

SECTION 33 39 13

**MANHOLES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This item shall govern the manufacture, construction, and installation of sanitary sewer manholes. All manholes shall conform to TCEQ requirements. Submittal and approval shall be required for all pre-cast design.

**1.2 MEASUREMENT AND PAYMENT**

- A. The depth of manholes completed shall be determined by measuring the vertical distance from the flow line of the sewer main to the top of the manhole ring and cover.
- B. Standard manholes shall be measured by the each for various size diameters and depths.
- C. The contract unit prices shall be the total compensation for furnishing all labor, materials, tools, equipment, and incidentals and performing all work, of whatever nature required, that is necessary for the completion of the manholes in accordance with the provisions of the plans and these specifications. Material or methods used to stabilize the foundation shall be subsidiary to the bid item for Manholes.
- D. Cleanouts for services shall be considered subsidiary to the price for each service connection.
- E. Drop connections will be measured for payment per each, complete in place regardless of depth.

**1.3 SUBMITTALS**

- A. Submit manufacturer’s data on materials furnished indicating compliance with the specifications regarding dimensions, thickness, weights, and materials.
- B. Submit manufacturer’s “Certificate of Compliance” stating that the materials furnished comply with this specification.

**PART 2 – PRODUCTS**

**2.2 MATERIALS**

A. CONCRETE

Refer to SECTION 03 30 00 - CONCRETE

B. MANHOLE RINGS AND COVERS

The standard rings and covers (V-1432-3) and the water-tight ring and cover (V-2432-3) shall be manufactured by East Jordan Iron Works (or pre-approved equal.) The manhole shall bear the appropriate model number, the logo of City and the words “Sanitary Sewer”. The cover shall have pick lugs cast into the surface. All manhole ring and covers shall have a 32” diameter.

**C. GRADE RINGS**

Grade rings shall be precast reinforced concrete. Minimum thickness shall be 2 inches by 8 inches wide by 30 inches inside diameter.

**D. PRECAST REINFORCED MANHOLE SECTIONS**

Precast manhole sections conform to the current ASTM C478 standard. Joints shall be O-ring gasketed. Thickness for manhole risers shall be as listed under wall “B” in the “Class Tables” of ASTM C76, Reinforced Concrete Pipe.

**E. PRE-CAST MANHOLE BASES**

Pre-cast manhole bases will conform to all TCEQ requirements and City Specifications for invert depths, reinforcement, base thickness and manhole depth for pipe size.

**F. DROPS**

Drops shall be constructed of either ductile iron as specified in SECTION 33 05 02 – DUCTILE IRON PIPE or PVC pipe as specified in Section 33 05 01 - POLYVINYLCHLORIDE PIPE AND FITTINGS. City of Bryan requires drops to be placed on the inside of a manhole, using a cross to allow access to the vertical pipe, for all pipes up to and including 12” in size. Outside drops will not be allowed unless pre-approved by City of Bryan. City of College Station requires drops to be placed on the outside of a manhole, using a size on size wye, for all pipes 6” in size and larger. For pipes smaller than 6”, within the City of College Station, drops shall be placed inside of manhole using a cross.

**2.2 TESTING REQUIREMENTS**

See SECTION 33 01 30.13 - TESTING FOR SANITARY SEWAGE GRAVITY SYSTEM

**PART 3 – EXECUTION****3.1 INSTALLATION****A. MANHOLE BASES**

1. Construct manhole bases in the configuration shown on the Plans. Minimum thickness below the flowline of sewer shall be 8 inches or as shown on the details.
2. Insure that bases are constructed or installed on firm ground and that ground water is controlled. Install appropriate material for a minimum of 4” to stabilize bottom if directed to do so by the Engineer.
3. The invert of manholes shall be formed in such a fashion that they are smooth and will not obstruct flow of sewage. Provide flow channels in the manhole base equivalent to the top of the pipe by forming the concrete base and trowelling it to a smooth, even finish with a steel trowel. Slope the manhole bench from the wall line to edge of flow channel and trowel it smooth on a grade of 1 inch per foot with a liberal radius applied at flow channel intercepts.

**B. PRECAST MANHOLES**

1. Precast Manhole bases shall be placed on a 6” minimum depth layer of cushion sand, gravel or pre-approved material.

- 2. Cast bottom section of precast manhole riser ring in manhole base as shown on the Plans. Place “Synko-Flex” waterstop (or pre-approved equal) per manufacturer’s recommendations prior to setting precast starter ring.

The base shall have a minimum diameter 12 inches greater than the outside diameter of the manhole, and a minimum thickness including the area under the pipe as follows:

0’ to 12’ deep manhole..... 8” base thickness  
 Greater than 12’ depth..... 12” base thickness

- 3. All invert channels shall be smooth and accurately shaped to a semi-circular bottom conforming to the outside of the adjacent sewer section. Inverts shall be formed directly in the concrete of the manhole base or may be constructed by laying full section sewer pipe straight through the manhole and cutting out the top half after the base is constructed. Changes in the direction of the sewer and entering branches shall have a true curve of as large a radius as the size of the manhole will permit. Where the largest pipe at a manhole is less than 12”, the channel depth shall be one half of the largest pipe diameter. When the largest pipe at the manhole is between 12 and 24 inches (inclusive,) the channel depth shall be three fourths of the largest pipe diameter. When the largest pipe at a manhole is greater than 24”, the channel depth shall match the largest pipe. In all cases, the edges of the pipe along the invert and at the walls of the manhole shall be plastered and brush-finished. Plaster shall be non-shrink or hydraulic grout.
- 4. Where inlet leads, main or lateral pipe sewers enter manholes, pipes shall be cut off flush with inside of manhole any irregularities shall be grouted up with non-shrink grout. Install stub outs, where shown, to line and grade. Use one full joint of pipe, of size indicated, for stub out. Seal stub out with plug. Install plug in such a manner as to prevent seepage of leakage through stub outs. Installation of plug shall be such that it may easily be removed in future without damaging bell or groove end of stub out.
- 5. If manholes are constructed in streets where immediate subsequent paving or re-paving is involved, readjust the manhole ring and covers, immediately prior to the paving operations. Manholes shall be installed with joints of size and numbers required to obtain correct depth. Contractor is responsible for verifying correct manhole depth before construction. Initially, manhole tops shall be not less than 6-inches nor greater than 18-inches from final grade. If manholes are relocated in the field because of unforeseen conflicts, the Contractor is responsible for correct depth of manhole. Manhole tops shall be set as follows:
  - a.) Developed Areas: Set manhole tops 1-inch higher than existing elevation of natural ground or other final grade when specified by the Engineer.
  - b.) Undeveloped Areas: Set manhole tops flush with paved surfaces and 6-inches higher than shoulder and/or proposed final grade elevations in easements or other unpaved areas. Where manholes are located in bottom of ditches, either set manhole top by EJIW V-2342, or pre-approved equal, flush with ditch bottom and seal with solid cover, or set twelve inches above ditch top and reshape ditch around manhole.
- 6. Prior to placing each section of manhole riser or cone, thoroughly clean the bells and spigots to be joined.
- 7. Backfilling will be performed evenly and carefully around the manhole after the full strength of the concrete is attained.

8. Carefully place the O-ring gasket and check for proper alignment.
9. Plug lift holes, interior joints, and exterior joints with “Water Plug” grout.
10. Each manhole shall be individually vacuum tested according to the SECTION 33 39 13 - MANHOLES. Stub-outs, boots, and pipe plugs shall be secured to prevent movement while the vacuum is being drawn.

C. CAST-IN PLACE MANHOLES

Cast-In place manholes are not allowed without prior approval from the City Engineer. This approval shall only be in emergency situations.

D. FIBERGLASS MANHOLES

Fiberglass manholes are permitted with written approval from the City Engineer.

E. INSTALLATION OF MANHOLE AROUND EXISTING SEWER PIPE (City of College Station Only)

Should a manhole need to be installed around an existing sewer, the existing sewer pipe must first be exposed and an invert constructed under the pipe. The excavation must be kept free of water while the manhole is being constructed. Inverts may be formed by pouring the concrete invert (3,000 psi) and cutting out the top half of the pipe. A precast manhole section, with U-shaped cutouts for the pipe, can then be installed over the existing pipe. The voids of the cutout must then be filled with hydraulic cement. The top sections of the manhole shall be constructed per the standard manhole specification. Cast-in-place manholes will also be permitted for installation around existing sewers. The sanitary sewer pipe shall not protrude into the trough of the manhole (all pipe shall be flush with the manhole).

E. SERVICE CONNECTIONS

Service connections at manholes will meet all other requirements of this specification and shall be tied into the manhole with a manhole boot. At the time of construction, the Engineer will designate the locations of the service outlets and the depth to the top of the lateral pipe, if depth is not indicated on the plans. The minimum depth of cover over the end of the lateral pipe shall be no deeper than what is required to serve the intended lot.

F. CLEANOUT STRUCTURES

The Contractor shall construct cleanouts where shown on the plans and as specified. All backfill around and above the pipe shall be machine tamped in layers not exceeding 3-inches in depth so that no settlement shall occur after the cleanout is constructed. Cleanouts shall be provided at each service connection and located at the edge of an easement or at the right-of-way. The cleanouts shall be enclosed within a round plastic box which has a lid that makes the cleanout accessible, set flush with the ground. Cleanout shall include a brass plug (City of Bryan only).

G. DROP MANHOLES

Drop manholes shall be constructed for elevation differences of 24 inches or greater as measured from the flow line of the pipe to the flow line entrance of the manhole and constructed in a manner that will allow the water from the drop to drop in the flow line of the intersecting sewer.

**END OF SECTION**