MEMORANDUM

To: All Holders of the Virginia Department of Transportation’s 2001 Road and Bridge Standards

The following is a list of standards contained in the 2001 Road and Bridge Standards that have been revised. Please add these pages to your copy of the standards. An insertable sheet will not be required in plan assemblies for the following two (2) sheets only.

<table>
<thead>
<tr>
<th>PAGE</th>
<th>STANDARD</th>
<th>REVISION</th>
</tr>
</thead>
<tbody>
<tr>
<td>602.02</td>
<td>PE-1</td>
<td>Updated dimension lines.</td>
</tr>
<tr>
<td>702.00</td>
<td>GS-10</td>
<td>Revised sheet title.</td>
</tr>
</tbody>
</table>

The following is a list of revised standards to the 2001 Road and Bridge Standards that do require an insertable sheet to be included in your plan assembly until the next edition of the imperial standards is published. Please add these pages to your copy of the standards. They are available electronically in PDF format on the VDOT web site. The respective insertable sheet number has been placed with the revised standard. An insertable sheet is available for each of these revised standards in Falcon DMS for VDOT personnel and on the FTP server for consultants working on VDOT projects. These insertable sheets will be required in plan assemblies for projects utilizing the standard items listed below effective with the March 2007 advertisement.

<table>
<thead>
<tr>
<th>PAGE</th>
<th>INSERT</th>
<th>STANDARD</th>
<th>REVISION</th>
</tr>
</thead>
<tbody>
<tr>
<td>106.15</td>
<td>a186</td>
<td>DSB-1</td>
<td>New standard for the bedding of drainage structures.</td>
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<tr>
<td>107.20</td>
<td>a166_8</td>
<td>PC-1</td>
<td>Revised notes.</td>
</tr>
<tr>
<td>107.20A</td>
<td>a166_9</td>
<td>PC-1</td>
<td>Revised notes.</td>
</tr>
<tr>
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<td>REVISION</td>
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<td>107.21</td>
<td>a166_9</td>
<td>PC-1</td>
<td>Revised notes.</td>
</tr>
<tr>
<td>114.01</td>
<td>a69</td>
<td>EC-1</td>
<td>Added dimension tables for length and thickness of erosion control stone.</td>
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<tr>
<td>114.06</td>
<td>isd414_1</td>
<td>EC-5</td>
<td>Replaced silt fence at culvert inlet with a check dam.</td>
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<tr>
<td>201.01</td>
<td>a179</td>
<td>CG-2</td>
<td>Revised notes for use of 4” and 6” curb.</td>
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<tr>
<td>201.02</td>
<td>a180</td>
<td>CG-3</td>
<td>Revised notes for use of 4” and 6” curb.</td>
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<tr>
<td>201.03</td>
<td>a179</td>
<td>CG-6</td>
<td>Revised notes for use of 4” and 6” curb.</td>
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<tr>
<td>201.04</td>
<td>a180</td>
<td>CG-7</td>
<td>Revised notes for use of 4” and 6” curb.</td>
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<tr>
<td>201.05</td>
<td>a181</td>
<td>MC-3, 3A</td>
<td>Revised notes for use of 4” and 6” curb.</td>
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<tr>
<td>201.06</td>
<td>a181</td>
<td>MC-3B, 3C</td>
<td>Revised notes for use of 4” and 6” curb.</td>
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<tr>
<td>202.01</td>
<td>a182</td>
<td>MC-1</td>
<td>Revised notes for use of 4” and 6” curb.</td>
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<td>a159</td>
<td>MS-1</td>
<td>Revised notes for use of 4” and 6” curb.</td>
</tr>
<tr>
<td>202.03</td>
<td>a159</td>
<td>MS-1A</td>
<td>Revised notes for use of 4” and 6” curb.</td>
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<tr>
<td>202.04</td>
<td>a183</td>
<td>MS-2</td>
<td>Revised notes for use of 4” and 6” curb.</td>
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<td>202.05</td>
<td>a183</td>
<td>MS-4</td>
<td>Revised notes for use of 4” and 6” curb.</td>
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<tr>
<td>303.02</td>
<td>a187</td>
<td>WP-2</td>
<td>New standard for asphalt pavement widening.</td>
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<tr>
<td>304.03</td>
<td>a188</td>
<td>RS-3</td>
<td>New standard for centerline rumble strips.</td>
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<td>305.01</td>
<td>a189</td>
<td>TPT-1</td>
<td>New standard for pavement planing tie-ins.</td>
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<td>401.02</td>
<td>a161</td>
<td>RW-3</td>
<td>Clarified porous backfill location.</td>
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<tr>
<td>501.05</td>
<td>a87</td>
<td>GR-2, 2A</td>
<td>Added note for GR-11 option in place of 50’ of rail with washers.</td>
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<tr>
<td>PAGE</td>
<td>INSERT</td>
<td>STANDARD</td>
<td>REVISION</td>
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<tr>
<td>501.11</td>
<td>a89</td>
<td>GR-7</td>
<td>Revised to show only typical dimensions.</td>
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<tr>
<td>501.18</td>
<td>isd2390</td>
<td>GR-9</td>
<td>Revised to show only typical dimensions.</td>
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<tr>
<td>501.19</td>
<td>a88</td>
<td>GR-10</td>
<td>Revised depth of fill above culvert to 4’-0”.</td>
</tr>
<tr>
<td>501.20</td>
<td>a88</td>
<td>GR-10</td>
<td>Revised depth of fill above culvert to 4’-0” and added a note about 9” min. distance between post and culvert.</td>
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<tr>
<td>501.25</td>
<td>a65_1</td>
<td>FOA-1</td>
<td>Revised guardrail height to 27 ¾” ± ¾” to match GR-2.</td>
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<td>501.26</td>
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<td>FOA-1</td>
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<td>a65_2</td>
<td>FOA-1</td>
<td>Revised dimension of guardrail on parapet.</td>
</tr>
<tr>
<td>501.28</td>
<td>a66_1</td>
<td>FOA-2</td>
<td>Revised guardrail height to 27 ¾” ± ¾” to match GR-2.</td>
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<td>FOA-2</td>
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<td>a66_2</td>
<td>FOA-2</td>
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</tr>
<tr>
<td>501.31</td>
<td>a67</td>
<td>FOA-4</td>
<td>Revised guardrail height to 27 ¾” ± ¾” to match MB-3.</td>
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<tr>
<td>501.38</td>
<td>a92</td>
<td>GR-INS</td>
<td>Revised tables to reflect Road Design Manual revision.</td>
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<tr>
<td>501.39</td>
<td>a93</td>
<td>GR-INS</td>
<td>Revised transition length for rail height adjustment.</td>
</tr>
<tr>
<td>501.40</td>
<td>a93</td>
<td>GR-INS</td>
<td>Revised transition length for rail height adjustment.</td>
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<td>STANDARD</td>
<td>REVISION</td>
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<tr>
<td>501.41</td>
<td>a94</td>
<td>MB-3</td>
<td>Revised guardrail height to 27 ¾” ± ¾” to match GR-2.</td>
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<tr>
<td>501.53</td>
<td>isd1165A</td>
<td>MB-11A</td>
<td>Revised to be sheet 1 of 3.</td>
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<tr>
<td>501.54</td>
<td>isd1165A</td>
<td>MB-11A</td>
<td>Revised to be sheet 2 of 3.</td>
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<tr>
<td>501.54A</td>
<td>isd1165B</td>
<td>MB-11A</td>
<td>New staking detail for pavement locations.</td>
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<tr>
<td>1301.10</td>
<td>a128</td>
<td>LF-1</td>
<td>Corrected mislabeled dimensions.</td>
</tr>
<tr>
<td>1301.25</td>
<td>a184</td>
<td>WD-4</td>
<td>Revised notes.</td>
</tr>
<tr>
<td>1301.48</td>
<td>a127</td>
<td>JB-1A,2A,3A,4A,5A</td>
<td>Corrected mislabeled dimensions</td>
</tr>
<tr>
<td>1301.84</td>
<td>a185</td>
<td>ED-1, 2</td>
<td>Revised notes.</td>
</tr>
</tbody>
</table>

If you have any questions or comments regarding the listed revisions to this publication, please contact Steve Van Cleef of the Standards and Special Design Section at (804) 786-2532.

Sincerely,

Mohammad Mirshahi, P.E.
State Location and Design Engineer
NOTES

1. Bedding material is to be Aggregate Size 25 or 26. If foundation has standing or running water present, then Aggregate No. 57 shall be used for the depth specified on the plans or as directed by the engineer, capped with 4 inches of Aggregate No. 25 or 26.

2. Width of Bedding material shall extend a minimum of 6" beyond the base of the structure on all sides.

3. Height of structure (H) is measured from the invert of the structure to the top of the frame and cover or concrete depending on structure type. See applicable drainage structure standard for detail.

BEDDING THICKNESS TABLE

<table>
<thead>
<tr>
<th>FOUNDATION TYPE</th>
<th>BEDDING THICKNESS</th>
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<tbody>
<tr>
<td>NORMAL EARTH</td>
<td>4&quot; for H &lt; 'D'</td>
</tr>
<tr>
<td></td>
<td>6&quot; for H &gt; 'D'</td>
</tr>
<tr>
<td>ROCK</td>
<td>1&quot; per foot of H, max. 8&quot;</td>
</tr>
<tr>
<td>SOFT &amp; YELLING</td>
<td>AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER</td>
</tr>
</tbody>
</table>

DRAINAGE STRUCTURE BEDDING
FOR DROP INLET, MANHOLE, AND JUNCTION BOX

VIRGINIA DEPARTMENT OF TRANSPORTATION
POLYETHYLENE CORRUGATED PIPE (PE)

(SEE NOTE 6)

<table>
<thead>
<tr>
<th>DIAMETER</th>
<th>AREA</th>
<th>MAXIMUM HEIGHT OF COVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>INCHES</td>
<td>SQ. FT.</td>
<td>FEET</td>
</tr>
<tr>
<td>12</td>
<td>0.8</td>
<td>21</td>
</tr>
<tr>
<td>15</td>
<td>1.2</td>
<td>21</td>
</tr>
<tr>
<td>18</td>
<td>1.8</td>
<td>20</td>
</tr>
<tr>
<td>24</td>
<td>3.1</td>
<td>20</td>
</tr>
<tr>
<td>30</td>
<td>4.9</td>
<td>19</td>
</tr>
<tr>
<td>36</td>
<td>7.1</td>
<td>18</td>
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<tr>
<td>42</td>
<td>7.1</td>
<td>18</td>
</tr>
<tr>
<td>48</td>
<td>7.1</td>
<td>17</td>
</tr>
</tbody>
</table>

NOTES:
1. COVER HEIGHTS INDICATED IN TABLES ARE FOR FINISHED CONSTRUCTION.
2. TO PROTECT PIPE DURING CONSTRUCTION, MINIMUM HEIGHT OF COVER TO BE IN ACCORDANCE WITH TABLE 4 PRIOR TO ALLOWING CONSTRUCTION TRAFFIC TO CROSS INSTALLATION. THE COVER SHALL EXTEND THE FULL LENGTH OF THE PIPE. THE APPROACH FILL IS TO EXTEND A MINIMUM OF 10" (DIAMETER + \(1/2\) DIAMETER) ON EACH SIDE OF THE PIPE OR TO THE INTERSECTION WITH A CUT.
3. STANDARD MINIMUM FINISHED HEIGHT OF COVER FOR ALL PIPES, EXCEPT THOSE UNDER ENTRANCES, SHALL BE 24" OR \(1/2\) DIAMETER WHICHEVER IS GREATER IN CASES IN WHICH THESE COVER HEIGHTS CANNOT BE ACHIEVED, AN ABSOLUTE MINIMUM FINISHED COVER HEIGHT OF 10" OR \(1/4\) DIAMETER WHICHEVER IS GREATER WILL BE ALLOWED ONLY IF ALL POSSIBLE MEANS TO OBTAIN THE STANDARD VALUE HAVE BEEN EXHAUSTED. THE MINIMUM FINISHED HEIGHT OF COVER FOR PIPES UNDER ENTRANCES IS 9" FOR PIPE DIAMETERS LESS THAN OR EQUAL TO 24" AND 12" OR \(1/8\) DIAMETER WHICHEVER IS GREATER, FOR PIPE DIAMETERS GREATER THAN 24", WHERE THE SURFACE OVER THE TOP OF THE PIPE WILL BE ASPHALT, A MINIMUM OF 6" OF CLASS I BACKFILL MATERIAL IS TO BE PLACED BETWEEN THE TOP OF THE PIPE AND THE BOTTOM OF THE ASPHALT.
4. SEE STANDARD PB-1 FOR PIPE BEDDING AND BACKFILL REQUIREMENTS.
5. THE MAXIMUM HEIGHT OF COVER SHOWN IN THE TABLES IS BASED ON A SOIL MODULUS OF 700 P.S.I. ALL OTHER DESIGN CRITERIA ARE IN ACCORDANCE WITH THE AASHO SPECIFICATIONS AND VDOT MODIFICATIONS FOR SOIL THERMOPLASTIC PIPE INTERACTION SYSTEMS.
6. HEIGHT OF COVER VALUES FOR 12" TO 36" DIAMETER APPLY TO TYPE C OR S. HEIGHT OF COVER VALUES FOR 42" AND 48" APPLY TO TYPE S ONLY.

<table>
<thead>
<tr>
<th>TYPICAL PIPE DIAMETER</th>
<th>MINIMUM COVER HEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>12&quot; TO 30&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>36&quot; AND ABOVE</td>
<td>(1/2) DIAMETER</td>
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</table>

POLYVINYLCHLORIDE RIBBED PIPE (PVC)

<table>
<thead>
<tr>
<th>DIAMETER</th>
<th>AREA</th>
<th>MAXIMUM HEIGHT OF COVER</th>
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</thead>
<tbody>
<tr>
<td>INCHES</td>
<td>SQ. FT.</td>
<td>FEET</td>
</tr>
<tr>
<td>12</td>
<td>1.7</td>
<td>20</td>
</tr>
<tr>
<td>21</td>
<td>2.3</td>
<td>19</td>
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<td>36</td>
<td>6.9</td>
<td>18</td>
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<tr>
<td>48</td>
<td>12.3</td>
<td>18</td>
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</table>

PLASTIC PIPE

EXTRA STRENGTH CLAY PIPE

<table>
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<tr>
<th>DIAMETER</th>
<th>AREA</th>
<th>MAXIMUM HEIGHT OF COVER</th>
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</thead>
<tbody>
<tr>
<td>INCHES</td>
<td>SQ. FT.</td>
<td>FEET</td>
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<tr>
<td>12</td>
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<td>2.4</td>
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<td>24</td>
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<td>4.9</td>
<td>13</td>
</tr>
<tr>
<td>36</td>
<td>7.1</td>
<td>13</td>
</tr>
</tbody>
</table>

NOTES:
1. ALL VITRIFIED CLAY PIPE IS TO BE EXTRA STRENGTH.
2. MAXIMUM HEIGHTS OF COVER SHOWN IN TABLE ARE FOR FINISHED CONSTRUCTION.
3. TO PROTECT PIPE DURING CONSTRUCTION, MINIMUM HEIGHT OF COVER PRIOR TO ALLOWING CONSTRUCTION TRAFFIC TO CROSS INSTALLATION IS TO BE 30". THIS COVER IS TO EXTEND THE FULL LENGTH OF THE PIPE. THE APPROACH FILL RAMP IS TO EXTEND A MINIMUM OF (DIAMETER + \(1/2\) DIAMETER) ON EACH SIDE OF THE PIPE, OR TO THE INTERSECTION WITH A CUT.
4. MINIMUM FINISHED HEIGHT OF COVER TO BE 24"; EXCEPT PIPE UNDER ENTRANCES WHERE A 9" MINIMUM WILL BE PERMITTED.
5. SEE STANDARD PB-1 FOR PIPE BEDDING AND BACKFILL REQUIREMENTS.

VITRIFIED CLAY
# Table A - Allowable Type of Pipe Culvert

For roadways that are constructed, funded or will ultimately be maintained by VDOT.

<table>
<thead>
<tr>
<th>Functional Classification of Roads System Under Which Pipe is to be Installed</th>
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<tbody>
<tr>
<td>Higher Functional Class - HFC</td>
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<tr>
<td>Rural Principal Arterial, Urban Principal Arterial, Rural Minor Arterial, Urban Minor Arterial, Rural Collector Roads, Urban Collector Streets, Subdivision Streets with an ADT Greater than 4000</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Allowable Pipe Culverts</th>
<th>Statewide</th>
<th>Location Shown in Table B</th>
<th>Statewide</th>
<th>Location Shown in Table B</th>
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<tr>
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<td>WITH CONCRETE INVERT</td>
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<td>NOTE 3</td>
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<td>RIBBED PIPE (SMOOTH INTERIOR)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1. Allowable types of pipes for a specific area are to conform to the criteria shown in Tables A, A1, A2, and C. Any deviation must be approved by the state location and design engineer and the district materials engineer.

2. See height of cover tables for minimum and maximum cover limitations for each type of pipe.

3. See Table C for minimum and maximum pH, resistivity, and velocity limitations for metal pipes.

4. Use only under entrances where the pipe size is less than or equal to 30" diameter (or equivalent) and the height of cover is less than or equal to 15' and as an outlet pipe for standard DI-13 shoulder slot inlets.

**Specification Reference**

| 302 | 232 |

**Allowable Pipe Criteria for Culverts and Storm Sewers**

**Virginia Department of Transportation**

**Rev. 9/08**

**107.20A**
### TABLE A1 - ALLOWABLE TYPE OF STORM SEWER PIPE

FOR ROADWAYS THAT ARE CONSTRUCTED, FUNDED OR WILL ULTIMATELY BE MAINTAINED BY VDOT

<table>
<thead>
<tr>
<th>HIGHER FUNCTIONAL CLASS - HFC</th>
<th>LOWER FUNCTIONAL CLASS - LFC</th>
<th>ALLOWABLE PIPE CULVERTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>RURAL PRINCIPAL ARTERIAL, URBAN PRINCIPAL ARTERIAL, RURAL MINOR ARTERIAL, URBAN MINOR ARTERIAL, RURAL COLLECTOR ROADS, URBAN COLLECTOR STREETS, SUBDIVISION STREETS WITH AN ADT GREATER THAN 4000</td>
<td>RURAL LOCAL ROADS, URBAN LOCAL STREETS, SUBDIVISION STREETS WITH AN ADT LESS THAN OR EQUAL TO 4000</td>
<td>Statewide Excep Locations Shown In Table B Location Shown In Table B</td>
</tr>
</tbody>
</table>

**CONCRETE**

**CORRUGATED STEEL**
- ALUMINUM COATED TYPE 2 FULLY CONCRETE LINED
- NOTE 3

**ALUMINUM COATED TYPE 2 STEEL SPIRAL RIB**
- NOTE 3

**POLYMER COATED (10/10) CORRUGATED STEEL SPIRAL RIB**
- NOTE 3

**POLYMER COATED (10/10) CORRUGATED STEEL DOUBLE WALL (SMOOTH INTERIOR)**
- NOTE 3

**ALUMINUM SPIRAL RIB**
- NOTE 3

**POLYVINYLCHLORIDE (PVC) RIBBED PIPE (SMOOTH INTERIOR)**

**POLYETHYLENE (PE) CORRUGATED TYPE S**

---

### TABLE C

<table>
<thead>
<tr>
<th>PIPE TYPE</th>
<th>ALLOWABLE PH RANGE (SEE NOTE 6)</th>
<th>ALLOWABLE RESISTIVITY RANGE</th>
<th>ALLOWABLE VELOCITY (FPS) (SEE NOTE 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALUMINUM COATED TYPE 2 CORRUGATED STEEL</td>
<td>5.0 - 9.0</td>
<td>1500 - -</td>
<td>-</td>
</tr>
<tr>
<td>GALVANIZED STEEL STRUCTURAL PLATE WITH CONCRETE INVERT</td>
<td>6.0 - 9.0</td>
<td>2000 - 10000</td>
<td>-</td>
</tr>
<tr>
<td>GALVANIZED STEEL STRUCTURAL PLATE</td>
<td>6.0 - 9.0</td>
<td>2000 - 7000</td>
<td>-</td>
</tr>
<tr>
<td>POLYMER COATED (10/10) CORRUGATED STEEL</td>
<td>4.0 - 9.0</td>
<td>750 - -</td>
<td>-</td>
</tr>
<tr>
<td>UNCOATED GALVANIZED CORRUGATED STEEL</td>
<td>6.0 - 10.0</td>
<td>2000 - 7000</td>
<td>-</td>
</tr>
<tr>
<td>CORRUGATED ALUMINUM ALLOY</td>
<td>4.0 - 9.0</td>
<td>500 - -</td>
<td>-</td>
</tr>
<tr>
<td>CORRUGATED ALUMINUM ALLOY STRUCTURAL PLATE</td>
<td>4.0 - 9.0</td>
<td>500 - -</td>
<td>-</td>
</tr>
<tr>
<td>ALUMINUM SPIRAL RIB</td>
<td>4.0 - 9.0</td>
<td>500 - -</td>
<td>-</td>
</tr>
<tr>
<td>ALUMINUM COATED TYPE 2 SPIRAL RIB</td>
<td>5.0 - 9.0</td>
<td>1500 - -</td>
<td>-</td>
</tr>
<tr>
<td>CORRUGATED STEEL ALUMINUM COATED TYPE 2 FULLY CONCRETE LINED</td>
<td>5.0 - 9.0</td>
<td>1500 - -</td>
<td>-</td>
</tr>
<tr>
<td>POLYMER COATED CORRUGATED STEEL SPIRAL RIB</td>
<td>4.0 - 9.0</td>
<td>750 - -</td>
<td>-</td>
</tr>
<tr>
<td>POLYMER COATED CORRUGATED STEEL DOUBLE WALL</td>
<td>4.0 - 9.0</td>
<td>750 - -</td>
<td>-</td>
</tr>
</tbody>
</table>

**NOTES:**

1. ALLOWABLE TYPES OF PIPES FOR A SPECIFIC AREA ARE TO CONFORM TO THE CRITERIA SHOWN IN TABLES A, A1, B, AND C. ANY DEVIATION MUST BE APPROVED BY THE STATE LOCATION AND DESIGN ENGINEER AND THE DISTRICT MATERIALS ENGINEER.

2. SEE HEIGHT OF COVER TABLES FOR MINIMUM AND MAXIMUM COVER LIMITATIONS FOR EACH TYPE OF PIPE.

3. SEE TABLE C FOR MINIMUM AND MAXIMUM pH, RESISTIVITY, AND VELOCITY LIMITATIONS FOR METAL PIPES.

4. USE ONLY UNDER ENTRANCES WHERE THE PIPE SIZE IS LESS THAN OR EQUAL TO 30" DIAMETER (OR EQUIVALENT) AND THE HEIGHT OF COVER IS LESS THAN OR EQUAL TO 15" AND AS AN OUTLET PIPE FOR STANDARD D-13 SHOULDER SLOT INLETS.

5. ALLOWABLE VELOCITY WHERE ABRASIVE LOAD IS PRESENT OR ANTICIPATED, MAXIMUM VELOCITY BASED ON 10 YEAR DESIGN DISCHARGE (Q).

6. pH VALUES APPLY TO BOTH THE SOIL AND WATER.

---

### TABLE B

EXCEPTIONS TO STATEWIDE APPLICATIONS

<table>
<thead>
<tr>
<th>COUNTIES (INCLUDING TOWNS)</th>
<th>CITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARLINGTON - EAST OF AND INCLUDING RTS. 95 &amp; 395</td>
<td>SUFFOLK - EAST OF AND INCLUDING RTE. 32</td>
</tr>
<tr>
<td>FAIRFAX - EAST OF AND INCLUDING RTS. 95 &amp; 395</td>
<td>CHEAPEAKE WILMINGTON</td>
</tr>
<tr>
<td>PRINCE WILLIAM - EAST OF AND INCLUDING RTS. 95 &amp; 395</td>
<td>VIRGINIA BEACH PDQUOSON</td>
</tr>
<tr>
<td>WESTMORELAND</td>
<td>HAMPTON PORTSMOUTH</td>
</tr>
<tr>
<td>LANCaster</td>
<td>NEWPORT NEWS</td>
</tr>
<tr>
<td>MATTHEWS</td>
<td>NORFOLK</td>
</tr>
<tr>
<td>GLOUCESTER</td>
<td>ALEXANDRIA</td>
</tr>
<tr>
<td>JAMES CITY</td>
<td>FREDERICKSBURG</td>
</tr>
<tr>
<td>ESSEX</td>
<td>KING GEORGE</td>
</tr>
<tr>
<td>NORTH-AMPTON</td>
<td></td>
</tr>
<tr>
<td>ACCOWACK</td>
<td></td>
</tr>
<tr>
<td>MIDDLESEX</td>
<td></td>
</tr>
<tr>
<td>STAFFORD</td>
<td></td>
</tr>
<tr>
<td>YORK</td>
<td></td>
</tr>
<tr>
<td>RICHMOND</td>
<td></td>
</tr>
</tbody>
</table>
NOTES:

1. FOR MULTIPLE LINE INSTALLATIONS, DIMENSION S IS TO GOVERN THE PROTECTION OUTSIDE THE CHANNEL WIDTH (W).

2. ON ANY INSTALLATION REQUIRING CULVERT OUTLET PROTECTION WHERE NO ENDSWALL OR ENDSSECTION IS SPECIFIED ON THE PLANS, CONSTRUCTION IS TO BE IN ACCORDANCE WITH DETAIL 2 SHOWN ABOVE.

3. GEOTEXILE FABRIC TO BE INSTALLED UNDER CLASS 2, 3, AND 4 MATERIALS IN ACCORDANCE WITH THE SPECIFICATIONS.

4. S = DIAMETER OF CIRCULAR CULVERT OR SPAN FOR BOX, ELLIPTICAL OR ARCH CULVERT. H = DIAMETER OF CIRCULAR CULVERT OR RISE/HEIGHT FOR BOX, ELLIPTICAL OR ARCH CULVERT.

5. PLAN AND SECTION DETAILS DEPict CLASS 2, 3, AND 4 MATERIALS. FOR CLASS 1 INSTALLATION DETAILS SEE EC-3 TYPE B STANDARD DRAWING.

* USE TYPICAL SECTION SHOWN ON PLANS FOR SIDE SLOPE, BOTTOM WIDTH AND DEPTH OF CHANNEL OR MATCH EXISTING DITCH OR NATURAL GROUND.

<table>
<thead>
<tr>
<th>TYPE OF OUTLET PROTECTION MATERIAL</th>
<th>MAXIMUM OUTLET VELOCITY (FOR DESIGN STORM)</th>
<th>MINIMUM &quot;T&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASS 1 EC-3 TYPE B</td>
<td>6 fps</td>
<td>NA</td>
</tr>
<tr>
<td>CLASS 2 CLASS A DRY RIPRAP</td>
<td>8 fps</td>
<td>20&quot;</td>
</tr>
<tr>
<td>CLASS 3 CLASS I DRY RIPRAP</td>
<td>14 fps</td>
<td>20&quot;</td>
</tr>
<tr>
<td>CLASS 4 CLASS I DRY RIPRAP</td>
<td>19 fps</td>
<td>36&quot;</td>
</tr>
</tbody>
</table>

OUTLET PROTECTION MINIMUM LENGTH (L)

| TYPE A INSTALLATION | 3H |
| TYPE B INSTALLATION | 5H |
TYPICAL DETAIL FOR TEMPORARY FILTER BARRIER/SILT FENCE/CHECK DAM AT CULVERT

NOTES:
1. IF ANY PORTION OF FILL IS GREATER THAN 5', SILT FENCE IS REQUIRED. IF FILL HEIGHT IS LESS THAN 5', FILTER BARRIER IS REQUIRED.
2. ROCK CHECK DAM IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS, AND STANDARD EC-4.

TYPICAL DETAIL FOR TEMPORARY FILTER BARRIER/CHECK DAM AT TOE OF FILL

NOTE:
ROCK CHECK DAM IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS, AND STANDARD EC-4.

TYPICAL DETAIL FOR TEMPORARY SILT FENCE/CHECK DAM AT TOE OF FILL

NOTE:
ROCK CHECK DAM IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS, AND STANDARD EC-4.

TEMPORARY SILT FENCE

POSTS SHALL BE A NOMINAL 2 1/2" X 2 1/2" OR A 3" DIA. NO. 2 SOUTHERN PINE, A NOMINAL 2" X 2" OAK, OR STEEL HAVING A MIN. WEIGHT OF 1.25 LBS. PER LINEAR FOOT AND A MIN. LENGTH OF 5' FOR TEMPORARY SILT FENCES.

PROVIDE T' TUCK OR SUITABLY REINFORCED TOP END SECTION.

TEMPORARY FILTER BARRIER

SUPPORTS FOR TEMPORARY FILTER BARRIERS SHALL BE A NOMINAL 1" X 2" OR A 1/2" DIA. NO. 2 SOUTHERN PINE OR OAK, OR STEEL HAVING A MIN. WEIGHT OF 1.00 LBS. PER LINEAR FOOT.

SLICING IS AN APPROVED ALTERNATE METHOD TO TRENCHING.

TEMPORARY SILT FENCE AND FILTER BARRIER

VIRGINIA DEPARTMENT OF TRANSPORTATION
NOTES:

1. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.

2. CONCRETE TO BE CLASS A3 IF CAST IN PLACE, 4000 PSI IF PRECAST.

3. CURB HAVING A RADIUS OF 300 FEET OR LESS (ALONG FACE OF CURB) WILL BE PAID FOR AS RADIAL CURB.

4. THE DEPTH OF CURB MAY BE REDUCED AS MUCH AS 3" (15" DEPTH) OR INCREASED AS MUCH AS 3" (15" DEPTH) IN ORDER THAT THE BOTTOM OF CURB WILL CONCIDE WITH THE TOP OF A COURSE OF THE PAVEMENT SUBSTRUCTURE. OTHERWISE THE DEPTH IS TO BE 18" AS SHOWN. NO ADJUSTMENT IN THE PRICE BID IS TO BE MADE FOR A DECREASE OR AN INCREASE IN DEPTH.

5. CG-2 IS TO BE USED ON ROADWAYS MEETING THE REQUIREMENTS FOR CG-6 AS SHOWN IN APPENDIX A OF THE VDOT ROAD DESIGN MANUAL.
NOTES:

1. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.
2. CONCRETE TO BE CLASS A3 IF CAST IN PLACE, 4000 PSI IF PRECAST.
3. CURB HAVING A RADIUS OF 300 FEET OR LESS (ALONG FACE OF CURB) WILL BE PAID FOR AS RADIAL CURB.
4. THE DEPTH OF CURB MAY BE REDUCED AS MUCH AS 3" (13' DEPTH) OR INCREASED AS MUCH AS 3" (18' DEPTH) IN ORDER THAT THE BOTTOM OF CURB WILL CONFORM WITH THE TOP OF A COURSE OF THE PAVEMENT SUBSTRUCTURE. OTHERWISE, THE DEPTH IS TO BE 18" AS SHOWN. NO ADJUSTMENT IN THE PRICE BID IS TO BE MADE FOR A DECREASE OR AN INCREASE IN DEPTH.
5. CG-3 IS TO BE USED ON ROADWAYS MEETING THE REQUIREMENTS FOR CG-7 AS SHOWN IN APPENDIX A OF THE VDOT ROAD DESIGN MANUAL.
6. WHEN THIS STANDARD IS TO BE TIED INTO EXISTING BARRIER CURB, THE TRANSITION IS TO BE MADE WITHIN 10' OF THE CHANGE IN STANDARDS MADE AT REGULAR OPENINGS.
NOTES:

1. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.

2. CONCRETE TO BE CLASS A3 IF CAST IN PLACE, 4000 PSI IF PRECAST.

3. COMBINATION CURB & GUTTER HAVING A RADIUS OF 300 FEET OR LESS (ALONG FACE OF CURB) SHALL BE PAID FOR AS RADIAL COMBINATION CURBS & GUTTERS.

4. FOR USE WITH STABILIZED OPEN-GRADED DRAINAGE LAYER, THE BOTTOM OF THE CURB AND GUTTER SHALL BE CONSTRUCTED PARALLEL TO THE SLOPE OF SUBBASE COURSES AND TO THE DEPTH OF THE PAVEMENT.

5. ALLOWABLE CRITERIA FOR THE USE OF CG-6 IS BASED ON ROADWAY CLASSIFICATION AND DESIGN SPEED AS SHOWN IN APPENDIX A OF THE VDOT ROAD DESIGN MANUAL.

THIS AREA MAY BE CONCRETE AT THE OPTION OF THE CONTRACTOR.

THE BOTTOM OF THE CURB AND GUTTER MAY BE CONSTRUCTED PARALLEL TO THE SLOPE OF SUBBASE COURSES PROVIDED A MINIMUM DEPTH OF 7" IS MAINTAINED.
1. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.

2. CONCRETE TO BE CLASS A3 IF CAST IN PLACE, 4000 PSI IF PRECAST.

3. COMBINATION CURB & GUTTER HAVING A RADIUS OF 300 FEET OR LESS (ALONG FACE OF CURB) SHALL BE PAID FOR AS RADIAL COMBINATION CURB & GUTTER.

4. FOR USE WITH STABILIZED OPEN-GRADED DRAINAGE LAYER, THE BOTTOM OF THE CURB AND GUTTER SHALL BE CONSTRUCTED PARALLEL TO THE SLOPE OF SUBBASE COURSES AND TO THE DEPTH OF THE PAVEMENT.

5. ALLOWABLE CRITERIA FOR THE USE OF CG-7 IS BASED ON ROADWAY CLASSIFICATION AND DESIGN SPEED AS SHOWN IN APPENDIX A OF THE VDOT ROAD DESIGN MANUAL.

6. WHEN THIS STANDARD IS TO BE TIED INTO EXISTING BARRIER CURB, THE TRANSITION IS TO BE MADE WITHIN 10' OR THE CHANGE IN STANDARDS MADE AT REGULAR OPENINGS.

7. WHEN COMBINATION MOUNTABLE CURB AND GUTTER IS USED, THE STANDARD ENTRANCE GUTTERS OR STANDARD CONNECTION FOR STREET INTERSECTIONS ARE TO HAVE THE MOUNTABLE CURB CONFIGURATION INCORPORATED.

THE BOTTOM OF THE CURB AND GUTTER MAY BE CONSUTECTED PARALLEL TO THE SLOPE OF SUBBASE COURSES PROVIDED A MIN. DEPTH OF 7" IS MAINTAINED.

COMBINATION 4" CURB & GUTTER

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

1.05
2.02
ASPHALT CURB

ASPHALT CURB

ASPHALT CURB

FOR SLOPE EROSION CONTROL ONLY

ASPHALT MEDIAN

MC-3 AND MC-3A IS TO BE USED ON ROADWAYS MEETING THE REQUIREMENTS FOR CC-6 AS SHOWN IN APPENDIX A OF THE VDOT ROAD DESIGN MANUAL.

ASPHALT MEDIAN

* ASPHALT TOP FOR MEDIAN TO BE SAME MIX AS CURB.
**ASPHALT CURB**

MC-3B and MC-3C is to be used on roadways meeting the requirements for CG-7 as shown in Appendix A of the VDOT Road Design Manual.

*Asphalt top for median to be same mix as curb.*

**ASPHALT CURB**

**ASPHALT CURB FOR SLOPE EROSION CONTROL ONLY**

---

**ASPHALT MEDIAN**

**ASPHALT MEDIAN**

**ASPHALT CONCRETE CURB AND MEDIAN FOR TEMPORARY OR PERMANENT INSTALLATION**

**SPECIFICATION REFERENCE**

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06
201.06
When roadway design meets the criteria for CG-7 as shown in Appendix A of the Road Design Manual, median curb is to be in accordance with CG 3.

FOR USE WITH CONCRETE PAVEMENT

The depth of curb may be reduced as much as 3' (15" depth) or increased as much as 3' (21" depth) in order that the bottom of curb will coincide with the top of a course of the pavement substructure. Otherwise, the depth is to be 18" as shown. No adjustment in the price bid is to be made for a decrease or an increase in depth.

INTEGRAL

The depth of curb may be reduced as much as 3' (15" depth) or increased as much as 3' (21" depth) in order that the bottom of curb will coincide with the top of a course of the pavement substructure. Otherwise, the depth is to be 18" as shown. No adjustment in the price bid is to be made for a decrease or an increase in depth.

FOR USE WITH CONCRETE WITH ASPHALT TOP COURSE

INDEPENDENT

When roadway design meets the criteria for CG-7 as shown in Appendix A of the Road Design Manual, median curb is to be in accordance with CG 3.
HALF SECTION ON EXISTING CONCRETE PAVEMENT

Class A3 Concrete
2" R

Variable

2"

1/4" Slope

Dowels

Exis. and/or Proposed Asph. Surface Course

Exis. Concrete Pavement

Dowel spacing
Longitudinally at 2'-0" c-c from nose to first joint.

Note: Existing Asphalt Surface Course and Binder Course, if any, to be removed under median strip.

When roadway design meets the criteria for CG-7 as shown in Appendix A of the Roadway Design Manual, median curb is to be in accordance with CG-3.

HALF SECTION ON EXISTING CONCRETE PAVEMENT WITH PROPOSED OR EXISTING ASPHALT PAVEMENT

Class A3 Concrete
2" R

Variable

2"

1/4" Slope

Exist. Asphalt Base

Proposed Asphalt Surface Course

Exis. Asph. Surface Course

Exis. Concrete Pavement

Note: Existing Asphalt Surface Course and Binder Course, if any, to be removed under median strip.

12" square hole for sign post to be formed into introduced median noses a minimum of 5' from the nose.

W = 4 Min.

When median is instaled over existing pavement, hole for sign post is to extended to the subbase.

Note: Existing Asphalt Surface Course and Binder Course, if any, to be removed under median strip.

HALF SECTION ON EXISTING FLEXIBLE PAVEMENT

Class A3 Concrete
2" R

Variable

2"

1/4" Slope

Exist. Asph. Surface Course

Exis. Concrete Pavement

Exis. Asphalt Base

Note: Existing Asphalt Surface Course and Binder Course, if any, to be removed under median strip.

STANDARD SOLID CONCRETE RAISED MEDIAN STRIP

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06
202.02

SPECIFICATION
REFERENCE
502
Suggested Construction Method if Top Slab is Poured Separately

When roadway design meets the criteria for CG-7 as shown in Appendix A of the Road Design Manual, median curb is to be in accordance with Standard CG-3.

Alternate Construction Method if Top Slab is Poured Separately

The depth of curb may be reduced as much as 3' (9” depth) or increased as much as 3” (15” depth) in order that the bottom of curb will coincide with the top of a course of the pavement substructure. Otherwise the depth is to be 12” as shown. No adjustment in the price bid is to be made for a decrease or an increase in depth.

Alternate with Extruded Curb

When median width is 3 feet or greater a longitudinal contraction joint shall be provided along 1/6 of the median strip.

Circular Nose

W = 4’ Min.

Non-Symmetrical Nose

Additional notes of adequate size to be provided for sign posts, delineator posts, etc. as shown on the plans or directed by the Engineer.

When median width is 3 feet or greater a longitudinal contraction joint shall be provided along 1/6 of the median strip.

Specification Reference

502

Virginia Department of Transportation

Rev. 9/06

202.03
FOR DETAILS OF INTEGRAL CURB
SEE STANDARD MC-1 OR CG-3

HALF SECTION WITH PROP.
CONCRETE PAVEMENT

WHEN ROADWAY DESIGN MEETS THE
CRITERIA FOR CG-7 AS SHOWN IN
APPENDIX A OF THE ROAD DESIGN
MANUAL, MEDIAN CURB IS TO BE IN
ACCORDANCE WITH CG-3.

FOR DETAILS OF INDEPENDENT CURB
SEE STANDARD MC-1 OR CG-3

HALF SECTION WITH PROP.
CONCRETE OR FLEXIBLE PAVEMENT

1. THOROUGHLY COMPACTED AREA TO
CONSIST OF THE FOLLOWING:
IN FILLS: REGULAR FILL MATERIAL,
IN CUTS: UNDISTURBED EARTH AND
REGULAR FILL MATERIAL, AS
REQUIRED.
2. THOROUGHLY COMPACTED AREA TO
CONSIST OF REGULAR FILL MATERIAL.

FOR DETAILS OF INDEPENDENT CURB
SEE STANDARD MC-1 OR CG-3

HALF SECTION WITH PROP.
CONCRETE OR FLEXIBLE PAVEMENT

HALF SECTION WITH EXISTING FLEXIBLE PAVEMENT

FOR DETAILS OF INDEPENDENT CURB
SEE STANDARD MC-1 OR CG-3

HALF SECTION WITH EXIST. FLEXIBLE BASE
WITH ASPHALT TOP

STANDARD RAISED GRASS MEDIAN STRIPS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

502
2" ASPHALT CONCRETE TYPE SM-9.5 A OR D
FOR DETAILS OF INTEGRAL CURB
SEE STANDARD MC-1 OR CG-3

HALF SECTION WITH PROPOSED CONCRETE PAVEMENT

2" ASPHALT CONCRETE TYPE SM-9.5 A OR D
FOR DETAILS OF INDEPENDENT CURB
SEE STANDARD MC-1 OR CG-3

HALF SECTION WITH PROP. CONCRETE OR FLEXIBLE PAVEMENT

2" ASPHALT CONCRETE TYPE SM-9.5 A OR D
FOR DETAILS OF INDEPENDENT CURB
SEE STANDARD MC-1 OR CG-3

HALF SECTION WITH EXISTING FLEXIBLE PAVEMENT

WHEN ROADWAY DESIGN MEETS THE CRITERIA FOR CG-7 AS SHOWN IN APPENDIX A OF THE ROADWAY DESIGN MANUAL, MEDIAN CURB IS TO BE IN ACCORDANCE WITH CG-3.

1) THOROUGHLY COMPACTED AREA TO CONSIST OF THE FOLLOWING:
IN FILLS - REGULAR FILL MATERIAL
IN CUTS - UNDISTURBED EARTH AND REGULAR FILL MATERIAL, AS REQUIRED.

2) THOROUGHLY COMPACTED AREA TO CONSIST OF REGULAR FILL MATERIAL.

NOTE: THE ASPHALT CONCRETE SURFACE SLAB IS TO CONFORM TO THE CURRENT ROAD & BRIDGE SPECIFICATIONS FOR SM-9.5 A OR D MATERIAL EXCEPT THAT THE MINIMUM BITUMEN CONTENT IS TO BE 6.5%.
NOTES:

1. WHEN THE PAVEMENT DESIGN IS GREATER IN DEPTH THAN THE DEPTH OF THE EXISTING PAVEMENT, SUBSURFACE DRAINAGE MAY BE REQUIRED BY THE ENGINEER.

2. OVERLAP THE EXISTING PAVEMENT AS SHOWN IN THE CONSTRUCTION JOINT DETAILS.

3. A PERPENDICULAR CONSTRUCTION JOINT SHALL BE PROVIDED AT ALL LOCATIONS WHERE NEW PAVEMENT ABUTS EXISTING PAVEMENT.

4. THE AREA OF PAVEMENT WIDENING SHALL BE TRENCHED TO THE SUBGRADE AND COMPACTED PER VDOT SPECIFICATIONS.

5. SURFACE OF WIDENING AREA SHALL BE FLUSH WITH THE SURFACE OF EXISTING PAVEMENT PRIOR TO OVERLAY.

6. MILLING OF NEW AND EXISTING PAVEMENT MAY BE REQUIRED TO ACHIEVE ACCEPTABLE PAVEMENT CROSS-SLOPE AND PAVEMENT DRAINAGE.

7. OVERLAP THE ENTIRE SURFACE AREA OF THE NEW AND EXISTING PAVEMENT WITH A MINIMUM OF 165 LBS/SQ YD OF ASPHALT CONCRETE TO A POINT AT LEAST 100 FEET BEFORE AND AFTER THE LIMITS OF WIDENING.

8. ERADICATE EXISTING PAVEMENT MARKINGS AND RESTRIPE THE WORK ZONE AS REQUIRED TO ACHIEVE A UNIFORM APPEARANCE AS DIRECTED BY THE ENGINEER.

9. FINAL TRANSVERSE PAVEMENT TIE-IN SHALL CONFORM TO THE REQUIREMENTS OF SECTION 315.05(c) OF THE SPECIFICATIONS EXCEPT THAT ALL JOINTS AT TIE-IN LOCATIONS SHALL BE TESTED USING A 10 FEET STRAIGHTEDGE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 315.07(c) OF THE SPECIFICATIONS; THE VARIATION FROM THE TESTING EDGE OF THE STRAIGHTEDGE BETWEEN ANY TWO CONTACT POINTS WITH THE PAVEMENT SURFACE SHALL NOT EXCEED 1/4".

10. PAVEMENT WIDENING PERFORMED UNDER A VDOT LAND USE PERMIT SHALL HAVE A PAVEMENT DESIGN PROVOCED BY THE PERMITTEE AND APPROVED BY THE MATERIALS ENGINEER.
NOTES
1. CENTERLINE RUMBLE STRIPS SHALL NOT BE INSTALLED WITHIN THE LIMITS OF BRIDGES.
2. CENTERLINE RUMBLE STRIPS SHALL NOT BE INSTALLED ON SUBDIVISION STREETS OR IN NARROW UNMARKED ROAD SECTIONS WITHOUT PAVEMENT MARKINGS.
3. CENTERLINE RUMBLE STRIPS SHALL NOT BE INSTALLED WITHIN THE LIMITS OF CENTER TWO-WAY TURN LANES.
4. CENTERLINE RUMBLE STRIPS SHALL NOT BE INSTALLED IN PASSING ZONES EXCEPT AS DIRECTED BY THE TRAFFIC ENGINEER. THE DEPTH OF CENTERLINE RUMBLE STRIPS IN PASSING ZONES SHALL BE ½".
5. USE OF RAISED PAVEMENT MARKERS IS OPTIONAL. SEE STANDARD FM-9 FOR DETAILS ON RAISED PAVEMENT MARKER PLACEMENT.
NOTES

1. TRANSVERSE PAVEMENT TIE-IN SHALL BE USED TO PROVIDE A SMOOTH TRANSITION BETWEEN NEW PAVEMENT AND EITHER EXISTING PAVEMENT OR AN EXISTING BRIDGE DECK AS SHOWN ON THE PLANS AND DIRECTED BY THE ENGINEER.

2. THE EXISTING PAVEMENT SHALL BE PLANED A MINIMUM DEPTH OF 1½". THE FULL DEPTH OF PLANING SHALL EQUAL THE DEPTH OF THE ASPHALT OVERLAY.

3. TRANSVERSE PAVEMENT TIE-IN SHALL BE CONSTRUCTED A MINIMUM OF 10 FEET IN LENGTH FOR EVERY INCH OF DEPTH OF PAVEMENT PLANING PERFORMED.

4. TRANSVERSE PAVEMENT TIE-IN SHALL CONFORM TO THE REQUIREMENTS OF SECTION 310.051c) OF THE SPECIFICATIONS EXCEPT THAT ALL JOINTS AT TIE-IN LOCATIONS SHALL BE TESTED USING A 10 FOOT STRAIGHT EDGE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 310.07f) OF THE SPECIFICATIONS. THE VARIATION FROM THE TESTING EDGE OF THE STRAIGHT EDGE BETWEEN ANY TWO CONTACT POINTS WITH THE PAVEMENT SURFACE SHALL NOT EXCEED 1/4."
BLOCKOUT FOR CONCRETE POST
TO BE CUT TO FIT POST SHAPE
TO PREVENT BLOCKOUT FROM
ROTATING.

DIMENSIONS
SHOWN IN
PARENTHESES
INDICATE
ACCEPTABLE
TOLERANCES.

1/4" DRILL

STEEL POST

POST MAY BE HOT ROLLED OR WELDED.

6" x 8" x 1-2"
TREATED PINE BLOCK OR RECYCLED MATERIAL.

3/4" HOLES TO BE
CAST IN POST
1/2" CHAMFER
ON TOP 3-0"
OF POST
CHAMFER MAY BE
EXTENDED ENTIRE
LENGTH OF POST AT
THE OPTION OF THE
FABRICATOR. 1/2" (+1/4")
CHAMFER
ALL CORNERS.

ALL CONCRETE SHALL
BE CLASS A3.

CONCRETE POST

SOUTHERN PINE

6x8 WOOD POST

ROUND WOOD POST

6/8 x 18" BOLT

6" x 8" x 1-2"
TREATED PINE BLOCK OR RECYCLED MATERIAL.

3/4" HOLE

GALV STEEL 10D COMM NAIL.

SEE NOTE 5.

6/8 x 18" BOLT

3/4" HOLE

GALV STEEL 10D COMM NAIL.

SEE NOTE 5.

BACK-UP PLATE
AT NON SPICE LOCATIONS
REQUIRED WITH STEEL
BLOCKOUT.

6" x 8" x 1-2"
TREATED PINE BLOCK OR RECYCLED MATERIAL.

OPTIONAL HOLE TO FACILITATE GALVANIZING

HOLDS IN POSTS AND BRACKETS TO BE 3/4" DIA.

GUARDRAIL INSTALLATION
SITES REQUIRING LONGER
GUARDRAIL POSTS

NOTES:

1. ALL BOLTS, NUTS, WASHERS, AND OTHER STEEL ITEMS ARE TO BE GALVANIZED.

2. ALTERNATE TYPE POSTS AND BLOCKOUT MAY BE INTERCHANGED ON ANY ONE PROJECT WITH THE RESTRICTION THAT THE SAME TYPE OF POST AND BLOCKOUT MUST BE USED IN ANY SINGLE RUN OF GUARDRAIL.

3. FOR DETAILS OF GUARDRAIL ELEMENT SPICE JOINT, HARDWARE, ETC., SEE SHEET NO. 501.01 AND 501.02.

4. THE GUARDRAIL AND MEDIAN BARRIERS COMPONENTS DEPICTED IN A.I.R.T.B.A. TECHNICAL BULLETIN NUMBER 2669 MAY BE SUBSTITUTED IF INTERCHANGEABLE WITH THE STANDARDS FOR GUARDRAIL (GR) OR MEDIAN BARRIER (MB) AND APPROVED BY THE ENGINEER.

5. DRIVE NAIL ON BOTH SIDES WITHIN 2" OF THE TOP OR BOTTOM OF BLOCKOUT AFTER 3/8" x 18" BOLT IS INSTALLED.

STANDARD WASHER TO BE USED ON LAST 50' OF RUN-OFF END ONLY UNLESS A STANDARD GR-11 RUN-OFF TERMINAL TREATMENT IS USED.

SPECIFICATION
REFERENCE
221
236
505
NOTES:

1. GUARDRAIL TERMINAL, STD. GR-7 IS TO BE SRT 350 (SIMILAR TO AS SHOWN) MANUFACTURED BY TRINITY INDUSTRIES, THE FLEAT 350 MANUFACTURED BY ROAD SYSTEMS, INC., OR OTHER VDOT APPROVED EQUAL MEETING NCHRP 350 TESTING CRITERIA.

2. ALL TERMINALS SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER’S INSTALLATION INSTRUCTIONS AND THE FOLLOWING VDOT REQUIREMENTS:

   A. ALL STANDARD GR-7 TERMINALS SHALL BE INSTALLED WITH A 4 FT. OFFSET.

   B. YELLOW 8" X 36" REFLECTIVE SHEETING, IN ACCORDANCE WITH VDOT SPECIFICATIONS, SHOULD BE APPLIED IN TERMINALS EMPLOYING W-BEAM END SECTIONS. FOR TERMINALS EMPLOYING IMPACT (EXTRUDER) HEADS, AMBER (YELLOW) REFLECTIVE SHEETING WITH BLACK DIAGONAL STRIPES SHOULD BE APPLIED TO THE FULL AREA INSIDE THE IMPACT HEAD WITH THE DIRECTION OF THE BLACK DIAGONAL STRIPES CONFORMING TO CURRENT MUTCD APPLICATION FOR TYPE 3 OBJECT MARKERS (CM-3).

   C. DO NOT CHANGE THE LAPPING OF TERMINAL FOR ANY INSTALLATIONS; INSTALL AS TESTED.

3. IF YOU CANNOT GET THE NECESSARY CLEAR RUNOUT AREA FOR THE GR-7 TERMINAL, CONSIDER ALTERNATIVE TERMINAL OPTIONS.

4. FOR DETAILS OF GUARDRAIL TERMINAL INSTALLATION SITE PREPARATION REQUIREMENTS, SEE STANDARD GR-5P.

5. THIS DRAWING IS REPRESENTATIONAL ONLY. DETAILS, DIMENSIONS, QUANTITIES, AND OTHER INFORMATION NOT SHOWN WILL VARY FOR EACH MANUFACTURER. SEE INDIVIDUAL MANUFACTURER’S PLANS FOR THIS INFORMATION.
TRANSITION FROM GR-9 TERMINAL TO WEAK POST (STANDARD GR-8) GUARDRAIL

NOTES:

1. ALTERNATE BREAKAWAY CABLE TERMINAL (GR-9) IS TO BE ET-2000 (SIMILAR TO AS SHOWN), OR CAT (STD. MD-3 TERMINAL OPTION) AS MANUFACTURED BY SYRO STEEL COMPANY, BRAKEMASTER (STD. MD-3 TERMINAL OPTION) AS MANUFACTURED BY ENERGY ABSORPTION SYSTEMS, INC., THE SKT-350 AS MANUFACTURED BY ROAD SYSTEMS, INC., OR OTHER VDOT APPROVED EQUAL MEETING NCHRP 350 TESTING CRITERIA.

2. ALL TERMINALS SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND THE FOLLOWING VDOT REQUIREMENT(S):
   A. ALL STANDARD GR-9 TERMINALS (SIMILAR TO AS SHOWN ABOVE) SHALL BE INSTALLED WITH A 1 FT OFFSET ACCOMPANIED WITH A 50 FT FLARE TO PREVENT THE GUARDRAIL EXTRUDER FROM ENCROACHING ON THE SHOULDER FOR 3 FT WORK WHERE RIGHT OF WAY IS LIMITED, THE OFFSET CAN BE DECREASED AS DIRECTED BY THE ENGINEER.
   B. DIRECTION OF THE REFLECTIVE TAPE ON THE EXTRUDER SHALL CONFORM TO MUTCD APPLICATION FOR DIAGONAL STRIPES ON OBJECT MARKERS AND BRIDGE END PANELS. COLOR OF TAPE SHALL BE AMBER (YELLOW).
   C. DO NOT CHANGE THE LAPPING OF TERMINAL FOR ANY INSTALLATIONS; INSTALL AS TESTED.

3. IF THE CALCULATED LENGTH OF NEED CANNOT BE MET FOR THE SITES OF RETROFIT, MAINTENANCE, OR UPGRADE OF TERMINALS, PROVIDE AS MUCH DISTANCE AS POSSIBLE TO THE HAZARD.

4. THIS DRAWING IS REPRESENTATIONAL ONLY. DETAILS, DIMENSIONS, QUANTITIES, AND OTHER INFORMATION NOT SHOWN WILL VARY FOR EACH MANUFACTURER. SEE INDIVIDUAL MANUFACTURER'S PLANS FOR THIS INFORMATION.

SPECIFICATION REFERENCE

505

ALTERNATE BREAKAWAY CABLE TERMINAL
NO FLARE

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06
501.18
Guardsrail at Low-Fill Culverts

Virginia Department of Transportation

Summary:

- **Guardsrail at Low-Fill Culverts**
- **Table of Maximum Allowable Structure Widths**
- **Notes:**
  1. This sheet is applicable when guardsrail is required and the depth of fill above the top slab of the box culvert is less than 4'-0".
  2. Guardsrails shall be in accordance with Section 505 of the specifications. Material requirement for components shall be in accordance with Section 221 of the specifications.
  3. Guardsrail post spacing shall be in accordance with Standard GR-2.
  4. This distance shall be in accordance with VDOT policy on determining the length of need for guardsrail with a minimum distance as shown.
  5. All splices in nested W-beam sections must coincide at a common point and be bolted together using one set of bolts at each splice.

**Table of Maximum Allowable Structure Widths**

<table>
<thead>
<tr>
<th>Type I - One Post Omitted</th>
<th>Type II - Two Posts Omitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skew (°)</td>
<td>Max. Perpendicular Width (Feet)</td>
</tr>
<tr>
<td>0°</td>
<td>0.5</td>
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<tr>
<td>5°</td>
<td>10.5</td>
</tr>
<tr>
<td>10°</td>
<td>10.5</td>
</tr>
<tr>
<td>15°</td>
<td>10.5</td>
</tr>
<tr>
<td>20°</td>
<td>9.5</td>
</tr>
<tr>
<td>25°</td>
<td>9.2</td>
</tr>
<tr>
<td>30°</td>
<td>8.8</td>
</tr>
<tr>
<td>35°</td>
<td>8.2</td>
</tr>
<tr>
<td>40°</td>
<td>7.6</td>
</tr>
<tr>
<td>45°</td>
<td>7.0</td>
</tr>
</tbody>
</table>
**GUARDRAIL AT LOW-FILL CULVERTS**

**VIRGINIA DEPARTMENT OF TRANSPORTATION**

**NOTE:**
1. **A:** The minimum allowable distance between closest point of post to structure.
2. GUARDRAIL INSTALLATION SHALL BE IN ACCORDANCE WITH SECTION 505 OF THE SPECIFICATIONS. MATERIAL REQUIREMENT FOR COMPONENTS SHALL BE IN ACCORDANCE WITH SECTION 221 OF THE SPECIFICATIONS.
3. GUARDRAIL POST SPACING SHALL BE IN ACCORDANCE WITH STANDARD GR-2.
4. TWO NESTED W-BEAM GUARDRAILS, SEE TABLE FOR ALLOWABLE WIDTHS (25'-0" MAXIMUM).
5. TWO NESTED W-BEAM GUARDRAILS, CRT WOODPOST, 6'-3" SPACING, WITH TWO 6"X8"X14" WOOD OR RECYCLED MATERIAL BLOCKOUTS.
6. ALL SLICES IN NESTED W-BEAM SECTIONS MUST CONVENE AT A COMMON POINT AND BE BOLTED TOGETHER USING ONE SET OF BOLTS AT EACH SPLICE.

**SPECIFICATION REFERENCE**

221 505

**REV. 9.06**

50120
W-BEAM GUARDRAIL - FIXED OBJECT ATTACHMENT
FOR USE BETWEEN VERTICAL FIXED OBJECTS AND GUARDRAIL (WOOD POSTS)

NEW BRIDGES - ATTACHMENTS
ONE WAY TRAFFIC  RUN-ON, 2 - GR-FOA-1, TYPE I
RUN-OFF, 2 - GR-FOA-1, TYPE II
TWO WAY TRAFFIC  RUN-ON, 4 - GR-FOA-1, TYPE I
EXISTING BRIDGE ATTACHMENTS AS SHOWN ON PLANS.

REV 9/06

WASHERS FOR 3/8" BOLT

ITEM | MATERIAL/SPECIFICATIONS/NOTES
--- | ---
1 | 3/8" X 18" LONG, GUARDRAIL BOLT AND RECESSED NUT
2 | STANDARD 6" X 8" WOOD POST AND BLOCK
3 | STANDARD W-BEAM TERMINAL CONNECTOR
4 | STANDARD W-BEAM RAIL
5 | 3/8" X 2" LONG GUARDRAIL BOLT & RECESSED NUT (SEE STD GR-HOW)
6 | RECTANGULAR PLATE WASHER (SEE STD GR-HOW)
7 | BENT PLATE RUBRAIL (SEE SHEET 3 OF 3)
8 | C6 X 8.2 RUBRAIL (SEE SHEET 3 OF 3)
9 | 8" X 8" X 7.6" LONG WOOD POST & 8" X 8" X 14" LONG TREATED PINE BLOCK OR RECYCLED MATERIAL
10 | WASHER FOR 3/8" BOLT

Virginia Department of Transportation

505
NOTE:
CAN BE FIELD CUT AND BENT USING HEAT.
IF SHOP CUT AND BEND, RIGHT HAND OR LEFT
HAND MUST BE SPECIFIED DEPENDING ON
WHICH SIDE OF THE ROADWAY THE TRANSITION
IS USED.

ITEM (7) DETAIL

W BEAM GUARDRAIL - FIXED OBJECT ATTACHMENT
RUBRAIL AND HARDWARE DETAILS

ELEVATION

ITEM (8) DETAIL
W-BEAM GUARDRAIL - FIXED OBJECT ATTACHMENT
FOR USE BETWEEN SAFETY SHAPE AND GUARDRAIL (WOOD POSTS)

Virginia Department of Transportation

NOTE:
RUBRAIL MUST BE TWISTED 35° BETWEEN SECTION C-C AND D-D. SHOP FABRICATION MAY BE REQUIRED. RIGHT HAND AND LEFT HAND TWISTS WILL BE NECESSARY.

NEW BRIDGE - ATTACHMENTS
ONE-WAY TRAFFIC-RUN-ON, 2-GR-FOA-2, TYPE II
TWOWAY TRAFFIC-RUN-ON, 4-GR-FOA-2, TYPE II
EXISTING BRIDGE ATTACHMENTS AS SHOWN ON PLANS.

ITEM
1. 1/2 X 18" LG GUARDRAIL BOLT AND RECESS NUT
2. STANDARD 6" X 8" WOOD POST AND BLOCK
3. STANDARD W-BEAM TERMINAL CONNECTOR
4. STANDARD W-BEAM RAIL
5. 1/2" X 2" LONG GUARDRAIL BOLT AND RECESS NUT (SEE STANDARD GR-HDW)
6. RECTANGULAR PLATE WASHER (SEE STANDARD GR-HDW)
7. BENT PLATE RUBRAIL (SEE SHEET 3 OF 3)
8. C6 X 8.2 RUBRAIL (SEE SHEET 3 OF 3)
9. 8" X 8" X 7-6" LONG WOOD POST AND 8" X 8" X 14" LONG TREATED PINE BLOCK OR RECYCLED MATERIAL
10. WOOD BLOCKOUT FOR RUBRAIL (SEE SHEET 3 OF 3)
11. WASHER FOR 1/2" BOLT
W-BEAM GUARDRAIL - FIXED OBJECT ATTACHMENT
FOR USE WITH SAFETY SHAPE - STEEL POSTS

NOTES:
1. FIXED OBJECTS MAY CONSIST OF SAFETY SHAPED BRIDGE PARAPETS OR CONCRETE BARRIERS.
2. BRIDGE RAIL ENDS AND BRIDGE PARAPETS MUST BE OF ADEQUATE STRENGTH TO ACCEPT FULL IMPACT LOADING.
3. GUARDRAIL COMPONENTS SHALL BE IN ACCORDANCE WITH VDOT ROAD AND BRIDGE STANDARDS.
4. POSTS 1, 2, 3, 4, AND 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKS AND/OR RUBRAIL. RUBRAIL IS NOT BOLTED TO POSTS 2 AND 4.
5. BOTTOM WOOD BLOCKS, LOCATED ON POSTS 1 THROUGH 4, ARE CENTER DRILLED AND SECURED WITH 5/8" CARRIAGE BOLTS, (LENGTH AS REQUIRED).
6. RUBRAIL MUST BE TWISTED 35° BETWEEN SECTIONS C-C AND D-D. SHOP FABRICATION MAY BE REQUIRED. RIGHT HAND AND LEFT HAND TWISTS WILL BE NECESSARY.
7. APPROPRIATE LENGTH 5/8" ASTM A325 HEX BOLTS WITH WASHERS MUST BE USED WITH THRU DRILLED HOLES WITH A 5/8" BEARING PLATE ON THE BACK SIDE OF THE BRIDGE PARAPET OR CONCRETE Barrier.
8. SEE SHEET 3 OF 3 FOR RUBRAIL BLOCKOUT DETAILS.

SECTION A-A
SECTION B-B
SECTION C-C (W-BEAM OMITTED)
SECTION D-D

NEW BRIDGE ATTACHMENTS
ONE-WAY TRAFFIC - RUN-ON, 2 GR-FOA-2, TYPE I
RUN-OFF, 2 GR-FOA-2, TYPE II
TWO-WAY TRAFFIC - RUN-ON, 4 GR-FOA-2, TYPE I
EXISTING BRIDGE ATTACHMENTS AS SHOWN ON PLANS.

ITEM | MATERIAL/SPECIFICATIONS/NOTES
--- | ---
1 | WASHER FOR 5/8" BOLT
2 | STD. W6 X 8.5 OR W8 X 9. STEEL POST W/ STD. 6" X 8" X 14" LG. TREATED PINE BLOCK OR RECYCLED MATERIAL
3 | STANDARD W-BEAM TERMINAL CONNECTOR
4 | STANDARD W-BEAM RAIL
5 | 5/8" X 2" LONG GUARDRAIL BOLT AND RECESSD NUT (SEE STANDARD GR-HDW)
6 | RECTANGULAR PLATE WASHER (SEE STANDARD GR-HDW)
7 | BENT PLATE RUBRAIL (SEE SHEET 3 OF 3)
8 | C6 X 8.2 RUBRAIL (SEE SHEET 3 OF 3)
9 | 5/8" X 10" LG. HEX BOLT, NUT AND WASHER
10 | WOOD BLOCKOUT FOR RUBRAIL (SEE SHEET 3 OF 3)
11 | W8 X 13 X 7-6" LG. STEEL POST WITH STD. 6" X 8" X 14" LG. TREATED PINE BLOCK OR RECYCLED MATERIAL

W-Beam guardrail - fixed object attachment

FOR USE WITH SAFETY SHAPE - STEEL POSTS

VIRGINIA DEPARTMENT OF TRANSPORTATION
TRANSITION FROM WEAK POST (STANDARD GR-8) GURDRAIL TO FIXED OBJECT

27° HEIGHT (TYPICAL)

TRANSITION FROM FIXED OBJECT TO WEAK POST (STANDARD GR-8) GUARDRAIL

50'-0"

TRANSITION FROM WEAK POST (STANDARD GR-8) TO STRONG POST (STANDARD GR-2) GUARDRAIL

6'-3"

EXISTING GR-8
30°-31" HGT

OPTIONAL SPlice

SPlice

OPTIONAL SPlice

SPlice

OPTIONAL SPlice

SPlice

✓ IN ORDER TO GET SPlices AS PER THE NEW GR-8, A POST IS TO BE ADDED AT 6'-3" AFTER THE EXISTING GR-8.

TRANSITION FROM WEAK POST (EXISTING GR-8 30°-31" HIGHT) TO CURRENT NCHRP 350 TL-3 WEAK POST (STANDARD GR-8 32¼" HIGHT)
**Concrete Post**

- **NOTES:**
  - Standard MB-3 post spacing is 6'-3".
  - For details of rail element, rail splice joint, W beam back up plate, and associated hardware, see sheet No. 50101.

- **Alternate Type Posts and Blockouts May Be Interchanged On Any One Project With The Restriction That The Same Type Of Post And Blockout Must Be Used In Any Single Run Of Median Barrier.**

- **All Bolts, Nuts, Washers, Steel Posts, Bent Plate Post, And Blockouts Are To Be Galvanized.**

---

**Steel Post**

- **6x8"X7"-2" Treated Pine Block or Recycled Material**
- **6x8"X7"-2" Treated Pine Block or Recycled Material**

---

**Concrete Method of Treatment at Bridge Pier or Median Obstruction**

- 6'-3" Bridge Pier or Other Median Obstruction
- Flare Rate See Table

---

**Flare Rates**

<table>
<thead>
<tr>
<th>Design Speed</th>
<th>Shy Line FLARE RATE</th>
<th>Beyond Shy Line FLARE RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPH</td>
<td>In Feet</td>
<td>In Feet</td>
</tr>
<tr>
<td>70</td>
<td>10'</td>
<td>30:1</td>
</tr>
<tr>
<td>60</td>
<td>8'</td>
<td>26:1</td>
</tr>
<tr>
<td>50</td>
<td>6.6'</td>
<td>21:1</td>
</tr>
<tr>
<td>40</td>
<td>5'</td>
<td>17:1</td>
</tr>
<tr>
<td>30</td>
<td>3.6'</td>
<td>13:1</td>
</tr>
</tbody>
</table>

* Suggested Maximum Flare Rate for Semi-Rigid Barrier Systems.
NOTES:
1. BARRIER DELINEATOR IS TO BE SPACED IN ACCORDANCE WITH SECTION 702 OF THE ROAD AND BRIDGE SPECIFICATIONS AND THE BARRIER VERTICAL PANELS ARE TO BE SPACED IN ACCORDANCE WITH THE VIRGINIA WORK AREA PROTECTION MANUAL.
2. REFLECTIVE SURFACE, IN ALL Instances, ARE TO BE FACING ONCOMING TRAFFIC.
3. COST OF BARRIER DELINEATOR AND BARRIER VERTICAL PANELS ARE TO BE INCLUDED IN PRICE BD PER LINEAR FOOT OF BARRIER SERVICE.
4. ANCHOR BOLTS SHALL BE INSTALLED ON TRAFFIC SIDE.
5. CONCRETE 4000 PSI (MIN.)
6. WELDED WIRE FABRIC MAY BE ONE SHEET BENT TO FIT CONFIGURATION OR TWO SEPARATE SHEETS, ONE ON EACH FACE.
7. ANCHOR SYSTEM SHOWN IN DETAIL "A" SHALL BE TESTED TO PROVIDE A MINIMUM PULLOUT OF 32,000 LBS AND INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
9. FOR POSITIVE CONNECTION DETAILS AND DIMENSIONS SEE STANDARD MB-INS.
STAKE LOCATIONS WHEN STAKING STANDARD MB-11A, NOT TO BE USED ON BRIDGE DECKS.
4 PER PRECAST UNIT.
1 AT EACH CORNER.

20'-0" VDOT STANDARD MB-11A
FOR PROPRIETARY MB-11A LENGTHS, REFER TO MANUFACTURER

ADDITIONAL HOLES USED WHEN BOLTING TO BRIDGE DECKS.
FOR BRIDGE DECK INSTALLATIONS, REFER TO SHEETS 501.53 & 501.54 OF THE ROAD AND BRIDGE STANDARDS.

NOTES:
1. STAKING OF STANDARD MB-11A TO ASPHALT CONCRETE PAVEMENT, COMPACTED BASE MATERIAL, CONCRETE PAVEMENT, OR ASPHALT OVER CONCRETE PAVEMENT IS REQUIRED WHEN TRAFFIC BARRIER SERVICE CONCRETE IS PLACED WITHIN THE WO (21'-0") OFFSET OR A TRENCHING OPERATION (4' OR GREATER IN DEPTH) OR WHEN DETERMINED BY THE ENGINEER.

2. 2" MIN. FOR ASPHALT CONCRETE.
6" MIN. FOR COMPACTED BASE MATERIAL.

3. DRIVE STAKE HEAD BELOW FACE OF BARRIER TO PREVENT SNAGGING.

4. CONTRACTOR TO VERIFY PAVEMENT STRUCTURE PRIOR TO PLACING STAKES.

5. UPON REMOVAL OF THE STAKES AND BARRIERS, REPAIR THE RESULTING HOLES AS FOLLOWS OR AS DIRECTED BY THE ENGINEER. CLEAN AND FILL WITH TYPE LP-4 OR LP-5 EPOXY MORTAR CONFORMING TO THE REQUIREMENTS OF SECTION 24.3 FOR HYDRAULIC CEMENT CONCRETE PAVEMENT AND ASPHALT CONCRETE PAVEMENT. CARE SHALL BE TAKEN NOT TO TRAP AIR WITHIN OR AT THE BOTTOM OF THE EPOXY MORTAR.
NOTES:
1. ALL ENTRANCE GRADES SHALL START BACK OF THE SHOULDER LINE, IF DRAINAGE IS NECESSARY, THE DITCH MAY BE MOVED BACK TO PROVIDE AT LEAST 9" OF COVER OVER PIPE, AS SHOWN IN THE ALTERNATE METHODS FOR PLACING PIPE UNDER ENTRANCES DIAGRAM.
2. ENTRANCE GRADES ARE TO BE SMOOTHLY TIED INTO THE ROADWAY BY ROUNDOING AS NECESSARY.
3. 12" OR EXISTING WIDTH WHICHEVER IS GREATER.
4. LENGTHS OF CULVERTS SHOWN ON ROAD PLANS FOR ENTRANCES ARE APPROXIMATE AND SHALL BE ADJUSTED TO OBTAIN ABOVE ROADWAY WIDTHS.
5. ENTRANCES IN FILL TO BE SAME AS ABOVE EXCEPT LOCATION OF CULVERT (WHEN NECESSARY).
WIDTHS FOR TWO WAY TRAFFIC
(LESSER WIDTH MAY BE USED FOR ONE-WAY)

<table>
<thead>
<tr>
<th>TYPE</th>
<th>CURRENT ADT</th>
<th>TRAVELWAY WIDTH X</th>
<th>SURFACE</th>
<th>MIN ROADWAY SHOULDER TO SHOULDER</th>
<th>DITCH WIDTH (W)</th>
<th>DITCH DEPTH (D)</th>
<th>PAY ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0-250</td>
<td>18'</td>
<td>✔️ PAVED</td>
<td>22'</td>
<td>4'</td>
<td>16'</td>
<td>L.F.</td>
</tr>
<tr>
<td>B</td>
<td>251-750</td>
<td>20'</td>
<td>✔️ PAVED</td>
<td>24' ABS. 34' DES.</td>
<td>4'</td>
<td>16'</td>
<td>L.F.</td>
</tr>
<tr>
<td>C</td>
<td>751-2000</td>
<td>22'</td>
<td>✔️ PAVeD</td>
<td>30' ABS. 34' DES.</td>
<td>4'</td>
<td>16'</td>
<td>X X</td>
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<tr>
<td>D</td>
<td>2001-5500</td>
<td>24'</td>
<td>✔️ PAVED</td>
<td>40'</td>
<td>4'</td>
<td>16'</td>
<td>X X</td>
</tr>
<tr>
<td>E</td>
<td>5501-15,000</td>
<td>24'</td>
<td>✔️ PAVED</td>
<td>40'</td>
<td>4'</td>
<td>16'</td>
<td>X X</td>
</tr>
<tr>
<td>F</td>
<td>15,000-ABOVE</td>
<td>24'</td>
<td>✔️ PAVED</td>
<td>40'</td>
<td>6'</td>
<td>18'</td>
<td>X X</td>
</tr>
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* CURVES TO BE WIDENED IN ACCORDANCE WITH STD. TC-5.0R.
* XX PAID FOR BY INDIVIDUAL QUANTITIES.

GEOMETRICS

<table>
<thead>
<tr>
<th>DESIGN SPEED M.P.H.</th>
<th>20</th>
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<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
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</thead>
<tbody>
<tr>
<td>MIN. RADIUS</td>
<td>108' R</td>
<td>25' R</td>
<td>465' R</td>
<td>760' R</td>
<td>1204' R</td>
<td>1821' R</td>
</tr>
<tr>
<td>MAX. % GRADE</td>
<td>8%</td>
<td>7%</td>
<td>7%</td>
<td>6%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>STOPPING DISTANCE</td>
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<td>200'</td>
<td>325'</td>
<td>475'</td>
<td>650'</td>
<td>850'</td>
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<td>MAXIMUM S. ELEVATION</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
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<td>8%</td>
<td>8%</td>
</tr>
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IF GEOMETRICS AND WIDTHS SHOWN IN THESE CHARTS ARE GREATER THAN THE FINISHED CONTRACT DESIGN, APPROVAL MAY BE GRANTED BY THE DEPARTMENT FOR LESSER VALUES.

SPECIFICATION REFERENCE

MINIMUM DESIGN CRITERIA FOR TEMPORARY DIVERSION
(MAINTENANCE OF TRAFFIC)

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 9/06

702.00
Notes:

Conduit elbows shall have a 90° bend. The bend radius shall be in accordance with the N.E.C.

The bolt circle template shall be furnished by the lighting pole manufacturer.

* The number, orientation and size of conduits entering and exiting foundations shall be as shown on plans.

No mortar, grout, or concrete shall be placed between bottom of base plate and top of pedestal.
PEDESTAL POLE WIRING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

Signal conductors

Grounding lug

Grounding conductor

Grounding electrode 4" cover

1" Conduit required for grounding conductor

Conducts as specified on plans
PLAN VIEW

(FRAME AND COVER REMOVED)

Notes:

- J-hook wire support shall be securely attached to the junction box with a bolt and nut with a neoprene washer or an expansion fitting.
- Conduit entrances shall be located as shown on the plans. Conduits shall extend 2” min. to 3” max. beyond the inside wall of the junction box.
- Bell ends shall be installed on the ends of PVC conduits. Grounding bushings shall be installed on the ends of metal conduits. Bell ends & bushings shall be plugged to prevent moisture & rodent entry.
- Depth of conduit entrances for magnetic detectors shall be in accordance with SL'd TD-2.
- All reinforcing steel shall have a minimum 1 1/2’ concrete cover. Any reinforcing steel in conflict with conduit shall be cut a minimum of 1 1/2” from conduit.
- The junction box may be precast or cast-in-place concrete.
- A minimum 2” diameter conduit entrance is required unless otherwise specified on plans.
- A concrete collar is required only when junction box is installed in earth areas.
- High strength grout conforming to the Road & Bridge Specifications shall be used to secure the frame to the junction box.
- All junction boxes shall be installed with a grounding electrode unless box houses only communication/interconnect cable.
- Voids resulting from entrance of conduits into junction box shall be completely filled with hydraulic cement grout conforming to the Road & Bridge Specifications.
**STANDARD ROAD EDGE DELINEATORS**

**FLAT CUT**

- Reflectors
- Edge of Pavement
  - Variable 2'-0" to 10'-0"
- Shoulder

**SHED CUT**

- Reflectors
- Edge of Pavement

**PYRAMIDAL CUT**

- 3'-0" x 3'-0"
- 3'-0" x 3'-0"
- 3'-0" x 3'-0"

**NOTES:**

Standard ED-1 delineators consist of reflectorized sheathing, cut to a 3" by 8" vertical rectangle, mounted on a backing of aluminum alloy, not less than 0.063" thick conforming to ASTM B209, alloy 6061-T6 or 5052-H38. The color of the reflective sheathing shall, in all cases, conform to the color of the edge lines.

The reflectors are attached to wood posts with a minimum of two nails or screws produced from alloy 2024-T4 or 6061-T6.

The posts above the ground are painted white with number 11 white paint.

Posts are treated with a water-borne preservative in accordance with Section 236 of the Road and Bridge Specifications.

The top of the posts may have a flat, shed, or pyramidal cut; however, they shall be uniform throughout a project. Cuts shall be in accordance with Standard WSP-1.

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**SPECIAL ROAD EDGE DELINEATORS**

- 1/4" Aluminum Bolt
- 1/4" Aluminum Bolt

**NOTES:**

Special delineators are made from aluminum alloy, not less than 0.080" thick conforming to ASTM B209, alloy 6061-T6 or 5052-H38.

Delineators extend 1" above the top of the post.

Delineators are reflectorized, and in all cases, the color shall conform to the color of the edge lines, alternating with a black stripe.

The stripes shall slope down toward the center of roadway.

Delineators are mounted on U-Type posts fabricated from rolled-steel 1.33 lb./ft. minimum.

The bottom of the delineator panel is 12" above the pavement edge elevation.