

**SECTION 02733**  
**GRAVITY WASTEWATER COLLECTION SYSTEM**

**PART 1 -- GENERAL**

1.1 SECTION DESCRIPTION

- A. This section includes materials and installation standards, and Contractor responsibilities associated with the furnishing of all labor, materials, equipment and incidentals required to properly install, complete and make ready for operation all gravity collection lines and appurtenances as shown on the Drawings and as specified herein.
- B. Materials shall include but not limited to, the following:
  - 1. Gravity Wastewater Main
  - 2. Wastewater Manholes
  - 3. Services

1.2 SUBMITTALS

- A. Submit shop drawings of all materials for wastewater mains, manholes and services to be installed, for approval prior to ordering material.
- B. Manufacturer and Fabricator Certification

**PART 2 -- PRODUCTS**

2.1 GRAVITY WASTEWATER MAIN

- A. PVC pipe shall conform to ASTM D-3034, SDR 35 and meet requirements of ASTM D-3212 on joints for sewer pipe using flexible elastomeric seals. Pipe shall be green or white in color with the words "Sanitary Sewer" written on the pipe at regular intervals of third points around the pipe. Pipe bell shall consist of an integral wall section with a solid cross-section rubber ring, factory assembled, securely locked in place to prevent displacement during assembly.
- B. For excavations greater than 12 feet utilize AWWA C-900 SDR 18 PVC pipe, with the same color designations as stated above, shall be used.
- C. Where DIP is used, DIP shall be minimum Class 50 conforming to AWWA C-150 and ANSI A21.50. DIP shall be epoxy lined and bituminous coated. Lining shall be applied in accordance with the manufacturer's recommendations. DIP shall be

required where the separation from finished grade to invert is less than 4 feet, sewer lines cross other pipeline with less than 18 inches separation, in accordance to FDEP specifications and all other areas where SLCU requires. Absolute minimum cover for DIP shall be 24 inches to top of pipe.

- D. Fittings shall be of the same type of material used for the pipeline.

## 2.2 WASTEWATER MANHOLES

- A. The minimum inside diameter of manholes shall be 48 inches for wastewater main sizes up to 21 inches in diameter, with submittal of special designs for larger pipes. Non penetrating lift pen inserts shall be installed by precast Fabricator. Precast reinforced manholes shall be in accordance with ASTM C478, Class II, made with Type II acid resistant cement, shall attain a minimum compressive strength of 4,000 psi in 28 days. Joint material for manhole sections shall be butyl rubber sealant. After the sections are assembled, the remaining space shall be grouted with dense cement mortar, inside and outside. Installation of precast manholes shall comply with the details shown in the Construction Standards and in accordance with the manufacturer's recommendations.
- B. Manhole frames and covers shall be grey cast iron traffic rated heavy duty conforming to ASTM Designation A48, Class 30. Covers shall be marked with the word "SANITARY SEWER " in 2-inch raised letters. Frames and covers shall be set to the correct finish grade elevation, with adjustment precast concrete manhole rings placed below, as detailed, for precast manholes. Frames shall be suitable for the future addition of cast iron rings for upward adjustment of top elevation.
- C. The base slab and first ring of the precast manhole shall be cast monolithically.
- D. The manhole invert shall be carefully shaped to conform to the pipe flow channel. Flow channels within the manhole involving changes in direction or drops shall smoothly direct the flow in accordance with the Contract drawings and the Construction Standards.

## PART 3 -- EXECUTION

### 3.1 INSTALLATION

- A. Manholes
  1. Manholes shall be set according to construction plans and shall be precast in accordance with approved shop drawings, specifications and Construction standards.
  2. Manhole exterior shall receive two (2) application 16 mils each of 100% solid coal-tar epoxy. Application shall be by an approved applicator.

3. All manholes shall have sewer rain guards installed. Rain guards shall be manufactured by Fosroc-Preco Industries or approved equal.
4. All manholes shall require backfill compaction as specified in compaction specifications. Backfill shall be of a suitable material. Construction debris or other unstable or unsuitable materials shall not be used.

B. Gravity Wastewater Main

1. Gravity mains shall be laid accurately to both line and grade. Visible leakage, deflections, horizontal misalignment, significant bowing, non-constant slopes between manholes and sagging joints shall each be grounds for rejection of lines.
2. Where navigable waterways are crossed, ductile iron pipe shall be installed across and to ten feet each side of the crossing. Approved utility crossing signs shall be placed on the pipe alignment at each side of the waterway.
3. Special care shall be exercised in design and installation to provide adequate bedding for the type of pipe used, taking into consideration trench width and depth, superimposed loadings above grade, and the material below trench grade. Pipe loading capabilities shall be computed in accordance with established design criteria and special supporting bedding or facilities shall be provided as required by the Engineer. Trenches and excavations shall be kept dry while work is in progress. The Contractor shall be responsible to ensure that all safety requirements are met. The pipe barrel shall be uniformly supported along its entire length on undisturbed soil or bedding material. Pipe shall be laid in trenches having dry and stable bottom. Reference Section 02220, Utility Excavation, Backfilling and Compacting included in these Technical Specifications for further requirements pertaining to pipeline installations.
4. Extra protection shall be provided for underground ductile iron pipe and fittings within areas of severe corrosive conditions. This shall be accomplished by the installation of polyethylene encasement, through the area of concern.

C. Connections

1. Service Connections: Installation of service laterals shall be as shown within the Construction Standards. The service pipe lateral and required fittings shall extend to the property line, perpendicular to said line, terminating with stoppered ends or fittings, as indicated. The minimum service pipe size shall be four inches in diameter for a single service and six inches for a double service. All commercial service shall be six inches, minimum. The exact

location for each installed service shall be marked by permanent magnetic markers installed at the terminus location at each property line. Lateral magnetic markers shall be approved by SLCU with the same type used throughout the project

### 3.2 FIELD QUALITY CONTROL

#### A. TESTING

1. The Contractor shall perform testing of all wastewater gravity mains, as set forth in the following, and shall conduct said tests in the presence of representatives from SLCU and Engineer of Record. Testing shall not proceed until the facilities have been backfilled, the laying of roadway base is complete and Record Drawings are obtained.
2. For sanitary lines 100' or less in uninterrupted length (services excluded), the following shall apply:
  - a. Inspection lamping performed by the contractor shall be required. Lamping shall be performed in presence of SLCU and Engineer of Record. If deemed appropriate, SLCU may request T.V. and/or infiltration/exfiltration test. All testing performed shall be at the contractor's expense.
3. For sanitary lines greater than 100' in uninterrupted length (services excluded), the following shall apply:
  - a. The installed wastewater gravity main shall undergo television inspection performed by the contractor or representative of, prior to final acceptance by SLCU. Color videotapes and inspection logs shall be provided to SLCU for each inspection. At time of video taping, the lines shall be clean with sufficient water having been introduced into each segment of the line to show any sags or dips present. The video camera shall have a depth gauge attached to the front of the camera that will show depth of water in the line dips. If inspection reveals cracked, broken or defective pipe or pipe misalignment resulting in vertical sags in excess of ½ inch, or excessive water due to infiltration, the contractor shall be required to repair or replace the pipeline. Prior to repair or replacement of failed sewer pipe, the method of replacement shall be submitted to SLCU for approval. Pressure grouting shall not be considered as an acceptable method of repair. The results of all testing shall be provided to SLCU in legible form by the contractor. Notify SLCU and the Engineer of Record prior to conducting video inspection. The original videotape and three sets of record drawings shall be submitted to and become the property of SLCU

The video tape and record drawings must clearly show:

- 1) Project name, date & time of video taping, segment of line being taped (i.e., MH #1 to MH #2), and direction of taping process (i.e., with the flow or against the flow).
- 2) All lateral sizes, locations and orientation.
- 3) Depth of any sags/dips found in the line.
- 4) Entire length of line between manholes.

Any sand, rock, dirt or debris found in the lines shall be removed by the Contractor.

4. The sewer main, house laterals, and manholes shall be subjected to infiltration and exfiltration tests (method to be agreed upon by Engineer and SLCU). The allowable leakage shall not exceed 50 gallons/day/inch of diameter/mile.
5. Should the test fail, necessary repairs shall be accomplished by the contractor and the test repeated until the results are within the established limits. The contractor shall furnish the necessary labor, water and all other items required to conduct the required testing and shall perform the necessary system repairs required to comply with the specified test. All retesting shall be at the contractor's expense.

**\*\*END OF SECTION \*\***