

SECTION 33 05 17
PRECAST CONCRETE VALVE VAULTS AND METER BOXES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Precast concrete valve vaults.
 - 2. Precast concrete meter boxes.
- B. Related Sections:
 - 1. Section 31 23 17 – Trenching: Excavating and backfilling for vaults and meter boxes.
 - 2. Section 33 11 13 - Water Utility Distribution Piping: Connections to valve and meter vaults.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A48 - Standard Specification for Gray Iron Castings.
 - 2. ASTM A536 - Standard Specification for Ductile Iron Castings.
 - 3. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
 - 4. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
 - 5. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
 - 6. ASTM C891 - Standard Practice for Installation of Underground Precast Utility Structures.
 - 7. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
 - 8. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joints Sealants.
- B. SCDOT Standard Specifications:
 - 1. Standard Specifications for Highway Construction, 2007, published by the South Carolina Department of Transportation.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawing: Indicate plan, location and inverts of connecting piping.
- C. Product Data: Submit data on valve vaults and meter boxes.
- D. Manufacturer's Certificates: Submit Statement of Compliance and supporting data from materials suppliers attesting that precast concrete valve vaults and meter boxes provided meet or exceed ASTM Standards and specification requirements.
- E. Manufacturer's Installation Instructions: Submit special procedures for precast concrete valve vaults and meter boxes installation.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Accurately record actual locations and inverts of buried pipe, components and connections.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with Division 700 of SCDOT Standard Specifications.
- B. Maintain one copy of document on site.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing and protecting products.
- B. Transport and handle precast concrete units with equipment designed to protect units from damage.
- C. Do not place concrete units in position to cause overstress, warp or twist.

PART 2 PRODUCTS

2.1 PRECAST CONCRETE VALVES AND METER BOXES

- A. Precast Sections: Reinforced precast concrete in accordance with ASTM C478.
 - 1. Joints: O-ring rubber gaskets in accordance with ASTM C443.
 - 2. Joints: Butyl rubber gaskets in accordance with ASTM C990.

2.2 FRAMES AND COVERS

- A. Product Description: Grey cast iron ASTM A48/A48M, Class 30B; size and shape as indicated on Drawings. Live load rating of HS 20 in paved areas.

2.3 CONFIGURATION

- A. Provide size and shape as indicated on Drawings.
- B. Foundation Slab: Cast-in-place or precast reinforced concrete integral with bottom section, level top surface.

2.4 ACCESSORIES

- A. Steps: Conform to local agency requirements, minimum 12 inches wide spaced vertically 16 inches on center.
- B. Strap Anchors: Stainless steel capable of supporting pipe or accessories indicated on Drawings, minimum 1 inch wide x 1/8 inch thick.
- C. Geotextile Filter Fabric: Type 1 Engineering fabric in accordance with Division 800 of SCDOT Standard Specifications; non-woven, needle punched, non-biodegradable, and rot-proof.

2.5 BEDDING AND BACKFILL MATERIALS

- A. Bedding: Clean course aggregate Gradation No. 57 conforming to Division 700 and 800 of the SCDOT Standard Specifications.
- B. Backfill around Structures: As specified in Section 31 23 17 -Trenching.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify items provided by other Sections of Work are properly sized and located.
- B. Verify built-in items are in proper location and ready for roughing into Work.
- C. Verify correct size of manhole and structure excavation.

3.2 PREPARATION

- A. Coordinate placement of inlet and outlet pipe.
- B. Do not install vaults and structures where site conditions induce loads exceeding structural capacity of vaults.
- C. Inspect precast concrete vaults immediately prior to placement in excavation to verify structures are internally clean and free from damage. Remove and replace damaged units.

3.3 INSTALLATION

- A. Excavation and Backfill:
 - 1. Excavate and backfill for vaults and meter boxes in accordance with Section 31 23 17 in location and to depth shown. Provide clearance around sidewalls of structure for construction operations, backfill, and placement of geotextile filter fabric if required.
 - 2. When groundwater is encountered, prevent accumulation of water in excavations. Place structures in dry trench.
 - 3. Where possibility exists of watertight structure becoming buoyant in flooded excavation, anchor manhole or structure to avoid flotation.
- B. Place bedding and foundation slab; trowel top surface level if cast-in-place.
- C. Install underground precast utility structures in accordance with ASTM C891.
- D. Lift precast vaults and structures at lifting points designated by manufacturer.
- E. When lowering vaults and structures into excavations and joining pipe to units, take precautions to ensure interior of pipeline and manhole or structure remains clean.
- F. Set precast vaults and structures bearing firmly and fully on stone bedding, 8-inch minimum thickness, compacted to 95 percent maximum density per Section 31 23 17 or on other support system shown on Drawings.
- G. Assemble multi-section vaults and structures by lowering each section into excavation. Install rubber gasket joints between precast sections in accordance with manufacturer's recommendations. Lower, set level, and firmly position base section before placing additional sections.

- H. Remove foreign materials from joint surfaces and verify sealing materials are placed properly. Maintain alignment between sections by using guide devices affixed to lower section.
- I. Joint sealing materials may be installed on site or at manufacturer's plant.
- J. Verify vaults and structures installed satisfy required alignment and grade.
- K. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe. Fill annular space with non-shrink grout.

3.4 CASTINGS INSTALLATION

- A. Set frames using mortar and masonry as indicated on Drawings. Install radially laid concrete brick with 1/4 inch thick vertical joints at inside perimeter. Lay concrete brick in full bed of mortar and completely fill joints. Where more than one course of concrete brick is required, stagger vertical joints.
- B. Do not install more than 3 courses of brick or more than 12 inches of masonry.

3.5 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform soil compaction tests in accordance with Section 31 23 17.
- C. Perform hydrostatic tests in accordance with Section 33 01 32.
 - 1. Notify Engineer 72 hours in advance of test and have witness test.
- D. Test concrete manhole and structure sections in accordance with ASTM C497.
- E. Vertical Adjustment of Existing Structures:
 - 1. Where required, adjust top elevation of existing vaults and structures to finished grades shown on Drawings.
 - 2. Reset existing frames, grates and covers, carefully removed, cleaned of mortar fragments, to required elevation in accordance with requirements specified for installation of castings.
 - 3. Remove concrete without damaging existing vertical reinforcing bars when removal of existing concrete wall is required. Clean vertical bars of concrete and bend into new concrete top slab or splice to required vertical reinforcement, as indicated on Drawings.
 - 4. Clean and apply sand-cement bonding compound on existing concrete surfaces to receive cast-in-place concrete.

END OF SECTION