

EHRWSD
Sewage Pump Station Requirements

PART 1 - GENERAL

- 1.01 General: The intent of this section is to address all permanent, replacement and temporary pump station installations within the District. All new stations will be fitted with submersible pumps. Each station shall have a minimum of two (2) pumps of equal size with each station capable of pumping peak flow with one (1) pump out of service. The District reserves the right to modify the requirements of this section on a per project basis as they deem necessary to accommodate the overall needs of the District.

These specifications are intended to give a general description pump station requirements and does not purport to describe all details of the equipment to be furnished. Such details are considered to be either standard among all manufacturers or variable in accordance with specific equipment formulations, but resulting, in either case, in equal equipment performance, long-term reliability, and life-cycle cost-effectiveness.

- 1.02 Guarantee: A twenty-four (24) month warranty shall be provided for the pump station. This warranty shall begin on the date the pump station is accepted by the District for operation. The warranty shall cover the following:
1. All equipment, parts, and labor.
 2. Site materials, roadways, and fences.
 3. Ground subsidence and settlement of valve vault and wet well.

- 1.03 Scope of Work: The Contractor shall, unless otherwise notified, furnish all labor, materials, equipment, tools, and incidentals necessary to install, test, complete and make ready for operation a submersible sewage pump station. This includes the furnishing and installation of all necessary and desirable accessory equipment and auxiliaries, whether specifically mentioned in these specifications or not, as required for a successful installation. This includes the installation of a one (1) inch water service and frost free yard hydrant at each pump station for maintenance purposes.

The Contractor shall be responsible for all excavation and removal of obstructions and restoration of all properties involved directly with the construction and/ or installation of the pump station.

- 1.04 Capacity: The facility shall be sized to handle all flows from the total upstream tributary area, except for the pumps, which shall be sized to handle the peak flow of the upstream tributary area or twice the design peak flow of the proposed development, whichever is less. However, the facility shall be designed to permit future installation of pumps sized to handle the peak flow of the upstream tributary area.

The capacity of a pump station handling flow from existing gravity sewers shall be adequate to manage existing flows, including infiltration/inflow, as well as additional flows anticipated to be required for the proposed development.

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1.05 Design: Design of the pump station shall be coordinated with the District at all stages. In general, the wet well shall be designed to accommodate a three (3) minute run time of the pumps at ultimate flow. A minimum of one (1) foot shall be provided from the lowest incoming invert down to the "High Level Alarm" elevation. A minimum of one (1) foot shall be provided from the "High Level Alarm" elevation to the pump two (2) "On" elevation. A minimum of one (1) foot shall be provided from the pump two (2) "On" elevation to the pump one (1) "On" elevation. A minimum of one (1) foot shall be provided between pump off and top of pump. The operating range of the pump (pump one (1) "On" to "Off") shall contain a volume of at least a three (3) minute run time for the pumps with a minimum of one (1) foot of depth. A maximum cycle time of thirty (30) minutes at design average daily flow shall be obtained. The wet well and valve vault shall be at least six (6) feet in diameter and be of appropriate size to accommodate all equipment and appurtenances for the current and future needs of the District.

The pump station designer shall submit pump design efficiencies (catalog cuts) for review and approval. Pumps that are not properly selected for efficient operation may be rejected.

1.06 Site and Location: Pump stations cannot be located in the existing road right-of-way. The pump stations must be placed in a minimum 20' x 20' easement with access to an adjacent street.

PART 2 - PRODUCTS

2.01 Submersible Pump Requirements: Pumps shall be ITT Flygt C-Pumps or approved equal capable of passing a three (3) inch solid. Pumps shall be 460/480 volt, three phase when the pump horse power exceeds three horsepower. Pumps of three horsepower or less may be 230/240 volt, single phase, if three phase power is not available and the installation is approved by the District. Grinder pumps are only allowed for special circumstances as approved by the District. The pump shall be capable of 65 feet of continuous submergence without loss of watertight integrity. Pump and motor shall be made by the pump manufacturer. Pumps shall be provided with tungsten carbide seals on both upper and lower faces.

A 316 stainless steel nameplate shall be attached to the top of each pump. The manufacturer name, rated capacity, total head, model number, serial number, and all other pertinent data shall be stated. A 316 stainless steel lifting chain with a minimum of three (3) interspersed lifting rings shall be provided. The chain shall be of sufficient strength to raise and lower the pump with a safety factor of two (2) and a minimum of ¼ inch thick chain links.

The pump discharge shall be supplied with a mating cast iron discharge connection elbow. The elbow shall be permanently connected to the wet well along with the

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discharge piping and the pump slide rails. The slide rails shall be stainless steel and have a minimum diameter of two (2) inches and be sized in accordance with the manufacturers recommendations. The pump shall be easily removable and replaceable via the slide rails and quick disconnect system. No entry into the wet well shall be required to remove the pumps.

The interior piping shall be Ductile Iron Pipe, Class 52 with flanged joints conforming to AWWA C 115 and fittings conforming to AWWA C 110 unless internal pressures require a higher rated material. Pipe and fitting coating and lining shall be an asphaltic coating with a minimum 1 mil thickness.

2.02 Shop Drawing and Pump Curve: Shop drawings shall be submitted to the District or their agent for approval prior to construction. A complete submittal package shall consist of complete dimension drawings including location of pumps, piping, hatches, valves, and other accessories. A factory certified pump curve shall be submitted for review on all pumps greater than 10hp and shall include capacity, power requirements and efficiency at a minimum of five (5) points on the curve.

2.03 All pump stations shall be supplied with a lifting hoist. The hoist shall be stainless steel. For pumps under 500 pounds, the hoist shall be removable with a socket insert in the top of the wet well and supplied with a hand crank and stainless steel cable for pump removal. The hoist shall be a Halliday Products D3B36B or approved equal.

For pumps larger than 500 pounds, the hoist construction shall be a derrick-type lifting system and be coordinated with the District.

2.04 Mounting Hardware: All mounting hardware shall be 316 stainless steel. All brackets, supports, hangers, and braces inside the wet well shall be stainless steel.

2.05 Structures: The wet well and valve vault 10 feet diameter and smaller shall be constructed of manhole sections in accordance with ASTM C 478 with watertight rubber gasketed joints per ASTM C 443. Structure joints shall also be provided with a field applied mastic seal. The base section shall consist of a riser section with a 12-inch thick integral floor and a six (6) inch anti-flotation "Lip" around the exterior. The top shall be flat and be precast concrete with a minimum twelve (12) inch thickness. The requirements for wet wells larger than ten (10) feet in diameter shall be coordinated with the District.

Each structure (wet well and valve vault) shall have an access cover. Access covers shall be aluminum with 316 stainless steel hardware and flush mounted. The covers shall be rated for three hundred (300) pounds per square foot loading. The finish shall be checkered, diamond plate or other approved non-slip surface. The valve vault shall have a minimum dimension of 36" x 48". The wet well shall have a rectangular hatch opening which provides the maximum size opening. At a minimum, the wet well hatch shall provide a twelve (12) inch clearance from the back of the pump volute (away from

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the slide rails) to the edge of the opening to facilitate easy removal. The wet well and valve vault hatches shall be Halliday, Bilco or approved equal.

The interior of both the wet well and valve vault shall be coated with Thoroseal concrete sealant or approved equal. Only one (1) influent sewer shall be connected to the wet well and shall be located opposite of the pump.

Pump Stations and Valve Vaults shall be provided with manhole steps. Steps shall be polypropylene with steel reinforcement or approved equal.

A grout fillet shall be properly designed and constructed around the full circumference of the station's wet well bottom to direct grit and other solids to the pumps. The grout shall be approved by the District.

Each Valve Vault shall be fitted with a drain line back to the wet well. The drain line shall have a minimum diameter of two (2) inches, be of schedule 80 PVC, be placed at a 2% slope or better, and have a trap and check valve. The check valve shall be exposed in the wet well and be attached with a NPT threaded joint to permit changing the valve. The pipe shall extend a minimum of twelve (12) inches into the wet well but shall not interfere with the operations of the station or removal of the pumps.

- 2.06 Valve Vault: The valve vault shall house the valves, check valves, and bypass pumping connection for the pump station. Each pump shall have a swing check valve and gate valve. The bypass line shall be three (3) inches in diameter and have a "female" National Equipment Corp. 633F Quickcoupler meeting Mil-C-27487 or approved equal. The bypass line shall also have a check valve and gate valve. The maximum depth of the valve vault is seven (7) feet. A stainless steel pressure gauge shall be located on the upstream side of each swing check valve. The pressure gauge shall be Ashcraft or Amtek, with an acceptable pressure range.
- 2.07 Connections: All pipe wall connections shall utilize PSX manhole boots or approved equal. Once the wet well and valve vault are tested and approved, angular space shall be filled with non-shrink grout.
- 2.08 Vent: The wet well shall be provided with a four (4) inch Green Cap Vent or approved equal. The pipe shall be made of epoxy-coated ductile iron, stainless steel or other corrosion resistant material. PVC and black iron are not acceptable.
- 2.09 Testing: The wet well and valve vault shall be tested prior to backfilling as follows: The vaults shall be filled with water for twenty-four (24) hours and any visible leaks repaired immediately. If the water level drops more than twelve (12) inches within twenty-four (24) hours, the structure fails the test and the contractor shall make the necessary repairs to pass the test.

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- 2.10 Bedding and Backfill: The wet well and valve vaults shall be bedded with a minimum of 6 inches of ODOT Number 57 aggregate and backfilled with approved granular material.
- 2.11 Gate Valves: Gate valves shall be in accordance with AWWA C-500 or AWWA C-509 and have hand wheel operators.
- 2.12 Swing Check Valves: Check valves shall have exterior weighted arms and conform to AWWA C 508. Valves shall be cast iron body with a bronze mounted, single-disc, 175 psi working pressure, cushioned closing type. Valve shall be coated in accordance with AWWA C-550. Check valves shall be air cushioned, horizontal swing bolted bonnet, removable seat and disc flanged from G.A. Industries or approved equal.
- 2.13 Surge Relief Valves: Force Mains with a total dynamic head greater than 80 feet shall be required to have a surge Relief Valve. The valve shall be installed in the valve vault and discharge into the wet well. The valve shall be a APCO Angle-Style Surge Relief Valve or approved equal.
- 2.14 Fence: Each pump station shall be provided with a six (6) foot, galvanized, chain link fence with three (3) strands of barbwire and galvanized metal fence posts conforming to ODOT CMS Item 607. The fence shall provide at least ten (10) feet of working radius from each structure. A ten (10) foot wide gate of like material shall be provided. The layout of the fence and gate must allow service truck access to both the wet well and valve vault. A different type of fence system may be considered due to aesthetic considerations upon prior approval from the District. A warning sign shall be mounted on the fence which identifies that in case of an emergency, please contact (740) 474-3114.
- 2.15 Driveway: Each pump station shall be provided with asphalt driveway. The driveway shall be twelve (12) feet wide and run to the wet well. The drive shall consist of six (6) inches of #2 Stone, six (6) inches of compacted ODOT CMS Item 304, and four (4) inches of ODOT CMS Item 404.
- 2.16 Tools and Spare Parts: All special tools and recommended spare parts required for normal operation and maintenance shall be supplied for each piece of equipment furnished.

The following spare parts shall be furnished as a minimum:

1. One (1) set of 1 upper and 1 lower mechanical seals and a seal tool.
2. One (1) set of gaskets, O-rings, grommets, and other sealing devices.
3. One (1) rotating wear ring (if so equipped) or a spare impeller, and one (1) stationary wear ring (if so equipped) or spare volute.
4. One (1) complete set of spare fuses for all electrical devices.
5. Five (5) spare bulbs for each lamp type.
6. One (1) control relay of each types used.

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7. One (1) spare pump when five (5) hp or below. If item no. 7 is provided then items 1-3 can be waived.

All spare parts shall be delivered to the owner prior to final completion and start of the warranty period.

- 2.17 Operation and Maintenance Manuals: Four (4) complete sets of installation, operation and maintenance instructions shall be provided for all equipment and electrical components. The manuals shall be prepared specifically for the installation to which they pertain and shall include all available installation manuals, operation manuals, maintenance manuals, catalog cuts, drawings, wiring diagrams, equipment and parts list, list of spare parts provided, warranties, product descriptions, etc. All four (4) sets of manuals for major equipment shall be original manufacturer's manual. Photocopy reproductions of the originals will not be acceptable. Only one (1) set of original manufacturer's literature is required for miscellaneous components (valves, hoist, pipe, etc); copies of this literature is required for miscellaneous components; copies of this literature will be acceptable for the other three (3) O & M manuals. Copies must also be provided on a disk in PDF format.

PART 3 - EXECUTION

- 3.01 Record Drawings: The Record Drawings shall consist of the Contract Drawings revised per-as-built conditions and the approved Shop Drawings. As-built revisions to the Contract Drawings shall be professionally drafted. The Record Drawings shall be submitted to the District and on disk (or CD ROM) in AutoCADD format upon completion of the construction. The Record Drawings must consist of six (6) bond copies; three (3) being of 24" x 36" (or 22" X 34") size and three (3) being of 11" x 17" size.

Contract Drawings shall be legibly marked in the field to record the actual construction procedures and installation methodology including;

1. All deviations in location or elevation of any underground installation from that shown on the Contract Drawings.
2. Any significant changes in above-ground installation from the approved Shop Drawings or Contract Drawings.
3. Indication of District's approval of any such deviations or changes from the Contract Drawings or approved Shop Drawings.

- 3.02 Start Up: The contractor shall perform a lift station start up in the presence of District personnel. All aspects of the station shall be tested including a pump run test. A pump run test consists of determining the pump flow rate by measuring the depth of water in the wet well before and after a pump run cycle and calculating a flow value. If operation of the station is deemed unacceptable by the District, appropriate repairs shall be performed and a new Start Up scheduled at no additional cost.

END OF SECTION

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