

**PROJECT SPECIFICATIONS**

**DMVA PROJECT NO. 42250065**

**For**

**FTIG WASTEWATER TREATMENT PLANT  
SBR 1 AND DIGESTER 1 REHABILITATION**

**FORT INDIANTOWN GAP  
BUILDING 4-176  
ANNVILLE, LEBANON COUNTY, PENNSYLVANIA 17003**

**COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF MILITARY AND VETERANS' AFFAIRS  
HARRISBURG, PENNSYLVANIA**

**Josh Shapiro, GOVERNOR  
Major General Mark J. Shindler, ADJUTANT GENERAL**

**Date: 31 MARCH 2026**

**DESIGN PROFESSIONALS**

**Office of Facilities and Engineering  
Bureau of Design and Project Management  
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## DRAWING INDEX

The drawings which form a part of this project are indicated in the following list.

<u>NUMBER</u>	<u>DRAWING TITLE</u>
G.1.0	COVER SHEET
G.1.1	ABBREVIATIONS
C.1.0	EXISTING SITE PLAN
C.2.1	SBR AND DIGESTER PLAN
C.2.2	SBR AND DIGESTER SECTIONS
C.2.3	SBR AND DIGESTER DETAILS
C.3.1	SBR AND DIGESTER SLUDGE AND AERATION PIPING PLAN
C.3.2	SBR AND DIGESTER EQUIPMENT DETAILS
C.3.3	SBR AND DIGESTER EQUIPMENT DETAILS
C.3.4	TYPICAL DETAILS

The above is the list of drawings included under **DMVA Project No. 42250065** and shall be considered a part thereof.

As the work progresses, the Bureau of Design and Project Management may furnish supplemental drawings that may be required for further illustrating details of the work. However, these supplemental drawings will not include the shop drawings, all of which are to be prepared by the Contractor and submitted as hereinafter specified for approval before the work is started.

## TABLE OF CONTENTS

### GENERAL CONSTRUCTION (.1)

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE NO.</u>	
<u>DIVISION 01</u>	<u>GENERAL REQUIREMENTS</u>		
Section 010100	Summary of Work	010100-1	010100-3
Section 010400	Coordination and Control	010400-1	010400-4
Section 012000	Price and Payment Procedures	012000-1	012000-4
Section 013100	Sequence of Construction & Milestones	013100-1	013100-2
Section 013300	Submittals	013300-1	013300-2
Section 013300a	Submittals Schedule – AF Form 66		
Section 014000	Inspections	014000-1	014000-6
Section 016350	DMVA Supplemental Provisions	016350-1	016350-3
Section 017700	Closeout Procedures	017700-1	017700-4
Section 017823	Operation and Maintenance Data	017823-1	017823-7
Section 017839	Project Record Documents	017839-1	017839-3
<u>DIVISION 09</u>	<u>FINISHES</u>		
Section 099600	High Performance Coatings for Waste Treatment Tanks	092216-1	092216-6
<u>DIVISION 46</u>	<u>WATER AND WASTEWATER EQUIPMENT</u>		
Section 465353	Wastewater Treatment Equipment	465353-1	465353-20

**SECTION 010100**  
**SUMMARY OF WORK**

PART 1 – GENERAL

1.1 STIPULATIONS

- A. The specifications “General Conditions of the Construction Contract”, “Special Conditions” and “Division 1 – General Requirements” form a part of this Section by this reference thereto and shall have the same force and effect as if printed herewith in full.

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.

1.3 SCOPE OF WORK, GENERAL

- A. The work under this Contract shall generally consist of but is not limited to providing all labor, material, devices, tools and equipment required for the replacement of existing treatment equipment and application of protective coating system to concrete surfaces in SBR #1 and Digester #1 at the Fort Indiantown Gap Wastewater Treatment Plant. All Work shall be in accordance with the specifications and drawings and subject to the terms and conditions of all other Contract Documents.

1.4 PERFORMANCE PERIOD

- A. *Five hundred and twenty (520)* calendar days from Government granted Notice to Proceed.

1.5 WAGE RATES

- A. Prevailing Wage Rates ARE REQUIRED to be paid on this Project.

1.6 QUESTIONS DURING BID PROCESS.

- A. Direct all questions pertaining to the project as shown and described in the contract documents to all persons listed below:

- 1. DMVA Contracting Office Representative

- Ms. Tina Rebuck
    - DMVA Procurement and Contracting
    - Building 0-47, Fort Indiantown Gap
    - Annville, PA 17003
    - Ph.: 717.861.8794
    - Email: [trebuck@pa.gov](mailto:trebuck@pa.gov)

- 2. DMVA Project Manager

Mr. Mike Snesavage  
Bureau of Design and Project Management  
Building 0-10, Fort Indiantown Gap  
Annville, PA 17003  
Ph.: 717-861-9679  
Email: [c-msnesava@pa.gov](mailto:c-msnesava@pa.gov)

3. DMVA Technical Representative

Aaron Keirn, P.E.  
DMVA, Bureau of Design and Project Management  
Bldg. 0-10, Fort Indiantown Gap  
Annville, PA 17003  
Email: [aakeirn@pa.gov](mailto:aakeirn@pa.gov)  
Ph.: 717.821.5730

B. Should the contractor submit an RFI via email, the subject line shall appear as follows:

1. **DMVA Project#: 42250065 FTIG Wastewater Treatment Plant – SBR 1 and Digester 1 Rehabilitation**
2. Additional information can be included thereafter.

1.7 SUBMITTALS

A. See individual Sections and “SCHEDULE OF MATERIAL SUBMITTALS (AF FORM 66)” included within the project Design Documents

B. Submittals shall be emailed to:

Mr. Mike Snesavage ([c-msnesava@pa.gov](mailto:c-msnesava@pa.gov))

Cc: Ms. Tina Rebuck ([trebuck@pa.gov](mailto:trebuck@pa.gov)) and Mr. Aaron Keirn ([aakeirn@pa.gov](mailto:aakeirn@pa.gov))

C. Each submittal shall include the following:

1. Project number
2. Contract number
3. Related specification section
4. Contractor’s approval stamp
5. Contractors initials and date
6. Area for DMVA review stamp

D. All submittals must be approved by the discipline responsible, DMVA **Design Professional** prior to incorporation into the project.

1.8 REQUIRED WARRANTIES

A. Contractor shall provide all required warranties as outlined within the Project Design Specifications and on all included Government AF Form 66’s.

## PART 2 – OUTLINE OF REQUIRED WORK

2.1 The work of this project consists of but is not limited to the following. Detailed requirements of the work are described on the pertinent specification sections and/or shown on the drawings.

A. (.01 GENERAL CONTRACT)

1. Prepare and submit all necessary pre-construction documentation as outlined within the project Design Documents.
2. Prepare and submit for review and approval necessary engineering design drawings, shop drawings, and submittals for proposed equipment.
3. Outline individual construction tasks/milestones.
4. Selective demolition of existing wastewater treatment equipment in SBR #1 and Digester #1. Remove and store selected existing components as directed by DMVA staff.
5. Remove and dispose of accumulated sludge, grit, and debris in SBR #1 and Digester #1 in an approved manner at an approved landfill or other approved waste disposal facility.
6. Thorough cleaning and preparation of existing concrete surfaces, piping, etc. in accordance with coating system and equipment manufacturer's recommendations and requirements in SBR #1 and Digester #1.
7. Apply coating system in SBR #1 and Digester #1 in accordance with these specifications and the coating system manufacturer's instructions.
8. Installation of new equipment and related work in SBR #1 and Digester #1 in accordance with these specifications and the equipment manufacturer's and supplier's instructions.
9. Provide start-up training, adjustment, and commissioning of new equipment installed in SBR #1 and Digester #1.
10. Complete Punch Lists and Final Cleaning.
12. Provide all required closeout documentation and training per the Project Design Documents prior to deeming/granting the project complete.

**END OF SECTION 010100**

**SECTION 011200**  
**COORDINATION AND CONTROL**

PART 1 - GENERAL

1.1 STIPULATIONS

- A. The specifications “General Conditions of the Construction Contract”, “Special Conditions” and “Division 1 – General Requirements” form a part of this Section by this reference thereto and shall have the same force and effect as if printed herewith in full.

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.

1.3 SUMMARY

- A. Section includes a summary of each contract, including responsibilities for coordination and temporary facilities and controls that govern the performance of the work to complete this project.
- B. Specific requirements for work of each contract are also indicated in individual Specification Sections and on Drawings.

1.4 PRIME CONTRACTS FOR CONSTRUCTION

- A. .01 – General Construction

1.5 WORK HOURS

- A. Refer to General Conditions for more information.
- B. Regular work hours will be Monday through Friday, 7:00 am to 4:30 pm.
- C. Holidays: No work will be allowed on holidays observed by the State and Federal Government.
- D. Weekends: No work will be allowed on weekends.
- E. Exceptions: If deemed necessary, exceptions to the above can be made. Prime Contractors must submit, in writing, justification for such an exception and approval from the Department must be obtained prior to commencement of any work.
  - 1. Fort Indiantown Gap: Any and all work that takes place outside of the working hours as listed herein, shall be coordinated with the DMVA-FTIG Project Manager and Contracting Office. Contractor(s) performing work on approved dates shall submit, in writing, a list of all employees that will be on site for the days approved. This list of employees will be submitted to the Fort Indiantown Gap Police Dept. by the DMVA-FTIG Project Manager and Contracting Office.

## 1.6 COORDINATION

- A. The General Contractor shall be responsible for coordination between all contracts.
  - 1. Construction operations shall be coordinated to ensure efficient and orderly installation of each part of the work.
  - 2. Coordinate installation of different components with other Contractors to ensure accessibility for required construction operations.
  - 3. Make necessary provisions to accommodate items scheduled for later installation.

## PART 2 - TEMPORARY FACILITIES AND EQUIPMENT

### 2.1 GENERAL

- A. It shall be the responsibility of each Contractor to provide, maintain, and remove all facilities and equipment necessary for construction operations for individual Contracts.
  - 1. These items include, but are not limited to:
    - a. Costs and use charges associated with the facility.
    - b. Plug-in cords, power cords, and extension cords, power tools.
    - c. Task lighting and special lighting necessary for construction operations.
    - d. Storage and fabrication structures/areas.
    - e. Temporary enclosures for construction activities.
    - f. Hoisting equipment for construction activities.
    - g. Waste disposal facilities, including collection and legal disposal of its own waste materials.
    - h. Daily cleaning of work area.
    - i. Secure lockup of tools, materials, and equipment.
    - j. Construction aids, services, and facilities necessary for individual construction activities.

### 2.2 FIELD OFFICES

#### A. CONTRACTOR TRAILERS/OFFICES

- 1. The Prime Contractor(s) shall provide and maintain, at their cost, a suitable office on the premises. Trailer/offices shall be located based on either the staging area depicted on the Project Design Documents and/or the location determined during the Pre-Construction Coordination Meeting. The Contractor shall provide and maintain all necessary services and utilities for their respective offices and/or trailers, to include, but not limited to; electrical services, sanitary and water services, heating and cooling, telephone/fax and internet services.

#### B. SANITARY FACILITIES

1. Portable Toilets (Porta Johns) – Point 1 General Contractor (Lead), at their costs, shall be responsible for providing and maintaining any and all temporary toilet facilities. Toilets are to be utilized by all persons (Contractors, Sub-Contractors, DMVA Personnel, etc.) associated with the project.
  - a. Cleaning, Pumping and Maintenance of the portable toilets shall be the responsibility of the Point 1 General Contractor.

### PART 3 - TEMPORARY SERVICES/UTILITIES DURING CONSTRUCTION

#### 3.1 CONTRACTOR RESPONSIBILITIES

- A. The General Contractor shall be responsible for all temporary heating, cooling, ventilation, power, lighting and water/sewer. This shall include, unless otherwise indicated, utility-use charges, temporary meters, and temporary connections, necessary during construction operations.
- B. The designated Contractor shall install, operate, protect and maintain the respective temporary services as specified herein during the duration of the entire project.
- C. Temporary connections to new and/or existing permanent service lines shall be made at locations as directed by the Department, and when the temporary service lines are no longer required, they shall be removed by the Contractor. Any part or parts of the permanent service lines, grounds and building, disturbed and damaged by the installation and/or removal of the temporary service lines, shall be restored to their original condition by the Contractor responsible for the temporary installation.
- D. If the Contractor fails to carry out its responsibility in supplying temporary services as set forth in this contract it is responsible for such failure and the Department may take such action as it deems proper for the protection and conduct of the work and shall deduct the cost involved from the amount due the Contractor. Only those temporary utilities required for construction need to be extended to the work area(s).

#### 3.2 INTERRUPTION OF SERVICES

- A. Each Prime Contractor shall provide all needed equipment and material to complete planned work at the site prior to shutting down any system.
- B. No additional compensation or time will be given to the Contractor if work must be performed on State or National Holidays or on weekends or on overtime. See Paragraph 1.4 on 'Working Hours'.

#### 3.3 WELDING

- A. Any Contractor using electrical power for welding on the site shall use self-contained engine generating units.

#### 3.4 FIRE EXTINGUISHERS

- A. Each Contractor shall provide UL listed, NFPA approved fire extinguishers (ten (10) lb. minimum) at the construction site during operations, suitable for all types of fires in accordance with OSHA.

## PART 4 - RESTORATION AND REPAIRS

### 4.1 RESTORATION

- A. Restoration of areas affected by contract operations, shall be the responsibility of each individual Contractor for their location/area of operation, at no expense to the Department. Areas shall be restored to their pre-construction condition or better. Restoration includes cleaning, disposal of trash/waste/debris, restoration of grass surfaces with topsoil, seed and mulch, and similar Work.

### 4.2 REPAIRS

- A. Each individual Contractor shall be responsible for all repairs to work areas, to include repairs to both existing finishes and completed work.
- B. Individual Contractors will not be responsible for damages resulting from on-going work, neglect and/or carelessness of other contractors and/or their associated sub-contractors. Parties responsible for any damage, no matter the circumstances, will be required to repair all damage at no expense to the Department.

**END OF SECTION 011200**

## SECTION 01 20 00 - PRICE AND PAYMENT PROCEDURES

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Schedule of Values.
- B. Application for Payment.
- C. Unit prices.

#### 1.2 SCHEDULE OF VALUES

- A. Submit printed schedule on Contractor's Application for Payment.
- B. Submit Schedule of Values within 15 days after date of Notice to Proceed.
- C. Format: Use the unit and/or lump sum items and prices on the Bid Form to prepare the Schedule of Values.
- D. Revise schedule to list approved Change Orders with each Application for Payment.

#### 1.3 APPLICATION FOR PAYMENT

- A. Submit Application for Payment in accordance with General Conditions and DMVA Procurement and Contracting Administrative Procedures.
- B. Content and Format: Use Schedule of Values for listing items in Application for Payment.
- C. Submit updated bar chart style construction schedule with each Application for Payment.
- D. Payment Period: As directed by DMVA Procurement and Contracting.
- E. Substantiating Data: When Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:
  - 1. Affidavits and material invoices attesting to off-Site stored products.

#### 1.4 UNIT PRICES

- A. Authority: Measurement methods are delineated in this section.
- B. Take measurements and compute quantities. Engineer will verify measurements and quantities.
- C. Unit Quantities: Quantities and measurements indicated on Bid Form are for Contract purposes only. Actual quantities provided shall determine payment.

1. When actual Work requires more or fewer quantities than those quantities indicated, provide required quantities at contracted unit sum/prices.
- D. Payment Includes: Full compensation for required labor, products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application, or installation of item of the Work; overhead and profit.
- E. Final payment for Work governed by unit prices will be made on basis of actual measurements and quantities accepted by Engineer multiplied by unit sum/price for Work incorporated in or made necessary by the Work.

## 1.5 UNIT PRICE SCHEDULE

- A. General:
  1. The items on the Bid Form for this Contract will be measured and the payment made in accordance with this Section.
  2. All payments will be made at the unit prices for each item listed in the Bid Form.
  3. Any items not specifically listed on the Bid Form but are necessary to complete the Work will be considered incidental to the related items listed on the Bid Form.
- B. Pay Items and Measurement Methods: Pay items are listed in the order they appear on the Bid Form and unless stated otherwise, the numbers correspond to the Pay Item Numbers on the Bid Form.

### 1. GENERAL CONTRACT PROVISIONS

- a. This price and payment shall constitute full compensation for providing Bonds, insurance coverage and certificates, compliance with the General Conditions, Administrative Procedures, all Division I Specification Work and requirements except where specifically described and scheduled elsewhere, mobilization, demobilization, temporary facilities, all required permits and approvals / fees and costs / inspections / testing and documentation, and compliance with requirements of permits and approvals (not measured and paid for elsewhere) required for the project by the Contract Documents, as-built Drawings and close out documentation (not measured and paid for elsewhere).
- b. This item also includes costs to restore surfaces / facilities / areas of the project site disturbed during construction to their original or better condition.
- c. Unit of Measurement: Lump Sum. Payment for this item will be based on and made in proportion to the overall percentage of physical Work completed on the project.

### 2. LIQUID SLUDGE DISPOSAL – DIGESTER 1 AND 2

- a. This price and payment shall constitute full compensation for all items necessary to satisfactorily remove and dispose of liquid digested sludge from the Digester tanks at the beginning of the project and periodically (as needed) during the project as shown on the Drawings and specified herein including but not limited to scheduling and coordination with a municipal wastewater plant and sludge hauler for disposal, sampling and testing liquid sludge in accordance with PA DEP and disposal site requirements, loading liquid digested sludge using the existing piping and connection point at the wastewater plant, temporary piping/pumps and related equipment if needed to support tanker truck loading, hauling/transport, coordination with WWTP operating staff, and all other Work and items necessary (unless specifically measured and paid for elsewhere) to dispose of

the liquid digested sludge during the project.

- b. The Contractor shall remove and dispose of ALL liquid digested sludge from Digester 1. Provide temporary pumping, pipe/hoses, connections, and other items as needed to completely remove liquid sludge from the tank.
- c. WWTP operation staff will manage liquid sludge volume to extent possible by periodically decanting supernatant liquid and “thickening” the digested sludge to be hauled.
- d. Unit of Measurement: Gallon – Quantity shall be based on total volume in Gallons listed on manifests provided by the liquid sludge hauler.

### **3. SBR and DIGESTER GRIT REMOVAL AND DISPOSAL**

- a. This price and payment shall constitute full compensation for all items necessary to satisfactorily clean, remove, and dispose of sediment, grit, rags, debris, sludge, and any other solid and liquid materials from the SBR and Digester tanks as shown on the Drawings and specified herein including but not limited to collection and removal of materials from the tanks using mechanical and/or manual methods, dewatering of removed materials on site in an appropriate dewatering container, provision of pipe/fittings/connections/tanks to collect and hold water collected from dewatering tank(s), sampling and testing of liquid and solid materials to be disposed of in accordance with PA DEP and disposal facility requirements, hauling/transport and disposal of collected water and dewatered material at approved facilities, coordination with WWTP operating staff, and all other Work and items necessary (unless specifically measured and paid for elsewhere) to prepare the site and the tanks for the coating work and new equipment installation.
- b. DMVA will drain the SBR tank to approximately 1.5 feet (18 inches) of the bottom of the tank. The Contractor shall be responsible for removing and pumping the remaining standing wastewater in the SBR tank (not the accumulated grit and solids) back to the WWTP headworks in a controlled manner in coordination with WWTP operating staff. Payment for removing this water and any water that accumulates in the SBR AND Digester tanks during construction shall be included in the Lump Sum Pay Items 4 and 5.
- c. Concentrated wastewater from dewatering container(s) shall NOT be drained and returned directly to the WWTP headworks where it may potentially cause imbalances and upset the existing treatment process. All concentrated wastewater from the cleaning/dewatering operation shall be hauled off-site to an approved facility. Any water added to the tanks to facilitate removal of the grit and solids shall be collected and hauled off-site to an approved facility at no additional cost.
- d. The contractor shall anticipate a larger collection or “mound” of accumulated solids that typically settles in the corner of the SBR where the decant assembly and discharge piping is located.
- e. Unit of Measurement: Cubic Yard – Quantity shall be based on the “dewatered” volume of material in the dewatering container(s) before it is hauled off-site based on measurements and assessment by the DMVA Project Manager and Contractor. DMVA Project Manager and Contractor shall agree to and document the quantity measured and included on Applications for Payment.

### **4. SELECTIVE DEMOLITION – SBR 1**

- a. This price and payment shall constitute full compensation for all items necessary to satisfactorily disconnect and remove the existing treatment equipment, pipe/fittings, and

related items that are scheduled to be replaced in SBR 1 as shown on the Drawings and specified herein including but not limited to dewatering and cleaning the tank, disposal of waste materials resulting from tank dewatering / cleaning operations, protecting existing equipment / facilities / structures to remain, cleaning removed equipment that is to remain the property of DMVA, coordination with DMVA staff to store removed equipment on-site that is to remain the property of DMVA, disposal of removed items that will not remain the property of DMVA, maintaining tank dewatering operations as needed for the duration of the project, removal and storage or disposal of related valves / piping / fittings as required, temporary disconnection of equipment and reconnection as required, and all other Work and items necessary (unless specifically measured and paid for elsewhere) to prepare the site and SBR 1 for the tank coating work and new equipment installation.

b. Unit of Measurement: Lump Sum

**5. SELECTIVE DEMOLITION – DIGESTER 1**

a. This price and payment shall constitute full compensation for all items necessary to satisfactorily disconnect and remove the existing treatment equipment, pipe/fittings, and related items that is scheduled to be replaced in Digester 1 as shown on the Drawings and specified herein including but not limited to dewatering and cleaning the tank, disposal of waste materials resulting from tank dewatering / cleaning operations, protecting existing equipment / facilities / structures to remain, cleaning removed equipment that is to remain the property of DMVA, coordination with DMVA staff to store removed equipment on-site that is to remain the property of DMVA, disposal of removed items that will not remain the property of DMVA, maintaining tank dewatering operations as needed for the duration of the project, removal and storage or disposal of related valves / piping / fittings as required, temporary disconnection of equipment and reconnection as required, and all other Work and items necessary (unless specifically measured and paid for elsewhere) to prepare the site and Digester 1 tank for the tank coating work and new equipment installation.

b. Unit of Measurement: Lump Sum

**6. WASTE SLUDGE PIPING REPLACEMENT – SBR 1 AND DIGESTER 1**

a. This price and payment shall constitute full compensation for all items necessary to satisfactorily replace the waste sludge piping and related components scheduled to be replaced in SBR 1 and Digester 1 as shown on the Drawings and specified herein including but not limited to provision of all required pipe, fittings, hardware, valves, anchors, supports, sleeves, link-seals, adapters, connections to existing and proposed pipe and equipment, surface preparation and painting, heat trace wiring and connections, pipe insulation and encapsulation system, and all other Work and items necessary (unless specifically measured and paid for elsewhere) to replace and provide fully functional waste sludge piping in SBR 1 and Digester 1.

b. Unit of Measurement: Lump Sum

**7. COATING SYSTEM – SBR 1**

a. This price and payment shall constitute full compensation for all items necessary to satisfactorily furnish and install the coating system on the interior walls, floor, and piping in SBR 1 as shown on the Drawings and specified herein including but not limited to preparation of existing joints between precast concrete wall panels and between panels and floor including coordination with precast manufacturer and filling

/ treating joints as recommended by manufacturer, surface preparation and cleaning, disposal of waste materials, protection of existing facilities to remain, temporary removal and reinstallation of existing equipment and related items necessary to complete the work, application of coating system in accordance with the Drawings and Specifications and the coating system manufacturer's instructions, proper curing and testing of coating systems as required and recommended by the manufacturer; sealing all joints, terminations, anchors, penetrations, etc.; and all other Work and items necessary (unless specifically measured and paid for elsewhere) required to provide the Coating System for SBR 1.

- b. This item shall include full compensation for all work required for maintenance and protection of existing aeration piping OR removal / reinstallation of existing aeration piping; preparation and painting of aeration piping, raw wastewater influent piping and wastewater decant piping; and preparation / sealing of all pipe / conduit wall penetrations in accordance with the coating system manufacturer's instructions.
- c. This item shall include full compensation to remove and repair failing / loose grout in the wall-base keyway in accordance with the Drawings and Specifications and the coating system manufacturer's instructions.
- d. Unit of Measurement: Lump Sum.

#### **8. COATING SYSTEM – DIGESTER 1**

- a. This price and payment shall constitute full compensation for all items necessary to satisfactorily furnish and install the coating system on the interior walls and floor in Digester 1 as shown on the Drawings and specified herein including but not limited to preparation of existing joints between precast concrete wall panels and between panels and floor including coordination with precast manufacturer and filling / treating joints as recommended by manufacturer, surface preparation and cleaning, disposal of waste materials, protection of existing facilities to remain, temporary removal and reinstallation of existing equipment and related items necessary to complete the work, application of coating system in accordance with the Drawings and Specifications and the coating system manufacturer's instructions, proper curing and testing of coating systems as required and recommended by the manufacturer, and all other Work and items necessary (unless specifically measured and paid for elsewhere) required to provide the Coating System for Digester 1.
- b. This item shall include full compensation for all work required for maintenance and protection of existing aeration piping OR removal / reinstallation of existing aeration piping; preparation and painting of aeration piping and raw wastewater influent piping; and preparation / sealing of all pipe / conduit wall penetrations in accordance with the coating system manufacturer's instructions.
- c. This item shall include full compensation to remove and repair failing / loose grout in the wall-base keyway in accordance with the Drawings and Specifications and the coating system manufacturer's instructions.
- d. Unit of Measurement: Lump Sum.

#### **9. TREATMENT EQUIPMENT – SBR 1**

- a. This price and payment shall constitute full compensation for all items necessary to satisfactorily furnish and install treatment equipment and related items in SBR 1 as shown on the Drawings and specified herein including but not limited to review and verification of existing equipment and site conditions, coordination with equipment manufacturer, verification / coordination of dimensions and other information required

for new equipment, preparation and submission / review / revisions / resubmission of submittals and shop drawings, coordination with DMVA staff as required, furnish and install incidental items including anchors / restraints / supports / fittings, new equipment connections to existing boxes / disconnects, furnish and install new valves, furnish and install pumps, replace ductile iron influent pipe (Class 52, cement lined) and related supports / painting / connection to existing piping, testing / startup / adjustment of new equipment including manufacturer's on site representative, staff training, and all other Work and items (unless specifically measured and paid for elsewhere) required to provide the Treatment Equipment for SBR 1.

- b. Unit of Measurement: Lump Sum.

**10. TREATMENT EQUIPMENT – DIGESTER 1**

- a. This price and payment shall constitute full compensation for all items necessary to satisfactorily furnish and install treatment equipment and related items in Digester 1 as shown on the Drawings and specified herein including but not limited to review and verification of existing equipment and site conditions, coordination with equipment manufacturer, verification / coordination of dimensions and other information required for new equipment, submittals and shop drawings, review / revisions / resubmission of submittals and shop drawings, coordination with DMVA staff as required, furnish and install incidental items including anchors / restraints / supports / fittings, new equipment connections to existing boxes / disconnects, furnish and install new valves, furnish and install pumps, testing / startup / adjustment of new equipment including manufacturer's on site representative, staff training, and all other Work and items (unless specifically measured and paid for elsewhere) required to provide the Treatment Equipment for Digester 1.
- b. Unit of Measurement: Lump Sum

**11. PLANT START-UP**

- a. This price and payment shall constitute full compensation for all items necessary to satisfactorily start-up the plant as shown on the Drawings and specified herein including but not limited to provision of up to 60,000 gallons of seed sludge (activated sludge) from a nearby municipal wastewater treatment facility, hauling/transport of seed sludge, pumps/pipe/hose/fittings/supports and related items necessary to get seed sludge into the SBR tank, coordination with DMVA staff as required, pumps/pipe/hose/fittings/supports to provide additional activated sludge (mixed liquor) from SBR 2 to SBR 1, and all other Work and items (unless specifically measured and paid for elsewhere) necessary to successfully start-up the treatment process in SBR 1.
- b. Unit of Measurement: Lump Sum

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

**SECTION 013100**  
**SEQUENCE OF CONSTRUCTION AND MILESTONES**

Part 1 GENERAL

1.1 STIPULATIONS

- A. The specifications “General Conditions of the Construction Contract”, “Special Conditions” and “Division 1 – General Requirements” form a part of this Section by this reference thereto and shall have the same force and effect as if printed herewith in full.

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.

1.3 GENERAL REQUIREMENTS

- A. Before beginning work, the Contractor will be required to prepare a schedule in consultation with the Department. The work must be carried out in full accordance with the schedule. The Contractor shall arrange without any unnecessary interference with the Institution’s operation.

1.4 CRITICAL MATERIALS AND EQUIPMENT

- A. The Contractor is cautioned that all necessary and required critical materials and equipment shall be ordered as quickly as possible, in order that the shipping will not delay the progress of the work or completion of the project.

1.5 CRITICAL ITEMS TO BE NOTED AS MILESTONES

- A. Refer to the General Conditions regarding construction progress Milestones to be established by the Lead Contractor.
- B. The Lead Contractor shall submit a construction schedule, for the total project, including all prime contractors critical path work items. The schedule shall be submitted at the pre-construction meeting. The schedule will be reviewed and approved by the Owner to confirm compliance with construction sequencing and Using Agency training schedule.

1. GENERAL CONSTRUCTION (.1)

a. Construction Sequencing

1) Submittals

- 2) Equipment / Long Lead Items Fabrication / Delivery Schedule
- 3) Mobilization
- 4) Tank Dewatering Operations (per tank)
- 5) Selective Equipment Removal / Demolition (per tank)
- 6) Tank Cleaning / Preparation (per tank)
- 7) Tank Coating Application (per tank)
- 8) New Equipment Installation (per tank)
- 9) Tank Filling / Place in Operation / Training / Field Services / Commissioning
- 10) Site Restoration
- 11) Final Cleaning, Puch List Items, Close-Out Documents

**END OF SECTION 013100**

**SECTION 013000**  
**SUBMITTALS**

Part 1 GENERAL

1.1 STIPULATIONS

- A. The specifications “General Conditions of the Construction Contract”, “Special Conditions” and “Division 1 – General Requirements” form a part of this Section by this reference thereto and shall have the same force and effect as if printed herewith in full.

1.2 RELATED DOCUMENTS

- A. Drawings and general provision of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 SUMMARY

- A. Included in this section of the specifications is a list of approvals required for all materials incorporated into the project. The Department reserves the right to require additional approvals if necessary. No material, equipment or supplies listed herein shall be incorporated into the work until the Contractor has obtained prior approval from the Department.
- B. Submittals required by each prime contract are indicated within AF Form 66 “Schedule of Material Submittals” attached to the end of Section 01300.

1.4 SUBMITTAL PROCEDURES

- A. Refer to ‘Submittals’ of the General Conditions.
- B. Comply with the following or resubmission will be required:
  - 1. Indicate contract number, specification section and building number (as shown on the drawings) on each item submitted.
  - 2. Signify approval by stamp, initialing and dating each item prior to submission to the Professional.
- C. Items requiring testing shall be forwarded directly to the approved laboratory. The Contractor shall pay all costs associated with testing.
- D. Expedite critical materials, equipment and shop drawings, and other required submissions.
- E. Incomplete submissions will be returned for resubmission.
- F. Use of substitutions for materials or details shown on the contract drawings or called for in these specifications require written approval from the Department. See General Conditions.

1.5 PRODUCT DATA

- A. Manufacturer's printed directions and manufacturer's standard specifications showing all dimensions, cuts, finishes, etc., as well as catalog cuts and ratings of all material will be required and shall be submitted in advance prior to application and/or installation.

#### 1.6 TESTS

- A. Refer to 'Tests' of the General Conditions.
- B. Submit required reports listing items tested, tests conducted and results obtained as specified.

#### 1.7 CERTIFICATIONS

- A. Submit required certifications in written form identifying authorized representative, manufacturer, systems designer and other required data as specified.

#### 1.8 WARRANTIES

- A. Refer to Specifications for required warranties. Copies of proposed warranties specified for products shall accompany the designated submittal of that product.

#### 1.9 OPERATION AND MAINTENANCE MANUALS

- A. Manual Format (Use 3-ring binder):
  - 1. Title page with the following information for each system covered:
    - a. Project Title and DMVA Contract Number (in capital letters)
    - b. Name of Company
    - c. Name of the individual to be called
    - d. Normal telephone numbers
    - e. Contractor's account number for project
  - 2. Index listing all sections of the Manual.
  - 3. Warranties for equipment furnished in contract. (Index tabbed)
  - 4. Complete system circuit diagrams, block diagrams, copies of all approved shop drawings, which shall clearly illustrate how all the components relate and how they are interconnected and a point wiring diagram.
  - 5. Reports, testing analysis.
  - 6. Operating instructions and maintenance instructions for all equipment and finish materials furnished.
- B. Electronic Format: Provide in PDF format.

#### 1.10 SUBMITTALS LIST

- A. See attached AF FORM 66 "Schedule of Material Submittals" organized by prime contract.

**END OF SECTION 013000**





**SECTION 014000**  
**QUALITY CONTROL REQUIREMENTS**

PART 1 - GENERAL

1.1 STIPULATIONS

- A. The specifications “General Conditions of the Construction Contract”, “Special Conditions” and “Division 1 – General Requirements” form a part of this Section by this reference thereto and shall have the same force and effect as if printed herewith in full.

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.

1.3 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and -control services required by the Department of Military and Veterans’ Affairs or authorities having jurisdiction are not limited by provisions of this Section.
  - 4. Specific test and inspection requirements are not specified in this Section.

1.4 DEFINITIONS

- A. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Government Design Professionals. All Quality Control Services shall be at the Contractor's cost, which shall be included proportionally in all items of payment or contained in any Base Bid or Unit Price on the Proposal.
- B. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- C. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

- D. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- E. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- F. Testing Agency: An entity engaged by the contractor to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- G. Government Required Inspections: All inspections deemed necessary per the DMVA Inspection Form, will require oversight and verification by DMVA-Bureau of Design and Project Management personnel.
- H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- I. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

#### 1.5 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to the Government Design Professional(s) for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to the Government Design Professional(s) for a decision before proceeding.

#### 1.6 TESTING SUBMITTALS

- A. Schedule of Tests: Testing submittals shall include the following:
  - 1. Specification Section number and title.
  - 2. Entity responsible for performing tests and inspections.
  - 3. Description of test and inspection.
  - 4. Identification of applicable standards.
  - 5. Identification of test and inspection methods.
  - 6. Number of tests and inspections required.
  - 7. Time schedule or time span for tests and inspections.
  - 8. Requirements for obtaining samples.
  - 9. Unique characteristics of each quality-control service.

## 1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within ten (10) days of Notice to Proceed, and not less than five (5) days prior to preconstruction conference. Submit in format acceptable to Government Design Professional. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
  - 1. Project quality-control manager may also serve as Project superintendent.
- C. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
  - 1. Contractor-performed tests including subcontractor-performed tests. Include required tests and inspections and Contractor-elected tests and inspections.
- D. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- E. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Government Design Professional and/or Project Manager has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

## 1.8 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, and telephone number of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.
  - 6. Description of the Work and test and inspection method.
  - 7. Identification of product and Specification Section.
  - 8. Complete test or inspection data.
  - 9. Test and inspection results and an interpretation of test results.
  - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  - 12. Name and signature of laboratory inspector.
  - 13. Recommendations on retesting and re-inspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
  - 1. Name, address, and telephone number of technical representatives making report.
  - 2. Statement on condition of substrates and their acceptability for installation of product.

3. Statement that products at Project site comply with requirements.
  4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  6. Statement whether conditions, products, and installation will affect warranty.
  7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
  2. Statement that equipment complies with requirements.
  3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  4. Statement whether conditions, products, and installation will affect warranty.
  5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Government's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

#### 1.9 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- F. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
1. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Government Design Professional, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

## 1.10 QUALITY CONTROL

- A. Government Responsibilities: Where quality-control services are indicated as Government's responsibility, the Government will engage qualified Government personnel and/or an independent testing agency to perform these services.
  - 1. Government will furnish Contractor with names, addresses, and telephone numbers of personnel or testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
- B. Contractor Responsibilities: All testing requirements outlined within the Project Design Documents and/or requested by the Government Project Representatives, are to be the Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
  - 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ same entity engaged by the Government, unless agreed to in writing by Government.
  - 2. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  - 3. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  - 4. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction work that failed to comply with the Contract Documents.
- F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

## 1.11 TESTS AND INSPECTION PROCEDURES

- A. Required Tests: Contractors shall refer to the Project Specifications for all testing requirements pertaining to individual aspects of the project.
- B. Notification of Inspections and Tests: Contractor shall notify the DMVA-BDPM Project Manager of a required or specified inspection and/or inform them of an upcoming test. Contractor shall refer to the DMVA Inspection Log for the required allowance of notification (in business days) for requesting inspections and/or observations of tests.

1. Notification of required inspections or tests shall not be less than 48 hours prior to the inspection and/or test. Weekends and Observed Government Holidays shall not be factored into notifications and are not considered as business days.
- C. Upon the completion of an inspection or test. The Government Design Professional or Project Manager will approve or dis-approve the work in question and sign and date the Inspection Log within forty-eight (48) hours of the test or inspection being completed.
- D. At no time shall any work of any type outlined within the DMVA Inspection Log be covered-up or concealed from view until all required inspections and/or tests have been conducted and the Department has approved it.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  1. Provide materials that comply with installation requirements specified in corresponding Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams, that show no visible signs of damage or repair.
- B. Protect construction exposed by or for quality-control service activities.
- C. In the event of work being deemed unacceptable due to poor workmanship, code violations, failure to meet design intent or following of the design documents, etc., corrective actions will be provided to the contractor along with a timeframe in which the contractor will have to complete the corrective actions. Communication to the contractor(s) regarding corrective actions will be in the form of meeting minute comments and/or formal (email or written) correspondence provided by the Government Contracting Office.
- D. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.
- E. Failure of the contractor to correct work of any type deemed to be unacceptable could result in the Government taking actions as outlined within the Project General Conditions.

**END OF SECTION 014000**

**SECTION 016350**  
**DEPARTMENT OF MILITARY & VETERANS AFFAIRS**  
**SUPPLEMENTAL PROVISIONS**

PART 1 – GENERAL

1.1 STIPULATIONS

- A. The specifications “General Conditions of the Construction Contract”, “Special Conditions” and “Division 1 – General Requirements” form a part of this Section by this reference thereto and shall have the same force and effect as if printed herewith in full.

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.

1.3 PERSONAL BEHAVIOR

- A. Contractors are responsible for informing their employees of the special restrictions on personal behavior and the procedures/potential penalties for violations.
- B. Identification tags or badges to be furnished by the Project Manager must be worn at all times while on facility property.
- C. Smoking is not permitted in any facility.

1.4 WORKING HOURS

- A. Refer to specification Section 011200 “Coordination & Control”, for working hours. Any extension outside of these hours must be accomplished in accordance with the General Conditions and with the consent of both the Department and Institution Manager.

1.5 VEHICLES

- A. Construction vehicles, as well as employees’ vehicles, will be parked in an area designated by the Project Manager and Department and locked at all times. If any vehicles are to be left overnight, the license number or numbers of vehicles must be reported to the Project Manager daily.

1.6 TOOLS

- A. Tools shall be kept in a secure (locked) area when not in use and inventoried daily to ensure complete and total accountability. While the tools are being used, they shall be kept in view or on person. Broken or non-usable tools are to be disposed of away from Institutional property.

1.7 FRATERNIZATION

- A. There shall be no fraternization or private relationships of Contractors' employees with residents and Institution Staff. This includes, but is not limited to, trading, bartering or receiving gifts, money, favors from the residents, or the residents' friends, relatives or representatives.

#### 1.8 ALCOHOL AND CONTROLLED SUBSTANCES

- A. Alcoholic beverages and controlled substances shall not be carried, stored, or consumed on Department property nor left in any vehicle.

#### 1.9 SECURITY REQUIREMENTS

##### A. General Personnel Register

1. Contractor shall be responsible for creating, updating and revising a typed list of all employees on site, along with a copy of each individual's photo identification. This information shall also include any and all sub-contractors. The list and copies of identification will be revised and updated as construction progresses. A copy of the list and copies of identification shall be provided to the DMVA Project Manager, listed in Section 010400-1.4. Contractors shall provide their initial list of employees to the Project Manager at the pre-construction conference. All future updates to the initial list, to include photo identifications should be delivered to the Project manager at least three (3) days prior to those individuals entering the project site.

##### B. Fort Indiantown Gap Access

1. Currently access to Fort Indiantown Gap (FTIG) is restricted. There is one gate (Main Gate) and access point for all contractors, delivery drivers, and vendors to enter Fort Indiantown Gap (FTIG) and it is located at the West end of FTIG. The Main Gate is located on SR934 directly after passing the National Cemetery, which can be accessed from Exit 85 on Interstate 81 (Exit 85B if traveling northbound). Delivery and contractor vehicles must utilize the "Truck Lanes" for access and an official state or federal photo identification will be required. All personnel entering the FTIG Main Gate will be required to stop at the Visitors Center to attain a background check using the FBI's National Crime Information Center Interstate Identification Index (NCIC-III) to obtain access. The visitor center is located with the Main Gate and will be open during business hours. Contractors requiring multi-day, multi-month, or yearlong access to complete projects or perform service work should enter the visitors center to get information about work crew access or acquiring extended access (AIE) badges.
2. Contractors coming to FTIG for a site visit or that will only be on site for a limited time will be required to stop at the visitor's center and obtain a 24 hour or short term pass.
3. All contractors, contractor personnel, delivery drivers, and subcontractors will need to know the purpose of their visit to FTIG and the building number they are visiting (if applicable) to obtain an access (AIE) badge or a 24 hour pass. It is the contractor's responsibility to ensure that subcontractors and delivery personnel have the information necessary to gain access to FTIG.
4. Once personnel have an AIE badge, they will not need to provide additional information regarding the reason for visit or worksite when entering the gate/truck lane. All contractors that receive an access (AIE) badge will not need to show additional ID at the gate/truck lane.
5. All contractor vehicles that include covered or closed beds, boxes, or compartments must proceed to the truck lane for inspection, this includes tractor trailers, work vans, delivery vans, box trucks, work trucks with multiple compartments, and pickup trucks with covered beds. If the truck lane is not open,

the trucks will be checked at the regular checkpoint lanes. If the vehicle is under 5 tons and the operator possesses a long term AIE badge the vehicle will not require inspection at this time.

6. This guidance is subject to change with changes in the Force Protection Condition (FPCON) or operational tempo or variables.

**END OF SECTION 016350**

**SECTION 017700**  
**CLOSEOUT PROCEDURES**

PART 1 - GENERAL

1.1 STIPULATIONS

- A. The specifications “General Conditions of the Construction Contract”, “Special Conditions” and “Division 1 – General Requirements” form a part of this Section by this reference thereto and shall have the same force and effect as if printed herewith in full.

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.

1.3 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Warranties.
3. Final cleaning.

- B. Related Sections include the following:

1. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
2. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
3. Divisions 2 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.4 SUBSTANTIAL COMPLETION (BENEFICAL OCCUPANCY)

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
3. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction, damage or settlement surveys, property surveys, and similar final record information.

4. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
  5. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  6. Complete startup testing of systems.
  7. Submit test/adjust/balance records.
  8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  9. Advise Owner of changeover in heat and other utilities.
  10. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
  11. Complete final cleaning requirements, including touchup painting.
  12. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Government Design Professional and Government Inspector will either proceed with inspection or notify Contractor of unfulfilled requirements. The Contracting Officer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Design Professional and/or Inspector, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for Final Completion.

#### 1.5 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to the Government Contracting Office's "Payment Procedures."
  2. Submit certified copy of Government Design Professional's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by the Design Professional. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Government Design Professional and Inspector will either proceed with inspection or notify Contractor of unfulfilled requirements. The Contracting Officer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

#### 1.6 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
  - 1. Organize list of spaces in sequential order, starting with exterior areas first then proceeding on the interior from the Main Entrance clockwise throughout the facility.
  - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  - 3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date
    - c. Name of Contractor.
    - d. Page number.

## 1.7 WARRANTIES

- A. Submittal Time: Submit written warranties on request of the Government Design Professional (per FORM 66's) for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents within the Project Operation and Maintenance Manuals.

## PART 2 - EXECUTION

### 2.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.
    - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Sweep concrete floors broom clean in unoccupied spaces.
    - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
    - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove

glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

- k. Remove labels that are not permanent.
  - l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
    - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
  - m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
  - n. Replace parts subject to unusual operating conditions.
  - o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
  - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - q. Clean ducts, blowers, and coils if units were operated without filters during construction.
  - r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
  - s. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

## PART 3 - PRODUCTS

### 3.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

**END OF SECTION 017700**

**SECTION 017823**  
**OPERATION AND MAINTENANCE**

PART 1 - GENERAL

1.1 STIPULATIONS

- A. The specifications “General Conditions of the Construction Contract”, “Special Conditions” and “Division 1 – General Requirements” form a part of this Section by this reference thereto and shall have the same force and effect as if printed herewith in full.

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.

1.3 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Emergency manuals.
  - 3. Operation manuals for systems, sub-systems, and equipment.
  - 4. Maintenance manuals for the care and maintenance of products, materials, finishes, systems and equipment.
- B. Related Sections include the following:
  - 1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
  - 2. Division 1 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
  - 3. Divisions 2 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.4 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.5 SUBMITTALS

- A. Final Submittal: Submit one copy of each manual in final form at least 14 days before final inspection. Government Design Professional will return copy with comments within 7 days after final inspection.
  - 1. Correct or modify each manual to comply with Architect's comments. Submit 3 copies of each

corrected manual within 7 days of receipt of Architect's comments.

## 1.6 COORDINATION

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

## PART 2 - PRODUCTS

### 2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
  - 1. List of documents.
  - 2. List of systems.
  - 3. List of equipment.
  - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

### 2.2 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  - 1. Title page.
  - 2. Table of contents.
  - 3. Manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
  - 1. Subject matter included in manual.
  - 2. Name and address of Project.
  - 3. Date of submittal.
  - 4. Name, address, and telephone number of Contractor.
  - 5. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the

content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents per CSI Specifications (Divisions 2-16). Within each organize each Division by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
  - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
  - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
  - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
  - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

### 2.3 EMERGENCY INFORMATION

A. Content: Organize into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

## 2.4 OPERATION INFORMATION

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions.
2. Operating standards.
3. Operating procedures.
4. Operating logs.
5. Wiring diagrams.
6. Control diagrams.
7. Piped system diagrams.
8. Precautions against improper use.
9. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.

5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

## 2.5 PRODUCT MAINTENANCE

- A. Content: Organize into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Product Information: Include the following, as applicable:
  1. Product name and model number.
  2. Manufacturer's name.
  3. Color, pattern, and texture.
  4. Material and chemical composition.
  5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  1. Inspection procedures.
  2. Types of cleaning agents to be used and methods of cleaning.
  3. List of cleaning agents and methods of cleaning detrimental to product.
  4. Schedule for routine cleaning and maintenance.
  5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  1. Include procedures to follow and required notifications for warranty claims.

## 2.6 SYSTEMS AND EQUIPMENT MAINTENANCE INFORMATION

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified

by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

- C. **Manufacturers' Maintenance Documentation:** Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  - 1. Standard printed maintenance instructions and bulletins.
  - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - 3. Identification and nomenclature of parts and components.
  - 4. List of items recommended to be stocked as spare parts.
  
- D. **Maintenance Procedures:** Include the following information and items that detail essential maintenance procedures:
  - 1. Test and inspection instructions.
  - 2. Troubleshooting guide.
  - 3. Precautions against improper maintenance.
  - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - 5. Aligning, adjusting, and checking instructions.
  - 6. Demonstration and training videotape, if available.
  
- E. **Maintenance and Service Schedules:** Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
  - 1. **Scheduled Maintenance and Service:** Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  - 2. **Maintenance and Service Record:** Include manufacturers' forms for recording maintenance.
  
- F. **Spare Parts List and Source Information:** Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
  
- G. **Maintenance Service Contracts:** Include copies of maintenance agreements with name and telephone number of service agent.
  
- H. **Warranties and Bonds:** Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

## PART 3 - EXECUTION

### 3.1 MANUAL PREPARATION

- A. **Operation and Maintenance Documentation Directory:** Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance information.
  
- B. **Emergency Information:** Compile complete documentation of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

- C. Product Maintenance Information: Compile complete documentation of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Information: Compile complete documentation of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
  - 1. Do not use original Project Record Documents as part of operation and maintenance manuals.
  - 2. Comply with requirements of newly prepared Record Drawings in Division 1 Section "Project Record Documents."

**END OF SECTION 017823**

**SECTION 017839**  
**PROJECT RECORD DOCUMENTS**

PART 1 - GENERAL

1.1 STIPULATIONS

- A. The specifications “General Conditions of the Construction Contract”, “Special Conditions” and “Division 1 – General Requirements” form a part of this Section by this reference thereto and shall have the same force and effect as if printed herewith in full.

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.

1.3 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
  - 1. Record Drawings in CAD Format.
  - 2. Record Specifications.
  - 3. Record Product Data.
  - 4. Project Cost Analysis
  
- B. Related Sections include the following:
  - 1. Division 1 Section "Closeout Procedures" for general closeout procedures.
  - 2. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 3. Divisions 2 through 33 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.4 SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. One (1) Hard Copy of Contractor As-Built Drawings. Drawing Size to be 24”x36”.
  - 2. One (1) electronic (.PDF) copy of As-Built Drawings.
  - 3. One (1) CDROM containing CAD based Contractor As-Built Drawings.
  
- B. Record Product Data: Submit as part of the Project Operation and Maintenance Manuals.
  
- C. Project Cost Analysis: To be submitted when the Owner takes Beneficial Occupancy.

## PART 2 - PRODUCTS

### 2.1 RECORD DRAWINGS

- A. Record Prints: Contractor to maintain one (1) red-lined set of drawings throughout the duration of the project construction phase. Prior to the substantial completion, contractor shall transfer all red-lined mark-ups to the Government provided CAD drawings.
1. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations below first floor.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or No Cost Field Change.
    - k. Changes made following Government Design Professional's written orders.
    - l. Field records for variable and concealed conditions.
- B. Preparation: Contractor to transfer all construction red-line mark-ups from the record set onto the Government provided CAD drawings. Government drawings are AutoDesk (AutoCad) format and this format shall be maintained by the contractor.
1. Contractor to create a CAD layer within each Government provided CAD drawing and label it; "CONTR\_AS-BUILTS"  
Note: All contractor related As-Built changes shall be contained to this layer.
- C. Format:
1. Record Prints: Contractor shall plot one (1) 24"x36" (min.) set of As-Built drawings to submit for review. As-Built set shall be organized and binded per the DMVA-BMCE Cover Sheet. Hardcopy set should contain an "AS-BUILT" stamp located in the lower right-hand corner of each sheet.
  2. AutoDesk (AutoCad) Format, Most Current Release – compatible with Owner's current software.
  3. Electronic Copy: Adobe PDF format

### 2.2 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  3. Note related Change Orders, Specifications and Record Drawings where applicable.

## 2.3 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submit in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

## PART 3 - EXECUTION

### 3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Government Design Professional, Government Inspector and/or Contracting Officer's reference during normal working hours.

**END OF SECTION 017839**

## SECTION 09 96 00

### HIGH-PERFORMANCE COATINGS FOR WASTE TREATMENT TANKS

#### PART 1 - GENERAL

##### 1.1 STIPULATIONS

- A. The specifications “General Conditions of the Construction Contract”, “Special Conditions” and “Division 1 – General Requirements” form a part of this Section by this reference thereto and shall have the same force and effect as if printed herewith in full.

##### 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.

##### 1.3 SUMMARY

- A. This Section includes surface preparation and application of a high-performance epoxy liner system for concrete SBR and Digester Tanks. It also includes preparation and application of coating system (epoxy paint) to existing and new piping in the SBR and Digester Tanks.

##### 1.4 REFERENCES

- A. Society for Protective Coatings (SSPC) Surface Preparation Standards
- B. National Association of Corrosion Engineers (NACE) Surface Preparation Standards
- C. NACE No. 6/SSPC-SP13 Surface Preparation of Concrete

##### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying:
  - 1. Coating or material name.
  - 2. Manufacturer.
  - 3. Color name and number.
  - 4. Batch or lot number.
  - 5. Date of manufacture.
  - 6. Mixing and thinning instructions.
- B. Storage:
  - 1. Store materials in a clean dry area and within temperature range in accordance with manufacturer's instructions.
  - 2. Keep containers sealed until ready for use.
  - 3. Do not use materials beyond manufacturer's shelf-life limits.

- C. Handling: Protect materials during handling and application to prevent damage or contamination.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

## 1.6 QUALITY ASSURANCE

### A. Manufacturer's Quality Assurance

- 1. Submit manufacturer's certification that coatings comply with specified requirements and are suitable for intended application. Performance criteria must be included for comparison with the minimum performance criteria outlined in Section 2.3.

### B. Manufacturers Qualifications

- 1. Specialized in manufacture of the submitted coatings for a minimum of five (5) years on projects of similar nature.

### C. Applicator's Quality Assurance: Submit list of a minimum of 5 completed projects of similar size and complexity to this Work. Include for each project:

- 1. Project name and location.
- 2. Name of owner.
- 3. Name of contractor.
- 4. Name of engineer.
- 5. Name of coating manufacturer.
- 6. Approximate area of coatings applied.
- 7. Date of completion.
- 8. Estimate of remaining useful service life.

### D. Pre-application Meeting: Convene a pre-application meeting before start of application of coating systems. Require attendance of parties directly affecting work of this section, including Contractor, Engineer, applicator, and manufacturer's representative. Review the following:

- 1. Environmental requirements.
- 2. Protection of surfaces not scheduled to be coated.
- 3. Surface preparation.
- 4. Application methods.
- 5. Repair.
- 6. Field quality control.
- 7. Cleaning.
- 8. Protection of coating systems.
- 9. One-year inspection.
- 10. Coordination with other work.

## 1.7 SURFACE PREPARATION

- A. Power wash all concrete clean prior to preparing the concrete surfaces.
- B. All existing caulking is to be removed prior to the application of the protective coatings and reinstalled following the application and cure of all coatings.

- C. Concrete: Verify concrete dryness in accordance with ASTM F 1869 “Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride” (moisture vapor transmission should not exceed three pounds per 1,000 square feet in a 24 hour period), F 2170 “Standard Test Method for Determining Relative Humidity in Concrete using in situ Probes” (relative humidity should not exceed 80%), or D 4263 “Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method” (no moisture present). Prepare concrete surfaces in accordance with NACE No. 6/SSPC-SP13 Joint Surface Preparation Standards and ICRI Technical Guidelines. Abrasive blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove laitance, curing compounds, hardeners, sealers and other contaminants and to provide a minimum ICRI-CSP 5 surface profile. Large cracks, voids and other surface imperfections should be filled with a recommended filler or surfacer.

## 1.8 JOB CONDITIONS

### A. Environmental Requirements:

1. Proceed with corrosion protection lining Work only when temperature and moisture conditions of substrates, air temperature, relative humidity, dew point and other conditions comply with the corrosion protection lining manufacturer’s written recommendations and when no damaging environmental conditions are forecasted for the time when the material will be vulnerable to such environmental damage. Record all such conditions and include in final Site Quality Control Report.
2. Maintain substrate temperature and ambient temperature before, during and after installation above 50°F (16°C) and rising in accordance with protective lining material manufacturer’s instructions.
3. Provide adequate ventilation during installation and full curing periods of the protective lining.
4. Protective Lining shall not be applied when ambient air temperature is within 5°F (3°C) of the dew point and falling.
5. Protective Lining shall not be applied when relative humidity is outside of material manufacturer’s recommendations. Do not prepare surfaces or apply materials in rain, snow, fog, mist, or otherwise inclement weather as per material manufacturer’s instructions.

- B. Dust and Contaminants: Protect work and adjacent areas from excessive dust and airborne contamination during protective lining application and curing. Schedule Work to avoid excessive dust and airborne contaminants.

## PART 2 - PRODUCTS

### 2.1 HIGH PERFORMANCE COATINGS GENERAL

- A. Provide concrete restoration materials and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Provide products of same manufacturer for each coat in a coating system.

## 2.2 MATERIALS

- A. Products specified are manufactured by Tnemec Company, Inc., 123 W. 23<sup>rd</sup> Avenue, North Kansas City, MO 64116, (816) 483-3400, [www.tnemec.com](http://www.tnemec.com), and are specified as a standard of quality/performance and **basis of design**. The specified basis of design is intended to provide the longest service life, lowest life cycle cost, and most sustainable solution.
1. Concrete Resurfacing Material – Cementitious Repair Mortar (for Wall-Base Keyway repairs)
    - a. A single component, ultra rapid setting, hydraulic cementitious resurfacer used to restore deteriorated concrete surfaces or extended with aggregate to make high strength concrete.
    - b. Recommended DFT: Horizontal / Vertical – ¼ inch to 4 inches
    - c. Curing Time: 70 deg F – Initial set 60 minutes; Final set 90 minutes; Topcoat 12 hours
    - d. VOC: 0.0 lbs/gallon
    - e. No. of Components: One
    - f. TNEMEC Mortarcrete Series 217, Sherwin-Williams Industrial Wastewater Coating products, or equal as approved by the Professional.
  2. Concrete Resurfacing Material - Epoxy Modified Cementitious Mortar
    - a. A self-priming, high-performance, aggregate reinforced material for surfacing, patching and filling voids and bugholes in concrete substrates.
    - b. Volume Solids: 100% (Mixed)
    - c. Recommended DFT: Parge Coat – 1/16” – ¼” per lift; maximum ½” thickness; Feather Edge Capable: 1/32”
    - d. Curing Time: 75 deg F & 50% RH – 3-4 hours (Touch), Unlimited (Recoat with Itself), 15 hours min. (Topcoat)
    - e. VOC: 0.15 lbs/gallon (Unthinned)
    - f. No. of Components: Three – Liquid Part A and Part B, Powder Part C
    - g. TNEMEC Mortarclad Series 218, Sherwin-Williams Industrial Wastewater Coating products, or equal as approved by the Professional.
  3. Epoxy Prime Coat – Polyamidoamine Epoxy
    - a. An advanced generation epoxy formulated for the protection of steel, concrete, and ductile iron substrates with excellent resistance to abrasion and is suitable for immersion as well as chemical contact exposure.
    - b. Product shall be part of a coating system tested in accordance with ISO 12944-6 (2018). Coating system test results shall be provided upon request.
    - c. Volume Solids: 67.0 +/- 2.0% (Mixed)
    - d. DFT: 2.0 – 10 mils per coat
    - e. Curing Time: 70 deg F – 9 hours (To Handle), 12 hours (Recoat), 7 days (Immersion)
    - f. VOC: 2.4 lbs/gal (Unthinned)
    - g. HAPS: 2.4 lbs/gal solids
    - h. No. of Components: Two – Part A (amine) and Part B (epoxy)
    - i. Mixing Ratio: 1 Part A to 1 Part B by volume.
    - j. TNEMEC Hi-Build Epoxoline II Series N69, Sherwin-Williams Industrial Wastewater Coating products, or equal as approved by the Professional.

4. Glass Flake Reinforced Modified Polyamine Epoxy Lining Material
  - a. Abrasion resistant, high solids, epoxy coating which offers high-build edge protection and excellent corrosion resistance. Contains glass flake and aluminum oxide for improved film integrity. For use on the interior and exterior of steel or concrete tanks, pipes, and other heavy-duty equipment in industrial service.
  - b. Volume Solids: 82% +/- 2.0% (Mixed)
  - c. DFT: 8.0 – 20.0 mils
  - d. Curing Time: 75 deg F – 6 hours (To Handle), 9 hours (Topcoat), 7 days (Immersion)
  - e. VOC: EPA Method 24 – 1.28 lbs/gallon (Unthinned)
  - f. HAPS: 1.27 lbs/gal solids
  - g. No. of Components: Two – Part A (amine) and Part B (epoxy)
  - h. Mixing Ratio: 1 Part A to 1 Part B by volume.
  - i. TNEMEC Epoxoline Series 142, Sherwin Williams Industrial Wastewater Coating Products, or equal as approved by the Professional.
- B. Materials specified herein shall not preclude consideration of equivalent or superior materials. Submitted equivalent materials or other substitutions shall be submitted to Owner for consideration in compliance with substitution procedures in the Contract Documents and shall include the following:
  1. Must include all required data as listed in these specifications. Substitution requests with incomplete data shall not be reviewed.
  2. Requests for substitution shall include actual case histories as evidence of satisfactory past performance in similar environment with similar estimated service life of system specified.
  3. Substitutions will not be considered that change the number of coats or do not meet specified dry film thicknesses.
  4. Manufacturer's certified test reports showing all the substitute product(s) accelerated testing performance shall be submitted.

## PART 3 - EXECUTION

### 3.1 APPLICATION

- A. Apply coating in accordance with manufacturer's instructions.
- B. Mix and thin coating in accordance with manufacturer's instructions.
- C. Keep containers closed when not in use to avoid contamination.
- D. Do not use mixed coatings beyond pot life limits.
- E. Use application equipment, tools, pressure settings, and techniques in accordance with manufacturer's instructions.
- F. Uniformly apply coatings at spreading rate required to achieve specified DFT.
- G. Apply coatings to be free of film characteristics or defects that would adversely affect performance or appearance of coating systems.

- H. Coatings shall be applied in accordance with manufacturer's recommended recoat times.
- I. The installed coating shall not contain any sags, runs, wrinkles, spots, blisters, or other noticeable flaws.

### 3.2 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Provide the services of a qualified inspector approved by the coating system manufacturer to inspect the surface preparation Work. Address and correct any deficiencies with the preparation Work identified and documented by the inspector.
- C. Provide the services of a qualified inspector approved by the coating system manufacturer to inspect and verify the coating system is applied in accordance with the manufacturer's instructions and to ensure the DFT is in accordance with these specifications.

### 3.3 PROTECTION OF SURFACES NOT SCHEDULED TO BE COATED

- A. Protect surrounding areas and surfaces not scheduled to be coated from damage during surface preparation and application of coatings.
- B. Immediately remove coatings that fall on surrounding areas and surfaces not scheduled to be coated.

### 3.4 COATING SCHEDULE

#### A. Interior Concrete Walls and Floors

- 1. Surface Preparation: NACE No. 6/SSPC-SP13 ICRI-CSP 5 or greater
- 2. Resurfacer: Concrete Resurfacing Material - Epoxy Modified Cementitious Mortar
- 3. Prime Coat: Epoxy Prime Coat – Polyamidoamine Epoxy, DFT 4.0 – 6.0 mils
- 4. Finish Coat: Glass Flake Reinforced Modified Polyamine Epoxy Lining Material, DFT 14.0 – 16.0 mils

#### B. Ductile Iron Pipe

- 1. NEW Ductile Iron Pipe (shop primed):
  - a. Surface Preparation: NAPF 500.03.04 Sweep Blast
  - b. Coating: Two (2) coats of Epoxy Prime Coat – Polyamidoamine Epoxy, 6 – 8 mil each coat (color to match existing color coding scheme)
- 2. Existing Ductile Iron Pipe (submerged):
  - a. Surface Preparation: NAPF 500.03.04 Remove all existing coatings
  - b. Coating: Two (2) coats of Epoxy Prime Coat – Polyamidoamine Epoxy, 6 – 8 mil each coat (color to match existing color coding scheme)

- 3. Existing Ductile Iron Pipe (above water):

- a. Surface Preparation: NAPF 500.03.04 Sweep Blast
- b. Coating: Two (2) coats of Epoxy Prime Coat – Polyamidoamine Epoxy, 6 – 8 mil each coat (color to match existing color coding scheme)

END OF SECTION 09 96 00

**SECTION 46 53 53**  
**WASTEWATER TREATMENT EQUIPMENT**

**PART 1 – GENERAL**

**1.1 STIPULATIONS**

- A. The specifications “General Conditions of the Construction Contract”, “Special Conditions” and “Division 1 – General Requirements” form a part of this Section by this reference thereto and shall have the same force and effect as if printed herewith in full.

**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.

**1.3 SUMMARY**

- A. This Section includes requirements for the rehabilitation and replacement of equipment and related items in SBR #1 and Digester #1.
- B. The equipment and related items provided shall be complete and operational with controls and accessories as shown in the contract drawings and as specified. Equipment shall be suitable for installation as shown in the drawings and as specified in this section and includes, but is not be limited to, the following components and appurtenances necessary for the interconnection of components, in the quantities required:

- 1. SBR Basin #1
  - a. Influent Baffle
  - b. Influent Plug Valve
  - c. Mixer System and Drive Motor
  - d. Cable Mooring System and Power Cable
  - e. Decanter Assembly and Discharge Pipe
  - f. Decanter Mooring System
  - g. Decant Flow Control Valve
  - h. Retrievable Fine Bubble Air Diffuser Assemblies
  - i. Sludge Wasting Pump
  - j. Level Sensors Assemblies – Float Switches and Pressure Transducer
  - k. Dissolved Oxygen and ORP Assemblies and Sensors
- 2. Aerobic Digester #1
  - a. Digester Mixer System and Drive Motor
  - b. Mixer Restrained Mooring System and Power Cable
  - c. Retrievable Coarse Bubble Diffuser Air Assemblies
  - d. Sludge Wasting Pump
  - e. Supernatant Withdrawal System
  - f. Level Sensors Assemblies – Float Switches and Pressure Transducer

- C. Related Sections include the following:

- 1. Divisions 1 through 33 Specifications.

**1.4 SUBMITTALS**

- A. Shop Drawings showing SBR and Aerobic Digester basin and equipment layouts, construction methods, equipment and component installation details, wiring diagrams and plans, instrumentation locations, and details including dimensions and materials of construction, and installation instructions for all equipment and components supplied. Drawings shall indicate clearances required for maintenance and operation of equipment and shall also contain complete wiring and schematic diagrams, equipment layout and dimensions, templates and directions for the installation of anchor bolts and other anchorages and any other details required to demonstrate that the system and its components has been coordinated and will function as specified.
- B. Product Data: Manufacturer's Descriptive data, technical literature, and/or catalog cuts. Submittal shall include: design calculations relevant to the type of equipment or component proposed indicating performance, manufacturer illustrations, drawings showing fabrication methods, assembly, accessories required, installation details and point-to-point wiring diagrams for instrumentation and controls equipment; dimensions; make and model; materials of construction; and installation instructions for all equipment and components supplied.
- C. Warranty: The Manufacturer shall provide a written warranty against defects in materials and workmanship. Manufacturer shall warrant the goods provided by the Manufacturer to be free from defects in materials and workmanship under normal conditions and use for a period of one (1) year from the date the goods are put into service, or eighteen (18) months from shipment of equipment, whichever first shall occur.
- D. System Operation and Maintenance Manuals
  - 1. Complete system Operation and Maintenance manuals shall be available in hardcopy and electronic form. The electronic form shall be provided in .pdf format and be fully bookmarked. Manuals shall address:
    - a. General project information
    - b. Installation and start-up
    - c. Process design and operational control description
    - d. Mechanical, electrical and field instrumentation component descriptions
    - e. Maintenance and troubleshooting
    - f. Mechanical and electrical drawings
    - h. Record Product Data
  - 2. Provide Three (3) printed (hardcopy) copies and one (1) copy in electronic (.PDF) format.

## 1.5 QUALIFICATIONS

- A. Contractor: Contractor shall have a minimum of 10-years experience in the construction of water, wastewater, and/or industrial wastewater facilities.
- B. Manufacturer: The SBR System shall be supplied by a company of good reputation that is regularly engaged in the manufacture and fabrication of SBR wastewater treatment systems. The manufacturer's experience shall include a minimum of ten (10) installations where equipment of similar size and design has been in operation successfully in a similar process for a minimum of five (5) years. As a minimum, the supplier shall be the manufacturer of the following components: mixers, decanters, retrievable diffusers, and controls.
- C. The Contractor shall assign full responsibility for the functional operation of all system components to a Single Source Supplier. This Supplier shall be responsible for all engineering necessary in order to select, furnish, inspect the installing contractor's equipment installation and connections, calibrate, and place into operation the SBR System along with all other equipment and accessories as specified herein.

## 1.6 DELIVERY, HANDLING AND STORAGE

- A. Equipment and materials delivered, handled, and placed in storage shall be protected from damage, deterioration, weather, excessive humidity, excessive temperature variation, dirt, dust, and contaminants from the time of shipment until installation is completed and the equipment and materials are ready for operation. Equipment shall be marked and stored to permit easy identification and inspection. Each item of the equipment shall be tagged or marked as identified in the delivery schedule or on the shop drawings. Complete packing lists and bills of materials shall be included with each shipment.

## PART 2 - PRODUCTS

### 2.1 FUNCTIONAL REQUIREMENT

- A. The following design conditions shall be the basis for the SBR System manufacturer's design of the SBR process and minimum performance requirements. The manufacturer shall be completely responsible for the proper design of their system, including but not limited to; diffused aeration equipment, transfer pumps, mixers, decanters, and controls. All equipment shall perform as specified and the completed installation shall operate in accordance with the requirements of the plans and specifications.
- B. Contractor shall review and verify the following information and any other information required by the manufacturer:

#### 1. SBR STRUCTURE (EXISTING)

Basin Quantity            1

Inside Dimensions:

Basin Width            75 feet

Basin Length           75 feet

Side Water Depth:

Minimum Operating Level    13.08 feet SWD

Maximum Operating Level    21 feet SWD

Top Of Wall            24 feet

Centerline of Discharge      2.7 feet from LWL (SBR Only)

#### 2. AEROBIC DIGESTER BASIN STRUCTURE (EXISTING)

Basin Quantity            1

Inside Dimensions:

Basin Width            36.83 feet

Basin Length           54.67 feet

Side Water Depth:

Minimum Operating Level    13 feet SWD

Maximum Operating Level    21 feet SWD

Top Of Wall            24 feet

### 2.2 EQUIPMENT

A. Basis of Design

1. The physical layout and design for the existing facility and the equipment specified and shown on the contract documents is based upon the AquaSBR System manufactured by Aqua-Aerobic Systems, Inc. 6306 North Alpine Road, Loves Park, IL, 61111, phone no. 815/654-2501, fax no. 815/654-2508.
2. If a system, equipment or component is proposed that is sufficiently different than that shown and specified, the Contractor shall submit detailed, modified facility design drawings (signed and sealed by a registered professional engineer in Pennsylvania) and supporting documentation describing in detail how the system will be incorporated into the existing treatment plant design, operation, and controls. Documentation shall include but is not limited to equipment descriptions, shop drawings, design calculations, control schematics, and operational and functional descriptions for approval by the Owner within 5 working days following Notice to Proceed. Documentation shall also include a letter signed by an officer of the company certifying compliance with the specifications without exception; certification that proposed motors will be Warranted by the motor supplier as outlined in the specified Warranty; field test report documenting the proposed or similar units have been field tested; proof of manufacturing and testing facilities; installation list with contacts and phone numbers for a minimum of ten installations of similar size in operation for ten years. The Contractor shall also obtain all necessary approvals including all required permits and/or permit modifications from the Pennsylvania Department of Environmental Protection for the sufficiently different system, equipment, components and/or layout proposed within 15 working days following approval of modification.
3. No structural modifications will be permitted.
4. No hydraulic profile modifications will be permitted.
5. No changes to system capacity or treatment performance / effluent limits will be permitted.

B. Quality Assurance

1. ELECTRICALLY ACTUATED VALVE - Actuated valves shall be tested prior to shipment. Testing shall consist of the following:
  - a. Project and nameplate data verification per assembly documentation
  - b. Limit switch and torque switch setup and cycle test
  - c. Hydrostatic test (two pressurization cycles) for all plug and butterfly valves
2. MIXER - The floating mixer(s) shall be shop inspected and tested prior to shipment. Testing shall consist of the following:
  - a. Project and nameplate data verification per assembly documentation
  - b. Dynamic balancing
  - c. Final inspection

C. Motor Compliance

1. Motors shall be in compliance with the Energy Independence and Security Act of 2007 (EISA 2007).
2. All three phase motors and components shall be 460 volt, 60 hertz.

3. All single phase components shall be 115 volt, 60 hertz.
4. Contractor shall confirm all existing motor sizes, electrical requirements, and loads.

D. Specification Precedence

1. The specifications for equipment and controls under this section supersede specifications for equipment and controls specified elsewhere in the contract documents and drawings. Purchased components such as gear reducers, pumps, motors, valves, and actuators shall be provided with standard recommended manufacturers paint, unless otherwise specified within this section.
2. The SBR area electrical classification shall be Non-classified. Motors within the basin shall be rated for a temperature code T2A (280 Deg.C).

E. SBR BASIN NO. 1

1. Influent Baffle

- a. Provide Influent baffle(s) to diffuse incoming flow for the SBR basin. Each baffle shall terminate between 12 and 18 inches above the basin floor.

Baffle Quantity	1
Baffle size	4x4 ft
Materials of Construction:	
Baffle side panels and supports	304 Stainless steel
Mounting Hardware	304 Stainless steel

- b. Field attachment of the baffle assembly to the basin shall be the responsibility of the installing contractor.
- c. Supply of all influent piping and supports shall be the responsibility of the installing contractor.

2. Influent Plug Valve

- a. Provide electrically operated flanged plug valve(s) for one SBR basin to control the influent flow. Due to the risk of effluent violations, systems not including influent valves are not acceptable.

Valve quantity	1	Per basin
Valve Size	12	inch
Valve Model	Milliken 601 or approved equal	
Actuator	Auma or approved equal	
Actuator Power	Single	Phase
Actuator Type	Open/Close	Service
Compartment Heater	Yes	

- b. Valves shall be a 125# flanged end connection, ASTM A-126 Class B cast iron body with welded in nickel seat, coated non-lubricated ductile or cast iron plug with 80% port opening, assembled and tested with an electric actuator.
- c. Valve actuator shall include motor winding protection, manual override, and limit switch feedback in the open and closed position. Actuator(s) include local controls consisting of pushbutton(s), selector switch(es), and light(s). Field wiring and junction/box disconnect shall be provided by the installing contractor.

d. Provisions for valve access shall be provided by the installing contractor.

3. SBR Mixer Assembly

a. Provide mechanical floating mixer and related equipment accessories as described herein. Mixer shall consist of a motor, direct-drive impeller driven at a constant speed, an integral flotation unit, and impeller volute. Mixer shall incorporate design enhancements that provide for three (3) years without routine maintenance (greasing).

Mixer Quantity		1	
Motor			
Size		25	HP
RPM		900	RPM
Efficiency		Premium	
Mounting Base Materials		304	Stainless Steel
Float			
Diameter (minimum)		94.5"	inches
Shell Material	Fiber Reinforced Polyester Skin	FRP	
Impeller Volute Material		304	SS

b. Mooring System - Each unit shall be provided with a mooring system, as described below:

Mooring Type	Cable	
Mooring Point Quantity	Four	
Cable Mooring		
Cable Material	304	SS
Power Cable Size		
Unit	#8-four	Conductor

c. Cable Mooring System - Each unit shall be provided with a maintenance cable mooring system complete with mooring cable, clips, thimbles, quick disconnects, anchors (if necessary), and extension springs as shown on the drawings. Field attachment of mooring points to the tank shall be the responsibility of the installing contractor.

d. Cable Mooring Electrical Power Cable - Each unit shall include power cable wired into the motor conduit box and terminating at the basin wall. Electrical cable shall be supplied with kellems grips at the motor and basin wall terminations. Electrical cable(s) shall be attached with cable ties provided by the equipment supplier. Attachment of cable and supply of junction box/disconnect at the basin wall shall be the responsibility of the installing contractor.

e. Performance - Each mixer shall meet the requirements summarized above. Complete mix shall be defined as maintaining biological suspension of all mixed liquor suspended solids with the specified MLSS concentration without the introduction of air.

f. Mixer Drive Motor

1. The motor shall be vertical P base design, totally enclosed fan cooled TEFC, and generally rated for severe duty. The motor shall in all cases equal or exceed standard NEMA specifications. A minimum service factor of 1.15 shall be furnished.

2. The motor winding shall be nonhygroscopic, and insulation shall equal or exceed NEMA Class "F". A lip seal shall be provided below the bottom bearing to prevent moisture from penetrating around the motor shaft. A condensate drain shall be located at the lowest point in the lower-end bell housing. Unit shall have a one-piece motor shaft continuous from the top motor bearing, through the lower bearing and down to and through the propeller. The shaft shall be manufactured from 17-4 PH stainless steel.
  3. Motor bearings shall be regreasable. Sealed bearings are not acceptable. Top bearing shall be shielded on the bottom side only. Bottom bearing shall be open. The top and bottom motor bearings shall be of combined radial and axial thrust type. The lower motor bearing inner brace shall be locked to the motor shaft via a special washer and locking nut arrangement. The shaft shall be threaded just below the lower bearing and shall have a keyway cut into the motor shaft. This key shall accept a tab from the inner diameter of the locking washer, and the locking nut shall have recesses to accept a tab from the outer diameter of the locking washer to prevent the nut from backing off. Snap ring type bearing retainers will not be acceptable.
  4. Submerged motors, jet pumps, submerged gear motors or gearboxes shall not be acceptable.
- g. Mixer Motor Mounting Base
1. The motor shall be securely mounted onto a solid base which is integral with the motor base extension. All submersed wetted motor mounting base components shall be constructed of 304 stainless steel.
  2. The upper portion of the motor mounting base, immediately below the lower motor bearing, shall include two independent acting air seals. The two seals shall be capable of sealing off the flow of air from the suction action of the pumped flow, and prevent backflow of liquid during impeller reversal. The lower end of the motor base extension shall be provided with a rotating backflow seal that will prevent grit from being introduced into the anti-deflection insert reservoir, but shall allow liquid to contact the shaft. The backflow seal shall not require scheduled lubrication or maintenance.
- h. Mixer Flootation - Each unit shall be equipped with a modular float with a central float passage of a size to allow installation and removal of the pump impeller. The float shall be foamed full of polyurethane foam of the closed cell type, and shall be totally sealed to prevent the foam from being in contact with the external environment.
- i. Mixer Impeller - The impeller shall be designed to pump the liquid from near the surface and direct it down toward the vessel/basin bottom. The impeller shall be a two-blade marine type precision casting of 316 or 15/5 stainless steel and shall be specifically designed for the application intended. It shall be dynamically and hydraulically balanced. The propeller must be attached to the motor shaft with a hardened stainless steel pin and set screw. Impeller shall be capable of being reversed to cause back flow liquid movement without causing damage to the mixer chassis and without causing upflow liquid damage to the motor bearing and windings. No liquid spray or other liquid leakage upward onto the surface of the motor support surface or flotation chassis will be allowed.
- j. Mixer Intake Volute Assembly - The impeller shall operate in a volute made of stainless steel plate, minimum 3/16 inch thick.

- k. Mixer Vibration
1. The entire rotating assembly including the motor rotor, shaft, shaft accessories, and impeller shall be dynamically balanced within 2.0 mils peak-to-peak horizontal displacement measured at the upper and lower motor bearing.
  2. Measurements shall be taken at a frequency equivalent to the motor RPM.
  3. Measurements shall be taken with the motor in a vertical, shaft down position with the entire power section mounted on resilient pads.

4. Decanter Assembly

- a. Provide floating decanter(s) and related equipment accessories as described herein for one SBR basin. Each decanter shall consist of an integral flotation unit, a stainless steel movable weir assembly, and an electric motor-driven actuator to open and close the weir. Due to the risk of ragging, spring loaded valves are not an acceptable means to seal the decanter. Fixed decanters, or decant weirs lifted above the water surface are not acceptable.

Quantity	1	
Unit size	10x9	
Performance Requirements		
Maximum allowable water level (HWL)	21	ft
Minimum allowable water level (LWL)	13' – 1"	ft
Decant pipe centerline	2.7	ft below LWL
Decant rate, as average from HWL to LWL	5,556	gpm
Weir Actuator		
Linear Weir Actuator	Single	phase
Weir Actuator Closing Force	1,500	lbs
Power Section Material	Painted	steel
Band Clamp Heater	Aluminum	
Junction Box Rating	NEMA 4X	
Power Cable(s) Required	#14 AWG	ten-conductor
Weir		
Shape	Circular	
Material	304	SS
Decanter Float		
Reserve Buoyancy	1,833	lbs
Discharge Line		
Type	Pipe	
Diameter	18	inches
Mooring System		
Pylon Quantity	3	Per unit
Pylon Diameter	4	inch
Support Quantity	1	Per unit
Support Diameter	4	inch
Pylon/Support Material	304	SS
	Schedule 10	
Base Plate Material	304	SS

Floor Connection	304 SS adhesive anchors
Mooring Frame Material	304 SS
Discharge Pipe	
Elbow Material	304 SS
Pipe Material	304 SS
Flex Joint/Hinge Material	304 SS
Decant Valve	1 Per SBR basin
Valve Size	18 Inch
Valve Model	Milliken Fig. 511A or approved equal
Decant Valve Actuator	Auma or approved equal
Actuator Power	Three Phase
Actuator Type	Open/Close Service
Compartment Heater	Yes
Valve Extension	No

b. Performance

1. Each decanter shall be capable of withdrawing decant fluid from 4-6 inches beneath the liquid surface, regardless of liquid depth, down to the minimum allowable water level specified below. The decant liquid shall be drawn through an adjustable weir opening of 2-6 inches. The weir shall permit liquid to enter the decanter from the entire 360 degrees without obstruction.
2. The centerline of each decant pipe must be located at the elevation stated within this section by the installing contractor.

c. Weir Actuator - Weir actuator shall include a reversible electric motor operated linear actuator. The actuator shall be capable of operating with a closing force as required above and shall operate from a remote power source as required above. Adjustable limit switches shall be included to permit adjustment of the weir opening. A spring shall be included to provide for travel after the weir has closed and provide desired closure pressure. A corrosion resistant removable cover shall be included to provide protection to the actuator and motor during normal operation. Power cable(s) as specified above shall be provided from the junction box of the unit to the basin wall. Supply of junction box/disconnect at the basin wall shall be the responsibility of the installing contractor.

d. Weir - The weir shall include vortex control baffles permanently affixed to the weir. The weir shall be attached to the actuator through a removable single shaft or linkage which shall also function as the torque restraint.

e. Floatation - Each unit shall be equipped with a modular float constructed of fiberglass filled with closed cell polyurethane foam having a minimum 2.0 lbs./ft<sup>3</sup> density. Float shall be completely sealed to prevent the foam from being in contact with the external

environment. Float shall have adequate reserve buoyancy as specified within this section to ensure stability and to provide support flotation required during decanter servicing. A urethane type seal shall be molded into the bottom of the float assembly to receive the decanter weir.

f. Decanter Discharge Pipe

1. Decanter shall include a stainless steel elbow with schedule 10 stainless steel discharge pipe as specified above. Decanters with FRP or PVC discharge pipe are not acceptable. The installing contractor shall provide a ¾" valve with hose bib connection on the decant line between the decanter and the decant valve.
2. Decanter shall include two stainless steel flex joints sized at the same diameter as the discharge pipe. Flex joints shall be constructed of stainless steel flanges and 321 stainless steel bellows. Flex joints shall utilize heavy duty stainless steel hinges with over-travel stops and full perimeter welds. Flex joints shall carry a rating per EJMA calculations, the Elastic Joint Manufacturer's Association. Flex joints shall be full port diameter, and not reduce flow area of the nominal pipe size. Flex joints shall be fully crated and provided with shipping bars that immobilize and protect the flex joint prior to final installation. Flex joints constructed of plastic or rubber material are not acceptable.
3. All piping, supports, gaskets, and hardware beyond the terminating flange of the decant pipe flexible joint shall be supplied by the installing contractor.

g. Decanter Restrained Mooring System

1. Provided as part of the decanter assembly shall be a mooring frame, which shall permit the assembly to move up and down following the change in liquid level while restrained within the vertical pylons.
2. Decanter shall be moored with a restrained mooring system consisting of vertical pylon(s) with base plate and/or supports as specified above. Each pylon/support with base plate shall be attached to the basin floor and filled with concrete by the installing contractor.
3. Mooring post supports, if specified within this section shall be provided for attachment to the basin wall by the installing contractor.

h. Decant Flow Control Valve

1. Provide electrically operated butterfly valve as specified above to control the decant flow rate. Systems not including decant valves are not acceptable.
2. Valve(s) shall be an AWWA C-504 Class 150B electrically operated butterfly valve(s) with ANSI Class 125# flanged end ASTM ductile or cast-iron body and disk with a 316 stainless steel edge, EPDM seat, 304 stainless steel shaft assembled and tested with an electric actuator. Valve actuator shall include motor winding protection, manual override, and limit switch feedback in the open and closed position. Actuator(s) include local controls consisting of pushbutton(s), selector switch(es), and light(s). Field wiring and junction/box disconnect shall be provided by the installing contractor.
3. Provisions for valve access shall be provided by the installing contractor.

5. Retrievable Fine Bubble Air Diffuser Assembly

- a. The aeration system shall be a fine bubble diffused air system and shall be a retrievable configuration as shown on the contract drawings. Systems with fixed diffuser configuration or jet aeration are not acceptable.

Airflow per basin	1,380	SCFM
Assembly quantity	5	
Diffuser Rack Size	25	Duplex tubes
Materials of Construction		
Manifold	304	Stainless steel
Vertical Air Column	304	Stainless steel
Threaded Flange	304	Stainless steel
Quick Disconnect Adapter	316	Stainless steel
Track/beam Assembly	304	Stainless steel
Diffuser Hoist Assembly		Galvanized steel
Valve Seat		EPDM
Tank Connection		304 SS adhesive anchors

- b. Provide retrievable air diffuser assemblies for one SBR basin. Each assembly shall consist of membrane diffusers, frame assembly, manifold weldment, vertical air column, track/beam, flexible air line, isolation valve, and lifting mechanism. Duplex diffuser tubes total that specified herein shall be provided for each diffuser rack. The 4" diffuser manifold weldment shall be constructed of stainless steel. The entire assembly shall be located such that each diffuser centerline is twelve (12) inches above the basin floor.
- c. Air diffuser assemblies shall be of the tubular, non-clog, fine bubble type with a flexible perforated air release membrane. Disc and panel diffuser designs are not acceptable. The diffuser membrane shall be constructed from EPDM rubber and be suitable for continuous or intermittent aeration. Each membrane shall be held in place by two 304 stainless steel band clamps. The membrane shall include UV inhibitor and compounds designed for resistance to chemical attack, weathering, fatigue, and aging. The diffuser assemblies shall have double backflow prevention to prevent liquid from passing into the aeration header. Backflow prevention shall consist of self-sealing slits and membrane clamping over the circumference of the diffuser support pipe. The membrane exterior surface shall be smooth as to inhibit biological film growth. The membrane shall inflate during aeration and deflate when the airflow is discontinued, further restricting biological film growth. The membrane shall be cleanable in place with water from a high pressure wash. Each diffuser membrane shall be supported over its' full length and circumference by a support tube. Tube diffuser shall be of non-buoyant design. Diffusers which are of buoyant design are not acceptable.
- d. Each diffuser assembly shall include a 3" diameter wire reinforced EPDM flexible air line with quick disconnect end fittings, and a threaded flange, elbow and stainless-steel quick disconnect adapters. All air distribution piping, gaskets, and hardware beyond the threaded flange shall be supplied by the installing contractor. The vertical track/beam shall support the lifting mechanism assembly during operation and servicing.
- e. Each assembly shall include a diffuser hoist assembly with base socket to receive a portable electric winch. A total of (one) portable electric winch shall be provided for the diffuser assemblies. The winch mechanism shall be of sufficient design capacity to raise the diffuser rack assembly to the servicing position. The portable electric winch

shall operate from a single phase, electrical supply rated for 12.6 full load amps. The winch shall be provided with a total of 8 feet of electrical cable. Supply of electrical power supply, wiring and junction box for winch shall be the responsibility of the installing contractor.

- f. Each diffuser assembly shall include a 3" diameter manually operated isolation butterfly valve for connection to the main air distribution piping by the installing contractor. Valve gaskets and hardware are to be provided by the installing contractor. Valve shall be a butterfly valve with cast iron body, seat as specified herein, disk and one piece stainless steel shaft.
- g. Anchoring the diffuser assemblies to the basin shall be the responsibility of the installing contractor.

6. Sludge Wasting Pump

- a. Provide a submersible non-clog pump as specified herein. Each pump shall be equipped with a submersible electrical motor connected for three phase operation. Pump housing shall be painted cast iron. Pump shall include an adequate length of multi-conductor chloroprene jacketed type SPC cable suitable for submersible pump applications. The power cable shall also be sized according to NEC and ICEA standards. The pump shall be supplied with a mating cast iron discharge elbow. Each unit shall be fitted with an adequate length of steel lifting chain of adequate strength to permit raising and lowering the pump.

Pump Quantity	1
Pump Function	Sludge
Motor Size	3.5 HP
Pump Flow rate and Required total dynamic head (TDH)	200 GPM at 27.9 TDH
Discharge Valve	
Actuator type	Manual
Manufacturer	Milliken or approved equal
Diameters	
Discharge connection elbow	3 inches
Discharge pipe	3 inches
Valve(s)	3 inches
Materials of Construction	
Lifting chain	304 SS
Upper guide bars and bracket	304 SS
System Manufacturer termination point	Pump discharge connection elbow
Tank Connection	304 SS adhesive anchors

- b. The pump shall be capable of handling raw, unscreened sewage. The discharge connection elbow shall be permanently installed with the discharge piping. The pump shall be automatically connected to the discharge connection elbow when lowered into place, and shall be easily removed for inspection or service. There shall be no need for personnel to enter the basin or pump well. Sealing of the pumping unit to the discharge connection elbow shall be accomplished by a simple linear downward motion of the pump.

- c. An upper guide bar bracket shall be provided with each pump. The entire weight of the pumping unit shall follow guide bars into the operating position and pressed tightly against the discharge connection elbow with metal-to-metal contact. No sealing of the discharge interface by means of a diaphragm, O-ring, or other devices shall be acceptable. The pump, with its appurtenances and cable, shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 ft.
- d. Supply of all discharge piping, supports, gaskets, and hardware beyond the flanged connection specified above shall be the responsibility of the installing contractor.

7. Pressure Transducer

- a. Provide submersible pressure transducer unit(s) constructed of stainless steel as specified herein. Transducer output shall be a 4-20 mA signal.

Quantity	1	Per basin
Model	Levelrat or approved equal	
Mounting materials of construction		
Support pipe	304	SS
Supports	304	SS
Anchors	304	SS
Tank Connection	304 SS adhesive anchors	

- b. One (1) Transducer shall be suspended on a removable mounting pipe assembly. Pipe, supports and anchors shall be provided. Field attachment of the pipe and supports to the basin shall be the responsibility of the installing contractor. A moisture excluding aneroid bellows shall be supplied loose for installation in the junction box/disconnect. Attachment and supply of the junction box/disconnect at the basin wall shall be the responsibility of the installing contractor.
- c. Field attachment of the pressure transducer mounting brackets to the tank shall be the responsibility of the installing contractor.

8. Level Sensors - Provide one (1) level sensor assembly for each basin, consisting of an Anchor Scientific model GSI 40NONC or approved equal float switch with a smooth, chemical resistant polypropylene casing, and 316 stainless steel mounting bracket for each basin. Each float switch shall be provided with a three conductor electrical cable. Electrical cable shall terminate at the existing junction box/disconnect located at the basin wall. Field wiring shall be provided by the installing contractor. Field attachment of the level sensor assembly to the tank shall be the responsibility of the installing contractor.

9. Process Control Instrumentation

- a. Install DO and ORP probes/sensors (1 each) furnished by Owner (DMVA). Sensors shall be suspended on a removable mounting pipe assembly. Stainless steel pipe, stainless supports and stainless steel anchors shall be provided. Field attachment of the pipe and supports to the basin shall be the responsibility of the installing contractor. Field wiring, conduit, and installation of cable shall be the responsibility of the installing contractor.
- b. Locate and trace existing ORP signal wire from sensor located in SBR Basin #1 to the SBR Control Panel located in the blower building. Reconnect the ORP signal wire to the existing Hach SC4500 controller in the SBR Control Panel.

F. AEROBIC DIGESTER BASIN NO. 1

1. Mixer Assembly

Mixer Quantity		1	
Motor			
Size		15	HP
RPM		900	RPM
Efficiency		Premium	
Mounting Base Materials		304	Stainless Steel
Float			
Diameter (minimum)		84	inches
Shell Material	Fiber Reinforced Polyester Skin	FRP	
Impeller Volute Material		304	SS

a. Digester Mixer Restrained Mooring System

1. Provide a mooring system, as described below:

Mooring Type	Restrained
Mooring Point Quantity	Two
Mooring Posts	
Diameter	4
Pylon Material	Schedule 10
Base Plate Material	304 Stainless steel
Floor Connection	304 SS adhesive anchors
Mooring Frame Material	304 Stainless steel

2. The system shall consist of vertical pylons with base plate. Each pylon shall be filled with concrete by the installing contractor.

3. Furnished, as part of the unit, shall be a triangular mooring frame. The frame shall permit the assembly to move up and down following the change in liquid level while restrained within the vertical pylons. Removable 304 stainless steel U-bolts shall be attached to each frame and fit around the pylons.

b. Restrained Mooring Electrical Power Cable – Provide power cable wired into the motor conduit box and terminating at the basin wall. Electrical cable shall be supplied with kellems grips at the motor and basin wall terminations. Electrical cable floats for flotation of power cable(s) shall be provided. Attachment of cable to the existing junction box/disconnect at the basin wall shall be the responsibility of the installing contractor.

c. Performance - Each mixer shall meet the requirements summarized above. Complete mix shall be defined as maintaining biological suspension of all mixed liquor suspended solids with the specified MLSS concentration without the introduction of air.

d. Mixer Drive Motor

1. The motor shall be vertical P base design, totally enclosed fan cooled TEFC, and generally rated for severe duty. The motor shall in all cases equal or

- exceed standard NEMA specifications. A minimum service factor of 1.15 shall be furnished.
- 2., The motor winding shall be nonhygroscopic, and insulation shall equal or exceed NEMA Class "F". A lip seal shall be provided below the bottom bearing to prevent moisture from penetrating around the motor shaft. A condensate drain shall be located at the lowest point in the lower-end bell housing. Unit shall have a one-piece motor shaft continuous from the top motor bearing, through the lower bearing and down to and through the propeller. The shaft shall be manufactured from 17-4 PH stainless steel.
  3. Motor bearings shall be regreasable. Sealed bearings are not acceptable. Top bearing shall be shielded on the bottom side only. Bottom bearing shall be open. The top and bottom motor bearings shall be of combined radial and axial thrust type. The lower motor bearing inner brace shall be locked to the motor shaft via a special washer and locking nut arrangement. The shaft shall be threaded just below the lower bearing and shall have a keyway cut into the motor shaft. This key shall accept a tab from the inner diameter of the locking washer, and the locking nut shall have recesses to accept a tab from the outer diameter of the locking washer to prevent the nut from backing off. Snap ring type bearing retainers will not be acceptable.
  4. Submerged motors, jet pumps, submerged gear motors or gearboxes shall not be acceptable.
- e. Mixer Motor Mounting Base
1. The motor shall be securely mounted onto a solid base which is integral with the motor base extension. All submersed wetted motor mounting base components shall be constructed of 304 stainless steel.
  2. The upper portion of the motor mounting base, immediately below the lower motor bearing, shall include two independent acting air seals. The two seals shall be capable of sealing off the flow of air from the suction action of the pumped flow, and prevent backflow of liquid during impeller reversal. The lower end of the motor base extension shall be provided with a rotating backflow seal that will prevent grit from being introduced into the anti-deflection insert reservoir, but shall allow liquid to contact the shaft. The backflow seal shall not require scheduled lubrication or maintenance.
- f. Mixer Floatation – Mixer shall be equipped with a modular float with a central float passage of a size to allow installation and removal of the pump impeller. The float shall be foamed full of polyurethane foam of the closed cell type and shall be totally sealed to prevent the foam from being in contact with the external environment.
- g. Mixer Impeller - The impeller shall be designed to pump the liquid from near the surface and direct it down toward the vessel/basin bottom. The impeller shall be a two-blade marine type precision casting of 316 or 15/5 stainless steel and shall be specifically designed for the application intended. It shall be dynamically and hydraulically balanced. The propeller must be attached to the motor shaft with a hardened stainless steel pin and set screw. Impeller shall be capable of being reversed to cause back flow liquid movement without causing damage to the mixer chassis and without causing upflow liquid damage to the motor bearing and windings. No liquid spray or other liquid leakage upward onto the surface of the motor support surface or flotation chassis will be allowed.

- h. Mixer Intake Volute Assmby - The impeller shall operate in a volute made of stainless-steel plate, minimum 3/16 inch thick.
- i. Mixer Vibration - The entire rotating assembly including the motor rotor, shaft, shaft accessories, and impeller shall be dynamically balanced within 2.0 mils peak-to-peak horizontal displacement measured at the upper and lower motor bearing. Measurements shall be taken at a frequency equivalent to the motor RPM. Measurements shall be taken with the motor in a vertical, shaft down position with the entire power section mounted on resilient pads.

2. Retrievable Coarse Bubble Diffuser Assembly

- a. The aeration system shall be a coarse bubble diffused air system and shall be a retrievable configuration as shown on the contract drawings.

Assembly quantity	2
Diffuser Rack Size	10 Tubes
Materials of Construction	
Manifold	304 SS
Vertical Air Column	304 SS
Threaded Flange	304 SS
Quick Disconnect	316 SS
Adapter	
Track/beam Assembly	304 SS
Diffuser Hoist Assembly	304 SS
Valve Seat	EPDM
Tank Connection	304 SS adhesive anchors

- b. Provide retrievable air diffuser assemblies as specified herein. Each assembly shall consist of diffusers, diffuser manifold, track/beam, flexible air line, isolation valve, and lifting mechanism. Diffuser tubes as specified herein shall be provided for each diffuser assembly. Each diffuser shall be a non-clog diffuser and shall consist of an end connection, air reservoir, and air release ports. The diffuser shall be constructed of 316L stainless steel and shall include an integral hex nut and NPT male threads. Each diffuser assembly shall provide a uniform air distribution.
- c. The diffusers shall be connected to a diffuser manifold. The entire assembly shall be located such that each diffuser centerline is 12 inches above the basin floor. The vertical track/beam shall support the manual lifting mechanism assembly during operation and servicing.
- d. A manual lifting mechanism shall be provided for each retrievable diffuser assembly. Each lifting mechanism shall consist of a hoist, polyolefin guide wheels, stainless steel sheave with bronze bushing, 304 stainless steel lifting cable, and manual winch with enamel coated cast iron case and drum. The lifting mechanism shall be of sufficient design capacity to raise the diffuser rack assembly to the servicing position. In addition, the mechanism shall be designed to allow the diffuser rack to be pivoted 360 degrees when in the service position for ease of diffuser inspection and servicing.
- e. Each diffuser assembly shall include a 3 inches diameter wire reinforced EPDM flexible air line with quick disconnect end fittings and a threaded flange, elbow and

stainless-steel quick disconnect adapters. All air distribution piping, gaskets, and hardware beyond the threaded flange shall be supplied by the installing contractor.

- f. Each diffuser assembly shall include a 3 inches diameter manually operated isolation butterfly valve for connection to the main air distribution piping by the installing contractor. Valve gaskets and hardware are to be provided by the installing contractor. Valve shall be a butterfly valve with cast iron body, seat as specified herein, disk and one-piece stainless-steel shaft.
  - g. Attachment of the diffusers to the basin shall be the responsibility of the installing contractor.
3. Sludge Wasting Pump
- a. Provide a submersible non-clog pump as specified herein. Pump shall be equipped with a submersible electrical motor connected for three phase operation. Pump housing shall be painted cast iron. Pump shall include an adequate length of multi-conductor chloroprene jacketed type SPC cable suitable for submersible pump applications. The power cable shall also be sized according to NEC and ICEA standards. The pump shall be supplied with a mating cast iron discharge elbow. Each unit shall be fitted with an adequate length of steel lifting chain of adequate strength to permit raising and lowering the pump.

Pump Quantity	1	Per SBR/Digester basin
Pump Function	Sludge	
Motor Size	3.5	HP
Pump Flow rate and Required total dynamic head (TDH)	200 GPM at 27.9 TDH	
Discharge Valve		
Actuator type	Manual	
Manufacturer	Milliken or approved equal	
Diameters		
Discharge connection elbow	3	inches
Discharge pipe	3	inches
Valve(s)	3	inches
Materials of Construction		
Lifting chain	304 SS	
Upper guide bars and bracket	304 SS	
System Manufacturer	Pump discharge connection elbow	
termination point		
Tank Connection	304 SS adhesive anchors	

- b. The pump shall be capable of handling raw, unscreened sewage. The discharge connection elbow shall be permanently installed with the discharge piping. The pump shall be automatically connected to the discharge connection elbow when lowered into place and shall be easily removed for inspection or service. There shall be no need for personnel to enter the basin or pump well. Sealing of the pumping unit to the discharge connection elbow shall be accomplished by a simple linear downward motion of the pump.
- c. An upper guide bar bracket shall be provided with each pump. The entire weight of the pumping unit shall follow guide bars into the operating position and pressed tightly against the discharge connection elbow with metal-to-metal contact. No sealing of the

discharge interface by means of a diaphragm, O-ring, or other devices shall be acceptable. The pump, with its appurtenances and cable, shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 ft.

- d. Supply of all discharge piping, supports, gaskets, and hardware beyond the flanged connection specified above shall be the responsibility of the installing contractor.
4. Supernatant Withdrawal - An 8" x 20' pipe with a swivel joint shall be supplied for supernatant withdrawal. The pipe shall be raised and lowered using a portable manual winch hoist assembly. The pipe shall include a flange with counterweight assembly similar to what is provided on the existing digester tanks, an 8"x6" reducer, and a 6" handwheel operated plug valve.

5. Pressure Transducer

- a. Provide submersible pressure transducer unit constructed of stainless steel as specified herein. Transducer output shall be a 4-20 mA signal.

Quantity	1	Per basin
Model	Levelrat or approved equal	
Mounting materials of construction		
Support pipe	PVC	
Supports	304	SS
Anchors	304	SS
Tank Connection	304 SS adhesive anchors	

- b. One (1) Transducers shall be suspended on a removable assembly consisting of support pipe and hose. Removable assembly shall be supported by steel supports and guide rail, and anchors. Field attachment of the guide rail and supports to the basin shall be the responsibility of the installing contractor. A moisture excluding aneroid bellows shall be supplied loose for installation in the junction box/ disconnect. Attachment to the existing junction box/disconnect at the basin wall shall be the responsibility of the installing contractor.
- c. Field attachment of the pressure transducer mounting brackets to the tank shall be the responsibility of the installing contractor.

6. Level Sensors – Provide one (1) level sensor assembly consisting of an Anchor Scientific model GSI 40NONC (or approved equal) float switch with a smooth, chemical resistant polypropylene casing, and 316 stainless steel mounting bracket for each basin. Each float switch shall be provided with a three conductor electrical cable. Electrical cable shall terminate at a junction box/disconnect located at the basin wall. Field wiring and junction box/disconnect shall be provided by the installing contractor. Field attachment of the level sensor assembly to the tank shall be the responsibility of the installing contractor.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. The installation of the equipment furnished by the manufacturer shall be the responsibility of the installing contractor in accordance with all requirements of the contract documents.

3.2 SERVICE

- A. The equipment manufacturer shall provide the services of a factory trained representative for a maximum of two (2) trips and four (4) eight-hour days at the jobsite to inspect the installing contractor's equipment installation, supervise the initial operation of the equipment, instruct the plant operating personnel in proper operation and maintenance, and provide process assistance.
- B. If additional service is required due to the mechanisms not being fully operational, at the time of service requested by the contractor, the additional service days will be at the contractor's expense.
- C. The selected SBR manufacturer shall have a free troubleshooting help line available 24 hours a day, 365 days per year for the life of the plant. The line shall connect to a live service technician who shall have the capability of connecting to the control panel via internet, with the operator's permission.

END OF SECTION