

**SECTION 33 39 20**  
**PRECAST CONCRETE MANHOLE**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Sanitary Sewer, Water Appurtenance, or Reclaimed Water Appurtenance Precast Concrete Manholes
- B. Deviations from this City of Fort Worth Standard Specification
  - 1. None.
- C. Related Specification Sections include, but are not necessarily limited to:
  - 1. Division 0 – Bidding Requirements, Contract Forms, and Conditions of the Contract
  - 2. Division 1 – General Requirements
  - 3. Section 03 30 00 – Cast-in-Place Concrete
  - 4. Section 03 80 00 – Modifications to Existing Concrete Structures
  - 5. Section 33 01 30 – Sewer and Manhole Testing
  - 6. Section 33 05 13 – Frame, Cover, and Grade Rings
  - 7. Section 33 39 60 – Epoxy Liners for Sanitary Sewer Structures

**1.2 PRICE AND PAYMENT PROCEDURES**

- A. Measurement and Payment
  - 1. Manhole
    - a. Measurement
      - 1) Measurement for this Item shall be per each concrete manhole installed.
    - b. Payment
      - 1) The work performed and the materials furnished in accordance with this Item shall be paid for at the unit price bid per each “Manhole” installed for:
        - a) Various sizes
        - b) Various types
    - c. The price bid will include:
      - 1) Manhole structure complete in place
      - 2) Excavation
      - 3) Forms
      - 4) Reinforcing steel (if required)
      - 5) Concrete
      - 6) Backfill
      - 7) Foundation
      - 8) Drop pipe
      - 9) Stubs
      - 10) Frame
      - 11) Cover
      - 12) Grade rings

- 13) Pipe connections
  - 14) Pavement removal
  - 15) Hauling
  - 16) Disposal of excess material
  - 17) Placement and compaction of backfill
  - 18) Clean-up
2. Extra Depth Manhole
    - a. Measurement
      - 1) Measurement for added depth beyond 6 feet will be per vertical foot, measured to the nearest 1/10 foot.
    - b. Payment
      - 1) The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid per vertical foot for "Extra Depth Manhole" specified for:
        - a) Various sizes
    - c. The price bid will include:
      - 1) Manhole structure complete in place
      - 2) Excavation
      - 3) Forms
      - 4) Reinforcing steel (if required)
      - 5) Concrete
      - 6) Backfill
      - 7) Foundation
      - 8) Drop pipe
      - 9) Stubs
      - 10) Frame
      - 11) Cover
      - 12) Grade rings
      - 13) Pipe connections
      - 14) Pavement removal
      - 15) Hauling
      - 16) Disposal of excess material
      - 17) Placement and compaction of backfill
      - 18) Clean-up

### 1.3 REFERENCES

#### A. Definitions

1. Manhole Type
  - a. Standard Manhole (See City Standard Details)
    - 1) Greater than 4 feet deep up to 6 feet deep
  - b. Standard Drop Manhole (See City Standard Details)
    - 1) Same as Standard Manhole with external drop connection(s)
  - c. Type "A" Manhole (See City Standard Details)
    - 1) Manhole set on a reinforced concrete block placed around 39-inch and larger sewer pipe.
  - d. Shallow Manhole (See City Standard Details)
    - 1) Less than four 4 deep with formed invert for sewer pipe diameters smaller than 39-inch
2. Manhole Size

- a. 4 foot diameter
  - 1) Used with pipe ranging from 8-inch to 15-inch
- b. 5 foot diameter
  - 1) Used with pipe ranging from 18-inch to 36-inch
  - 2) See specific manhole design on Drawings for pipes larger than 36-inch.

**B. Reference Standards**

1. Reference standards cited in this Specification refer to the current reference standard published at the time of the latest revision date logged at the end of this Specification, unless a date is specifically cited.
2. ASTM International (ASTM):
  - a. C443, Standard Specification for Joint for Concrete Pipe and Manholes, Using Rubber Gaskets
  - b. C478, Standard Specification for Precast Reinforced Concrete Manhole Sections.
  - c. C923, Standard Specification for Resilient Connectors Between Reinforced Concrete Manholes Structures, Pipes, and Laterals.
  - d. D1187, Standard Specification for Asphalt-Base Emulsion for Use as Protective Coatings for Metal
  - e. D1227, Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing

**1.4 ADMINISTRATIVE REQUIREMENTS [NOT USED]**

**1.5 SUBMITTALS**

- A. Submittals shall be in accordance with Section 01 33 00.
- B. All submittals shall be approved by the City prior to delivery.

**1.6 ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS**

- A. Product Data
  1. Precast Concrete Manhole
  2. Drop connection materials
  3. Pipe connections at manhole walls
  4. Stubs and stub plugs
  5. Admixtures
  6. Concrete Mix Design

**1.7 CLOSEOUT SUBMITTALS [NOT USED]**

**1.8 MAINTENANCE MATERIAL SUBMITTALS [NOT USED]**

**1.9 QUALITY ASSURANCE [NOT USED]**

**1.10 DELIVERY, STORAGE, AND HANDLING [NOT USED]**

**1.11 FIELD [SITE] CONDITIONS [NOT USED]**

**1.12 WARRANTY**

- A. Manufacturer Warranty

1. Manufacturer's Warranty shall be in accordance with Division 1.

## **PART 2 - PRODUCTS**

### **2.1 OWNER-FURNISHED [or] OWNER-SUPPLIED PRODUCTS [NOT USED]**

### **2.2 EQUIPMENT, PRODUCT TYPES, AND MATERIALS**

#### **A. Manufacturers**

1. Only the manufacturers as listed on the City's Standard Products List will be considered as shown in Section 01 60 00.
  - a. The manufacturer must comply with this Specification and related Sections.
2. Any product that is not listed on the Standard Products List is considered a substitution and shall be submitted in accordance with Section 01 25 00.

#### **B. Materials**

1. Precast Reinforced Concrete Sections – Conform to ASTM C478.
2. Precast Joints
  - a. Provide gasketed joints in accordance with ASTM C443.
  - b. Minimize number of segments.
  - c. Use long joints at the bottom and shorter joints toward the top.
  - d. Include manufacturer's stamp on each section.
3. Lifting Devices
  - a. Manhole sections and cones may be furnished with lift lugs or lift holes.
    - 1) If lift lugs are provided, place 180 degrees apart.
    - 2) If lift holes are provided, place 180 degrees apart and grout during manhole installation.
4. Frame and Cover – Conform to Section 33 05 13.
5. Grade Ring – Conform to Section 33 05 13 and ASTM C478.
6. Pipe Connections
  - a. Utilize either an integrally cast embedded pipe connector or a boot-type connector installed in a circular block out opening conforming to ASTM C923.
7. Steps
  - a. No steps are allowed.
8. Interior Coating or Liner – Conform to Section 33 39 60.
9. Exterior Coating
  - a. Coat with non-fibered asphaltic emulsion in accordance with ASTM D1187 Type I and ASTM D1227 Type III Class I.

### **2.3 ACCESSORIES [NOT USED]**

### **2.4 SOURCE QUALITY CONTROL [NOT USED]**

## **PART 3 - EXECUTION**

### **3.1 INSTALLERS [NOT USED]**

### **3.2 EXAMINATION**

#### **A. Evaluation and Assessment**

1. Verify lines and grades are in accordance to the Drawings.

### **3.3 PREPARATION**

#### **A. Foundation Preparation**

1. Excavate 8 inches below manhole foundation.
2. Replace excavated soil with course aggregate; creating a stable base for manhole construction.
  - a. If soil conditions or ground water prevent use of course aggregate base a 2-inch mud slab may be substituted.

### **3.4 INSTALLATION**

#### **A. Manhole**

1. Construct manhole to dimensions shown on Drawings.
2. Precast Sections
  - a. Provide bell-and-spigot design incorporating a premolded joint sealing compound for wastewater use.
  - b. Clean bell spigot and gaskets, lubricate and join.
  - c. Minimize number of segments.
  - d. Use long joints used at the bottom and shorter joints toward the top.

#### **B. Invert**

1. Construct invert channels to provide a smooth waterway with no disruption of flow at pipe-manhole connections.
2. For direction changes of mains, construct channels tangent to mains with maximum possible radius of curvature.
  - a. Provide curves for side inlets.
3. For all standard manholes provide full depth invert.
4. For example, if 8-inch pipe in connected to manhole construct the invert to full 8 inches in depth.

#### **C. Drop Manhole Connection**

1. Install drop connection when sewer line enters manhole higher than 24 inches above the invert.

#### **D. Final Rim Elevation**

1. Install concrete grade rings for height adjustment.
  - a. Construct grade ring on load bearing shoulder of manhole.
  - b. Use sealant between rings as shown on Drawings.
2. Set frame on top of manhole or grade rings using continuous water sealant.
3. Remove debris, stones and dirt to ensure a watertight seal.

4. Do not use steel shims, wood, stones or other unspecified material to obtain the final surface elevation of the manhole frame.

E. Internal coating

1. Internal coating application will conform to Section 33 39 60, if required by Drawings.

F. External coating

1. Remove dirt, dust, oil and other contaminants that could interfere with adhesion of the coating.
2. Cure manhole for 3 days before backfilling around the structure.
3. Application will follow manufacturer's recommendation.

G. Modifications and Pipe Penetrations

1. Conform to Section 03 80 00.

**3.5 REPAIR / RESTORATION [NOT USED]**

**3.6 RE-INSTALLATION [NOT USED]**

**3.7 FIELD QUALITY CONTROL**

A. Field Tests and Inspections

1. Perform vacuum test in accordance with Section 33 01 30.

**3.8 SYSTEM STARTUP [NOT USED]**

**3.9 ADJUSTING [NOT USED]**

**3.10 CLEANING [NOT USED]**

**3.11 CLOSEOUT ACTIVITIES [NOT USED]**

**3.12 PROTECTION [NOT USED]**

**3.13 MAINTENANCE [NOT USED]**

**3.14 ATTACHMENTS [NOT USED]**

**END OF SECTION**

Revision Log		
DATE	NAME	SUMMARY OF CHANGE
12/20/2012	D. Johnson	1.1.A.1 – Modified to include precast manholes for water and reclaimed water applications 1.3.B.2 – Modified to include ASTM C443, D1187 and D1227 as references 2.2.B.1-3 – Modified in accordance with new ASTM references 2.2.B.10 – Modified in accordance with new ASTM references