### CONCRETE ROUND PIPE CULVERT

#### FILL HEIGHT AND PIPE CLASS TABLE

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>DIA. INCHES</th>
<th>MINIMUM COVER INCHES</th>
<th>CLASS II</th>
<th>CLASS III</th>
<th>CLASS IV</th>
<th>CLASS V</th>
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<tbody>
<tr>
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<td></td>
<td>EMBANKMENT</td>
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**NOTES:**
1. When directed, camber pipe culverts upward from a chord through the invert and outlet invert a downward angle equal to 1% of the pipe length. Develop camber on a parabolic curve. If the midpoint elevation on the parabolic curve is less than the elevation of the invert, reduce the amount of camber or increase the pipe culvert gradient.

2. For flexible pavement and aggregate surface roadways, measure minimum cover from the top of the pipe culvert to the bottom of the roadway subgrade. For rigid pavement, measure minimum cover from the top of the pipe culvert to the top of the pavement. For all roadway surface types, measure maximum fill height from the top of the pipe culvert to the top of the pavement.

3. Pipe compaction limits shown are for pipe installation in an embankment. For pipe installation in trenches, ensure the compaction limits are the walls of the trench.

4. When grades exceed 15%, install supplemental concrete pipe ties on pipe culvert or install ball and socket pipe.

5. Maximum fill heights for pipe culvert installations may be increased on approval of site-specific structural pipe designs meeting the criteria of AASHTO Standard Specifications for Highway Bridges.

6. Use supplemental concrete pipe ties on long downstream pipe-to-pipe joint and at downstream pipe-to-end section joint, if present. Use elsewhere as specified in the contract documents. Ensure tie hardware are galvanized and conforming to ASTM A 307.

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**ON UNYIELDING MATERIAL**

- Finished subgrade
- Bedding material
- 0.15H
- Gravel backfill to springline
- Bedding material

**ON UNSTABLE MATERIAL**

- Embankment slope
- Natural ground
- Culvert end treatment

**MULTIPLE ROUND PIPE INSTALLATION**

- Minimum spacing (See table)
- 1'-0" (min.)

**SUPPLEMENTAL CONCRETE PIPE TIE**

- 1'-0" dia. hole for 1'-0" dia. joint tie
- Tapered holes permitted when precast.

**PIPING PLUG**

- Construct piping plug at culvert invert when embankment material is classified other than AASHTO A-6 or A-7. Inlets with full-height headwalls or slope paving excluded. Construct plug of A-6 or A-7 material or other approved material with a permeability not to exceed 0.004 in/hr. Width may be adjusted to tie into impervious material.

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**SECTION A-A**

- Pipe culvert
- Embankment slope
- Natural ground
- Piping plug

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**LEGEND:**

- Bedding material
- Embankment material placed in layers not exceeding 6" compacted depth.
- Approved granular material or fine compactible soil placed in layers not exceeding 6" compacted depth.

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**NO SCALE**

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**CONCRETE PIPE CULVERT INSTALLATION**

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**U.S. DEPARTMENT OF TRANSPORTATION**

**FEDERAL HIGHWAY ADMINISTRATION**

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**U.S. CUSTOMARY DETAIL**

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**DETAIL APPROVED:**

**ASHFORD GROUP**

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**DETAIL E602-07**