SECTION 601
PIPE CULVERTS – GENERAL

DESCRIPTION

601.01.01 GENERAL: These specifications include general requirements that are applicable to all type culvert pipes irrespective to the material or culvert use with the following exceptions:

1. Structural plate pipe,
2. Water distribution systems and sanitary sewer system specifications will specify the pipe to be used in their respective installations.

This work shall consist of furnishing and installing pipe culverts, siphons, end sections, end walls, etc., as may be required to complete the work shown on the plans or established by the Engineer.

The pipe shall comply with AASHTO Design and Construction LRFD Specifications most current edition and these specifications. The more stringent requirements shall apply.

601.01.02 REFERENCE CODES AND STANDARDS:

(a) Uniform Standard Specifications for Public Works’ Construction Off-Site Improvements, Clark County Area, Nevada that will henceforth be referred to as “USS” Specifications and Drawings.

(b) Contract Special Provisions and Drawings.

(c) NRS 338.176, NAC 625.550.

(d) Most current ASTM, AASHTO, or NDOT test procedures.

(e) Related Interagency Quality Assurance Committee (IQAC) procedures at www.accessclarkcounty.com/pubworks/iqac/IQAC.htm.

MATERIALS

601.02.01 GENERAL: The materials used shall be those prescribed or used for the several items which constitute the finished work and shall conform to the requirements in the following subsections:

Table 1- List of Pipe Types

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Section or Subsection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bituminous Coated Corrugated Metal Pipe and Pipe Arches</td>
<td>709.03.02</td>
</tr>
<tr>
<td>Clay Pipe</td>
<td>708.03.04</td>
</tr>
<tr>
<td>Corrugated Aluminum Pipe</td>
<td>709.03.05</td>
</tr>
<tr>
<td>Corrugated Metal Pipe and Pipe Arches</td>
<td>709.03.01</td>
</tr>
<tr>
<td>Grout and Mortar Sand</td>
<td>706.03.04</td>
</tr>
<tr>
<td>Nonreinforced Concrete Pipe</td>
<td>708.03.02</td>
</tr>
<tr>
<td>Portland Cement</td>
<td>701</td>
</tr>
<tr>
<td>Reinforced Concrete Pipe</td>
<td>708.03.01</td>
</tr>
<tr>
<td>Rubber Gaskets</td>
<td>707.03.02</td>
</tr>
<tr>
<td>Thermoplastic Pipe</td>
<td>709.03.09</td>
</tr>
</tbody>
</table>
When the location of manufacturing plants allows, the plants will be inspected periodically for compliance with specified manufacturing methods. Material samples will be obtained for laboratory testing for compliance for materials quality requirements as specified in the referenced specifications. This can be the basis for acceptance of manufacturing lots.

All materials will be subject to inspection for acceptance as to condition at the latest practicable time the Engineer has the opportunity to check for compliance prior to or during incorporation of materials in the work.

The lengths shown on the plans are approximate.

For structural plate pipe and arches, attention is directed to Section 606, "Structural Plate Pipe, Pipe Arch, and Arch Culverts."

CONSTRUCTION

601.03.01 EARTHWORK: Excavation and backfill shall conform to the requirements of Section 206, "Structure Excavation" and 207, "Structure Backfill," or Section 208, "Trench Excavation and Backfill" when the culvert is placed in a trench. The pipe shall be bedded as shown in the standard specifications and/or drawings appended to the plans or as specified in the Special Provisions. When no bedding class is specified, the requirements for normal bedding as shown in the Uniform Standard Drawings shall apply. The lines and grades will be established by the Engineer or as designated in the contract provisions.

Where pipes are to be installed in new embankments on a steep slope or in a difficult location, the height of new embankments may be varied as directed by the Engineer before installing pipes.

When headwalls are not required and granular materials are used for backfilling, the fill at the ends of the structure shall be sealed against the infiltration of water by bedding the ends of the structure using class II CLSM or concrete.

601.03.02 HEADWALLS: Where shown on the plans, inlet and outlet headwalls shall be constructed or installed in connection with culvert pipes. Where such headwalls are constructed or installed, the ends of pipes shall be placed flush or cut off flush with the headwall face, unless otherwise permitted by the Engineer. Headwalls are to be constructed to conform to the applicable requirements of Sections 501, "Portland Cement Concrete" and 502, "Concrete Structures."

601.03.03 END SECTIONS: The bed for the end section shall be excavated to the required width and grade. For metal end sections with toe plates, a trench shall be excavated for the toe plate in a manner to permit the toe plate from being against the inner face of the trench when the end section is in its final position. After end sections have been properly secured to the pipe, this trench shall be backfilled and firmly compacted.

Precast concrete end section shall be placed with its tongue (or groove) fully entered in the groove (or tongue) of the pipe.

Thermoplastic pipe greater than 30" shall not be used at the open-end sections.

601.03.04 JACKED PIPES: Culvert pipe to be jacked in place between the limits shown on the plans shall conform to the requirements of the respective section of pipe culverts.

The strength of pipe or gage of pipe will be determined for vertical load only in embankment conditions. Any additional reinforcement or strength required to withstand jacking pressure shall be determined and furnished by the Contractor at his expense.

Variation from theoretical alignment and grade at the time of completion of placing shall not exceed 0.2 foot (6.1 centimeters) for each 20 feet (6.1 meters) of pipe placed.
The diameter of the excavated hole shall not be more than 0.1 foot (3 centimeters) greater than the outside diameter of the pipe. Sluicing and jetting with water will not be permitted. When the material tends to cave in from outside these limits, a shield shall be used ahead of the first section of pipe or the face of excavation shall not extend beyond the end of the pipe greater than 1-1/2 feet (0.46 meters) unless permitted by the Engineer.

Areas resulting from caving or excavating outside the above limits shall be backfilled with sand or grout by a method, which will fill the voids.

601.03.05 LAYING CULVERT PIPE: Laying of culvert pipe shall conform to the requirements of the respective sections of culvert pipe.

601.03.06 EXTENDING EXISTING CULVERTS: Where shown on the plans or directed by the Engineer, existing culverts shall be extended in accordance with the provisions for installing new culverts and the following additional provisions.

Existing headwalls shall be demolished and removed and disposed of or moved to the extended location as indicated on the plans or ordered by the Engineer. Attention is directed to Section 202, "Removal of Structures and Obstructions."

A headwall that is not to be reset shall be demolished without injury to the existing culvert and removed and disposed of in accordance with the provisions of Section 202, "Removal of Structures and Obstructions." If shown on the plans or ordered by the Engineer, a new concrete headwall shall be constructed in accordance with the provisions of Section 501, "Portland Cement Concrete" of these specifications or a flared end section shall be attached thereto.

601.03.07 VIDEO INSPECTION: Unless otherwise approved by the entity, all video inspection shall be completed by a National Association of Sewer Service Companies (NASSCO) certified operator, certified at the user level minimum. The user must have completed the Pipeline Assessment and Certificate Program (PACP). Video inspection reports must follow the NASSCO format and use standard sewer defect codes.

METHOD OF MEASUREMENT

601.04.01 MEASUREMENT: The materials to be paid for under these specifications will be listed in the contract items by size, class, type, gage, or whatever information is necessary for identification.

The quantity of culvert pipe to be measured for payment will be the actual number of linear feet (meters) of pipe including the stub on end sections, complete and in place. When pipes are cut to fit a structure or slope, the quantity to be paid for will be the length of pipe necessary to be placed before cutting, measured in even 2 foot (61 centimeters) increments.

Attention is especially directed to plan sheets titled "STANDARD DETAILS — STRUCTURE EXCAVATION & BACKFILL — METHOD OF MEASUREMENT," which shall pertain.

Culvert pipe bends, wyes, tees, and other branches will be measured and paid for by the linear foot (meter) for the sizes of pipes involved. Wyes, tees, eccentric reducers, and other branches will be measured along centerlines to the point of intersection.

Structure excavation and structure backfill, Portland cement concrete and reinforcement required for headwalls, end walls, structures, and other items of work required by the plans and special provision to complete the work, will be measured and paid for as separate items as provided for under their respective sections of these specifications, or the contract documents. Structure excavation and backfill will not be measured for payment on preformed end sections.
No separate measurement or payment will be made for constructing jacking pits and backfilling all pits after the pipe is jacked, or for excavation and backfill between the limits shown on the plans for jacking the pipe. Full compensation therefore will be considered as included in the price paid for jacked pipe.

Culvert pipe to be placed outside the limits for jacked pipe shall conform to the requirements of the respective section of pipe culverts. The limits for payment of structure excavation and backfill will be the original ground line before jacking pits are excavated.

All measurements will be made in accordance with Subsection 109.01, "Measurement of Quantities."

**BASIS OF PAYMENT**

601.05.01 PAYMENT: The accepted quantities of culvert pipe measured as specified in Subsection 601.04.01, "Measurement," will be listed under the respective sections of pipe culverts.

When any of the various sizes, types, and gages of pipe is installed by the jacking method, the contract price paid per linear foot (meter) for jacked pipe shall include full compensation for furnishing the pipe, excavating, jacking, furnishing and placing backfill material, and all incidentals and for doing all the work involved in jacking the pipe, as specified.

Full compensation for furnishing pipe with end finish, including distortion if required, will be considered as included in the price paid per linear foot (meter) for the pipe involved and no additional compensation will be allowed therefore. Full compensation for bedding will be considered included in the price paid per cubic yard (cubic meter) for backfill or granular backfill as the case may be and such payment shall include compensation for all the materials, labor, tools, and incidentals necessary to complete the work.

Provisions for handling of whatever water may be encountered at the site shall be an obligation of the Contractor, and payment therefore shall be considered as subsidiary to the items involved, and no further compensation will be allowed therefore.

All payments will be made in accordance with Subsection 109.02, "Scope of Payment."