosure Integrity” for Tier 15 applications (15,000lb design load and 22,500lb test load) unless noted otherwise.
2. All covers shall have a minimum coefficient of friction of 0.05 in accordance with ASTM C1028 and the corresponding Tier level shall be embossed on the top surface.
3. Cover shall be bolt-down include factory-labeling to read “Electric”, “Communications” or other as directed.
4. Hardware shall be stainless steel.
5. Shall be Quazite or approved equal.

PART 3 - EXECUTION

3.1 APPLICATION

A. General

1. All boxes and wireways shall be of sufficient size to provide free space for all enclosed conductors per NEC requirements. Fill calculations shall be performed by contractor per NEC requirements.

B. Outlet Boxes & Junction Boxes (through 4-11/16”)

a. Sheet metal boxes shall be used on concealed work in ceiling or walls.

2. Cast boxes shall be used wherever Rigid or I.M.C. conduits are installed. Cast boxes shall be Cast Aluminum wherever installed in same locations as Rigid Aluminum conduit
3. All boxes installed in extremely corrosive areas (such as chlorine and fluoride storage rooms) where non-metallic raceways are used shall be non-metallic.
4. Except when located in exposed concrete block, switch and receptacle boxes shall be 4" square for single gang installation. Appropriate gang boxes shall be used for mounting ganged switches.
5. When installed in exposed concrete block, switch and receptacle boxes shall be square type designed for exposed block installation.
6. Ceiling outlet boxes shall be 4" octagon 1-1/2" deep or larger required due to number of wires.
7. Boxes installed in hazardous locations shall be explosion-proof rated for the associated application, constructed of copper-free cast aluminum.

C. Junction & Pull Boxes (larger than 4-11/16”)

1. For all below grade exterior use and elsewhere as shown:

a. In areas subject to future vehicular traffic: shall be galvanized cast iron (rated AASHTO H-20 Loading unless noted otherwise).
b. In areas not subject to vehicular traffic: shall be galvanized cast iron or pre-cast polymer concrete (rated for Tier 15 Loading unless noted otherwise).

2. All boxes installed exposed in exterior or wet areas shall be stainless steel (NEMA 4X).
3. All boxes installed exposed in corrosive areas shall be stainless steel (NEMA 4X).

4. All boxes installed in extremely corrosive areas (such as chlorine and fluoride storage rooms) where non-metallic raceways are used shall be non-metallic.
5. Padmounted Pull Boxes shall be installed as shown on Plans or as required by project conditions. Transclosure-style Padmounted boxes shall be installed wherever required by the quantities and sizes of conductors. Contractor shall submit all Padmounted Pull Box types prior to ordering for engineer's review and comment.
6. Boxes installed in hazardous locations shall be explosion-proof rated for the associated application, constructed of copper-free cast aluminum.
7. All others shall be oil tight JIC box not less than 16 gauge.

3.2 INSTALLATION

A. General

1. All boxes and wireways shall be securely anchored.
2. All boxes shall be properly sealed and protected during construction and shall be cleaned of all foreign matter before conductors are installed.
3. All boxes and wireways shall be readily accessible. Contractor shall be responsible for furnishing and installing access panels per architect's specifications. Locations shall be as directed by the architect as required to make boxes, wireways, electrical connections, etc. accessible where above gypsum board ceilings or in other similar locations.
4. All metallic boxes and wireways shall be properly grounded.
5. Refer to Specification Section 26 05 53 for identification requirements.

B. Outlet Boxes & Junction Boxes (through 4-11/16")

1. Boxes shall be provided with approved 3/8" fixture studs were required.
2. Recessed boxes for wiring devices, surface fixtures, or connections, shall be set so that the edge of cover comes flush with finished surface.
3. There shall be no more knockouts opened in any sheet metal box than actually used.
4. Any unused opening in cast boxes shall be plugged.
5. Back to back boxes to be staggered at least 3 inches.
6. Under no circumstances shall through-the-wall boxes be used.

C. Junction & Pull Boxes (larger than 4-11/16")

1. Pull boxes shall be installed as indicated on plans and/or as required due to number of bends, distance or pulling conditions.
2. Boxes to be imbedded in concrete shall be properly leveled and anchored in place before the concrete is poured.
3. All pull boxes and/or junction boxes installed exterior below grade, shall have their tops a minimum of 1-1/2 inches above surrounding grade and sloped so that water will not stand on lid. A positive drain shall be installed, to prevent water accumulation inside.
4. Above grade pull boxes shall be installed on concrete anchor bases as shown on Plans.

D. Wireways and/or wall-mounted equipment

1. Mount each wireway to channels of the same metal type as the wireway.

2. Conductors serving a wireway shall be extended without reduction in size, for the entire length of the wireway. Tap-offs to switches and other items served by the wireway shall be made with ILSCO type GTA with GTC cap.

END OF SECTION 26 05 34

SECTION 26 05 53 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Wire and cable identification.

B. Pullbox & Junction Box Identification

C. Electrical distribution & utilization equipment identification.

D. Instrument and control device identification.

E. Raceway identification.

PART 2 - PRODUCTS

2.1 WIRE AND CABLE IDENTIFICATION

A. Intermediate Locations:

1. Wires and cable labels shall be white, thermal transfer, halogen-free, flame-retardant marker plates (sized to accommodate three lines of text) permanently affixed to the associated cable with UV-resistant plastic wire ties. Labels shall be Panduit #M200X/300X series or equal.

B. Circuit/Cable Termination Locations:

1. Wires and cable labels shall be non-ferrous identifying tags or pressure sensitive labels unless noted otherwise.

2.2 ELECTRICAL DISTRIBUTION & UTILIZATION EQUIPMENT IDENTIFICATION

A. Labels on electrical distribution & utilization equipment shall be black-on-white engraved Bakelite nameplates permanently affixed to the equipment with rivets or silicone adhesive unless noted otherwise.

B. Text used on labels on electrical distribution & utilization equipment shall be sufficiently sized to allow user to quickly/easily read labels while standing a normal/reasonable distance from the equipment. Text sizes shall be adjusted based on types of equipment (large switchgear would require larger labels than small toggle-type disconnect switches). If there is any question about what is reasonable, contractor may submit typical physical sample label(s) for each major application to the engineer for review/approval, at its discretion.

2.3 INSTRUMENT AND CONTROL DEVICE IDENTIFICATION

A. Instruments and control device labels shall be black-on-white engraved Bakelite nameplates permanently affixed to the equipment or the adjacent, visible mounting surface with silicone adhesive or stainless steel wire ties.

2.4 RACEWAY IDENTIFICATION

A. Raceway labels shall be white thermal transfer marker plates permanently affixed to the associated raceway with stainless steel wire ties, with two wire ties (one on either end of marker plate to provide a flush installation) where possible. Labels shall be Panduit #M300X series or equal.

PART 3 - EXECUTION

3.1 GENERAL

A. Any proposed deviation in identification methods and materials from those described herein shall be submitted to Engineer for review and comment prior to installation.

B. Contractor shall provide all labeling or identification required by applicable local, state and national codes. These specifications do not intend to itemize all code-required labeling or identification requirements.

C. All labels/identification shall be positioned such as to be readable from the normal perspective without adjusting wiring/cables/labels. For example, labels/identification of wires/cables within cable trays shall be positioned to point towards the viewer (typically downward for overhead cable trays, or upward for cable trays within trenches).

D. All labels/identification (except for handwritten labels on concealed pullbox/junction box covers as noted below) shall be typewritten/printed/engraved in a neat, workmanlike, permanent, legible, consistent and meaningful manner. Labels shall not be handwritten unless specific approval is granted by engineer.

3.2 WIRE AND CABLE IDENTIFICATION

A. General:

1. Where cabling is exposed (such as within cable trays), provide two wire ties per cable (one on either end of marker plate to provide a flush installation). Where cabling is concealed (such as within pullboxes/wireways), one wire tie per cable will be acceptable.

B. Intermediate Locations:

1. Thermal transfer labels shall be securely fastened to all wiring and cabling in the following locations:

a. Wireways
b. Pullboxes/Junction boxes larger than 4-11/16”
c. Pullboxes/Junction boxes through 4-11/16” where wires and cables are not easily identifiable via the color coding and box labeling
d. Vaults & Manholes
e. Approximately every 50 feet within cable trays (especially at locations where cables exit or diverge). Labels within cable trays shall be grouped (rather than being pre-labeled on cables and pulled into cable trays).
f. Other similar intermediate locations.

2. Labels shall be stamped or printed with the following data so that the feeder or cable can be readily identified and traced:

a. From where the circuit originates (including panel designation and circuit number):

1) Ex: “FROM: PP-A CIR. 3 (IN MAIN ELEC ROOM)”

b. To where the circuit extends (using the common name of the equipment):

1) Ex: “TO: RTU-6 (ON ROOF)”

c. The purpose of the circuit:

1) Ex: “POWER”

d. The set number (If parallel power feeds are used).

1) Ex: “SET NO. 3 OF 4”

C. Circuit/Cable Termination Locations:

1. Where multiple termination points exist within a circuit origination point (panelboard, switchboard, MCC, starter, etc.) or other similar circuit endpoint (control panel, etc.), labels shall be securely fastened to all ungrounded and neutral conductors to clearly identify the terminal and/or circuit number associated with each conductor. For example, within lighting panels, each phase and neutral conductor shall be labeled near the terminals at a clearly visible location with the associated circuit number(s), so that if all conductors were unterminated, the labels would clearly indicate which conductor was associated with each circuit.

D. Refer to Specification Section 26 05 19 for all color-coding requirements of wires and cables.

3.3 PULLBOX & JUNCTION BOX IDENTIFICATION

A. Concealed pullboxes/junction boxes:

1. Front surface of all pullbox/junction box covers in concealed areas (such as above lay-in ceilings) or within mechanical/electrical rooms (and other similar areas where appearance of boxes is not an issue) shall be neatly marked with the ID of circuits/cables contained with

permanent black marker on cover of box (Ex: "RP-1A Cir. 1, 2 & 3"). Additionally, front surface of box shall be painted red where box contains fire alarm system cabling.

B. Exposed pullboxes/junction boxes:

1. Interior surface of all pullbox/junction box covers in exposed areas shall be labeled "Power", "Telecommunications", "Fire Alarm" or with other similar general text neatly with permanent black marker to indicate function of box. Circuit/cable labeling within box (see above) shall identify specific cables contained. Additionally, interior surface of cover shall be painted red where box contains fire alarm system cabling.

C. Where pullboxes/junction boxes are named on contract documents (Ex:"PULLBOX #3"), an engraved nameplate shall be installed on the front surface of the box to identify the name.

3.4 ELECTRICAL DISTRIBUTION & UTILIZATION EQUIPMENT IDENTIFICATION

A. General:

1. All new and existing equipment modified by this project shall include arc-flash warning labels in accordance with NEC article 110.16.

B. All Panels, Motor Control Centers, Switchboards, Switchgear, Transformers, Etc.:

1. Engraved nameplates identifying name of equipment, nominal voltage and phase of the equipment and where the equipment is fed from shall be installed on front surface of all panels, motor control centers, switchboards, switchgear, transformers, etc.:

a. Ex: First Line: "NAME: RP-A", Second Line: "120/208V-3Ø-4W", Third Line: "FED FROM: PP-A CIR. 4 (IN MAIN ELEC ROOM)"

2. Refer to Panelboard Specification Sections for additional labeling requirements (circuit directory cards, permanent circuit labels, permanent circuit numbers, etc.) required inside panelboards.

C. Safety/Disconnect Switches and Utilization Equipment (HVAC Equipment, Pumps, Powered Valves, Control Panels, Starters, Etc.)::

1. Engraved nameplates identifying equipment being fed and where the equipment is fed from shall be installed on front surface of all disconnect switches (including both visible blade type switches and toggle-type switches) and on utilization equipment (where not clearly identified by immediately adjacent local disconnect switch):

a. Ex: First Line: "RTU-6", Second Line: "FED FROM: PP-A CIR. 5"

2. Where safety/disconnect switches are installed on the load side of variable frequency drives, the safety/disconnect switch shall be furnished with an additional engraved nameplate to read: "WARNING: TURN OFF VFD PRIOR TO OPENING THIS SWITCH".
3. Safety/Disconnect switches feeding equipment that is fed from multiple sources (such as motors with integral overtemperature contacts that are monitored via a control system) and Utilization Equipment fed from multiple sources shall be furnished with an additional

BLACK-ON-YELLOW engraved nameplate to read: "WARNING: ASSOCIATED EQUIPMENT FED FROM MULTIPLE SOURCES – DISCONNECT ALL SOURCES PRIOR TO OPENING COVER".

3.5 INSTRUMENT AND CONTROL DEVICE IDENTIFICATION

A. New Instruments and control devices (whether furnished by contractor or not) shall be labeled with black-on-white engraved nameplates permanently affixed to the equipment or to the adjacent, readily-visible mounting surface with silicone adhesive or stainless steel wire ties.

1. Instruments and process control devices (float switches, etc.) shall be labeled with instrument name and, where available, instrument ID number.
2. Pushbutton stations shall be labeled with equipment being controlled. Labels shall be installed on front surface (or adjacent mounting surface) of all pushbutton stations.
3. Thermostats and other similar HVAC control devices installed in process areas shall be labeled with equipment being controlled. Labels shall be installed on front surface (or adjacent mounting surface) of all thermostats and other similar HVAC control devices.

3.6 RACEWAY IDENTIFICATION

A. Each exposed raceway shall be labeled at the point where it becomes concealed, such as where it enters a concrete floor slab, a concrete wall, the ground, etc.

B. Each raceway entering in-grade or on-grade pullboxes/junction boxes, where the conduits are only visible inside the box, shall be labeled within the box at the point where the raceway becomes concealed.

C. Raceway nameplates shall identify:

1. The location of the other end of the raceway ("TO MCC-1" or similar). If the other end of the raceway is at an intermediate, named pullbox ("INSTRUMENTATION PULLBOX #4" or similar), that pullbox name shall be labeled rather than the endpoint of the circuitry.

3.7 OTHER IDENTIFICATION

A. Factory-engraved coverplates identifying functions of light switches and other similar devices shall be installed where so required by plans/specifications.

END OF SECTION 26 05 53

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Wiring Devices

B. Plates

C. Finishes

PART 2 - PRODUCTS

2.1 WIRING DEVICES AND PLATES

A. Switches shall be AC type, extra-heavy duty industrial grade (unless otherwise shown) of ratings shown on drawings. Switches shall be as manufactured by Hubbell, P & S, Sierra, Bryant, GE, Arrow Hart or equal.

B. Receptacles shall have blade configuration and shall be heavy duty industrial grade (unless otherwise shown) of current and voltage rating as shown on drawings. Receptacles shall be as manufactured by Hubbell, P & S, Sierra, Bryant, GE, Arrow Hart or equal.

C. All GFCI-type receptacles shall continuously self-test and shall trip/deny power if the receptacle does not provide proper GFCI protection or if the line/load terminations are miswired and shall provide visual indication of power status, trip conditions, ground fault conditions and end-of-life status.

D. Each wiring device shall have a plate (see “Finishes” section below for specific requirements).

2.2 FINISHES

A. All wiring devices (switches, receptacles, etc.) shall be colored to match the coverplates described below. For instance, all items covered by stainless steel, aluminum or malleable iron plates shall be gray in color.

B. Coverplates for recessed, wall-mounted electrical items (switches, receptacles, telephone outlets, etc.) shall be stainless steel unless shown otherwise.

C. Coverplates, trim rings, etc. for recessed, floor-mounted electrical items (floor outlets, underfloor duct junctions, etc.) shall match finish of building hardware (302/304 stainless steel, brass, etc.) in area installed.

D. Coverplates for exposed electrical items (switches, receptacles, telephone outlets, etc.) shall be of same material as exposed boxes (see Outlet Box Specification for required material type) and

shall have beveled edges.

E. Coverplates for receptacles in wet locations shall be metallic, in-use type, rated for wet locations per NEC requirements unless noted otherwise.

F. See “Electrical Identification” specification section for coverplate labeling requirements.

PART 3 - EXECUTION

3.1 GENERAL MOUNTING

A. Symbols on drawings and mounting heights are approximate. The exact locations and mounting heights shall be determined on the job, and it shall be the Contractor's responsibility to coordinate with all trades to secure correct installation. For example, Contractor shall coordinate exact mounting heights over counters, in or above backsplashes, in block walls, and at other specific construction features.

B. Verify all door swings with Architectural. Locate boxes for light switches within four inches of door trim on swing side (not hinge side) of door.

C. Devices and associated plates shall not be used as support; outlet boxes shall be rigidly supported from structural members.

D. Mount all straight-blade receptacles vertically with ground pole up, unless specifically noted otherwise.

E. Unless otherwise shown or required by local handicap codes, outlet boxes shall be the following distances above the finished floor unless otherwise noted.

1. Receptacles and telephone outlets in offices and other finished areas: 1’-6” to the center of the box.
2. Receptacles and telephone outlets in equipment rooms and other unfinished areas: 4’-0” to the center of the box.
3. Receptacles over counters: As Noted
4. Switches, general: 4’-0” to the top of the box.
5. Push-button, etc., general: 4’-0” to the top of the box.
6. Other device types: verify with engineer prior to rough-in.

END OF SECTION 26 27 26

SECTION 26 28 16 - SAFETY SWITCHES AND FUSES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Safety Switches

B. Fuses

C. Branch Feeders

D. Feeders

PART 2 - PRODUCTS

2.1 SAFETY SWITCHES

A. Safety switches shall be quick-make, quick-break, NEMA heavy duty type HD, fused or nonfused as shown. Switch blades shall be fully visible in the off position.

B. Safety switches shall be furnished with transparent internal barrier kits to prevent accidental contact with live parts. Barriers shall provide finger-safe protection when the switch door is open and shall allow use of test probes and removal of fuses without removing barrier.

C. Fused switches shall have provisions for class R, rejection type fuses.

2.2 FUSES (600V)

A. Fuses for all branch switches shall be Bussman Mfg. Co., Dual Element, Class “R” Fusetron.

B. Fuses for main switch/switches shall be Bussman Mfg. Co. Hi-Cap.

2.3 MANUFACTURER

A. Safety switches shall be as manufactured by Siemens or Cutler Hammer.

B. Fuses shall be as manufactured by Bussman Mfg. Co. or equal.

PART 3 - EXECUTION

3.1 SAFETY SWITCHES

A. Safety switches shall be installed as shown on the plans and in accordance with N.E.C.

B. Locations shown for safety switches on plans are diagrammatical only. Exact locations shall be field coordinated by contractor as required to provide code-required clearances.

C. Switch enclosures shall be rated NEMA I indoors in dry locations and NEMA 4X stainless steel outdoors and in wet or process areas.

D. Adequate support shall be provided for mounting safety switches. Safety switches shall not be mounted to the associated equipment (unless the safety switch is furnished with the equipment).

3.2 FUSES

A. Fuses shall be sized as shown on drawings, unless a smaller size is required by the associated equipment supplier, in which case the contractor shall provide fuses sized as directed by the associated equipment supplier at no additional cost.

B. Provide not less than one spare set of fuses for each size used. Provide an additional spare set for each five sets of same size fuses used.

END OF SECTION 26 28 16

SECTION 26 29 00 - MANUFACTURED CONTROL PANELS

PART 1 - GENERAL

1.1 SCOPE

A. This section describes control stations, PLC panels, motor control panels, manufactured control panels, and other similar panels specified herein. Specifications herein are intended as an extension of requirements in other Divisions of these specifications where reference is made to Electrical Specifications.

1.2 DEFINITIONS

A. "Control Stations": Enclosures (with all required accessories) containing only door-mounted pushbuttons, indicator lights and/or selector switches (no electronic components or starter/controller equipment).

B. "Control Panels": Enclosures (with all required accessories) containing equipment/devices other than door-mounted pushbuttons, indicator lights and/or selector switches (such as electronic components, starter/controller equipment, etc.).

1.3 SUBMITTALS

A. Provide the following for each control panel:

1. A job-specific, custom wiring diagram

    a. The wiring diagram shall clearly show all components (whether the components are mounted internal or external to the control panel enclosure).
    b. All wires and terminal blocks shall be clearly labeled.
    c. Diagram shall be in accordance with NEMA/ICS standards.

2. Size, type and rating of all system components.
3. Unit frontal elevation and dimension drawings.
4. Internal component layout diagrams.
5. Manufacturer's product data sheets for all components.

B. A Bill of Materials shall be included with catalog information on all components.

C. Information shall be included on any proprietary logic component sufficient to demonstrate its ability to perform the required functions.

D. The following calculations shall be submitted:

1. Thermal calculations showing amount of panel cooling/ventilating/heating required for each control panel, per ambient requirements listed below and operating temperature limitations of all equipment/devices within each control panel. See Part 2 below for requirements for

forced air ventilation rather than air conditioning. Panel shall be oversized, interior equipment/devices shall be derated, and solar shielding shall be provided, etc, as required to allow the use of forced air ventilation as the cooling method. Air conditioning, ventilation, and/or heating equipment shall each have ratings/capacities at least 20% larger than required by calculations below unless noted otherwise:

a. Thermal calculations used for sizing cooling/ventilation systems for each control panel located in exterior or non-conditioned spaces shall assume:

1) Ambient exterior air temperature ranges of -5 degrees F to 105 degrees F.
2) Full solar contact where applicable (not applicable where enclosures are fully protected from solar contact using solar shields separated from panel enclosure with standoffs or similar).
3) No wind.
4) Heat loss from interior equipment (electronics, etc.) per equipment supplier's information.

b. Thermal calculations used for sizing heating systems for each control panel shall assume:

1) Ambient exterior air temperature ranges of -5 degrees F to 105 degrees F.
2) No heat loss by interior components of control panel.
3) No solar gain on exterior of control panel.
4) Doubling of heating wattage required to account for wind where control panels are located outdoors.
5) Minimum temperature difference (due to heating) of 10 degrees F to prevent condensation, regardless of equipment temperature limitations.

2. Load calculations showing the sizing of all power supplies provided (with spare capacity as specified). Power supplies shall each have ratings/capacities at least 20% larger than required by load calculations unless noted otherwise.
3. Load calculations showing the sizing and anticipated runtime of all Uninterruptible Power Supply systems provided (with spare capacity as specified).

PART 2 - PRODUCTS

2.1 GENERAL

A. Control panels shall be Underwriters' Laboratories labeled by the panel manufacturer. Control panel manufacturers not capable of applying the U.L. label to their products are unacceptable.

B. All human interface equipment/devices (indicator lights, selector switches, pushbuttons, time switches, displays, keypads, and other similar items used for control, adjustments or monitoring) shall be mounted on the non-energized side of enclosure door(s) in such a way as to be accessible without exposing the user to energized parts.

2.2 RATINGS

A. All Control Panels shall have short circuit current ratings at least equal to the lesser of the following, unless noted otherwise on plans:

1. The short circuit current rating of the electrical distribution equipment that feeds the Control Panel.
2. 150% of the available fault current at the Control Panel as determined by a Short Circuit Current study prepared by a licensed professional electrical engineer.

B. All equipment/devices installed within control panels shall be rated to operate in ambient temperatures of 50 degrees C (122 degrees F) or higher.

2.3 ENCLOSURES

A. All enclosures (with any required accessories or auxiliary items) shall fit within the space shown on the Plans. Any costs associated with furnishing equipment which exceeds the available space shall be borne by the Contractor.

B. Enclosures (with any required accessories or auxiliary items) shall be suitable for the environment where installed.

C. Enclosure materials shall be as follows unless noted otherwise:

1. Control Stations:

a. Where located in extremely corrosive areas (chlorine rooms, fluoride rooms, etc.): NEMA 4X of non-metallic construction (with non-metallic hardware) compatible with the associated chemical(s).
b. Where located in other wet, process or outdoor areas: NEMA 4X of type 304 stainless steel construction (with stainless steel hardware).
c. Where located in dry, non-process, indoor areas (such as electrical rooms): NEMA 1 of die cast zinc/aluminum construction.

2. Control Panels:

a. Where located in hazardous areas, shall be rated NEMA 7 for the associated hazardous zone (Class 1, Division 1; Class 1, Division 2; etc.), and shall be of cast aluminum finish with gray electrostatic polyester painted finish.
b. Where located in extremely corrosive areas (chlorine rooms, fluoride rooms, etc.): NEMA 4X of non-metallic construction (with non-metallic hardware) compatible with the associated chemical(s).
c. Where located in other wet, process or outdoor areas: NEMA 4X of type 304 stainless steel construction (with stainless steel hardware).
d. Where located in dry, non-process, indoor areas (such as electrical rooms): NEMA 1 or 12.

D. Control Panel Enclosure Construction:

1. Hazardous location panels shall be of cast aluminum construction, equivalent to Hoffman SX7 series.

2. Non-metallic control panel enclosure material, where specified, shall be reinforced polyester resin or equivalent, with a minimum thickness of 3/16 inch for all surfaces except those requiring reinforcement. Panels shall be precision molded to form a one piece unit with all corners rounded. Exterior surfaces shall be gel-coated to provide a corrosion-resistant maintenance-free satin finish which shall never need painting. Color pigments shall be molded into the resin. Color shall be grey.
3. NEMA 4X, 1 and 12 Metallic control panel enclosures, where specified, shall be fabricated using a minimum of 14 gauge steel for wall or frame mounted enclosures and a minimum of 12 gauge for freestanding enclosures. Continuously weld all exterior seams and grind smooth. Reinforce sheet steel with steel angles where necessary support equipment and ensure rigidity and preclude resonant vibrations.
4. Use pan-type construction for doors.
5. Door widths shall not exceed 36-inches.
6. Mount doors with full length, heavy duty piano hinge with hinge pins.
7. Provide gasket completely around each door opening.
8. Mount and secure all internal components to removable back plate assembly.
9. For NEMA 1 or 12 enclosures, provide handle-operated key-lockable three point stainless steel latching system for each door.
10. For NEMA 4X or 7 enclosures, provide provisions for padlocking all doors and provide clamps on three (3) sides of each door.

E. Control panel enclosures (and associated backpanels and other similar accessories) shall be manufactured by Hoffman Engineering Co., or Saginaw Control & Engineering.

2.4 CONTROL PANEL ACCESSORIES:

A. Panel ventilation systems shall be provided if so required by the application to maintain temperatures within the acceptable ranges of the interior equipment. In no case (regardless of temperature ratings of internal equipment) shall maximum temperatures within control panels be allowed to exceed 50 degrees C (122 degrees F). Panel Air Conditioners or Heat Exchangers (to satisfy the specified thermal calculation requirements) are generally NOT acceptable unless specifically stated otherwise in these specifications, and shall not be provided for panels without specific written direction from the engineer PRIOR to submission of panel shop drawings. Panels shall be oversized, provided with standoffs/shields, and/or ventilated as required to meet the contract requirements. Thermostats shall be provided to control cooling without need of manual operation. Thermostat setpoints shall be as per recommendations of the equipment suppliers. See above for thermal calculation requirements. Cooling units shall be as manufactured by Hoffman Engineering Co., Rittal or approved equal and shall be thermostatically controlled.

B. Space heaters shall be provided for condensation and temperature control. Thermostats AND hygrostats (or combination hygrotherm controllers) shall be provided to control heating requirements (based on temperature and relative humidity within enclosure) without need of manual operation. Setpoints shall be as per recommendations of the equipment suppliers. See above for thermal calculation requirements. Space heaters and associated control devices shall be as manufactured by Hoffman Engineering Co., Rittal, Stego or approved equal.

C. NEMA 4X and 7 control panels shall be provided with vapor-phase corrosion inhibitor(s) (chemical combinations that vaporize and condense on all surfaces in the enclosed area, to protect metal surfaces/devices within the enclosed area from corrosion). Corrosion inhibitor

shall be Hoffman #AHCI series (sized as required by the enclosure volume to be protected) or equal.

D. For outdoor panels, stainless steel solar shields for front, top and each side of panel, supported to associated panel face with standoffs as required (to allow free air flow between solar shield and panel enclosure), shall be provided where required to limit solar loading on panel to allow use of a ventilated panel design rather than an air-conditioned panel design.

E. Provide a sun shield over all LCD displays in exterior-mounted panels. Sun shield shall be collapsible to fully protect LCD display from UV light when not in use, shall provide side and top shielding when in use, shall be constructed of stainless steel and shall be installed such as to maintain NEMA 4X ratings of enclosures.

F. Provide a clear polycarbonate gasketted hinged door or window to encompass all indicators, controllers, recorders, etc. mounted on NEMA 4 and 4X enclosures.

G. Provide interior mounting panels and shelves constructed of minimum 12 gauge steel with white enamel finish. Provide metal print pocket with white enamel finish on inside of door.

H. Provide interior LED light kit, mounted at top of interior of panel, and switched to turn "ON" when door is opened for the following control panels:

1. Control panels with outer dimensions greater than 20" wide or 30" high.
2. Control panels containing PLCs or other similar programmable devices.

I. Control panels containing VFDs or Reduced Voltage Soft Starters shall include a door mounted digital keypad for adjusting the starter parameters and viewing process values and viewing the motor and starter statuses without opening the enclosure deadfront door.

2.5 CONTROL COMPONENTS

A. General:

1. Any door-mounted devices in hazardous-area panels shall be rated for the associated hazardous area/condition (C1D1, C1D2, etc.).
2. All pushbuttons, pilot lights, selector switches and other control devices shall be separate, standard size (full 30mm) and shape, heavy duty oil-tight units.

    a. Devices in extremely corrosive areas (chlorine rooms, fluoride rooms, etc.) shall be of non-metallic construction.
    b. Devices in other areas shall be of chrome-plated construction.

3. All components and devices so that connection can be easily made and so there is ample room for servicing each item.
4. Door-mounted indicators, recorders, totalizers and controllers shall be located between 48" and 72" above finished floor level.
5. Door-mounted indicator lights, selector switches and pushbuttons shall be located between 36" and 80" above finished floor level.

6. All devices and components shall be adequately supported to prevent movement. Mounting strips shall be used to mount relays, timers and other devices suitable for this type of mounting.

B. Pilot Lights:

1. All pilot lights to be cluster LED type & push to test.

C. Pushbuttons:

1. All STOP operators within control stations located at equipment shall be provided with padlockable lockout provisions and a minimum of two (2) sets of contact blocks.
2. Emergency shutoff pushbutton devices shall be as follows unless noted otherwise:

    a. 44mm diameter, mushroom-style, maintained contact push buttons
    b. With a minimum of one (1) normally open dry contact and three normally closed dry contacts.
    c. Connections made such that pushing “in” the button will shutoff the associated equipment.
    d. Provided with a red engraved nameplate with ½” lettering to read “Emergency Shutoff”.
    e. Provided with padlockable lockout provisions

D. Relays:

1. Control relays shall have the following characteristics, unless noted otherwise:

    a. General purpose, plug-in type.
    b. Minimum mechanical life of 10 million operations.
    c. Coil voltage as indicated or required by application.
    d. Single-break contacts rated 12 amperes, resistive at 240 volts.
    e. Contacts as shown on wiring diagrams plus a minimum of one (1) spare N.O. contact and one (1) spare N.C. contact. At a minimum, each individual relay shall have 3PDT contacts. Where required, multiple control relays shall be provided (to provide the required quantities of contacts) for each “relay” function shown on plans/diagrams.
    f. Furnished with RC transient suppressor to suppress coil-generated transients to 200% of peak voltage.
    g. LED on/off indicator light and manual operator.
    h. Industry standard wiring and pin terminal arrangements.
    i. Equal to Square D 8501KP series with matching plug-in socket.

2. Interposing/isolation relays used to isolate discrete output field wiring (and where required for voltage translation for other discrete signals) to/from PLC inputs/outputs shall be terminal-block style. Terminal-block style relays shall have the following characteristics, unless noted otherwise:

    a. Minimum mechanical life of 10 million operations.
    b. Single-break contacts rated 6 amperes, resistive at 120 volts.
    c. One (1) N.O. contact per relay.
    d. Furnished with integral transient protection.
    e. LED on/off indicator light.

f. DIN-rail mounted.
g. Equal to Square D type Zelio RSL.

3. Timer relays shall be electronic, adjustable plug-in devices meeting the following characteristics, unless noted otherwise:

   a. General purpose, plug-in type.
   b. Minimum mechanical life of 10 million operations.
   c. Single-break contacts rated 10 amperes, resistive at 240 volts.
   d. Contacts as shown on wiring diagrams plus a minimum of one (1) spare N.O. contact and one (1) spare N.C. contact. At a minimum, each relay shall have DPDT contacts (2 N.O. & 2N.C.). Where required, multiple timer or control relays shall be provided (to provide the required quantities of contacts) for each "relay" function shown on plans/diagrams.
   e. Rotary-thumbwheel adjustments for time value, timing range and function.
   f. Time value adjustments from .05 seconds to 999 hours
   g. Selectable Timing Functions, including the following:

      1) On Delay
      2) Interval
      3) Off Delay
      4) One Shot
      5) Repeat Cycle-Off
      6) Repeat Cycle-On
      7) On/Off Delay
      8) One Shot Falling Edge
      9) Watchdog
      10) Trigger On Delay

   h. Accuracy shall be $\pm$ 2% and repeatability shall be $\pm$ 0.1%.
   i. Furnished with integral transient protection.
   j. LED indicator light(s) for "timing" and "on/off status"
   k. Held in place with hold-down spring
   l. Equal to Square D type JCK with matching plug-in socket.

2.6 CONFORMAL COATINGS

A. All printed circuit boards within electronic devices (PLCs, RTUs, controllers, I/O modules, power supplies, touchscreens, Ethernet switches, radios, etc.) installed in panels located in non-conditioned or exterior/process areas shall be conformal-coated for harsh environments.

2.7 DC POWER SUPPLIES

A. DC Power supplies shall be provided where specified elsewhere, or as required by design of system. Power supplies shall be industrial type, AC-to-DC switching, output voltage as required, 120vac input, size as required for the initial application plus 50% spare capacity.

B. Redundant power supplies with diode isolation shall be provided so that the loss of one power supply does not affect system operation. The back-up supply systems shall be designed so that

either the primary or the back-up supply can be removed, repaired, and returned to service without disrupting the system operation.

C. Power supply output shall be protected by secondary overcurrent protection device(s).

D. The power distribution from multiloop supplies shall be selectively fused so that a fault in one instrument loop will be isolated from the other loops being fed from the same supply.

E. Each power supply shall meet the following requirements.

1. Regulation, line: 0.4% for input from 105 to 132vac.
2. Regulation, load: 0.8%
3. Ripple/Noise: 15mV RMS / 200 mV peak to peak
4. Operating temperature range: 0 deg C - 60 deg C
5. Overvoltage protection
6. Overload Protection
7. Output shall remain within regulation limits for a least 16ms after loss of AC power at full load.
8. Output status indicator.
9. UL listing

F. Power supplies shall be manufactured by Puls, Sola, Phoenix Contact or equal.

2.8 DISCONNECTS

A. A main disconnect switch or circuit breaker shall be supplied integral to all control panels. The main disconnect or circuit breaker shall be accessible/operable without exposing the operator to energized sections of the control panel(s), and shall be lockable in the open/off position.

B. Individual circuit breakers shall be provided integral to the manufactured control panel for each separate power circuit originating within the control panel.

C. Where the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated (or can be adjusted to is 1200A or higher, breakers shall be electronic trip and shall be provided with arc energy-reducing maintenance switching (with local status indicator) to reduce arc flash energy per NEC 240.87 requirements.

D. Manufacturers:

1. Siemens or Cutler Hammer.

2.9 COMBINATION STARTERS

A. All combination starters shall utilize a unit disconnect. Magnetic starters shall be furnished in all combination starter units unless specifically shown otherwise. All starters shall utilize full NEMA/EEMAC rated contactors (size 1 minimum).

B. Starters shall be provided with a three-pole, external (door mounted) manual reset, solid state overload relay. Solid state overload relay shall have switch-selectable trip class and shall

provide protection from:

1. Overload.
2. Phase Unbalance.
3. Phase Loss.
4. Ground Fault (Class II detection).

C. Unless specifically shown otherwise, each combination starter or each group of starters shall be furnished with a control circuit transformer including two primary protection fuses and one secondary fuse (in the non-ground secondary conductor). The transformer shall be sized to accommodate the contactor(s) and all connected control circuit loads (including motor space heaters and other similar loads where specified). The transformer rating shall be fully visible from the front when the unit door is opened. Unless otherwise indicated, control voltage shall be 120V AC. Control power shall be provided by individual unit control power transformers.

D. When a unit control circuit transformer is not provided, the disconnect shall include an electrical interlock for disconnection of externally powered control circuits.

E. Auxiliary control circuit interlocks shall be provided where indicated. Auxiliary interlocks shall be field convertible to normally open or normally closed operation.

F. NEMA/EEMAC Size 1-4 starters shall be mounted directly adjacent to the wireway so that power wiring (motor leads) shall connect directly to the starter terminals without the use of interposing terminals. Larger starters shall be arranged so that power wiring may exit through the bottom of the starter cubical without entering the vertical wireway.

G. Each starter shall be equipped with a minimum of the following control devices:

1. Door-mounted reset button.
2. Two (2) field-reversible (N.O./N.C.) auxiliary contacts
3. For reversing and two-speed starters: Four (4) field-reversible (N.O./N.C.) auxiliary contacts
4. Additional control devices as indicated on plans.

H. Control Wiring Terminal Blocks

1. Terminal blocks shall generally be:

   a. Feed-thru, screw-in type
   b. DIN rail mounted
   c. Furnished with the stationary portion of the block secured to the unit bottom plate
   d. Furnished with unit-mounted control terminal blocks for each field wire.
   e. Rated for the voltage and current of the proposed application per UL/NEC standards.
   f. Sized (by supplier) for the associated wire gauges/types/quantities.
   g. Phoenix Contact UT-4 series, Weidmuller WDU-4 series (or equivalent) unless required otherwise by application.

I. Nameplates

1. Each unit shall be properly labeled with an engraved phenolic nameplate with a white background and black letters.

2. Each pilot device shall be properly labeled with a legend plate or an engraved phenolic nameplate.

J. Manufacturers:

1. Siemens or Cutler Hammer.

2.10 NETWORK EQUIPMENT

A. Ethernet Switches:

1. Where Ethernet switch(es) are required by application or by other specifications/plans, provide Industrial Ethernet Switch(es), with copper ports for all required copper Ethernet connections plus 50% spares and fiber optic ports for all required fiber optic connections. Ethernet switches shall be Rockwell Stratix series or equal by Moxa or NTron.

B. Fiber Optic Patch Panels:

1. Where panel includes fiber optic network connections to external panels/equipment/devices, provide compact, din-rail mounted fiber optic patch panel(s) within panel as required. See Fiber Optic Cabling or other specifications for required fiber optic cable and connector types. Fiber optic patch panel shall be DINSpace Snap XL Compact type or equivalent, unless required otherwise by application.

2.11 WIRING

A. Refer to Section 26 05 19 for all wiring types/applications.

B. All wiring shall be identified on each end with hot stamped, shrink tube type, or self-laminating vinyl permanent wire markers to correspond with numbering shown on wiring diagrams.

C. All connections shall be made on terminals with no splices.

D. All wiring runs shall be along horizontal or vertical routes to present a neat appearance. Angled runs will not be acceptable. Group or bundle parallel runs of wire in plastic wire duct where practical.

E. All wiring runs shall be securely fastened to the panel or wire duct by means of plastic wire ties. Adequately support and restrain all wire runs to prevent sagging or movement.

F. AC power wiring and instrumentation/analog wiring shall be run separate.

G. Color code all internal wiring (not field wiring) as follows:

1. Line and load circuits: Black (B)
2. AC control wiring: Red (R)
3. Externally-Powered control wiring: Yellow (Y)
4. Neutral wiring: White (W)
5. Low voltage DC(+)pos: Blue (BL)

6. Low voltage DC(-)neg: Blue/White Tracer (BL/W)
7. Grounding: Green (G)

H. Terminal strips shall be provided for all input and output wiring. No more than two (2) wires shall be connected to one (1) terminal block.

2.12 ELECTRICAL SURGE AND TRANSIENT PROTECTION

A. General

1. Function: Protect the system against damage due to electrical surges.

B. Application: As a minimum, provide surge and transient protection (with proper grounding) at the following locations as described below:

1. Power Input High Frequency Noise Filtering:

a. 120VAC Control panels with integral UPSs, PLCs, or other electronic/microprocessor equipment that is susceptible to failure or improper operation due to high frequency/harmonic input transients shall be provided with series-connected high-frequency noise filters on the line input (downstream of any panel main disconnects/breakers). Filters shall be as manufactured by Edco/Emerson/Islatrol or equal (exact type(s) as required by application).

2. Power Input Surge Protection:

a. Provide surge protection device at any connection of 120VAC power to panels containing programmable logic controllers, remote I/O equipment, UPS's, transmitters, radios, VFDs, Reduced Voltage Soft Starters or other electronic equipment. Device shall:

1) Be mounted internal to the associated panel, with dedicated overcurrent protection.
2) Be of two-part (base and SPD), DIN-rail mountable construction.
3) Have 15kA total nominal discharge current per line (based on 8/20µs waveform).
4) Have maximum continuous operating voltage (MCOV) rating as required by the associated circuit voltage.
5) Visually indicate operational status.
6) Be Dehn DEHNguard series or equal by MTL Technologies or Phoenix Contact, or may be combined with the High Freqency Noise Filtering device required above.

b. Provide surge protection device at any connection of multi-pole AC power to panels containing programmable logic controllers, remote I/O equipment, UPS's, transmitters, radios, VFDs, Reduced Voltage Soft Starters or other electronic equipment. Device shall:

1) Be mounted internal to the associated panel, with dedicated overcurrent protection.
2) Provide protection for all phases.
3) Have 40kA (per phase) peak surge current rating.

4) Have maximum continuous operating voltage (MCOV) rating as required by the associated circuit voltage.
5) Visually indicate operational status.
6) Be Square D SDSA or HWA series or equal.

3. Analog I/O Panel Terminations Surge Protection:

   a. Provide surge protection device at the PLC (or similar) panel connection of each analog I/O signal. Device shall:

      1) Be mounted internal to the associated panel.
      2) Be of two-part (base and SPD), DIN-rail mountable construction.
      3) Have the following nominal discharge current ratings:

         a) D1 Lightning impulse current (10/350 µs) per line: 1 kA
         b) C2 Total nominal discharge current (8/20 µs): 20 kA
         c) C2 Nominal discharge current (8/20 µs) per line: 10 kA

      4) Have maximum continuous operating voltage (MCOV) rating as required by the associated signal.
      5) Manufacturer and Model:

         a) DEHN BSP M4 BE 24 (926 324) with 920300 base.
         b) Phoenix Contact 2801263 with included base.
         c) Weidmuller 1093400000 with 8951710000 base.

4. Discrete I/O Panel Terminations Surge Protection:

   a. Provide isolation relay at the PLC (or similar) panel connection of each discrete output signal (within the associated panel). See above for isolation relay requirements.

5. Low Voltage Power Supply Load Side Surge Protection:

   a. Provide surge protection device at the PLC (or similar) panel on the load side of each low voltage power supply that has low voltage connections extending external to the panel. Device shall:

      1) Be mounted internal to the associated panel.
      2) Be of two-part (base and SPD), DIN-rail mountable construction.
      3) Have 10kA total nominal discharge current per line (based on 8/20µs waveform).
      4) Have maximum continuous operating voltage (MCOV) rating as required by the associated utilization voltage.
      5) Be as manufactured by Dehn, MTL Technologies, or Phoenix Contact.

6. Network Panel Terminations Surge Protection:

   a. Provide surge protection device at the PLC (or similar) panel connection of each network cable. Device shall:

      1) Be mounted internal to the associated panel.
      2) Be of DIN-rail mountable construction.

3) Have 1kA total nominal discharge current per line (based on 8/20µs waveform).
4) Be designed specifically for the associated network connection type (Ethernet, RS485, RS232, etc.).
5) Be MTL Zonebarrier series or equal.

7. Antenna Cable Terminations Surge Protection:

a. Provide surge protection device at the connection of antenna cable to the radio panel. Device shall:

1) Be mounted internal to the associated panel.
2) Provide coarse protection via replaceable gas-filled surge voltage arrestor
3) Be Phoenix Contact CN-LAMBDA series or equal.

C. Installation and grounding of suppressor: As directed by manufacturer. Provide coordination and inspection of grounding.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE & HANDLING

A. Provide Site and warehouse storage facilities for all equipment.

B. Prior to shipment, include corrosive-inhibitive vapor capsules in shipping containers, and related equipment as recommended by the capsule manufacturer.

C. Prior to installation, store items in dry indoor locations. Provide heating in storage areas for items subject to corrosion under damp conditions.

D. Cover panels and other elements that are exposed to dusty construction environments.

3.2 INSTALLATION

A. Provide enclosure mounting supports as required for floor, frame or wall mounting. All supports in exterior, wet or process areas shall be stainless steel unless noted otherwise. All floor-mounted panels or other similar distribution equipment shall be mounted on 6” concrete housekeeping pads unless specifically shown otherwise. The general design intent is that centers of control panels be mounted at heights that are easily accessible. Design intent is that devices on panel fronts (pushbuttons, selector switches, pilot lights, HMIs, ETMs, breaker handles, etc.) generally be mounted as close to 5’-0”a.f.f. as possible, no higher than 6’-7”a.f.f (per NEC requirements) and no lower than 3’-6”a.f.f., where possible, without specific approval of the owner or engineer. Additionally, every effort shall be made to provide a professional, consistent, neat, and workmanlike finished appearance of panel installations. For example, tops of adjacent panels shall be mounted at matching heights where possible/reasonable.

B. All enclosures used outside shall be solid bottom unless otherwise specified. All cable and piping openings shall be sealed watertight. Cable and piping shall enter the enclosure as shown on drawings or specified herein.

C. All equipment and components shall be solidly grounded to the control panel. One grounded terminal unit shall be provided in each control panel for connection to plant ground system. Grounding digital and analog components shall be performed in accordance with the instrument supplier's installation recommendations. Signal ground shall be solidly connected to the ground system so as to prevent ground loops

3.3 PAINTING

A. For enclosures other than NEMA 4X stainless steel or fiberglass:

1. Completely clean all surfaces so that they are free of corrosive residue. Then, phosphatize all surfaces for corrosion protection.
2. Prime with two (2) coats and finish with one coat of factory finish textured polyurethane. Paint shall be Sherwin-Williams Polane "T' or approved equal.
3. Color to be selected during shop drawing review phase.

3.4 IDENTIFICATION & DOCUMENTATION

A. Refer to specification section 26 05 53 for additional requirements.

B. Control panel power supply source, type, voltage, number or circuit ratings shall be identified inside control panels and on drawings.

C. All interior devices and components shall be identified with thermal transfer labels with black letters on white background. Labels shall be placed on the subpanel and not the component. Marking system shall be a Brother "PTouch II" or equal. Lettering shall be 1/4" high.

D. All front panel mounted devices such as push buttons shall be identified by the use of engraved bakelite nameplates or legend plates. Nameplates shall be 1/8" thick, white with black core.

E. Where a panel includes a PLC or other network-connected device that is intended to be connected to another system (such as a plant SCADA system) via a network connection, the panel supplier shall provide an Interface Control Document (ICD) to the other system supplier (such as the SCADA Integrator). This document shall itemize the following for each networked parameter that is capable of being monitored or controlled by the other system:

1. Parameter Name/Function (ex: Pump No. 1 On/Off Status)
2. Parameter Type (discrete or analog, input or output)
3. Parameter register ID/location

F. Where a panel includes a touchscreen or other programmable HMI display and is to be monitored by another system (such as a plant SCADA system), the panel supplier shall provide copies of the HMI display code and screenshots of all proposed HMI screens to the other system supplier (such as the SCADA Integrator) for their use in duplicating the associated HMI.

G. A job-specific, custom wiring diagram for each control panel (not including control stations without relays) shall be provided to the contractor prior to installation for making the appropriate electrical connections. The wiring diagram shall clearly show all control components connected to the panel (whether the components are mounted internal or external to

the enclosure). All wires and terminal blocks shall be clearly labeled. A laminated copy of the final wiring diagram for each unit shall be installed inside the door of the associated panel, and submitted to the owner with the as-built documentation.

3.5 OWNER TRAINING

A. Fully train the owner in the proper operation of all control panels/equipment, describing and demonstrating full operation, including function of each door-mounted device.

3.6 SPARE EQUIPMENT

A. Provide the following spare equipment:

1. Fuses: 10% (minimum of 3) of each size and type utilized, mounted within a pocket within the associated control panel.
2. Where control panel contains programmable controller (or similar equipment): Flash drive containing copies of all final programs utilized within the control panel, with provisions/cable assemblies as required to connect the flash drive provided to the controller to download the programs. Flash drive shall be attached to retractable cord (long enough to reach the associated port) attached to the inside of the panel door.

END OF SECTION 26 29 00

SECTION 27 05 00 - AUXILIARY SYSTEM CABLES, 0-50V

PART 1 - GENERAL

1.1 DESCRIPTION

A. Cables rated for 0V-50V application

PART 2 - PRODUCTS

2.1 GENERAL

A. Unless specified otherwise, all cables within the scope of this specification section shall:

1. Be rated for exposed cable tray installation.
2. Be plenum rated (Class 1 Control cabling and Instrumentation cabling installed in conduit or exposed in cable tray in non-plenum areas is not required to be plenum-rated).
3. Be UL-rated for the proposed application.
4. Be multi-conductor with overall outer sheath as required by the application. The insulation of each conductor within the overall multi-conductor cable shall be uniquely color-coded. Ground conductors (when provided) within the multi-conductor cable shall have green insulation. Conductors with green insulation shall not be used for conductors other than ground.
5. Utilize copper conductors.
6. Have wire gauge as required to limit voltage drop to acceptable limits determined by the system supplier and to meet all applicable code requirements.
7. Where installed underground, within slab-on-grade or in exterior locations, be rated for wet locations.
8. Where required for specific systems, meet the specific requirements (conductor quantity, wire gauge, insulation type, shielding, etc.) of the system supplier.

2.2 INSTRUMENTATION CABLING

A. In addition to above requirements, and unless specified otherwise, Instrumentation cabling shall:

1. Be #16awg minimum.
2. Be rated for 300V.
3. Have aluminum foil shielding.
4. Have stranded, twisted conductors.
5. Have PVC insulation/jacket with ripcord.
6. Be manufactured by Belden, AlphaWire or General Cable.

2.3 CLASS 1 CONTROL CABLING (120VAC CONTROL CIRCUITS, ETC.)

A. In addition to above requirements, and unless specified otherwise, Class 1 control cabling shall:

1. Be rated for 600V.
2. Be industrial grade.
3. Have stranded conductors.
4. Have sunlight/oil-resistant PVC/Nylon insulation and jacket with ripcord.
5. Be manufactured by Belden, AlphaWire or General Cable.

2.4 CLASS 2 & 3 CONTROL CABLING (FED FROM CLASS 2 OR 3 POWER SUPPLIES)

A. In addition to above requirements, and unless specified otherwise, Class 2 & 3 control cabling shall:

1. Be rated for 300V.
2. Be shielded if so recommended by the system supplier/integrator.
3. Have twisted conductors.
4. Have plenum-rated insulation/jacket with ripcord.
5. Be manufactured by AlphaWire, Belden, General Cable, Superior Essex or West Penn.

2.5 NETWORK CABLING

A. Furnish and install all Ethernet, Fiber Optic and Backbone Copper Telephone cabling in accordance with all BICSI requirements and in accordance with other applicable specification sections.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

A. Routing:

1. All wires and cables shall be installed in conduit unless specifically noted otherwise. Where conduit is not otherwise required by contract documents, 0-50V Cabling located within concealed, accessible ceiling spaces (such as above lay-in ceilings) may be run without conduit if the following requirements are met:

   a. Cabling is plenum-rated, multi-conductor.
   b. Cabling is supported by cable tray or with J-hook supports on intervals not to exceed 5’-0” on center. Cabling shall be supported solely from the cable tray or j-hooks supported from the building structure, without using piping, ductwork, conduit or other items as supports.
   c. Cabling is neatly formed, bundled and tied with plenum-rated Velcro straps on intervals not to exceed 30” on center.
   d. Properly-sized conduit(s) are provided wherever cabling enters an inaccessible or exposed area (such as above gyp board ceilings, within walls or through walls).
   e. Cabling is not a part of a Fire Alarm System, Smoke Control System, Emergency Generator Control System or other life-safety related system.

2. End bushings shall be provided on both ends of all raceway terminations.
3. No splices shall be pulled into conduit.
4. No cabling shall be pulled until conduit is cleaned of all foreign matter.

B. Penetrations:

1. All fire/smoke barrier penetrations shall be made in accordance with a U.L. listed assembly.
2. For cabling not installed in conduit:

    a. Fire/smoke barrier penetrations shall be sealed utilizing an enclosed fire-rated pathway device (STI EZ Path or equal) containing a built-in fire sealing system sufficient to maintain the hourly fire rating of the barrier being penetrated. The self-contained sealing system shall automatically adjust to the installed cable loading and shall permit cables to be installed, removed or retrofitted without the need to remove or reinstall firestop materials. The pathway shall be UL Classified and tested to the requirements of applicable ASTM/UL1479 standards.

3. For cabling installed within conduit from endpoint to endpoint:

    a. Fire/smoke barrier penetrations shall sealed utilizing fire caulk or other equivalent firestop systems around perimeters of conduits per UL requirements.

4. For cabling installed within cable trays:

    a. Fire/smoke barrier penetrations shall be sealed with one of the following methods:

        1) Continuous cable tray through the penetration, with a combination of large firestop pillows and small firestop pillows contained, supported and secured (to prevent unauthorized removal) on both sides by aluminum wire mesh and firestop putty. Firestop pillows shall be STI Series SSB or equal and Firestop putty shall be STI Spec Seal or equal.
        2) Cable tray broken at the penetration, with fire/smoke barrier penetrations sealed utilizing an enclosed fire-rated pathway device (STI EZ Path or equal) containing a built-in fire sealing system sufficient to maintain the hourly fire rating of the barrier being penetrated. The self-contained sealing system shall automatically adjust to the installed cable loading and shall permit cables to be installed, removed or retrofitted without the need to remove or reinstall firestop materials. The pathway shall be UL Classified and tested to the requirements of applicable ASTM/UL1479 standards.

C. Excess Cabling:

1. Excess cabling shall be neatly coiled within all junction boxes, pullboxes, wireways, etc. and at all terminations as required to allow future re-termination of cabling.

D. Terminations:

1. All conductors/cabling (including spare conductors) shall be properly terminated unless specifically directed otherwise. See below for general termination hardware requirements.
2. Cabling shall be neatly formed, bundled and tied at all terminations.

3.2 SPLICES/CONNECTIONS/TERMINATIONS:

A. Network Cabling:

1. Network and fiber optic cabling shall be continuous from endpoint to endpoint and shall not be spliced unless specifically noted otherwise.

B. Control Cabling:

1. Connections shall be made with T & B Sta-Kon wire joints EPT66M, complete with insulating caps. To be installed with WT161 Tool or C nest of WT11M Tool, Ideal Super - Nuts (not wire nuts), Ideal Wing Nuts, or Buchanan Elec. Products B Cap or Series 2000 Pressure connectors complete with nylon snap on insulators to be installed with C24 pressure tool.

C. Shielded cabling:

1. Unless directed otherwise by the system supplier, 0-50V cable shielding shall be grounded at the PLC/control panel end only (not at the field device end) with a termination kit as directed by the PLC/control panel supplier.
2. Shielded cabling shall be continuous from endpoint to endpoint and shall not be spliced without prior written approval from the Engineer.

3.3 LABELING

A. Refer to Specification Section 26 05 53 for all labeling requirements.

END OF SECTION 27 05 00

SECTION 27 10 00 - FIBER OPTIC CABLING SYSTEM

PART 1 - GENERAL

1.1 SCOPE:

A. This document describes the products and execution requirements relating to furnishing and installing Fiber Optic Cabling Systems.

B. All cables and related terminations, support and grounding hardware shall be furnished, installed, wired, tested, labeled, and documented by the structured cabling contractor as detailed in this document.

C. Product specifications, general design considerations, and installation guidelines are provided in this document. Quantities of telecommunications outlets, typical installation details, cable routing and outlet types are indicated on the plans. If the bid documents are in conflict, this specification shall take precedence.

D. Refer to Specification Section 26 05 53 (Electrical Identification) for additional identification requirements.

E. Refer to Specification Section 27 05 00 (Auxiliary System Cables, 0-50V) for additional material and installation requirements.

1.2 REGULATORY REFERENCES:

A. All work and materials shall conform in every detail to the rules and requirements of the National Fire Protection Association, the National Electrical Code, local ordinances and present manufacturing standards.

B. All materials shall be UL Listed and shall be marked as such. If UL has no published standards for a particular item, then other national independent testing standards shall apply and such items shall bear those labels. Where UL has an applicable system listing and label, the entire system shall be so labeled.

C. All modular jacks, patch cords, consolidation point, and patch cords shall be ETL Verified (not just tested) to be category 6 component and channel compliant.

D. The cabling system described in this specification is derived from the recommendations made in recognized telecommunications industry standards. The following documents are incorporated by reference:

1. ANSI/TIA/EIA - 568-B.1, Commercial Building Telecommunications Cabling Standard Part 1: General Requirements, April, 2001
2. ANSI/TIA/EIA - 568-B.2, Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components, April, 2001

3. ANSI/TIA/EIA - 568-B.2-1, Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted Pair Cabling Components, Addendum 1 – Transmission Performance Specifications for 4-pair 100 Ω Category 6 Cabling
4. ANSI/TIA/EIA - 568-B.3, Commercial Building Telecommunications Cabling Standard Part 3: Optical Fiber Cabling Components, March, 2000
5. ANSI/TIA/EIA – 569-E, Commercial Building Standard for Telecommunications Pathways and Spaces, 2019
6. ANSI/TIA/EIA – 606-A, Administration Standard for Telecommunications Infrastructure of Commercial Buildings, February, 2002
7. ANSI/TIA/EIA – 607-AJ, Commercial Building Grounding and Bonding Requirements for Telecommunications, August 1994
8. ANSI/ TIA/EIA – 758, Customer-Owned Outside Plant Telecommunications Cabling Standard, April 1999
9. BICSI - TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual (TDMM) 10TH edition.
10. National Fire Protection Agency (NFPA – 70), National Electrical Code (NEC) –2002
11. ANSI/TIA/EIA – 45-B, Test Procedures for Fiber Optic Connections.
12. ANSI/TIA/EIA – 526-14, Power Test for Fiber Runs.
13. FCC 47 CFR 68
14. NEMA 250
15. NEC Articles 770 and 800
16. ADA, Americans with Disabilities Act

E. If this document and any of the documents listed above are in conflict, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Contractor has the responsibility to determine and adhere to the most recent release.

F. This document does not replace any code, either partially or wholly. The contractor must be aware of local codes that may impact this project. All local State and federal codes are to be followed.

1.3 APPROVED CONTRACTOR:

A. The Fiber Optic Cabling Contractor must meet the following requirements:

1. Contractor must have a certified RCDD on staff. The project manager for this project shall have an RCDD certification, and RCDD shall be responsible for reviewing all aspects of the design, submittals and installation of all products.
2. All required submittal information shall be stamped by the RCDD.
3. Contractor must have a minimum of 3 years experience with projects of similar size and scope to this project.
4. The company performing the work must have been in business for a minimum of 3 years.
5. The company must have an office within 75 miles of the job site.

B. The Fiber Optic cabling contractor is responsible for workmanship and installation practices in accordance with the requirements of the standards described in these specifications and manufacturer's requirements.

1.4 WORK INCLUDED:

A. The work included under this specification consists of furnishing all labor, equipment, materials, and supplies and performing all operations necessary to complete the installation of this structured cabling system in compliance with the specifications and drawings. The structured cabling contractor will provide and install all of the required material to form a complete system whether specifically addressed in the technical specifications or not.

B. The work shall include, but not be limited to the following:

1. Furnish and install a complete telecommunications wiring infrastructure.
2. Furnish, install, and terminate all UTP and Optical Fiber cable
3. Furnish any other material required to form a complete system.
4. Perform channel testing (100% of horizontal and/or backbone links/channels) and certification of all components.
5. Furnish test results of all cabling to the owner on disk and paper format, listed by each closet, then by workstation ID.
6. Provide owner test results and documentation. (Testing documentation and As-built drawings)

1.5 SUBMITTALS:

A. Within thirty (30) days of notice to proceed the structured cabling contractor shall submit the following items:

1. Submit copies of the certification of the company and names of staff that will be performing the installation and termination of the installation to provide proof of compliance of this spec.
2. Submit proof from manufacturer of contractor's good standing in manufacturer's certification program.
3. Submit copy of contractor's RCDD certification.
4. Submit listing of five (5) projects of similar size and scope to this project that have been completed within the last five years. Include in this submittal owner's contact information for each project.
5. Submit letter from the manufacturer stating that the manufacturer will provide a twenty-five year (25) warranty in accordance with the requirements paragraph 1.03 (B) of these specifications.
6. Submit appropriate cut sheets and samples for all products, hardware and cabling.

B. Work shall not proceed without the engineer's approval of the submitted items.

C. The structured cabling contractor shall receive approval from the engineer on all substitutions of material. No substituted materials shall be installed except by written approval from the engineer.

1.6 DRAWINGS:

A. It shall be understood that the electrical details and drawings provided with the specification package are diagrammatic. They are included to show the intent of the specifications and to aid

the structured cabling contractor in bidding the job. The structured cabling contractor shall make allowance in the bid proposal to cover whatever work is required to comply with the intent of the plans and specifications.

B. The structured cabling contractor shall verify all dimensions at the site and be responsible for their accuracy.

PART 2 - PRODUCTS

2.1 BACKBONE - FIBER:

A. Backbone Fiber Optic Cabling shall meet the following requirements:

1. All optical fiber shall be Indoor/Outdoor,Tight-Buffered, All-Dielectric, Plenum rated (unless specified otherwise on plans) with Enhanced Multimode OM4-rated 50/125 Optical Fibers.
2. Each Multimode Fiber shall:

    a. Be graded-index optical fiber wave-guide with nominal 50/125µm-core/cladding diameter.
    b. Comply with ANSI/EIA/TIA-492AAAC-A
    c. Have attenuation measured in accordance with ANSI/EIA/TIA-455-46, 53 or 61.
    d. Have information transmission capacity measured in accordance with ANSI/EIA/TIA-455-51 or 30.
    e. Have measurements performed at 23 degrees C +/- 5 degrees.
    f. Have Maximum attenuation dB/Km @ 850/1300 nm: 3.5/1.0
    g. Have bandwidth $\geq$ 4700 MHz-km @ 850nm. (EMB)
    h. Have bandwidth $\geq$ 500 MHz-km @ 1300nm.
    i. Be laser optimized and guarantee a 1 Gb/s distance of 1000 meters @ 850nm and 10 Gb/s at 600 meters @ 850nm.
    j. Terminate on fiber patch panel using SC Type fiber connectors.

3. Each indoor/outdoor fiber optic cable shall:

    a. Be suitable for use in both outdoor and indoor applications without the use of a transition at the building entrance.
    b. Be suitable for use in risers, plenums and horizontal applications.
    c. Have a dry water blocking system for cable.
    d. Have a fiber strand count of 12 (unless shown otherwise on plans).
    e. Have a nominal 2.21 mm sub-unit diameter.
    f. Have and be marked with an UL-OFNP Flame Rating (unless engineer specified otherwise on plans).
    g. Comply with Bellcore GR-409 and GR20
    h. Be independently verified to comply with ICEA S-104-696
    i. Have strength members of FGE/Aramid yarn.
    j. Be suitable for underground or above ground conduits.
    k. (Where applicable) Have Tight Buffered fibers color coded in accordance with EIA / TIA 598 with an overall black jacket.
    l. Be suitable for operation between -40° to +70° C

m. Be UV resistant
n. Be of an all dielectric design

4. Shall be manufactured by Berk-Tek, Corning, General Cable or Superior Essex.

2.2 PATCH CORDS:

A. The structured cabling contractor shall provide factory terminated and tested optical fiber patch cords and equipment cords for the complete cabling system. Patch cords shall be provided by the structured cabling contractor to connect patch panels to owner furnished electronics. Provide one set of optical fiber patch cables per fiber run that terminates on fiber patch panel.

B. Fiber Optic patch cords shall:

1. Be furnished in the quantity of two (2) per IDF in each IDF and two (2) per IDF in each MDF.
2. Be manufactured by Panduit, Amp or Systimax.
3. Be multimode OM4 type.
4. Have connector type as directed by owner.
5. Have a performance marking indelibly labeled on the jacket (by the manufacturer).
6. Have the ability to accept color-coded labels and icons to comply with ANSI/TIA/EIA-606-A labeling specifications.
7. Be available in three standard colors
8. Be available in 3 foot, 5 foot, 7 foot, 10 foot, and 14 foot standard lengths

PART 3 - EXECUTION

3.1 PRE-INSTALLATION SITE SURVEY:

A. Prior to start of work, meet at the project site with the owner's representative and representatives of trades performing related work to coordinate efforts. Review areas of potential interference and resolve conflicts before proceeding with the work. Facilitation with the General Contractor will be necessary to plan the crucial schedule completions of the equipment rooms and telecommunication closets.

B. Examine areas and conditions under which the system is to be installed. Do not proceed with work until satisfactory conditions have been achieved.

3.2 OPTICAL FIBER TERMINATION HARDWARE:

A. Fiber slack shall be neatly coiled within the fiber splice tray or enclosure. No slack loops shall be allowed external to the fiber panel.

B. Each cable shall be individually attached to the respective splice enclosure by mechanical means. The cables strength member shall be securely attached the cable strain relief bracket in the enclosure.

C. Each fiber bundle shall be stripped upon entering the splice tray and the individual fibers routed in the splice tray.

D. Each cable shall be clearly labeled at the entrance to the splice enclosure. Cables labeled within the bundle shall not be acceptable.

E. A maximum of 12 strands of fiber shall be spliced in each tray

F. All spare strands shall be installed into spare splice trays.

3.3 BACKBONE CABLE INSTALLATION:

A. Raceways:

1. All backbone cables shall be installed inside innerducts (see specification above) within conduits meeting specification requirements unless specifically noted otherwise.
2. Backbone cables shall be installed separately (in separate innerducts/conduits) from horizontal distribution cables.
3. A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in any conduit.

3.4 IDENTIFICATION AND LABELING:

A. The contractor shall develop and submit for approval a labeling system for the cable installation. The Owner will negotiate an appropriate labeling scheme with the successful structured cabling contractor. At a minimum, the labeling system shall clearly identify all components of the system: racks, cables, panels and outlets. The labeling system shall designate the cables origin and destination and a unique identifier for the cable within the system. Racks and patch panels shall be labeled to identify the location within the cable system infrastructure. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme. Labeling shall follow the guidelines of ANSI/TIA/EIA-606-A.

B. All label printing will be machine generated by Panduit software (or other) using indelible ink ribbons or cartridges. Self-laminating labels will be used on cable jackets, appropriately sized to the OD of the cable, and placed within view at the termination point on each end. Outlet, patch panel and wiring block labels shall be installed on, or in, the space provided on the device.

3.5 TESTING AND ACCEPTANCE:

A. General

1. All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA/EIA-568-B. All pairs of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.

2. All cables shall be tested in accordance with this document, the ANSI/TIA/EIA standards, the Panduit Certification Program Information Manual and best industry practice. If any of these are in conflict, the Contractor shall bring any discrepancies to the attention of the project team for clarification and resolution.

B. Fiber Testing

1. All fiber testing shall be performed on all fibers in the completed end to end system. There shall be no splices unless clearly defined in an RFP. Testing shall consist of an end to end power meter test performed per EIA/TIA-455-53A. The system loss measurements shall be provided at 850 and/or 1300 nanometers for multimode fibers and 1310 and/or 1550 nanometers for single mode fibers. These tests also include continuity checking of each fiber.
2. Backbone multimode fiber cabling shall be tested at both 850 nm and 1300 nm (or 1310 and 1550 nm for singlemode) in both directions.
3. Test set-up and performance shall be conducted in accordance with ANSI/EIA/TIA-526-14 Standard, Method B.
4. Where links are combined to complete a circuit between devices, the structured cabling contractor shall test each link from end to end to ensure the performance of the system. ONLY LINK TEST IS REQUIRED. The structured cabling contractor can optionally install patch cords to complete the circuit and then test the entire channel. The test method shall be the same used for the test described above. The values for calculating loss shall be those defined in the ANSI/TIA/EIA Standard.
5. Attenuation testing shall be performed with an approved hand held tester from an industry recognized test equipment manufacturer.

3.6 SYSTEM DOCUMENTATION:

A. Upon completion of the installation, the structured cabling contractor shall provide three (3) full documentation sets to the owners for approval. Documentation shall include the items detailed in the sub-sections below.

B. Documentation shall be submitted within ten (10) working days of the completion of each testing phase (e.g. subsystem, cable type, area, floor, etc.). This is inclusive of all test result and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall be submitted within 30 working days of the completion of each testing phase. At the request of the Engineer, the structured cabling contractor shall provide copies of the original test results.

C. The Engineer may request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the structured cabling contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re-test shall be at no additional cost to the Owner.

3.7 TEST RESULTS:

A. Test documentation shall be provided on disk within three weeks after the completion of the project. The disk shall be clearly marked on the outside front cover with the words “Project

Test Documentation", the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.

B. The field test equipment shall meet the requirements of ANSI/TIA/EIA-568-A/B including applicable TSB's and amendments.

C. Test results generated for each cable by the wire (or fiber) test instrument shall be submitted as part of the documentation package. The structured cabling contractor must furnish this information in electronic form.

D. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

3.8 WARRANTY:

A. The manufacturer shall provide a 25 year extended product warranty with a 25 year applications assurance warranty. Manufacturer shall provide the warranty directly to the end user.

B. An Extended Product Warranty shall be provided which warrants functionality of all components used in the system for 25 years from the date of registration. The Extended Product Warranty shall warrant the installed horizontal copper and the backbone optical fiber portions of the cabling system.

C. The Application Assurance Warranty shall cover the failure of the wiring system to support current or future applications that are designed for the link/channel specifications of ANSI/TIA/EIA–568-B.1. These applications include, but are not limited to, 10BASE-T, 100BASE-T, 1000BASE-T, and 155 Mb/s ATM.

D. The contractor shall provide a warranty on the physical installation.

3.9 FINAL ACCEPTANCE & SYSTEM CERTIFICATION:

A. Completion of the installation, in-progress and final inspections, receipt of the test and as-built documentation, and successful performance of the cabling system for a two week period will constitute acceptance of the system. Upon successful completion of the installation and subsequent inspection, the end user shall be provided with a numbered certificate, from the manufacturer, registering the installation.

END OF SECTION 27 10 00

SECTION 40 05 19 - DUCTILE IRON PROCESS PIPE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Ductile-iron pipe and fittings.
2. Accessories.

B. Related Requirements:

1. Section 09 96 00 – High-Performance Coating

1.2 REFERENCE STANDARDS

A. American Water Works Association:

1. AWWA C104/A21.4 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
2. AWWA C110/A21.10 - Ductile-Iron and Gray-Iron Fittings.
3. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
4. AWWA C150/A21.50 - Thickness Design of Ductile-Iron Pipe.
5. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast.
6. AWWA C153/A21.53 - Ductile-Iron Compact Fittings.
7. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.

B. ASME International:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
2. ASME B31.3 - Process Piping.

C. ASTM International:

1. ASTM A48 - Standard Specification for Gray Iron Castings.

D. SSPC - The Society for Protective Coatings:

1. SSPC SP 6/NACE No. 3 - Commercial Blast Cleaning.

PART 2 - PRODUCTS

2.1 DUCTILE-IRON PIPE AND FITTINGS

A. Manufacturers:

1. US Pipe.
2. American.
3. Or Approved Equal.

B. Piping:

1. Comply with AWWA C151.
2. Diameter and Class: As indicated below (unless noted otherwise in Piping Schedule):

Pipe Size (in)	Pressure Class
12” and Smaller	350
14” – 24”	250
30” and Larger	150

C. Joints:

1. Pressure Rating: Same as that of connected piping.
2. Mechanical:

    a. Comply with AWWA C110 and AWWA C111.
    b. Glands: Ductile iron with asphaltic coating.
    c. Use Tee-head or non-hex head bolts and head nuts for joint makeup and gasket seating. Bolts & Nuts shall be carbon steel coated with corrosion inhibiting fluoropolymer composite material.
    d. Mechanical joint fittings hall be furnished with sufficient quantities of accessories as required for each joint.
    e. All mechanical joints shall be restrained.

3. Push On: Comply with AWWA C111.
4. Flanged: Comply with AWWA C115 with gaskets and bolts conforming to AWWA C115, Appendix A.
5. Gaskets for mechanical and push-on type joints shall conform to ANSI A21.11 and AWWA C111, Gaskets shall be SBR, neoprene, or EPDM.
6. Gaskets for flange joints shall conform to ANSI A21.15 and AWWA C115. Gaskets shall be neoprene or EPDM.
7. Gaskets for joints above 250 psi shall be Toruseal gaskets as manufactured by American specially designed for a working pressure of 350 psi.

D. Fittings:

1. Comply with AWWA C153, ductile iron.
2. Pressure Rating, Pipes 12 Inches and Smaller: 250 psig.

2.2 FINISHES

A. Interior Coating as shown in the Piping Schedule shall conform to the following:

1. Cement-mortar lining, AWWA C104; standard thickness.
2. Gas piping shall be glass lined.

B. Outside Coating:

1. Buried: Asphaltic; 1-mil thick, minimum, in accordance with AWWA C151 / ANSO A21.51.
2. Exposed: As specified in Section 09 96 00 - High-Performance Coatings.

2.3 ACCESSORIES

A. Dielectric Fittings: Provide between dissimilar metals.

B. Pipe Identification Labels

1. Identification for Process Piping: As specified in Section 40 05 53 - Identification for Process Piping.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Exposed Service: Install pipe as specified in:

1. Install according to ASME B31.3.
2. Fittings:

a. Clean gasket seats thoroughly and wipe gaskets clean prior to installation.
b. Install fittings according to manufacturer instructions.
c. Tighten bolts progressively, drawing up bolts on opposite sides until bolts are uniformly tight; use torque wrench to tighten bolts to manufacturer recommendations.

3. Provide required upstream and downstream clearances from devices as indicated.

B. Tap ductile-iron piping only with service saddle, tapping boss of a fitting or valve body, or equipment casting.

C. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or other means acceptable to the Engineer.

D. The cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe or lining so as to leave a smooth end at right angles to the axis of the pipe.

E. Where pipe is laid on a grade of ten (10) percent or greater, the laying shall start at the bottom and shall proceed upward with the bell ends of the pipe upgrade.

3.2 JOINING OF PIPE

A. Flanged Joints

1. Flanges conforming to AWWA C110 can be joined with Class 125 B16.1 flanges shown in ANSI B16.1 but not with Class 250 B16.1 flanges.
2. Flange joints should be fitted so that the contact faces bear uniformly on the gasket. The joint should be made with relatively uniform bolt stress.
3. Set flange bolts beyond finger tightness with an indicating torque wrench to insure equal tension in all bolts. Tighten bolts such that those 180 degrees apart or directly opposite are torqued in sequence.

3.3 PLACEMENT OF FITTINGS

1. Pipeline fittings, plugs, and caps shall be furnished and installed of the type indicated and at the location shown on the Drawings or as directed by the Engineer. It shall be the responsibility of the Contractor to furnish and install all proper size pipe bends for both horizontal and vertical deflections that are required to construct the pipeline to the line and grade as shown on the construction drawings or as set by the Engineer.

3.4 FIELD QUALITY CONTROL

A. Inspection:

1. Inspect for damage to pipe lining or coating and for other defects that may be detrimental as determined by Engineer.
2. Repair damaged piping or provide new, undamaged pipe.
3. After installation, inspect for proper supports and interferences.

END OF SECTION 40 05 19

SECTION 40 05 53 - IDENTIFICATION FOR PROCESS PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Nameplates.
2. Tags.
3. Stencils.
4. Pipe markers.
5. Labels.
6. Lockout devices.

1.2 REFERENCE STANDARDS

A. American Society of Mechanical Engineers:

1. ASME A13.1 - Scheme for the Identification of Piping Systems.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's catalog literature for each product required.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Tools: Furnish special tools and other devices required for Owner to reinstall tags.

1.5 QUALITY ASSURANCE

A. Conform to ASME A13.1 for color scheme for identification of piping systems and accessories.

1.6 QUALIFICATIONS

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

PART 2 - PRODUCTS

2.1 TAGS

A. Plastic Tags:

1. Manufacturers:

a. Brady ID
b. Craftmark Pipe Markers
c. Kolbi Pipe Marker Co.
d. Seton Identification Products
e. Or Approved Equal

2. Description:

a. Laminated three-layer plastic with engraved black letters on light, contrasting background color.
b. Minimum Tag Size and Configuration: 1-1/2 inches; diameter or square.

B. Metal Tags:

1. Manufacturers:

a. Brady ID
b. Craftmark Pipe Markers
c. Kolbi Pipe Marker Co.
d. Seton Identification Products
e. Or Approved Equal

2. Description:

a. Aluminum or Stainless-steel construction; stamped letters.
b. Minimum Tag Size and Configuration: 1-1/2 inches; diameter or square with finished edges.

C. Information Tags:

1. Manufacturers:

a. Brady ID
b. Craftmark Pipe Markers
c. Kolbi Pipe Marker Co.
d. Seton Identification Products
e. Or Approved Equal

2. Description:

a. Clear plastic with printed DANGER, CAUTION, WARNING, and message.
b. Minimum Tag Size: 3-1/4 by 5-5/8 inch.

c. Furnish grommet and self-locking nylon ties.

3. Tag Chart: Typewritten, letter-size list of applied tags and location, in anodized aluminum frame.

2.2 STENCILS

A. Manufacturers:

a. Kolbi Pipe Marker Co.
b. Seton Identification Products
c. Or Approved Equal

B. Description:

1. Clean-cut symbols.
2. Letters:

a. Up to 2-inch Outside Diameter of Insulation or Pipe: 1/2-inch-high letters.
b. 2-1/2- to 6-inch Outside Diameter of Insulation or Pipe: 1-inch-high letters.
c. Over 6-inch Outside Diameter of Insulation or Pipe: 1-3/4-inch-high letters

C. Stencil Paint: As specified in 09 96 00 - High-Performance Coatings; semigloss enamel.

D. Color-Coding and Lettering Size: Conform to ASME A13.1.

2.3 PIPE MARKERS

A. Color-Coding and Lettering Size: Conform to ASME A13.1.

B. Plastic Pipe Markers:

1. Manufacturers:

a. Brady ID
b. Craftmark Pipe Markers
c. Seton Identification Products
d. Or Approved Equal

2. Description:

a. Factory-fabricated, flexible, semirigid plastic.
b. Preformed to fit around pipe or pipe covering.
c. Larger sizes may have maximum sheet size with spring fastener.

C. Plastic Tape Pipe Markers:

1. Manufacturers:

a. Brady ID

b. Craftmark Pipe Markers
c. Kolbi Pipe Marker Co.
d. Seton Identification Products
e. Or Approved Equal

2. Description: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.

2.4 LABELS

A. Manufacturers:

1. Brady ID
2. Seton Identification Products
3. Or Approved Equal

B. Description:

1. Aluminum or Laminated Mylar construction.
2. Minimum Size: 1.9 by 0.75 inches.
3. Adhesive backed, with printed identification and bar code.

2.5 LOCKOUT DEVICES

PART 3 - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install identifying devices after completion of coverings and painting.

B. Install plastic nameplates with corrosion-resistant mechanical fasteners or adhesive.

C. Labels:

1. Install labels with sufficient adhesive for permanent adhesion and seal with clear lacquer.
2. For unfinished covering, apply paint primer before applying labels.

D. Piping:

1. Identify piping, concealed or exposed, with plastic pipe markers, plastic tape pipe markers and/or stenciled painting.
2. Identify service and flow direction
3. Install in clear view and align with axis of piping.

4. Locate identification not to exceed 20 feet on straight runs, including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION 40 05 53

Section 27b - SECTION 46 83 25 – FIXED DIGESTER COVER AND MIXER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fixed digester cover

    a. Contractor shall remove the fixed cover for Primary Digester #1 and install a new fixed cover.

2. Digester Cover Accessories
3. Plunger style mixer

    a. Contractor shall furnish, install, adjust, and test one (1) plunger mixer for installation on fixed cover. The mixer shall be supported from the digester cover and shall be capable of completely mixing sludge within the tank.

B. This Section and the Drawings direct attention to certain required features of the equipment but do not purport to cover all details entering into its design. Nevertheless, furnish and install the equipment complete in all details and ready for operation.

C. Related Requirements:

1. Section 09 96 00 – High Performance Coatings for coating of all ferrous materials furnished under this section.
2. Division 26 – Electrical
3. Section 40 05 19 – Ductile Iron Process Piping

1.2 SUBMITTALS

A. Shop drawings showing general equipment arrangement, welding details, anchor details, dimensions, and materials.

1. The equipment manufacturer's shop drawing shall clearly show complete information regarding location, type, size and length of all field welds in accordance with AWS A2.7 “Standard Symbols for Welding, Brazing, and Nondestructive Examination”. Special conditions shall be fully explained by notes and/or details.

B. Submit shop drawings, design data, and structural calculations by a professional engineer licensed to practice in the state of Alabama.

1. Show overall assembly, plan and sections, showing dimensions, layout, anchor bolt locations, and location of appurtenances.
2. Show details of all appurtenances, including sampling hatches, pipe penetrations, pipe supports, and manways.

C. Manufacturer's delivery, storage and handling requirements, installation requirements and recommendations.

D. In the event that it is impossible to conform to certain details of the specifications because of different manufacturing techniques, describe completely all nonconforming aspects.

E. Contractor shall submit a written statement indicating that field measurements of the existing tank is performed and that the actual field conditions have been coordinated with the cover manufacturer.

F. Cover manufacturer shall provide written documentation in the shop drawing that the proposed cover is suitable for the proposed annular seal materials.

G. Mixer

1. Shop drawings showing general equipment arrangement, design data, support details, and detailed erection drawings of the mixer and its attachment to the cover.
2. Computational Fluid Dynamics (CFD) mixing analysis for the specific configuration of the tank where the mixer will be installed.
3. List of at least ten (10) linear mixer installations, operating for a minimum of 5 years, in tanks of the same or greater size than the one in this project. Contact information for the facilities shall be included.
4. Manufacturer's delivery, storage and handling requirements, installation requirements and recommendations.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Manuals

B. Manufacturer's certification that the equipment was installed in accordance with the manufacturer's instructions, inspected by the manufacturer, serviced as defined in the O&M manual, and equipped with applicable safety equipment.

1.4 QUALIFICATIONS

A. The Equipment shall be designed, constructed and installed in accordance with the best practices of the trade, and shall operate satisfactorily when installed as shown on the drawings.

B. The Manufacturer shall have demonstrated ability to design and manufacture covers of this diameter and pressure conforming to these specifications. The Manufacturer shall provide a history of being regularly engaged in the design, manufacture, project management, execution, shipment, field inspection and startup services of arched, radial beam shell membrane design covers as defined in this specification.

1. The cover Manufacturer shall have designed and furnished not less than thirty (30) steel fixed covers of the same specified size of greater.

1.5 QUALITY ASSURANCE

A. The cover shall all be fabricated of structural steel, conforming to the requirements of "Standard Specifications for Steel for Bridges and Buildings" ASTM A-36.

B. All welding, both shop and field, shall be shielded arc welding and shall conform to the latest edition of the American Welding Society (AWS) D1.1 "Structural Welding Code - Steel" for gastight welding.

C. The Contractor's welding procedures, welders, and welding operators shall be qualified and certified in accordance with the requirements of American Welding Society (AWS) D1.1 "Structural Welding Code - Steel". The Contractor shall perform all field welding in conformance with information shown on the Equipment Manufacturer's drawings regarding location, type, size and length of all welds in accordance with the latest edition of AWS A2.7 “Standard Symbols for Welding, Brazing, and Nondestructive Examination” and special conditions as shown by notes and details.

1. Field weld inspection shall be per AWS and with AWS CWI inspectors.

D. All shop and field coating shall be per SSPC standards and codes.

E. The mixer wetted parts shall be either epoxy-painted mild steel or stainless steel, conforming to the requirements of "Standard Specifications for Steel for Bridges and Buildings".

1.6 PROJECT/SITE REQUIREMENTS

A. Contractor shall consult the Engineer and Owner for proper staging of necessary equipment for the demolition and installation of equipment that is not detailed on the Drawings.

B. The cover will be installed on an existing concrete tank. The tank wall roundness and plumbness is not known. The cover manufacturer and Contractor shall coordinate and make the appropriate measurements and/or survey to ensure the cover is fabricated to match actual field conditions.

1.7 WARRANTY

A. The cover and mixer manufacturer shall provide a two (2) year warranty against factory defects. The warranty must be submitted during the shop drawing phase. Approval of the shop drawings will be contingent on the receipt of the warranty. If any part of the equipment should fail during the warranty period, it shall be replaced at no expense to the Owner.

PART 2 - PRODUCTS

2.1 FIXED COVER

A. Manufacturers:

1. Ovivo

B. Description:

1. The cover shall be of the fixed, dome type utilizing radial arched ribs with a peripheral thrust ring and center ring to form the basic structural element.

C. General:

1. The fixed cover shall be of the arched radial beam dome type with ¼" minimum steel cover plates and shall conform to the drawings and shall be designed for the existing 80 ft diameter concrete digester tank.

    a. The Drawings depict a cover configuration that will satisfy performance and operational characteristics described and required by these Specifications. Alternative configurations will be considered if review of information submitted by the Contractor/Manufacturer confirms these objectives will be satisfied.

2. The cover shall provide a gastight seal over the tanks contents to maintain anaerobic conditions using a skirt plate attached to the cover rim and an annular seal between the tank wall and cover.
3. The cover shall have a dome radius of 1.5 times the tank diameter and be held in position by thrust and compression rings.
4. The entire surface of the cover shall be surfaced to perform as a walking surface. The cover and surfacing shall be such that no water accumulates on the cover and drainage is free flowing to the edge of the tanks.

D. Design Criteria:

1. Digester inside diameter: 80 ft
2. SWD: 22'-4"
3. Cone height: 9 ft
4. Maximum liquid level: 22.33 ft
5. Minimum liquid level: 17.83 ft
6. Gas operating pressure range: 3-1/2" w.c. to 8" w.c.
7. Gas testing pressure: 15" w.c.

E. Anchors and Fasteners

1. Cover shall be anchored to the top of the digester wall.
2. Vertical loads shall be taken by the tank walls, not the cover side skirts.
3. Provide anchoring assembly at each of the radial beams to restrain upward movement of cover and minimize friction loads on digester wall from steel expansion / contraction.

    a. Provide modified outrigger at the location of the decant box.

4. Provide Teflon and 304 stainless steel bearing pads as part of each anchoring assembly at all bearing points.
5. Design shall allow for lateral adjustment in field during erection.
6. All anchor bolts, including nuts and washers, shall be made of Type 316 stainless steel. The equipment manufacturer shall furnish all anchor bolts, nuts, and washers required for the equipment.
7. The anchoring assemblies shall be as shown in the manufacturer's drawings.

8. All structural fasteners, including nuts and washers shall be Type 316 stainless steel. Temporary fasteners used only for erection purposes shall be Type A307 steel. The equipment supplier shall furnish all fasteners required for the assembly of the equipment.

F. Side Skirt

1. Provide vertical side skirt located at a nominal distance of 2-3" (per manufacturer) from tank wall. The maximum allowed variation is 1" in either direction.
2. Extend side skirt a minimum of 6" below normal operating sludge level to trap gas.
3. Side skirt sections shall be designed with lifting lugs for use in field assembly located to provide lifting of the skirt sections in a level manner maintaining the skirt in the vertical plane.
4. Vertical skirt joints shall have shop welded back-up plates and temporary connection tabs used for convenience in field assembly.
5. Design horizontal shelf plate at bottom of side skirt to support annular sealant between side skirt and tank wall. Maximum clearance between the shelf plate and digester wall shall be 1/4". Shelf plate shall be adjusted to achieve allowable clearance if required.
6. The Contractor shall provide and install annular sealants and packing as detailed in the Drawings.

G. Cover Plates

1. Cover plates shall be minimum ¼" thick steel.
2. Cover plates shall be shop welded to each pair of arched radial beams to form a panel.
3. Closure plates shall be provided loose for field welding in between cover plate panels.
4. Each cover panel shall have temporary field assembly connection tabs to bolt panels to thrust ring sections and to center ring.
5. The cover shall be designed to be completely assembled with temporary tabs and bolts for ease in final field alignment and adjustments prior to field welding.
6. Tabs and bolts shall be removed after field welding.

H. Structural:

1. The cover shall be supported on the top of the tank wall and shall be designed to resolve horizontal thrust loads into a peripheral thrusting ring.
2. The cover shall be stable under all design load conditions, including localized static and dynamic loads. All structural members shall be designed to allow the cover to be self-supporting when resting in an empty tank on the corbels or on the tank wall with the maximum possible applied loading, as follows:

    a. Dead load: according to manufacturer's design
    b. Uniform live load: 40 psf
    c. Wind load shall be designed for hurricane prone areas.

        1) Wind speed: 168 mph (Ult., 3-sec. gust)
        2) Occupancy Category: III
        3) Wind exposure: B

    d. Concentrated live load: 4,500 lbs
    e. Vacuum load: -2 in. W.C.
    f. Internal design pressure (or relief pressure, whichever is greater): 16 in. W.C.

g. Mixer dynamic and static loads: As required

3. The entire weight of the cover and the specified loadings shall be carried by evenly spaced wall supports. The supports shall be designed to prevent any radial loads from being transmitted to the tank wall. The wall support brackets shall be designed to distribute the vertical loads evenly over each of the support bracket anchor bolts.
4. Maximum allowable stresses shall not exceed the limiting stresses as set forth in the AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings," latest edition, for structural steel with 36,000 psi yield point.

I. Materials:

1. The structural steel for arched radial beams shall conform to ASTM A36, A500, or A283, Grade C, with minimum thickness of ¼".
2. The steel cover plates, side skirts, manholes, gas dome, etc. materials shall be ¼" minimum thickness.

J. Welding

1. Shield arc welding conforming to standards of the American Welding Society.
2. Welding shall be performed by pre-qualified AWS certified welders.
3. Weld inspection shall be by AWS/C.W.I. per D1.1. of the AWS codes.
4. All interior seams and joints shall be welded.
5. Thrust ring, side skirt and lower rim angle splice joints: full penetration welds.
6. Cover plates shall be welded to the top of the erection beams. All internal joints and seams shall be continuously welded.

K. Cover Appurtenances and Penetrations

1. One (1) 8'-6" diameter gastight center compression ring and opening to accommodate the plunger mixer.
2. One (1) 6 in. flanged nozzle for gas safety equipment
3. One (1) 6 in. flanged nozzle for gas withdrawal pipe
4. Three (3) 8 in. diameter sludge influent pipes
5. Two (2) 8" nozzle for sample port

L. Anchor Bolts

1. All anchor bolts and structural fasteners shall be ⅝" minimum diameter.
2. Anchor bolt size shall be as recommended by manufacturer.
3. Anchor bolt material: Type 304 stainless steel.
4. Flange bolt material: Type 304 stainless steel.

2.2 DIGESTER COVER ACCESSORIES

A. Pressure/Vacuum Relief Valve and Flame Arrester

1. Pressure and vacuum relief valve with flame arrester shall have ANSI 150 FF flanged connections.

2. Relief valve and flame arrester shall be two independent items of equipment. Valve shall be field installed on the flame arrester by means of a bolted and gasketed flanged connection.
3. Valve pressure and vacuum ports shall be oversized to keep overpressure to a minimum.
4. Valve pallets and seat rings shall be replaceable and interchangeable. Pallets shall be dead weight loaded, and both center and side guided for stability. They shall incorporate replaceable "air cushion" Teflon seat inserts. HDPE protective screens shall be provided at the pressure and vacuum ports, located external of the pallets.
5. The valve body and cover shall be low copper cast aluminum. Seat rings, and pallet assemblies and guideposts shall be stainless steel.
6. Flame arrester net free area through the bank assembly shall be not less than three times the corresponding size standard pipe. Entire bank assembly shall slide easily out of the arrester housing to facilitate inspection and cleaning. Removing or replacing the bank assembly shall not require support for alignment, jackscrew for extending the housing, and shall not place a strain on the connecting piping. Bank frame shall be extensible and shall be filled with corrugated rectangular shaped bank sheets. Alternating flat and crimped ribbon is not an acceptable substitute. Flame arrester shall be self -draining.
7. Arrester housing construction shall be low copper cast aluminum. Bank assembly shall include a low copper aluminum frame and stainless steel bank sheets and hardware.
8. “All Weather” feature shall be provided to protect the valve in temperatures ranging from -250 F to +2000 F. “All Weather” feature shall include special anti-freeze coating applied to seat ring tip, pallet periphery and stem, and guide posts.
9. Allowable overpressure: 10%
10. Vacuum Setting: -2: WC
11. Allowable vacuum: 50% (10% minimum)
12. Pressure/Vacuum Relief Valve and Flame Arrester shall be Shand & Jurs Model 97570.

B. Safety Selector Valve

1. Provide a safety selector valve to allow switch-over between two Pressure/Vacuum Relief Valve and Flame Arresters.
2. The safety selector valve design shall prevent the possibility of leaving the digester unprotected at any time during the switch-over of the operating Pressure and Vacuum Relief (PVR) Valve and Flame Arrester Assembly.
3. A bright red indicator manufactured in stainless steel shall be included to provide positive indication of active pressure and vacuum relief and flame arrester. Provide means to accommodate a locking device to prevent unwanted access to either of the Pressure and Vacuum Relief (PVR) Valve and Flame Arrester Assembly.
4. Valve shall have built in seat equalization defined as the pressure being equalized across the seat during change over. There shall be no special tools required to operate the unit and must not require more than 80 ft-lb of force. Valves requiring greater than 80 ft-lb of force shall be supplied with explosion proof electric actuators.
5. The SSV shall have a pressure drop through the active device of no greater than 3% of the flow with the pressure relief valve fully open. Valve design shall have Cv values which are verified in an ASME certified flow test facility. Testing shall have been witnessed by an ASME observer and test reports shall be supplied as part of the submittal process. Cv shall, at a minimum, be as defined in the following tables:

2”	255
3”	612
4”	1061

6”	2713
8”	4512
10”	6930

6. The Safety Selector Valve shall come with threaded ports on both process sides. The threaded ports shall come with 1" manual hand valves constructed in stainless steel.
7. Safety selector valve shall be rated for a minimum pressure of 15 psig at 100 degrees F and shall be rated for a maximum temperature of 400 degrees F.
8. Material of construction: Body, Base: Aluminum; Rotor, Indicator Seat: 316 SS; Isolation Disk, Index Shaft, Retraction Bushing: 1704 stainless steel; Body/Base Nut and Process Connection Nut: SA 194-8M stainless steel; Body/Base Stud and Process Connection Stud: SA 193-B8M stainless steel; Soft Goods: Teflon.
9. The Pressure/Vacuum Relief Valve and Flame Arrester and Safety Selector Valve shall be provided with an easily removable 1” thick insulation jacket. The insulating jacket shall be constructed with a silicone impregnated woven glass cloth lining with a 1” thick, 6-lb density fiber glass insulating material. Through-cover quilting pins provide firm support for the insulation. The pins shall keep the insulation from shifting inside the liner and jacket for dimensional stability and uniform heat retention. The silicone lining has inside seams and folded closing seams with two parallel rows of stitching. The special made insulating jacket shall be attached to the unit with a combination of Velcro and cinch belts. The jacket must allow access to the flame arrester bank assembly during maintenance without removing the entire jacket.
10. Three way lubricated plug valves shall not be an acceptable substitute.
11. Safety Selector Valve shall be Shand & Jurs Model 97190.

C. Sampling Hatch

1. Sampling hatch shall be an 8 inch size flanged connections. It shall include inclined foot pedal to facilitate opening. Provide handwheel to ensure a positive seal with locking capability.
2. Material of construction: Aluminum with replaceable BUNA-N cover insert shall be provided for non-sparking operation.
3. Flange shall be drilled per ANSI 150 FF flanged dimensions.
4. Maximum working pressure shall be 3 psig (20.7 kPa).
5. Sampling hatch shall be Shand & Jurs Model 95021.

D. Roof Manhole Cover

1. Roof manhole cover shall have a 42 inch inside diameter and shall include a flanged base for mounting.
2. Provide a replaceable neoprene gasket to allow for non-sparking operation. The unit shall come with lifting handles, a self-locking foot pedal, open cover hatch and safety pin to prevent accidental closure of the cover. Material shall be aluminum.
3. The unit will come with stainless steel wing nuts, hinge pin and hardware.
4. Maximum test pressure 30” WC.
5. Manhole cover shall be Shand & Jurs Model 95220.

2.3 PLUNGER MIXER

A. Manufacturers:

1. Ovivo

B. Description:

1. The equipment provided shall include the hydro-disk, shaft, lubrication system, seal tube, mounting base, cam drive system, local control station, adapters, access platform, handrail, access ladder, fasteners, and accessories.
2. The mixer drive assembly shall be removable as a unit without varying the normal sludge level or gas pressure within the digesters.

C. Design Information

Number of Digester	One (1)
Cover Type	Steel
Tank Diameter	80 ft
Top of Tank Elevation	50.58 ft
Maximum Liquid Level Elevation	49.58 ft
Minimum Liquid Level Elevation	48.58 ft
Bottom of Wall Elevation	27.25 ft
Side Wall Height	23.33 ft
Cone Height	~9 ft
Volume	1,048,550 gal
Concentration	2-5%

1. The mixer assembly shall have the following characteristics

Maximum motor name plate rating	10 hp
Stroke length	16 in
Hydro-disk shape	Circular ring
Hydro-disk outer diameter	84 in
Hydro-disk inner diameter	56 in
Required cover opening diameter	8’-6”
Cycle time (Cycles per minute)	Approx. 30 cpm

D. Mixer Drive

1. The motor drive assembly shall consist of an explosion-proof, single-speed motor, and a helical bevel or planetary gearbox driving a cam-scotch-yoke mechanism that vertically moves the hydro-disk shaft. The mixing Hydro-disk and shaft shall be constructed of 304L Stainless steel.
2. The mixer drive enclosure shall include a hinged door complete with a window to allow access to the yoke mechanism.
3. The mixer shall be designed to create a vertical “up and down” motion of the hydro-disk producing a vertical axial flow in the center of the disk, in both up and down directions.
4. The hydro-disk shall be mounted at the end of the vertical drive shaft. The disk shall be a hollow circular ring (no exceptions allowed) and shall comply with the specified outer and inner diameters listed above. All other designs are not acceptable and shall be strictly enforced.

5. The motor for the mixer shall be designed, manufactured, and tested in accordance with the latest edition of NEMA MG 1. The motor shall conform to the following:

    a. Type: Single-speed, reversible, explosion-proof
    b. Area classification: Class I, Division 1, Group D
    c. Horsepower: 10
    d. Power: 460 V, 3 phase, 60 Hz
    e. Motor speed: 1800 rpm
    f. Min. motor efficiency at high speed: 88%

E. Liquid Seal System

1. The liquid seal shall be mounted to the mixer mounting plate to create a gas-tight connection during normal operating conditions of the digester (normal liquid level and operating pressure).

F. Mounting Plate

1. The mounting plate shall be designed to support the entire weight of the linear motion mixer and the seal system.
2. The mounting plate shall be designed to support and transfer all dynamic and dead loads imposed by the mixer to the cover.
3. The mixer manufacturer shall supply a structural fabricated steel mixer mounting plate designed to be attached to the cover opening. The mounting plate shall be provided with the necessary flange bolts and gaskets.

G. Ladder and Working Platform

1. The manufacturer shall furnish a working platform around the mixer. The platform shall include handrail and grating. Refer to the project drawings for additional details.
2. The manufacturer shall also provide an access ladder securely mounted to the platform.

H. Electrical

1. Local Control Panel

    a. The mixer shall be provided with a NEMA 7 local control panel equipped with the following at minimum:

        1) Hand/Off/Auto Switch
        2) Motor starter
        3) Integral disconnect

    b. The following instrumentation shall be provided and shall be transmittable to the plant SCADA system.

        1) Vibration sensor
        2) Motor temperature
        3) Motor current

c. Control panel shall have provisions for connecting a fiber optic cable for communication to the plant SCADA system.

I. Anchor Bolts

1. All flange bolts shall be made of 304 stainless steel with the exception of the high strength fasteners for the mixer which shall be in accordance with the manufacturer's recommendations.

J. Spare Parts

1. Furnish one (1) set of extra materials matching products installed for each set as described below:

a. Two (2) Slide Guide Rollers
b. One (1) Cam-Follower Assembly
c. One (1) Shaft-to-Yoke Connection Assembly

2. Spare parts shall be packaged for long term storage and labeled with the name and number of the equipment to which they belong.

2.4 FINISHES

A. Steel plates, structural shapes and fabricated assemblies shall be shipped unpainted, for field painting by others. After erection, welding, testing and final inspection of erection by manufacturer's representative, the cover shall be painted as directed in Section 09 96 00 of these specifications.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Fabricated assemblies shall be shipped in the largest sections permitted by carrier regulations and properly match-marked for ease of field erection.

B. Receive deliveries, handle, store, and protect equipment as recommended by manufacturer.

C. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the unit and equipment are ready for operation.

3.2 ASSEMBLY

A. Upon shipment to the site, the match-marked subassemblies shall be placed upon false work, carefully constructed to the cover's final dimensions, and joined into a single unit. Welding shall be in accordance with the previously specified standards. All major structural inspections shall be completed, and the cover will be capable of functioning as an integral structural unit prior to removing the false work supports.

B. At laps on the underside of the tank cover, such as between ceiling plates and lower beam web, and where gaps or cracks occur, specifically fabricated fill pieces of the same material and thickness as the cover plates shall be provided by the cover manufacturer and used to create a complete and contiguous surface, to ensure a complete and sealed coverage by the interior coating system. All fill pieces shall be completely seal welded in place.

3.3 INSTALLATION

A. According to manufacturer's instructions.

B. Fixed Cover

1. Prior to mounting, the Contractor shall inspect the concrete surface of the existing tank, and prepare the surface as recommended by the manufacturer. Re-inspect the surfaces after securing the cover in place to ensure surfaces are acceptable and make any repairs that may be necessary.
2. All pipe supports, cover penetrations or connections to the cover shall be completed prior to leak testing or application of coatings.

3.4 TESTING

A. Weld tests shall be conducted as soon as practical after completion of the welding.

B. The Contractor shall employ a third-party AWS certified welding inspector in accordance with AWS QCI with a minimum of 3 years' experience. All welded joints shall be visually inspected by the welding inspector, and repairs completed prior to startup testing. The Contractor shall coordinate the welding schedule with the Owner's onsite representative so weld inspections can be scheduled. Visual inspection shall be conducted once every two welding days and all defect identified by the welder shall be rectified the same day in the weld inspector's presence. Field weld testing shall be accordance with section 6, AWS D.1.1, latest edition with the minimum level of non-destructive testing as follows:

1. Visual inspection of 100% of welds for size, undercut, etc.
2. Magnetic particle and/or dye penetrant as required for all joints suspected having cracks in the weld.
3. All CJP (continuous joint penetration) joints shall be inspected as required by UBC and AWS. Radiograph or ultrasonic tests shall be required per AWS.

C. After assembly and field welding, test cover for gas tight construction.

1. Pressurize air to 15" water column.
2. Check all welded seams for leaks by applying soap suds solution. Welds shall be cleaned with wire brush before testing.
3. Any leaks shall be carefully chipped out to sound metal, marked and then re-welded, re-tested, and re-painted.
4. Contractor shall be responsible for supply of the test water and testing equipment.

D. Other test methods may also be considered such as dye penetrant or vacuum box procedures. Prior approval shall be received from Engineer before conducting such tests.

E. Visual inspection and moisture probes shall be used to locate leaks in the annular seal. Areas where leaks occur shall be repaired by installing more bottom fill layer material until the test is satisfactorily passed. No additional compensation will be given for bottom fill layer material required to repair leaks.

F. Plunger Mixer

1. The Contractor shall inspect the mixer after installation in accordance with the manufacturer's "Field Service Check List".
2. The Contractor, assisted by the manufacturer, shall field verify the following items as a minimum:

    a. Motor installed and appropriately mounted for operation
    b. Mixer motion speed
    c. Mixer crank direction
    d. Amperage measurements not exceeding nameplate rating
    e. Assembly bolts tightened properly
    f. Unit install properly and shaft is plumb

3. The Contractor shall correct any functional deficiencies. The Contractor shall provide all labor, water and other materials necessary to complete the field testing and verification. Completed inspection reports shall be submitted to the Engineer.

3.5 PIPE SUPPORTS

A. No cover penetrations shall be allowed for pipe and / or handrail supports.

3.6 DIGESTER COVER ACCESSORIES

A. Install digester cover accessories and gas safety equipment in accordance with manufacturer’s instructions.

3.7 FIELD QUALITY CONTROL

A. Furnish services of manufacturer's representative experienced in installation of products furnished under this Section for installation, inspection, field testing, and instructing Owner's personnel in maintenance of equipment.

B. Equipment Acceptance:

1. Adjust, repair, modify, or replace components failing to perform as specified, and rerun tests.
2. Make final adjustments to equipment under direction of manufacturer's representative.

C. Furnish installation certificate from equipment manufacturer's representative attesting equipment has been properly installed and is ready for startup and testing.

3.8 MANUFACTURER'S SERVICE

A. Fixed Cover

1. Manufacturer Services: Furnish services of manufacturer's representative experienced in installation of products furnished under this Section for not less than three (3) trip(s) on-Site for installation, inspection, field testing, and instructing Owner's personnel in maintenance of equipment.
2. Provide a manufacturer's service representative for inspection of completed installation. The manufacturer's service representative shall also perform start-up and operator training.

B. Plunger Mixer

1. Manufacturer's Services: Furnish services of a qualified manufacturer's representative experienced in installation of products furnished under this Section for not less than one (1) trip(s) of two (2) day(s) on-site for start-up, inspection, field testing, and instructing Owner's personnel in maintenance of equipment.
2. Provide a manufacturer's service representative for inspection of completed installation. The manufacturer's service representative shall also perform start-up and operator training.

END OF SECTION 43 12 51