

SECTION 11306

PACKAGED PUMPING STATIONS

PART 1. GENERAL

1.01 SECTION INCLUDES

- A. Furnish all labor, materials and equipment to install pumping station(s) and/or wet well lift station(s) as shown on the Drawings and as specified herein. Work shall include but not be limited to:
 - 1. Excavation
 - 2. Enclosure and Component Placement
 - 3. Control Panel and Wiring
 - 4. Internal and external piping with required supports and concrete encasement
 - 5. Backfill

1.02 RELATED SECTIONS

- A. Section 01010 - Summary of Work
- B. Section 01039 - Coordination and Meetings
- C. Section 01300 - Submittals
- D. Section 01400 - Quality Control
- E. Section 01600 - Material and Equipment
- F. Section 01650 - Starting of Systems
- G. Section 01700 - Contract Closeout
- H. Section 02225 - Excavating, Backfilling and Compacting for Utilities
- I. Section 02600 - Utility Piping
- J. Section 02605 - Manholes
- K. Section 03300 - Cast-In-Place Concrete
- L. Appendix A - Standard and Special Construction Detailed Drawings

1.03 COMMENTARY

- A. This Authority recognizes the fact that there are many types of pumps and pump manufacturers. The Authority also is aware that costs of pumping stations operation and maintenance may be significant.
- B. Therefore, the Owner shall do or cause the following elements to be done:

1. Whenever possible, a pumping station shall not be used.
2. Prior to design of a required pumping station, the Owner shall discuss the proposed pumping station in detail with the Authority.
3. Any pumping station design shall be of a type satisfactory to the Authority and shall meet all applicable requirements of DER.
4. The intent of the Authority is to standardize components used in pumping station and/or wet well applications.
5. Submersible stations shall not be used for flows greater than 30,000 gpd.
6. Submit calculations concerning odor and corrosion control caused by the detention time of the sewage. All calculations shall conform with EPA Design Manual "Odor and Corrosion Control in Sanitary Sewerage Systems and Treatment Plant", EPA/625/1-85/018. When odor and corrosion control is required by the Authority, the developer shall submit an engineering analysis of the chlorination systems to be used.

1.04 REFERENCES

- A. Pennsylvania Department of Transportation Publication 408, Latest Edition
- B. ASTM C-478 - Specifications for Pre-Cast Reinforced Concrete Manhole Sections
- C. National Electric Code - N.E.C.
- D. National Electric Safety Code

1.05 JOB CONDITIONS

- A. Job Conditions shall generally meet those of the related Sections.
- B. Specific conditions will be included with each project as may be required.

1.06 SUBMITTALS

- A. Submit shop drawings/product data from manufacturers' descriptive literature and specifications for all materials used in this Section. Submit in accordance with Section 01300.
- B. Specific submittals will be included with each project as may be required for testings, warranties, project manuals, etc.

1.07 QUALITY ASSURANCE

- A. Qualifications of Workmen: Provide at least one person who shall be thoroughly trained and experienced in the skills required, who shall be completely familiar with the design and application of work described for this Section, and who shall be present at all times during progress of the work of this Section and shall direct all work performed under this Section.

PART 2. PRODUCTS

2.01 GENERAL

- A. Pump stations and wet well lift stations shall normally be designed using components as specified herein with no approved equals. This is done to improve inventory control (standardization), equipment familiarization, use of proven equipment, etc.
- B. Products listed are not all inclusive. Refer to applicable project Drawings and Specifications.

2.02 PUMPS

- A. Packaged Pump Stations (Suction Lift)
 - 1. Gorman Rupp
- B. Wet Well Lift Station
 - 1. Peabody Barnes

2.03 WET WELL AND VALVE PIT ENCLOSURES

- A. Pre-cast enclosures shall meet the requirements of ASTM C-478.
- B. Wet Well Interior Coating System.
 - 1. All concrete wet wells shall have a coating system applied to the interior of the structure.
 - 2. The coating system shall be a 100% solids, two-component high build epoxy designed to be applied to concrete structures.
 - 3. Surface preparation shall include pressure washing at a minimum of 3500 psi and the surface must be completely dry prior to application.
 - 4. The two-component product shall be accurately measured to obtain proper mix ratio and thoroughly mixed.
 - 5. The final coating thickness shall be 80-100 mils. If additional coats are required, they must be applied within 12 hours. Product temperature range must be between 80-85 degrees Fahrenheit during application. Application temperature range shall be between 40-100 degrees Fahrenheit.
 - 6. Curing time for product shall be 18-20 hours at 70 degrees Fahrenheit. Curing times at other temperatures shall be in accordance with manufacturer's requirements.
 - 7. Coating system shall be manufactured by Parson Environmental and shall be Parsonpoxy SEL-80 or approved equal.
 - 8. All manufacturer's requirements shall be strictly adhered to.

2.04 ACCESS FRAMES AND COVERS

- A. These shall be manufactured by Bilco Company, Type K and be of aluminum and stainless steel materials.

2.05 CONTROL PANEL FOR DUPLEX PUMPING STATIONS

- A. All control panels utilized at submersible pumping stations in the Spring-Benner-Walker Joint Authority service areas shall be built to the design specifications approved by the Authority.

- 1. Enclosure

- a. Wall mounted NEMA 4 (Hoffman or ASCO only) Stainless steel electrical enclosure, designed to accommodate the appropriate power requirements as approved for each station by the Authority.
- b. The size of the enclosure shall not exceed a forty-eight (48) inch height or a thirty-six (36) inch width. Final size to be approved by the Authority.
- c. The enclosure shall have a dead front, an interior door for control and indicator functions/displays, and be equipped with padlock facilities.
- d. The enclosure also shall include a Square D exterior mounted weather-proof 15A-115V GFI duplex receptacle, and an exterior mounted weather-proof Crouse Hinds - Arktite inlet fitting (Model M-72, Cat. No. AR 631, 60A for 240 1 phase) or a (Model M-54, Cat. No. APJ 10377, 100A for 480 3 phase) for a 3 pole/3 wire + ground generator connection.

2.06 PIPE

- A. Ductile Iron Pipe - Section 02600, Sub-Section 2.01 A.3.
- B. PVC Pipe (Force Main) Section 02600, Sub-Section 2.01 A.1.b.

2.07 VALVES

- A. Gate valves shall be used. Ball valves will not be accepted.
- B. Gate and check valves shall be as manufactured by Kennedy.
- C. Vacuum/Air release valves shall be stainless steel manufactured by the ARI Valve Company.

2.08 CEMENT CONCRETE

- A. Concrete shall meet the requirements of Section 03300, Cast-In-Place Concrete for Class AA.

2.09 MONITORING EQUIPMENT

- A. Monitoring of equipment shall be site specific as to method and scope.

2.10 OTHER MATERIALS

- A. All other materials, not specifically described but required for proper and complete installation of the

work of this Section, shall be selected by the Contractor subject to the approval of the Authority.

2.11 BUILDINGS

- A. Permanent structures are required to be constructed for all Suction Lift Pump Stations and to enclose odor control facilities.
- B. Structure shall be designed with sufficient room to allow maintenance on the pumps.
- C. Structure shall be constructed of:
 - 1. Standard
 - a. SBWJA brick (Glen-Gery Courtland Econo Extruded Cored 04404N) and block exterior wall
 - b. Fiberglass shingled wooden truss roof with 5/12 slope and 2'-6" overhangs.
 - 2. Alternate 1
 - a. Split faced block exterior wall with insulated cores. Color to be chosen by Authority.
 - 3. Alternate 2
 - a. Textured precast concrete plank exterior walls.
 - b. Fiberglass shingled wooden truss roof with 5/12 slope and 2'-6" overhangs.

2.12 RADIO TELEMETRY / SCADA SYSTEMS

- A. All pump stations shall be supplied with supervisory control and data acquisition (SCADA) system to correspond with the Authority's existing SCADA system. Utilizing radio telemetry equipment coordinated and programmed to match the Authority's existing equipment.
- B. All pump stations, both suction lift and submersible, shall have SCADA equipment to report alarm and emergency conditions.
- C. SCADA system must be RE Smartware and SCADAPAK/Micro 16 compatible.
- D. Radio telemetry equipment must match the existing Authority equipment in use at the time of construction.

2.13 ODOR AND CORROSION CONTROL FACILITIES

- A. When odor and corrosion control has been deemed necessary by the Authority, a chlorination system shall be used.
- B. Chlorination system
 - 1. Less than 2 pounds of chlorine required per day, hypo-chlorite solution system shall be used.
 - 2. Between 2 and 15 pounds of chlorine required per day, a chlorine system using 150 pound chlorine cylinders shall be used.
 - 3. Over 15 pounds per day of chlorine required per day, a chlorine system using one-ton chlorine cylinders shall be used.
- C. Hypo-chlorite Solution System
 - 1. Metering Pump
 - a. Permanently installed
 - b. Manufactured by LMI or equal
- D. 150 pound and One-Ton Chlorine Cylinder Systems
 - 1. System must be contained in separate chlorine room
 - a. Room must be completely sealed
 - b. Ventilation system to automatically operate when anyone is in room
 - c. Chlorine detector required
 - 2. Regal Chlorination Systems
 - a. Tank mounted vacuum regulators, with heater if required.

- b. Automatic switch-over system with scale
- c. Two 150 pound cylinder supply / two-ton cylinder supply
- 3. Chlorine Detector
 - a. Manufactured by Regal Chlorination
 - b. Signal SCADA and radio telemetry alarms
- 4. Booster Pump (if required)
 - a. Manufactured by Aurora Pumps
- 5. Alarm System
 - a. Local – Exterior light and horn, interior annunciator
 - b. Remote – by radio telemetry
 - c. Deactivate ventilation system

2.14 PUMP STATION SITE

- A. Pump station site shall contain an area large enough for vehicular access and turnaround.
- B. Access roads shall have a plowable surface, preferable paved.
- C. Sites with structures shall have paved roadways and parking area.
- D. All pump stations shall be enclosed by site fencing.
 - 1. The site fencing shall enclose ample area for vehicular access and turnaround.
 - 2. Site fence shall be a minimum of 8' high chain link with three strands of barbed wire on top. Site fencing shall be PVC coated.
 - 3. Swing gates shall be provided for vehicular access.
- E. Pump station sites shall be adequately lighted.

2.15 EMERGENCY GENERATORS

- A. All pump stations shall be equipped with an emergency generator.
- B. Submersible Pump Stations
 - 1. One portable generator shall be supplied for each submersible pump station.
 - 2. Furnish and install double throw transfer switch for use with a portable emergency generator.
 - 3. Furnish and install a weatherproof exterior-mounted receptacle for connection of a portable emergency generator. Provide heavy duty plug to match receptacle.
 - 4. Manufacturer
 - a. Onan
- C. Suction Lift Pump Stations
 - 1. One emergency generator shall be installed inside the structure.
 - 2. Function:
 - a. When the normal power supply fails on any phase at the automatic transfer switch, the system shall automatically crank up and provide power to equipment deemed necessary by Authority.
 - b. After load is removed from system, it shall run 5 minutes before automatic shutdown.
 - c. System shall be capable of producing its standby rated horsepower continuously for the duration of each power failure.
 - d. Fuel tank capacity must sustain twenty four (24) hours of continuous operation.
 - 3. Manufacturers
 - a. Onan
 - b. Caterpillar

PART 3. EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions under which Work of this Section will be installed. Correct conditions detrimental to proper and timely completion of the Work. Do not proceed until unsatisfactory conditions of site have been corrected.

3.02 INSTALLATION

- A. Install equipment with skilled labor in accordance with manufacturer's instructions and details as shown on the Drawings.
- B. All pre-cast or cast-in-place sections/pads shall be placed on a minimum six (6) inch depth of AASHTO No. 57 aggregate. The subgrade for the aggregate shall be properly compacted to requirements of Section 02225.
- C. Install internal/external piping using specified materials.
- E. Install steel support for external piping as shown and encase/cradle with Class A concrete.
- F. Equipment installed shall be inspected, adjusted, approved and certified satisfactory by the manufacturer. Provide certification(s) that equipment is ready for operation.

3.03 BACKFILL AND COMPACTION

- A. Backfilling of pumping stations/wet well lift stations shall not commence until all cast-in-place concrete has reached its required compressive strength.
- B. Backfill around exterior piping and enclosure shall be as detailed in Section 02225 or as specifically shown on project Drawings.
- C. Compaction shall meet the requirements of Section 02225.

3.04 OPERATION

- A. The pumps shall be controlled automatically by float switches located in the wet well. The lead pump will start automatically when the liquid level reaches the "Lead Pump" float switch level and shall continue to operate, through a holding circuit, until the liquid level drops below the "Pump Stop" float switch level. Should the liquid level continue to rise above the "Lead Pump" float switch level, and reaches the "Lag Pump" float switch level, the lag pump will start and operate in parallel with the lead pump until the liquid level drops below the "Pump Stop" float switch level. In normal operation, the lead and lag pumps shall automatically alternate after each pumping cycle has been completed.
- B. At the discretion of the Authority, a high liquid level relay with dry contacts shall be energized for a remote alarm, such as a red blinking light mounted on the exterior of the enclosure for purposes of visual notification, should the liquid level continue to rise above the "Lag Pump" float switch level and reaches the "High Level Alarm" float switch level.
- C. Contractor shall fulfill the requirements of Section 01650 - Starting of Systems.

3.05 TESTING

- A. All piping shall be tested in accordance with Section 02600 and/or as may be directed by the Authority.