

## **SECTION 02605**

### **MANHOLES**

#### **PART 1 - GENERAL**

##### **1.01 WORK INCLUDED**

- A. This section covers the materials and procedures used in the construction and repair of sanitary sewer manholes.

##### **1.02 RELATED WORK**

- A. Section 02220 - Excavation, Backfilling, and Compacting.
- B. Section 02610 – Pipe and Fittings
- C. Section 02730 - Sanitary Sewer Pipelines
- D. Section 02734 – Inspection and Testing of Sanitary Sewer Pipelines, Manholes, and Service Lines.
- E. Section .3300 – Cast In Place Concrete

##### **1.03 SUBMITTALS**

- A. Furnish Shop Drawings and Submittal Data for approval prior to the delivery of any pre-cast manhole sections to the Engineer of Record.
- B. Submit for approval any materials not listed specifically below to the Engineer of Record.

##### **1.04 REFERENCES**

AASHTO M85

ASTM C 443

ASTM C 478

ASTM C 361

ASTM A 48

ASTM A 536

## **1.05 MANHOLE DIMENSIONS AND LAYOUT**

- A. Construct all manholes in accordance with the Standard Manhole Details in Standard Detail Drawings.
- B. The required dimensions on manholes are:
  - 1. Cone section height: 24 inches, minimum; 30 inches, maximum.
  - 2. Throat section height: 12 inches, maximum.
- C. Locate the manhole so the centerlines of all pipelines entering and leaving pass through the center of the manhole.

## **1.06 PROTECTION**

- A. In all cases, the Contractor is responsible for protecting public and private property; and, protecting any person or persons who might be injured as a result of the Contractor's work.
- B. All utilities shown on the plans may not represent the exact location; however, the Contractor is responsible for verifying these locations and contacting "Arkansas One Call System" before excavating.

## **PART 2 - PRODUCTS**

### **2.01 WATER FOR MORTAR AND GROUT**

- A. Water: Potable water free from injurious amounts of acids, alkalis, oils, sewage, vegetable matter, and dirt.

## **2.02 CEMENT**

- A. Portland Cement, conforming to AASHTO M 85, Type I.

## **2.03 PRECAST CONCRETE MANHOLES**

- A. Conform to the latest requirements of ASTM C478.
- B. Never transport sections to the site until they have cured for at least ten (10) days.
- C. Mark each piece plainly with manhole numbers and date of manufacture so it can be installed in the proper location, as shown on the plans.
- D. Make sure factory-installed cutouts in the bottom section are appropriate for the pipe being laid.
- E. Pipe connections at manhole - Cutouts should be equipped with rubber boots to ensure a watertight connection. Material shall be equal to Kor-N-Seal connector, as manufactured by NPC, Inc.
- F. Joint Sealant - Flexible rubber sealant for joints in pre-cast manhole sections shall provide permanently flexible watertight joints, shall remain workable over a wide temperature range and shall not shrink, harden or oxidize upon aging. Material shall be equal to Tylox Superseal and shall meet ASTM C 443 and ASTM C 361 requirements.
- G. The frame for the lid shall be installed when cone section is cast.
- H. Heat-Shrinkable Encapsulation:
  - 1. Wrapid Seal as manufactured by Canusa CPS
  - 2. BIDCO Wrap as manufactured by NPC.
  - 3. Or Approved Equal

## **2.04 CAST-IN-PLACE MANHOLES**

- A. Construct with Class A concrete only as outlined in Section 03300 - Cast-In-Place Concrete.

- B. Reinforcement shall be as outlined in Section 03300 - Cast-in-Place Concrete.
- C. The frame for the lid shall be installed when the manhole is constructed.

## **2.05 MANHOLE – 2’ DIAMETER**

- A. 2’ Diameter Manholes will only be allowed at locations specifically approved by the Little Rock Wastewater. 2’ Diameter Manholes will only be approved for 6”, 8”, or 10” sewer mains.
- B. Submittal of type of 2’ Diameter Manholes is required. Little Rock Wastewater will have final approval as to location and type of 2’ Diameter Manholes used in LRW’s System.

## **2.06 MANHOLE DROP**

- A. Drop on the outside of the manhole: Ductile iron pipe with mechanical joint fittings as specified in Section 02610 - Pipe and fittings.

## **2.08 STANDARD MANHOLE RING AND COVER**

- A. Cover must have the words LITTLE ROCK SANITARY SEWER cast in the top. Cover shall also have the words CONFINED SPACE PERMIT REQUIRED cast in the top. Also, include two closed pick holes in top side of cover.
- B. Minimum combined weights of the manhole ring and cover is 240 pounds. Minimum cover weight is 115 pounds. Minimum ring weight is 125 pounds.
- C. All castings shall be cast with the approved foundry’s name, manufacturing foundry mark, part number, and production date in mm/dd/yy format. All castings shall be manufactured in the USA.
- D. All castings: Free from porosity, blowholes, hard spots, shrinkage, distortion and other defects; smooth and well cleaned by sandblasting; manufactured true to pattern.

- E. Ring and cover dimensions: Refer to Standard Detail Drawings. Final casting dimensions may vary one-half the maximum shrinkage possessed by the metal or no more than  $\pm 1/16$  inch per foot.
- F. Lid and ring bearing surface: smooth finish, non-rocking design or machined bearing surfaces to prevent rocking and rattling under traffic.
- G. Cast Iron: ASTM A 48, Class 35B.
- H. Ductile Iron: ASTM A 536, Grade 80-55-06.

## **2.08 WATERTIGHT MANHOLE RING AND COVER**

- A. Dimensions, casting quality, material: Same as Standard manhole ring and cover.
- B. Cover: machined with dovetail groove in cover for self sealing rubber gasket.

## **2.09 MANHOLE STEPS**

- A. Manhole steps will not be accepted in manholes constructed within the jurisdiction of the Little Rock Wastewater Utility.

## **2.10 RUBBER WATERSTOP GASKETS (CAST – IN - PLACE)**

- A. Waterstop gaskets shall be required at **ALL** manhole connections. Manhole seals shall be concrete manhole adapter by Fernco, or approved equal

## **2.11 MANHOLE GROUT**

- A. Cementitious non-shrink grout for use in manholes shall be one specially formulated for stopping active infiltration and filling voids in manholes and similar locations. Grout mix shall provide a quick-setting, volume-stable, cementitious product suitable for patching the interior of manholes when mixed

and applied according to the manufacturer's recommendations. Grout mix shall be Strong Seal QSR, or equal.

## **2.12 MANHOLE RISER RING**

- A. Manhole riser rings shall be compatible with the size and type of manhole cover with which it will be used.
- B. Manhole riser rings shall only be used with written approval from Little Rock Wastewater.

## **PART 3 - EXECUTION**

### **3.01 MANHOLES - GENERAL**

- A. Perform excavation and prepare base area in accordance with Section 02220 - Excavation, Backfilling, and Compacting for Sanitary Sewer Pipelines.
- B. Never install base in a water filled excavation.
- C. Place base per the Standard Detail Drawings and Section 03300 - Cast-in-Place Concrete. Extend base a minimum of six inches beyond finished sides of manhole.
- D. Extend all pipes entirely through the manhole wall so that a joint occurs approximately six inches, but no greater than 12 inches, outside the manhole wall.
- E. After manhole is constructed, wait no less than 48 hours, then backfill per Section 02220 - Excavation, Backfilling, and Compacting.

### **3.02 CAST-IN-PLACE MANHOLES**

- A. Dimension shall be as per Little Rock Wastewater Standard Detail Drawings. The top section or cone must be concentric with the barrel unless otherwise noted.
- B. The frame shall be set in accordance with Little Rock Wastewater Standard Details.
- C. Install rubber waterstop gaskets in the walls around all pipes.
- D. Interior finish: Smooth, free of fins or sharp edges.
- E. Invert to be constructed in accordance with Little Rock Wastewater Standard Details.
- F. Care should be taken to prevent the end of the pipe from deflecting, due to loads imposed by the weight of the concrete.
- G. Construction joints on manholes of excessive depth shall be connected with reinforcement approved by the Engineer of Record.

### **3.03 PRECAST MANHOLES**

- A. Dimension shall be as per Little Rock Wastewater Detail Drawings. The top section or cone must be concentric with the barrel unless otherwise noted.
- B. The bottom section for pre-cast manholes shall be manufactured as an integral part of the manhole base slab.
- C. Install remaining sections in a truly vertical plane.
- D. Fill space between pipe and periphery of cutout entirely with grout.
- E. Grout joints between sections inside and outside.
- F. Interior finish: smooth, free of fins or sharp edges.
- G. Invert to be constructed the same as a cast-in-place manhole.
- H. Grout lifting eyes for manholes.
- I. Heat-Shrinkable Encapsulation:

1. Apply an external 18" sheet of heat-shrinkable encapsulation around the manhole frame in accordance with manufacturer's specifications and Little Rock Wastewater Details.
  2. Apply an external 6" sheet of heat-shrinkable encapsulation around all cold joints in accordance with manufacturer's specifications and Little Rock Wastewater Details.
- J. Butyl Mastic Wrap
1. All wrapping shall occur after pre-cast manhole has been cleaned and free of debris that would inhibit the seal.
  2. Butyl Mastic Wrap shall be NPC's Bidco Wrap or approved equal.

### **3.04 FIBERGLASS MANHOLE – 2' DIAMETER**

- A. Installation of 2' diameter manhole must be within strict accordance with the manufacturer's specifications.

### **3.05 DROP MANHOLES**

- A. Install a drop manhole when the vertical difference between the pipe entering and leaving the manhole exceeds two (2) feet.
- B. Construct manhole base, barrel, and top per the requirements for cast-in-place or pre-cast manholes.
- C. Construct drop of ductile iron pipe with mechanical joint fittings as per Standard Details.
- D. Encase the 90-degree bend in Class A or B concrete as per Standard Details.
- E. Extend the ductile iron pipe a minimum of five (5) feet beyond the manhole excavation before changing pipe materials.



### **3.06 MANHOLE FRAME AND COVER**

- A. Set the manhole frame in Class A concrete as shown on the Standard Details as an integral part of the manhole construction.
- B. Set manhole frame and cover top level and to the elevation shown on the Drawings. In public rights-of-way, set the ring and cover flush with pavements, sidewalks, or other paved surfaced areas

### **3.07 MANHOLE INVERT**

- A. Invert depth at the flow line: Approximately one-half the pipe diameter.
- B. In curved inverts, make curves with the longest possible radius to facilitate smooth flow.
- C. Invert shape: Semicircular.
- D. Invert materials and finish: Class A Concrete, smooth finish.
- E. Invert grade: Constant, smooth grade; no offsets.
- F. Bench: Slope grout upward from the edge of the invert to the manhole wall.
- G. Form a flow channel in the bench for any services stubbed into manhole. Form invert and finish per above.
- H. Cut the upper half of any pipe extending inside the manhole wall flush with the wall. Smooth rough edges with grout.

### **3.08 MANHOLE REPAIRS**

- A. Make all repairs in accordance with these specifications.
- B. Use manhole grout in patching around new taps.
- C. Plaster all brickwork with mortar.

### **3.11 MANHOLE RISER RING**

- A. Manhole riser rings may be used to raise manhole covers to grade.
- B. The throat section height shall not exceed 12 inches. The throat section shall be defined as the distance from the bottom of the integral cast manhole ring to the top of the manhole cover.
- C. Manhole riser rings may be constructed of concrete, polyethylene, or approved equal.

**END OF SECTION 02605**