

**SECTION 02566
LOW PRESSURE SEWER SYSTEMS**

1.0 GENERAL

- A. Low pressure sewer system installation shall include, but not necessarily be limited to, furnishing and installing pressure sewer pipe, valves, fittings, and appurtenances of the size and type shown on the Contract Plans and in accordance with the Contract Documents and approved installation details.
- B. Related Work Specified Elsewhere
1. Trench Excavation, Backfill, and Compaction: Section 02250
 2. Water Valves and Appurtenances: Section 02552
 3. Water Services, Water Meter Settings, and Vaults: Section 02553
 4. Cast-in-Place Concrete: Section 03300
 5. Miscellaneous Metals: Section 05500
 6. Sewage Grinder Pumping units: Section 11307
- C. Quality Assurance
- The Commission will inspect all materials before, during and after installation to ensure compliance with the Contract Documents.

2.0 MATERIALS

- A. General
1. Materials shall be furnished in accordance with the Contract Documents.
 2. To minimize the number of joints, only standard manufacturer's length of pipe shall be furnished and installed for all low pressure sewer unless otherwise indicated on the plans or approved by the Commission.
- B. Materials
1. Pressure Sewer Piping, Fittings and Valves
 - a. All sanitary pressure sewer piping shall be of PVC (DR-18 or SDR-21), high density polyethylene (HDPE) pipe (DR-11) or ductile iron (DI) and fittings as hereinafter specified. (PVC) pipe and fittings shall be homogeneous throughout and free from visible discoloration cracks, bubbles, blisters, holes, foreign inclusions, cuts, or scrapes on inside or outside surfaces, or other imperfections which may impair the performance or life of the pipe. Polyvinyl Chloride Plastic Water Pipe 4 inch and larger shall be Class 150 (DR18) and shall meet the requirements of AWWA C900. PVC Water Pipe smaller than 4 inches shall be PVC 1120 (SDR21) and shall meet the requirements of ASTM D 2241. The outside diameters of DR18 shall be equivalent to cast-iron

pipe. PVC Pipe shall have an integral bell with a rubber gasketed joint as listed in the AWWA C900 standard. Pipe and couplings shall be marked and factory tested in accordance with AWWA C900. (HDPE) pipe (DR-11) or ductile iron (DI) and fittings as hereinafter specified. Pipe and fittings shall utilize heat fusion jointing. HDPE pipe shall be DR11 with outside diameters equivalent to cast iron pipe (DIPS). Heat fusion joining of HDPE pipe and fittings shall be done in accordance with ASTM F2620-11.

- b. All valves shall be Ball Valve Curb Stop with Female Iron Pipe Thread (NPT) end connections. The valve size shall be same as the pipeline size. Connection to force main shall be packed joint with stainless steel insert, push-on joint or approved equal. Valves shall open left, counter-clockwise and be suitable for the conveyance of wastewater. The ball valves shall turn one-quarter (1/4) turn, ninety degrees to open and shall have a minimum working pressure rating of 200 psi. The ball valve shall be suitable for buried service and shall be manufactured in accordance with AWWA C-500. Valve extension stems shall be manufactured with cold rolled steel and have a centering ring when depth of ball valve is greater than 6' - 0". Top of stem shall be compatible with a standard tee-head wrench and extend to a maximum of 3-feet below finished grade. Bottom of stem shall be compatible with the ball valve tee-head and pinned to top of valve.

- c. Roadway valve boxes shall be as specified in Section 02552 except the covers shall be labeled "SEWER."

- d. Detector Tape

Visual detection tape shall be 3 inches wide (minimum) non-metallic green plastic tape lettered "sewer" in black graphics.

- e. Tracer Wire for Non Metallic Pipelines

Tracer wire shall be THHN solid, soft, continuous copper wire with a 45 mil polyethylene insulation. The wire shall be green, have "UL" markings and suitable for direct bury applications. All underground splicing shall be with butt splice connectors and shrink tubing or split bolt connections with a water proof binder and underground electrical tape.

- C. Material Storage Note: Materials shall be stored in order to insure the preservation of their quantity, quality and fitness for Work. The Contractor shall place materials on wooden platforms, or other hard, clean surfaces, not on the ground, and the materials shall be placed under cover when directed by the Owner. Stored materials shall be located in order to facilitate prompt inspection by the Owner. Lawns, grass plots, or other private or public property shall not be used for storage purposes without written permission of the owner or lessee. Unless directed or noted otherwise in the Contract documents, there will be no payment for stored materials.

3.0 EXECUTION

- A. Pressure Sewer, Fittings and Valves

1. The pressure sewer main shall be installed by either directional boring or open cut methods. A minimum 5' and maximum 6' depth of cover is required for all sewer force mains.
 - 2.
 3. For open cut methods, the installation of pressure sewer pipe shall be in accordance with Section 02551 of the Standard Specifications. For directional drilling methods, the installation of pressure sewer pipe shall be in accordance with Section 02310 of the Standard Specifications.
 4. Service valve assemblies (SVA) subjected to test pressure or system operating pressure prior to completion of service pipe installation and backfill shall be provided with adequate temporary bracing or anchorage to prevent valve separation from pipe.
 5. Pipe and fittings shall be installed in strict accordance with the manufacturer's recommendations.
- B. Pressure Sewer House Service Connections and Appurtenances
1. Service connections from sewage grinder pump connections or pressure sewer mains shall be installed using service saddles as the pressure sewer main is being installed or with installation of the service valve assemblies as approved by the Commission.
 2. Intersection, Flushing Connections, Terminal Flushing Connections and In-Line Cleanouts and Valves: Flushing connections and in-line cleanouts and valves shall be provided where indicated on the Drawings and in accordance with the Construction Details.
- C. Concrete Thrust Blocks
1. The Contractor shall provide concrete thrust blocks on all pressure sewer bends, tees, plugs and caps in accordance with the drawings and Standard Details. The entire face of earth against which the thrust block will bear shall be undisturbed earth or soil that meets all required compaction requirements, flat, and at the proper angle to counteract the thrust. Concrete thrust blocks shall be cured for a minimum of 48 hours before testing. Wood for temporary blocking and valve box installation shall be pressure treated with chromated copper arsenate in accordance with AWWA C1. Wood for blocking shall be solid, a minimum of one inch thick. No wood buttressing shall be used except as a temporary restraining measure until remaining work is completed.
- D. Tracer Wire
1. All non-metallic mains shall have a tracer wire secured with duct tape to the top of the pipe. The tracer wire shall be continuous for the full length of the pipeline. Continuous conductivity shall be maintained and tested. Underground splice connections shall be made with solderless split bolt connectors and taped to pipe.
- E. Detector Tape
1. Tape shall be placed 12 inches below the surface at final grade.
- F. Inspection and Field Tests

1. The Commission will inspect all materials before and after installation to ensure compliance with these Contract Documents. When specific material tests are called for in the referenced standards and specifications, the Commission shall have the option of requiring that any or all these tests be performed for materials furnished for a specified project.
2. After installation, pressure piping and appurtenances shall be tested by the Contractor for compliance with the Contract Documents. The Contractor shall furnish all labor, tools, materials, and equipment necessary to perform the specified tests.
3. All tests shall be witnessed by the Commission. The Contractor shall schedule all tests with the Commission at least 48 hours in advance. Commission inspection costs shall be paid for by the Contractor.
4. If any section of the pressure sewer system fails the inspection and/or tests, the Contractor shall, at his own expense, replace, repair, adjust, seal, or reseal the system and retest it until such time as it passes.
5. Inspection and testing of the various components of the low pressure sewer system shall be in accordance with Section 02551 of the Standard Specifications. Specified test pressure shall be 80 psi as measured at the high point.
6. The Contractor shall test the tracer wire for continuity at every installation location.

4.0 METHOD OF MEASUREMENT

Measurement for furnishing and installing low pressure sewer, including appurtenances, flushing connections and service valve assemblies will be made horizontally along the centerline of the pipe for each size and type of pipe.

5.0 BASIS OF PAYMENT

A. General

1. Payment will be made at the unit prices bid. The prices shall include furnishing all labor, tools, equipment and materials necessary to complete the work as shown, and in strict accordance with the Contract Documents.
2. Payment for furnishing and installing low pressure sewer and appurtenances shall incorporate the requirements of the following sections:
 - a. Clearing and Grubbing: Section 02110
 - b. Aggregate Backfill: Section 02240
 - c. Trench Excavation, Backfill and Compaction: Section 02250
 - d. Directional boring of pressure sewer: Section 02310
 - e. Restoration: Section 02800

- f. Turf Establishment: Section 02820
- g. Pre-cast Concrete Utility Services: Section 03400

3. Payment will be made for contingent items when approved by the Commission.

B. Low Pressure Sewer

Payment for furnishing and installing low pressure sewer, complete in place, will be made per linear foot of the size and type installed. The price(s) bid shall include clearing and grubbing, sediment and erosion control, traffic control, furnishing and installing pipe, fittings and jointing materials, joint restraint, buttresses, connection to existing pipelines or structures, testing, aggregate, excavation and backfill, disposing of spoil material, restoration of all disturbed areas and all other incidental items to complete the work.

C. Air/Vacuum Valves

Payment for air/vacuum valves shall be in accordance with Section 02563.

D. In-line Flushing Connections, Terminal Flushing Connections and Service Valve Assemblies.

Payment for furnishing and installing in-line flushing connections, terminal flushing connections and service valve assemblies complete in place, will be made for each unit installed. The price(s) bid shall include clearing and grubbing, sediment and erosion control, excavation and backfill, furnishing and installing all valves, pipe and fittings, furnishing and installing all vaults and manhole frames and covers, restoration and testing for the complete installation and all incidental items necessary to complete the work.

****END OF SECTION 02566****