

## SECTION 02536 – MANHOLES

### 1. GENERAL

#### 1.1 DESCRIPTION

- A. Work included but not limited to:
  - 1. Precast concrete manholes
  - 2. Concrete manhole bases
  - 3. Manhole steps
  - 4. Manhole frames and covers
- B. Related Work
  - 1. Section 02200 – Earthwork
  - 2. Section 02610 – Sanitary Sewer Pipe
  - 3. Section 02651 – Sewer and Manhole Testing
  - 4. Section 03300 – Concrete

#### 1.2 REFERENCES

- A. Maryland Department of Transportation (MD DOT):
  - Maryland Department of Transportation
  - State Highway Administration
  - Standard Specifications for Construction Materials
  - 2001 or latest Edition & Addendums
- B. American Society for Testing and Materials (ASTM):
  - 1. A48 Specification for Gray Iron Castings
  - 2. C270 specifications for Mortar for Unit Masonry
  - 3. C478 Specifications for Precast reinforced Concrete Manhole sections
  - 4. C923 Specification for Resilient Connectors between Reinforced Concrete Manhole Structures and Pipes
  - 5. A536 Specification for Ductile Iron Castings
  - 6. D448 Standard Sizes of Coarse Aggregate for Highway Construction

#### 1.3 SUBMITTALS

- A. Submit certification from material suppliers attesting that materials meet or exceed specification requirements.
- B. Shop drawings:
  - 1. Submit detailed shop drawings of manholes including precast bases if used.
  - 2. Submit detailed shop drawings of manhole frames and covers.
  - 3. Submit detailed shop drawings of manhole steps.
- C. Submit manufacturers' descriptive literature and installation instructions for the resilient pipe-to-manhole connection and for the joint sealant compound.

### 2. PRODUCTS

#### 2.1 MATERIALS

- A. Crushed Stone Subbase – ASTM D448, Size 57 (AASHTO M-43)
- B. Masonry Mortar: ASTM C270, Type S
- C. Cement Concrete: Section 03300

## 2.2 MANHOLES

- A. Precast Concrete Manhole Sections:
  - 1. Conforming to ASTM C478, with 5.5% ± 1% air-entrained cement concrete.
  - 2. Provide flat slab top sections for manholes less than 4' deep, or as indicated on Contract Drawings.
  - 3. Provide eccentric cone sections for manholes greater than 4' in depth, except as indicated on Contract Drawings.
  - 4. Provide 24" minimum access opening.
  - 5. Precast riser sections of length to suit.
  - 6. Precast bases of a design similar to the precast riser sections.
- B. Manhole Steps:
  - 1. Aluminum: ASTM B247, Alloy 6061-T6
  - 2. Plastic Coated Steel: Deformed steel reinforcing bar encapsulated with injected molded polypropylene. Serrated tread and end lugs to prevent foot slippage.
- C. Manhole Frames and Covers:
  - 1. Cast iron castings: ASTM A48, Class 30 or better; free of bubbles, sand and air holes, and other imperfections.
  - 2. Ductile iron casting: ASTM A536
  - 3. Contact surfaces machined and matched.
  - 4. Cast cover inscription with pipeline service.
- D. Joint Sealant Compound: FS SS-S-00210, ASTM D1850, cold applied.
- E. Resilient Pipe-to-Manhole Connection: ASTM C923
- F. Grade Rings
  - 1. HDPE Grade Adjustment Rings: ASTM D1248.
  - 2. Concrete Grade Adjustment Rings: ASTM C478.

## 2.3 MANHOLE EXTERNAL SEALING SYSTEM

- A. External sealing sleeve made of neoprene and EDOM rubber with a 60 mil minimum thickness meeting ASTM C 923, ASTM C 443, ASTM F 477 low head.
- B. Butyl rubber mastic, non hardening butyl rubber based sealant, must remain flexible, resistant to environmental temperature extremes, acid and alkaline conditions. Must not shrink or oxidize under long-term aging. The mastic must meet federal specification No.SS-S 210A, ASTM C 990, ASTM C 877 and AASHTO M 198-75.
- C. Manufactured by Infi-Shield Inc. or approved equal.

## 3. EXECUTION

### 3.1 EXCAVATION

- A. Perform excavation to the line and grade indicated on the Contract Drawings and as specified.
- B. Location and depth of manholes as indicated on the Contract Drawings.

### 3.2 CONSTRUCTION

- A. Construct watertight manholes of precast concrete sections of the type indicated on the Contract Drawings.
- B. Construct 4' diameter manholes unless otherwise indicated.

- C. Construct drop connections of the required type as indicated on the Contract Drawings. Encase drop connection in concrete.
- D. Provide cast-in-place concrete or precast concrete bases.
  - 1. Construct bases as indicated on the Contract Drawings.
    - a) Install a minimum of 6" of AASHTO #57 Aggregate Subbase.
    - b) Cast-in-place bases may be constructed with a special form for a joint to match the manhole cylinder sections.
    - c) Provide a sealed, flexible resilient connection between pipe and precast base section.
- E. Flow Channels:
  - 1. Form flow channels in manhole bases as indicated on the Contract drawings.
  - 2. Slope channels uniformly from influent invert to effluent invert; minimum 1" drop.
  - 3. Construct bends of the largest possible radius. Form channel sides and invert smooth and uniform; free of cracks, holes or protrusions.
- F. Do not permit pipe to project more than 2" into the manhole.
- G. Joint Sealant:
  - 1. Seal joints between precast concrete manhole sections with joint sealant compound.
  - 2. Apply joint sealant compound in accordance with instructions of the manufacturer.
  - 3. Place compound on the interior and exterior sides of the joint to be squeezed out by the weight of the upper section.
  - 4. Trowel sealant compound smooth with manhole interior.
  - 5. Do not apply rigid mortar to the joints between manhole sections.
- H. Install manhole sections with steps in proper vertical alignment.
- I. Precast Concrete Manhole Grade Adjustment Rings:
  - 1. Use precast manhole rings to achieve elevation indicated for frame and cover.
  - 2. Do not adjust elevation more than 1 ft. with precast concrete rings.
  - 3. Seal joints between precast rings with joint sealant compound.
- J. Install manhole frames and covers:
  - 1. Set top of frames at finished grade elevation or other elevation indicated on the Contract Drawings.
  - 2. Anchor manhole frames installed in unpaved areas.
  - 3. Seal joint between manhole frame and manhole with joint sealant compound.
- K. Where new manholes are to be constructed on existing pipelines, carefully excavate around existing pipeline for placement of the new manhole base; take all measures necessary to control flow through the existing pipeline and to prevent leakage into the new base; after completion of the manhole, carefully remove the top portion of the existing pipeline.

### 3.3 MANHOLE EXTERNAL SEALING SYSTEM

- A. Existing manholes – remove dirt to a minimum depth of 1'0" below the lowest joint. Thoroughly high pressure wash the manhole exterior. Use an abrasive stone to smooth any rough edges on the outside surface of the manhole.
- B. Allow manhole surface to dry.

- C. Install EPDM rubber with mastic on manhole external riser section joints.
- D. The top of the cone, adjusting rings and casting shall be sealed with rubber sealing sleeve.
- E. Install seals in accordance with the manufacturers instructions.

3.4 BACKFILLING

- A. Test manhole as specified prior to backfilling.
- B. Backfill as specified.
- C. Place backfill in approximately equal lifts on opposite sides of manhole.

END OF SECTION 02536