

SECTION 02601

MANHOLES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. WORK required under this section consists of all materials, accessories, equipment, tools, and labor required to install precast concrete standard manholes, where shown on Drawings, and to perform all adjustments to guarantee satisfactory system operation.
- B. Manholes shall be constructed of specified materials to sizes, shapes, and dimensions, and at locations shown on Drawings. Height of manholes shall be such that top of manhole frame will be as shown on Drawings, and invert shall be at designed elevations. Wall thickness of precast concrete manholes shall be in accordance with ASTM 478 or as shown on Drawings.

1.02 RELATED WORK

- A. Section 02225 - Earthwork for Utilities
- B. Section 02602 – Coatings for Existing Manholes and Wastewater Structures
- C. Section 02603 – Coatings for New Manholes and Wastewater Structures
- D. Section 03200 - Concrete Reinforcement
- E. Section 03300 - Concrete

1.03 REFERENCES

- A. ASTM A 48, Standard Specification for Gray Iron Castings.
- B. ASTM C 32, Standard Specification for Sewer and Manhole Brick (made from clay or shale).
- C. ASTM C 144, Standard Specification for Aggregate for Masonry Mortar.
- D. ASTM C 443, Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
- E. ASTM C 478, Standard Specification for Precast Reinforced Concrete Manhole Sections.
- F. ASTM C 1244, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) test.
- G. ASTM C 923, Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.

1.04 QUALITY ASSURANCE

After delivery to site, materials which have been damaged in transit or are otherwise unsuitable for use in the WORK, shall be rejected and removed from the site.

PART 2 PRODUCTS

2.01 MATERIALS

A. Concrete

1. Concrete, cement, sand and water used in manhole construction shall conform to the applicable requirements stated in Section 03300 of these Specifications. All concrete shall be of class shown on Drawings.
2. Steel reinforcement shall conform to the applicable requirements of Section 03200 of these Specifications.

B. Precast Concrete Manholes

1. Precast concrete manholes shall consist of precast reinforced concrete sections, a conical or flat slab top section, and a base section conforming to the typical manhole details as shown on Drawings, concrete to be Type II, 4,000 psi wetcast concrete.
2. Precast manhole sections shall be manufactured, tested, and marked in accordance with latest provisions of ASTM C-478.
3. Ends of each reinforced concrete manhole riser section and bottom end of manhole top section shall be so formed that when manhole risers and top are assembled, they will make a continuous and uniform manhole.
4. Joints of manhole sections shall be of tongue and groove type. Sections shall be joined using gaskets conforming to applicable provisions of ASTM C-443 or C990, latest revision. Mastic will not be allowed.
5. Holes in manhole bases to receive sewer pipes shall be precast at the factory at required locations and heights. Knocking out of holes in the field will not be permitted.
6. Holes in precast bases to receive sewer pipes shall be provided with flexible manhole connectors of high quality synthetic or natural rubber or with stainless steel wedge connection and conform to ASTM C923. Approved products are ALOK Gasket, Kor-N-Seal II or equal. Coring will only be permitted with approval of TOWN when unknown field conditions arise.

7. Manhole inverts shall be constructed of Class C (4,000 psi) concrete in accordance with details on Drawings and shall have the same cross section as the invert of the sewer with which they connect. Invert shall be carefully formed to required size and grade by gradual and even changes in sections. Changes in direction of flow through sewer shall be made to a curve with as large a radius as size of manhole will permit.
8. Precast inverts will be allowed.
9. The interior walls of wet wells, first manhole upstream of wet wells, forcemain discharge manholes, and drop manholes shall be coated according to Section 02603 (Coatings for New Manholes and Wastewater Structures.)
10. The interior walls of existing manholes that receive forcemain discharges shall be coated according to Section 02602 (Coatings for Existing Manholes and Wastewater Structures.)

C. Frames, Covers and Steps

1. Manhole frames, stepsets and covers shall be cast iron conforming to minimum requirements of latest ASTM A-48, for Class 35B Gray Iron Castings. Castings shall be made accurately to required dimensions, fully interchangeable, sound, smooth, clean and free from blisters or other defects. Defective castings which have been plugged or otherwise treated shall not be used. Each casting shall have its actual weight in pounds stenciled or painted on it in white paint.
2. Manhole frames and covers shall be of size and location as shown on Drawings. Where manholes are to be located under roads or driveways, whether paved or unpaved, frames and covers shall be equal to Neenah Foundry Co., No. R-1642 with T-Gasket, or approved equal. Where called for on drawings, frames and covers shall be equal to Neenah Foundry Co., No. R-1916-F (bolt down) with T-Gasket, or approved equal.
3. All bolts or screws must be stainless steel.
4. Contact surfaces of all manhole covers and corresponding supporting rings in rims shall be machined to provide full perimeter contact.
5. Sanitary sewer manhole covers shall have cast on the top in letters 1 inch high, as shown on the TOWN Details. Cover shall be Neenah Type "A".
6. Steps: Manhole steps conforming to applicable provision of ASTM C-478 such as "Wedg-Lok" as manufactured by Delta Pipe Products, or plastic steps as manufactured by M. A. Industries, Inc., American Step, or approved equal, shall be used.

- D. Brick used in manhole construction shall be either solid or cored, medium hard or better, Grade SM brick conforming to requirements of ASTM C-32 for sewer and manhole brick.

- E. Mortar for brick manhole construction shall be sand-cement mortar composed of one part Portland cement to two parts clean sand conforming to ASTM C-144. Twenty pounds of hydrated lime per sack of cement may be added. No retempered mortar shall be used.

All drop manholes with outside drop connections shall include all exterior drop pipe additions to standard manholes complete with drop pipe encasement, excavation, and foundation cushion. All outside drop pipe materials are to be ductile iron, including a minimum of one (1) joint of ductile iron pipe entering the manhole. Any drop from the invert in to the invert out equal to or greater than 2.0 feet shall be constructed as an outside-drop manhole. See the Town of Braselton Water & Sewer Departments Standards.

PART 3 EXECUTION

3.01 MANHOLES

- A. Manhole bases shall be placed on 6-inch bed of foundation stone to required elevation.
- B. Joints of precast sections shall be sealed with approved gasket under ASTM C443 or C990. External joint rap, such as Rub R Nek or Butyl Lok Wrap must be used on all precast joints. Interior joints shall be grouted.
- C. After installation of pipe to proper grade and alignment, make required seal of pipe and manhole base and formed inverts in accordance with Specifications and as shown on Drawings.
- D. Manhole shall have a minimum of 0.2' (2/10') fall, measured from inlet to outlet.
- E. Install manhole frames and covers in accordance with Specifications and as shown on Drawings.
- F. Backfilling of manhole in accordance with Section 02225 (Earthwork for Utilities).
- G. Elevation adjustment shall be made by the use of precast reinforced grade rings manufactured in accordance to ASTM C478. Brick are also permitted.
- H. Lift inserts must be integrally cast into the structures. Holes will not be permitted to penetrate the entire wall thickness.
- I. Spare Parts – Manhole hook number to be determined by Town at end of construction.

3.02 COATING REQUIREMENT

See specification sections 02602 and 02603 for coating requirements.

3.03 INSPECTION

- A. After completion of sanitary sewer systems, all manholes shall be visually inspected to insure all joints are seated, all lift holes are grouted, all inverts are properly constructed, and pipe to manhole connections are installed per manufacturer's recommendations.
- B. Vacuum Testing
 - 1. Each manhole shall be tested immediately after assembly and prior to backfilling as defined by ASTM C1244 *Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test*.
 - 2. All lift holes shall be plugged with an approved non-shrink grout.
 - 3. All pipes entering the manhole shall be plugged, taking care to securely brace the plug from being drawn into the manhole.
 - 4. The test head shall be placed at the inside of the top of the ring and the seal inflated in accordance with the manufacturer's recommendations.
 - 5. Following the procedures as defined ASTM C1244, a vacuum of 10 inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9 inches. The TOWN's time requirements shall substitute for the requirements of ASTM C1244 as follows: The manhole shall pass if the time is greater than 60 seconds for 48" diameter, 75 seconds for 60", and 90 seconds for 72" diameter manholes.
 - 6. If the manhole fails the initial test, necessary repairs shall be made with a non-shrink grout while the vacuum is still being drawn. Retesting shall proceed until a satisfactory test is obtained.
- C. The system will not be accepted by the TOWN until all manholes pass a vacuum test.

END OF SECTION