

SECTION 02630 - STORM DRAINAGE - STRUCTURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Bidding requirements, conditions of the contract and pertinent portions of sections in Division 1 of these specifications and MaineDOT Standard of Specifications (current version – as revised), Item 604 – Manholes, Inlets, and Catch Basins, apply to the section as fully as though repeated herein.
- B. Section Includes:
 - 1. Modular precast concrete manholes and structures with tongue-and-groove joints and masonry transition to frame, grates, covers, and accessories.
 - 2. Bedding and cover materials.
- C. Related Sections:
 - 1. Excavation and Fill: Section 02315
 - 2. Embankment: Section 02330
 - 3. Subgrade and Roadbed: Section 02335

1.02 REFERENCES

- A. Maine Department of Transportation (MaineDOT) Standard Specifications (Latest Revision):
 - 1. SECTION 604 - MANHOLES, INLETS, AND CATCH BASINS
 - 2. SECTION 700 – MATERIALS INCLUDING BUT NOT LIMITED TO:
 - a. Portland Cement 701.01
 - b. Clay or Shale Brick 704.01
 - c. Concrete Masonry Blocks 704.03
 - d. Joint Mortar 705.02
 - e. Reinforcing Steel 709.01
 - f. Stone Curbing and Edging 712.04
 - g. Precast Concrete Units 712.06

1.03 DESIGN REQUIREMENTS

- A. Equivalent strength: Based on structural design of reinforced concrete as outlined in ACI 318.
- B. Design of Lifting Devices for Precast Components: In accordance with ASTM C913.
- C. Design of Joints for Precast Components: In accordance with ASTM C913; maximum leakage of 0.025 gallons per hour per foot of joint at 3 feet of head.

1.04 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Requirements for submittals.

- B. Product Data: Submit cover and frame construction, features, configuration, and dimensions.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with MaineDOT standards and common industry practices.

1.06 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Comply with precast concrete manufacturer's instructions for unloading, storing and moving precast manholes and structures.
- C. Store precast concrete manholes and structures to prevent damage to Owner's property or other public or private property. Repair property damaged from materials storage.
- D. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers shown on Drawings to indicate its intended use.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Masonry: Maintain materials and surrounding air temperature to minimum 50 degrees F prior to, during, and 48 hours after completion of masonry work.
- C. Masonry: Cold Weather Requirements: ACI 530.

PART 2 - PRODUCTS

2.01 MANHOLES AND STRUCTURES

- A. Manhole and Structure Sections:
 1. Reinforced precast concrete, except that concrete blocks may be used around inlet and outlet pipes.
 2. Joints for precast concrete units shall be of portland cement mortar, rubber gaskets, flexible plastic rings, mastic joint filler or other approved types to form a watertight joint.
 3. Joints for concrete blocks shall be of portland cement mortar, not more than ½ in wide, completely filled and neatly tooled on the inside of the structure. In accordance with ASTM C478 with gaskets in accordance with ASTM C923.
 4. Catch basins and manholes shall be placed to the required grade on a compacted foundation of uniform density.

5. Inlet and outlet pipe elevations may vary from the elevations shown on the plans depending upon field conditions.
6. Pipe sections entering catch basins shall be firmly connected to the structure wall with no part of the pipe projecting more than 6 in inside the wall.
7. When a section of culvert is cut, the end shall be finished in a skillful manner.
8. Upon completion, each catch basin and manhole shall be cleaned of all accumulation of silt, debris, or foreign matter and shall be kept clean until final acceptance of the work.

2.02 FRAMES AND COVERS

- A. Frames, Covers and Catch basin grates shall be either the type of grate shown on the Drawing, MaineDOT Standard Details or an approved equal. The Catch Basin Grate corners shall be notched by the Contractor at the project site by grinding the corner to fit the cast iron frames.
- B. Metal frames and traps, when called for, shall be set in a bed of clay bricks or shale bricks and mortar, or otherwise secured as shown in the Drawings. Castings shall be set to the correct elevation before the next final course of paving material has been placed.
- C. Steps: As required by code.

2.03 BEDDING AND COVER MATERIALS

- A. Bedding: As specified in Sections 02315 and 02335, depth per Drawings
- B. Cover: As specified in Sections 02315 and 02335, depth per Drawings
- C. Soil Backfill from Above Pipe to Gravels or Topsoil: As specified in Sections 02315 and 02335

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify items provided by other sections of Work are properly sized and located.
- C. Verify built-in items are in proper location, and ready for roughing into Work.
- D. Verify correct size of manhole and structure excavation.

3.02 PREPARATION

- A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections.

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

3.03 INSTALLATION

- A. Excavation and Backfill:
 - 1. Excavate for manholes and structures in accordance with Section 02315 in location and to depth shown. Provide clearance around sidewalls of structure for construction operations.
 - 2. When groundwater is encountered, prevent accumulation of water in excavations. Place manholes and structures in dry trench.
 - 3. Where possibility exists of watertight structure becoming buoyant in flooded excavation, anchor structure to avoid flotation.
- B. Place base pad, trowel top surface level.
- C. Place manhole and structures sections plumb and level, trim to correct elevations, anchor to base pad.
- D. Backfill excavations for manholes and structures in accordance with Section 02315.
- E. Form and place manhole and structures cylinder plumb and level, to correct dimensions and elevations.
- F. Cut and fit for pipe.
- G. Grout base of shaft sections to achieve slope to exit piping. Trowel smooth. Contour to form continuous drainage channel as indicated on Drawings.
- H. Set cover frames and covers level without tipping, to correct elevations.
- I. Coordinate with other sections of Work to provide correct size, shape, and location.

3.04 PRECAST CONCRETE MANHOLE AND STRUCTURE INSTALLATION

- A. Lift precast components at lifting points designated by manufacturer.
- B. When lowering manholes and structures into excavations and joining pipe to units, take precautions to ensure interior of pipeline and structure remains clean.
- C. Set precast structures bearing firmly and fully on crushed stone bedding, compacted in accordance with provisions of Section 02315 or on other support system shown on Drawings.
- D. Assemble multi-section structures by lowering each section into excavation. Lower, set level, and firmly position base section before placing additional sections.

- E. 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.
- F. Joint sealing materials may be installed on site or at manufacturer's plant.
- G. Verify manholes and structures installed satisfy required alignment and grade.
- H. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe. Fill annular space with mortar.
- I. Cut pipe to finish flush with interior of structure.
- J. Shape inverts through manhole and structures as shown on Drawings.

3.05 FRAME AND COVER INSTALLATION

- A. Set frames using mortar and masonry.
 - 1. Install radially laid concrete brick with 1/4 inch thick vertical joints at inside perimeter.
 - 2. Lay concrete brick in full bed of mortar and completely fill joints.
 - 3. Where more than one course of concrete brick is required, stagger vertical joints.
 - 4. Set frame and cover 2 inches above finished grade for manholes and structures with covers located within unpaved areas to allow area to be graded away from cover beginning 1 inch below top surface of frame.

3.06 FIELD QUALITY CONTROL

- A. Test concrete manhole and structure sections in accordance with ASTM C497.
- B. Vertical Adjustment of Existing Manholes and Structures:
 - 1. Where required, adjust top elevation of existing manholes 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.
 - 4. Clean vertical bars of concrete and bend into new concrete top slab or splice to required vertical reinforcement, as indicated Drawings.
 - 5. Clean and apply sand-cement bonding compound on existing concrete surfaces to receive cast-in-place concrete.

END OF SECTION 02630