

## **SECTION 719 -- FLEXIBLE PIPE CULVERTS**

(Corrugated Metal and Plastic)

### **719.01 -- Description**

This work shall consist of furnishing and installing new corrugated metal pipe, helical corrugated metal pipe, slotted pipe, pipe-arches, high density polyethylene (corrugated interior), high density polyethylene (smooth interior), and polyvinyl chloride pipe, and the relaying of existing corrugated metal pipe, helical corrugated metal pipe, slotted pipe, pipe-arches, high density polyethylene (corrugated interior), high density polyethylene (smooth interior), and polyvinyl chloride pipe at the locations shown in the plans or ordered by the Engineer in accordance with the requirements of these Specifications.

### **719.02 -- Material Requirements**

1. Flared end sections for flexible pipe shall be metal and shall conform to the requirements of Section 1036.
2. Approved water-tight and soil-tight joints are shown on the NDR Approved Products List.
3. Flap gates shall conform to the requirements of Section 1043.
4. Corrugated metal pipe, helical corrugated metal pipe, and pipe-arches shall be Zinc Coated (Galvanized) Pipe, Aluminum Coated Pipe, or Polymer Coated Pipe and shall conform to the requirements of Section 1035.
5. Slotted pipe shall conform to the requirements shown in the plans.
6. Unless otherwise specified in the plans, the minimum gage or sheet thickness shall conform to Sections 1035 and 1036.
7. Plastic pipe shall conform to the requirements of Section 1038.
8. The Contractor shall not order or deliver the pipe until a list of sizes and lengths is furnished by the Engineer.

### **719.03 -- Construction Methods**

1. Excavation and backfilling shall be performed by the Contractor in accordance with the requirements of Section 702 and the plans.
2. The Contractor shall lay the pipe true to the lines and grades shown in the plans or as directed by the Engineer. Any pipe which is not true in alignment or to the established grade or which shows any settlement after laying shall be taken up and relaid by the Contractor at no additional cost to the Department.
3. a. When plastic pipe is used or when corrugated metal pipe 48 inch (1200 mm) larger is used, the Contractor shall periodically check for pipe deflection during pipe installation and again not less than 30 days following completion of the roadway embankment. The internal diameter of plastic pipe shall not be reduced by more than 5 percent of its design diameter. The internal diameter of corrugated metal pipe shall not be reduced by more than 7.5 percent of its design diameter. If the installation does not

meet these requirements, the pipe shall be removed and replaced at no additional cost to the Department.

b. Optional devices for deflection testing include electronic deflectometers, calibrated television or video cameras, or properly sized "go, no-go" mandrel. Deflection measurements can be made directly with extension rulers or tape measures at 10 feet (3 m) increments in pipes that allow safe entry. To ensure accurate measurements, the lines should be cleaned before testing.

c. Deflection testing will not be required on corrugated metal pipe extensions of less than 25 feet (7.6 m).

4. a. All flexible pipe installed under the roadway prism shall be connected by the Contractor with an approved water-tight joint. All flexible pipe installed outside of the roadway prism shall be connected with an approved soil-tight joint.

b. If the plans call for the extension of a corrugated metal pipe culvert, the pipes shall be connected by the Contractor with an approved water-tight connecting band. In all cases where an existing concrete headwall is in place, the old concrete shall be completely removed by the Contractor.

5. The Contractor shall clean accumulations of soil and debris, haul, and relay all culvert pipe designated to be relaid in accordance with the methods herein described for installing new pipe.

6. The Contractor shall strut or take other action recommended by the manufacturer for all corrugated metal culverts with diameters greater than 48 inches (1200 mm) to insure that the pipe's final shape is properly aligned.

7. Instead of strutting corrugated metal pipe 48 inches (1200 mm) or larger in diameter, the Contractor may furnish corrugated metal pipe with the vertical axis fabricated out of round 5 percent of the normal diameter from end to end of the pipe. The elongation shall be made by approved shop methods, and any coating damaged or destroyed shall be repaired or replaced. If helical metal pipe 48 inches (1200 mm) or larger in diameter is furnished with the vertical axis fabricated out of round instead of strutting, then field connections shall be made with match-marked connecting pipe to assure that the helical sections match when the vertical axis of the pipe sections are brought together.

8. All flexible pipe installed under the roadway prism shall be bedded and backfilled as shown in the plans. Granular bedding and backfill will not be required for corrugated metal pipe extensions unless called for in the plans.

9. Plastic pipe shall be installed by the Contractor in accordance with the plans, ASTM D 2321, and the manufacturer's recommendations.

10. When polymer pre-coated pipe is used, in order to protect the coated pipe, the Contractor shall use padded or nonmetallic slings and padded straps when handling the pipe. This includes unloading, moving and installation.

**719.04 -- Method of Measurement**

1. Excavation, concrete, and reinforcement for headwalls will be measured for payment in accordance with the provisions in Table 719.01.

**Table 719.01**

<b>Method of Measurement</b>	
<b>Requirement</b>	<b>Subsection</b>
Excavation for Structures	702.04
Concrete	704.04
Reinforcement	707.04

2. Flexible pipe shall be measured as described in Subsection 718.04.

3. Granular bedding and backfill will not be measured for payment, but shall be considered subsidiary to the pipe being installed.

**719.05 -- Basis of Payment**

<b>1. Pay Item</b>	<b>Pay Unit</b>
____inch (mm) ____Pipe	Linear Foot (LF) [meter (m)]
Relaying Corrugated Metal Pipe	Linear Foot (LF) [meter (m)]
____inch (mm) Round Equivalent Corrugated Metal Pipe	Linear Foot (LF) [meter (m)]
____inch (mm) Corrugated Metal Slotted Pipe	Linear Foot (LF) [meter (m)]

**Table 719.02**

<b>Basis of Payment</b>	
<b>Requirement</b>	<b>Subsection</b>
Excavation for Structures	702.05
Concrete	704.05
Reinforcement	707.05

2. Payment for excavation, concrete, and reinforcement for headwalls shall be made in accordance with the provisions shown in Table 719.02.

3. Payment is full compensation for all work prescribed in this Section.