

**SECTION 02532**  
**UTILITY STRUCTURES**

**PART 1 – GENERAL**

**1.1 Summary**

**A. Description of the Work**

The work shall include the furnishing of all labor, tools, equipment, materials and performing all required operations to provide a complete item in accordance with the project plans and these specifications.

**B. This Section includes the following structures and related appurtenances:**

Precast concrete manholes  
Pump Station wet well and valve vault.  
Accessory vault.  
Concrete anchor and thrust blocks.

**C. Related Work Specified Elsewhere:**

Trench Excavation and Backfill.....Section 02300  
Sewer Line Construction .....Section 02560  
Concrete .....Section 03300

**1.2 Quality Assurance**

**A. Applicable Test Standards and Specifications**

**1. American Society for Testing and Materials (ASTM)**

ASTM A48 - Gray Iron Castings

ASTM C76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

ASTM C270 - Mortar for Unit Masonry

ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets

ASTM C478 - Precast Reinforced Concrete Manhole Sections

ASTM C1107 –Packaged Dry, Hydraulic-Cement Grout, Nonshrink

**2. Federal Specification (FS)**

FS FF-H-106 - General Hardware, Builder's, Locks and Door Trim

FS SS-S-00210 - Sealing Compound, Preformed Plastic, for Expansion Joints and Pipe Joints

**3. American Association of State Highway Transportation Officials (ASSHTO)**

AASHTO H20 – Axial Loading

**4. American Concrete Institute (ACI)**

ACI 350 – Code Requirements for Environmental Engineering Concrete Structures and Commentary

**B. Leakage Test**

Test all manholes installed under this contract using the vacuum method described below. Provide all equipment necessary to perform the test. Coordinate test schedule with the Owner. Test will not be accepted unless witnessed by the Owner.

1. Plug all pipes entering the manhole, taking care to securely brace the plug from being drawn into the manhole.
2. Place the test head inside of the top of the cone section and inflate seal in accordance with the manufacturer's recommendations.
3. Draw a vacuum of 10 inches of mercury and shut off the vacuum pump. With the valves closed, measure the time for the vacuum to drop to 9 inches. The manhole shall pass if the time for the vacuum to drop is greater than 60 seconds for 48" diameter manhole, 75 seconds for 60" diameter manhole and 90 seconds for 72" diameter manholes. In lieu of vacuum testing, a water tightness test may be performed by filling the manhole with water. The manhole shall pass if

the drop in water level does not exceed 0.001% of the manhole volume in one hour.

4. If the manhole fails the initial test, make necessary repairs with a non-shrink grout while the vacuum is still being drawn. Retest until a satisfactory test is obtained.

### **1.3 Submittals**

- A. Certificates of Compliance and Descriptions required for Frames and Covers.
- B. Provide submittal for precast reinforced manholes per Section 01330, Submittals. The minimum information required for each manhole includes:
  1. Top Elevation.
  2. Base Elevation.
  3. All pipe inverts entering and leaving the manhole.
  4. All angles between lines leaving and entering the manhole.

### **1.4 Product Delivery, Storage And Handling**

Take all necessary precautions in handling, storage and placement of manhole components and appurtenances. Replace defective materials.

## **PART 2 – PRODUCTS**

### **2.1 Precast Manholes**

- A. Precast concrete manholes shall conform to ASTM C478 with ASTM C443 two-fin serrated flat gasket to concrete joint or with FS SS-S-00210 preformed plastic concrete joint.
- B. Precast manholes shall be 48-inchs in diameter unless otherwise indicated.
- C. Provide precast concrete manhole bases for all concrete precast manholes.
- D. Manhole cone section shall conform to ASTM C478, 24 inch minimum inside diameter of similar quality as manhole riser sections.

- E. Manhole penetrations for pipes entering the manhole shall be provided with A-lock gaskets or approved equal and shall be included in the precast base section.

## **2.2 Manhole Frames And Covers**

- A. Shall conform to ASTM A48, Class 30B.
- B. The word "sewer" shall be cast into the top of the lid and the lid shall contain the City's Logo.
- C. The cover and frame shall be a locking, nonventilated type for all locations in nonpaved areas, and nonlocking, nonventilated type in paved areas.
- D. Provide a concrete collar around the frame. (Minimum 1' wide and 8" thick)
- E. Provide one ("T" Handle Type) for 24-inch manhole frame and cover for locking units required for non-paved installations.
- F. Acceptable Manufacturers:
  - 1. Neenah Foundry Company Model R-1772 Cast Iron Manhole Frame & Cover with special lid containing the City Logo.
  - 2. Model REXUS D 400 or PAMREX as manufactured by SAINT GOBAIN. (This manufacturer can provide a Ductile Iron Locking Lid as specified to be installed in easements.)
  - 3. East Jordan Iron Works – Product no. 00102214 Catalog No. 1022Z3 with special lid containing the Logo.
  - 4. Engineer approved equal.
- G. Machine-bearing surfaces to provide even seating.

## **2.3 Non Shrink Grout**

ASTM C1107, prepackaged.

## **2.4 Preformed Joint Material For Precast Concrete Manholes**

Plastic or mastic as recommended by the barrel section manufacturer. Resistant to sewer environment to provide water tight seal between

concrete sections. Preformed joint material shall be Ram-Nek, Kent Seal, or equal.

### **PART 3 - EXECUTION**

#### **3.1 Excavation, Backfill And Compaction**

##### **A. Manholes**

Prepare subgrade and bedding in accordance with Section 02300, Trench Excavation and Backfill. Provide bedding to depth and density indicated. Place and compact bedding and backfill with the same material and to the same density indicated for the adjacent trench.

##### **1. Extensions**

Place each extension plumb. Join sections with a full bed of preformed joint material. Cut off excess joint material to provide space for at least 1/4 inch depth of grout. Grout smooth the interior and exterior of the joint after the mastic has set.

##### **2. Final Adjustment to Grade**

Adjust frame and cover to required elevation with manhole extensions. Do not exceed maximum dimensions of 18 inches between the top of the frame and the top of the cone. Use preformed joint material to provide water tight seal between extension sections. Grout smooth the interior surface of sections and extensions.

##### **3. Frame and Cover**

Place frame and cover level to the elevation indicated or required to match surface conditions on full bed of mortar. Construct concrete collar as indicated.

##### **4. Connections for precast concrete manholes**

Grout around pipes with nonmetallic non-shrink grout. Install all piping using a flexible-rubber, entrance-hole gasket joint of pattern approved by the Engineer. Place pipe stub in manhole wall with bell or coupling outside manhole wall to provide flexible joints as indicated. Make provisions for future connections where indicated. Include plug or stopper capable

of withstanding 4.3 psi of internal or external pressure without leakage for future connections.

- 5. Manhole Installation:** All manholes shall be installed in accordance with manufacturers instructions. A representative of the manufacturer must be present for the installation of all manholes until the manufacturer is satisfied that the Contractor is proficient in the installation of the manhole.
- 6. Invert Channels:** Form invert channel with 4,000 psi Type II portland cement concrete. Make changes in direction of flow with smooth curves of as large a radius as size of manhole permits. Make changes in size and grade smoothly and uniformly. Slope floor of manhole adjacent to channels as indicated. Finish channel bottom smoothly without roughness, irregularity, or pockets.

## **B. Accessory Vault**

- 1. Design:** Construct to conform to Drawings of reinforced concrete pipe conforming to ASTM C76, Class II
- 2. Installation:**
  - a. Install vaults where indicated.
  - b. Extend from centerline of pipe to ground surface.
  - c. Notch lower section 2 inches greater than pipe OD and include fiberglass batt to prevent transmission of loads to pipe barrel.
- 3. Manhole Frame and Cover:**
  - a. Pattern as shown on drawings. Set frame level and to grade in mortar.

## **C. Air Valve Vault**

- 1. Design:**
  - a. Precast and masonry construction as indicated.
  - b. Precast concrete footings.
  - c. Riser of ASTM C76, Class II pipe.

- d. Top slab shall be precast as indicated.

**2. Manhole Frame and Cover:**

- a. Pattern as shown on attached detail.
- b. Set frame level and to grade in mortar.

**D. CONCRETE ANCHOR AND THRUST BLOCKS**

1. Install at tees, elbows, bends, and dead ends where indicated.
2. Place against undisturbed earth or rock.
3. Of design indicated or specified.

**PART 4 – MEASUREMENT AND PAYMENT**

**4.1 Measurement And Payment**

- A. Measurement and payment for manholes shall be as specified in Section 01210 – Measurement and Payment.

**\*\* END OF SECTION 02532 \*\***

