

SECTION 33 40 00

STORM DRAINAGE UTILITIES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Storm sewer pipe, manholes, and miscellaneous appurtenances.

1.02 REFERENCES

A. North Dakota Department of Transportation “Standard Specifications for Road and Bridge Construction” 2008 Edition, As Revised

1. Section 714 – Culverts, Storm Drains, Edge Drains, and Underdrains
2. Section 722 – Manholes, Catch Basins, and Inlets

B. American Society of Testing Materials (ASTM)

1. A48 – Specification for Gray Iron Castings
2. A153 – Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
3. A615 – Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
4. C76 – Specification for Reinforced Concrete Culvert, Drain, and Sewer Pipe.
5. C150 – Specification for Portland Cement.
6. C443 – Specification for Joints for Circular Concrete Sewer and Pipe, Using Rubber Gaskets.
7. C478 – Specification for Precast Reinforced Concrete Manhole Sections

1.03 SUBMITTALS

A. Submittals shall conform to Section 01 33 00.

B. Shop drawings shall indicate complete information for fabrication and installation of units. Include the following:

1. Plans and elevations defining all material furnished by manufacturers.
2. Sections and details showing connections, cast-in items, field installed lifting devices, capacities, all openings, and their relation to the structure.

1.04 SEQUENCING AND SCHEDULING

A. No work to begin until traffic control is in place.

PART 2 PRODUCTS

2.01 MATERIALS

A. Mortar Materials

1. Cement: Use Type 1 Standard Portland Cement conforming to ASTM C150
2. Lime: Use normal finishing hydrated
4. Water cement ratio of 0.38 max.
5. A non-calcium chloride based accelerator conforming to AASHTO M 194 not to exceed 3 percent.
6. 28 day compressive strength of 4,000 psi.

2.02 STORM MANHOLE AND CATCH BASIN FRAMES AND COVERS

A. General Requirement: ASTM A48.

B. Material: Class 35 cast iron. Best grade. Free from injurious defects and flaws.

C. Type and Style: As shown on Drawing. Covers without grate openings shall be stamped "STORM SEWER".

D. Covers with 2 pick holes of approved design.

2.03 STORM MANHOLES AND CATCH BASINS

A. General Requirements: ASTM C478 and details on the Drawings

B. Structures and bases shall be of precast concrete.

C. Manhole Joints: All joints on precast RCP Manholes shall be sealed to provide a watertight connection.

1. Rubber o-ring gasket type meeting ASTM C443
2. Joint Sealer: RAM-NEK flexible plastic gaskets or approved equal.

2.04 PIPE MATERIALS

A. Reinforced Concrete (RCP) Pipe and Fittings

1. General Requirement: ASTM C76, Wall B with circular reinforcing.
2. Materials: Conform to the requirements of ASTM C76, Wall B with circular reinforcing. O-ring gaskets shall be synthetic rubber, circular reinforcing in cross-section, and shall conform to ASTM C361.
3. Pipe Joints: Bell and spigot ASTM C361.
4. Pipe Class: As shown on the Drawings.

5. Marking: Each pipe shall be identified with the name of the manufacturer trade name or trademark and code, identification of plant, date of manufacture, and the pipe class and specification design.

2.08 ADJUSTING RING

A. Concrete

1. Size to match cone or opening in top slab.
2. Concrete Compressive Strength: Minimum 3,000 psi
3. Reinforcing: Single hoop 8-gauge steel wire.
4. Thickness: Minimum 2 inches, maximum 4 inches.

B. HDPE adjustment rings allowed.

2.09 CASTINGS

A. Manhole, Catch Basin Frames, and Covers.

1. Requirement: ASTM A48
2. Material: Class 35 cast iron. Best grade. Free from injurious defects and flaws.
3. Machine cover and frame contact surface for non-rocking protection.

C. Jointing material shall be gray in color.

PART 3 EXECUTION

3.01 INSTALLATION

A. Pipe Installation

1. Lay and maintain pipe appurtenances to the alignment, grade, and location shown on the Drawings and/or staked in the field. Deviation from grade in excess of 0.05 percent may be cause for removal and relaying pipe at Contractor's expense.
2. Wipe joints clean; apply the manufacturer's recommended lubricant compound over the entire joint surface; center spigot in bell and push spigot home; take care to prevent dirt from entering the joint space.
3. Lay pipe from lowest point in the line and progress opposite direction of flow with spigot ends pointing in the direction of flow.
4. Joints to be watertight.
5. Where cut-ins make it impossible to construct bell and spigot joints or when dissimilar pipe materials are joined, a reinforced concrete collar shall be placed completely surrounding the joint or the connection shall be made by using an approved adapter.

B. Structures and Appurtenances Installation

1. Furnish and install structures in accordance with the Drawings.
2. Pour inverts shaped to the half section of equivalent size pipe conforming to the inlet and outlet pipe to allow for a free, uninterrupted flow with all surfaces sloping to the flow line.
3. Preformed inverts not allowed.
4. All concrete pipes entering manholes must be cut with a concrete saw.
5. Mortar lift holes.

C. Concrete Adjusting Ring Installation

1. Adjust Manholes and Catch Basin Frames 3/8 to 3/4 inch below grade prior to placing wear course.
2. Mortar on top and bottom surfaces of all concrete adjusting rings; between surface of top slab or cone and bottom ring; between surface of top ring and casting; on entire surface of area of ring with no gaps.
3. No shims of any material allowed.
4. Required cross slope of casting to be achieved by varying thickness of mortar.
5. Remove all mortar spills from the structure.

3.02 FIELD QUALITY CONTROL

A. Cleaning Pipe and Structures.

1. If newly installed mains and structures are kept clean during construction, cleaning will not be required.
2. If newly installed mains and/or structures become dirty due to negligence of the Contractor, cleaning will be performed at the sole expense of the Contractor.