To: Users of the Highway Standards  
Subject: Revision #214  
Date: September 27, 2012

Revision #214 of the Highway Standards, effective January 1, 2013, is now available on the Department’s website. The revisions are as follows:

<table>
<thead>
<tr>
<th>Removed</th>
<th>Inserted</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standards by Subject/Title January 1, 2012</td>
<td>Standards by Subject/Title January 1, 2013</td>
<td>Updated.</td>
</tr>
<tr>
<td>Division 200 Index January 1, 2012</td>
<td>Division 200 Index January 1, 2013</td>
<td>Updated.</td>
</tr>
<tr>
<td>280001-06</td>
<td>280001-07</td>
<td>Corrected notation for flowline on Sediment Basin Elevation.</td>
</tr>
<tr>
<td>Division 300 Index January 1, 2012</td>
<td>Division 300 Index January 1, 2013</td>
<td>Updated.</td>
</tr>
<tr>
<td>Division 400 Index January 1, 2012</td>
<td>Division 400 Index January 1, 2013</td>
<td>Updated.</td>
</tr>
<tr>
<td>420401-08</td>
<td>420401-09</td>
<td>Replaced preformed joint seal with reference to bridge plans for details.</td>
</tr>
<tr>
<td>424001-06</td>
<td>424001-07</td>
<td>Widened crosswalk markings to 6’ (1.83 m) minimum inside dimension. Revised General Notes.</td>
</tr>
<tr>
<td>424006</td>
<td>424006-01</td>
<td>Revised General Notes.</td>
</tr>
<tr>
<td>424011</td>
<td>424011-01</td>
<td>Revised General Notes.</td>
</tr>
<tr>
<td>424016</td>
<td>424016-01</td>
<td>Widened crosswalk markings to 6’ (1.83 m) minimum inside dimension. Revised General Notes.</td>
</tr>
<tr>
<td>424021</td>
<td>424021-01</td>
<td>Revised General Notes.</td>
</tr>
<tr>
<td>424026</td>
<td>424026-01</td>
<td>Revised General Notes.</td>
</tr>
<tr>
<td>Removed</td>
<td>Inserted</td>
<td>Remarks</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>424031</td>
<td>424031-01</td>
<td>Widened crosswalk markings to 6’ (1.83 m) minimum inside dimension.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Revised General Notes</td>
</tr>
<tr>
<td>Division 500 Index</td>
<td>Division 500 Index</td>
<td>Updated.</td>
</tr>
<tr>
<td>January 1, 2012</td>
<td>January 1, 2013</td>
<td></td>
</tr>
<tr>
<td>509001-02</td>
<td></td>
<td>Deleted standard.</td>
</tr>
<tr>
<td>542001-02</td>
<td>542001-03</td>
<td>Completely revised and renamed standard.</td>
</tr>
<tr>
<td></td>
<td>542006</td>
<td>New standard.</td>
</tr>
<tr>
<td></td>
<td>542011</td>
<td>New standard.</td>
</tr>
<tr>
<td></td>
<td>542016</td>
<td>New standard.</td>
</tr>
<tr>
<td>542101-02</td>
<td></td>
<td>Deleted standard.</td>
</tr>
<tr>
<td>542106-02</td>
<td></td>
<td>Deleted standard.</td>
</tr>
<tr>
<td>542111-02</td>
<td></td>
<td>Deleted standard.</td>
</tr>
<tr>
<td>542116-02</td>
<td></td>
<td>Deleted standard.</td>
</tr>
<tr>
<td>542121-02</td>
<td></td>
<td>Deleted standard.</td>
</tr>
<tr>
<td>542311-03</td>
<td>542311-04</td>
<td>Completely revised and renamed standard.</td>
</tr>
<tr>
<td>Division 600 Index</td>
<td>Division 600 Index</td>
<td>Updated.</td>
</tr>
<tr>
<td>January 1, 2012</td>
<td>January 1, 2013</td>
<td></td>
</tr>
<tr>
<td>602006-3</td>
<td>602006-04</td>
<td>Revised and relocated steps.</td>
</tr>
<tr>
<td>606001-04</td>
<td>606001-05</td>
<td>Added General Note regarding requirement for dowel bars.</td>
</tr>
<tr>
<td>630106</td>
<td>630106-01</td>
<td>Added minimum dimension from guardrail to headwall. Added dimension to section A-A.</td>
</tr>
<tr>
<td>630301-05</td>
<td>630301-06</td>
<td>Modified dimensioning of terminal.</td>
</tr>
<tr>
<td>631011-08</td>
<td>631011-09</td>
<td>Corrected metric dimension for Bearing Plate K. Changed pipe diameter in wood post.</td>
</tr>
<tr>
<td>Removed</td>
<td>Inserted</td>
<td>Remarks</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>631031-10</td>
<td>631031-11</td>
<td>Added notes to see plans for details of approach curbs details.</td>
</tr>
<tr>
<td>631032-07</td>
<td>631032-08</td>
<td>Added note to see plans for bridge approach curb. details</td>
</tr>
<tr>
<td>631036-05</td>
<td></td>
<td>Deleted standard.</td>
</tr>
<tr>
<td>631041-03</td>
<td></td>
<td>Deleted standard.</td>
</tr>
<tr>
<td>631056-02</td>
<td></td>
<td>Deleted standard.</td>
</tr>
<tr>
<td>637001-04</td>
<td>637001-05</td>
<td>Revised General Notes to reference standard 836006 for light pole foundation.</td>
</tr>
<tr>
<td>637006-02</td>
<td>637006-03</td>
<td>Revised General Notes to reference standard 836011 for light pole foundation.</td>
</tr>
<tr>
<td>643001</td>
<td>643001-01</td>
<td>Changed ‘posted speed’ to ‘design speed’.</td>
</tr>
<tr>
<td>Division 700 Index</td>
<td>Division 700 Index</td>
<td>Updated.</td>
</tr>
<tr>
<td>701006-03</td>
<td>701006-04</td>
<td>Omitted WORKERS sign.</td>
</tr>
<tr>
<td>701011-02</td>
<td>701011-03</td>
<td>Omitted WORKERS sign</td>
</tr>
<tr>
<td>701101-02</td>
<td>701101-03</td>
<td>Omitted WORKERS sign</td>
</tr>
<tr>
<td>701316-06</td>
<td>701316-07</td>
<td>Omitted General Note regarding lights. Omitted vertical panel detail and symbol.</td>
</tr>
<tr>
<td>701321-12</td>
<td>701321-13</td>
<td>Omitted center line between stop bars and tapers.</td>
</tr>
<tr>
<td>701400-05</td>
<td>701400-06</td>
<td>Replaced BEGINS sign with PHOTO ENFORCED sign.</td>
</tr>
<tr>
<td>701401-06</td>
<td>701401-07</td>
<td>Omitted temporary raised pavement markers. Replaced BEGINS and RESUMES signs with PHOTO ENFORCED sign.</td>
</tr>
</tbody>
</table>
### Removed

<table>
<thead>
<tr>
<th>Number</th>
<th>Removed</th>
<th>Inserted</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>701406-06</td>
<td>701406-07</td>
<td></td>
<td>Replaced BEGINS and RESUMES signs with PHOTO ENFORCED sign.</td>
</tr>
<tr>
<td>701423-05</td>
<td>701423-06</td>
<td></td>
<td>Omitted WORKERS sign. Replaced BEGINS sign with PHOTO ENFORCED sign. Added devices at arrowboard.</td>
</tr>
<tr>
<td>701426-04</td>
<td>701426-05</td>
<td></td>
<td>Omitted original DETAIL B. Revised detail notes. Revised one sign.</td>
</tr>
<tr>
<td>701427</td>
<td>701427-01</td>
<td></td>
<td>Omitted original DETAIL B. Revised detail notes. Revised one sign.</td>
</tr>
<tr>
<td>701431-07</td>
<td>701431-08</td>
<td></td>
<td>Replaced BEGINS signs with PHOTO ENFORCED signs.</td>
</tr>
<tr>
<td>701446-03</td>
<td>701466-04</td>
<td></td>
<td>Omitted temporary raised pavement markers. Replaced BEGINS and RESUMES signs with PHOTO ENFORCED sign.</td>
</tr>
<tr>
<td>701502-04</td>
<td>701502-05</td>
<td></td>
<td>Omitted WORKERS sign.</td>
</tr>
<tr>
<td>701601-07</td>
<td>701601-08</td>
<td></td>
<td>Omitted WORKERS sign.</td>
</tr>
<tr>
<td>701602-05</td>
<td>701602-06</td>
<td></td>
<td>Omitted WORKERS sign.</td>
</tr>
</tbody>
</table>

### Division 800 Index

**Updated.**

- 830001 | 830001-01 | Added ‘barrier or retaining wall’ to POLE BASE DETAIL. |
- 830006 | 830006-01 | Added ‘barrier or retaining wall’ to POLE BASE DETAIL. |
- 830011 | 830011-01 | Added ‘barrier or retaining wall’ to POLE BASE DETAIL. |
<table>
<thead>
<tr>
<th>Removed</th>
<th>Inserted</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>830016</td>
<td>830016-01</td>
<td>Added ‘barrier or retaining wall’ to POLE BASE DETAIL.</td>
</tr>
<tr>
<td>830021</td>
<td>830021-01</td>
<td>Added ‘barrier or retaining wall’ to POLE BASE DETAIL.</td>
</tr>
<tr>
<td></td>
<td>830026</td>
<td>New standard.</td>
</tr>
<tr>
<td>836001-01</td>
<td>836001-02</td>
<td>Revised concrete foundation notes, pole setback notes, and ring plate detail.</td>
</tr>
<tr>
<td></td>
<td>836006</td>
<td>New standard.</td>
</tr>
<tr>
<td></td>
<td>836011</td>
<td>New standard.</td>
</tr>
<tr>
<td>837001-01</td>
<td>837001-02</td>
<td>Revised first General Note for clarification. Revised DETAIL A.</td>
</tr>
</tbody>
</table>

Questions regarding the Highway Standards should be directed to the Policy and Procedures Section in the Bureau of Design and Environment at 217-524-9311.

Sincerely,

John D. Baranzelli, P.E.
Acting Engineer of Design and Environment
<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARTHWORK</td>
<td></td>
</tr>
<tr>
<td>202001-01</td>
<td>Earth Median Ditch Check</td>
</tr>
<tr>
<td>EROSION CONTROL</td>
<td></td>
</tr>
<tr>
<td>280001-07</td>
<td>Temporary Erosion Control Systems</td>
</tr>
<tr>
<td>285001-02</td>
<td>Fabric Formed Concrete Revetment Mats</td>
</tr>
<tr>
<td>STD. NO.</td>
<td>TITLE</td>
</tr>
<tr>
<td>---------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>353001-04</td>
<td>PCC Base Course with HMA Binder and Surface Courses</td>
</tr>
</tbody>
</table>
## DIVISION 400  SURFACE COURSES, PAVEMENTS, REHABILITATION, AND SHOULDERS

<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BITUMINOUS SURFACES AND HOT-MIX ASPHALT PAVEMENTS</strong></td>
<td></td>
</tr>
<tr>
<td>406001-05</td>
<td>Entrance Ramp Terminal (Flexible Ramp Pavement Adjacent to Flexible Mainline Pavement)</td>
</tr>
<tr>
<td>406101-04</td>
<td>Exit Ramp Terminal (Flexible Ramp Pavement Adjacent to Flexible Mainline Pavement)</td>
</tr>
<tr>
<td>406201-01</td>
<td>Mailbox Turnout</td>
</tr>
<tr>
<td><strong>PORTLAND CEMENT CONCRETE PAVEMENTS AND SIDEWALKS</strong></td>
<td></td>
</tr>
<tr>
<td>420001-07</td>
<td>Pavement Joints</td>
</tr>
<tr>
<td>420101-04</td>
<td>24’ (7.2 m) Jointed PCC Pavement</td>
</tr>
<tr>
<td>420106-04</td>
<td>36’ (10.8 m) Jointed PCC Pavement</td>
</tr>
<tr>
<td>420111-03</td>
<td>PCC Pavement Roundouts</td>
</tr>
<tr>
<td>420201-07</td>
<td>Entrance Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to Jointed PCC Mainline Pavt.)</td>
</tr>
<tr>
<td>420206-08</td>
<td>Entrance Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to CRC Mainline Pavement)</td>
</tr>
<tr>
<td>420301-04</td>
<td>Exit Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to Jointed PCC Mainline Pavt.)</td>
</tr>
<tr>
<td>420306-06</td>
<td>Exit Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to CRC Mainline Pavement)</td>
</tr>
<tr>
<td>420401-09</td>
<td>Bridge Approach Pavement Connector</td>
</tr>
<tr>
<td>420501-04</td>
<td>PCC Pavement and PCC Base Course Adjacent to Railroad Grade Crossing</td>
</tr>
<tr>
<td>420601-05</td>
<td>24’ (7.2 m) PCC Pavement</td>
</tr>
<tr>
<td>420701-02</td>
<td>Pavement Fabric</td>
</tr>
<tr>
<td>421001-02</td>
<td>Bar Reinforcement for CRC Pavement</td>
</tr>
<tr>
<td>421101-08</td>
<td>24’ (7.2 m) CRC Pavement (With Wide Flange Beam Terminal Joint)</td>
</tr>
<tr>
<td>421106-08</td>
<td>36’ (10.8 m) CRC Pavement (With Wide Flange Beam Terminal Joint)</td>
</tr>
<tr>
<td>421201-06</td>
<td>24’ (7.2 m) CRC Pavement (With Lug System)</td>
</tr>
<tr>
<td>421206-06</td>
<td>36’ (10.8 m) CRC Pavement (With Lug System)</td>
</tr>
<tr>
<td>424001-07</td>
<td>Perpendicular Curb Ramps for Sidewalks</td>
</tr>
<tr>
<td>424006-01</td>
<td>Diagonal Curb Ramps for Sidewalks</td>
</tr>
<tr>
<td>424011-01</td>
<td>Corner Parallel Curb Ramps for Sidewalks</td>
</tr>
<tr>
<td>424016-01</td>
<td>Mid-block Curb Ramps for Sidewalks</td>
</tr>
<tr>
<td>424021-01</td>
<td>Depressed Corner for Sidewalks</td>
</tr>
<tr>
<td>424026-01</td>
<td>Entrance / Alley Pedestrian Crossings</td>
</tr>
<tr>
<td>424031-01</td>
<td>Median Pedestrian Crossings</td>
</tr>
<tr>
<td><strong>PAVEMENT REHABILITATION</strong></td>
<td></td>
</tr>
<tr>
<td>442001-04</td>
<td>Class A Patches</td>
</tr>
<tr>
<td>442101-07</td>
<td>Class B Patches</td>
</tr>
<tr>
<td>442201-03</td>
<td>Class C and D Patches</td>
</tr>
<tr>
<td><strong>SHOULDERS</strong></td>
<td></td>
</tr>
<tr>
<td>482001-02</td>
<td>HMA Shoulder Adjacent to Flexible Pavement</td>
</tr>
<tr>
<td>482006-03</td>
<td>HMA Shoulder Adjacent to Rigid Pavement</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------------------------</td>
</tr>
<tr>
<td>482011-03</td>
<td>HMA Shoulder Strips/Shoulders With Resurfacing or Widening and Resurfacing Projects</td>
</tr>
<tr>
<td>483001-04</td>
<td>PCC Shoulder</td>
</tr>
</tbody>
</table>
## DIVISION 500  BRIDGES and CULVERTS

<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BRIDGES</strong></td>
<td></td>
</tr>
<tr>
<td>515001-03</td>
<td>Name Plate for Bridges</td>
</tr>
<tr>
<td><strong>CULVERTS</strong></td>
<td></td>
</tr>
<tr>
<td>542001-03</td>
<td>Concrete End Sections for Pipe Culverts 15” (375 mm) thru 84” (2100 mm) Diameter</td>
</tr>
<tr>
<td>542006</td>
<td>Multiple Concrete End Sections for Pipe Culverts 15” (376mm) thru 84” (2100 mm) Diameter</td>
</tr>
<tr>
<td>542011</td>
<td>Concrete End Sections for Elliptical Pipe Culverts 15” (375 mm) thru 72” (1800 mm) Equivalent Diameter</td>
</tr>
<tr>
<td>542016</td>
<td>Multiple Concrete End Sections for Elliptical Pipe Culverts 15” (375 mm) thru 72” (1800 mm) Equivalent Diameter</td>
</tr>
<tr>
<td>542201-02</td>
<td>Reinforced Concrete End Sections for Pipe Culverts, 15” (375 mm) thru 36” (900 mm) Diameter Skewed With Roadway</td>
</tr>
<tr>
<td>542206-02</td>
<td>Reinforced Concrete End Sections for Pipe Culverts, 42” (1050 mm) thru 60” (1500 mm) Diameter Skewed With Roadway</td>
</tr>
<tr>
<td>542301-03</td>
<td>Precast Reinforced Concrete Flared End Section</td>
</tr>
<tr>
<td>542306-02</td>
<td>Precast Reinforced Concrete Elliptical Flared End Section</td>
</tr>
<tr>
<td>542311-04</td>
<td>Traversable Pipe Grate</td>
</tr>
<tr>
<td>542401-01</td>
<td>Metal End Section for Pipe Culverts</td>
</tr>
<tr>
<td>542406-01</td>
<td>Metal End Section for Pipe Arches</td>
</tr>
<tr>
<td>542501-02</td>
<td>Inlet Box Type 24 (600) A</td>
</tr>
<tr>
<td>542506-02</td>
<td>Inlet Box Type 24 (600) B</td>
</tr>
<tr>
<td>542511-02</td>
<td>Inlet Box Type 24 (600) C</td>
</tr>
<tr>
<td>542516-03</td>
<td>Inlet Box Type 24 (600) D</td>
</tr>
<tr>
<td>542521-02</td>
<td>Inlet Box Type 24 (600) E</td>
</tr>
<tr>
<td>542526-03</td>
<td>Inlet Box Type 24 (600) F</td>
</tr>
<tr>
<td>542531-04</td>
<td>Inlet Box Type 24 (600) G</td>
</tr>
<tr>
<td>542536-03</td>
<td>Inlet Box Type 36 (900) A</td>
</tr>
<tr>
<td>542541-02</td>
<td>Inlet Box Type 48 (1200) A</td>
</tr>
<tr>
<td>542546-01</td>
<td>Flush Inlet Box for Median</td>
</tr>
<tr>
<td>542601-03</td>
<td>Reinforced Concrete Pipe Elbow 24”, 30” or 36” (600 mm, 750 mm or 900 mm)</td>
</tr>
<tr>
<td>542606-02</td>
<td>Reinforced Concrete Pipe Tee</td>
</tr>
<tr>
<td>STD. NO.</td>
<td>TITLE</td>
</tr>
<tr>
<td>-----------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>601001-04</td>
<td>Sub-Surface Drains</td>
</tr>
<tr>
<td>601101-01</td>
<td>Concrete Headwall for Pipe Drain</td>
</tr>
<tr>
<td>602001-02</td>
<td>Catch Basin, Type A</td>
</tr>
<tr>
<td>602006-04</td>
<td>Catch Basin, Type B</td>
</tr>
<tr>
<td>602011-02</td>
<td>Catch Basin, Type C</td>
</tr>
<tr>
<td>602016-02</td>
<td>Catch Basin, Type D</td>
</tr>
<tr>
<td>602101-02</td>
<td>Drainage Structures, Types 1, 2 &amp; 3</td>
</tr>
<tr>
<td>602106-01</td>
<td>Drainage Structures, Types 4, 5 &amp; 6</td>
</tr>
<tr>
<td>602301-03</td>
<td>Inlet, Type A</td>
</tr>
<tr>
<td>602306-03</td>
<td>Inlet, Type B</td>
</tr>
<tr>
<td>602401-03</td>
<td>Manhole, Type A</td>
</tr>
<tr>
<td>602406-05</td>
<td>Manhole, Type A, 6’ (1.8 m) Diameter</td>
</tr>
<tr>
<td>602411-03</td>
<td>Manhole, Type A, 7’ (2.1 m) Diameter</td>
</tr>
<tr>
<td>602416-03</td>
<td>Manhole, Type A, 8’ (2.4 m) Diameter</td>
</tr>
<tr>
<td>602421-03</td>
<td>Manhole, Type A, 9’ (2.7 m) Diameter</td>
</tr>
<tr>
<td>602501-02</td>
<td>Valve Vault, Type A</td>
</tr>
<tr>
<td>602601-02</td>
<td>Precast Reinforced Concrete Flat Slab Top</td>
</tr>
<tr>
<td>602701-02</td>
<td>Manhole Steps</td>
</tr>
<tr>
<td>604001-03</td>
<td>Frame and Lids, Type 1</td>
</tr>
<tr>
<td>604006-04</td>
<td>Frame and Grate, Type 3</td>
</tr>
<tr>
<td>604011-04</td>
<td>Frame and Grate, Type 3V</td>
</tr>
<tr>
<td>604016-02</td>
<td>Frame and Grate, Type 4</td>
</tr>
<tr>
<td>604021-02</td>
<td>Base, Frame and Lids, Type 5</td>
</tr>
<tr>
<td>604026-02</td>
<td>Frame and Grate, Type 6</td>
</tr>
<tr>
<td>604031-02</td>
<td>Grate, Type 7</td>
</tr>
<tr>
<td>604036-02</td>
<td>Grate, Type 8</td>
</tr>
<tr>
<td>604041-02</td>
<td>Frame and Grate, Type 9</td>
</tr>
<tr>
<td>604046-02</td>
<td>Frame and Grate, Type 10</td>
</tr>
<tr>
<td>604051-03</td>
<td>Frame and Grate, Type 11</td>
</tr>
<tr>
<td>604056-03</td>
<td>Frame and Grate, Type 11V</td>
</tr>
<tr>
<td>604061-02</td>
<td>Frame and Grate, Type 12</td>
</tr>
<tr>
<td>604066-02</td>
<td>Frame and Lid, Type 15</td>
</tr>
<tr>
<td>604071-04</td>
<td>Frame and Grate, Type 20</td>
</tr>
<tr>
<td>604076-04</td>
<td>Frame and Grate, Type 21</td>
</tr>
<tr>
<td>604081-04</td>
<td>Frames and Grates, Type 22</td>
</tr>
<tr>
<td>604086-02</td>
<td>Frame and Grate, Type 23</td>
</tr>
<tr>
<td>604091-02</td>
<td>Frame and Grate, Type 24</td>
</tr>
<tr>
<td>604101-01</td>
<td>Median Inlet for 24” (600 mm) Reinforced Concrete Pipe</td>
</tr>
</tbody>
</table>
604106-01 Median Inlet for 36" (900 mm) Reinforced Concrete Pipe
606001-05 Concrete Curb Type B and Combination Concrete Curb and Gutter
606006-02 Outlet for Concrete Curb and Gutter, Type B-6.24 (B-15.60)
606101-04 Type A Gutter (Inlet, Outlet, and Entrance)
606106-04 Outlet, Type I for Type A Gutter
606111-03 Outlets, Type 2 for Type A Gutter
606201-02 Type B Gutter (Inlet, Outlet, and Entrance)
606206-03 Outlet, Type 1 for Type B Gutter
606211-03 Outlets, Type 2 for Type B Gutter
606301-04 PC Concrete Islands And Medians
606306-03 Corrugated PC Concrete Medians
606401-01 Paved Ditch
609006-05 Bridge Approach Pavement (Drain Detail)
610001-06 Shoulder Inlet With Curb

SAFETY RELATED ITEMS
630001-10 Steel Plate Beam Guardrail
630101-09 Guardrail Mounted on Existing Culverts
630106-01 Long-Span Guardrail Over Culvert
630201-06 PCC/HMA Stabilization at Steel Plate Beam Guardrail
630301-06 Shoulder Widening for Type 1 (Special) Guardrail Terminals
631006-08 Traffic Barrier Terminal, Type 1B
631011-09 Traffic Barrier Terminal, Type 2
631026-05 Traffic Barrier Terminal, Type 5
631031-11 Traffic Barrier Terminal, Type 6
631032-08 Traffic Barrier Terminal, Type 6A
631033-04 Traffic Barrier Terminal, Type 6B
631046-04 Traffic Barrier Terminal, Type 10
631051-03 Traffic Barrier Terminal, Type 11
635001-01 Delineators
635006-03 Reflector and Terminal Marker Placement
635011-02 Reflector Marker and Mounting Details
636001-02 Cable Road Guard Single Strand
637001-05 Concrete Barrier 32 in. (815 mm) Height
637006-03 Concrete Barrier 42 in. (1065 mm) Height
638001-02 Glare Screen Blades
638101-02 Concrete Glare Screen
639001-02 Sight Screen Precast Prestressed Concrete Panel Wall
640001-01 Sight Screen Chain Link Fence
641001-01 Sight Screen Cedar Stockade Fence Type S
641006-01 Sight Screen Wood Plank Fence Type P
642001-02 Shoulder Rumble Strips, 16 in.
642006 Shoulder Rumble Strips, 8 in.
643001-01 Sand Module Impact Attenuators

OTHER ITEMS
664001-02 Chain Link Fence
665001-02 Woven Wire Fence
666001-01 Right-of-Way Markers
667001-01 Drainage Markers
667101-02 Permanent Survey Markers
U.S. Geological Survey and National Geodetic Survey Benchmarks, Resetting Method
<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>701001-02</td>
<td>Off-Road Operations, 2L, 2W, More Than 15’ (4.5 m) Away</td>
</tr>
<tr>
<td>701006-04</td>
<td>Off-Road Operations, 2L, 2W, 15’ (4.5 m) to 24” (600 mm) From Pavement Edge</td>
</tr>
<tr>
<td>701011-03</td>
<td>Off-Road Moving Operations, 2L, 2W, Day Only</td>
</tr>
<tr>
<td>701101-03</td>
<td>Off-Road Operations, Multilane, 15’ (4.5 m) to 24” (600 mm) From Pavement Edge</td>
</tr>
<tr>
<td>701106-02</td>
<td>Off-Road Operations, Multilane, More Than 15’ (4.5 m) Away</td>
</tr>
<tr>
<td>701201-04</td>
<td>Lane Closure, 2L, 2W, Day Only, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701206-03</td>
<td>Lane Closure, 2L, 2W, Night Only, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701301-04</td>
<td>Lane Closure, 2L, 2W, Short Time Operations</td>
</tr>
<tr>
<td>701306-03</td>
<td>Lane Closure, 2L, 2W, Slow Moving Operations Day Only, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701311-03</td>
<td>Lane Closure, 2L, 2W, Moving Operations - Day Only</td>
</tr>
<tr>
<td>701316-07</td>
<td>Lane Closure, 2L, 2W, Bridge Repair, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701321-13</td>
<td>Lane Closure, 2L, 2W, Bridge Repair with Barrier</td>
</tr>
<tr>
<td>701326-04</td>
<td>Lane Closure, 2L, 2W, Pavement Widening, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701331-04</td>
<td>Lane Closure, 2L, 2W, With Run-Around, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701336-06</td>
<td>Lane Closure, 2L, 2W, Work Areas in Series, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701400-05</td>
<td>Approach to Lane Closure, Freeway/Expressway</td>
</tr>
<tr>
<td>701401-07</td>
<td>Lane Closure, Freeway/Expressway</td>
</tr>
<tr>
<td>701402-09</td>
<td>Lane Closure, Freeway/Expressway, with Barrier</td>
</tr>
<tr>
<td>701406-07</td>
<td>Lane Closure, Freeway/Expressway, Day Operations Only</td>
</tr>
<tr>
<td>701411-08</td>
<td>Lane Closure, Multilane, at Entrance or Exit Ramp, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701416-07</td>
<td>Lane Closure, Freeway/Expressway, with Crossover and Barrier</td>
</tr>
<tr>
<td>701421-05</td>
<td>Lane Closure, Multilane, Day Operations Only, for Speeds ≥ 45 MPH to 55 MPH</td>
</tr>
<tr>
<td>701422-05</td>
<td>Lane Closure, Multilane, for Speeds ≥ 45 MPH to 55 MPH</td>
</tr>
<tr>
<td>701423-06</td>
<td>Lane Closure, Multilane, with Barrier, for Speeds ≥ 45 MPH to 55 MPH</td>
</tr>
<tr>
<td>701426-05</td>
<td>Lane Closure, Multilane, Intermittent or Moving Operation, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701427-01</td>
<td>Lane Closure, Multilane, Intermittent or Moving Operation, for Speeds ≤ 40 MPH</td>
</tr>
<tr>
<td>701431-07</td>
<td>Lane Closure, Multilane, Undivided with Crossover, for Speeds ≥ 45 MPH to 55 MPH</td>
</tr>
<tr>
<td>701446-04</td>
<td>Two Lane Closure, Freeway/Expressway</td>
</tr>
<tr>
<td>701451-01</td>
<td>Ramp Closure Freeway/Expressway</td>
</tr>
<tr>
<td>701456-02</td>
<td>Partial Exit Ramp Closure Freeway/Expressway</td>
</tr>
<tr>
<td>701501-06</td>
<td>Urban Lane Closure, 2L, 2W, Undivided</td>
</tr>
<tr>
<td>701502-05</td>
<td>Urban Lane Closure, 2L, 2W, with Bidirectional Left Turn Lane</td>
</tr>
<tr>
<td>701601-08</td>
<td>Urban Lane Closure, Multilane, 1W or 2W with Nontraversable Median</td>
</tr>
<tr>
<td>701602-06</td>
<td>Urban Lane Closure, Multilane, 2W with Bidirectional Left Turn Lane</td>
</tr>
<tr>
<td>701606-08</td>
<td>Urban Lane Closure, Multilane, 2W with Mountable Median</td>
</tr>
<tr>
<td>701701-08</td>
<td>Urban Lane Closure, Multilane Intersection</td>
</tr>
<tr>
<td>701801-05</td>
<td>Lane Closure, Multilane 1W or 2W Crosswalk or Sidewalk Closure</td>
</tr>
</tbody>
</table>
Traffic Control Devices
Temporary Concrete Barrier

SIGNING
Sign Panel Mounting Details
Sign Panel Erection Details
Metal Posts for Signs, Markers and Delineators
Mast Arm Mounted Street Name Signs
Sign Panels, Extruded Aluminum Type
Mast Arm Mounted Street Name Signs
Applications of Types A and B Metal Posts (For Signs & Markers)
Base for Telescoping Steel Sign Support

PAVEMENT MARKING
Typical Pavement Markings
Typical Applications Raised Reflective Pavement Markers
Prismatic Curb Reflectors
<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>805001-01</td>
<td>Electrical Service Installation Details</td>
</tr>
<tr>
<td>814001-02</td>
<td>Handholes</td>
</tr>
<tr>
<td>814006-02</td>
<td>Double Handholes</td>
</tr>
<tr>
<td>825001-01</td>
<td>Lighting Controller, Pole Mounted, 240V</td>
</tr>
<tr>
<td>825006-01</td>
<td>Lighting Controller, Pole Mounted, 480V</td>
</tr>
<tr>
<td>825011-02</td>
<td>Lighting Controller, Pedestal Mounted, 240V</td>
</tr>
<tr>
<td>825016-02</td>
<td>Lighting Controller, Pedestal Mounted, 480V</td>
</tr>
<tr>
<td>825021-02</td>
<td>Lighting Controller, Base Mounted, 240V</td>
</tr>
<tr>
<td>825026-02</td>
<td>Lighting Controller, Base Mounted, 480V</td>
</tr>
<tr>
<td>826001</td>
<td>Navigation Obstruction Lighting Controller, 240V</td>
</tr>
<tr>
<td>826006</td>
<td>Navigation Obstruction Lighting Controller, 480V</td>
</tr>
<tr>
<td>830001-01</td>
<td>Light Pole Aluminum Mast Arm</td>
</tr>
<tr>
<td>830006-01</td>
<td>Light Pole Aluminum Davit Arm</td>
</tr>
<tr>
<td>830011-01</td>
<td>Light Pole Steel Mast Arm</td>
</tr>
<tr>
<td>830016-01</td>
<td>Light Pole Steel Davit Arm</td>
</tr>
<tr>
<td>830021-01</td>
<td>Light Pole Steel Tenon Top</td>
</tr>
<tr>
<td>830026</td>
<td>Temporary Roadway Lighting</td>
</tr>
<tr>
<td>835001</td>
<td>Light Tower</td>
</tr>
<tr>
<td>836001-02</td>
<td>Light Pole Foundation</td>
</tr>
<tr>
<td>836006</td>
<td>Light Pole Foundation with 32 in. (815 mm) Concrete Median Barrier</td>
</tr>
<tr>
<td>836011</td>
<td>Light Pole Foundation with 42 in. (1065 mm) Concrete Median Barrier</td>
</tr>
<tr>
<td>837001-02</td>
<td>Light Tower Foundation</td>
</tr>
<tr>
<td>857001-01</td>
<td>Standard Phase Designation Diagrams and Phase Sequences</td>
</tr>
<tr>
<td>857006-01</td>
<td>Supervised Railroad Interconnect Circuit</td>
</tr>
<tr>
<td>862001-01</td>
<td>Uninterruptable Power Supply (UPS)</td>
</tr>
</tbody>
</table>
TRAFFIC SIGNALS - WIRE AND CABLE
873001-02 Traffic Signal Grounding & Bonding

TRAFFIC SIGNALS - POSTS AND FOUNDATIONS
876001-02 Pedestrian Push Button Post
877001-05 Steel Mast Arm Assembly and Pole 16’ Through 55’
877002-02 Steel Mast Arm Assembly and Pole 56’ Through 75’
877006-04 Steel Mast Arm Assembly and Pole with Dual Mast Arms
877011-05 Steel Combination Mast Arm Assembly and Pole 16’ Through 55’
877012-02 Steel Combination Mast Arm Assembly and Pole 56’ Through 75’
878001-09 Concrete Foundation Details

TRAFFIC SIGNALS - SIGNAL HEADS
880001-01 Span Wire Mounted Signals and Flashing Beacon Installation
880006-1 Traffic Signal Mounting Details

TRAFFIC SIGNALS - DETECTION
886001-01 Detector Loop Installations
886006-01 Typical Layout for Detection Loops
<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>000001-06</td>
<td>Standard Symbols, Abbreviations and Patterns</td>
</tr>
<tr>
<td>001001-02</td>
<td>Areas of Reinforcement Bars</td>
</tr>
<tr>
<td>001006</td>
<td>Decimal of an Inch and of a Foot</td>
</tr>
</tbody>
</table>
### Division BLR  -  Local Roads

<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLR 10-6</td>
<td>PCC Pavement Special</td>
</tr>
<tr>
<td>BLR 14-10</td>
<td>Portland Cement Concrete Pavement (Nonreinforced)</td>
</tr>
<tr>
<td>BLR 17-4</td>
<td>Traffic Control Devices - Day Labor Construction</td>
</tr>
<tr>
<td>BLR 18-5</td>
<td>Traffic Control Devices - Day Labor Maintenance</td>
</tr>
<tr>
<td>BLR 20-7</td>
<td>Traffic Barrier Terminal - Type 5R</td>
</tr>
<tr>
<td>BLR 21-9</td>
<td>Typical Application of Traffic Control Devices for Construction on Rural Local Highways</td>
</tr>
<tr>
<td>BLR 22-7</td>
<td>Typ. Appl. of T.C.D. for Rural Loc. Hwys. (2-Lane 2 Way Rural Traff.) (Rd. Closed to Thru Traff.)</td>
</tr>
<tr>
<td>BLR 23-4</td>
<td>Traffic Barrier Terminal Type 1</td>
</tr>
<tr>
<td>BLR 24-2</td>
<td>Mailbox Turnout for Local Roads</td>
</tr>
<tr>
<td>BLR 25-1</td>
<td>Type 1A Barricade for Non-NHS Routes</td>
</tr>
<tr>
<td>BLR 26-3</td>
<td>Steel Plate Beam Guardrail 29 in. (731 mm) Height</td>
</tr>
<tr>
<td>BLR 27-1</td>
<td>Traffic Barrier Terminal Type 5A</td>
</tr>
<tr>
<td>SUBJECT/TITLE</td>
<td>STD. NO.</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Abbreviations, Symbols and Patterns</td>
<td>000001</td>
</tr>
<tr>
<td>Barricade, Type 1A for Non-NHS Routes</td>
<td>BLR 25</td>
</tr>
<tr>
<td>Barrier, Concrete, 32 in. (815 mm) Height</td>
<td>637001</td>
</tr>
<tr>
<td>Barrier, Concrete, 42 in. (1065 mm) Height</td>
<td>637006</td>
</tr>
<tr>
<td>Barrier, Concrete, Temporary</td>
<td>704001</td>
</tr>
<tr>
<td>Base Course, PCC with HMA Binder and Surface Courses</td>
<td>353001</td>
</tr>
<tr>
<td>Benchmarks, Method of Resetting</td>
<td>668001</td>
</tr>
<tr>
<td>Cable, Road Guard, Single Strand</td>
<td>636001</td>
</tr>
<tr>
<td>Catch Basin, Type A</td>
<td>602001</td>
</tr>
<tr>
<td>Catch Basin, Type B</td>
<td>602006</td>
</tr>
<tr>
<td>Catch Basin, Type C</td>
<td>602011</td>
</tr>
<tr>
<td>Catch Basin, Type D</td>
<td>602016</td>
</tr>
<tr>
<td>Circuit, Supervised Railroad Interconnect</td>
<td>857006</td>
</tr>
<tr>
<td>Curb Type B and Combination Curb and Gutter, Concrete</td>
<td>606001</td>
</tr>
<tr>
<td>Curb Ramps for Sidewalks, Corner Parallel</td>
<td>424011</td>
</tr>
<tr>
<td>Curb Ramps for Sidewalks, Diagonal</td>
<td>424006</td>
</tr>
<tr>
<td>Curb Ramps for Sidewalks, Mid-block</td>
<td>424016</td>
</tr>
<tr>
<td>Curb Ramps for Sidewalks, Perpendicular</td>
<td>424001</td>
</tr>
<tr>
<td>Decimal Equivalents of an Inch and Foot</td>
<td>001006</td>
</tr>
<tr>
<td>Delineators</td>
<td>635001</td>
</tr>
<tr>
<td>Depressed Corner for Sidewalks</td>
<td>424021</td>
</tr>
<tr>
<td>Detection Loops, Typical Layout</td>
<td>886006</td>
</tr>
<tr>
<td>Detector Loop Installations</td>
<td>886001</td>
</tr>
<tr>
<td>Ditch, Paved</td>
<td>606401</td>
</tr>
<tr>
<td>Ditch Check, Earth Median</td>
<td>202001</td>
</tr>
<tr>
<td>Drainage Structures, Type 1, 2 and 3</td>
<td>602101</td>
</tr>
<tr>
<td>Drainage Structures, Type 4, 5 and 6</td>
<td>602106</td>
</tr>
<tr>
<td>Drains, Sub-Surface</td>
<td>601001</td>
</tr>
<tr>
<td>Elbow, Concrete Pipe, 24 in. (600 mm), 30 in. (750 mm) or 36 in. (900) Diameter</td>
<td>542601</td>
</tr>
<tr>
<td>Electrical Service Installation Details</td>
<td>805001</td>
</tr>
<tr>
<td>End Section, Flared, Precast Reinforced Concrete, Elliptical</td>
<td>542306</td>
</tr>
<tr>
<td>End Section, Flared, Precast Reinforced Concrete, Round</td>
<td>542301</td>
</tr>
</tbody>
</table>
## Standards by Subject

**January 1, 2013**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>End Section, Metal, for Pipe Arch</td>
<td>542406</td>
</tr>
<tr>
<td>End Section, Metal, for Pipe Culvert</td>
<td>542401</td>
</tr>
<tr>
<td>End Sections, Reinforced Concrete:</td>
<td></td>
</tr>
<tr>
<td>Multiple Pipe Culverts, 15 in. (375 mm) thru 84 in. (2100 mm) Diameter</td>
<td>542006</td>
</tr>
<tr>
<td>Multiple Pipe Culverts, Elliptical, 15 in. (375 mm) thru 72 in. (1800 mm) Equivalent Dia.</td>
<td>542016</td>
</tr>
<tr>
<td>Pipe Culverts, 15 in. (375 mm) thru 84 in. (2100 mm) Diameter</td>
<td>542001</td>
</tr>
<tr>
<td>Pipe Culverts, Elliptical, 15 in. (375 mm) thru 72 in. (1800 mm) Equivalent Diameter</td>
<td>542011</td>
</tr>
<tr>
<td>Skewed, for 15 in. (375 mm) thru 36 in. (900 mm) Diameter</td>
<td>542201</td>
</tr>
<tr>
<td>Skewed, for 42 in. (1050 mm) thru 60 in. (1500 mm) Diameter</td>
<td>542206</td>
</tr>
<tr>
<td>Erosion Control Systems, Temporary</td>
<td>280001</td>
</tr>
</tbody>
</table>

### F
- Fence, Chain Link ................................................. 664001
- Fence, Woven Wire .................................................. 665001
- Flashing Beacon Installation ..................................... 880001
- Flat Slab Top, Precast Reinforced Concrete ................. 602601
- Foundations, Details, Concrete ................................. 878001
- Frames, Grates and Lids:
  - Type 1 Frame and Lids ........................................... 604001
  - Type 3 Frame and Grate ........................................ 604006
  - Type 3V Frame and Grate ........................................ 604011
  - Type 4 Frame and Grate ........................................ 604016
  - Type 5 Base, Frame and Lids ................................. 604021
  - Type 6 Frame and Grate ........................................ 604026
  - Type 7 Grate ........................................................ 604031
  - Type 8 Grate ........................................................ 604036
  - Type 9 Frame and Grate ......................................... 604041
  - Type 10 Frame and Grate ....................................... 604046
  - Type 11 Frame and Grate ....................................... 604051
  - Type 11V Frame and Grate ..................................... 604056
  - Type 12 Frame and Grate ....................................... 604061
  - Type 15 Frame and Lid .......................................... 604066
  - Type 20 Frame and Grate ....................................... 604071
  - Type 21 Frame and Grate ....................................... 604076
  - Type 22 Frames and Grates .................................... 604081
  - Type 23 Frame and Grate ....................................... 604086
  - Type 24 Frame and Grate ....................................... 604091

### G
- Glare Screen, Blades ................................................ 638001
- Glare Screen, Concrete ........................................... 638101
- Grate, Traversable Pipe ........................................... 542311
- Guardrail:
  - Long Span Over Culverts ....................................... 630106
  - Mounted on Existing Culverts ............................... 630101
  - Steel Plate Beam .................................................. 630001
  - Steel Plate Beam, 29 in. (731 mm) Height ............... BLR 26
  - Steel Plate Beam, PCC/HMA Stabilization ............... 630201
H
Handholes, Concrete and Polymer Concrete, Double.........................................................814006
Handholes, Polymer Concrete, Single...............................................................................814001
Headwall for Pipe Drain, Concrete..................................................................................601101

I
Impact Attenuators, Sand Module......................................................................................643001
Inlet:
For 24 in. (600 mm) Reinforced Concrete Pipe in Median..............................................604101
For 36 in. (900 mm) Reinforced Concrete Pipe in Median..............................................604106
For Shoulder With Curb.................................................................................................610001
For Type B Gutter ..........................................................................................................606201
Outlet & Entrance for Type A Gutter ..............................................................................606101
Type A .............................................................................................................................602301
Type B .............................................................................................................................602306
Inlet Box:
Flush for Median............................................................................................................542546
Type 24 (600) A .............................................................................................................542501
Type 24 (600) B .............................................................................................................542506
Type 24 (600) C .............................................................................................................542511
Type 24 (600) D .............................................................................................................542516
Type 24 (600) E .............................................................................................................542521
Type 24 (600) F .............................................................................................................542526
Type 24 (600) G .............................................................................................................542531
Type 24 (900) A .............................................................................................................542536
Type 48 (1200) A ..........................................................................................................542541
Islands, Concrete.............................................................................................................606301

J/K
Joints, Pavement .............................................................................................................420001

L
Lane Closure ....................................................................................................................(see Traffic Control and Protection)
Lighting Controller, Pole Mounted, 240V........................................................................825001
Lighting Controller, Pole Mounted, 480V........................................................................825006
Lighting Controller, Pedestal Mounted, 240V.................................................................825011
Lighting Controller, Pedestal Mounted, 480V.................................................................825016
Lighting Controller, Base Mounted, 240V......................................................................825021
Lighting Controller, Base Mounted, 480V......................................................................825026
Lighting Controller, Navigation Obstruction, 240V.......................................................826001
Lighting Controller, Navigation Obstruction, 480V.......................................................826006
Light Pole, Aluminum, Mast Arm..................................................................................830001
Light Pole, Aluminum, Davit Arm..................................................................................830006
Light Pole, Steel, Mast Arm.........................................................................................830011
Light Pole, Steel, Davit Arm.........................................................................................830016
Light Pole, Steel, Tenon Top.........................................................................................830021
Light Tower ...................................................................................................................835001
Light Pole Foundation .................................................................................................836001
Light Pole Foundation with 32 in. (815 mm) Concrete Median Barrier..........................836006
Light Pole Foundation with 42 in. (1065 mm) Concrete Median Barrier.........................836011
Standards by Subject

January 1, 2013

Light Tower Foundation ........................................................................................................... 837001

M
Mailbox Turnout, Local System .................................................................................................. BLR-24
Mailbox Turnout, State System .................................................................................................. 406201
Manhole, Type A .................................................................................................................. 602401
Manhole, Type A, 6 ft. (1.8 m) Diameter ................................................................................. 602406
Manhole, Type A, 7 ft. (2.1 m) Diameter ................................................................................. 602411
Manhole, Type A, 8 ft. (2.4 m) Diameter ................................................................................. 602416
Manhole, Type A, 9 ft. (2.7 m) Diameter ................................................................................. 602421
Manhole Steps ....................................................................................................................... 602701
Markers:
  Drainage ........................................................................................................................... 667001
  Permanent Survey ............................................................................................................. 667101
  Right-of-Way ..................................................................................................................... 666001
Mast Arm Assembly and Pole 16' Through 55', Steel Combination ......................................... 877011
Mast Arm Assembly and Pole 56' Through 75', Steel Combination ......................................... 877012
Mast Arm Assembly and Pole, Steel, Dual Mast Arms ............................................................. 877006
Mast Arm Assembly and Pole 16' Through 55', Steel ............................................................. 877001
Mast Arm Assembly and Pole 56' Through 75', Steel ............................................................. 877002
Mast Arm Mounted Street Name Signs ................................................................................... 720016
Median, Concrete .................................................................................................................... 606301
Median, Concrete, Corrugated ................................................................................................ 606306

N
Name Plates for Bridges ........................................................................................................... 515001

O
Outlet:
  Inlet and entrance for Type A Gutter ................................................................................. 606101
  Type 1, for Type A Gutter ............................................................................................... 606106
  Type 1, for Type B Gutter ............................................................................................... 606206
  Type 2, for Type A Gutter ............................................................................................... 606111
  Type 2, for Type B Gutter ............................................................................................... 606211
  Type B-6.24 (B-15.60) for Concrete Curb and Gutter ..................................................... 606006
  For Type B Gutter, Standard ......................................................................................... 606006

P/Q
Patching, Class A .................................................................................................................... 442001
Patching, Class B .................................................................................................................... 442101
Patching, Class C and D ........................................................................................................ 442201
Pavement:
  24' (7.2 m) Continuously Reinforced PCC With Lug System ............................................ 421201
  24' (7.2 m) Continuously Reinforced PCC With Wide Flange Beam Term. Joint ............... 421101
  24' (7.2 m) Jointed PCC .................................................................................................... 420101
  24' (7.2 m) PCC ................................................................................................................ 420601
  36' (10.8 m) Continuously Reinforced PCC With Wide Flange Beam Term. Joint .......... 421106
  36' (10.8 m) Continuously Reinforced PCC With Lug System ......................................... 421206
  36' (10.8 m) Jointed PCC .................................................................................................. 420106
  Adjacent to Railroad Grade Crossing, PCC ...................................................................... 420501
Bridge Approach, Connector ................................................................. 420401
Bridge Approach, (Drain Detail) .............................................................. 609006
Fabric ................................................................................................. 420701
Nonreinforced PCC ............................................................................... BLR 14
Reinforcement for Continuously Reinforced PCC Pavement ................. 421001
Roundabouts, PCC .............................................................................. 420111
Special, PCC ...................................................................................... BLR 10
Pavement Markers, Raised Reflective, Applications ............................ 781001
Pavement Markings ............................................................................ 780001
Pedestrian Crossings, Entrance / Alley ............................................... 424026
Pedestrian Crossings, Median ............................................................... 424031
Phase Sequences ............................................................................... 857001
Posts, Metal, Applications for Type A and B ........................................ 729001
Posts, Metal, for Signs, Markers and Delineators ................................. 720011
Push Button Post ............................................................................... 876001

R

Ramp Closure, Freeway/Expressway ....................................................... 701451
Ramp Closure, Partial Exit, Freeway/Expressway ..................................... 701456
Ramp Terminal:
  Entrance, Flexible Adjacent to Flexible Mainline Pavement .......... 406001
  Entrance, Jointed PCC Adjacent to CRC Mainline Pavement ...... 420206
  Entrance, Jointed PCC Adjacent to Jointed PCC Mainline Pavement .. 420201
  Exit, Flexible Adjacent to Flexible Mainline Pavement .......... 406101
  Exit, Jointed PCC Adjacent to CRC Mainline Pavement .......... 420306
  Exit, Jointed PCC Adjacent to Jointed PCC Mainline Pavement .... 420301
Reflector and Terminal Marker Placement ........................................ 635006
Reflector Markers and Mounting Details ........................................... 635011
Reflectors, Prismatic Curb ................................................................. 782001
Revetment Mat, Fabric Formed Concrete ............................................ 001001
Rumble Strips, Shoulder, 16 inch ....................................................... 642001
Rumble Strips, Shoulder, 8 inch .......................................................... 642006

S

Shoulder:
  Adjacent to Flexible Pavement, HMA .............................................. 482001
  Adjacent to Rigid Pavement, HMA ............................................... 482006
  PCC .............................................................................................. 483001
  or Shoulder Strips With Resurfacing or Widening and Resurfacing Projects ... 482001
Sidewalks, Corner Parallel Curb Ramps for ...................................... 424011
Sidewalks, Diagonal Curb Ramps for ............................................... 424006
Sidewalks, Mid-block Curb Ramps for ............................................ 424016
Sidewalks, Perpendicular Curb Ramps for ........................................ 424001
Sight Screen, Chain Link Fence .......................................................... 640001
Sight Screen, Concrete Panel Wall, Precast Prestressed ................... 639001
Sight Screen, Wood Fence, Cedar Stockade ...................................... 641001
Sight Screen, Wood Fence, Wood Plank ........................................... 641006
Sign Panel, Erection Details ............................................................... 720001
Sign Panel, Extruded Aluminum Type ............................................... 720021
Sign Panel, Mounting Details ................................................................. 720001
Sign Support, Telescoping Steel ............................................................ 728001
Sign Support, Telescoping Steel, Base for ........................................... 731001
Symbols, Abbreviations, and Patterns ................................................... 000001

T

Tee, Concrete Pipe .................................................................................. 542606

Traffic Barrier Terminal:

Type 1 ...................................................................................................... BLR-23
Type 1B .................................................................................................. 631006
Type 1 Special, Shoulder Widening for .................................................. 630301
Type 2 .................................................................................................. 631011
Type 5A .................................................................................................. BLR 27
Type 5R .................................................................................................. BLR 20
Type 6 ..................................................................................................... 631031
Type 6A ................................................................................................. 631032
Type 6B ................................................................................................. 631033
Type 10 ................................................................................................. 631046
Type 11 ................................................................................................. 631051

Traffic Control:

Devices ................................................................................................. 701901

Devices:

Type 1A Barricade for Non-NHS Routes ............................................... BLR 25
Day Labor Construction ........................................................................ BLR 17
Day Labor Maintenance ........................................................................ BLR 18
Typical Application of, for Construction on Rural Local Highways .... BLR 21
Typical Application of, for Construction on Rural Local Highways (Two-Lane
Two Way Rural Traffic) (Road Closed to Thru Traffic) ........................ BLR 22

Lane Closure, 2L, 2W:

Bridge Repair, for Speeds \( \geq 45 \text{ MPH} \) ......................................... 701316
Bridge Repair with Barrier .................................................................. 701321
Day Only, for Speeds \( \geq 45 \text{ MPH} \) .................................................. 701201
Moving Operations - Day Only ............................................................ 701311
Night Only, for Speeds \( \geq 45 \text{ MPH} \) ................................................. 701206
Pavement Widening, for Speeds \( \geq 45 \text{ MPH} \) ............................... 701326
Short Time Operations ........................................................................ 701301
Slow Moving Operations Day Only, for Speeds \( \geq 45 \text{ MPH} \) .......... 701306
With Run-Around, for Speeds \( \geq 45 \text{ MPH} \) ......................................... 701331
Work Areas in Series, for Speeds \( \geq 45 \text{ MPH} \) ............................... 701336

Lane Closure, Freeway/Expressway ...................................................... 701401

Lane Closure, Freeway/Expressway:

Approach to ......................................................................................... 701400
Day Operations Only ........................................................................... 701406
Sidewalk, Corner or Crosswalk Closure ............................................. 701801
Two Lane Closure ............................................................................... 701446
with Barrier ......................................................................................... 701402
with Crossover and Barrier ............................................................... 701416

Lane Closure, Multilane:

at Entrance or Exit Ramp, for Speeds \( \geq 45 \text{ MPH} \) ....................... 701411
Day Operations Only, for Speeds \( \geq 45 \text{ MPH} \) to 55 MPH ................ 701421
for Speeds ≥ 45 MPH to 55 MPH .............................................................. 701422
Intermittent or Moving Operation, for Speeds ≥ 45 MPH ...................... 701426
Intermittent or Moving Operation, for Speeds ≤ 40 MPH ...................... 701427
Undivided With Crossover, for Speeds ≥ 45 MPH to 55 MPH ................. 701431
with Barrier, for Speeds ≥ 45 MPH to 55 MPH ..................................... 701423
Lane Closure, Urban:
2L, 2W, Undivided .................................................................................... 701501
2L, 2W, with Bidirectional Left Turn Lane ................................................ 701502
Multilane, 1W or 2W with Nontraversable Median ................................. 701601
Multilane, 2W with Bidirectional Left Turn Lane .................................... 701602
Multilane, 2W with Mountable Median .................................................... 701606
Multilane Intersection ............................................................................. 701701
Off-Road Operations:
2L 2W, 15 ft. (4.5 m) to 24 in (600 mm) From Pavement Edge .............. 701006
2L 2W, More Than 15 ft. (4.5 m) Away .................................................... 701001
Moving, 2L 2W, Day Only ....................................................................... 701011
Multilane, 15 ft. (4.5 m) to 24 in. (600 mm) From Pavement Edge .......... 701101
Multilane, More Than 15 ft. (4.5 m) Away .............................................. 701106
Traffic Signal Grounding & Bonding ...................................................... 873001
Traffic Signal Mounting Details, Post and Bracket Mounted ................. 880006
Traffic Signal Mounting Details, Span Wire Mounted and Flashing Beacon 880001

U-Z

Uninterruptable Power Supply (UPS) ......................................................... 862001
Valve Vault, Type A .................................................................................. 602501
### Erosion & Sediment Control Items

- Cleaning & Grading Limits
- Dike
- Erosion Control Fence
- Perimeter Erosion Barrier
- Temporary Fence
- Ditch Check Temporary
- Ditch Check Permanent

### Non-Highway Improvement Items

- Noise Attenuation Fences/Levees
- Field Line
- Fence
- Base of Levee
- Mailbox
- Multiple Mailboxes

### Landscaping Items

- Contour Mounding Line
- Fence
- Fence Post
- Shrubs
- Mowline
- Perennial Plants

### Existing Landscaping Items (contd.)

- Seeding Class 5
- Seeding Class 7
- Seeding Rings Type 1
- Seeding Rings Type 2
- Seeding Rings Rings
- Waspone w/Sign
- Tree Trunk Protection
- Evergreen Tree
- Shade Tree

### Cleaning & Grading Limits

- Dike
- Erosion Control Fence
- Perimeter Erosion Barrier
- Temporary Fence
- Ditch Check Temporary
- Ditch Check Permanent

### Maintenance Items

- Inlet & Pipe Protection
- Sediment Basin
- Erosion Control Blanket
- Fabric Formed Concrete
- Revetment Mat

### Turf Reinforcement Mat

- Mulch Temporary
- Mulch Method 1
- Mulch Method 2 Stabilized
- Mulch Method 3 Hydraulic

### Biking Items

- Mowstake w/Sign
- Tree Trunk Protection

### Evergreen Tree

- Shade Tree

### Lighting

- Duct
- Conduit
- Electrical Aerial Cable
- Electrical Buried Cable
- Controller
- Underpass Luminaire
- Power Pole

### Standard Symbols, Abbreviations and Patterns

Sheet 3 of 8

**Standard 000001-06**
RAILROAD ITEMS

EX  PR

Abandoned Railroad
Ex

Railroad
Ex

Railroad Point
Ex

Control Box
Ex

Crossing Gate
Ex

Flashing Signal
Ex

Railroad Cont. Mast Arm
Ex

Crossbuck
Ex

REMOVAL ITEMS

EX  PR

Removal Tic
Ex

Bituminous Removal
Ex

Hatch Pattern
Ex

Tree Removal Single
Ex

RIGHT OF WAY ITEMS

EX  PR

Future ROW Corner Monument
Ex

ROW Marker
Ex

ROW Line
Ex

Easement
Ex

Temporary Easement
Ex

STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS

STANDARD 000001-06

(Sheet 5 of 8)
<table>
<thead>
<tr>
<th>RIGHT OF WAY ITEMS</th>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access Control Line</td>
<td>AC</td>
<td>AC</td>
</tr>
<tr>
<td>Access Control Line &amp; ROW</td>
<td>AC</td>
<td>-AC-</td>
</tr>
<tr>
<td>Access Control Line &amp; ROW with Fence</td>
<td>AR</td>
<td>-AC-</td>
</tr>
<tr>
<td>Excess ROW Line</td>
<td>XS</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ROADWAY PLAN ITEMS</th>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable Barrier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete Barrier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edge of Movement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bit Shoulders, Medians and C&amp;G Line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggregate Shoulder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sidewalks, Driveways</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guardrail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guardrail Post</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic Sign</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrugated Median</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact Attenuator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Arrow with District Office</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watch Line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slope LIMIT Line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Cross-Section Line</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ROADSIDE ITEMS</th>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verh. Curve Data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ditch Profile Left Side</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ditch Profile Right Side</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roadway Profile Line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storm Sewer Profile Left Side</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storm Sewer Profile Right Side</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SIGNING ITEMS</th>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cone, Drum or Barricade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barricade Type II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barricade Type III</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barricade with Edge Line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flashing Light Sign</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panels I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panels II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direction of Traffic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sign Flag</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Sheet 6 of 8)</td>
</tr>
</tbody>
</table>
### Signing Items

<table>
<thead>
<tr>
<th>Ex</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Way Arrow Long R-3-I0</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Two Way Arrow Large R-1-I0</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Detour MH-40-K0</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Detour MH-40-K0</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>One Way Left R6-L</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>One Way Right R6-R</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Left Turn Lane R3-100L</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Keep Left R4-T3L</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Keep Left R4-T3L</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Keep Right R4-T3R</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Keep Right R4-T3R</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Stop Here On Red R10-6-AL</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Stop Here On Red R10-6-AH</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>No Left Turn R3-2</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>No Right Turn R3-1</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Road Closed R11-2</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Road Closed Thru Traffic R11-2</td>
<td>(Half Size)</td>
</tr>
</tbody>
</table>

### Structures Items

<table>
<thead>
<tr>
<th>Ex</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box Culvert Normal</td>
<td></td>
</tr>
<tr>
<td>Box Culvert Hooded</td>
<td></td>
</tr>
<tr>
<td>Bridge Plan</td>
<td></td>
</tr>
<tr>
<td>Bridge</td>
<td></td>
</tr>
<tr>
<td>Retaining Wall</td>
<td></td>
</tr>
<tr>
<td>Temporary Sheet Piling</td>
<td>~~~~~~~~~</td>
</tr>
</tbody>
</table>

### Traffic Items

<table>
<thead>
<tr>
<th>Ex</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable Number</td>
<td></td>
</tr>
<tr>
<td>Left Turn Green</td>
<td></td>
</tr>
<tr>
<td>Left Turn Yellow</td>
<td></td>
</tr>
<tr>
<td>Signal Backplate</td>
<td></td>
</tr>
<tr>
<td>Signal Section 8&quot; (200 mm)</td>
<td></td>
</tr>
<tr>
<td>Signal Section 12&quot; (300 mm)</td>
<td></td>
</tr>
<tr>
<td>Walk/Don't Walk Letters</td>
<td></td>
</tr>
<tr>
<td>Walk/Don't Walk Symbols</td>
<td></td>
</tr>
</tbody>
</table>

### Traffic Signal Items

<table>
<thead>
<tr>
<th>Ex</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galv. Steel Conduit</td>
<td>~~~~~~~~~</td>
</tr>
<tr>
<td>Underground Cable</td>
<td>~~~~~~~~~</td>
</tr>
<tr>
<td>Detector Loop Line</td>
<td>~~~~~~~~~</td>
</tr>
<tr>
<td>Detector Loop Large</td>
<td></td>
</tr>
<tr>
<td>Detector Loop Small</td>
<td></td>
</tr>
<tr>
<td>Detector Loop Quadrapole</td>
<td>~~~~~~~~~</td>
</tr>
</tbody>
</table>

### Standard Symbols, Abbreviations and Patterns

Sheet 7 of 8

STD 000001-06
<table>
<thead>
<tr>
<th>TRAFFIC SIGNAL ITEMS (contd.)</th>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detector Raceway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminum Mast Arm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel Mast Arm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veh. Detector Magnetic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conduit Splice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controller</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gulfbox Junction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood Pole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tree, Signal, Mood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handhole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Double Handhole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy Duty Handhole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junction Box</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ped, Pushbutton Detector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ped, Signal, Mood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Pole Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Priority Veh. Detector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signal, Mood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signal, Mood w/Backplate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signal Post</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Closed Circuit TV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Video Detector System</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UNDERGROUND UTILITY ITEMS</th>
<th>EX</th>
<th>PR</th>
<th>ABANDONED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable TV</td>
<td></td>
<td>CT</td>
<td>CT</td>
</tr>
<tr>
<td>Electric Cable</td>
<td></td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Fiber Optic</td>
<td></td>
<td>FO</td>
<td>FO</td>
</tr>
<tr>
<td>Gas Pipe</td>
<td></td>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>Oil Pipe</td>
<td></td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Sanitary Sewer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telephone Cable</td>
<td></td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>Water Pipe</td>
<td></td>
<td>W</td>
<td>W</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UTILITIES ITEMS</th>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Double Handhole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire Hydrant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GuyWire or Decam Anchor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handhole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy Duty Handhole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junction Box</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light Pole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manhole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipeline Warning Sign</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Pole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Pole with Light</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanitary Sewer Cleanout</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Splice Box Above Ground</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telephone Splice Box Above Ground</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telephone Pole</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UTILITY ITEMS (contd.)</th>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Signal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic Signal Control Box</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Meter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Meter Valve Box</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profile Line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerial Power Line</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VEGETATION ITEMS</th>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deciduous Tree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bush or Shrub</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evergreen Tree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stump</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orchard/Nursery Line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetation Line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woods &amp; Bush Line</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WATER FEATURE ITEMS</th>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stream or Drainage Ditch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waterers Edge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Surface Indicator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Point</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disappearing Ditch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marsh</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marsh/Swamp Boundary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Reinforcement Bars - English (Metric)

<table>
<thead>
<tr>
<th>Bar Size</th>
<th>Dia., in.</th>
<th>Gr. Sec. Area, sq. in.</th>
<th>Weight, lbs./ft.</th>
<th>Spacing, in.</th>
<th>Area of Steel per Foot, sq. in. (sq. mm)</th>
<th>Rebar Weight, kg/m</th>
<th>Weight, kg/m</th>
<th>Stress, psi</th>
<th>Stress, MPa</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (10)</td>
<td>0.245</td>
<td>0.250</td>
<td>0.215</td>
<td>0.250</td>
<td>0.290</td>
<td>0.240</td>
<td>0.180</td>
<td>450</td>
<td>315</td>
</tr>
<tr>
<td>4 (13)</td>
<td>0.360</td>
<td>0.360</td>
<td>0.660</td>
<td>0.360</td>
<td>0.730</td>
<td>0.650</td>
<td>0.490</td>
<td>730</td>
<td>496</td>
</tr>
<tr>
<td>5 (16)</td>
<td>0.475</td>
<td>0.470</td>
<td>1.190</td>
<td>0.800</td>
<td>1.300</td>
<td>1.100</td>
<td>0.800</td>
<td>1800</td>
<td>1250</td>
</tr>
<tr>
<td>6 (19)</td>
<td>0.600</td>
<td>0.600</td>
<td>1.900</td>
<td>1.200</td>
<td>2.000</td>
<td>1.700</td>
<td>1.300</td>
<td>3500</td>
<td>2410</td>
</tr>
<tr>
<td>7 (22)</td>
<td>0.725</td>
<td>0.720</td>
<td>3.000</td>
<td>1.600</td>
<td>3.000</td>
<td>2.600</td>
<td>2.000</td>
<td>5400</td>
<td>3710</td>
</tr>
<tr>
<td>8 (25)</td>
<td>0.850</td>
<td>0.850</td>
<td>4.500</td>
<td>2.400</td>
<td>4.500</td>
<td>3.600</td>
<td>2.800</td>
<td>7200</td>
<td>5030</td>
</tr>
</tbody>
</table>

#### Additional Information
- **Areas of Reinforcement Bars**
- **Date**: January 1, 2009
- **Engineer of Design and Environment**: Approved
- **Engineer of Policy and Procedures**: Passed
- **Illinois Department of Transportation**: Standard 001001-02

**NOTE:** Table converted from English to metric units.

**Soft converted English to metric table.**
<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0002</td>
<td>0.004</td>
<td>0.025</td>
<td>0.075</td>
<td>0.100</td>
<td>0.125</td>
<td>0.150</td>
<td>0.175</td>
</tr>
<tr>
<td>0.001</td>
<td>0.04</td>
<td>0.027</td>
<td>0.078</td>
<td>0.103</td>
<td>0.128</td>
<td>0.153</td>
<td>0.178</td>
</tr>
<tr>
<td>0.002</td>
<td>0.05</td>
<td>0.037</td>
<td>0.087</td>
<td>0.107</td>
<td>0.129</td>
<td>0.159</td>
<td>0.184</td>
</tr>
<tr>
<td>0.004</td>
<td>0.07</td>
<td>0.071</td>
<td>0.101</td>
<td>0.109</td>
<td>0.131</td>
<td>0.161</td>
<td>0.186</td>
</tr>
<tr>
<td>0.008</td>
<td>0.14</td>
<td>0.144</td>
<td>0.142</td>
<td>0.170</td>
<td>0.198</td>
<td>0.218</td>
<td>0.246</td>
</tr>
<tr>
<td>0.016</td>
<td>0.28</td>
<td>0.285</td>
<td>0.284</td>
<td>0.309</td>
<td>0.338</td>
<td>0.357</td>
<td>0.394</td>
</tr>
<tr>
<td>0.032</td>
<td>0.57</td>
<td>0.571</td>
<td>0.570</td>
<td>0.618</td>
<td>0.646</td>
<td>0.664</td>
<td>0.708</td>
</tr>
<tr>
<td>0.064</td>
<td>1.14</td>
<td>1.142</td>
<td>1.141</td>
<td>1.236</td>
<td>1.291</td>
<td>1.308</td>
<td>1.384</td>
</tr>
</tbody>
</table>

**Decimal of an Inch and of a Foot**

*A = Fractions of inch or foot

*B = Inch Equivalents to Foot Fractions*
DITCH CHECK FOR NARROW MEDIAN

DITCH CHECK FOR WIDE MEDIAN

GENERAL NOTES

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.
STEP 1

Attach two silt filter fences. End-post of first silt fence is placed adjacent to end-post of second silt fence with fabric positioned as shown.

STEP 2

ATTACHING TWO SILT FILTER FENCES

Rotate posts together 180° clockwise and drive both posts 18 (450) into ground. Where applicable for unique installation details.

SILT FILTER J-HOOK PLACEMENT

Place posts (staked) together 180° clockwise adjacent to end-post of second silt fence. End-post of first silt fence is placed adjacent to end-post of second silt fence with fabric positioned as shown.

AGGREGATE DITCH CHECK

Filter fabric

Filter fabric

Excavate, backfill and compact trench to secure fabric.

GENERAL NOTES

The installation details and dimensions shown for perimeter erosion barriers shall also apply for inlet and pipe protection. All dimensions are in inches (millimeters) unless otherwise shown.

Temporary Erosion Control Systems

Sheet 1 of 2

STANDARD 280001-07
INLET AND PIPE PROTECTION

ELEVATION

The performance of the basin will improve if put into a series.

PLAN

Outlet type as directed by Engineer.

The long dimension should be parallel with the direction of the flow. Accumulated silt shall be removed anytime the basins become 75% filled.

SEDIMENT BASIN

30' (9.0 m) to 6' (1.8 m)

20' (6.0 m) to 8' (2.4 m) in.

TYPICAL CUT CROSS-SECTION

TYPICAL FILL CROSS-SECTION

TEMPORARY DITCHES FOR CUT & FILL SECTIONS

STANDARD 280001-07

TEMPORARY EROSION CONTROL SYSTEMS (Sheet 2 of 2)
Width to be measured along the slope of the top surface of the fabric formed concrete revetment mat in place from end to end.

Locate flat sewn joint midway between mortar stops. Lay seams down for best appearance.

TYPICAL FABRIC FORMED CONCRETE REVETMENT MAT LINED DITCH

INSTALLATION DETAILS
1. In placing inserts through fabric use care to avoid breaking drop stitches.
2. Indicates sequence of pour.

TYPICAL LAP JOINTS W/ANCHOR WALL

CUT OFF WALL DETAILS

Seams between mill widths of fabric shall be generally perpendicular to waterway.

GENERAL NOTES
Dimensions given with minimum limits shall be adjusted for field conditions as directed by the Engineer.
All anchor walls on side slopes and at lap joints, as well as cut off walls, shall be installed in trenches.
Cut off walls shall be installed at the upstream and downstream ends.
All dimensions are in inches (millimeters) unless otherwise shown.
**SECTION A-A**
(TYPICAL 2 LANE WITH SHOULDERS)

- Base course pay width
- Surface width
- Slope 1:1
- Slope 1.5%
- Subbase
- Longitudinal sawed joint

**ALTERNATE SECTION A-A**
(TYPICAL 2 LANE WITH SHOULDERS)

- Base course pay width
- Lane width
- Slope 1:1
- Slope 1.5%
- Stripe
- Subbase
- Longitudinal sawed joint

**GENERAL NOTES**

The longitudinal sawed joint shall be as detailed on Standard 420001 except the sawed groove does not require sealing.

All dimensions are in inches (millimeters) unless otherwise shown.

**LONGITUDINAL SECTION SHOWING CONSTRUCTION ADJACENT TO PCC BRIDGE APPROACH PAVEMENT OR EXISTING PAVEMENT**

**TRANSVERSE CONSTRUCTION JOINT**

**PLAN**
GENERAL NOTES

The indicated "A" and "B" grades for the ramp terminal are based on an assumed mainline grade of 0.00%.

See plans for actual grades.

See Standard 482001 for ramp shoulder details.

Between Sections A-A and B-B (shaded area), provide a drainage swale and flush berm to enhance drainage.

When using grades expressed in %, the grade value shall be divided by 100 to obtain vertical offsets.

When radius R1 is less than 760 ft (230 m), the acceleration length shall be recalculated.

With a mainline horizontal curve to the right, keep the gore nose dimensions at Sections C-C and D-D as shown. From Section C-C to Section B-B, construct the ramp as a tangent section, and the gore nose at Section B-B shall be a variable width dependent on the radius of the mainline curve. Show a special cross-section on the plans for Section B-B.

With a mainline horizontal curve to the right, keep the gore nose dimensions at Sections C-C and D-D as shown, and the edge of the ramp between Sections C-C and D-D shall be constructed as a compound curve tying Section C-C.

All dimensions are in inches (millimeters) unless otherwise shown.
CROSS SECTIONS WHEN MAINLINE IS ON TANGENT OR CURVED TO THE RIGHT

SECTION B-B

SECTION C-C

SECTION D-D

CROSS SECTIONS WHEN MAINLINE IS CURVED TO THE LEFT

DETAIL A

DETAIL B
Pavement in the ramp taper (shaded area) for a distance of 400' (120 m) shall be the same thickness as the mainline.

Max. cross slope allowed is 4%

Min. cross slope allowed is 1.5%

Refer to sheet 3 for vertical offsets using $R_i \times 765' \times 0.30$ m

Range of initial ramp grades when mainline is curved to the right using $R_i \times 765' \times 0.30$ m

See Sheet 3 for GENERAL NOTES
When Mainline is on Tangent or Curved to the Right

When Mainline is Curved to the Left

See Sheet 3 for General Notes
DETAILS FOR DRAINAGE IN NEUTRAL AREA

<table>
<thead>
<tr>
<th>Sections on Tangent</th>
<th>Machine Curved Right</th>
<th>Machine Curved Left</th>
<th>Machine Right</th>
<th>Machine Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>15.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>392</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Vertical offset values are calculated and based on the right edge of mainline pavement at 0.0% grade.
2. The vertical offsets of these points are above the mainline pavement and lie on an upgrade in relationship to the mainline grade.
3. S.E. = Super elevation rate

GENERAL NOTES

1. The initial ramp grade (G) is based on the line generated through the point created by the vertical offset of Section B-B and the point created by the vertical offset of Section D-D.

2. See plans for actual grades.


In the neutral area, provide a swale and flush inlet to enhance drainage.

When using grades expressed in %, the grade values shall be divided by 100 to obtain vertical offsets.

If an exit ramp terminal is proposed adjacent to a mainline horizontal curve, construct the edge of the terminal by using offset widths, and for the terminal segment downstream from Section C-C to R, construct the ramp as a 140 ft. 143 m tangent section.

All dimensions are in inches (millimeters) unless otherwise shown.

EXIT RAMP TERMINAL

FLEXIBLE RAMP PAVEMENT ADJACENT TO FLEXIBLE MAINLINE PAVEMENT

SHAPED 3 of 3

STANDARD 406101-04
Mailbox Turnout

Typical Application

Mailbox on Farside of Entrance

Mailbox on Nearside of Entrance

General Notes

Mailboxes shall be mounted such that the face of the mailbox is 6 (150) to 12 (300) from the edge of the turnout surfacing. All dimensions are in inches (millimeters) unless otherwise shown.

Dimension Table

<table>
<thead>
<tr>
<th>Width of Shoulder</th>
<th>4-8 (122-203)</th>
<th>10+10 (254+254)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width of Turnout (Y)</td>
<td>8 (203)</td>
<td>8+10 (203+254)</td>
</tr>
<tr>
<td>L1</td>
<td>32 (813)</td>
<td>32 (813)</td>
</tr>
<tr>
<td>L2</td>
<td>20 (508)</td>
<td>20 (508)</td>
</tr>
</tbody>
</table>

Inches - ft.

Mailboxes are to be installed and maintained in accordance with the Illinois Department of Transportation standards.
Sawed groove (shown on support pins)

No. 6x30 (No. 19x750) Tie bars at 30 (750) cts. No. 6x30 (No. 19x750)

Joint sealer

Hot poured

~

15

1.02 m

20

3'-4" (1.02 m)

20

3'-4" (1.02 m)

chairs

0.0598x2 (1.5x50)

Tie bars at 24 (600) cts. No. 6x24 (No. 19x600)

Form

First pour

Second pour

Preformed or drilled hole, bar size 3/4 (6)

Tie bars at 30 (750) cts. No. 6x30 (No. 19x750)

Sheet steel of suitable thickness to form keyway as detailed or approved.

General Notes:

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.

English (metric).

Switched units to English (metric).

Notes for trans. exp. jt.

constr. jt. and revised

ALTERNATE

SUPPORTING CHAIR

ALTERNATE

SUPPORTING CHAIR

LONGITUDINAL SAWED JOINT

TIE BAR FORMED IN PLACE

LONGITUDINAL KEYED JOINT

LONGITUDINAL CONSTRUCTION JOINT

(TIE BAR GROUTED IN PLACE)

LONGITUDINAL CONSTRUCTION JOINT
 dams. The image shows a diagram of pavement joints, specifically focusing on transverse expansion and contraction joints. The text includes details on the installation of joint sealer, expansion caps, and dowel bars, as well as specifications for different types of pavement and joint thicknesses.

A table is also provided, detailing the thickness of pavement and corresponding diameter of dowel bars. For example, if the pavement thickness is 8 (200) or greater, the recommended dowel bar diameter is 1 1/2 (38). The text is clear and the diagrams are informative, providing a comprehensive guide for the installation of these joints.
**SECTION A-A**

(TYPICAL 2-LANE WITH SHOULDERS)

- The 15' (4.5 m) dimension shall be adjusted to 12' (3.6 m) max. when placed adjacent to existing pcc pavement structure so that the joints are in prolongation.

- The 15' (4.5 m) dimension shall be adjusted to 12' (3.6 m) min. to

- Longitudinal sawed joint

- Transverse contraction joint

**Transverse Construction Joint**

- Lane edge or edge of pavement

**Detail of Added Reinforcement**

- For pavement blocks-outs

**General Notes**

- See Standard 420001 for details of joints not shown.
- All dimensions are in inches (millimeters) unless otherwise shown.

**24' (7.2 m) JOINTED PCC PAVEMENT**

**STANDARD 420101-04**
**SECTION A-A**

(TYPICAL 3-LANE, 1-WAY W/ SHOULDERS)

- The 15' (4.5 m) dimension shall be adjusted to 12' (3.6 m) min. to 18' (5.5 m) max. when placed adjacent to existing pcc pavement structure so that the joints are in prolongation.

**PLAN**

- 12 Dowel bars at 12 (300) cts.
- No. 6 (No. 19) Tie bars at 30 (750) cts.
- Longitudinal sawed joint
- Transverse contraction joint
- Joint filler-full depth (typ.)
- Longitudinal key joint (typ.)
- Casting outside limits
- Place casting to grade and fill with full depth concrete after pavement has cured.

**DETAIL OF ADDED REINFORCEMENT FOR PAVEMENT BLOCK-OUTS**

- 2-No. 5x4'-0" (No. 16x1.2 m) reinforcement bars (8 total) placed at pavement mid-depth
- The 15' (4.5 m) dimension shall be adjusted to 12' (3.6 m) min. to 18' (5.5 m) max. when placed adjacent to existing pcc pavement structure so that the joints are in prolongation.

**GENERAL NOTES**

See Standard 420001 for details of joints not shown.

- All dimensions are in inches (millimeters) unless otherwise shown.

**DATE**

1-1-97

**REVISIONS**

January 1, 2008
**MID PANEL DETAIL**

- **Tie bars**: 8 No. 6 (19) Tie bars equally spaced and symmetrical about longitudinal joint drilled and grouted in place.
- **Circular form**: 4'-0" (1.22 m) dia. to be removed before concrete added.
- **No. 6 (19) Inner hoop bar**: 3'-6" (1.1 m) dia. (typ.)
- **No. 6 (19) Outer hoop bar**: 18 (450) long (typ.)

**DETAIL AT TRANSVERSE JOINT**

- **Circular form**: Extend sawcut to edge of circular form.
- **4'-0" (1.22 m) Semi-circular form**: With tangent extended to transverse joint.
- **4 No. 6 (19) Tie bars**: 18 (450) long at fixed side.

**DETAIL NEAR TRANSVERSE JOINT**

- **No. 6 (19) Inner hoop bar**: 6 (100) clearance outer loop to joint (typ.)
- **Continuous No. 6 (19) Inner hoop bar**: 6 (100) clearance outer loop to joint (typ.)

**GENERAL NOTES**

- **Circular form shall be removed prior to drill and grout of tie bars.**
- **Drill and grout is preferred, however tie bars can be poured in place if clearance is provided to outer edge of frame. Maximum 2 (500) clearance.**
- **Shims shall be used to adjust all frames. After adjusting mortar has cured, the shims shall be removed and the voids under the frames filled with nonshrink grout.**
- **Hoop reinforcement shall be one piece construction having a minimum lap length of 24 (600).**

Additional notes include the importance of maintaining proper clearance and the use of shims to adjust frames. The details are designed to prevent movement during the paving operation and ensure correct alignment.
ROUNDOUT FOR SQUARE FRAME & GRATE
AND MANHOLES

- No. 6 (19) Inner hoop reinf.
- No. 6 (19) Outer loop reinf.

Prop, Class S concrete (higher strength concrete may be used if no detrimental shrinkage cracks occur)

Frame

Frame

Sub-Base

No. 5 (16) Support bar

Type 1 or Type 5 Frame and Grate may be used

DETAIL OF REINFORCEMENT
FOR PAVEMENT ROUNDOUT

CAST IN PLACE DETAIL

* Less than 12 (300) formed roundout to be used.
**GENERAL NOTES**

The indicated "A" and "B" grades for the ramp terminal are based on an assumed mainline grade of 0.00%.

See plans for actual grades.

All pavement joints shall be detailed as shown on Standards 420001 and 483001.

See Standard 483001 for ramp shoulder details.

Between Sections A-A and B-B (shaded area), provide a drainage swale and flush inlet to enhance drainage.

When using grades expressed in %, the grade value shall be divided by 100 to obtain vertical offsets.

When radius R is less than 760 ft. (230 m), the acceleration length shall be recalculated.

With a mainline horizontal curve to the left, keep the gore nose dimensions of Sections C-C and D-D as shown. From Section C-C to Section D-D, construct the ramp as a tangent section, and the gore nose of Section B-B shall be a variable width dependent on the radius of the mainline curve. Show a special cross-section on the plans for Section B-B.

With a mainline horizontal curve to the right, keep the gore nose dimensions of Sections D-D, C-C, and B-B as shown, and the edge of the ramp between Sections C-C and B-B is constructed as a compound curve tying Section C-C.

All dimensions are in inches (millimeters) unless otherwise shown.

**DATE**

- **1-1-07**: Revised General notes
- **1-1-08**: Revisions

**ENTRANCE RAMP TERMINAL**

**JOINTED PCC MAINLINE PAVEMENT**

**JOINTED PCC RAMP PAVEMENT ADJACENT TO MAINLINE PAVEMENT**

**STANDARD 420201-07**

(Sheet 1 of 2)
The indicated "A" and "B" grades for the ramp terminal are based on assumed mainline grade of 0.00%.

See plans for actual grades.

All pavement joints shall be detailed as shown on Standards 40001 and 48301.

See Standard 48301 for ramp shoulder details.

Between Sections A-A and B-B (shaded areas), provide a drainage swale and flush inlet to enhance drainage.

When using grades expressed in %, the grade value shall be divided by 100 to obtain vertical offsets.

When radius R1 is less than 760 ft (230 m), the acceleration length of the ramp shall be recalculated.

When radius R1 is greater than or equal to 760 ft (230 m), the acceleration length of the ramp is based on the assumed mainline grade of 0.00%.

Pavement and reinforcement in the ramp area shall be the same as the mainline. Reinforcement shall be placed parallel and perpendicular to the mainline pavement.

References to CRC mainline pavement in this standard shall also be applicable to the ramp base area unless otherwise shown.

No. 6 (No. 19) tie bars at 24 (600) cts. for a distance of 100' (30 m) beginning at the 24 (600) stub. Joint line is longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars at 24 (600) cts.

Account for vertical offsets.

See Standard 48301 for ramp shoulder details.

With a mainline horizontal curve to the right, keep the gore nose dimensions at Sections C-C and D-D as shown, from Section C-C to Section B-B, construct the ramp as a tangent section, and the gore nose at Section B-B shall be variable width dependent on the radius of the mainline curve. Show a special crosssection on the plans for Section B-B.

With a mainline horizontal curve to the right and variable gore nose dimensions at Sections A-A, C-C, and B-B as shown, and the edge of the ramp between Sections C-C and B-B is constructed as a compound curve tying Section C-C. All dimensions are in inches (millimeters) unless otherwise shown.

With a mainline horizontal curve to the right, keep the gore nose dimensions at Sections A-A and B-B as shown, and the edge of the ramp at Sections C-C and D-D is a compound curve tying Section C-C.
CROSS SECTIONS WHEN MAINLINE IS ON TANGENT OR CURVED TO THE RIGHT

CROSS SECTIONS WHEN MAINLINE IS CURVED TO THE LEFT

DETAIL A

DETAIL B
Longitudinal construction joint with No. 6 (No. 19) tie bars spaced at 24 (600) cts. in prolongation with the existing joint in the mainline movement.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced 24 (600) cts. for a distance of 100'-0" (30 m) beginning of the 12 (300) stub. Joint line is parallel to ramp baseline.

Transverse construction joint (undoweled) or optional transverse construction joint.

Transverse contraction joint (undoweled).

Longitudinal keyed joint (without tie bars).

Neutral area.

Neutral area.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced at 24 (600) cts. in prolongation with the existing joint in the mainline movement.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced 24 (600) cts. for a distance of 100'-0" (30 m) beginning of the 12 (300) stub. Joint line is parallel to ramp baseline.

Transverse construction joint (undoweled) or optional transverse construction joint.

Transverse contraction joint (undoweled).

Longitudinal keyed joint (without tie bars).

Neutral area.

Neutral area.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced at 24 (600) cts. in prolongation with the existing joint in the mainline movement.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced 24 (600) cts. for a distance of 100'-0" (30 m) beginning of the 12 (300) stub. Joint line is parallel to ramp baseline.

Transverse construction joint (undoweled) or optional transverse construction joint.

Transverse contraction joint (undoweled).

Longitudinal keyed joint (without tie bars).

Neutral area.

Neutral area.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced at 24 (600) cts. in prolongation with the existing joint in the mainline movement.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced 24 (600) cts. for a distance of 100'-0" (30 m) beginning of the 12 (300) stub. Joint line is parallel to ramp baseline.

Transverse construction joint (undoweled) or optional transverse construction joint.

Transverse contraction joint (undoweled).

Longitudinal keyed joint (without tie bars).

Neutral area.

Neutral area.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced at 24 (600) cts. in prolongation with the existing joint in the mainline movement.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced 24 (600) cts. for a distance of 100'-0" (30 m) beginning of the 12 (300) stub. Joint line is parallel to ramp baseline.

Transverse construction joint (undoweled) or optional transverse construction joint.

Transverse contraction joint (undoweled).

Longitudinal keyed joint (without tie bars).

Neutral area.

Neutral area.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced at 24 (600) cts. in prolongation with the existing joint in the mainline movement.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced 24 (600) cts. for a distance of 100'-0" (30 m) beginning of the 12 (300) stub. Joint line is parallel to ramp baseline.

Transverse construction joint (undoweled) or optional transverse construction joint.

Transverse contraction joint (undoweled).

Longitudinal keyed joint (without tie bars).

Neutral area.

Neutral area.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced at 24 (600) cts. in prolongation with the existing joint in the mainline movement.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced 24 (600) cts. for a distance of 100'-0" (30 m) beginning of the 12 (300) stub. Joint line is parallel to ramp baseline.

Transverse construction joint (undoweled) or optional transverse construction joint.

Transverse contraction joint (undoweled).

Longitudinal keyed joint (without tie bars).

Neutral area.

Neutral area.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced at 24 (600) cts. in prolongation with the existing joint in the mainline movement.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced 24 (600) cts. for a distance of 100'-0" (30 m) beginning of the 12 (300) stub. Joint line is parallel to ramp baseline.

Transverse construction joint (undoweled) or optional transverse construction joint.

Transverse contraction joint (undoweled).

Longitudinal keyed joint (without tie bars).

Neutral area.

Neutral area.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced at 24 (600) cts. in prolongation with the existing joint in the mainline movement.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced 24 (600) cts. for a distance of 100'-0" (30 m) beginning of the 12 (300) stub. Joint line is parallel to ramp baseline.

Transverse construction joint (undoweled) or optional transverse construction joint.

Transverse contraction joint (undoweled).

Longitudinal keyed joint (without tie bars).

Neutral area.
DETAILS FOR DRAINAGE IN NEUTRAL AREA

GENERAL NOTES

The initial ramp grade (G) is based on the line generated through the PI that is 105'-132 mi (32 m) past Section C-C and the point created by the vertical offset at Section D-D.

See plans for actual grades.

All pavement joints shall be detailed as shown on Standards 420001 and 483001.

See Standard 483001 for ramp shoulder details.

In the neutral area, provide a swale and flush inlet to enhance drainage.

When using grades expressed in %, the grade values shall be divided by 100 to obtain vertical offsets.

Where an exit ramp terminal is proposed adjacent to a mainline horizontal curve, construct the edge of the terminal by using offset widths, and for the terminal segment downstream from Section C-C to R, construct the ramp as a 141' (43 m) tangent section.

All dimensions are in inches (millimeters) unless otherwise shown.

EXIT RAMP TERMINAL

JOINTED PCC RAMP PAVEMENT

ADJACENT TO JOINTED PCC MAINLINE PAVEMENT

STANDARD 420301-04

1. Vertical offset values are calculated and based on the right edge of mainline pavement at 0.2 % grade.
2. The vertical offsets of these points are above the mainline pavement and lie on an upgrade in relationship to the mainline grade.
3. S.E. = Super-elevation Rate

### Vertical offsets in inches for right edge of ramp, when R = 1760

<table>
<thead>
<tr>
<th>Sections</th>
<th>Mainline on Tangent</th>
<th>Mainline Curved Right</th>
<th>Mainline Curved Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>- 0.8</td>
<td>- 1.5</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>- 3.0</td>
<td>- 1.5</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>- 3.0</td>
<td>- 1.5</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>- 15.4</td>
<td>- 15.4</td>
<td>- 15.4</td>
</tr>
</tbody>
</table>

### Vertical offsets in mm for right edge of ramp, when R = 1760

<table>
<thead>
<tr>
<th>Sections</th>
<th>Mainline on Tangent</th>
<th>Mainline Curved Right</th>
<th>Mainline Curved Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>- 0.2 cm</td>
<td>- 3.8 cm</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>- 0.7 cm</td>
<td>- 3.8 cm</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>- 0.7 cm</td>
<td>- 3.8 cm</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>- 39.2 mm</td>
<td>- 39.2 mm</td>
<td>- 39.2 mm</td>
</tr>
</tbody>
</table>

### DETAILS FOR DRAINAGE IN NEUTRAL AREA

- Provide a swale and flush inlet to enhance drainage.
- Where an exit ramp terminal is proposed adjacent to a mainline horizontal curve, construct the edge of the terminal by using offset widths, and for the terminal segment downstream from Section C-C to R, construct the ramp as a 141' (43 m) tangent section.
**PLAN**

- **Joint Line**: Parallel to ramp baseline.
- **Vertical Offset Range for Ramp Right Edge when Mainline is Curved to the Left**
  - Min. Cross Slope: 4%
  - Max. Cross Slope: 12%
- **Vertical Offset Range for Ramp Right Edge when Mainline is Curved to the Right**
  - Min. Cross Slope: 1.5%
  - Max. Cross Slope: 5%

**PROFILE**

- **Variable Grade when R > 192 (4900)**
- **Constant Grade when Mainline is on Tangent**

- **Range of Initial Ramp Grades when Mainline is Curved to the Right and R ≤ 765 (230 m)**
  - Min. Cross Slope: 1.5%
  - Max. Cross Slope: 5%

**Link**

- **Transverse Expansion Joint**
  - Concrete grade: 48.95'

**Exit Ramp Terminal**

**Adjacent to CRC Mainline**

**Jointed PCC Ramp Pavement**

**References**

- Refer to sheet 3 for additional details.
- See Sheet 3 for General Notes.
DETAILS FOR DRAINAGE IN NEUTRAL AREA

Vertical offsets in inches for right edge of ramp, when R = 1760:

<table>
<thead>
<tr>
<th>Sections</th>
<th>Molding on Tangent</th>
<th>Molding Curve Right</th>
<th>Molding Curve Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>- 0.8</td>
<td>S.E. % ML x 12</td>
<td>S.E. % ML x 12</td>
</tr>
<tr>
<td>B</td>
<td>+ 3.0</td>
<td>S.E. % ML x 12</td>
<td>S.E. % ML x 12</td>
</tr>
<tr>
<td>C</td>
<td>- 15.4</td>
<td>S.E. % ML x 12</td>
<td>S.E. % ML x 12</td>
</tr>
<tr>
<td>D</td>
<td>+ 15.4</td>
<td>S.E. % ML x 12</td>
<td>S.E. % ML x 12</td>
</tr>
</tbody>
</table>

Vertical offsets in mm for right edge of ramp, when R = 4900:

<table>
<thead>
<tr>
<th>Sections</th>
<th>Molding on Tangent</th>
<th>Molding Curve Right</th>
<th>Molding Curve Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>- 5</td>
<td>S.E. % ML x 300</td>
<td>S.E. % ML x 300</td>
</tr>
<tr>
<td>B</td>
<td>+ 74</td>
<td>S.E. % ML x 4900</td>
<td>S.E. % ML x 4900</td>
</tr>
<tr>
<td>C</td>
<td>- 74</td>
<td>S.E. % ML x 4900</td>
<td>S.E. % ML x 4900</td>
</tr>
<tr>
<td>D</td>
<td>- 392</td>
<td>S.E. % ML x 4900</td>
<td>S.E. % ML x 4900</td>
</tr>
</tbody>
</table>

1. Vertical offset values are calculated and based on the right edge of mainline pavement at 0.2% grade.
2. The vertical offsets of these points are above the mainline pavement and lie on an upgrade in relationship to the mainline grade.
3. S.E. = Superelevation Rate

GENERAL NOTES

The initial ramp grade (G) is based on the line generated through the PI that is 100' (32 m) past Section C-C and the point defined by the vertical offset at Section D-D.

See plans for actual grades.

All pavement joints shall be detailed as shown on Standards 400001 and 483001.

See Standard 483001 for ramp shoulder details.

In the neutral area, provide a swale and flush inlet to enhance drainage.

When using grades expressed in %, the grade values shall be divided by 100 to obtain vertical offsets.

Where an exit ramp terminal is proposed adjacent to a mainline horizontal curve, construct the edge of the terminal by using offset widths, and for the terminal segment downstream from Section C-C to R, construct the ramp as a 141' (43 m) tangent section.

All dimensions are in inches (millimeters) unless otherwise shown.

EXIT RAMP TERMINAL
JOINTED PCC RAMP PAVEMENT
ADJACENT TO CRC MAINLINE PAVEMENT

STANDARD 420306-06
**BRIDGE APPROACH PAVEMENT CONNECTOR (PCC)**

- Bridge Approach: 6'-0" (1.8 m)
- Existing Shoulder
- Approach Footing
- Longitudinal Sawn Joint
- Existing PCC Pavement
- Tie bars at 12" (300) cts.
- No. 10 x 18 (No. 32 x 460)
- Match Existing Subbase
- Proposed PCC Connector Pavement
- Existing Shoulder
- Pay Width of PCC Bridge
- See DETAIL A

**SECTION G-G - RIGID PAVEMENT**

- Bridge approach
- See Bridge Plans for details.
- 10'-0" (3 m) max., variable slope
- Proposed PCC Connector Pavement
- Existing Pavement
- Existing Subbase
- Tie bars at 12" (300) cts.

**BRIDGE APPROACH PAVEMENT CONNECTOR (FLEXIBLE)**

- Bridge Approach: 6'-0" (1.8 m)
- Existing Shoulder
- Approach Footing
- Existing Flexible Pavement
- Existing Shoulder

**SECTION G-G - FLEXIBLE PAVEMENT**

- Proposed Flexible Pavement
- Existing Flexible Pavement
- Hot mix asphalt
- See DETAIL A
- 10'-0" (3 m) max., variable slope

**DETAIL A**
GENERAL NOTES

See Standard 420001 for joint details not shown. All dimensions are in inches (millimeters) unless otherwise shown.

1. Cross sections are for guide purpose only. Check calculations with structural engineer.
2. All dimensions are in inches (millimeters) unless otherwise shown.
3. English (metric). Switched units to terminology.

SECTION A-A

For PCC pavement

Thickness some as adjacent pavement

Ties 8'-6" (2.6 m) min.

SECTION B-B

For PCC base course with HMA surface

Subbase (when used)

Thickness of HMA surface

Transverse construction joint or transverse contraction joint

Transverse construction joint or transverse contraction joint

SUBGRADE

Improved subbase

Ties

SECTION A-A

FOR PCC BASE COURSE WITH HMA SURFACE

GENERAL NOTES

See Standard 420001 for joint details not shown. All dimensions are in inches (millimeters) unless otherwise shown.

1. Cross sections are for guide purpose only. Check calculations with structural engineer.
2. All dimensions are in inches (millimeters) unless otherwise shown.
3. English (metric). Switched units to terminology.

SECTION A-A

For PCC pavement

Thickness some as adjacent pavement

Ties 8'-6" (2.6 m) min.

SECTION B-B

For PCC base course with HMA surface

Subbase (when used)

Thickness of HMA surface

Transverse construction joint or transverse contraction joint

Transverse construction joint or transverse contraction joint

SUBGRADE

Improved subbase

Ties
SECTION A-A
(TYPICAL 2-LANE WITH SHOULDERS)

PLAN

Pavement fabric

LONGITUDINAL SAWED JOINT

Pavement fabric

Transverse contraction joint

Subbase

Slope 1.5%

PCC PAVEMENT

24' (7.2 m)

STANDARD 420601-05

GENERAL NOTES
See Standard 420001 for details not shown.


All dimensions are in inches (millimeters) unless otherwise shown.

DATE
REVISIONS
3-1-05
Switched units to English metrics.

8-1-05
Added bar supports to transverse contr. joint detail.

24' (7.2 m)

PCC PAVEMENT

STANDARD 420601-05
**GENERAL NOTES**

Pavement block-outs shall be at least 24' (600) from contraction joints.

Pavement fabric which is taped longitudinally shall have a minimum lap of 6 (150).

Pavement fabric may be positioned with the transverse wires on top or bottom of the longitudinal wires.

All dimensions are in inches (millimeters) unless otherwise shown.

**PAVEMENT FABRIC**

**DATE**

**REVISIONS**

- Inserted units of cm
- English metric
- Minor corrections of joint information

**STANDARD 420701-02**
**PCC Shoulder**

- **Concrete Pad**
  - 10'-0" (3.0 m) long at 18 (450) cts.
  - 9'-6" (2.85 m) long at 12 (300) cts.
  - 24- No. 5 (No. 16) Longitudinal bars
  - 7- No. 4 (No. 13) Transverse bars

- **Extended Steel**
  - to be blocked up with wood blocking.
  - 5'-0" (1.5 m)
  - 7'-0" (2.1 m)

- **Header Board**
  - 36 (900)
  - 3 (75)

- **Concrete Pad Slope**
  - shall match pavement slope.

- **Pavement Reinforcement**
  - when pavement is extended
  - Lap reinforcing steel 36 (900)

- **End of Stabilized Subbase (HMA required)**
  - Stabilized Subbase (300)

- **Transverse Terminal Joint**
  - Tie bars at 30 (750) cts.
  - Continuously reinforced pcc pavement

- **Transverse Construction Joint**
  - Pavement reinforcement
  - 9"-6" (2.85 m) long at 12 (300) cts.
  - 24- No. 5 (No. 16) Longitudinal bars

- **Pavement Slope**
  - shall match pavement slope.
  - Concrete Pad Slope

**General Notes**

- Sealant components for the wide flange beam terminal joint shall be as follows:
- The sealant shall be Dow Corning 888 Silicone Highway Joint Sealant. The tape shall be Polyethylene Tape No. 40. The primer, used on the metal only, shall be Dow Corning 1200. At the Contractor's option the joint may be sealed as shown in the optional groove detail.

- Dow Corning 1200. At the Contractor's option the joint may be sealed as shown in the optional groove detail.

- Sealant components for the wide flange beam terminal joint shall be as follows:
- The sealant shall be Dow Corning 888 Silicone Highway Joint Sealant. The tape shall be Polyethylene Tape No. 40. The primer, used on the metal only, shall be Dow Corning 1200. At the Contractor's option the joint may be sealed as shown in the optional groove detail.

-选项: Sealant components for the wide flange beam terminal joint shall be as follows:
- The sealant shall be Dow Corning 888 Silicone Highway Joint Sealant. The tape shall be Polyethylene Tape No. 40. The primer, used on the metal only, shall be Dow Corning 1200. At the Contractor's option the joint may be sealed as shown in the optional groove detail.
WIDE FLANGE BEAM TERMINAL JOINT

MATERIALS REQUIRED FOR ONE TRANSVERSE TERMINAL JOINT COMPLETE

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>SQUARE YARDS (M²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>266.7 (216)</td>
</tr>
<tr>
<td>Reinforcement bars, lbs.</td>
<td>1635 (740)</td>
</tr>
<tr>
<td>Pavement reinforcement</td>
<td>15.3 (10.8)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CUBIC YARDS (M³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel beam</td>
<td>0.19 (0.15)</td>
</tr>
<tr>
<td>End plates</td>
<td>0.07 (0.06)</td>
</tr>
<tr>
<td>Weight includes beam, end plates, stiffener plates and studs.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>LBS. (KG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete reinforcement</td>
<td>0.13 (0.06)</td>
</tr>
<tr>
<td>Reinforcement bars</td>
<td>0.14 (0.06)</td>
</tr>
<tr>
<td>Pavement reinforcement</td>
<td>0.06 (0.03)</td>
</tr>
<tr>
<td>Weight includes beam, end plates, stiffener plates and studs.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>LBS. (KG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete reinforcement</td>
<td>266.7 (216)</td>
</tr>
<tr>
<td>Reinforcement bars</td>
<td>1635 (740)</td>
</tr>
<tr>
<td>Pavement reinforcement</td>
<td>15.3 (10.8)</td>
</tr>
<tr>
<td>Weight includes beam, end plates, stiffener plates and studs.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>LBS. (KG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete reinforcement</td>
<td>266.7 (216)</td>
</tr>
<tr>
<td>Reinforcement bars</td>
<td>1635 (740)</td>
</tr>
<tr>
<td>Pavement reinforcement</td>
<td>15.3 (10.8)</td>
</tr>
<tr>
<td>Weight includes beam, end plates, stiffener plates and studs.</td>
<td></td>
</tr>
</tbody>
</table>
Steel beam and concrete sleeper slab shall be motion pavement slip, cut and remove sufficient material from web to obtain the required pavement gross cross section. Butt web and grind smooth the web and flange seam.

Bend top flange of beam.

35'-11½ (10.79 m) Beam (See Table)

Bar No. | Size | Length | Shape
--- | --- | --- | ---
36 & 4 | No. 4 | 19'-9½ (5.99 m) | A
19 & 29 | No. 5 | 35'-8½ (10.76 m) | B
36 & 4 | No. 6 | 8'-6½ (2.60 m) | C

**Materials Required For One Wide Flange Beam Terminal Joint Complete**

<table>
<thead>
<tr>
<th>Bar No.</th>
<th>Size</th>
<th>Length</th>
<th>Shape</th>
<th>Weight</th>
</tr>
</thead>
</table>
| 0 | 36 & 4 | 19'-9½ (5.99 m) | A | 113.8 (51.5)
| 0 | 19 & 29 | 35'-8½ (10.76 m) | B | 264.0 (119.9)
| 0 | 36 & 4 | 8'-6½ (2.60 m) | C | 17.0 (7.7)

Concrete, cu. yds. (m³)
Reinforcement Bars, lbs. (kg)
Concrete, cu. yds. (m³)

*Weight includes beam, end plates, stiffener plates and studs.

Pavement, sq. yds. (m²)
Reinforcement Bars, lbs. (kg)
Structural Steel, lbs. (kg)

**Materials Required For One Wide Flange Beam Terminal Joint Complete**

<table>
<thead>
<tr>
<th>Bar No.</th>
<th>Size</th>
<th>Length</th>
<th>Shape</th>
<th>Weight</th>
</tr>
</thead>
</table>
| 0 | 36 & 4 | 19'-9½ (5.99 m) | A | 113.8 (51.5)
| 0 | 19 & 29 | 35'-8½ (10.76 m) | B | 264.0 (119.9)
| 0 | 36 & 4 | 8'-6½ (2.60 m) | C | 17.0 (7.7)

Concrete, cu. yds. (m³)
Reinforcement Bars, lbs. (kg)
Concrete, cu. yds. (m³)

*Weight includes beam, end plates, stiffener plates and studs.

Pavement, sq. yds. (m²)
Reinforcement Bars, lbs. (kg)
Structural Steel, lbs. (kg)

**Materials Required For One Wide Flange Beam Terminal Joint Complete**

<table>
<thead>
<tr>
<th>Bar No.</th>
<th>Size</th>
<th>Length</th>
<th>Shape</th>
<th>Weight</th>
</tr>
</thead>
</table>
| 0 | 36 & 4 | 19'-9½ (5.99 m) | A | 113.8 (51.5)
| 0 | 19 & 29 | 35'-8½ (10.76 m) | B | 264.0 (119.9)
| 0 | 36 & 4 | 8'-6½ (2.60 m) | C | 17.0 (7.7)

Concrete, cu. yds. (m³)
Reinforcement Bars, lbs. (kg)
Concrete, cu. yds. (m³)

*Weight includes beam, end plates, stiffener plates and studs.

Pavement, sq. yds. (m²)
Reinforcement Bars, lbs. (kg)
Structural Steel, lbs. (kg)

**Materials Required For One Wide Flange Beam Terminal Joint Complete**

<table>
<thead>
<tr>
<th>Bar No.</th>
<th>Size</th>
<th>Length</th>
<th>Shape</th>
<th>Weight</th>
</tr>
</thead>
</table>
| 0 | 36 & 4 | 19'-9½ (5.99 m) | A | 113.8 (51.5)
| 0 | 19 & 29 | 35'-8½ (10.76 m) | B | 264.0 (119.9)
| 0 | 36 & 4 | 8'-6½ (2.60 m) | C | 17.0 (7.7)

Concrete, cu. yds. (m³)
Reinforcement Bars, lbs. (kg)
Concrete, cu. yds. (m³)

*Weight includes beam, end plates, stiffener plates and studs.

Pavement, sq. yds. (m²)
Reinforcement Bars, lbs. (kg)
Structural Steel, lbs. (kg)

**Materials Required For One Wide Flange Beam Terminal Joint Complete**

<table>
<thead>
<tr>
<th>Bar No.</th>
<th>Size</th>
<th>Length</th>
<th>Shape</th>
<th>Weight</th>
</tr>
</thead>
</table>
| 0 | 36 & 4 | 19'-9½ (5.99 m) | A | 113.8 (51.5)
| 0 | 19 & 29 | 35'-8½ (10.76 m) | B | 264.0 (119.9)
| 0 | 36 & 4 | 8'-6½ (2.60 m) | C | 17.0 (7.7)

Concrete, cu. yds. (m³)
Reinforcement Bars, lbs. (kg)
Concrete, cu. yds. (m³)

*Weight includes beam, end plates, stiffener plates and studs.

Pavement, sq. yds. (m²)
Reinforcement Bars, lbs. (kg)
Structural Steel, lbs. (kg)
**GENERAL NOTES**

- See Standard 420001 for details of pavement reinforcement.
- See Standards 420001 and 420401 for joint details not shown.
- All dimensions are in inches (millimeters) unless otherwise shown.

**TRANSVERSE TERMINAL JOINT**

**SECTION B-B**

- Extended steel to be blocked up with wood blocking.
- Entire top surface shall be steel trowel finished.

- Lap reinforcing steel 36 (900) when pavement is extended.
- 3'-6" (1.1 m) min. from the end of the nearest longitudinal bar lap (typ).

**TRANSVERSE CONSTRUCTION JOINT**

- Tie bars at 30 (750) cts.
- Concrete pad slope shall match pavement slope.

- Concrete pad slope and match pavement slope.

**SECTION A-A**

(TYPICAL 2-LANE WITH SHOULDERS)

- Continuous reinforced pcc pavement
- 12 Dowel bars at 12 (300) cts.
- Fori'll dowel when placed adjacent to existing pcc pavement

**PLAN**

- 2 050 Transverse expansion joint
- 12 Dowel bars at 12 (300) cts.

**NOTES:**

- See Standard 420001 for details of pavement reinforcement.
- See Standards 420001 and 420401 for joint details not shown.
- All dimensions are in inches (millimeters) unless otherwise shown.
**Materials Required for (1) One Pavement Reinforcement**

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
<th>Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td>132</td>
<td>No. 8 (No. 25)</td>
<td>14'-0&quot; (4.25 m)</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>18</td>
<td>No. 5 (No. 16)</td>
<td>24'-0&quot; (7.37 m)</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>132</td>
<td>No. 5 (No. 16)</td>
<td>20'-0&quot; (6.09 m)</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>28</td>
<td>No. 4 (No. 13)</td>
<td>11'-9&quot; (3.57 m)</td>
<td></td>
</tr>
</tbody>
</table>

Concrete, cu. yds. (m^3):
- 64.0 (48.5)
- 83.72 (60.0)

Reinforcing Bars, lbs. (kg):
- 144 (120)

Improved Subgrade, sq. yds. (m^2):
- 162 (120)

**Section at LUG W**
- 44 a bars at 6½ (165) cts.
- Bend in fab to fit.

**Section at LUG X**
- a bars at 6½ (165) cts.

**Section at LUG Y**
- a bars at 6½ (165) cts.
- Bend top portion in field as shown.

**Notes**
- Improved subgrade, if applicable.
- 10 mil (0.25) Polyethylene bond breaker.
- 16, 000 (New construction only)
- 12, 000 (Improved subgrade)
- (When applicable)

**MATERIALS REQUIRED FOR (1) ONE LUG SYSTEM**

- (Excluding Pavement Concrete and Pavement Reinforcement)

**Bar**
- a: 132 No. 8 (No. 25) 14'-0" (4.25 m)
- b: 18 No. 5 (No. 16) 24'-0" (7.37 m)
- d: 132 No. 5 (No. 16) 20'-0" (6.09 m)
- a: 28 No. 4 (No. 13) 11'-9" (3.57 m)

**Concrete**
- 64.0 (48.5)

**Reinforcing Bars**
- 83.72 (60.0)

**Concrete Pad**
- 144 (120)

**Improved Subgrade**
- 162 (120)

**Standard**

**CRC Pavement**

**With LUG System**

**Sheet 1 of 2**
**GENERAL NOTES**

- See Standard 420001 for details of pavement reinforcement.
- See Standards 420001G and 420011 for joint details not shown.
- All dimensions are in inches (millimeters) unless otherwise shown.

**SECTION A-A**  
**TYPICAL 3-LANE, 1-WAY WITH SHOULDERS**

**SECTION B-B**  
**TRANSVERSE TERMINAL JOINT**

**TRANSVERSE CONSTRUCTION JOINT**

**PLAN**

**CRC PAVEMENT WITH LUG SYSTEM**

**STANDARD 421206-06**
**Lug System**

**Materials Required for (1) One**

<table>
<thead>
<tr>
<th>Bar No.</th>
<th>Size</th>
<th>Length</th>
<th>Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>18</td>
<td>18</td>
<td>8</td>
</tr>
<tr>
<td>b</td>
<td>330</td>
<td>330</td>
<td>3</td>
</tr>
<tr>
<td>c</td>
<td>330</td>
<td>330</td>
<td>1</td>
</tr>
</tbody>
</table>

- 18 a bars of 6'/3" (160) cts.
- Bend top portion in field as shown.
- Improved Subgrade, sq. yds. (m²) 36 (900)
- Concrete Pad, sq. yds. (m²) 24 (600)
- Reinforcing Bars, lbs. (kg) 12,550 (5695)
- Concrete, cu. yds. (m³) 96.0 (73.4)
- Bond breaker, 10 mil (0.25) Polyethylene

**Section At Lug W**

- 66 a bars of 6'/3" (160) cts.
- Bend in field to fit.
- 66 a bars of 6'/3" (160) cts.

**Section At Lug X**

- 66 a bars of 6'/3" (160) cts.
- Bend top portion in field as shown.

**Section At Lug Y**

- 10 mil (0.25) Polyethylene bond breaker

**Bar a**

- 4'-0" (1.2 m)
- 6'-0" (1.8 m)
- Concrete Pad

**Bar b**

- 35'6" (10.8 m)
- CRC Pavement with Lug System

**Standard 421206-06**

*Illinois Department of Transportation*

*Engineer of Policy and Procedures*

*Engineer of Design and Environment*

*Approved January 1, 2008*

*Issued 1-1-97*
Ramps in landscaped area

Setback ≤ 5'

Section A-A


Section B-B


General Notes

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

Where 1:50 maximum slope is shown, 1:64 is preferred.

See Standard 606001 for details of depressed curb adjacent to curb ramps.

All dimensions are in inches (millimeters) unless otherwise shown.

Perpendicular Curb Ramps for Sidewalks

Standard 424001-07

Date: 1-1-13

Revisions:

1-1-12

Completely revised and renamed standard.

Dimension: V:H

See DETAIL A
PERPENDICULAR CURB RAMPS FOR SIDEWALKS

STANDARD 424001-07

SECTION C-C

\( 1 \) Upper landing not required for ramp slopes flatter than 1:20.
RAMP IN LANDSCAPED AREA

- Sidewalk width: 5' (1.52 m) typical, 4' (1.22 m) min.
- Upper landing: 3' (0.91 m) typical, 2.5' (0.76 m) min.
- Ramp width: 5' (1.52 m) typical, 4' (1.22 m) min.
- Ramp length: 8' (2.44 m) typical, 6' (1.83 m) min.
- Ramp slope: 1:50 max., 1:40 max.
- Crosswalk: 4'x4' (1.22x1.22 m) min.
- Clear maneuvering area: 4'x4' (1.22x1.22 m) min.
- Upper landing: 5'x5' (1.52x1.52 m) min.
- Upper landing: 6'x6' (1.83x1.83 m) min.
- Upper landing: 7'x7' (2.13x2.13 m) min.
- Upper landing: 8'x8' (2.44x2.44 m) min.

RAMP IN PAVED AREA

- Upper landing: 15' (4.57 m) max.
- Ramp width: 15' (4.57 m) max.
- Ramp length: 20' (6.1 m) max.
- Ramp slope: 1:12 max., 1:8 max.
- Crosswalk: 4'x4' (1.22x1.22 m) min.
- Clear maneuvering area: 4'x4' (1.22x1.22 m) min.
- Upper landing: 5'x5' (1.52x1.52 m) min.
- Upper landing: 6'x6' (1.83x1.83 m) min.
- Upper landing: 7'x7' (2.13x2.13 m) min.
- Upper landing: 8'x8' (2.44x2.44 m) min.

GENERAL NOTES

- This Standard shall only be used for curb radii of 20 ft. (6.1 m) or greater.
- All dimensions are in inches (millimeters) unless otherwise shown.
- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.
- See Standard 606001 for details of depressed curb adjacent to curb ramp.
- All dimensions are in inches (millimeters) unless otherwise shown.

STANDARD 424006-01
**General Notes**

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

Where 1:50 maximum slope is shown, 1:64 is preferred.

See Standard 606001 for details of depressed curb adjacent to curb ramps.

All dimensions are in inches (millimeters) unless otherwise shown.

---

**Parallelogram Mid-Block Curb Ramp**

- Upper 4' (1.22 m) min. side flare where applicable.
- Upper landing 4' (1.22 m) min.
- Lower landing 4' (1.22 m) min.
- Face of building, where applicable.

**Perpendicular Mid-Block Curb Ramp**

- Upper landing(s) not required for ramp slopes flatter than 1:12.
- Lower landing(s) not required for ramp slopes flatter than 1:20.

**SECTION A-A**

- Upper landing(s) not required for ramp slopes flatter than 1:12.
- Upper landing(s) not required for ramp slopes flatter than 1:20.

**SECTION B-B**

- Upper landing(s) not required for ramp slopes flatter than 1:12.
- Upper landing(s) not required for ramp slopes flatter than 1:20.

**SECTION C-C**

- Upper landing(s) not required for ramp slopes flatter than 1:12.
- Upper landing(s) not required for ramp slopes flatter than 1:20.
DEPRESSED CORNER

SECTION A-A

SECTION B-B

DETAIL A

SIDE CURB DETAIL

GENERAL NOTES

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement ratio.

Where 1:50 maximum slope is shown, 1:64 is preferred.

See Standard 606001 for details of depressed curb adjacent to curb ramps.

All dimensions are in inches (millimeters) unless otherwise shown.
SECTION A-A

Detectable warning

Depressed curb and gutter

Variable

See DETAIL A

GENERAL NOTES

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement type.

Where 1:50 maximum slope is shown, 1:64 is preferred.

See Standard 606001 for details of depressed curb adjacent to curb ramp.

All dimensions are in inches (millimeters) unless otherwise shown.
GENERAL NOTES

When patching two adjacent lanes in one operation, the longitudinal joint shall be a longitudinal sawed joint as detailed on Standard 420001; however, the groove may be either preformed or sawed. All dimensions are in inches (millimeters) unless otherwise shown.

DATE

REVISIONS

CLASS A PATCHES

STANDARD 442001-04
Edge of lane

No. 6 (No. 19) rebar tied to longitudinal rebar.

Transverse rebar will be tied to longitudinal rebar.

Edge of lane

Transverse rebar will extend to outer longitudinal rebar while providing a minimum 3 (75) clearance from existing pavement edge.

Transverse rebar will be tied to the bottom of the longitudinal rebar.

Shoulder removal

2 (50) min. cl.

Existing pav't

Support chair

Subbase

2 (50) min. cl.

Existing pav't

Class A patches

Sheer: 2 of 2

Standard 442001-04

* Every 3rd intersection must be tied.

** When the minimum clearance cannot be obtained with the transverse bar on top then the transverse rebar shall be tied to the bottom of the longitudinal rebar.

*** Variables where $S_1$ and $S_2$ are 2½ (65) min. and 12 (300) max, $D_1 = 205/1$ and $D_2 = 205/1$. 
12' (3.6 m) WIDE LANES

12' (3.6 m) WIDE LANES

14' (4.2 m) WIDE RAMP

16' (4.8 m) WIDE RAMP

CENTERLINE JOINT

GENERAL NOTES

The transverse joints for Class B patches shall align with joints or cracks in the adjacent lane whenever possible.

See Standard 420701 for details of pavement fabric. All dimensions are in inches (millimeters) unless otherwise shown.

CLASS B PATCHES

STANDARD 442101-07
**CLASS B PATCHES**

**SEALING DETAIL**

**METHOD I**

*Without Resurfacing*  

- 18 (450) Long dowel bars anchored into existing pavement at 12 (300) cts.  
- Tie bars anchored into existing pavement at 12 (300) cts.

**METHOD II**

*With Resurfacing*  

- Traffic

*When re-establishing a transverse expansion joint on a two-lane, two-way road, reverse the orientation of the dowel bars with respect to traffic for one of the patches such that the joint will be continuous across both lanes.*
Class C and D Patches

Class C

- Longitudinal joint shall be as detailed on Standard 420001, except
  - tie bars are not required for patches 20'-0" (6.0 m) or less in length.

- Note: Existing tie bars shall be either cut or removed. Marginal bars shall be cut.

Class D

- Longitudinal joint shall be as detailed on Standard 420001, except
  - tie bars are not required for patches 20'-0" (6.0 m) or less in length.

- Note: Existing tie bars shall be either cut or removed. Marginal bars shall be cut.

All dimensions are in inches (millimeters).
SHOULDER FOR TANGENT PAVEMENT

When the superelevation rate of the pavement is between 0% and 4%, the shoulder shall be sloped at 4%. When the superelevation rate of the pavement exceeds 4%, the shoulder shall be sloped so that the algebraic difference between pavement and shoulder will not be greater than 8%.

SHOULDER FOR SUPERELEVATED PAVEMENT (OUTSIDE OF CURVE)

Variable slope

Slope shall be the same as the superelevation rate but not less than 4%.

SHOULDER FOR SUPERELEVATED PAVEMENT (INSIDE OF CURVE)

Variable slope

GENERAL NOTES

Except as noted or shown, the dimensions and notes specified for the shoulder of tangent pavement are typical for the shoulders of superelevated pavement.

All dimensions are in inches (millimeters) unless otherwise shown.
SHOULDER FOR TANGENT PAVEMENT

When the plans specify the shoulder to be stabilized full width, the HMA shall be extended to this line.

SHOULDER FOR SUPERELEVATED PAVEMENT

- Outside of Curve
- Inside of Curve

SHOULDER FOR SUPERELEVATED PAVEMENT

When the plans specify the shoulder to be stabilized full width, the HMA shall be extended to this line.

GENERAL NOTES

- Except as noted or shown the dimensions and notes specified for the shoulder of tangent pavement are typical for the shoulders of superelevated pavement.
- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).
- All dimensions are in inches (millimeters) unless otherwise stated.
HMA SHOULDER STRIP AND
AGGREGATE WEDGE WITH WIDENING
(Cross-section A)

HMA SHOULDER STRIP AND
AGGREGATE WEDGE WITH RESURFACING
(Cross-section B)

COLD MILLING AND/OR RESURFACING OF
EXISTING PAVEMENT WITH SHOULDER STRIPS
(Cross-section C)

COLD MILLING AND/OR RESURFACING OF
EXISTING PAVEMENT WITH SHOULDER STRIPS
(Cross-section D)

All dimensions are in inches (millimeters) unless otherwise shown.

English (metric).

Switched units to English (metric).

Switched to Hot-Mix Asphalt (HMA) terminology.
HMA SHOULDER AND AGGREGATE
WEDGE WITH WIDENING
(Cross-section E)

HMA SHOULDER AND AGGREGATE
WEDGE WITH RESURFACING
(Cross-section F)

HMA AND AGGREGATE
SHOULDS WITH WIDENING
(Cross-section G)

HMA AND AGGREGATE SHOULDS
WITH RESURFACING
(Cross-section H)
SHOULDER FOR TANGENT PAVEMENT

- Shoulder width
- Paved width
- See Note 2
- Aggregate shoulder Type 3 (typ.)

SHOULDER FOR SUPERELEVATED PAVEMENT

- Outside of curve
- Shoulder slope
- Shoulder shall be the same as the superelevation rate but not less than 4%.
- Slope shall be straight at 4% until the superelevation rate exceeds 8%, at which point the shoulder slope shall be stepped down at this line to provide a 6" (150) minimum thickness.

SHOULDER FOR SUPERELEVATED PAVEMENT

- Inside of curve

NOTES

Note 1: Does not apply when subsurface drains are installed.

Note 2: When the subbase is not removed, this thickness will vary with the thickness of pavement, extended length of subbase, and the slope of pavement. When the thickness is less than 6" (150), the paved shoulder shall be stepped down at this line to provide a 6" (150) minimum thickness.

Note 3: When the superelevation rate of the pavement exceeds 4%, the shoulder shall be sloped so that the algebraic difference between the pavement and shoulder slopes will not be greater than 8%.

GENERAL NOTES

- Switched units to English (metric).
- See Standard 420001 for details not shown.

PCC SHOULDER

STANDARD 483001-04
FOR MULTI-SPAN CULVERTS

Unless otherwise noted on the plans, name plates are not required for structures less than 20' (6.1 m) in length.

1. Place on back side of girder Roll Line 1
2. 6'-0"min. to 36'-0" max. Space to miss Roll Post.

FOR STEEL RAILS

FOR TRUSSES

FOR PIER ON FAIR ROUTES

GENERAL NOTES

On one-way traffic structures, place name plates on right side of approach end. On two-way traffic structures, place name plates on right side of approach end while looking in the direction of increasing stationing.

All dimensions are in inches (millimeters) unless otherwise shown.
SEE DESIGN PLANS FOR LETTERING

NOTE:
Border and lettering:
Raised 1/16" square cut and not tapered.

Center of 1/4" dia. holes for bolts when required.

SECTIONS A-A
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
ENGINEER OF BRIDGES AND STRUCTURES

Culvert End Section dimensions

**GENERAL NOTES**

The number of segments shown in elevation is for guidance only. The length and number of precast sections required to complete the end section shall be determined by the Contractor.

End sections may be installed up to ±15 degrees skewed with roadway.

Sections shown may be drilled using core bits in lieu of formed holes.

See Section D-D for assembly details.

All dimension are in inches (millimeters) unless otherwise shown.

**CONCRETE END SECTIONS FOR PIPE CULVERTS**

**PIPE CULVERT END SECTION DIMENSIONS**

<table>
<thead>
<tr>
<th>Pipe I.D.</th>
<th>A</th>
<th>R</th>
<th>S</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>(375)</td>
<td>60</td>
<td>66</td>
<td>30</td>
<td>33</td>
</tr>
<tr>
<td>(400)</td>
<td>66</td>
<td>72</td>
<td>36</td>
<td>39</td>
</tr>
<tr>
<td>(425)</td>
<td>72</td>
<td>78</td>
<td>42</td>
<td>45</td>
</tr>
<tr>
<td>(475)</td>
<td>78</td>
<td>84</td>
<td>48</td>
<td>51</td>
</tr>
<tr>
<td>(525)</td>
<td>84</td>
<td>90</td>
<td>54</td>
<td>57</td>
</tr>
<tr>
<td>(575)</td>
<td>90</td>
<td>96</td>
<td>60</td>
<td>63</td>
</tr>
<tr>
<td>(625)</td>
<td>96</td>
<td>102</td>
<td>66</td>
<td>69</td>
</tr>
<tr>
<td>(660)</td>
<td>102</td>
<td>108</td>
<td>72</td>
<td>75</td>
</tr>
<tr>
<td>(700)</td>
<td>108</td>
<td>114</td>
<td>78</td>
<td>81</td>
</tr>
<tr>
<td>(735)</td>
<td>114</td>
<td>120</td>
<td>84</td>
<td>87</td>
</tr>
<tr>
<td>(770)</td>
<td>120</td>
<td>126</td>
<td>90</td>
<td>93</td>
</tr>
<tr>
<td>(800)</td>
<td>126</td>
<td>132</td>
<td>96</td>
<td>99</td>
</tr>
<tr>
<td>(835)</td>
<td>132</td>
<td>138</td>
<td>102</td>
<td>105</td>
</tr>
<tr>
<td>(870)</td>
<td>138</td>
<td>144</td>
<td>108</td>
<td>111</td>
</tr>
<tr>
<td>(900)</td>
<td>144</td>
<td>150</td>
<td>114</td>
<td>117</td>
</tr>
<tr>
<td>(935)</td>
<td>150</td>
<td>156</td>
<td>120</td>
<td>123</td>
</tr>
<tr>
<td>(970)</td>
<td>156</td>
<td>162</td>
<td>126</td>
<td>129</td>
</tr>
<tr>
<td>(1000)</td>
<td>162</td>
<td>168</td>
<td>132</td>
<td>135</td>
</tr>
<tr>
<td>(1030)</td>
<td>168</td>
<td>174</td>
<td>138</td>
<td>141</td>
</tr>
<tr>
<td>(1060)</td>
<td>174</td>
<td>180</td>
<td>144</td>
<td>147</td>
</tr>
<tr>
<td>(1090)</td>
<td>180</td>
<td>186</td>
<td>150</td>
<td>153</td>
</tr>
<tr>
<td>(1120)</td>
<td>186</td>
<td>192</td>
<td>156</td>
<td>159</td>
</tr>
<tr>
<td>(1150)</td>
<td>192</td>
<td>198</td>
<td>162</td>
<td>165</td>
</tr>
<tr>
<td>(1180)</td>
<td>198</td>
<td>204</td>
<td>168</td>
<td>171</td>
</tr>
<tr>
<td>(1200)</td>
<td>204</td>
<td>210</td>
<td>174</td>
<td>177</td>
</tr>
<tr>
<td>(1220)</td>
<td>210</td>
<td>216</td>
<td>180</td>
<td>183</td>
</tr>
<tr>
<td>(1240)</td>
<td>216</td>
<td>222</td>
<td>186</td>
<td>189</td>
</tr>
<tr>
<td>(1260)</td>
<td>222</td>
<td>228</td>
<td>192</td>
<td>195</td>
</tr>
<tr>
<td>(1280)</td>
<td>228</td>
<td>234</td>
<td>198</td>
<td>201</td>
</tr>
<tr>
<td>(1300)</td>
<td>234</td>
<td>240</td>
<td>204</td>
<td>207</td>
</tr>
<tr>
<td>(1320)</td>
<td>240</td>
<td>246</td>
<td>210</td>
<td>213</td>
</tr>
<tr>
<td>(1340)</td>
<td>246</td>
<td>252</td>
<td>216</td>
<td>219</td>
</tr>
<tr>
<td>(1360)</td>
<td>252</td>
<td>258</td>
<td>222</td>
<td>225</td>
</tr>
<tr>
<td>(1380)</td>
<td>258</td>
<td>264</td>
<td>228</td>
<td>231</td>
</tr>
<tr>
<td>(1400)</td>
<td>264</td>
<td>270</td>
<td>234</td>
<td>237</td>
</tr>
<tr>
<td>(1420)</td>
<td>270</td>
<td>276</td>
<td>240</td>
<td>243</td>
</tr>
<tr>
<td>(1440)</td>
<td>276</td>
<td>282</td>
<td>246</td>
<td>249</td>
</tr>
<tr>
<td>(1460)</td>
<td>282</td>
<td>288</td>
<td>252</td>
<td>255</td>
</tr>
<tr>
<td>(1480)</td>
<td>288</td>
<td>294</td>
<td>258</td>
<td>261</td>
</tr>
<tr>
<td>(1500)</td>
<td>294</td>
<td>300</td>
<td>264</td>
<td>267</td>
</tr>
</tbody>
</table>

**STANDARD 542001-03**

CONCRETE END SECTIONS FOR PIPE CULVERTS

15" (375 mm) THRU 84" (2100 mm) DIA.

(Date of Issue: 1-1-97)

(Sheet 1 of 3)
LONGITUDINAL SECTION
(Showing bottom slab and backwall reinforcement.)

SECTION B-B
(Showing backwall reinforcement only. Pipe omitted for clarity.)

SECTION C-C

SECTION D-D

CONCRETE END SECTIONS FOR PIPE CULVERTS
15" (375 mm) THRU 84" (2100 mm) DIA.

STANDARD 542001-03
### QUANTITIES

<table>
<thead>
<tr>
<th>Pipe No.</th>
<th>Concrete yd. m³</th>
<th>Reinforcement Without Lap Bar kg</th>
<th>Reinforcement With Lap Bar kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>1.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>2.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>3.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>6.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>10.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>15.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>20.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>30.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>40.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 15" (375 mm) THRU 84" (2100 mm) DIA. | Concrete volumes by approximately 10%.
PIPE CULVERT END SECTION DIMENSIONS

<table>
<thead>
<tr>
<th>Pipe I.D. (in)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>T</th>
<th>Slope of End Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>14</td>
<td>29</td>
<td>28</td>
<td>8</td>
<td>5'-6&quot;</td>
</tr>
<tr>
<td>18</td>
<td>15</td>
<td>33</td>
<td>32</td>
<td>9</td>
<td>5'-9&quot;</td>
</tr>
<tr>
<td>24</td>
<td>17</td>
<td>37</td>
<td>36</td>
<td>12</td>
<td>5'-12&quot;</td>
</tr>
<tr>
<td>30</td>
<td>19</td>
<td>41</td>
<td>40</td>
<td>16</td>
<td>5'-16&quot;</td>
</tr>
<tr>
<td>36</td>
<td>21</td>
<td>45</td>
<td>44</td>
<td>20</td>
<td>5'-20&quot;</td>
</tr>
<tr>
<td>42</td>
<td>23</td>
<td>49</td>
<td>48</td>
<td>24</td>
<td>5'-24&quot;</td>
</tr>
<tr>
<td>48</td>
<td>25</td>
<td>53</td>
<td>52</td>
<td>28</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>54</td>
<td>27</td>
<td>57</td>
<td>56</td>
<td>32</td>
<td>6'-4&quot;</td>
</tr>
<tr>
<td>60</td>
<td>29</td>
<td>61</td>
<td>60</td>
<td>36</td>
<td>6'-8&quot;</td>
</tr>
<tr>
<td>66</td>
<td>31</td>
<td>65</td>
<td>64</td>
<td>40</td>
<td>6'-12&quot;</td>
</tr>
<tr>
<td>72</td>
<td>33</td>
<td>69</td>
<td>68</td>
<td>44</td>
<td>6'-16&quot;</td>
</tr>
<tr>
<td>78</td>
<td>35</td>
<td>73</td>
<td>72</td>
<td>48</td>
<td>6'-20&quot;</td>
</tr>
</tbody>
</table>

GENERAL NOTES

The number of segments shown in elevation is for excels only. The length and number of panels required to construct the end section should be determined by the Contractor.

End section may be installed up to ±15 degrees skewed with roadway.

2¾ x 2¾ x 96" (60 x 60 x 2400 mm) plate washers shall be provided under each motor required for the anchor rods. Holes in the walls for the culvert tie assembly may be drilled using core bits in lieu of formed holes.

See Standard 542006 for end sections having a pipe inside diameter greater than 27.5" (700 mm).
LONGITUDINAL SECTION
(Showing bottom slab and backwall reinforcement.)

SECTION B-B
(Showing backwall reinforcement only.)
(Pipe omitted for clarity.)

SECTION C-C

REINFORCEMENT SCHEDULE

<table>
<thead>
<tr>
<th>Pipe I.D. (mm)</th>
<th>Bar #</th>
<th>Bar Size</th>
<th>Bar Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2100)</td>
<td>15</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(2000)</td>
<td>16</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(1850)</td>
<td>17</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(1700)</td>
<td>18</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(1500)</td>
<td>19</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(1350)</td>
<td>20</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(1200)</td>
<td>21</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(1050)</td>
<td>22</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(900)</td>
<td>23</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(850)</td>
<td>24</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(750)</td>
<td>25</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(700)</td>
<td>26</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(600)</td>
<td>27</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(525)</td>
<td>28</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(450)</td>
<td>29</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(375)</td>
<td>30</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(300)</td>
<td>31</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>(200)</td>
<td>32</td>
<td>4</td>
<td>12</td>
</tr>
</tbody>
</table>

The Contractor may use lap splices for the sidewall reinforcement at the locations shown.

LAP DIMENSION

The Contractor may use lap splices for the sidewall reinforcement at the locations shown.
For cast-in-place construction, increase concrete volumes by approximately 12%.

**SECTION D-D**

**QUANTITIES PER END SECTION**

<table>
<thead>
<tr>
<th>Concrete yd</th>
<th>Reinforcement Without Lap lbs.</th>
<th>Reinforcement With Lap lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 (400)</td>
<td>2013</td>
<td>2013</td>
</tr>
<tr>
<td>10 (250)</td>
<td>1700</td>
<td>1700</td>
</tr>
<tr>
<td>5 (125)</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td>6 (150)</td>
<td>1350</td>
<td>1350</td>
</tr>
<tr>
<td>15 (375)</td>
<td>1200</td>
<td>1200</td>
</tr>
<tr>
<td>30 (750)</td>
<td>1050</td>
<td>1050</td>
</tr>
<tr>
<td>60 (1500)</td>
<td>900</td>
<td>900</td>
</tr>
<tr>
<td>100 (2500)</td>
<td>750</td>
<td>750</td>
</tr>
<tr>
<td>300 (7500)</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>600 (15000)</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>1000 (25000)</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>1500 (37500)</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>2000 (50000)</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>3000 (75000)</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>4000 (100000)</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>5000 (125000)</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>6000 (150000)</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>7000 (175000)</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>8000 (200000)</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>9000 (225000)</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>10000 (250000)</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

**SECTION A-A**

**TIE PLATE DETAIL**

1. Joint
2. Restraint angle
3. Tie plate
4. Tie rod
5. Slotted hole, typ.
6. Restraint angle

**SECTION D-D**

**RESTRAINT ANGLE DETAIL**

1. Tie plate
2. Tie rod
3. Slotted hole, typ.
4. Restraint angle
5. Tie plate
6. Tie rod
7. Slotted hole, typ.
8. Restraint angle

**MULTIPLE CONCRETE END SECTIONS FOR PIPE CULVERTS**

15" (375 mm) THRU 84" (2100 mm) DIA.

**STANDARD 542006**
**SECTION B-B**

*Showing backwall reinforcement only (Pipe omitted for clarity)*

- 2 ½ (16) bars at 6 (150) cts., for EORS ≤ 48 (1200), 4 wp. each face
- 1 ½ (10) bar for EORS > 48 (1200), 4 wp. each face

**SECTION C-C**

*Showing bottom slab and backwall reinforcement.*

- 6 (150) cts., max.
- 1 ½ (10) bar for EORS < 48 (1200), typ.
- 2 ½ (16) bars at 6 (150) cts., typ. each face

**SECTION D-D**

*Showing end section tie details*

- 1 ½ (10) bar for CP connary
- 1 ½ (10) bar for CP connary
- 1 ½ (10) bar for CP connary

**CONCRETE END SECTIONS FOR ELLIPTICAL PIPE CULVERTS 15" (375 mm) THRU 72" (1800 mm) EQUIVALENT DIAMETER**

**STANDARD 542011**

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Round Size</th>
<th>Bar Size</th>
<th>Bar Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 (450)</td>
<td>(13)</td>
<td>(12)</td>
<td>(1200)</td>
</tr>
<tr>
<td>21 (525)</td>
<td>(13)</td>
<td>(12)</td>
<td>(1200)</td>
</tr>
<tr>
<td>24 (600)</td>
<td>(13)</td>
<td>(12)</td>
<td>(1200)</td>
</tr>
<tr>
<td>27 (750)</td>
<td>(13)</td>
<td>(12)</td>
<td>(1200)</td>
</tr>
<tr>
<td>30 (900)</td>
<td>(13)</td>
<td>(12)</td>
<td>(1200)</td>
</tr>
<tr>
<td>36 (1200)</td>
<td>(13)</td>
<td>(12)</td>
<td>(1200)</td>
</tr>
<tr>
<td>42 (1500)</td>
<td>(13)</td>
<td>(12)</td>
<td>(1200)</td>
</tr>
<tr>
<td>48 (1800)</td>
<td>(13)</td>
<td>(12)</td>
<td>(1200)</td>
</tr>
<tr>
<td>54 (2100)</td>
<td>(13)</td>
<td>(12)</td>
<td>(1200)</td>
</tr>
<tr>
<td>60 (2400)</td>
<td>(13)</td>
<td>(12)</td>
<td>(1200)</td>
</tr>
<tr>
<td>66 (2700)</td>
<td>(13)</td>
<td>(12)</td>
<td>(1200)</td>
</tr>
<tr>
<td>72 (3000)</td>
<td>(13)</td>
<td>(12)</td>
<td>(1200)</td>
</tr>
</tbody>
</table>

The Contractor may use lap splices for the side wall reinforcement at the locations shown.
### Quantities

<table>
<thead>
<tr>
<th>Equivalent Round Size (Pipe ID)</th>
<th>Concrete yd (m³)</th>
<th>Reinforcement Without Lap lbs (kg)</th>
<th>Reinforcement With Lap lbs (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slope of End Section</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>W</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>15</td>
<td>110</td>
<td>110</td>
<td>600</td>
</tr>
<tr>
<td>20</td>
<td>135</td>
<td>135</td>
<td>800</td>
</tr>
<tr>
<td>25</td>
<td>160</td>
<td>160</td>
<td>1000</td>
</tr>
</tbody>
</table>

For cast-in-place construction, increase concrete volumes by approximately 13%.

### General Notes

The number of segments shown in elevation is for example only. The length and number of precast sections required to construct the end section shall be determined by the Contractor.

End section may be installed up to ±15 degrees skewed with roadway.

2½ x 2½ x 6 ½ x 56 x 56 x 8 pipe plate washers shall be provided under each nut required for the anchor rods. Holes in the wal for the culvert tie assembly may be drilled using core bits in lieu of forcelled holes.

See Standard 542011 for end sections having traversable pipe grate.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.

All dimensions are in inches (millimeters) unless otherwise shown.
LONGITUDINAL SECTION
(Showing bottom slab and backwall reinforcement.)

SECTION C-C

- The Contractor may use lap splice for the sidewall reinforcement at the locations shown.

SECTION B-B
(Showing backwall reinforcement only.
Pipe omitted for clarity.)

REINFORCEMENT SCHEDULE

<table>
<thead>
<tr>
<th>Equivalent Round Size</th>
<th>Bar Size</th>
<th>Bar Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe ID</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>12&quot; (300)</td>
<td>72</td>
<td>24</td>
</tr>
<tr>
<td>18&quot; (450)</td>
<td>66</td>
<td>21</td>
</tr>
<tr>
<td>24&quot; (600)</td>
<td>60</td>
<td>18</td>
</tr>
<tr>
<td>30&quot; (750)</td>
<td>54</td>
<td>15</td>
</tr>
<tr>
<td>36&quot; (900)</td>
<td>48</td>
<td>12</td>
</tr>
<tr>
<td>42&quot; (1050)</td>
<td>42</td>
<td>9</td>
</tr>
<tr>
<td>48&quot; (1200)</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>54&quot; (1350)</td>
<td>30</td>
<td>3</td>
</tr>
<tr>
<td>60&quot; (1500)</td>
<td>24</td>
<td>1.5</td>
</tr>
<tr>
<td>66&quot; (1650)</td>
<td>21</td>
<td>1</td>
</tr>
<tr>
<td>72&quot; (1800)</td>
<td>18</td>
<td>0.75</td>
</tr>
</tbody>
</table>

LAP DIMENSION

- #4 (13) bar + 1 ft (38) cl.
- #6 (19) bar + 2 ft (62) cl.
- #8 (25) bar + 3 ft (91) cl.

MULTIPLE CONCRETE END SECTIONS FOR
ELLIPICAL PIPE CULVERTS 15" (375 mm)
THRU 72" (1800 mm) EQUIVALENT DIAMETER

STANDARD 542016
If the embankment slope above the headwall is flatter than 1:2, provide wings for a 1:2 slope.

No. 5 (No. 16) h bars, 1½ (40) cl. from bottom of headwall.

No. 4 (No. 13) v bars at 12 (300) cts.

If the embankment slope above the headwall is flatter than 1:2, provide wings for a 1:2 slope.

No. 5 (No. 16) h bars, 1½ (40) cl. from bottom of headwall.

No. 4 (No. 13) v bars at 12 (300) cts.

BAR - h
Bent in field, two req. for each headwall.

BAR - v
Bent in field, one req. for each headwall.

GENERAL NOTES
Build tops of headwalls parallel to grade line.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.
### WINGS FOR 1 1/2 SLOPE

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6°</td>
<td>DS 15-1/2</td>
<td>(375)</td>
<td>28</td>
<td>13</td>
<td>32</td>
<td>22</td>
<td>7</td>
<td>29</td>
<td>7</td>
<td>39</td>
<td>28</td>
<td>12</td>
<td>32</td>
<td>22</td>
<td>7</td>
<td>29</td>
</tr>
<tr>
<td>10°</td>
<td>DS 30-1/2</td>
<td>(900)</td>
<td>49</td>
<td>19</td>
<td>38</td>
<td>26</td>
<td>10</td>
<td>49</td>
<td>19</td>
<td>38</td>
<td>26</td>
<td>10</td>
<td>49</td>
<td>19</td>
<td>38</td>
<td>26</td>
</tr>
<tr>
<td>15°</td>
<td>DS 45-1/2</td>
<td>(1350)</td>
<td>70</td>
<td>25</td>
<td>43</td>
<td>31</td>
<td>13</td>
<td>59</td>
<td>13</td>
<td>59</td>
<td>13</td>
<td>59</td>
<td>13</td>
<td>59</td>
<td>13</td>
<td>59</td>
</tr>
<tr>
<td>20°</td>
<td>DS 60-1/2</td>
<td>(1800)</td>
<td>90</td>
<td>31</td>
<td>50</td>
<td>38</td>
<td>15</td>
<td>74</td>
<td>15</td>
<td>74</td>
<td>15</td>
<td>74</td>
<td>15</td>
<td>74</td>
<td>15</td>
<td>74</td>
</tr>
<tr>
<td>25°</td>
<td>DS 75-1/2</td>
<td>(2250)</td>
<td>110</td>
<td>37</td>
<td>61</td>
<td>45</td>
<td>17</td>
<td>89</td>
<td>17</td>
<td>89</td>
<td>17</td>
<td>89</td>
<td>17</td>
<td>89</td>
<td>17</td>
<td>89</td>
</tr>
<tr>
<td>30°</td>
<td>DS 90-1/2</td>
<td>(2700)</td>
<td>130</td>
<td>43</td>
<td>71</td>
<td>50</td>
<td>19</td>
<td>112</td>
<td>19</td>
<td>112</td>
<td>19</td>
<td>112</td>
<td>19</td>
<td>112</td>
<td>19</td>
<td>112</td>
</tr>
</tbody>
</table>

### REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS

15" (375 mm) THRU 36" (900 mm) DIA.
SKEWED WITH ROADWAY

**Sheet 2 of 5**
## Wings for 1 1/2 Slope

<table>
<thead>
<tr>
<th>Skew Angle</th>
<th>Design No.</th>
<th>Nominal Pipe Dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>35°</td>
<td>05-15/1</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>05-18/1</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>05-24/1</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>05-30/1</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>05-36/1</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>05-42/1</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>05-48/1</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>05-54/1</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>05-60/1</td>
<td>60</td>
</tr>
<tr>
<td>40°</td>
<td>05-15/1</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>05-18/1</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>05-24/1</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>05-30/1</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>05-36/1</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>05-42/1</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>05-48/1</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>05-54/1</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>05-60/1</td>
<td>60</td>
</tr>
<tr>
<td>45°</td>
<td>05-15/1</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>05-18/1</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>05-24/1</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>05-30/1</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>05-36/1</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>05-42/1</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>05-48/1</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>05-54/1</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>05-60/1</td>
<td>60</td>
</tr>
<tr>
<td>50°</td>
<td>05-15/1</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>05-18/1</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>05-24/1</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>05-30/1</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>05-36/1</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>05-42/1</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>05-48/1</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>05-54/1</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>05-60/1</td>
<td>60</td>
</tr>
<tr>
<td>55°</td>
<td>05-15/1</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>05-18/1</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>05-24/1</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>05-30/1</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>05-36/1</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>05-42/1</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>05-48/1</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>05-54/1</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>05-60/1</td>
<td>60</td>
</tr>
<tr>
<td>60°</td>
<td>05-15/1</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>05-18/1</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>05-24/1</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>05-30/1</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>05-36/1</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>05-42/1</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>05-48/1</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>05-54/1</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>05-60/1</td>
<td>60</td>
</tr>
</tbody>
</table>

### Dimensions for Concrete

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>10</td>
<td>29</td>
<td>33</td>
<td>3</td>
<td>53</td>
<td>5</td>
<td>73</td>
<td>4</td>
<td>24</td>
<td>4</td>
<td>24</td>
<td>4</td>
</tr>
<tr>
<td>28</td>
<td>13</td>
<td>32</td>
<td>27</td>
<td>3</td>
<td>53</td>
<td>4</td>
<td>24</td>
<td>3</td>
<td>24</td>
<td>3</td>
<td>24</td>
<td>3</td>
</tr>
<tr>
<td>24</td>
<td>16</td>
<td>35</td>
<td>30</td>
<td>2</td>
<td>35</td>
<td>2</td>
<td>19</td>
<td>1</td>
<td>20</td>
<td>1</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>30</td>
<td>19</td>
<td>40</td>
<td>23</td>
<td>2</td>
<td>35</td>
<td>1</td>
<td>20</td>
<td>0</td>
<td>19</td>
<td>0</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>26</td>
<td>15</td>
<td>29</td>
<td>31</td>
<td>2</td>
<td>19</td>
<td>2</td>
<td>20</td>
<td>1</td>
<td>20</td>
<td>1</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>28</td>
<td>16</td>
<td>35</td>
<td>30</td>
<td>2</td>
<td>35</td>
<td>2</td>
<td>19</td>
<td>1</td>
<td>20</td>
<td>1</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>18</td>
<td>36</td>
<td>31</td>
<td>2</td>
<td>35</td>
<td>2</td>
<td>19</td>
<td>1</td>
<td>20</td>
<td>1</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>13</td>
<td>35</td>
<td>23</td>
<td>2</td>
<td>35</td>
<td>1</td>
<td>20</td>
<td>0</td>
<td>19</td>
<td>0</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>15</td>
<td>29</td>
<td>30</td>
<td>2</td>
<td>19</td>
<td>2</td>
<td>19</td>
<td>1</td>
<td>19</td>
<td>1</td>
<td>19</td>
<td>1</td>
</tr>
<tr>
<td>26</td>
<td>16</td>
<td>35</td>
<td>30</td>
<td>2</td>
<td>35</td>
<td>2</td>
<td>19</td>
<td>1</td>
<td>20</td>
<td>1</td>
<td>20</td>
<td>1</td>
</tr>
</tbody>
</table>

### Concrete and Steel Sections

- **For 15" (375 mm) thru 36" (900 mm) dia. skewed with roadway**
- **Standard 542201-02**

---

### Reinforced Concrete End Sections

For Pipe Culverts

<table>
<thead>
<tr>
<th>H</th>
<th>n</th>
<th>d</th>
<th>n’</th>
<th>l</th>
<th>d’</th>
<th>n”</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>4</td>
<td>2</td>
<td>7</td>
<td>4</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>35</td>
<td>7</td>
<td>3</td>
<td>10</td>
<td>6</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>40</td>
<td>10</td>
<td>5</td>
<td>15</td>
<td>8</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>45</td>
<td>15</td>
<td>7</td>
<td>23</td>
<td>10</td>
<td>4</td>
<td>23</td>
</tr>
<tr>
<td>50</td>
<td>23</td>
<td>11</td>
<td>40</td>
<td>15</td>
<td>7</td>
<td>40</td>
</tr>
<tr>
<td>55</td>
<td>40</td>
<td>21</td>
<td>80</td>
<td>20</td>
<td>10</td>
<td>80</td>
</tr>
<tr>
<td>60</td>
<td>80</td>
<td>41</td>
<td>160</td>
<td>25</td>
<td>15</td>
<td>160</td>
</tr>
</tbody>
</table>

---

**Sheet 3 of 5**
**WINGS FOR 1/2 SLOPE**

<table>
<thead>
<tr>
<th>Skew Angle</th>
<th>Design No.</th>
<th>Nominal Pipe Dia.</th>
<th>Dimensions for Concrete</th>
<th>Concrete for End Sections with Enlargements</th>
</tr>
</thead>
<tbody>
<tr>
<td>6°</td>
<td>DS 15-2</td>
<td>DS 75-2</td>
<td>55</td>
<td>h - bars</td>
</tr>
<tr>
<td></td>
<td>DS 19-2</td>
<td>DS 100-2</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DS 24-2</td>
<td>DS 125-2</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DS 30-2</td>
<td>DS 150-2</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DS 36-2</td>
<td>DS 175-2</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DS 42-2</td>
<td>DS 200-2</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>10°</td>
<td>DS 50-2</td>
<td>DS 225-2</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DS 56-2</td>
<td>DS 250-2</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DS 62-2</td>
<td>DS 275-2</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DS 68-2</td>
<td>DS 300-2</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

**REINFORCED CONCRETE END SECTIONS**

For Pipe Culverts
15" (375 mm) thru 36" (900 mm) Dia. Skewed with Roadway

Standard 542201-02

*Sheet 4 of 5*
<table>
<thead>
<tr>
<th>Section</th>
<th>D</th>
<th>W</th>
<th>H</th>
<th>C</th>
<th>( D \times W )</th>
<th>( K )</th>
<th>( J )</th>
<th>( H \times L )</th>
<th>( J \times K )</th>
<th>( I \times J )</th>
</tr>
</thead>
<tbody>
<tr>
<td>15&quot; (375 mm)</td>
<td>48</td>
<td>86</td>
<td>77</td>
<td>48</td>
<td>4.03 m²</td>
<td>1200</td>
<td>26</td>
<td>21.6 m²</td>
<td>5280</td>
<td>380</td>
</tr>
<tr>
<td>20&quot; (500 mm)</td>
<td>70</td>
<td>120</td>
<td>110</td>
<td>70</td>
<td>6.10 m²</td>
<td>1700</td>
<td>34</td>
<td>34.2 m²</td>
<td>7020</td>
<td>1120</td>
</tr>
<tr>
<td>25&quot; (625 mm)</td>
<td>90</td>
<td>153</td>
<td>143</td>
<td>90</td>
<td>9.23 m²</td>
<td>2200</td>
<td>46</td>
<td>34.2 m²</td>
<td>8780</td>
<td>1520</td>
</tr>
<tr>
<td>30&quot; (750 mm)</td>
<td>110</td>
<td>203</td>
<td>193</td>
<td>110</td>
<td>12.36 m²</td>
<td>2700</td>
<td>58</td>
<td>34.2 m²</td>
<td>10340</td>
<td>1960</td>
</tr>
<tr>
<td>35&quot; (875 mm)</td>
<td>130</td>
<td>248</td>
<td>238</td>
<td>130</td>
<td>15.49 m²</td>
<td>3200</td>
<td>70</td>
<td>34.2 m²</td>
<td>11900</td>
<td>2200</td>
</tr>
</tbody>
</table>

**DIMENSIONS FOR CONCRETE**

For Pipe Culverts Served with Roadway

- **Angle**: 45° (DS 900-2)
- **DS 24-2**: 30°
- **DS 15-2**: 15°
- **DS 750-2**: 55°
- **DS 1200-2**: 70°

**WINGS FOR 1:2 SLOPE**

- **Sections**: 15" (375 mm) through 35" (875 mm) DIA.

**FOR PIPE CULVERTS**

- **Design**: A - G
- **Basis of Design**: A - E

*Note: The table continues with detailed specifications for each section.*
Use two layers of welded wire fabric in back face of wings.

* If the embankment slope above the headwall is flatter than 1:2, provide wings for 1:2 slope.

** Wires of each fabric sheet shall not be less than 8 (200).

** Overlap measured between the outermost cross wires of each fabric sheet shall not be less than 8 (200).

** All dimensions are in inches (millimeters) unless otherwise shown.

** All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

** Build tops of headwalls parallel to grade line.

** When lapping sheets of welded wire fabric, the overlap measured between the outermost cross wires of each fabric sheet shall not be less than 8 (200).

** Plan Culverts

** Reinforced Concrete End Sections

** 42" (1050 mm) thru 60" (1500 mm) Dia.

** Skewed With Roadway

** STANDARD 542206-02

** English and Metric
## Dimensions for Concrete

| 5°         | 1500                   | 26 | 1500 | 1490 | 1480 | 1470 | 1460 | 1450 | 1440 | 1430 | 1420 | 1410 | 1400 | 1390 | 1380 | 1370 | 1360 | 1350 | 1340 | 1330 | 1320 | 1310 | 1300 | 1290 | 1280 | 1270 | 1260 | 1250 | 1240 | 1230 | 1220 | 1210 |
| 10°        | 1500                   | 26 | 1500 | 1490 | 1480 | 1470 | 1460 | 1450 | 1440 | 1430 | 1420 | 1410 | 1400 | 1390 | 1380 | 1370 | 1360 | 1350 | 1340 | 1330 | 1320 | 1310 | 1300 | 1290 | 1280 | 1270 | 1260 | 1250 | 1240 | 1230 | 1220 | 1210 |
| 15°        | 1500                   | 26 | 1500 | 1490 | 1480 | 1470 | 1460 | 1450 | 1440 | 1430 | 1420 | 1410 | 1400 | 1390 | 1380 | 1370 | 1360 | 1350 | 1340 | 1330 | 1320 | 1310 | 1300 | 1290 | 1280 | 1270 | 1260 | 1250 | 1240 | 1230 | 1220 | 1210 |
| 20°        | 1500                   | 26 | 1500 | 1490 | 1480 | 1470 | 1460 | 1450 | 1440 | 1430 | 1420 | 1410 | 1400 | 1390 | 1380 | 1370 | 1360 | 1350 | 1340 | 1330 | 1320 | 1310 | 1300 | 1290 | 1280 | 1270 | 1260 | 1250 | 1240 | 1230 | 1220 | 1210 |
| 25°        | 1500                   | 26 | 1500 | 1490 | 1480 | 1470 | 1460 | 1450 | 1440 | 1430 | 1420 | 1410 | 1400 | 1390 | 1380 | 1370 | 1360 | 1350 | 1340 | 1330 | 1320 | 1310 | 1300 | 1290 | 1280 | 1270 | 1260 | 1250 | 1240 | 1230 | 1220 | 1210 |

### Concrete & Wire Fabric

<table>
<thead>
<tr>
<th>Dimensions for Concrete</th>
<th>Concrete &amp; Wire Fabric</th>
<th>Wire Fabric</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: 60</td>
<td>B: 60</td>
<td>C: 80</td>
</tr>
<tr>
<td>D: 80</td>
<td>E: 80</td>
<td>F: 80</td>
</tr>
<tr>
<td>G: 80</td>
<td>H: 80</td>
<td>I: 80</td>
</tr>
<tr>
<td>J: 80</td>
<td>K: 80</td>
<td>L: 80</td>
</tr>
<tr>
<td>M: 80</td>
<td>N: 80</td>
<td>O: 80</td>
</tr>
<tr>
<td>P: 80</td>
<td>Q: 80</td>
<td>R: 80</td>
</tr>
<tr>
<td>S: 80</td>
<td>T: 80</td>
<td>U: 80</td>
</tr>
<tr>
<td>V: 80</td>
<td>W: 80</td>
<td>X: 80</td>
</tr>
<tr>
<td>Y: 80</td>
<td>Z: 80</td>
<td>A: 80</td>
</tr>
</tbody>
</table>

### Reinforced Concrete End Sections

For pipe culverts:

- **42"** (1050 mm) thru **60"** (1500 mm) Dia.

### Skewed with Roadway
<table>
<thead>
<tr>
<th>Skew Angle</th>
<th>Nominal Pipe Dia.</th>
<th>Dimensions for Concrete</th>
<th>Concrete &amp; End Secs. cu. yd. (m)</th>
<th>Wire Fabric Secs. cu. ft. (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35°</td>
<td>40</td>
<td>60</td>
<td>5' 0&quot; (1.52 m)</td>
<td>30</td>
</tr>
<tr>
<td>40°</td>
<td>48</td>
<td>60</td>
<td>5' 0&quot; (1.52 m)</td>
<td>30</td>
</tr>
<tr>
<td>45°</td>
<td>48</td>
<td>60</td>
<td>5' 0&quot; (1.52 m)</td>
<td>30</td>
</tr>
<tr>
<td>50°</td>
<td>48</td>
<td>60</td>
<td>5' 0&quot; (1.52 m)</td>
<td>30</td>
</tr>
<tr>
<td>55°</td>
<td>48</td>
<td>60</td>
<td>5' 0&quot; (1.52 m)</td>
<td>30</td>
</tr>
</tbody>
</table>

**Concrete**

<table>
<thead>
<tr>
<th>Dia.</th>
<th>60</th>
<th>48</th>
<th>36</th>
<th>26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dia.</td>
<td>54</td>
<td>42</td>
<td>30</td>
<td>18</td>
</tr>
</tbody>
</table>

**Wire Fabric**

<table>
<thead>
<tr>
<th>Dia.</th>
<th>60</th>
<th>48</th>
<th>36</th>
<th>26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dia.</td>
<td>54</td>
<td>42</td>
<td>30</td>
<td>18</td>
</tr>
</tbody>
</table>

**Dimensions for Concrete**

<table>
<thead>
<tr>
<th>Dia.</th>
<th>60</th>
<th>48</th>
<th>36</th>
<th>26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dia.</td>
<td>54</td>
<td>42</td>
<td>30</td>
<td>18</td>
</tr>
</tbody>
</table>

**Concrete & End Secs. cu. yd. (m)**

<table>
<thead>
<tr>
<th>Dia.</th>
<th>60</th>
<th>48</th>
<th>36</th>
<th>26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dia.</td>
<td>54</td>
<td>42</td>
<td>30</td>
<td>18</td>
</tr>
</tbody>
</table>

**Wire Fabric Secs. cu. ft. (m)**

<table>
<thead>
<tr>
<th>Dia.</th>
<th>60</th>
<th>48</th>
<th>36</th>
<th>26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dia.</td>
<td>54</td>
<td>42</td>
<td>30</td>
<td>18</td>
</tr>
</tbody>
</table>

**REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS**

42" (1050 mm) THRU 60" (1500 mm) DIA. 
SKEWED WITH ROADWAY

STANDARD 542206-02
<table>
<thead>
<tr>
<th>Skew Angle</th>
<th>Nominal Pipe Dia.</th>
<th>Dimensions for Concrete</th>
<th>Wire Fabric</th>
<th>Concrete 2 End Sec. w/ Y, x (in²/ft²)</th>
<th>Wire Fabric 2 End Sec. w/ Y, x (in²/ft²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5°</td>
<td>42</td>
<td>0.65 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td></td>
<td>48</td>
<td>0.72 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>0.79 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td>10°</td>
<td>54</td>
<td>0.65 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>0.72 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td></td>
<td>65</td>
<td>0.79 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td>15°</td>
<td>60</td>
<td>0.75 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td></td>
<td>65</td>
<td>0.79 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>0.83 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td>20°</td>
<td>60</td>
<td>0.75 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td></td>
<td>65</td>
<td>0.79 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>0.83 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>0.88 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td>25°</td>
<td>60</td>
<td>0.75 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td></td>
<td>65</td>
<td>0.79 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>0.83 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>0.88 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td>30°</td>
<td>60</td>
<td>0.75 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td></td>
<td>65</td>
<td>0.79 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>0.83 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>0.88 m</td>
<td>10.5°</td>
<td>6'-0&quot;</td>
<td>10.5°</td>
</tr>
</tbody>
</table>
# Reinforced Concrete End Sections for Pipe Culverts

42" (1050 mm) thru 60" (1500 mm) Dia. Skewed with Roadway

*Sheet 5 of 5*

## WINGS FOR 1:2 SLOPE

<table>
<thead>
<tr>
<th>Skew Angle</th>
<th>Nominal Pipe Dia. (in)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>M</th>
<th>N</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>5°</td>
<td>60</td>
<td>26</td>
<td>4'-10&quot;</td>
<td>4'-10&quot;</td>
<td>2'-6&quot;</td>
<td>3'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
</tr>
<tr>
<td>10°</td>
<td>60</td>
<td>32</td>
<td>5'-7&quot;</td>
<td>5'-7&quot;</td>
<td>2'-6&quot;</td>
<td>3'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
</tr>
<tr>
<td>15°</td>
<td>60</td>
<td>38</td>
<td>6'-5&quot;</td>
<td>6'-5&quot;</td>
<td>2'-6&quot;</td>
<td>3'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
</tr>
<tr>
<td>20°</td>
<td>60</td>
<td>44</td>
<td>7'-2&quot;</td>
<td>7'-2&quot;</td>
<td>2'-6&quot;</td>
<td>3'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
</tr>
<tr>
<td>25°</td>
<td>60</td>
<td>50</td>
<td>8'-0&quot;</td>
<td>8'-0&quot;</td>
<td>2'-6&quot;</td>
<td>3'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
</tr>
</tbody>
</table>

## Dimensions for Concrete

**Concrete Cross Section:**
- A, B, C, D, E, F, G, H, J, K, M, N, X (in)

## Wire Fabric

- Wire Fabric End Secs. (lbs.)
- Concrete End Secs. (lbs.)

---

[Source: Department of Transportation]
**Plan**

End connection to end pipe used.

**SECTION A-A**

End connection to end pipe used.

**END VIEW**

Some reinforcement is:
- Inner cage, class HE-II
- Outer cage, class HE-II

Preceded or used in place and block.

+ Refers to the equivalent pipe diameter.

**GENERAL NOTES**

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.

All dimensions are in inches ( millimeters) unless otherwise shown.

**OPTIONAL FABRIC LAP**

**CONCRETE ELLIPTICAL FLARED END SECTION**

**STANDARD 542306-02**

**DATE**

**PRECAST REINFORCED**

**ENGINEER OF BRIDGES AND STRUCTURES**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**APPROVED**

**ISSUED**

**APPROVED**

**REVISIONS**

**DATE**

**CONTRACT**

**DATE**

**REVISIONS**

**DATE**

**REVISIONS**

**DATE**

**REVISIONS**

**DATE**

**REVISIONS**

**DATE**

**REVISIONS**

**DATE**

**REVISIONS**

**DATE**

**REVISIONS**

**DATE**
LONGITUDINAL SECTION

PLAN VIEW

GENERAL NOTES

This standard shall only be used on concrete end sections not skewed more than 15 degrees with roadway.
The minimum distance from the center of a hole to the free edge of a structural shape or plate shall be 1/2" (12.7 mm) unless noted otherwise.

As dimensions are in inches (millimeters) unless otherwise shown.

TRAVERSABLE PIPE GRATE

(Sheet 1 of 2)

STANDARD 542311-04

### PIPE-GRATE SCHEDULE FOR PIPE CULVERT END SECTIONS

<table>
<thead>
<tr>
<th>Pipe No.</th>
<th>Dia.</th>
<th>Main Pipe No. / Length</th>
<th>Int. Support No. / Length</th>
<th>Total Length of Pipe</th>
<th>Int. Support No. / Length</th>
<th>Total Length of Pipe</th>
<th>Int. Support No. / Length</th>
<th>Total Length of Pipe</th>
<th>Int. Support No. / Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>12</td>
<td>3 x 5 (15.24 m)</td>
<td>N/A</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
</tr>
<tr>
<td>20</td>
<td>18</td>
<td>2 x 5 (15.24 m)</td>
<td>N/A</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
</tr>
<tr>
<td>40</td>
<td>24</td>
<td>1 x 5 (15.24 m)</td>
<td>N/A</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
</tr>
<tr>
<td>60</td>
<td>30</td>
<td>1 x 5 (15.24 m)</td>
<td>N/A</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
</tr>
<tr>
<td>80</td>
<td>36</td>
<td>1 x 5 (15.24 m)</td>
<td>N/A</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
</tr>
</tbody>
</table>

### PIPE-GRATE SCHEDULE FOR ELLIPTICAL PIPE CULVERT END SECTIONS

<table>
<thead>
<tr>
<th>Pipe No.</th>
<th>Dia.</th>
<th>Main Pipe No. / Length</th>
<th>Int. Support No. / Length</th>
<th>Total Length of Pipe</th>
<th>Int. Support No. / Length</th>
<th>Total Length of Pipe</th>
<th>Int. Support No. / Length</th>
<th>Total Length of Pipe</th>
<th>Int. Support No. / Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>12</td>
<td>3 x 5 (15.24 m)</td>
<td>N/A</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
</tr>
<tr>
<td>20</td>
<td>18</td>
<td>2 x 5 (15.24 m)</td>
<td>N/A</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
</tr>
<tr>
<td>40</td>
<td>24</td>
<td>1 x 5 (15.24 m)</td>
<td>N/A</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
</tr>
<tr>
<td>60</td>
<td>30</td>
<td>1 x 5 (15.24 m)</td>
<td>N/A</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
</tr>
<tr>
<td>80</td>
<td>36</td>
<td>1 x 5 (15.24 m)</td>
<td>N/A</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
<td>15.24 m</td>
<td>1 x 5 (15.24 m)</td>
</tr>
</tbody>
</table>

### TRAVERSABLE PIPE GRATE

(Sheet 2 of 2)
**Metal End Sections for Pipe Arches**

**Type 1 and 2 Connections**

- For 17x13 (432x330) thru 83x37 (2108x1448) sizes only.
- (See Note 1)

**Alternate Strap Connector**

- For Type 1 only.
- Use standard M12x150 band bolt and nut.

**Notes**

1. Type 1 and 2 connection shall be used only with pipes with annular ends.
2. Type 3 connection can be used with all pipe sizes and includes 12 (300) of the pipe length. The annular connection shall be attached to the end section by rivets or bolts and shall be the same metal thickness as the end section. When coupling the Type 3 end section to a pipe with annular ends, only the dimple type coupling band shall be used.
3. Type 4 connection can be used with all pipe sizes. The end section band shall be either a dimple, spigot, or annular band and can be used with pipes having annular ends. For pipes having helical ends, only the dimple end section band will be allowed.

All dimensions are in inches (millimeters) unless otherwise shown.

---

**Table: Dimensions**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-97</td>
<td>(2108)</td>
<td>0.064</td>
<td>1.63 (41)</td>
<td>1.065 (269)</td>
<td>0.525 (133)</td>
<td>0.109 (2.77)</td>
<td>1 Pc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-1-97</td>
<td>(460)</td>
<td>0.064</td>
<td>2.77 (70)</td>
<td>2.005 (508)</td>
<td>1.065 (269)</td>
<td>0.109 (2.77)</td>
<td>1 Pc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-1-97</td>
<td>(990)</td>
<td>0.064</td>
<td>2.77 (70)</td>
<td>2.005 (508)</td>
<td>1.065 (269)</td>
<td>0.109 (2.77)</td>
<td>1 Pc.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Diagram:**

- End View
- Side View
- Connections of End Sections

---

**Notes:**

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.
- Type 1 and 2 connection shall be used only with pipes with annular ends.
- Type 3 connection can be used with all pipe sizes. The annular connection shall be attached to the end section by rivets or bolts and shall be the same metal thickness as the end section. When coupling the Type 3 end section to a pipe with annular ends, only the dimple type coupling band shall be used.
- Type 4 connection can be used with all pipe sizes. The end section band shall be either a dimple, spigot, or annular band and can be used with pipes having annular ends. For pipes having helical ends, only the dimple end section band will be allowed.

All dimensions are in inches (millimeters) unless otherwise shown.
**SECTION A-A**

**PLAN OF REINFORCEMENT**

Material required for one inlet box

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>10</td>
<td>No. 4</td>
<td>1'-3&quot;</td>
</tr>
<tr>
<td>u</td>
<td>10</td>
<td>No. 4</td>
<td>6'-1&quot;</td>
</tr>
<tr>
<td>w</td>
<td>1</td>
<td>No. 4</td>
<td>3'-6&quot;</td>
</tr>
<tr>
<td>v</td>
<td>6</td>
<td>No. 4</td>
<td>7'-0&quot;</td>
</tr>
<tr>
<td>v1</td>
<td>4</td>
<td>No. 4</td>
<td>4'-0&quot;</td>
</tr>
<tr>
<td>v2</td>
<td>2</td>
<td>No. 4</td>
<td>2'-6&quot;</td>
</tr>
<tr>
<td>v3</td>
<td>1</td>
<td>No. 4</td>
<td>1'-6&quot;</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (H:V).
- All dimensions are in inches (millimeters) unless otherwise shown.

**INLET BOX**

**TYPE 24 (600) A**

<table>
<thead>
<tr>
<th>Section of Steel Pipe</th>
<th>O.D.</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>(89)</td>
<td>8'-0&quot;</td>
</tr>
</tbody>
</table>

**Concrete**

- cu. yds. (0.9)

**Reinf. Bars**

- (52.2) lbs.
### GENERAL NOTES

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.

### PLAN OF REINFORCEMENT

#### PLAN

- **Bars:** u, u₁ & u₂

#### SECTION A-A

- **3½" (89) O.D. galv. steel pipe**

### MATERIAL REQUIRED FOR ONE INLET BOX

<table>
<thead>
<tr>
<th>Material</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>1</td>
<td></td>
<td>1.6 cu. yds.</td>
</tr>
<tr>
<td>Reinf. Bars</td>
<td>127</td>
<td></td>
<td>57.6 lbs.</td>
</tr>
<tr>
<td>Galv. Steel Pipe</td>
<td>3½&quot;</td>
<td>11'-4&quot;</td>
<td>3.37 m</td>
</tr>
</tbody>
</table>

### Traffic

- **INLET BOX TYPE 24 (600) B**

**STANDARD 542506-02**
TOP ANCHOR PLATE

SECTION B-B

SECTION C-C

DETAIL AT BLOCKOUTS

INLET BOX

TYPE 24 (600) B

STANDARD 542506-02

(Sheet 2 of 2)
**TOP ANCHOR PLATE**

(1) required

**SECTION B-B**

**SECTION C-C**

**DETAIL AT BLOCKOUTS**

**INLET BOX**

**TYPE 24 (600) C**

**STANDARD 542511-02**
**GENERAL NOTES**

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).
- All dimensions are in inches (millimeters) unless otherwise shown.

**Reinforcement Details**

<table>
<thead>
<tr>
<th>BAR</th>
<th>QTY.</th>
<th>SIZE</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>u</td>
<td>10</td>
<td>No. 4</td>
<td>(3.17 m)</td>
</tr>
<tr>
<td>v</td>
<td>3</td>
<td>No. 4</td>
<td>(0.91 m)</td>
</tr>
<tr>
<td>w</td>
<td>14</td>
<td>No. 4</td>
<td>(1.37 m)</td>
</tr>
<tr>
<td>h</td>
<td>2</td>
<td>No. 4</td>
<td>(1.22 m)</td>
</tr>
</tbody>
</table>

**Concrete**

- Material required for one inlet box

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>QTY.</th>
<th>SIZE</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>10</td>
<td>(3.17 m)</td>
<td>(1.68)</td>
</tr>
<tr>
<td>Reinf. Bars</td>
<td>18</td>
<td>(0.91 m)</td>
<td>(65.8)</td>
</tr>
</tbody>
</table>

**Traffic**

- Sketch showing location and direction of box in relation to ditch.

**PLAN OF REINFORCEMENT**

- Bar h1
- Bar L
- Bar u & u1

**SECTION A-A**
INLET BOX
TYPE 24 (600) D

DETAIL AT BLOCKOUTS

SECTION B-B
SECTION C-C

END VIEW

TOP ANCHOR PLATE

STANDARD 542516-03
Illinois Department of Transportation

PASSED
2009

ENGINEER OF POLICY AND PROCEDURES

ENGINEER OF DESIGN AND ENVIRONMENT

APPROVED
2009

ISSUED
1-1-97

January 1,

TOP ANCHOR PLATE

Slope

Traffic

Sketch showing location and direction of box in relation to median.

 Médian

Traffic

1 : 6 Slope

SECTION D-D

SECTION C-C

INLET BOX

TYPE 24 (600) E

DETAIL AT BLOCKOUTS
SECTION A-A

PLAN

DETAIL A

GENERAL NOTES

1. If field conditions permit, the bottom of the inlet box shall have a 2:1 slope.

2. All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

3. All dimensions are in inches (millimeters) unless otherwise shown.

INLET BOX

TYPE 24 (600) F

STANDARD 542526-03

DATE

REV. 2-22-11

Rev. Sheet 7 of 7

1-1-09

ENGLISH (METRIC) REVISED

Corrected weld symbols

on Sheet 7.

(Rev.) 4-29

General Notes.
SECTION A-A

NOTE:
Culvert pipe may exit from the side (or sides) by changing reinforcemnt bars in that area and in the headed end of box.

Traffic

Slope

Level

Bars at 12 (500) cts.

1:10 Slope

Traffic

Nort showing exit from side (or sides)

Detail showing exit from side (or sides)

GENERAL NOTES

If field conditions permit, bottom of inlet box shall have 2:10 slope.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement V/H.

All dimensions are in inches (millimeters) unless otherwise shown.

INLET BOX

TYPE 24 (600) G

STANDARD 542351-04
Traffic

SECTION A-A

PLAN

SECTION D-D

PLAN OF REINFORCEMENT

INLET BOX

TYPE 36 (900) A

STANDARD 542536-03
Remove concrete along these lines. Clean reinforcement for either tied or welded laps of longitudinal and circumferential reinforcement.

Degree of elbow = 2

For wire dia. W14 - W6 (10.72 - 7.01), length of weld shall be 9 (230) mm.
For wire dia. W10 - W4 (8.02 - 4.01), length of weld shall be 6 (150) mm.

Other wire dia. shall be tied per detail.

Mortar shall be Grout with mortar. Mortar shall be flush with pipe.

2-Each reinforcement shall have a minimum of 0.058 sq. in. (3.81 sq. mm) nominal area when opening is greater than 2½ (65).

Distance between added pipe and elbow shall be 24 (600) mm. Set elbow to 15° max.

All dimensions are in inches (millimeters) unless otherwise shown.
All dimensions are in inches (millimeters) unless otherwise shown.

**LONGITUDINAL SECTION**

For wire W2 thru W2 (120,000) or W2 (120,000) pipe, length of weld shall be 3 (80) min.
For wire W2 thru W2 (120,000) or W2 (120,000) pipe, length of weld shall be 3 (80) min.
Other wire gauges shall be tied per detail.

**TRANSVERSE SECTION**

For 36 (900) pipe riser, weld outer reinforcement cage of barrel to outer reinforcement cage of riser.

**PLAN**

TEE WITH 24 (600) RISER

**WELDED LAP**

Inner cage-circumferential reinforcement - 0.01 sq. in./ft. (212 mm /m) (min.)
Longitudinal reinforcement is same as for 36 (900) riser.
End connection to fit pipe used.

Grout with mortar

**TIED LAP**

Remove concrete in existing pipe along this line. Clean reinforcement for either tied or welded laps of longitudinal and circumferential reinforcement per detail.

**LONGITUDINAL SECTION**

Inner cage-circumferential reinforcement - 0.01 sq. in./ft. (212 mm /m) (min.)
Longitudinal reinforcement is same as for 36 (900) riser.
End connection to fit pipe used.

Grout with mortar

**TEEE WITH 36 (900) RISER**

**PLAN**

**REINFORCED CONCRETE PIPE TEE**

STANDARD 542606-02
**NEW CONSTRUCTION**

**TRENCH FOR DRAINAGE MAT UNDERDRAIN OPTION**

- Width max. = 7 (180)
- Width min. = 5 (130)
- PCC shoulder
- Stabilized subbase
- Flexible pavement
- Removed wedge
- HMA shoulder

**SECTION A-A**

**PCC SHOULDER**

- Trench shall be placed adjacent to the edge of pavement.
- Improved subgrade (when required)
- 4 (100) minimum pipe underdrain (special)
- Concrete headwall for pipe drain

**SECTION A-A**

**HMA SHOULDER**

- Dimensions and notes not shown shall be as shown in the above Section A-A.

**SECTION B-B**

- 4 (100) minimum pipe underdrain (special)

**GENERAL NOTES**

- See Standard 601001 for details of concrete headwall.
- See Standards 482001, 482006 and 483001 for details of shoulders not shown.
- The 24 (600) radius on the drainage fitting is only a minimum. Larger radii meeting the approval of the Engineer may be substituted.
- All dimensions are in inches (millimeters) unless otherwise shown.
Width max. = 12 (300)
Width min. = O.D. + 4 (100)

PCC or flexible pavement

Trench shall be placed adjacent to the edge of pav',
4 (100) min. pipe underdrain

Subbase granular material Type C
(when required)

Improved subgrade
(when required)

Backfill

Concrete headed
for pipe drain

Flows

The edge of pcc shoulder

PLAN

SECTION A-A

(PCC SHOULDER)

SECTION A-A

(HMA SHOULDER)

(proposed)

Existing shoulder

Existing pavement

Proposed pavement

Proposed surf.

Pavement

SECTION D-D

(TUBING ALTERNATE)

Existing Construction

Except as noted or shown, dimensions and notes
specified for Existing Construction
are the same as those of New Constructions

SECTION C-C

(NeW ConSTruction)

TRENCH FOR CORRUGATED POLYETHYLENE
TUBING ALTERNATE

NEW CONSTRUCTION

SUB-SURFACE DRAINS

STANDARD 601001-04

(Sheet 2 of 2)
Grout headwall
Back of headwall.
Rodent shield inserted 4 - 6 (100-150) into pipe.

End of pipe

Optional handling hole
End of pipe

No. 4 (No. 13) bar
Bar h

GENERAL NOTES
An alternate paved invert meeting the approval of the Engineer may be substituted for that shown in side view.

All dimensions are in inches (millimeters) unless otherwise shown.

CONCRETE HEADWALL
FOR PIPE DRAIN

STANDARD 601101-01
**General Notes**

- Bottom slabs shall be reinforced with a minimum of 0.20 sq. in./ft (420 sq. mm/m) in both directions with a maximum spacing of 12 in. (300 mm).

- Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

See Standard 602601 for optional precast reinforced concrete flat slab tops.

See Standard 602701 for details of steps.

All dimensions are in inches (millimeters) unless otherwise shown.

**Materials for Walls**

<table>
<thead>
<tr>
<th>ALTERNATE</th>
<th>MATERIALS FOR WALLS</th>
<th>D</th>
<th>E</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Masonry Unit</td>
<td>4'-0&quot; (1.2 m)</td>
<td>30 (750)</td>
<td>5 (125)</td>
<td></td>
</tr>
<tr>
<td>Brick Masonry</td>
<td>5'-0&quot; (1.5 m)</td>
<td>30 (750)</td>
<td>5 (125)</td>
<td></td>
</tr>
<tr>
<td>Precast Reinforced Concrete Section</td>
<td>5'-0&quot; (1.5 m)</td>
<td>12 (300)</td>
<td>6 (150)</td>
<td></td>
</tr>
<tr>
<td>Precast Concrete</td>
<td>5'-0&quot; (1.5 m)</td>
<td>12 (300)</td>
<td>6 (150)</td>
<td></td>
</tr>
</tbody>
</table>

* For precast reinforced concrete sections, dimension "D" may vary from the dimension given to plus 6 in. (150 mm).
MATERIALS REQUIRED FOR ONE (1) TYPE B CATCH BASIN

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Shape</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>1</td>
<td>No. 4 (No. 13)</td>
<td>h</td>
<td>3'-5'' (1.02 m)</td>
</tr>
<tr>
<td>h</td>
<td>3</td>
<td>No. 4 (No. 13)</td>
<td>h</td>
<td>5'-9'' (1.72 m)</td>
</tr>
<tr>
<td>u</td>
<td>14</td>
<td>No. 4 (No. 13)</td>
<td>u</td>
<td>7'-0'' (2.10 m)</td>
</tr>
<tr>
<td>v</td>
<td>16</td>
<td>No. 4 (No. 13)</td>
<td>v</td>
<td>4'-6'' (1.35 m)</td>
</tr>
<tr>
<td>x</td>
<td>3</td>
<td>No. 4 (No. 13)</td>
<td>x</td>
<td>6'-9'' (2.02 m)</td>
</tr>
<tr>
<td>Concrete</td>
<td></td>
<td></td>
<td></td>
<td>1'-11'' (580)</td>
</tr>
<tr>
<td>Reinforcement bars</td>
<td></td>
<td></td>
<td></td>
<td>210 (951)</td>
</tr>
</tbody>
</table>

All bars shall be of 12 (300) centers unless otherwise shown. Reinforcement bar clearance shall be 1/2 (15).
**ALTERNATE MATERIALS FOR WALLS**

<table>
<thead>
<tr>
<th>Material</th>
<th>T (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precast Reinforced Concrete Section</td>
<td>3 (76)</td>
</tr>
<tr>
<td>Concrete Masonry Unit</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Cast-in-Place Concrete</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Brick Masonry</td>
<td>6 (150)</td>
</tr>
</tbody>
</table>

**ALTERNATE BOTTOM SLAB**

Precast reinforced concrete slab

**GENERAL NOTES**

- Bottom slabs shall be reinforced with a minimum of 0.07 sq. ft./ft. (0.70 sq. mm/m) in both directions with a maximum spacing of 9 (230).
- Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.
- All dimensions are in inches (millimeters) unless otherwise shown.

**DATE**

<table>
<thead>
<tr>
<th>Revisions</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR-11</td>
<td>1-1-11</td>
</tr>
<tr>
<td>B-07</td>
<td>Added notes to baseline.</td>
</tr>
<tr>
<td>B-07</td>
<td>Added general notes.</td>
</tr>
<tr>
<td>BR-29</td>
<td>Switched units to 40.</td>
</tr>
<tr>
<td>BR-29</td>
<td>English notes.</td>
</tr>
</tbody>
</table>

**CATCH BASIN TYPE C**

**STANDARD 602011-02**
**MATERIALS FOR WALLS**

<table>
<thead>
<tr>
<th>ALTERNATE MATERIALS FOR WALLS</th>
<th>D (in)</th>
<th>C (in)</th>
<th>T (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Masonry Unit</td>
<td>36 (900)</td>
<td>15 (380)</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Block Masonry</td>
<td>36 (900)</td>
<td>15 (380)</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Precast Reinforced Concrete</td>
<td>36 (900)</td>
<td>15 (380)</td>
<td>3 (75)</td>
</tr>
<tr>
<td>Cast-In-Place Concrete</td>
<td>36 (900)</td>
<td>30 (760)</td>
<td>6 (150)</td>
</tr>
</tbody>
</table>

- For precast reinforced concrete sections, dimension "C" may vary from the dimension given above plus 6 (150).

**GENERAL NOTES**

Bottom slabs shall be reinforced with a minimum of 0.20 sq. in./ft. (420 sq. mm/m) in both directions with a maximum spacing of 12 (300) in. for precast reinforced concrete sections alternate is used.

All dimensions are in inches (millimeters) unless otherwise shown.

See Standard 602/01 for details of steps.

See Standard 602/01 for details of steps.
GENERAL NOTES

These structures are for use with concrete barrier, double face, 32 sl (815) height (Standard 637001).

The reinforcement shown in the front elevation of the Type 2 is typical for both elevations of all types.

See Standard 602701 for details of steps.

Exposed edges shall be beveled 1/4 (19).

All dimensions are in inches (millimeters) unless otherwise shown.

FRONT ELEVATION - TYPE 1

SIDE ELEVATION - TYPE 1 & 2

FRONT ELEVATION - TYPE 2

SIDE ELEVATION - TYPE 3

DRAINAGE STRUCTURES

TYPES 1, 2 & 3

STANDARD 602101-02
Type 20 frame & grate
Flow
Concrete barrier
Flow
Steps at 12'-6" (3.75 m) min.
Steps at 12'-6" (3.75 m) min.
12'-6" (3.75 m) max.

Type 22 frames & grates
Flow
Flow
For 4'-0" (1.22 m) to 8'-0" (2.44 m) use No. 5 (No. 16) bars at 8 (200) cts. (all sides).

Type 21 frame & grate
Flow
Concrete barrier
Flow
Steps at 12'-6" (3.75 m) min.
Steps at 12'-6" (3.75 m) min.
12'-6" (3.75 m) max.

GENERAL NOTES
These structures are for use with concrete barrier, double face, 42 (1065) height (Standard 637006).
The reinforcement shown in the front elevation of the Type 5 is typical for both elevations of all types.

For locations and elevations see plans.

Use mortar or sealer (typ).

Exposed edges shall be beveled 1/8" (19).

See Standard 602701 for details of steps.

All dimensions are in inches (millimeters) unless otherwise shown.

DRAINAGE STRUCTURES
TYPES 4, 5 & 6

STANDARD 602106-01
Types 4, 5 & 6

Drainage Structures

No. 4 (No. 13) Bar h
No. 3 (No. 10) Bar g
No. 6 (No. 19) Bar t
No. 5 (No. 16) Bar t1
**Top of masonry**

Concrete fill, 4%

Diameter 24 (600)

Pipe to be laid on a concrete slab

**Elevations**

Reinforced cast-in-place concrete

Pipe to be laid on a minimum grade of 1%

Pipe to be laid on a concrete slab

Precast reinforced concrete section

**Alternate materials for walls**

<table>
<thead>
<tr>
<th>Material</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brick masonry</td>
<td>B</td>
</tr>
<tr>
<td>Cast-in-place concrete</td>
<td>C</td>
</tr>
<tr>
<td>Concrete masonry and mortars</td>
<td>M</td>
</tr>
<tr>
<td>Precast reinforced concrete</td>
<td>T</td>
</tr>
</tbody>
</table>

**Alternate methods**

Bottom slabs shall be reinforced with a minimum of 0.24 sq. in./ft. (510 sq. mm/m) in both directions with a maximum spacing of 10 (250).

Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

All dimensions are in inches (millimeters) unless otherwise shown.

**General notes**

- English (metric)
- Added general notes
- Added max limit to height
- Switched units to English (metric)
- Detailed rein. in slabs
- Precast reinf. conc. section alternate
- Precast reinf. conc. slab, when the precast reinf. conc. section alternate is used

**Inlet - Type A**

**Standard 602301-03**
**General Notes**

- Bottom slabs shall be reinforced with a minimum of 0.20 sq. in./ft. (420 sq. mm/m) in both directions with a maximum spacing of 12 (300).
- Bottom slabs may be connected to the floor as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

See Standard 602601 for optional Precast Reinforced Concrete Flat Slab Top.

All dimensions are in inches (millimeters) unless otherwise shown.

**Materials for Walls**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Masonry Unit</td>
</tr>
<tr>
<td>Brick Masonry</td>
</tr>
<tr>
<td>Precast Reinforced</td>
</tr>
<tr>
<td>Concrete Section</td>
</tr>
<tr>
<td>Cast-in-Place Concrete</td>
</tr>
</tbody>
</table>

**Inlet - Type B**

Switched units to English (metric). Revised general notes.

**Inlet - Type B**

See Standard 602306-03.
**Materials for Walls**

<table>
<thead>
<tr>
<th>ALTERNATE MATERIALS FOR WALLS</th>
<th>D</th>
<th>C</th>
<th>T (min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Masonry Unit</td>
<td>4&quot; (102 mm)</td>
<td>30 (750)</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Brick Masonry</td>
<td>4&quot; (102 mm)</td>
<td>30 (750)</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Precast Reinforced Concrete</td>
<td>4&quot; (102 mm)</td>
<td>30 (750)</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Cast-in-place Concrete</td>
<td>4&quot; (102 mm)</td>
<td>30 (750)</td>
<td>6 (150)</td>
</tr>
</tbody>
</table>

For precast reinforced concrete sections, dimension "C" may vary from the dimension given to plus 6 (150).

**ELEVATION - ECCENTRIC**

**ELEVATION - CONCENTRIC**

**ALTERNATE BOTTOM SLAB**

**General Notes**

- Bottom slabs must be reinforced with a minimum of 0.31 sq. in./ft. (660 sq. mm/m) in both directions with a maximum spacing of 12 (300).
- Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.
- See Standard 602701 for details of steps.
- See Standard 602801 for optional Precast Reinforced Concrete Flat Top.

All dimensions are in inches (millimeters) unless otherwise shown.

**Manhole Type A**

**Stanard 602401-03**
**MATERIALS FOR WALLS**

<table>
<thead>
<tr>
<th>ALTERNATE BOTTOM SLABS</th>
</tr>
</thead>
</table>

**ELEVATION**

(with flat slab top only)

**ELEVATION**

(with flat slab top and riser)

**GENERAL NOTES**

Joint configuration and dimensions of flat slab top shall match and fit the riser joint detail.

Lifting devices shall be approved by the Engineer.

Bottom slabs shall be reinforced with a minimum of \( 0.37 \text{ sq. in.}/\text{ft.} \) (780 sq. mm/m) in both directions with a maximum spacing of \( 10 \text{ in.} \) (250 mm).

Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

See Standard 602701 for details of manhole steps.

All dimensions are in inches (millimeters) unless otherwise shown.

**ELEVATION**

**ALTERNATE JOINT CONFIGURATIONS**

MANHOLE TYPE A

6' (1.8 m) DIAMETER

**DATE**

**REVISIONS**

- 12-17: Added 12 (300) min. from pipe to interm. slab; changed riser to 36 (900) min. height.
- 12-24: Added 12 (300) min. from pipe to interm. slab; changed riser to 36 (900) min. height.
- Revised general notes.

**STANDARD 602406-05**

Sheet 1 of 2
PLAN
Showing Rebar Reinforcement

PLAN
Showing Welded Wire Fabric Reinforcement

<table>
<thead>
<tr>
<th>Diameter of opening</th>
<th>Thickness</th>
<th>Reinforcement</th>
<th>Bar Size</th>
<th>No. 4 (No. 13) Bar C</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'-0&quot; (1.22 m)</td>
<td>2 (200)</td>
<td>1.26 sq. in./ft.</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>5'-0&quot; (1.52 m)</td>
<td>2 (200)</td>
<td>1.26 sq. in./ft.</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>6'-0&quot; (1.83 m)</td>
<td>2 (200)</td>
<td>1.26 sq. in./ft.</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>8'-0&quot; (2.44 m)</td>
<td>2 (200)</td>
<td>1.26 sq. in./ft.</td>
<td>38</td>
<td></td>
</tr>
</tbody>
</table>

MANHOLE TYPE A
6' (1.8 m) DIAMETER

STANDARD 602406-05
**MANHOLE TYPE A**

**7' (2.1 m) DIAMETER**

**ALTERNATE BOTTOM SLABS**

*For precast reinforced concrete sections, this dimension may vary from the dimension given to plus 6 (150).*

**GENERAL NOTES**

- Joint configuration and dimensions of flat slab top shall match and fit the riser joint detail.
- Lifting devices shall be approved by the Engineer.
- Bottom slabs shall be reinforced with a minimum of 0.31 sq. in./ft. (660 sq. mm/m) in both directions with a maximum spacing of 12 (300).
- Bottom slabs may be connected to the riser as determined by the fabricator however, only a single row of reinforcement around the perimeter may be utilized.
- See Standard 602701 for details of manhole slabs.

All dimensions are in inches (millimeters) unless otherwise shown.

**ALTERNATE JOINT CONFIGURATIONS**

- Concrete Masonry Units
- Precast Reinforced
- Concrete Sections
- Prein-Place Concrete

**ELEVATION**

- Flat slab top

**FILL**

- Concrete fill, 1.5% max.
- With Flat Slab Top Only

**ELEVATION**

- Flat slab top and riser

**REINFORCED CONCRETE SLAB**

- Concrete slab
- Precast reinf. conc. slab when alternate is used.
- Sand cushion

**ALTERNATE MATERIALS**

- Concrete Masonry Units
- Precast Reinforced
- Concrete Sections
- Prein-Place Concrete

**DATE**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-11</td>
<td>Revised general notes.</td>
</tr>
<tr>
<td>1-1-12</td>
<td>2 (50)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**MANHOLE TYPE A**

7' (2.1 m) DIAMETER

**Sheet 2 of 2**

*Illinois Department of Transportation*

**PASSED**

**ENGINEER OF POLICY AND PROCEDURES**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**APPROVED**

2012

**ISSUED 4-1-06**

---

**PLAN**

**Showing Reinforcement**

**Typical location**

for lifting device.

---

**PLAN**

**Showing Welded Wire Fabric Reinforcement**

---

**SECTION B-B**

**Typical of each top**
MANHOLE TYPE A
8' (2.4 m) DIAMETER
(With Flat Slab Top and Riser)

**GENERAL NOTES**

- Joint configuration and dimensions of flat slab top shall match and fit the riser joint detail.
- Lifting devices shall be approved by the Engineer.
- Bottom slabs shall be reinforced with a minimum of 0.26 sq. ft./ft. (720 sq. mm/m) in both directions, with a minimum spacing of 10 (255).
- Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.
- See Standard 602701 for details of manhole slabs.
- All dimensions are in inches (millimeters) unless otherwise shown.

**ELEVATION**

- Use mortar or sealer (typ.)
- For precast reinforced concrete sections, the dimension may vary from the dimension given to plus 6 (150).

**ALTERNATE BOTTOM SLABS**

- ALTERNATE MATERIALS

<table>
<thead>
<tr>
<th>Material</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precast Reinforced Concrete</td>
<td>1000</td>
</tr>
<tr>
<td>Precast Reinforced Concrete</td>
<td>125</td>
</tr>
<tr>
<td>Precast Reinforced Concrete</td>
<td>6360</td>
</tr>
<tr>
<td>Precast Reinforced Concrete</td>
<td>125</td>
</tr>
<tr>
<td>Concrete Section</td>
<td>125</td>
</tr>
<tr>
<td>Concrete Section</td>
<td>125</td>
</tr>
<tr>
<td>Concrete Masonry Units</td>
<td>1000</td>
</tr>
</tbody>
</table>

**ALTERNATE JOINT CONFIGURATIONS**

- Concrete fill, 1.25% max.
- Outlet top of masonry
- Reinforced cast-in-place concrete
- Use mortar or sealer (typ.)
- Concrete Masonry Units
- Sand cushion
- Flat slab top
- Reinforced cast-in-place concrete
- Precast reinforced concrete slabs
- Precast reinforced concrete

**STANDARD 602416-03**

(A Sheet 1 of 2)
Typical Insertion for lifting device.

Typical insertion for lifting device.

**No. 8 (No. 25) bars top & bottom

**No. 8 (No. 25) bars top & bottom

**A maximum of two layers of welded wire fabric may be used to satisfy the required "As" for each mat.

Bar C top & bottom

(See Table)

Bar C top & bottom

(See Table)

Top mat ****

Bottom mat ****

No. 7 (No. 22)

**No. 8 (No. 25)

1.57 sq. in./ft.

2.19 m)

8'-6'' (2.55 m)

1.20 sq. in./ft.

2.540 sq. in./ft.

4'-0'' (1.22 m)

0.22 sq. in./ft.

0.22 sq. in./ft.

470 sq. mm/m

470 sq. mm/m

Bar C top & bottom

(See Table)

Reinforcement:

<table>
<thead>
<tr>
<th>Diameter (in.)</th>
<th>Class (ld.)</th>
<th>Bar Size</th>
<th>Reinforcement</th>
<th>As (min.) (in.):</th>
</tr>
</thead>
<tbody>
<tr>
<td>8' (2.4 m)</td>
<td>200</td>
<td>No. 4</td>
<td>470 sq. mm/m</td>
<td>0.22 sq. in./ft.</td>
</tr>
<tr>
<td>8' (2.4 m)</td>
<td>200</td>
<td>No. 4</td>
<td>470 sq. mm/m</td>
<td>0.22 sq. in./ft.</td>
</tr>
<tr>
<td>8' (2.4 m)</td>
<td>200</td>
<td>No. 4</td>
<td>470 sq. mm/m</td>
<td>0.22 sq. in./ft.</td>
</tr>
<tr>
<td>8' (2.4 m)</td>
<td>200</td>
<td>No. 4</td>
<td>470 sq. mm/m</td>
<td>0.22 sq. in./ft.</td>
</tr>
</tbody>
</table>

**Diameter

**Class

**Bar Size

**Reinforcement

**As (min.) (in.):
MANHOLE TYPE A
9' (2.7 m) DIAMETER

GENERAL NOTES
Joint configuration and dimensions of flat slab top shall match and fit the riser joint detail.
Lifting devices shall be approved by the Engineer.
Bottom slabs shall be reinforced with a minimum of 0.21 sq. ft. (0.07 sq. m) in both directions with a maximum spacing of 10 (250). Bottom slabs may be connected to the riser as determined by the fabricator, however, only a single row of reinforcement around the perimeter may be utilized.
See Standard 602701 for details of manhole bottom.
All dimensions are in inches (millimeters) unless otherwise shown.

ALTERNATE BOTTOM SLABS

ALTERNATE JOINT CONFIGURATIONS

ALTERNATE MATERIALS FOR RISER WALLS

<table>
<thead>
<tr>
<th>ALTERNATE MATERIALS</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Masonry Unit</td>
<td>300</td>
</tr>
<tr>
<td>Precast Reinforced Concrete Sections</td>
<td>300</td>
</tr>
<tr>
<td>Cast-In-Place Concrete</td>
<td>300</td>
</tr>
</tbody>
</table>

DATE  REVISIONS
1-1-12  Changed shape to 9' (2.7 m) minimum height.
2-28-12  Modified note, detail in slabs.
3-1-12  Added dimension to riser.

Revised general notes.

STANDARD 602421-03
**MANHOLE TYPE A**

**9’ (2.7 m) DIAMETER**

**Diameter**

<table>
<thead>
<tr>
<th>Reinforcement</th>
<th>Bar Size</th>
<th>No. 4 (No. 13)</th>
<th>No. 8 (No. 25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top mat</td>
<td>Dia. 4 (13)</td>
<td>24 (600)</td>
<td>24 (600)</td>
</tr>
<tr>
<td>Top mat</td>
<td>Dia. 8 (25)</td>
<td>51 (1300)</td>
<td>51 (1300)</td>
</tr>
<tr>
<td>Bottom mat</td>
<td>Dia. 4 (13)</td>
<td>51 (1300)</td>
<td>51 (1300)</td>
</tr>
<tr>
<td>Bottom mat</td>
<td>Dia. 8 (25)</td>
<td>51 (1300)</td>
<td>51 (1300)</td>
</tr>
</tbody>
</table>

Use mortar or sealer (typ.)

**PLAN**

- Showing Top & Bottom Bar C
- Showing Welded Wire Fabric Reinforcement

**SECTION B-B**

- PLAN
- Showing Top & Bottom Bar C
- Showing Welded Wire Fabric Reinforcement

**Typical location for lifting device.**

- Bottom mat of rebar shown.
- Top & bottom at 12 (300)
- Centers each direction.

**For lifting device.**

- Top mat of rebar shown.
- Top & bottom at 12 (300)
- Centers each direction.

**Top mat is placed at 12 (300)**

**Bottom mat of rebar shown.**

**Top & bottom at 12 (300)**

**Welded wire fabric typical placed at top and bottom.**

**Top & bottom Bar C**

**Top & bottom Bar C**

**Welded wire fabric typical placed at top and bottom.**

**PLAN**

**SECTION B-B**

**MANHOLE TYPE A**

**9’ (2.7 m) DIAMETER**

**STANDARD 602421-03**

**ISSUED 4-1-06**
The cone of the valve vault shall be constructed as shown above only when there is interference with underground conditions and those conditions cannot be altered.

The cone of the valve vault shall be constructed as shown above only when there is interference with underground conditions and those conditions cannot be altered.

**ELEVATION**

**ALTERNATIVE METHODS**

**GENERAL NOTES**

Bottom slabs shall be reinforced with a minimum of 0.1 sq. ft./ft. (660 sq. mm/m) in both directions, with a maximum spacing of 2 (50).

Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be used.

See Standard 602601 for optional Precast Reinforced Concrete Flat Top Slabs.

All dimensions are in inches (millimeters) unless otherwise shown.

**DATE**

**REVISIONS**

3-1-11 Detailed reinforcement in shop, Revised general notes.

1-1-09 Revisions in elev.

**VALVE VAULT TYPE A**

**STANDARD 602501-02**
**LIFTING HOLE OR LIFTING LOOP**

**TYPICAL**

(3 required per side)

**PLAN**

(WELDED WIRE FABRIC)

**SECTION A-A**

**ALTERNATE JOINT CONFIGURATIONS**

**TABLE**

<table>
<thead>
<tr>
<th></th>
<th>D</th>
<th>0</th>
<th>T</th>
<th>S</th>
<th>4</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>0 240</td>
<td>0 240</td>
<td>0 240</td>
<td>0 240</td>
<td>0 240</td>
<td>0 240</td>
<td>0 240</td>
</tr>
<tr>
<td>36</td>
<td>0 310</td>
<td>0 310</td>
<td>0 310</td>
<td>0 310</td>
<td>0 310</td>
<td>0 310</td>
<td>0 310</td>
</tr>
</tbody>
</table>

**SECTION B-B**

**GENERAL NOTES**

The flat slab top may be used in lieu of the tapered tops shown on Standards 602001, 602003, 602005, 602006, 602009, or 602010 at the option of the Contractor or when field conditions prohibit the use of tapered tops. All dimensions are in millimeters (inches) unless otherwise shown.

**DATE**

REVIsIONS

**ENGINEER OF POLICY AND PROCEDURES**

**ENGINEER OF DESIGN AND ENVIRONMENT**

APPROVED 2009

ISSUED 1-1-97

January 1,

January 1,
MANHOLE STEPS

CAST IRON STEPS

PLAN VIEW

SECTION A-A

ELEVATION VIEW

As dimensions are in inches (millimeters), unless otherwise shown.

1-1-09

10 (250) mm.

DATE

REVISIONS

1-1-97

5/1/09

Switched units to English (metric).

4-1-06

Revised title, drawings, and added plant steps on sheet 2.
CAST FRAME

SECTION B-B

SECTION C-C

CAST GRATE

SECTION D-D

SECTION A-A

ALTERNATE CURB BOX

SECTION E-E

FRAME AND GRATE

TYPE 3

STANDARD 604006-04

All dimensions are in inches unless otherwise shown.

English inches

Metric millimeters
As dimensions are in inches (millimeters) unless otherwise shown.

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

CAST FRAME

CAST GRATE

FRAME AND GRATE

TYPE 4

STANDARD 604016-02

DATE

REVISED DATE

6-1-02

Switched units to English metric.

1-1-97

4-1-94

Removed weights.
SECTION C-C
CAST OPEN LID

SECTION D-D
CAST CLOSED LID
Gray Iron

SECTION E-E

SECTION B-B
CAST FRAME
Gray Iron

SECTION A-A
CAST BASE
Gray Iron

DETAIL OF BOLTING
FRAME TO BASE

Wing bolts shall be removed after pavement has been placed.

GENERAL NOTES
The four holes in the cast base may be rotated 45° from the position shown in section A-A.

All dimensions are in inches (millimeters) unless otherwise shown.

BASE, FRAME AND LIDS TYPE 5
STANDARD 604021-02
All dimensions are in inches (millimeters) unless otherwise shown.

**SECTION A-A**

**CAST FRAME**

**SECTION B-B**

**SECTION C-C**

**SECTION D-D**

- 1 (25) bars

**CAST GRATE**

**FRAME AND GRATE**

- **TYPE 6**

**STANDARD 604026-02**

- Moved weights
- Removed weights
- Switched units to English system
- Changed units to metric

**DATE**

- 1-1-97
- 1-1-04
- 1-1-09

**REVISIONS**

- 1-1-97
- 1-1-04
- 1-1-09
CAST GRATE

All dimensions are in inches (millimeters) unless otherwise shown.

SECTION A-A

SECTION B-B

GRATE TYPE 7

STANDARD 604031-02
CAST GRATE

SECTION A-A

All dimensions are in inches (millimeters) unless otherwise shown.

GRAVE TYPE 8

STANDARD 604036-02

DATE  REVISIONS
1-1-04  Removed weights
1-1-09  Switched units to English metric

1-1-97 1-1-09

English (metric). Switched units to
SECTION A-A
CAST FRAME

SECTION B-B

SECTION C-C
CAST GRATE

SECTION D-D

CAST FRAME
FRAME AND GRATE
TYPE 9
STANDARD 604041-02

DATE
REVISIONS
1-1-97
Issued
1-1-97
Passed
1-1-04
Approved

1-1-09
English (metric).
Used dimensions are in inches (millimeters) unless otherwise shown.

All dimensions are in inches (millimeters) unless otherwise shown.

1. 6/4 (159) max. (typ.)
2. 1/4 (19) min. (typ.)
SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

CAST FRAME

CAST GRATE

All dimensions are in inches (millimeters) unless otherwise shown.

FRAME AND GRATE

TYPE 10

STANDARD 604046-02
NOTE:

Warped sloping faces of curbs in a distance of 5' (1.5 m) to the cross section shown on the frame.

No. 6 x 36 (No. 20 x 900), rebar required when X ≥ 5 (125) or more

X /2 at inlet.

Slope pavement or gutter flaps 12% at inlet.

All dimensions are in inches (millimeters) unless otherwise shown.
(13) Dia. tapped holes for bolting down grate, four places.
(13) Dia. countersinked holes for grate alignment, two places.
(14) Dia. holes for safety bars, four places.
(572) 22x9x25 Safety bar
(130) 5" (886)
(51) 2 (19) 35°
(610) 24 (578) 22x9 (530) 20
(25) 1 (51) 2
(64) 2
(25) 1
(51) 2
(38) 1 (25) 1
(51) 2
(25)
(19) 35°
(130) 5"
(610) 24
(578) 22x9
(530) 20

dimensions are in inches (millimeters) unless otherwise shown.

FRAME AND GRATE
TYPE 20
STANDARD 604071-04

DATE REVISIONS
1-1-07 Revised frame flanges, changed to a bolt down grate w/ deeper vane
1-1-09 Switched units to English (metric).
1-1-07 Revised frame flanges, changed to a bolt down grate w/ deeper vane.
Illinois Department of Transportation

PASSED
ENGINEER OF POLICY AND PROCEDURES
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
ISSUED 1-1-97

DATE
REVISIONS

1-1-09
2009

226x69
226x69

(610)
(581)
22‡

(130)
5"
(578)
22ƒ

(886)
34‡

(3 6 5 )
1 4 …
(1 8 8 )
8 …

(237)

Screw, & washer.
† (M16) Galv. bolt,

22x69
22x69

(572x19x25)
22ƒxƒx1

Safety bar,

22x69
22x69

(578)
22ƒ

4 5 °
3 5 °

(19) Thick
R
1' (32)
(38)

(19) Dia. tapped
holes for bolting down grate, four places.

(13) Dia. stainless steel
bolts w/ washers, through
counter bored holes or slots.

(14) Dia. holes
two places.

for grate alignment,

Œ (14) Dia. holes
(19)
2 (25)
1

1 (25)
6

3 8
1 52
6

(16)
†
(19)
ƒ

(25)
1
(51)
2

(19)
†
(25)
1
(51)
2

(19)

(229)
9

(143)
5 †

(610)
2 4
(578)
2 2 ƒ

(3 8 )
1

(152)
6

2 (51)
2

(51)
2

(572)
2 2 

(3 8 )
1 

(152)
6

Unless otherwise shown.

All dimensions are in inches (millimeters)

Switched units to
English (metric).

Revised frame flanges,
changed to a bolt down
grate w/ deeper vane.

SECTION C-C

SECTION B-B

SECTION D-D

SECTION A-A

SECTION E-E

CAST FRAME

CAST GRATE

CURB BOX

FRAME AND GRATE

TYPE 21

STANDARD 604076-04
\[
\frac{3}{8} \text{ in.} \times 6\text{ in.} \text{ galv. hex. head bolt & nut with gat, washer}
\]

Three \(\frac{3}{8} \text{ in.} \times 6\text{ in.} \) bolts with washers, through counter bored holes or slots, four places each grate.
All dimensions are in inches (millimeters) unless otherwise shown.

FRAME AND GRATE
TYPE 23
STANDARD 604086-02

SECTION A-A

SECTION B-B

SECTION C-C

DETAIL A

DETAIL B

SECTION D-D

PLAN - FRAME

GRATE

SECTION A-A

See DETAIL A

See DETAIL B

Revised frame and removed weights.

Switched units to English (metric).

1-1-09
1-1-04

DATE
REVISIONS
Traffic

Concrete apron, 4 (100) thick

Median

LOCATION SKETCH - PLAN

GENERAL NOTES

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.
- All dimensions are in inches (millimeters) unless otherwise shown.

REINFORCED CONCRETE PIPE

STANDARD 604101-01

MEDIAN INLET for 24" (600 mm)

SECTION B-B

SECTION A-A

DATE

REVISIONS

1-1-09

English

1-1-97

2250-3

REVISED

STANDARD 604101-01

Illinois Department of Transportation

PASSED

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ENGINEER OF POLICY AND PROCEDURES

January 1,

1-1-97

Traffic

Concrete apron, 4 (100) thick

Median

LOCATION SKETCH - PLAN

GENERAL NOTES

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.
- All dimensions are in inches (millimeters) unless otherwise shown.

REINFORCED CONCRETE PIPE

STANDARD 604101-01

MEDIAN INLET for 24" (600 mm)

SECTION B-B

SECTION A-A

DATE

REVISIONS

1-1-09

English

1-1-97

2250-3

REVISED

STANDARD 604101-01

Illinois Department of Transportation

PASSED

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ENGINEER OF POLICY AND PROCEDURES

January 1,

1-1-97

Traffic

Concrete apron, 4 (100) thick

Median

LOCATION SKETCH - PLAN

GENERAL NOTES

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.
- All dimensions are in inches (millimeters) unless otherwise shown.

REINFORCED CONCRETE PIPE

STANDARD 604101-01

MEDIAN INLET for 24" (600 mm)

SECTION B-B

SECTION A-A

DATE

REVISIONS

1-1-09

English

1-1-97

2250-3

REVISED

STANDARD 604101-01

Illinois Department of Transportation

PASSED

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ENGINEER OF POLICY AND PROCEDURES

January 1,

1-1-97

Traffic

Concrete apron, 4 (100) thick

Median

LOCATION SKETCH - PLAN

GENERAL NOTES

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.
- All dimensions are in inches (millimeters) unless otherwise shown.

REINFORCED CONCRETE PIPE

STANDARD 604101-01

MEDIAN INLET for 24" (600 mm)

SECTION B-B

SECTION A-A

DATE

REVISIONS

1-1-09

English

1-1-97

2250-3

REVISED

STANDARD 604101-01

Illinois Department of Transportation

PASSED

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ENGINEER OF POLICY AND PROCEDURES

January 1,

1-1-97

Traffic

Concrete apron, 4 (100) thick

Median

LOCATION SKETCH - PLAN

GENERAL NOTES

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.
- All dimensions are in inches (millimeters) unless otherwise shown.

REINFORCED CONCRETE PIPE

STANDARD 604101-01

MEDIAN INLET for 24" (600 mm)

SECTION B-B

SECTION A-A

DATE

REVISIONS

1-1-09

English

1-1-97

2250-3

REVISED

STANDARD 604101-01

Illinois Department of Transportation

PASSED

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ENGINEER OF POLICY AND PROCEDURES

January 1,

1-1-97

Traffic

Concrete apron, 4 (100) thick

Median

LOCATION SKETCH - PLAN

GENERAL NOTES

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.
- All dimensions are in inches (millimeters) unless otherwise shown.

REINFORCED CONCRETE PIPE

STANDARD 604101-01

MEDIAN INLET for 24" (600 mm)

SECTION B-B

SECTION A-A

DATE

REVISIONS

1-1-09

English

1-1-97

2250-3

REVISED

STANDARD 604101-01

Illinois Department of Transportation

PASSED

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ENGINEER OF POLICY AND PROCEDURES

January 1,

1-1-97

Traffic

Concrete apron, 4 (100) thick

Median

LOCATION SKETCH - PLAN

GENERAL NOTES

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.
- All dimensions are in inches (millimeters) unless otherwise shown.

REINFORCED CONCRETE PIPE

STANDARD 604101-01

MEDIAN INLET for 24" (600 mm)

SECTION B-B

SECTION A-A

DATE

REVISIONS

1-1-09

English

1-1-97

2250-3

REVISED

STANDARD 604101-01

Illinois Department of Transportation

PASSED

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ENGINEER OF POLICY AND PROCEDURES

January 1,

1-1-97

Traffic

Concrete apron, 4 (100) thick

Median

LOCATION SKETCH - PLAN

GENERAL NOTES

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.
- All dimensions are in inches (millimeters) unless otherwise shown.

REINFORCED CONCRETE PIPE

STANDARD 604101-01

MEDIAN INLET for 24" (600 mm)

SECTION B-B

SECTION A-A

DATE

REVISIONS

1-1-09

English

1-1-97

2250-3

REVISED

STANDARD 604101-01

Illinois Department of Transportation

PASSED

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ENGINEER OF POLICY AND PROCEDURES

January 1,

1-1-97

Traffic

Concrete apron, 4 (100) thick

Median

LOCATION SKETCH - PLAN

GENERAL NOTES

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.
- All dimensions are in inches (millimeters) unless otherwise shown.

REINFORCED CONCRETE PIPE

STANDARD 604101-01

MEDIAN INLET for 24" (600 mm)

SECTION B-B

SECTION A-A

DATE

REVISIONS

1-1-09

English

1-1-97

2250-3

REVISED

STANDARD 604101-01

Illinois Department of Transportation

PASSED

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ENGINEER OF POLICY AND PROCEDURES

January 1,

1-1-97

Traffic

Concrete apron, 4 (100) thick

Median

LOCATION SKETCH - PLAN

GENERAL NOTES

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.
- All dimensions are in inches (millimeters) unless otherwise shown.

REINFORCED CONCRETE PIPE

STANDARD 604101-01

MEDIAN INLET for 24" (600 mm)

SECTION B-B

SECTION A-A

DATE

REVISIONS

1-1-09

English

1-1-97

2250-3

REVISED

STANDARD 604101-01

MEDIAN INLET for 24" (600 mm)
Frame 1:4 or 1:6
Grate 45°
4 % Slope
Welded wire fabric

11 of pipe)
(13) PJF joint
Riser pipe
(67)
2†
(38)
1∥
(64)
2∥
(44)
1ƒ
(152)
6
(19)
ƒ
5°
(6)
124
(127)
5
(76)
3
(914)
36
(1.00 m)
39∥
(1.07 m)
42"
**DEPRESSED CURB (TYPICAL)**

- **Tie bar**
- **MOUNTABLE CURB**
- **Adjacent to PCC Pavement or PCC Base Course**

**TABLE OF DIMENSIONS**

<table>
<thead>
<tr>
<th>Type</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BARRIER CURB</strong></td>
<td>(450)</td>
<td>(150)</td>
<td>(50)</td>
<td>(150)</td>
<td>(50)</td>
</tr>
<tr>
<td><strong>MOUNTABLE CURB</strong></td>
<td>(450)</td>
<td>(150)</td>
<td>(50)</td>
<td>(150)</td>
<td>(50)</td>
</tr>
</tbody>
</table>

**ADJACENT TO PCC BASE COURSE WITH HMA SURFACING**

- **Gutter flag width:** 
  - **TIE BAR**

**CONCRETE CURB TYPE B AND COMBINATION CURB AND GUTTER**

**GENERAL NOTES**

- The bottom slope of construction curbs and gutter constructed adjacent to pcc pavement shall be the same slope as the subbase or 6% when subbase is omitted.
- All dimensions are in inches (millimeters) unless otherwise shown.

**CONCRETE CURB AND GUTTER**

**EXPANSION JOINT**

- Drainage casting
- Full depth & width: 1 (50) - thick (min.) preformed expansion joint filler.

**DETAIL A**

- Expansion gap

**PLAN**

- **Adjacent to PCC Pavement or PCC Base Course**

- **Barrier Curb**
- **Mountable Curb**

**DATE**

- **2013**
- **2013**
- **2013**

**CONCRETE CURB AND GUTTER**

- **Depressed Curb Adjacent to Curb Ramp Accessible to the Disabled**

- **Switched units to English (metric).**

**ADJACENT TO PCC BASE COURSE**

- **Pavement**
- **Tie bar**
- **Pavement expansion joint with or without dowels**

**Pavement**

- **Slopes 6%**
- **R-1**
- **R-2**
- **R-3**
- **R-4**

**RAMP RETURNS**

- **Such as entrances, side streets and roundabouts.**

**SWITCHED UNITS TO ENGLISH (METRIC).**

- **This dimension shall be adjusted to align with joint on an adjacent pavement.**

- **DATE**

- **2013**
- **2013**
- **2013**

**CONCRETE CURB TYPE B AND COMBINATION CURB AND GUTTER**

- **M-2.06 (M-5.15) and M-2.12 (M-5.30)**

**DATE**

- **2013**
- **2013**
- **2013**

**CONCRETE CURB AND GUTTER**

- **Depressed Curb Adjacent to Curb Ramp Accessible to the Disabled**

**DETAIL A**

- **Expansion Joint**
- **Drainage casting**
- **Full depth & width:** 1 (50) - thick (min.) preformed expansion joint filler.
Short radius curve

A

Undoweled contraction joint (typ.)
construction continues:

1. Form with %2 (13) thick steel template
   2. 10S deep, and seal.
   3. Saw 2 (50) deep at 4 to 24 hours, and seal.

Insert %6 (22) thick preformed joint filler
full depth and width.

2-No. 4 (No. 13) bars
placed at mid-depth
(when space permitted)

Edge of
pavement

Construction joint
2-No. 4 (No. 13) bars
with 2 (50) min. cl.

Drainage casting
without curb box
Back of curb

2-No. 4 (No. 13) bars
placed at mid-depth
(when space permitted)

Edge of
pavement

Mountable curb shown
(other types permitted)

ON DISTURBED SUBGRADE

ON UNDISTURBED SUBGRADE

CONCRETE CURB TYPE B

ADJACENT TO FLEXIBLE PAVEMENT

ADJACENT TO PCC PAVEMENT OR PCC BASE COURSE

Pavement

Tie bar

PLAN

0'-0" (0.0 m)

5'-0" (1.5 m)

12 (300)

Standard 606001-05

Concrete Curb and Gutter

ON DISTURBED SUBGRADE

ON UNDISTURBED SUBGRADE

Pavement

BARRIER CURB

BARRIER CURB

DEPRESSED CURB

DEPRESSED CURB

Adjacents to Flexible Pavement

Adjacent to Flexible Pavement

Adjacent to PCC Pavement or PCC Base Course
General Notes:

- Tie bars shall be No. 6 (No. 19) at 24 (600) centers unless otherwise shown.
- Tie bars shall be No. 6 (No. 19) at 24 (600) centers unless otherwise shown.

- Gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joints shown on Standard 030001.

- If the average grade of pavement for the distance from Section A-A to D-D exceeds 2%, this distance shall be increased 6' (1.8 m) for each 1% increase in grade.

- All dimensions are in inches (mm) unless otherwise shown.

- Switched units to English (metric) in accordance with details for longitudinal construction joints shown on Standard 030001.

- Gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joints shown on Standard 030001.

- If the average grade of pavement for the distance from Section A-A to D-D exceeds 2%, this distance shall be increased 6' (1.8 m) for each 1% increase in grade.

- All dimensions are in inches (mm) unless otherwise shown.

Quantities:

For Section A-A to E-E and certain walls:
- 2.38 cu. yds. (2.22 m³) concrete for 9 (225) pav't.
- 2.38 cu. yds. (2.22 m³) concrete for 10 (250) pav't.

For Section F-F:
- 0.069 cu. yds. (0.17 m³) concrete per ft. (m)

Sections:

- Sections A-A to E-E
- Section B-B
- Section C-C
- Section D-D
- Section E-E
- Section F-F
- Section G-G

Outlets for Concrete

Curb and Gutter

Type B-6.24 (B-15.60)

Standard outlet

Date: 1-1-07

Revisions: 1-1-07

Standard 606006-02

Sheet 1 of 2
2.01 cu. yds. (1.54 m³) concrete for 10 (250) pav't.
2.07 cu. yds. (1.60 m³) concrete for 9 (225) pav't.

**Type 1 Outlet**

**Quantities**
- 2.01 cu. yds. (1.54 m³) concrete for 10 (250) pav't.
- 2.07 cu. yds. (1.60 m³) concrete for 9 (225) pav't.

**Type 2 Outlet**

**Quantities**
- 2.07 cu. yds. (1.60 m³) concrete for 10 (250) pav't.
Shoulder paved

Section A-A

Section B-B

Section C-C

Plan

Expansion Joint

Type A Gutter

Inlet

Standard 606101-04

All dimensions are in inches or millimeters unless otherwise shown.

Type A Gutter

(Inlet, Outlet & Entrance)

Sheet 1 of 3

DATE

REVISIONS

1-1-09

Switched units to

English metric. Changed

Red, adjusted city.

1-1-09

B'-B' to B-B

In quantities under plan.

Illinois Department of Transportation

PASSED

2009

ENGINEER OF POLICY AND PROCEDURES

APPROVED

2009

ISSUED

1-1-97

January 1,

January 1,

edge

Rolled

edge

Rolled

edge

Rolled

edge

Expansion
dowels

1x18 (25x450)
dowel bars

Flow line

min. 3' (1 m)

with HMA shoulders

or at 25' (7.6 m) cts.

with pcc shoulder joints

Placed in prolongation

with pre shoulder joints

or at 25 (7.6 m) cts.

with HMA shoulders

Preformed expansion joint

10% 1.25x450

dowel bar

EXPANSION JOINT

SECTION D-D

INLET, OUTLET & ENTRANCE

TYPE A GUTTER

QUANTITY OF CONCRETE

Section A-A to C-C

0.83 cu. yd. (0.71 m³)

Standard 606101-04
**Type A Gutter**

*(Inlet, Outlet & Entrance)*

**Standard 606101-04**

**Plan**

Sections A-A & D-D

Sections B-B & C-C

**Quantities of Concrete**

- **Commercial Entrances**
  - Section B-B to C-C = 0.25 cu. yd./ft. (0.62 m³/m)
  - All Other Entrances
    - Section B-B to C-C = 0.20 cu. yd./ft. (0.50 m³/m)

**Note:**

- Welded wire fabric shall be installed at mid-depth from Section A-A to D-D.
- 18 lbs./100 sq. ft. (2.83 kg/m²)

- Rolled shoulder

- Rolled edge

- 1x18, 25x450 dowel bars

**Sections**

- L-A
- L-B
- L-C
- L-D

**Flow Line**

**Eased of Rolled Shoulder**

**Ensemble**

- 1x18, 25x450 dowel bars
**INLET, OUTLET & ENTRANCE**

**TYPE A GUTTER**

**STANDARD 606101-04**

**SECTION A-A**

- Rolled edge
- Shld. (150) R
- Edge of paved shld.
- 18 (450)

**SECTION B-B**

- Rolled edge
- Shld. (150) R
- Edge of outlet to convert to slope
- 125 (3,180)

**SECTION C-C**

- Rolled edge
- Shld. (150) R
- 33 (834)

**SECTION D-D**

- Rolled edge
- 23 (585)

**SECTION E-E**

- Rolled edge
- Shld. (150) R
- Edge of outlet to convert to slope
- Rolled edge

**SECTION F-F**

- Rolled edge
- Welded wire fabric
- 24 (600)

**SECTIONS AT END OF OUTLET**

- Rolled edge
- Welded wire fabric

**OUTLET**

- 6'-0" (1.8 m)
- 12'-0" (3.6 m)
- Flow line

---

**NOTE**

- If the average grade of pavement for the distance A-B exceeds 2%, the distance shall be increased 6' (1.8 m) for each 1% increase in grade.

**QUANTITY OF CONCRETE**

- Section A-A to Section E-E = 0.079 cu. yd./ft. (0.2 m³/m).
- Section F-F = 0.0219 cu. yd./ft. (0.07 m³/m).

---

**Flow line**

- 7'-4" (2.2 m)
- 3'-4" (1.02 m) R
- Welded wire fabric to begin here.

---

**Flow line**

- 3'-4" (1.02 m) R
- Welded wire fabric

---

**Flow line**

- 3'-4" (1.02 m) R
- Welded wire fabric

---

**Flow line**

- 3'-4" (1.02 m) R
- Welded wire fabric

---

**Flow line**

- 3'-4" (1.02 m) R
- Welded wire fabric

---

**Edge of paved shld.**

- Edge of shoulder

---

**Flow line**

- 3'-4" (1.02 m) R
- Welded wire fabric

---

**Flow line**

- 3'-4" (1.02 m) R
- Welded wire fabric

---

**Flow line**

- 3'-4" (1.02 m) R
- Welded wire fabric

---

**Flow line**

- 3'-4" (1.02 m) R
- Welded wire fabric

---

**Flow line**

- 3'-4" (1.02 m) R
- Welded wire fabric
The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

All dimensions are in inches (millimeters) unless otherwise shown.

**NOTE**

1. If the average grade of pavement for the distance A-E exceeds 2%, this distance shall be increased 6 ft. (1.8 m) for each 1% increase in grade.

2. The distance A-E exceeds 2%, this distance shall be increased 6 ft. (1.8 m) for each 1% increase in grade.

3. The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

4. All dimensions are in inches (millimeters) unless otherwise shown.

**QUANTITIES**

<table>
<thead>
<tr>
<th>Material</th>
<th>Single</th>
<th>Double</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete - cu. yd. (m³)</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Cast Iron Grate - Ea.</td>
<td>3.07</td>
<td>3.07</td>
</tr>
<tr>
<td>Cast Iron Cover - Ea.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Pipe Drain - Dia. in. (mm)</td>
<td>375</td>
<td>375</td>
</tr>
<tr>
<td>Cast Iron Grate - Dia. in. (mm)</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Cast Iron Cover - Dia. in. (mm)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Concrete - cu. yd. (m³)</td>
<td>2.35</td>
<td>2.35</td>
</tr>
<tr>
<td>Concrete - cu. yd. (m³)</td>
<td>4.33</td>
<td>4.33</td>
</tr>
<tr>
<td>Cast Iron Grate - Dia. in. (mm)</td>
<td>3.31</td>
<td>3.31</td>
</tr>
<tr>
<td>Cast Iron Cover - Dia. in. (mm)</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

All dimensions are in inches (millimeters) unless otherwise shown.

**OUTLETS TYPE 2**

FOR TYPE A GUTTER

**STANDARD 606111-03**
**GENERAL NOTES**

- Tie bars shall be No. 6 (No. 19) at 24 (600) centers unless otherwise shown.
- Gutter, gutter inlet, gutter outlet and gutter entrance shall be flush to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.
- The 1-1/4 x 18 (32 x 450) dowel bars shall be installed at all joints when the gutter is constructed adjacent to flexible pavement.
- All dimensions are in inches (millimeters) unless otherwise shown.

**TYPE B GUTTER (INLET, OUTLET & ENTRANCE)**

**DATE**

- 1-1-09

**REVISIONS**

- Switched units to English (metric). Changed units to English (metric). Soft converted metric to English (metric).

**STANDARD 606201-02**

**Sheet 1 of 2**
NOTE:
1. Edge of outlet to conform to lane of shoulder.
2. Center line of outlet to conform to edge of pavement.
3. Flow line to begin here.
4. Tie bars to be used each 1% increase in grade.
5. Distance shall be increased 6' (1.8 m) for the distance A-D exceeds 2%.
6. If the average grade of pavement for the distance A-D exceeds 2%, the distance shall be increased 6' (1.8 m) for each 1% increase in grade.
7. Welded wire fabric (not less than 58 lbs./100 sq. ft.) shall be used behind the outlet box
8. Flow line to begin here.
9. Tie bars to be used each 1% increase in grade.
10. Distance shall be increased 6' (1.8 m) for the distance A-D exceeds 2%.
11. If the average grade of pavement for the distance A-D exceeds 2%, the distance shall be increased 6' (1.8 m) for each 1% increase in grade.
12. Welded wire fabric (not less than 58 lbs./100 sq. ft.) shall be used behind the outlet box
13. Flow line to begin here.
14. Tie bars to be used each 1% increase in grade.
15. Distance shall be increased 6' (1.8 m) for the distance A-D exceeds 2%.
16. If the average grade of pavement for the distance A-D exceeds 2%, the distance shall be increased 6' (1.8 m) for each 1% increase in grade.
17. Welded wire fabric (not less than 58 lbs./100 sq. ft.) shall be used behind the outlet box
18. Flow line to begin here.
19. Tie bars to be used each 1% increase in grade.
20. Distance shall be increased 6' (1.8 m) for the distance A-D exceeds 2%.
21. If the average grade of pavement for the distance A-D exceeds 2%, the distance shall be increased 6' (1.8 m) for each 1% increase in grade.
The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

Tie bars shall be No. 6 (No. 19) at 24 (600) centers unless otherwise shown.

If the average grade of the pavement for the distance D-D exceeds 2%, this distance shall be increased 6'-0" (1.8 m) for each 1% increase in grade.

All dimensions are in inches (millimeters) unless otherwise shown.

**General Notes**

**Quantities**

<table>
<thead>
<tr>
<th>Material</th>
<th>Single</th>
<th>Double</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Cast Iron Grate + Eq.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Pipe Drain - Dia.</td>
<td>19 (500)</td>
<td>19 (500)</td>
</tr>
</tbody>
</table>

**Type B Gutter**

OUTLET TYPE 1 FOR STANDARD 606206-03

DATE: 1-1-97

REVISIONS: 1-1-00, 2009

English (metric) switched units to

 soft converted metric

Diameter, tons, weight

of grate.
Pavement.
Align with joint in adjacent pavement and median end.

alignment.

PEJF = Preformed expansion joint filler.

Median keyway and roll shall be as shown on the plans.

Keyed longitudinal construction joints shall be constructed without the use of tie bars.

X = PCC base course plus HMA thickness.

A = Movement or pcc base course thickness.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

PCC or HMA (var. thickness)

Improved subgrade

PCC or HMA

Slope 1:1

PCC pavement

Improved subgrade

Keyed longitudinal construction joint

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Fabric required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.
TABLE FOR PAVED DITCH TYPE A

<table>
<thead>
<tr>
<th>TYPE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-10</td>
<td>6</td>
<td>3</td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>A-20</td>
<td>22</td>
<td>0</td>
<td>9</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>A-30</td>
<td>71</td>
<td>0</td>
<td>13</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>A-40</td>
<td>22</td>
<td>2</td>
<td>8</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>A-50</td>
<td>60</td>
<td>0</td>
<td>15</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>A-60</td>
<td>24</td>
<td>2</td>
<td>11</td>
<td>18</td>
<td>10</td>
</tr>
</tbody>
</table>

Top of anchor wall shall conform to the slope of the earth.

ELEVATION

DETAIL A

TABLE FOR PAVED DITCH TYPE B

<table>
<thead>
<tr>
<th>TYPE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-15</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>B-22</td>
<td>9</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>B-30</td>
<td>18</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>B-37</td>
<td>27</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>B-45</td>
<td>36</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>B-52</td>
<td>45</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>B-60</td>
<td>54</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>6</td>
</tr>
</tbody>
</table>

Top of anchor wall shall conform to the slope of the earth.

ELEVATION

DETAIL A

PAVED DITCH

GENERAL NOTES

- All slopes are expressed as vertical displacement.
- All units are in horizontal displacement (V: H).
- All dimensions are in inches (millimeters).
- English (metric) is switched units to metric.
- Deleted DN Symbol.
- Renum. Standard 2258-5.

PAVED DITCH TYPE A

ELEVATION

SECTION B-B

DETAIL OF UPSTREAM END

LOCATION AND LIMITS OF PAVED DITCH

PAVED DITCH TYPE B

ELEVATION

SECTION C-C

DETAIL OF DOWNSTREAM END

PAVED DITCH

STANDARD 600401-01
* Type B, C, or D inlet box as required.

** Vary this dimension as needed to position the Inlet Box and Pipe Drain between the proposed approach guardrail posts.

<table>
<thead>
<tr>
<th>PILE TYPE</th>
<th>SHELL WIDTH</th>
<th>DRAIN FRAMING</th>
<th>PILE BOX O.D. DIAMETER</th>
<th>PILE BOX O.D. LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type B</td>
<td>Less than 5.1 (1.3 m)</td>
<td>4'-4&quot; (1.2 m)</td>
<td>5'-9&quot; (1.76 m)</td>
<td>18 (460)</td>
</tr>
<tr>
<td>Type C</td>
<td>5'-0&quot; (1.5 m)</td>
<td>5'-9&quot; (1.76 m)</td>
<td>6'-0&quot; (1.83 m)</td>
<td>18 (460)</td>
</tr>
<tr>
<td>Type D</td>
<td>Greater than 6'-0&quot; (1.83 m)</td>
<td>6'-4&quot; (1.94 m)</td>
<td>6'-0&quot; (1.83 m)</td>
<td>18 (460)</td>
</tr>
</tbody>
</table>
**INLET BOX**

**REQUIRED MATERIAL**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>BAR</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>4</td>
<td>No. 6 (No.13)</td>
<td>8'-4&quot;</td>
<td>(2.530 m)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>No. 6 (No.13)</td>
<td>8'-0&quot;</td>
<td>(2.425 m)</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>No. 4</td>
<td>6'-2&quot;</td>
<td>(1.870 m)</td>
</tr>
</tbody>
</table>

Concrete Reinf. bars Grating

**INLET BOX**

**REQUIRED MATERIAL**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>BAR</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>6</td>
<td>No. 6 (No.13)</td>
<td>10'-1&quot;</td>
<td>(3.060 m)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>No. 6 (No.13)</td>
<td>10'-4&quot;</td>
<td>(3.150 m)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>No. 4</td>
<td>8'-5&quot;</td>
<td>(2.550 m)</td>
</tr>
</tbody>
</table>

Concrete Reinf. bars Grating

**INLET BOX**

**REQUIRED MATERIAL**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>BAR</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>8</td>
<td>No. 6 (No.13)</td>
<td>12'-2&quot;</td>
<td>(3.695 m)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>No. 6 (No.13)</td>
<td>10'-4&quot;</td>
<td>(3.150 m)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>No. 4</td>
<td>8'-5&quot;</td>
<td>(2.550 m)</td>
</tr>
</tbody>
</table>

Concrete Reinf. bars Grating

**SECTION C-C**

**DETAIL OF CAST GRATE**

Type B requires 1 grate
Type C requires 2 grates
Type D requires 3 grates

**SECTION D-D**

**SECTION E-E**

**DETAIL OF CAST FRAME**

Type C shown

**SECTION F-F**

**BRIDGE APPROACH PAVEMENT**

**STANDARD 609006-05**

**SECTION G-G**

**DETAIL OF CAST GRATE**

Type B requires 1 grate
Type C requires 2 grates
Type D requires 3 grates

**SECTION H-H**

**DETAIL OF CAST FRAME**

Type C shown
**SECTION C-C**

**DETAiL OF CAST GRATe**

Type C requires 1 grate.
Type E requires 2 grates.
Type F requires 3 grates.

**SECTION D-D**

**DETAiL OF CAST FRAME**

Type C shown.

**SHOULDER INLET WITH CURB**

**INLET BOX**

**REQUIRED MATERIAL**

<table>
<thead>
<tr>
<th>TYPE F</th>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>No. 4</td>
<td>10'-3&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>No. 4</td>
<td>6'-11&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>No. 4</td>
<td>3'-8&quot;</td>
</tr>
<tr>
<td></td>
<td>Concrete</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reinf. bars</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grating</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TYPE E</th>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>No. 4</td>
<td>10'-3&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>No. 4</td>
<td>6'-11&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>No. 4</td>
<td>3'-8&quot;</td>
</tr>
<tr>
<td></td>
<td>Concrete</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reinf. bars</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grating</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TYPE G</th>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6</td>
<td>No. 4</td>
<td>9'-1&quot;</td>
<td>2.78 m</td>
</tr>
<tr>
<td>Concrete</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reinf. bars</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SHOULDERS**

Type E requires 2 grates.
Type G requires 1 grate.

**SECTION E-E**

**DETAiL OF CAST FRAME**

Type C shown.

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

PASSED

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ISSUED 1-1-97

STANDARD 610001-06
**General Notes**

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).
- All dimensions are in inches (millimeters) unless otherwise shown.

**Steel Plate Beam Guardrail**

**Type A**

- **Elevation**
  - Typical post spacing: 6'-3" (1.905 m)
- **Section A-A**
  - When "S" is less than 3 and the distance from the back of post to back of curb is less than 24 (610), the post shall be steel and the embedment shall be 16% (1936).

**Type B**

- **Elevation**
  - 37" (953) Open post spacing
- **Section B-B**
  - When connecting Type D guardrail to an impact attenuator, adjust this dimension to 37" (953) over a distance of 24'-0" (7.32 m) from point of connection.

**Type D**

- **Elevation**
  - 37" (953) Closed post spacing
- **Plan**
  - Double steel plate beam guardrail

**SECTION A-A**

- When "S" is less than 3 and the distance from the back of post to back of curb is less than 24 (610), the post shall be steel and the embedment shall be 16% (1936).

**SECTION B-B**

- When connecting Type D guardrail to an impact attenuator, adjust this dimension to 37" (953) over a distance of 24'-0" (7.32 m) from point of connection.

**Additional Notes**

- Revised table on Sheet 4.
- Added note to Section B-B for conn. to impact att.
- Added req. for 9 ft. posts.
- Revised notes on Sheet 4a.
STEEL PLATE BEAM
GUARDRAIL

STANDARD 630001-10

Sheet 2 of 4

STEEL POST CONSTRUCTION

WOOD POST CONSTRUCTION

TWO-PIECE WOOD BLOCKOUT OPTION

WOOD BLOCK-OUT AND STEEL POST DETAILS

POST OR SPLICE BOLT & NUT
GUARDRAIL

STEEL PLATE BEAM

STANDARD 630001-10

NOTE
Anchorage T shall be used to attach cable assembly to guardrail when required on traffic barrier terminals.

NOTE
When end shoe is attached to a bridge parapet which has an expansion joint, the bolts shall be provided with a locknut or double nut and shall be tightened only to a point that will allow guardrail movement.

The standard end shoe shall be attached to the concrete with pre-drilled or self-drilling anchor bolts. The anchor cone shall be set flush with the surface of the concrete.

Externally threaded studs protruding from the surface of the concrete will not be permitted.
GUARDRAIL

STEEL PLATE BEAM

STANDARD 630001-10

GUARDRAIL PLACED BEHIND CURB

Note: 'D' shall not exceed 6 (152) for design speeds greater than 45 mph.

PLAN

ELEVATION

FOOTING FOR POST WHEN IMPERVIOUS MATERIAL IS ENCOUNTERED

<table>
<thead>
<tr>
<th>D (min)</th>
<th>V</th>
<th>W</th>
<th>L (Steel Post)</th>
<th>L (Wood Post)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>24</td>
<td>15</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>31</td>
<td>12</td>
<td>6</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>45</td>
<td>30</td>
<td>20</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>40</td>
<td>24</td>
<td>16</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>35</td>
<td>20</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>30</td>
<td>16</td>
<td>8</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>25</td>
<td>12</td>
<td>6</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>20</td>
<td>8</td>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>15</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

0° ≤ D < 4'-0" (1.2 m)

4'-0" (1.2 m) ≤ D ≤ 12'-0" (3.7 m)

Elevated grade shall be provided at post tops.

CABLE ASSEMBLY

1/2 (19) dia. (6x19) galvanized cable

Steel Post

Wood Post

Standard Swage Fitting and Stud (stud threaded entire length)

1/2 (19) dia. (6x19) galvanized cable

Tighten to taut tension.

(40,000 lbs. (18,100 kg) min. breaking strength)

Note: 'D' shall not exceed 6 (152) for design speeds greater than 45 mph.
General Notes:

Unless otherwise noted, dimensions and notes specified for Case I, II, III, and IV are the same as specified for Case I.

For details of guardrail elements not shown, see Standard 630001.

All threaded rods shall be installed with heavy hex nuts and standard washers.

All dimensions are in inches (millimeters) unless otherwise shown.

Galvanized steel shall be used for all exposed rivets.

All dimensions are in inches (millimeters) unless otherwise shown.
GUARDRAIL MOUNTED ON EXISTING CULVERTS

CASE III
MOUNTED ON HEADWALL
WITH CURVED OR DEMOLISHED TIP

CASE IV
MOUNTED ON SLAB

SECTION B-B

SECTION C-C

ON EXISTING CULVERTS

GUARDRAIL MOUNTED
STANDARD 630101-09

(1 of 1)
**Pay limits of LONG-SPAN GUARDRAIL OVER CULVERT**

- **Steel posts:**
  - Dia. hole: 3\(\frac{1}{8}\) (19 mm)
  - 15\(\frac{1}{6}\) (203 mm)
  - 8\(\frac{1}{8}\) (203 mm)
  - 6\(\frac{1}{8}\) (152 mm)
  - Top of guardrail to headwall: Added dim.
  - 3\(\frac{1}{8}\) (89 mm)

- **CRT wood posts:**
  - Dia. hole: 3\(\frac{1}{8}\) (89 mm)
  - 8\(\frac{1}{8}\) (203 mm)

**GENERAL NOTES**

- See Standard 630106-01 for details of guardrail not shown.
- All dimensions are in inches (millimeters) unless otherwise shown.

**LONG-SPAN GUARDRAIL OVER CULVERT**

**STANDARD 630106-01**
**GENERAL NOTES**

- 50:1 Taper required so the guardrail head will not encroach on the shoulder.
- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).
- All dimensions are in inches (millimeters) unless otherwise shown.

**SHOULDER WIDENING TRANSITION FOR TANGENT TERMINAL**

**SECTION A-A**

(Section Head omitted for clarity)

**SHOULDER WIDENING FOR TYPE 1 (SPECIAL) GUARDRAIL TERMINALS**

**DATE**

- 1-1-09

**REVISIONS**

- Switched units to English (metric)
SHOULDER WIDENING TRANSITION
FOR FLARED TERMINAL

Edge of pavement

Edge of shoulder

SHOULDER WIDENING FOR
TYPE 1 (SPECIAL)
GUARDRAIL TERMINALS

Sheet 2 of 2

STANDARD 630301-06
**TRAFFIC BARRIER TERMINAL, TYPE 1B**

**BEARING PLATE K**

- 3/4 (19) Dia. hole
- 3/8 (10) Slotted plate
- 1/4 (6) Dia. hole

**WOOD POST**

- 3/4 (19) Dia. hole
- 5/8 (16) Dia. hole
- 3/4 (19) Dia. hole

**YOKE**

- 3/4 (19) Dia. thick steel

**CABLE STRUT**

- 3/4 (19) Dia. hole

**STEEL TUBE**

- 1 (25) Dia. hole
- 1 1/4 (32) Dia. hole
- 1 1/4 (32) Dia. hole

---

**GENERAL NOTES**

See Standard 630001 for details of guardrail not shown.

The bearing plate K shall be held in position by two eight penny nails driven into the post and bent over the top of the plate.

All dimensions are in inches (millimeters) unless otherwise shown.

---

**TRAFFIC BARRIER TERMINAL, TYPE 1B**

**STANDARD 631006-08**
TRAFFIC BARRIER TERMINAL, TYPE 2

GENERAL NOTES
See Standard 630001 for details of guardrail not shown.

The bearing plate K shall be held in position by two eight penny nails driven into the post and bent over the top of the plate.

All dimensions are in inches (millimeters) unless otherwise shown.

TRAFFIC BARRIER TERMINAL TYPE 2 (3 each)

Bearing plate K
Face of guardrail
Route: flow

PLAN

Elevation

BEARING PLATE K

WOOD POST

YOKE

STEEL TUBE

CABLE STRUT

FRONT
SIDE

Wood post inserted in steel tube.

 tưm (22) Dia. hole

TS 8x6x0.1875 ~

PLAN

End section
Anchor plate T

To center of first bolt-hole in anchor plate.

Bearing plate K

To be bent over end section

The bearing plate K shall be held in position by two eight penny nails driven into the post and bent over the top of the plate.

GENERAL NOTES
See Standard 630001 for details of guardrail not shown.

The bearing plate K shall be held in position by two eight penny nails driven into the post and bent over the top of the plate.

All dimensions are in inches (millimeters) unless otherwise shown.

TRAFFIC BARRIER TERMINAL, TYPE 2

STANDARD 631011-09
Traffic Barrier Terminal, Type 5

**Type 5 - Concrete Bridge Parapet**

- **Plate Washer D**
  - **Placement of Plate Washer D**
  - **Plate E**
  - **Plate F**
  - **Plate G**
  - **Wedge M**

**General Notes**

- Plate washer D shall be installed at the 1.5" projection fills the remainder of the slotted holes in the 1 (M24) dia. bolts are in place.
- When an expansion joint exists above the bridge parapet, bolts shall be provided with a locknut or double nuts and shall be tightened only to a point that will allow plate G to be free to move.

See Standard 631026-05 for details of guardrail not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Traffic Barrier Terminal, Type 5

Standard 631026-05
**GENERAL NOTES**

- See Standard 630001 for details of guardrail not shown.

- Thrie beam rails shall be bolted to block-out at all posts.

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.

- All dimensions are in inches unless otherwise shown.

---

**TRAFFIC BARRIER TERMINAL, TYPE 6**

**STANDARD 631031-11**

**PLAN**

- Two sections of thrie beam, one set inside the other
- Single section of thrie beam

**ELEVATION**

- Bridge approach curbs, see plans for details.

---

**SECTION A-A**

- Concrete parapet or parallel wingwall
- Steel bearing plate
- Bridge approach curb, see plans for details.
- Steel post
- Wood Blockout

---

**DATE**

- January 1, 1997

**REVISIONS**

- Corrected curb length.
- Added notes to see plans for details of approach curbs.
- Corrected curb height.
5 (epoxy grouted M20) anchor bolts with standard washers. After tightening, cut the anchor bolts flush with the nuts, and damage the nuts to prevent them from loosening.

两天的细节，请参阅计划图。（Sheet 2 of 3）
TERMINAL, TYPE 6

TRAFFIC BARRIER

STANDARD 631031-11

(See Standard 630001 for post 13-17 blockouts.)

PARAPET STEEL BEARING PLATE DETAIL

In each individual bearing 1050x3050 steel plates with centered 2.5 hole may be substituted for the plate shown.

TRAFFIC BARRIER

TERMINAL, TYPE 6

(Shed 3 of 3)

STANDARD 631031-11
GENERAL NOTES

This standard shows attachment to curb mounted bridge rail. Attachment to side mounted bridge rail is similar.

See Standard 639000 for details of guardrail not shown.

Thrie beam rail shall be bolted to block-out at all posts.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement ratio.

All dimensions are in inches (millimeters) unless otherwise shown.

TRAFFIC BARRIER TERMINAL, TYPE 6A

(Shed 1 of 3)
Guardrail connection plate assembly

- Bolt 7/8"x5 (22x127)
- Bolt 7/8"x2 (22x51)

Thrie beam and shoe

Finished surface

SECTION C-C

Guardrail connection plate assembly

Bolts (430) with washers and self-locking nut or nut and jam nut. Top bolt 3/8"x24 (bottom bolt 3/8"x42) for curb mount or 3/4"x7 (22x178) for side mount.

Note:

Finished surface varies.

For side mount:

- Bolt 7/8"x5 (22x127)
- Bolt 7/8"x2 (22x51)

For curb mount or side mount:

- Bolt 3/8"x24 (bottom bolt 3/8"x42)

Side mounted rail align as to connection details.

MODIFIED THRIE BEAM END SHOE DETAIL

Compiled May 20, 2013

TRAFFIC BARRIER TERMINAL, TYPE 6A

STANDARD 631032-08

Sheet 2 of 3
### GUARDRAIL CONNECTION PLATE ASSEMBLY DETAILS

**Transition Plate**
- Dimension: 102 x 32" (259 x 81 cm)
- Material: Steel
- Notes: Drilled and tapped 3 holes for (22) H.S. bolts ~ 4-1/2 (25) holes

**View D-D**
- Dimension: 102 x 32" (259 x 81 cm)
- Material: Steel
- Notes: Drilled and tapped 3 holes for (22) H.S. bolts ~ 4-1/2 (25) holes

**Connection Angles**
- Dimension: 38 x 19 x 1" (97 x 48 x 2.5 cm)
- Material: Steel
- Notes: Drilled and tapped (22) H.S. bolts ~ 4-1/2 (25) holes

**Approach End View**
- Dimension: 102 x 32" (259 x 81 cm)
- Material: Steel
- Notes: Drilled and tapped (22) H.S. bolts ~ 4-1/2 (25) holes

**Departure End View**
- Dimension: 102 x 32" (259 x 81 cm)
- Material: Steel
- Notes: Drilled and tapped (22) H.S. bolts ~ 4-1/2 (25) holes

### LEGEND
- "4-1/2 (25) holes" for 1/4 (10) H.S. bolts and nuts
- Drill and tap 3 holes for 1/4 (10) H.S. bolts

#### Dimensions

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Curb</td>
<td>8&quot;</td>
<td>1/2</td>
</tr>
<tr>
<td>Mounted Rail</td>
<td>8&quot;</td>
<td>1/2</td>
</tr>
<tr>
<td>For Side</td>
<td>8&quot;</td>
<td>1/2</td>
</tr>
<tr>
<td>Mounted Rail</td>
<td>8&quot;</td>
<td>1/2</td>
</tr>
</tbody>
</table>

**For Curb Mounted Rail**
- 8" 1/2 (22)
- 1/2 (22)

**For Side Mounted Rail**
- 8" 1/2 (22)
- 1/2 (22)

**rail cap (By others)**
- Bolt cap (By others)
- Install angles to rail caps using 1/4 (10) washers and self-locking nuts or nuts and jam nuts, to be provided by others

**TraFFic Barrier Terminal, type 6A**
- Standard 631032-08

**Sheet 3 of 3**
**TERMINAL, TYPE 6B**

**TRAFFIC BARRIER**

**STANDARD 631033-04**

---

### GENERAL NOTES

See Standard 63000 for details of guardrail not shown.

Thrie beam rail shall be bolted to block-out at all posts.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.

---

**ELEVATION**

- **Concrete structure**
- **Steel post**
- **Wood Blockout**
- **Thrie beam rail**
- **End shoe**

---

**SECTION A-A**

- **Thrie beam rail**
- **Concrete structure**
- **End shoe**

---

**TRANSITION SECTION**

(10 gauge high rail element)

---

**DATE**

1-1-11

**REVISIONS**

- 1-1-11: Changed vertical dimension as noted for blockouts A, B, C, D, and for posts 1-11.
- 1-1-09: Switched units to English notation.

---

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**ENGINEER OF POLICY AND PROCEDURES**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**APPROVED**

**ISSUED 1-1-2003**

---

**POSTS**

- **WOOD Blockouts A, B, C, & D**
- **Steel post**
- **Thrie beam rail**
- **End shoe**

---

**TERMINAL, TYPE 6B**

**TRAFFIC BARRIER**

**STANDARD 631033-04**

(Sheet 1 of 2)
Guardrail System.

- Splice:
  - Inside:
    - P.T.: 6x4x13 (150x100x330) Treated wood block
    - 15° head.
    - Countersink the head.
    - Attach to rail only.
    - Cut wood back to fit.
    - Min. slope back to fit wing.
    - Min. mined in the field.
    - Or to be determined in the field.

- Splice:
  - Outside:
    - 6 (152) Post bolt & bolts with standard washers, ***
    - 4 Epoxy grouted ‡ (M22) anchor
    - Min. 4 (100)

- Splice:
  - End shoe:
    - Standard
    - Min. 6 (150)

- Splice:
  - Type
    - Min. 6 (150)

- Splice:
  - Type
    - Min. 4 (100)

- Splice:
  - Type
    - Min. 4 (100)

GENERAL NOTES

See standard 630001 or details of guardrail not shown.

*** After tightening, cut the anchor bolts flush with nuts, and damage the bolt head to prevent it from loosening.

All dimensions are in inches (millimeters) unless otherwise shown.

TRAFFIC BARRIER
TERMINAL, TYPE 10

REINFORCED CONCRETE HANDRAIL

STANDARD 631046-04
TRAFFIC BARRIER TERMINAL TYPE 11

PLAN

Temporary bridge rail

TEMPORARY CONCRETE BARRIER

PLATE G

PLATE E

BRACKET U

GENERAL NOTES

For details of guardrail not shown, see Standard 631051-03.

Install the face of the guardrail flush with the face of the temporary bridge rail. Install plate washer B so that the 1 (M24) projection fills the remainder of the slotted holes in the 1 (25) end plate G after the 1 (M24) diameter bolts are in place.

Bolts shall be provided with a lock nut or a captive nut and shall be tightened only to a point that will allow plate G to be free to move.

After tightening, cut the anchor bolts flush with the nuts and damage the bolt head to prevent them from loosening.

All dimensions are in inches (millimeters) unless otherwise shown.
## Delineators

**Delineators**

Delineators shall be placed 24 (600) from break point and at interchange ramps and whenever pavement superelevation exceeds 6%. On all interchange ramps, delineators shall be placed at 400' (120 m) spacing. Delineators on ramps and acceleration and deceleration lanes shall be placed at a maximum 24' (600) from break point.

Delineators shall be placed on outside of hazardous curves. Delineators on tangent sections of main line roadways shall be placed at 400' (120 m) spacing. Delineators on outside of all acceleration and deceleration lanes shall be placed at a maximum spacing of 100' (30 m).

Refer to Standard 720011 for details of metal post.

### GENERAL NOTES

Delineators on tangent sections of main line roadways shall be spaced at 400' (120 m) apart. Delineators on ramps and acceleration and deceleration lanes shall be placed at a maximum spacing of 100' (30 m).

Refer to Standard 720011 for details of metal post.

Double reflector units shall be used on the outside of all acceleration and deceleration lanes. Single reflector units shall be used on ramps. Delineators shall be used on outside of all curved sections of ramps.

All dimensions are in inches (millimeters) unless otherwise shown.

### SPACING FOR DELINEATORS

**ON HORIZONTAL CURVES**

<table>
<thead>
<tr>
<th>Radius of Curve</th>
<th>Spacing in Advance of Curve</th>
<th>Spacing at Radius</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 100</td>
<td>20</td>
<td>35</td>
</tr>
<tr>
<td>100 - 174</td>
<td>(3)</td>
<td>(6)</td>
</tr>
<tr>
<td>175 - 224</td>
<td>24</td>
<td>35</td>
</tr>
<tr>
<td>225 - 274</td>
<td>40</td>
<td>55</td>
</tr>
<tr>
<td>275 - 349</td>
<td>65</td>
<td>80</td>
</tr>
<tr>
<td>350 - 449</td>
<td>95</td>
<td>110</td>
</tr>
<tr>
<td>450 - 549</td>
<td>110</td>
<td>135</td>
</tr>
<tr>
<td>550 - 649</td>
<td>135</td>
<td>160</td>
</tr>
<tr>
<td>650 - 749</td>
<td>165</td>
<td>190</td>
</tr>
<tr>
<td>750 - 849</td>
<td>190</td>
<td>215</td>
</tr>
<tr>
<td>850 - 949</td>
<td>215</td>
<td>240</td>
</tr>
<tr>
<td>950 - 1049</td>
<td>240</td>
<td>265</td>
</tr>
<tr>
<td>1050 - 1259</td>
<td>265</td>
<td>290</td>
</tr>
<tr>
<td>1250 - 1399</td>
<td>290</td>
<td>315</td>
</tr>
<tr>
<td>1399 - 1599</td>
<td>315</td>
<td>340</td>
</tr>
<tr>
<td>1599 - 1999</td>
<td>340</td>
<td>365</td>
</tr>
<tr>
<td>1999 - 2499</td>
<td>365</td>
<td>390</td>
</tr>
<tr>
<td>2499 - 3000</td>
<td>390</td>
<td>415</td>
</tr>
<tr>
<td>3000 - 3569</td>
<td>415</td>
<td>440</td>
</tr>
<tr>
<td>3569 - 4000</td>
<td>440</td>
<td>460</td>
</tr>
<tr>
<td>4000 or greater</td>
<td>460</td>
<td>495</td>
</tr>
<tr>
<td>5000 or greater</td>
<td>495</td>
<td>520</td>
</tr>
<tr>
<td>6000 or greater</td>
<td>520</td>
<td>550</td>
</tr>
</tbody>
</table>

### SPACING FOR DELINEATORS

**PLAN - TWO-WAY ROADWAYS**

**PLAN - DUAL HIGHWAYS**

<table>
<thead>
<tr>
<th>Radius of Curve</th>
<th>Spacing in Advance of Curve</th>
<th>Spacing at Radius</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 100</td>
<td>20</td>
<td>35</td>
</tr>
<tr>
<td>100 - 174</td>
<td>(3)</td>
<td>(6)</td>
</tr>
<tr>
<td>175 - 224</td>
<td>24</td>
<td>35</td>
</tr>
<tr>
<td>225 - 274</td>
<td>40</td>
<td>55</td>
</tr>
<tr>
<td>275 - 349</td>
<td>65</td>
<td>80</td>
</tr>
<tr>
<td>350 - 449</td>
<td>95</td>
<td>110</td>
</tr>
<tr>
<td>450 - 549</td>
<td>110</td>
<td>135</td>
</tr>
<tr>
<td>550 - 649</td>
<td>135</td>
<td>160</td>
</tr>
<tr>
<td>650 - 749</td>
<td>165</td>
<td>190</td>
</tr>
<tr>
<td>750 - 849</td>
<td>190</td>
<td>215</td>
</tr>
<tr>
<td>850 - 949</td>
<td>215</td>
<td>240</td>
</tr>
<tr>
<td>950 - 1049</td>
<td>240</td>
<td>265</td>
</tr>
<tr>
<td>1050 - 1259</td>
<td>265</td>
<td>290</td>
</tr>
<tr>
<td>1250 - 1399</td>
<td>290</td>
<td>315</td>
</tr>
<tr>
<td>1399 - 1599</td>
<td>315</td>
<td>340</td>
</tr>
<tr>
<td>1599 - 1999</td>
<td>340</td>
<td>365</td>
</tr>
<tr>
<td>1999 - 2499</td>
<td>365</td>
<td>390</td>
</tr>
<tr>
<td>2499 - 3000</td>
<td>390</td>
<td>415</td>
</tr>
<tr>
<td>3000 - 3569</td>
<td>415</td>
<td>440</td>
</tr>
<tr>
<td>3569 - 4000</td>
<td>440</td>
<td>460</td>
</tr>
<tr>
<td>4000 or greater</td>
<td>460</td>
<td>495</td>
</tr>
<tr>
<td>5000 or greater</td>
<td>495</td>
<td>520</td>
</tr>
<tr>
<td>6000 or greater</td>
<td>520</td>
<td>550</td>
</tr>
</tbody>
</table>
Reflective area of 288 sq. in. (0.18 m²).

The width and height (a, b) of the terminal marker shall be within approximately 1/25 of the outer edge of the terminal end, with a minimum reflective area of 288 sq. in. (0.18 m²).

**Terminal Marker Details**

Coding block: Black/Yellow reflectorized

**Case I**

**Case II**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Case I</th>
<th>Case II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>18 (450)</td>
<td>16 (406)</td>
</tr>
<tr>
<td>b</td>
<td>15 (380)</td>
<td>16 (406)</td>
</tr>
</tbody>
</table>

- The width and height (a, b) of the terminal marker shall be within approximately 1/25 of the outer edge of the terminal end, with a minimum reflective area of 288 sq. in. (0.18 m²).

**Guardrail/Barrier Wall/Bridge Rail Reflectors**

**Sheeting Position: Case II**

All dimensions are in inches (mm) unless otherwise shown.

**Reflector and Terminal Marker Placement**

Standard 635006-03

**Revisions**

- 1-1-02: Revised Case II
- 1-1-09: Switched units to English (metric). Changed and removed alternate detail.
REFLECTOR MARKER TYPE A

REFLECTOR MARKER TYPE B

Adhesive weep slots or holes equally spaced on both sides

Metal rivet

Brass or plastic rivet

All dimensions are in inches (millimeters) unless otherwise shown.
REFLECTOR MARKER TYPE C

TYPICAL MOUNTING WITH REFLECTOR

TYPICAL MOUNTING DETAIL FOR BRIDGE RAIL REFLECTOR

TYPICAL MOUNTING DETAIL FOR BARRIER WALL REFLECTOR

REFLECTOR MARKER AND MOUNTING DETAILS

(Sheet 2 of 3)

STANDARD 635011-02
Detail of Mounting Terminal Marker to Post

- Flat washer
- Elastic stop nut
- 1/4-20 x .50, hex head bolt 2 (50)
- Flat nylon washer
- Bolt 2 (50) long

Sign Size | Dimensions
---|---
12x16 (305x406) | A 12.0, B 16.0, C 1.5, D 50.0

Reflective Marker and Standard 635011-02

Standard Terminal Marker
The Engineer will determine the stability of the impervious material for anchoring.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement. (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.

**Typical Footings for Post and Anchor**

*When Impervious Material is Encountered*

**Notes**

- V + W shall not exceed 39 (990). When V exceeds 33 (840), W shall be shortened correspondingly.
- T = 15 (380) when U is 33 (840) or more. When U exceeds 33 (840) the impervious material shall be removed and the standard anchor shall be used.

Timber blocks shall be nailed to each wood post on the concave side of curve for curves having a radius of less than 600' (180 m).

**General Notes**

- Timber posts shall be used.
- When V is 6 (150) or less, post hole shall be filled to ground line with concrete.
- When U exceeds 33 (840), the impervious material shall be removed and the standard anchor shall be used.
- Post anchors shall be used.

**Material Table**

<table>
<thead>
<tr>
<th>Item</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post</td>
<td>4x4x6'-0&quot;</td>
</tr>
<tr>
<td>Block</td>
<td>2x12x18</td>
</tr>
<tr>
<td>Rail</td>
<td>2x6</td>
</tr>
<tr>
<td>Spacer</td>
<td>(100x150x150)</td>
</tr>
<tr>
<td>Anchor</td>
<td>(100x150x1.83 m)</td>
</tr>
</tbody>
</table>

**Additional Notes**

- **View X-X**

- **General Notes**

- **Cable Road Guard**

  - **Single Strand**

  - **Standard 636001-02**

  - **Sheet 1 of 3**
SINGLE STRAND CABLE ROAD GUARD

STANDARD 636001-02

Typical Steel Materials

<table>
<thead>
<tr>
<th>Item</th>
<th>Post</th>
<th>Plate</th>
<th>Bottom Plate</th>
<th>Side Plate</th>
<th>Brace</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>3 1/4 x 6 x 200 (S75x8.5x1.75 m)</td>
<td>3 x 5.7 x 5'-9&quot; (6x200x200)</td>
<td>3 x 8 x 8 (6x200x600)</td>
<td>3 x 8 x 24 (6x200x600)</td>
<td>6 x 102 x 76 x 9.5 (L 102x76x9.5)</td>
</tr>
</tbody>
</table>
The Variable Cross-Section shall be used when there is a difference in elevation between the two sides of the barrier.

See standard 836006 for light pole foundation details where required in concrete barrier.

All dimensions are in inches (millimeters) unless otherwise shown.

- When this dimension exceeds 12 (300), the barrier may be cast in two pours. No. 6 x 12 (No. 19 x 300) tie bars at 30 (760) centers, or a suitable keyway, shall be used between the pours.

The Variable Cross-Section shall be used when there is a difference in elevation between the two sides of the barrier.
The Variable Cross-Section shall be used when there is a difference in elevation between the two sides of the barrier. See standard 836011 for light pole foundation details where required in concrete barrier. All dimensions are in inches (millimeters) unless otherwise shown.
CONCRETE BARRIER, DOUBLE FACE,
42 in. (1065 mm) HEIGHT

ELEVATION AT LIGHTING FOUNDATION

PLAN AT LIGHTING FOUNDATION

Expansion Joint

Conduit

Barrier base

Conduit

Barrier base

Anchor rod

Preformed expansion joint filler

1/4" x 18 (32 x 450) Dowel bars w/plastic caps

Expansion joint

Dowel bars

1/4" x 18 (32 x 450) Dowel bars

Drilled for bars

Smooth header

Sheet 2 of 2

STANDARD 637006-03
The height, spacing, and installation angle of the glare screen blades shall be as shown on the plans.

All dimensions are in inches (millimeters) unless otherwise shown.

<table>
<thead>
<tr>
<th>Minimum Installation Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barrier Top Width</td>
</tr>
<tr>
<td>60</td>
</tr>
<tr>
<td>72</td>
</tr>
<tr>
<td>84</td>
</tr>
</tbody>
</table>

GLARE SCREEN BLADES

STANDARD 638001-02
Expansion Joint

**No. 4 (No. 13) Bar 18 (450) long (typ.)**

**Bend in field**

**Concrete glare screen (75) 3 barrier**

Concrete (750) 30 (2.1 m) 7'-0" and spacing in concrete barrier

(Joints to match joint type at 4'-0" (1.2 m) | cts.

**No. 4 (No. 13) Bars (typ.) (300)**

**12 (typ.) (300)**

**12 (typ.) (300)**

**(13) Chamfer min. 3 (90)**

**2 (50) min.**

Center on concrete barrier

- 3½ in. (90)
- 2.181 in. (550)

Necessity for glare screen is dependent upon geometrics

All dimensions are in inches (millimeters) unless otherwise shown.

**GLARE SCREEN**

**SECTION A-A**

**ELEVATION**

**TYPICAL APPLICATION AT MEDIAN OBSTRUCTIONS**

**Concrete**

**GLARE SCREEN**

**STANDARD 638101-02**
Each alternate pair of panels shall have a textured surface finish as shown, and shall be alternated with panels having a smooth finish. The intersection of every two panels having the same finish shall point toward the road as shown.

**PLAN**

![Plan view of concrete panel wall setup with finish grade and elevation details.]

**ELEVATION**

![Elevation view of wall with reinforcement and finish grade details.]

---

**GENERAL NOTES**

Loading for 80 mph (130 km/h) wind with 30% gust factor, normal to wall.

**HORIZONTAL STRESSES**

- Concreting: $f_c = 3,500$ psi (24 MPA)
- Prestressing Steel: $f_y = 270,000$ psi (1890 MPa)
- Reinforcing Steel: $f_y = 40,000$ psi (270 MPa)
- Structural Steel: $f_y = 50,000$ psi (350 MPa)
- Minimum allowable soil bearing pressure: $1,250$ psi (87 kPa)

All dimensions are in inches (millimeters) unless otherwise shown.

---

**CONCRETE PANEL WALL**

**SIGHT SCREEN**

**STANDARD 639001-02**

---

**DATE**

1-1-07

**REVISIONS**

Draft slightly.

1-1-09

Soft converted metric, reinforcement bars & connected dimensions.
No. 4 (N° 13) bars shall be alternated above and below prestressing strands.

NOTE
Each prestressing strand shall be stressed to 16,000 lbs (71.2 kN)

Each prestressing strand shall be stressed to 16,000 lbs (71.2 kN).

Bars
No. 4 (N° 13)

(Showing location of metal band connection)

Strip may vary from
by 1/8 to 1/4 below

Smooth vertical border each side

No. 4 (N° 13) bars shall be alternated above and below prestressing strands.
ELEVATION - 6' (1.83 m) FENCE

Fence fabric shall be tied to all line posts, tension cable and brace rails with 9 ga. (237) wire ties of 1/2 (250) cts.

Tension cable shall be provided with one turn buckle between each pair of pull posts.

Minimum allowable soil pressure = 1.25 tsf (120 kPa).

Loading for wind 80 mph (130 km/h) with 30% gust factor.

GENERAL NOTES
Loading for wind 80 mph (130 km/h) with 30% gust factor. Minimum allowable soil pressure = 1.25 tsf (120 kPa).

Tension cable shall be provided with one turn buckle between each pair of pull posts.

All dimensions are in inches (millimeters) unless otherwise shown.

SIGHT SCREEN
CHAIN LINK FENCE

HEIGHT
POST (O.D.)
FENCE (kg/m)
lbs./ft.
6 ft. (1.83 m)
4
102
(13.6)
9.11
8 ft. (2.43 m)
4
102
(18.6)
12.51
10 ft. (3.05 m)
4
102
(34)
22.85

CHAIN LINK FENCE

ELEVATION - 8' (2.43 m) & 10' (3.05 m) FENCES

ELEVATION - 6' (1.83 m) FENCE

(0.3 m)

(1.14 m)

(1.37 m)

8'-9" (3.02 m)

4 '-9" (1.45 m)

4'-6" (1.37 m)

3'-9" (1.14 m)

8'-0" (2.43 m) (max.) Post spacing

10'-0" (3.05 m) (max.) post spacing

Tension cable and brace rails with 9 ga. (237) wire ties of 1/2 (250) cts.

Tension cable shall be provided with one turn buckle between each pair of pull posts.

Unless otherwise shown.

All dimensions are in inches (millimeters) unless otherwise shown.

GENERAL NOTES
Loading for wind 80 mph (130 km/h) with 30% gust factor. Minimum allowable soil pressure = 1.25 tsf (120 kPa).

Tension cable shall be provided with one turn buckle between each pair of pull posts.

All dimensions are in inches (millimeters) unless otherwise shown.
DETAIL A
(Showing typical method of attaching middle brace rails to posts.)

DETAIL B
(Showing typical method of attaching middle brace rails to posts.)

SECTION A-A
(Showing method of fastening bottom tension cable and fence fabric to pull post.)

DETALL OF FABRIC
(Showing method of fastening 6x19 diamond mesh.)

DETAIL C
(Looking toward highway)

FENCE INSTALLATION ON SLOPES

PROTECTIVE ELECTRICAL GROUND

SIGHT SCREEN
CHAIN LINK FENCE

STANDARD 640001-01

(Sheet 2 of 2)
**Cedar Stockade Fence**

### Plan
- Cedar pickets (Facing highway)
- Posts

### Detail A
- 3x4 (75x100) Rails (nominal dim.)
- Cedar pickets

### Detail B
- Fence height
  - 6'-0" (2.4 m)
  - 8'-0" (4.3 m)

### Details
- Post Size (nominal dim.)
  - 6" x 6" (150x150)
  - 8" x 8" (200x200)

### Sections
- Section B-B

### General Notes
- Loading is based on 80 mph (130 km/h) with 30% gust factor. Minimum allowable soil pressure = 1,250 psi (8700 kPa).
- All dimensions are in inches (millimeters) unless otherwise shown.
1x4 (25x100) rough sawn or surfaced wood planks, nominal dim.

Post Size
- Post Length
- Post Embedment
- Post Size

Plank to Grade

Install planks vertical to grade

Slope rails parallel to grade

Clinch nails on back side of rail

Galvanized common wire nails of sufficient length to have a minimum 1/2" (13) projection to clinch nails in back.

GENERAL NOTES

Loading was based on 80 mph (130 km/h) with 30% gust factor. Minimum allowable soil pressure = 125 psi (870 kPa).

All dimensions are in inches (millimeters) unless otherwise shown.

DATE

REVISIONS

APPROVED

ENGINEER OF BRIDGES AND STRUCTURES

ENGINEER OF DESIGN AND ENVIRONMENT

APPROVED

ISSUED

Detail B

(Signing typical panel to post connection details)

Sec. A-A

(Showing typical plank to rail attachment each rail)

ELEVATION

(Showing treatment with sloping ground)

Plan (Facing highway)

ENGINEER OF BRIDGES AND STRUCTURES

ENGINEER OF DESIGN AND ENVIRONMENT

APPROVED

ISSUED

January 1, 1997
SHOULDER RUMBLE STRIPS, 16 in.

TYPICAL APPLICATION AT AN INTERCHANGE

TYPICAL APPLICATION AT AN INTERSECTION OR ENTRANCE

GENERAL NOTES

1. Shoulder rumble strips shall be placed closer than 6 (150) to a transverse joint.

2. Shoulder rumble strip shall be located closer than 6 (150) to a transverse joint.

3. Shoulder rumble strips across structures.

All dimensions are in inches (millimeters) unless otherwise shown.

On Portland cement concrete shoulders, no shoulder rumble strips shall be located closer than 6 (150) to a transverse joint.

Omit shoulder rumble strips across structures.
PLAN

See Section A-A.

TYPICAL APPLICATION AT AN INTERSECTION OR ENTRANCE

GENERAL NOTES

Shoulder rumble strips across structures
and at mailbox turnouts.

All dimensions are in inches (millimeters)
unless otherwise shown.

SHOULDER RUMBLE STRIPS, 8 in.

STANDARD 642006
GORE INSTALLATION
(Traffic approaches on both sides)
(Test Level 2 array shown)

ROADSIDE INSTALLATION
(Traffic approaches on one side)
(Test Level 2 array shown)

SAND MODULE
IMPACT ATTENUATORS

TEST LEVEL 2 ARRAY
(Number in sand modules indicate sand weight in pounds)

TEST LEVEL 3 ARRAY
(Number in sand modules indicate sand weight in pounds)

GENERAL NOTES
All dimensions are in inches (millimeters) unless otherwise shown.

DATE
REVISIONS
02-16 Changed posted speed to design speed.
02-12 New standard.

Illinois Department of Transportation
PASSED 2013
ENGINEER OF POLICY AND PROCEDURES
APPROVED 2013
ISSUED 1-1-97
January 1, 1997

STANDARD 643001-01
**CHAIN LINK FENCE**

**STANDARD 664001-02**

---

**Sheet 2 of 3**

**ENGINEER OF POLICY AND PROCEDURES**

**APPROVED**

**ISSUED 1-1-97**

---

**CHAIN LINK FENCE STANDARD 664001-02**

- **0.0747 (2) Thick**
- **0.1345 (3.5) Thick**

**Lock loops**

**Fabric**

**Post**

**Stretcher bar**

Band spaced (4 1.3)

24 (600) c-c max.

**Fabric tie**

Woven into the lock loops for the entire length of post.

**Top tension wire**

**Bottom tension wire**

Knuckled selvage wire

**TERMINAL POST**

<table>
<thead>
<tr>
<th>Section</th>
<th>(kg/m)</th>
<th>lbs./ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Type A</td>
<td>1.66 (42.2) O.D.</td>
<td>5.43</td>
</tr>
<tr>
<td>Pipe Type B</td>
<td>1.66 (42.2) O.D.</td>
<td>4.63</td>
</tr>
<tr>
<td>Pipe Type C</td>
<td>1.66 (42.2) O.D.</td>
<td>4.60</td>
</tr>
</tbody>
</table>

**TERMINAL & GATE POST**

<table>
<thead>
<tr>
<th>Section</th>
<th>(kg/m)</th>
<th>lbs./ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Type A</td>
<td>1.90 (48.3) O.D.</td>
<td>3.5</td>
</tr>
<tr>
<td>Pipe Type B</td>
<td>1.90 (48.3) O.D.</td>
<td>3.36</td>
</tr>
<tr>
<td>Pipe Type C</td>
<td>1.90 (48.3) O.D.</td>
<td>3.39</td>
</tr>
</tbody>
</table>

**HORIZONTAL BRACES**

<table>
<thead>
<tr>
<th>Section</th>
<th>(kg/m)</th>
<th>lbs./ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Type A</td>
<td>1.31x1.5 (33.3x38.1)</td>
<td>1.83</td>
</tr>
<tr>
<td>Pipe Type B</td>
<td>1.50x1.8 (38.1x45.7)</td>
<td>1.60</td>
</tr>
<tr>
<td>Pipe Type C</td>
<td>1.50x1.8 (38.1x45.7)</td>
<td>1.62</td>
</tr>
</tbody>
</table>

**GATE FRAMES**

<table>
<thead>
<tr>
<th>Section</th>
<th>(kg/m)</th>
<th>lbs./ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Type A</td>
<td>1.66 (42.2) O.D.</td>
<td>5.43</td>
</tr>
<tr>
<td>Pipe Type B</td>
<td>1.66 (42.2) O.D.</td>
<td>4.63</td>
</tr>
<tr>
<td>Pipe Type C</td>
<td>1.66 (42.2) O.D.</td>
<td>4.60</td>
</tr>
</tbody>
</table>

**GATE POSTS**

<table>
<thead>
<tr>
<th>Gate Opening</th>
<th>Size (O.D.)</th>
<th>Size (O.D.)</th>
<th>Size (O.D.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>Double</td>
<td>Single</td>
<td>Double</td>
</tr>
<tr>
<td>Up to 4 (1.2)</td>
<td>0.57 (14.5)</td>
<td>0.57 (14.5)</td>
<td>0.57 (14.5)</td>
</tr>
<tr>
<td>Over 4 (1.2) to 8 (2.5)</td>
<td>0.78 (20.0)</td>
<td>0.78 (20.0)</td>
<td>0.78 (20.0)</td>
</tr>
<tr>
<td>Over 8 (2.5) to 12 (3.6)</td>
<td>0.99 (25.0)</td>
<td>0.99 (25.0)</td>
<td>0.99 (25.0)</td>
</tr>
</tbody>
</table>

**METHOD OF FASTENING STRETCHER BAR TO POST**

**METHOD OF TYING FABRIC TO TENSION WIRES**

---

* The 3½ x 3½ (89.0 x 89.0) roll formed section as detailed may be used as gate posts for single gate up to 6' (1.8 m) and double gate up to 12' (3.6 m).
**CHAIN LINK FENCE**

**STANDARD 664001-02**

**INSTALLATION ON SLOPES**

- **Highway**
- **Fence**
- **Ground line**
- **Post**

**INSTALLATION AT CORNERS**

- **Terminal post**
- **Ground line**
- **Post**

**ELEVATION INSTALLATION OVER STREAM**

- **End post assembly**
- **Line post**

- **Post not centered in concrete.**

- **36 (900) for 4 ft (1.2 m) fence.**
- **3'-6'' (1.0 m) for over 4'-0" (1.2 m) fence.**

- **5'-0" (1.5 m) for over 4'-0" (1.2 m) fence.**

**INSTALLATION AT HEADWALL**

- **Corner post assembly**

**INSTALLATION AROUND HEADWALL**

- **Corner post assembly**

**PLAN AT STREAM CROSSING**

- **Top of slope**
- **Fence**
- **Culvert**

- **Corner post assembly**

**PLAN AT HEADWALL**

- **Corner post assembly**

**DETAIL A**

The chain link fabric shall be replaced by barbed wire (or fence of 12 [-300]) maximum centers between the double posts shown on DETAIL A when shown on the plans.

When the width of the culvert makes it necessary to anchor a post to the top of the culvert, a cast iron shoe or other device approved by the Engineer shall be used.

When fence line has a change in direction of 15° or more, a terminal post shall be placed as shown above. Where angle is less than 15° and existing conditions require a terminal post, they shall be placed as directed by the Engineer.
Gate frame
Gate post
Brace
Ground line
Gate opening
Concrete
Gate stop
Truss rod
Plunger rod
Latch
Center brace on gates 7' (2.13 m) and 10' (3.05 m) long, and 2-braces spaced on gates over 10' (3.05 m) long
Gate latch with provisions for padlocking
Gate post and brace
Ground line
Highway
Fence
Post
R.O.W.

NOTES

Barbed wires shall be tied to each post. Top and bottom wires of woven fence shall be tied to each post. Top every other wire between, alternating on successive posts.

Barbed wires and line wires of woven fence shall be be fastened to the corner, pull, and gate posts by wrapping the wires around the post and tying back on itself with not less than 3 twists tightly wrapped.

General notes

Pull posts shall be placed at the locations determined by the Engineer. They shall be placed at 660' (200 m) intervals between posts to which the ends of the fabric and barbed wires are fastened, or midway between such posts when the distance is less than 660' (200 m) and greater than 1320' (400 m).

Bracing for gate posts shall be the same type used for end posts.

The clearance between the bottom fence wire and the ground may be up to 3 (15) for a maximum distance of 8' (2.4 m) when uneven ground is encountered.

All dimensions are in inches (millimeters) unless otherwise shown.

Woven wire fence

Standard 665001-02
WOVEN WIRE FENCE

STANDARD 665001-02

FENCE USING WOOD POSTS

SINGLE OR DOUBLE GATE

PULL POST

LINE POST

CORNER OR END POST

NOTES

Barbed wires shall be stapled to each post. Top and bottom wire of woven fence shall be stapled to each post. Staple every other wire between, alternating on successive posts.

Wood line posts may be used in lieu of wood line posts.

Three bags of bracing for run of fence 300' 152 m or more to corner, end, gate or pull post.

Two bags of bracing for run of fence 150' 46 m to less than 300' 152 m to corner, end or gate post.

One bay of bracing for run of fence less than 150' 46 m to corner, end or gate post.

Wood blocks nailed to post layout.

Details of the double and single gates are the same as those for metal posts.

One bay of bracing for runs of fence 150' 46 m to 300' 152 m or more to corner, end, gate or pull post.

Wood blocks, nailed to post layout.

Ground line

Corner or end post

Brace post

Wood post

Wood blocks

Barbed wire

Line post

Brace wires

Woven wire fence
**GATE FRAMES**

<table>
<thead>
<tr>
<th>Section</th>
<th>Type A: Pipe 1.315 (33.4) O.D.</th>
<th>Type B: Pipe 1.315 (33.4) O.D.</th>
<th>Type C: Pipe 1.315 (33.4) O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbs/ft. (kg/m)</td>
<td>1.33 (1.98)</td>
<td>1.34 (1.99)</td>
<td>1.68 (2.50)</td>
</tr>
</tbody>
</table>

**CORNER, END or PULL POSTS**

<table>
<thead>
<tr>
<th>Section</th>
<th>Type A: Pipe 2.375 (60.3) O.D.</th>
<th>Type B: Pipe 2.375 (60.3) O.D.</th>
<th>Type C: Pipe 2.375 (60.3) O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbs/ft. (kg/m)</td>
<td>3.19 (4.75)</td>
<td>3.09 (4.63)</td>
<td>3.65 (5.43)</td>
</tr>
</tbody>
</table>

**LINE POSTS**

<table>
<thead>
<tr>
<th>Section</th>
<th>Type A: Pipe 2.875 (73.0) O.D.</th>
<th>Type B: Pipe 2.875 (73.0) O.D.</th>
<th>Type C: Pipe 2.875 (73.0) O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbs/ft. (kg/m)</td>
<td>6.41 (9.41) min.</td>
<td>6.1 (9.20) min.</td>
<td>6.78 (10.20)</td>
</tr>
</tbody>
</table>

**BRACES and BLOCKS**

<table>
<thead>
<tr>
<th>Section</th>
<th>Type A: Pipe 3.500 (88.9) O.D.</th>
<th>Type B: Pipe 3.500 (88.9) O.D.</th>
<th>Type C: Pipe 3.500 (88.9) O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbs/ft. (kg/m)</td>
<td>8.8 (13.10)</td>
<td>8.1 (12.20)</td>
<td>7.5 (11.28)</td>
</tr>
</tbody>
</table>

**METAL ITEMS**

<table>
<thead>
<tr>
<th>Section</th>
<th>Type A: Pipe 3.000 (76.2) Sq.</th>
<th>Type B: Pipe 3.000 (76.2) Sq.</th>
<th>Type C: Pipe 3.000 (76.2) Sq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbs/ft. (kg/m)</td>
<td>10.70 (16.20) min.</td>
<td>11.10 (17.00) min.</td>
<td>11.40 (17.50)</td>
</tr>
</tbody>
</table>

**WOOD ITEMS**

<table>
<thead>
<tr>
<th>Section</th>
<th>Type A: Pipe 2.000 (50.8) O.D.</th>
<th>Type B: Pipe 2.000 (50.8) O.D.</th>
<th>Type C: Pipe 2.000 (50.8) O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbs/ft. (kg/m)</td>
<td>4.3 (6.49)</td>
<td>4.6 (6.80)</td>
<td>5.2 (7.83)</td>
</tr>
</tbody>
</table>

**WOVEN WIRE FENCE**

(Sheet 3 of 4)
**FOOTING FOR POSTS WHEN ROCK LEDGE IS ENCOUNTERED**

- **Metal Post**
  - Footing
  - Concrete
  - Ledge
  - Ground line

- **Wood Post**
  - Footing
  - Concrete
  - Ledge
  - Ground line

**NOTE**

When the fence line has a change in direction of 15° or more, a corner post with bracing as required shall be placed as shown above. Where angle is less than 15° and existing conditions require a corner post, they shall be placed as directed by the Engineer.

**INSTALLATION AT CORNERS**

- Metal post substituted for wood line post.
- Barbed wire
- Woven wire fence
- Ground line

**INSTALLATION ON SLOPES**

- Wood or metal post
- Top of slope
- Grout
- Toe of slope

**PROTECTIVE ELECTRICAL GROUNDING FOR WOOD POST FENCE INSTALLATION**

- Wood or metal post
- Top of slope
- Grout
- Toe of slope

**PLAN AT STREAM CROSSING**

- End post assembly
- Extra length posts where necessary

**PLAN AT HEADWALL**

- End post assembly
- Extra length posts where necessary

**INSTALLATION OVER STREAM**

- The woven wire fabric shall be replaced by barbed wire strands at 12 (300) maximum centers between the double posts shown on DETAIL A when seen on the plans.

**INSTALLATION AROUND HEADWALL**

- Wood or metal post
- Top of slope
- Grout
- Toe of slope

**DETAIL A**

- Metal end post
- Corner or line post
- Ground line

**NOTE**

- When the tension of the fence tends to pull the posts from the ground, the line posts shall be anchored with the applicable concrete or wood anchorage specified for corner posts.
METHOD A

METHOD B

SECTION A-A

TERMINAL BOOKENDS

GENERAL NOTE

Reinforcement bars shall be No. 3 (No. 10) unless otherwise specified.

A 2\(\times\)2\(\times\)6\(\times\)10\(\text{in}^4\) shadow box with beveled edges, and a 7 mm (\(\frac{1}{4}\) in) thick indentation may be used with the standard lettering shown.

All dimensions are in inches unless otherwise shown.

METHOD A

METHOD B

a BAR

RIGHT OF WAY MARKERS

STANDARD 666001-01
All dimensions are in inches (millimeters) unless otherwise shown.
Use cement and water or approved product from approved list of chemical adhesives to seal marker tablet in rock ledge, concrete pavement or structure. Hole shall be 1⁄4 (6) in diameter.

Tablet constructed in rock ledge or concrete.

ALUMINUM TABLET

PRECAST MARKER

CAST-IN-PLACE MARKER

**DETAIL A**

All dimensions are in inches (millimeters) unless otherwise shown.
See DETAIL A

Ground surface

Concrete

DIA. 10 (250)

DIA. 14 (350)

To be 4'-0" (1.2 m) min. in dist. 1, 2, 3, & 4.

To be 36" (900) min. in dist. 5, 6, 7, 8, & 9.

(3 0 0)

12

Concrete

14 (350)

10 (250)

ELEVATION

DETAIL A

All dimensions are in inches (millimeters) unless otherwise shown.

U.S. GEOLOGICAL SURVEY AND
NATIONAL GEODETIC SURVEY
BENCHMARKS RESETTNG METHOD

STANDARD 668001-01

DATE
REVISIONS
1-1-97
Revised design.

1-1-99
Revised depth.

1-1-09
Revised unit.

1-1-99
Revised unit.
TYPICAL APPLICATIONS

Landscaping work
Utility work
Fencing contracts and maintenance
Opening culverts

GENERAL NOTES

This Standard is used where at all times all vehicles, equipment, workers or their activities are more than 15' (4.5 m) from the edge of pavement.

When the work operation requires that two or more work vehicles cross the 15' (4.5 m) travel zone in any one hour, traffic control shall be according to Standard 701001.

All dimensions are in inches (millimeters) unless otherwise shown.

OFF-RD OPERATIONS,
2L, 2W, MORE THAN
15' (4.5 m) AWAY

STANDARD 701001-02
When the work operation exceeds one hour, cones, drums or barricades shall be placed at 25' (7.5 m) centers for L/3 distance, and at 50' (15 m) centers through the remainder of the work area.

**SYMBOLS**
- Work area
- Sign
- Cone, drum or barricade

**TYPICAL APPLICATIONS**
- Utility operations
- Culvert extensions
- Slide slope changes
- Guardrail installation and maintenance
- Delineator installation
- Landscaping operations
- Shoulder repair
- Sign installation and maintenance

**FORMULAS**

For maintenance and utility projects:

\[ L = 0.65(W)(S) \]

In feet (meters).

**GENERAL NOTES**

This standard is used where any vehicles, equipment, workers or their activities will encroach in the area 15' (4.5 m) to 24' (600 mm) from the edge of pavement.

Calculate \( L \) as follows:

\[ L = \frac{W}{S} \]

**OFF-RD OPERATIONS, 2L, 2W,**

15' (4.5 m) TO 24' (600 mm)

FROM PAVEMENT EDGE

**STANDARD 701006-04**

**TABLE**

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-97</td>
<td>Approved and Issued</td>
</tr>
<tr>
<td>1-1-97</td>
<td>Engine of Design and Environment approved</td>
</tr>
<tr>
<td>1-1-97</td>
<td>Engine of Safety Engineering approved</td>
</tr>
</tbody>
</table>
**GENERAL NOTES**

This Standard is used where at any time, any vehicle, equipment, workers or their activities require an intermittent or continuous moving operation on the shoulder, where the average speed is 1 mph (2 km/h) or less. When the work operation does not exceed 30 minutes, traffic control may be according to Standard 70130.

When the work operation is for temporary shoulder work, where the average speed is 30 mph (48 km/h) or less, traffic control may be according to Standard 70101.1.4

All dimensions are in inches (millimeters) unless otherwise shown.

**SYMBOLS**

- Work area
- Sign
- Flagger with traffic control sign when required

**TYPICAL APPLICATIONS**

Shoulder work or utility operations.

- **For contract construction projects:**
  - W20-I103(0)-48
  - W21-1a(0)-48

- **For maintenance and utility projects:**
  - W20-1(0)-48
  - W21-I101(0)-48

1 Minimum distance is 200' (60 m). Maximum distance to be determined by the Engineer but should not exceed 1/2 the length of a non-working day's operation, whichever is less.

**DATE**

1-1-09

**REV S**

- 01-11
- 01-09
- 01-03

- English (metric)
- Switched units to English metric
- Connected sign No.
- Corrected sign No.'s.

**STANDARD 70101-03**

**OFF-ROAD MOVING OPERATIONS, 2L, 2W, DAY ONLY**
This Standard is used where at all times all vehicles, equipment, workers or their activities are more than 15' (4.5 m) from the edge of pavement.

When the work operation requires that two or more work vehicles cross the 15' (4.5 m) clearance zone in any one hour, traffic control shall be according to Standard 701301.

This Standard also applies to work performed in the median more than 15' (4.5 m) from either pavement.

All dimensions are in inches (millimeters) unless otherwise shown.

GENERAL NOTES

TYPICAL APPLICATIONS
- Landscaping work
- Utility work
- Fencing contracts

OFF-RD OPERATIONS, MULTILANE, MORE THAN 15' (4.5 m) AWAY

STANDARD 701106-02
CONSTRUCTION ROAD AHEAD WORK ROAD AHEAD ROAD ONE LANE AHEAD

Additional cones may be placed at 50' (15 m) centers, when drums or barricades are used, the interval between devices may be doubled.

For contract and utility projects

For maintenance projects

W20-1(0)-48
W20-4(0)-48
W20-I103(0)-48

TYPICAL APPLICATIONS

- Work area
- Sign
- Barricade or drum
- Cone, drum or barricade
- Flagger with traffic control sign

SYMBOLS

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach in the area between the center line and a line 24 (600) outside the edge of pavement for daylight operation.

When the distance between successive work areas exceeds 2000' (600 m), additional warning signs, flaggers, and taper shall be placed as shown.

All dimensions are in inches (millimeters) unless otherwise shown.

LANE CLOSURE, 2L, 2W, DAY ONLY, FOR SPEEDS > 45 MPH

STANDARD 701201-04
AHEAD
CONSTRUCTION
ROAD AHEAD
WORK ROAD ONE LANE AHEAD

Barricades at 50' (15 m) centers for the first 500' (150 m) and at no greater than 100' (30 m) centers through the remainder of the work area.

For contract construction projects:
- Barricade or drum: W20-I103(0)-48
- Flagger with traffic control sign: W20-1(0)-48
- Barricade or drum with flashing light: W20-4(0)-48
- Flagger with traffic control sign: W20-7(O)-48

For maintenance and utility projects:
- Barricade or drum: W20-100(0)-48
- Barricade or drum with steady burning light: W20-I103(0)-48

TYPICAL APPLICATIONS
- Roadside ditch
- Installation of drainage structure
- Utility operations

SYMBOLS
- Work area
- Sign
- Flagger with traffic control sign
- Barricade or drum
- Barricade or drum with flashing light
- Barricade or drum with steady burning light

GENERAL NOTES
This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach in the area between the center line and a line 24" (600) from the edge of pavement for nighttime operation.

All dimensions are in inches (millimeters) unless otherwise shown.

LANE CLOSURE, 2L, 2W, NIGHT ONLY, FOR SPEEDS > 45 MPH

STANDARD 701206-03
**GENERAL NOTES**

This standard is used where at any time, any vehicle, equipment, workers or their activities require an intermittent or continuous moving operation on the pavement where the average speed of movement is greater than 1 mph (2 km/h) and less than 4 mph (6 km/h).

When the operation does not exceed 60 minutes, traffic control may be according to Standard 701301.

All dimensions are in inches (millimeters) unless otherwise shown.

**TYPICAL APPLICATIONS**

- For contract construction projects.
- For maintenance and utility projects.
- Shoulder operations.
- Milling operations.
- Bituminous resurfacing operations.

**SYMBOLS**

- **Work area**
- **Sign on portable or permanent support**
- **Flagger with traffic control sign**

**LATEL CLOSURE, 2L, 2W, SLOW MOVING OPERATIONS DAY ONLY, FOR SPEEDS > 45 MPH**

**STANDARD 701306-03**

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>alt1</td>
<td>Revised flagger sign</td>
</tr>
<tr>
<td>alt2</td>
<td>Switched units to English (metric)</td>
</tr>
<tr>
<td>alt3</td>
<td>Corrected sign No.'s.</td>
</tr>
<tr>
<td>alt4</td>
<td>Switched units to English (metric)</td>
</tr>
</tbody>
</table>

Updated 1-1-11

State Department of Transportation

Approved 1-1-11

Engineer of Safety Engineering

Approved 1-1-97

Engineer of Design and Environment

Variable 1

Minimum distance is 200' (60 m). Maximum distance to be determined by the Engineer but should not exceed 1/4 the length required for one normal working day's operation or 2 miles (3200 m) whichever is less.

Minimum distance is 100' (30 m).

Minimum distance is 500' (150 m) max.

Minimum distance is 500' (150 m) min.
**TYPICAL APPLICATIONS**
- Crack pouring
- Debris cleanup
- Roadometer measurements
- Weed spraying
- Pavement marking
- Utility work
- Landscaping work
- Safety work
- Movement working
- Pothole repair
- Crosshatch marking
- Crack sealing

**SYMBOLS**
- Arrow board (Hazard Mode only)
- Truck with headlights, emergency flashers and flashing amber light (visible from all directions)
- 18x18 (450x450) min. orange flag (use when guide wheel is used)
- Truck mounted attenuator

**GENERAL NOTES**
This Standard is used where any vehicle, equipment, workers or their activities will require a continuous moving operation where the average speed is greater than 3 mph (5 km/h).

For shoulder operations not encroaching on the pavement, use STANDARD 701311-02.

All dimensions are in inches (millimeters) unless otherwise shown.

**LANE CLOSURE 2L, 2W MOVING OPERATIONS—DAY ONLY**

**DATE**
- 1-1-00
- 1-1-09

**REVISIONS**
- Switched units to English Metric System
- Elim. speed restrictions
- Made with Care copy
- Speed restrictions
- TYPICAL APPLICATIONS

**STANDARD 701311-03**
AHEAD ROAD AHEAD
WORK ROAD AHEAD
CONSTRUCTION ROAD AHEAD
ONE LANE STOP HERE
RED ON

Illinois Department of Transportation
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
January 1, 2007
ISSUED 1-1-97
DATE
REVISIONS

FOR SPEEDS > 45 MPH
BRIDGE REPAIR,
LANE CLOSURE, 2L, 2W,
STANDARD 701316-07
See Sheet 1 for GENERAL NOTES.
ENGINEER OF DESIGN AND ENVIRONMENT

APPROVED

ISSUED 1-1-97

January 1,

FOR SPEEDS > 45 MPH

BRIDGE REPAIR, LANE CLOSURE, 2L, 2W,

STANDARD 701316-07

(For loops)

(1.5 m)

5'

(1.5 m)

5'

(3.0 m)

12

24 (600)

Stop bar

45°

(Near loops)

(85 m)

275'

Stage lane width

12

1500

32

1500

White temporary pavement marking

TEMPORARY PAVEMENT MARKING

TRAFFIC SIGNAL SEQUENCE

PHASE INTERVAL

A 1 2 3 4 5 6

B

EASTBOUND

NEAR LOOP

G Y R R R R

FHISTODE MARKING

Y

R

R

R

G

Y

R

SOUTHBOUND

RHISTODE MARKING

R R G Y R

GENERAL NOTES

This Standard is used where, at any time any vehicle, equipment, worker or their activities will encroach on one lane of a bridge and traffic signals are required.

When traffic signals are not in operation, flaggers shall be used and traffic control devices shall conform to Standard 701205 or 701206.

Existing or temporary pavement markings shall be on both sides of open lane from stop bar to stop bar.

All dimensions are in inches (millimeters) unless otherwise shown.

ADVISORY SPEED LIMIT

<table>
<thead>
<tr>
<th>INTERVAL</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>EASTBOUND</td>
<td>G</td>
<td>Y</td>
</tr>
<tr>
<td>SOUTHBOUND</td>
<td>R</td>
<td>R</td>
</tr>
</tbody>
</table>

NORMAL POSTED SPEED

<table>
<thead>
<tr>
<th></th>
<th>EASTBOUND</th>
<th>SOUTHBOUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 - 45 mph</td>
<td>40 mph</td>
<td>40 mph</td>
</tr>
<tr>
<td>40 mph</td>
<td>35 mph</td>
<td>35 mph</td>
</tr>
<tr>
<td>35 - 30 mph</td>
<td>30 mph</td>
<td>30 mph</td>
</tr>
</tbody>
</table>

LANE CLOSURE, 2L, 2W, BRIDGE REPAIR, FOR SPEEDS > 45 MPH

STANDARD 701316-07

(For loop)
**Traffic Signal Sequence**

<table>
<thead>
<tr>
<th>Phase</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

- **Eastbound**
  - NL or SB
- **Northbound or Southbound**
  - NL or SB

**Temporary Concrete Barrier**

<table>
<thead>
<tr>
<th>Normal Speed</th>
<th>Posted Speed</th>
<th>Taper Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mph and Above</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Below 40 mph</td>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>

**Advisory Speed Limit**

<table>
<thead>
<tr>
<th>Normal Speed</th>
<th>Advisory Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 - 45 mph</td>
<td>40 mph</td>
</tr>
<tr>
<td>40 mph</td>
<td>35 mph</td>
</tr>
<tr>
<td>35 - 30 mph</td>
<td>30 mph</td>
</tr>
</tbody>
</table>

**General Notes**

This Standard is used where, at any time, any vehicles, equipment, workers, or their activities will encroach on one lane of a bridge. Traffic signals and a positive barrier are required.

Traffic signals shall be operational only when all traffic controls are in place. When traffic signals are not in operation, flaggers shall be used and traffic control shall conform to Standard 701201 or 701206.

Temporary concrete barrier shall be according to Standard 704001.

Existing or temporary pavement markings shall be on both sides of open lane from stop bar to stop bar.

All dimensions are in inches (millimeters) unless otherwise shown.
AHEAD WORK ROAD AHEAD CONSTRUCTION ROAD MPH X X
MPH X X

DATE

ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
ISSUED 1-1-97
APPROVED January 1, 2011

Illinois Department of Transportation
ENGINEER OF SAFETY ENGINEERING

TYPICAL APPLICATIONS
Bridge construction
Culvert construction
Work area

SYMBOLS
 SIGN
Barricade or drum with monofunctional steady burning light
Double vertical panel

GENERAL NOTES
This Standard is used where at any time, any vehicle, equipment, workers or their activities require the closure of both lanes and a temporary run-around is constructed.

Barricades or drums of 50' (15 m) centers shall be used in lieu of vertical panels on the contour where they are to be placed on new or existing pavement.

Where the tangent distance on the temporary run-around exceeds 650' (180 m), any radial distances of 50' (15 m) centers may be substituted for the vertical panels, or the spacing between vertical panels may be increased to 100' (30 m) within the limits of the tangent.

All dimensions are in inches (millimeters) unless otherwise shown.

LANE CLOSURE, 2L, 2W, WITH RUN-AROUND, FOR SPEEDS > 45 MPH
STANDARD 701331-04

REVIEWS

DATE

5-09 Corrected sign No.'s.

9-01 Changed vertical panel to double vertical panel.

3-01 Changed vertical panel to double vertical panel.

1-09 Revised units to English metric.

W1-3L(0)-48
W1-3R(0)-48
W1-4L(0)-48
W1-4R(0)-48
W1-6R(0)-6030
W1-6L(0)-6030
W13-1(0)-2424
W20-I103(0)-48
W20-1(0)-48

50' (15 m) centers

500' (150 m) min.
1000' (300 m) max.
500' (150 m) min.
100' (30 m)

1000' (300 m) max.
1000' (300 m) max.
### SYMBOLS

1. **Arrow board**
2. **Portable changeable message sign**
3. **Sign**
4. **Type II barricades, drums, or vertical barricades with unidirectional flashing lights**

#### GENERAL NOTES

**This standard is used where at any time a lane is closed on a freeway/expressway.** When the left lane is closed, **LEFT LANE CLOSED** signs shall be substituted for the **RIGHT LANE CLOSED** signs. The first two signs and the message board are stationary.

The last four signs and arrowboard shall be moved as necessary to maintain the required distance from the start of the lane closure taper(s).

All dimensions are in inches (millimeters) unless otherwise stated.

**APPENDIX TO LANE CLOSURE, FREEWAY/EXPRESSWAY**

**STANDARD 701400-06**
**January 1, 2013**

**Statute of Lane Closure, Freeway / Expressway**

**SYMBOLS**

- Arrow board
- Worker area
- Sign
- Direction Indicator barricade with steady burn monodirectional light
- Type II barricade, drum, or vertical barricade with steady burn monodirectional light
- Flagger with traffic control sign

**GENERAL NOTES**

This Standard is used where at any time any vehicle, equipment, workers or their activities will encroach on the lane adjacent to the shoulder, or on the shoulder within 2400 (6000) of the edge of pavement.

This Standard must always be used in combination with Standard 701400.

This Standard also applies when work is being performed in the left lane, under these conditions, the set up would be a mirror image to what is shown.

A check barricade shall be placed in the middle of the closed lane and at the shoulder at 1000' (300 m) centers. As dimensions are in inches (millimeters) unless otherwise shown.

**DATE**

- 1-1-11: Revised work and work signs with PHOTO ENFORCED.
- 1-1-13: Revised temp. raised pavement

**REVIVERs**

- 1-1-11: Revised work and work signs with PHOTO ENFORCED.
- 1-1-13: Revised work and work signs with PHOTO ENFORCED.
**SYMBOLES**

- Arrow board
- Work area
- Sign
- Direction indicator barricade with steady burn monodirectional light
- Type III barricades, drums, or vertical barricades with steady burn monodirectional light
- Temporary concrete barrier
- Monodirectional barrier wall/guardrail marker
- Drop off-retractor

**GENERAL NOTES**

This standard is used where at any time any vehicle, equipment, workers or their activities will encroach on the pavement or on the shoulder within 24 (600) ft of the edge of pavement for daylight operation exceeding one day and where temporary concrete barrier is utilized.

This Standard must always be used in combination with Standard 701400.

When work is being performed in the left lane, this setup would be a mirror image to what is shown.

Temporary concrete barrier shall be according to Standard 701602.

Calculate L as follows:

\[ L = \frac{0.65(W)(S)}{45} \]  

**FORMULAS**

**POSTED SPEED**

<table>
<thead>
<tr>
<th>English</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>72.4</td>
</tr>
</tbody>
</table>

**POSTED SPEED**

- Normal posted speed
- 45 mph (72.4 km/h) or more

- Width of offset
- In feet (meters)

- Normal posted speed
- In mph (km/h)

**SYMBOLS**

- Arrow board
- Work area
- Sign
- Direction indicator barricade with steady burn monodirectional light
- Type III barricades, drums, or vertical barricades with steady burn monodirectional light
- Temporary concrete barrier
- Monodirectional barrier wall/guardrail marker
- Drop off-retractor

**LANE CLOSURE, FREEWAY/EXPRESSWAY, WITH BARRIER**

**STANDARD 701402-09**

**DATE**

- 1-1-12

**REVIEWS**

- Corrected barrier in symbol legend.
- Added metric to L calculation.
**TYPICAL APPLICATIONS**

- Bituminous resurfacing
- Pavement patch
- Utility operations
- Continuous resurfacing

**SYMBOLS**

- Arrow board
- Work area symbol
- Sign
- Worker
- Direction indicator barricade
- Cone, drum or barricade
- Flagger with traffic control sign

**GENERAL NOTES**

This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach on the lane adjacent to the shoulder, or on the shoulder within 24 (600) of the edge of pavement for daylight operations.

This Standard must always be used in combination with Standard 701400.

This Standard also applies when work is being performed in the left lane. Under these conditions, the set up would be a mirror image to what is shown.

All dimensions are in inches (millimeters) unless otherwise shown.

**LANE CLOSURE,**

**FREEWAY/EXPRESSWAY,**

**DAY OPERATIONS ONLY**

**STANDARD 701406-07**
APPLICATION NO. 1

Application No. 1 depicts a modified entrance ramp. This method shall be utilized whenever existing entrance tapers cannot be retained due to the close proximity of the work zone. The entrance location may be shifted, with the approval of the Engineer, to perform work.

In the entrance area, Application No. 2 shall be put into effect as soon as possible.

APPLICATION NO. 2

Application No. 2 depicts a shortening of the normal entrance ramp. This method shall be used whenever the existing geometrics can be retained. Consideration should be given to the entering motorist's line of sight, through, between, or over the delineation devices.
APPLICATION NO. 3

Application No. 3 depicts a modified exit ramp. The channelizing devices shall provide a clearly defined path for the exiting motorists. The minimum dimensions shown shall be increased as soon as the progress of the work will permit. The open portion of the ramp may be shifted, with the approval of the Engineer, to perform work in stages on the area adjacent to the ramp exit. Application No. 4 shall be put into effect as soon as possible with the approval of the Engineer, to perform work in stages on the area adjacent to the ramp exit. Application No. 4 shall be put into effect as soon as possible.

APPLICATION NO. 4

Application No. 4 depicts an extension of the normal exit lane. This method shall be used whenever existing geometrics can be retained. Consideration should be given to the exiting motorists line of sight through, between or over the delineation devices.
This Standard is used where at any time, any vehicle, equipment, workers or their activities require the closure of two adjacent lanes and a temporary crossover is provided by signing use of one lane of pavement normally used by opposing flow of traffic and concrete barrier is used to separate the opposing traffic.

This Standard must always be used in combination with Standard 70400.

All barricades, drums, and vertical panels shall be of type II in lane shift.

Temporary concrete barrier shall be according to Standard 70400.

4. All dimensions are in inches unless otherwise shown.
This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach on the lane adjacent to the shoulder, or on the shoulder within 24 (600) of the edge of pavement.

This Standard also applies when work is being performed in the left lane, under these conditions, LEFT LANE CLOSED signs shall be substituted for RIGHT LANE CLOSED signs. On undivided highways, LEFT LANE CLOSED signs shall be substituted for LEFT LANE CLOSED signs. On undivided highways, LEFT LANE CLOSED signs shall be substituted for LEFT LANE CLOSED signs.

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach on the lane adjacent to the shoulder, or on the shoulder within 24 (600) of the edge of pavement.

This Standard also applies when work is being performed in the left lane, under these conditions, LEFT LANE CLOSED signs shall be substituted for RIGHT LANE CLOSED signs. On undivided highways, LEFT LANE CLOSED signs shall be substituted for LEFT LANE CLOSED signs. On undivided highways, LEFT LANE CLOSED signs shall be substituted for LEFT LANE CLOSED signs.

ALL dimensions are in inches (millimeters) unless otherwise shown.

LANE CLOSURE, MULTILANE, DAY OPERATIONS ONLY, FOR SPEEDS > 45 MPH TO 55 MPH

STANDARD 701421-05
**GENERAL NOTES**

This standard is used where at any time any vehicle, equipment, workers or their activities will encroach on the pavement or on the shoulder within 24 (600) of the edge of pavement for daylight operation exceeding one day and where temporary concrete barrier is utilized.

When work is being performed in the left lane, the set up would be a mirror image to what is shown.

Calculate L as follows:

\[
L = 0.65 \times W \times S
\]

Where:
- L = Lane taper length
- W = Width of offset
- S = Speed in mph (km/h)

Normal posted speed unless otherwise shown.

All dimensions are in inches (millimeters) unless otherwise shown.

**SYMBOLS**

- Arrow board
- Work area
- Sign
- Direction indicator barrier with steady burn monodirectional light
- Type II barricade, drum, or vertical barricade with steady burn monodirectional light
- Temporary concrete barrier
- Monodirectional barrier wall/guardrail marker
- Impact attenuator
- Type III barricade, drum, or vertical barricade with monodirectional flashing light

**FORMULAS**

45 mph (72 km/h) or more

K = Width of offset in feet (meters)

S = Normal posted speed in mph (km/h)

All dimensions are in inches (millimeters) unless otherwise shown.

**LANE CLOSURE, MULTILANE, WITH BARRIER, FOR SPEEDS > 45 MPH TO 55 MPH**

**STANDARD 701423-06**
**NOTE**
When a shoulder does not exist or is narrow, use Detail C.

**DETAIL A**

**DETAIL B**

**DETAIL C**
* Required when workers are on the pavement.

**SYMBOLS**
- Arrow board
- Work area
- Truck with flashing amber light
- Truck mounted attenuator
- Flagger with traffic control sign
- Sign

**TYPICAL APPLICATIONS**
- Landscaping work
- Utility work
- Pavement marking
- Weed spraying
- Roadometer measurements
- Debris cleanup
- Pavement marking
- Crack pouring

**GENERAL NOTES**
This Standard is used where any vehicle, equipment, workers or their activities will require:
1) 
2) A continuous or intermittent moving operation where the average speed of movement is greater than 1 mph (2 km/h).

This Standard is also applicable when work is being performed in the left lane(s) or on the median shoulder. Under these conditions, KEEP RIGHT signs shall be substituted for KEEP LEFT signs and arrow board indications shall be directed to the right.

All dimensions are in inches (millimeters). Unless otherwise shown.

**LANE CLOSURE, MULTILANE, INTERMITTENT OR MOVING OPER., FOR SPEEDS > 45 MPH**

**STANDARD 701426-05**
NOTE: When a shoulder does not exist or is narrow, use Detail C.

DETAIL A

NOTE: When a shoulder does not exist or is narrow, use Detail C.

DETAIL B

DETAIL C

SYMBOLS

Arrow board
Work area
Truck with flashing amber light
Truck/Trailer mounted attenuator
Flagger with traffic control sign
Sign

TYPICAL APPLICATIONS
Landscape work
Utility work
Pavement marking
Weed spraying
Roadometer measurements
Debris cleanup
Crock pouting

GENERAL NOTES
This Standard is used where any vehicle, equipment, workers or their activities will require:
1) stationary operations up to 1 hour, or 2) a continuous or intermittent moving operation where the average speed of movement is greater than 1 mph (2 km/h).

This Standard is also applicable when work is being performed in the left lane(s) or on the median shoulder. Under these conditions, KEEP RIGHT signs and arrow board indications shall be directed to the right.

All dimensions are in inches (millimeter) unless otherwise shown.

LANE CLOSURE, MULTILANE, INTERMITTENT OR MOVING OPER., FOR SPEEDS < 40 MPH

STANDARD 701427-01
I MILE WORK ROAD
1/2 MILE CLOSED LEFT LANE
1 MILE CONSTRUCTION ROAD
1 MILE WORK ROAD
1/2 MILE CLOSED RIGHT LANE

DATE REVISIONS MILES NEXT MILES

Illinois Department of Transportation
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
APPROVED ISSUED 1-1-97

END WORK ZONE SPEED LIMIT

January 1,

END WORK ZONE SPEED LIMIT

January 1,
SYMBOLS

- Arrow board
- Work area
- Sign
- Direction Indicator barricade with steady burn monodirectional light
- Type II barricade, drum, or vertical barricade with steady burn monodirectional light
- Flagger with traffic control sign

GENERAL NOTES

This Standard is used where at any time any vehicle, equipment, workers or their activities will encroach on two lanes of a freeway/expressway. This Standard must always be used in combination with Standard 701400. This Standard also applies when work is being performed in the left lanes. Under these conditions, the set up would be a mirror image to what is shown.

Check barricades shall be placed in the middle of the closed lanes at 1000' (300 m) centers. Work Zone Speed Limits signs and FLAGGER signs shall be moved as necessary to maintain the required spacing between the signs and the workers in each separate work activity. Work Zone Speed Limit sign(s) shall be omitted when the work area dictates as necessary.

The length of the tangent section shall be:

Duration of Closure | Length of Tangent Section
--- | ---
< 14 Days | 1000' (300 m)
> 14 Days | 2000' (600 m)

SPEED LIMIT
WORK ZONE END

FREEWAY/EXPRESSWAY
TWO LANE CLOSURE

DATE
REVISIONS

1-1-12
1-1-13

FREEWAY/EXPRESSWAY

STANDARD 701446-04
EXIT RAMP CLOSURE

SYMBOLS

<table>
<thead>
<tr>
<th>Sign Type III barricade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drum with steady burning light</td>
</tr>
</tbody>
</table>

ENTRANCE RAMP CLOSURE

RAMP CLOSURE
FREEWAY/EXPRESSWAY

STANDARD 701451-01
PARTIAL EXIT RAMP CLOSURE

SYMBOLS
- Sign
- Type III barricade
- Drum with steady burning light
- Work area
- Flagger with traffic control sign

All dimensions are in inches (millimeters) unless otherwise shown.
**SYMBOLS**

- Work area
- Cones, drum or barricade (not required for moving operations)
- Sign on post, panel or permanent support
- Flicker with traffic control sign
- Barricade or drum with flashing light
- Type III barricade with flashing light
- One way / one lane operation

**SIGN SPACING**

- Posted speed 55
- 50-45
- <45
- 500' (150 m)
- 350' (100 m)
- 200' (60 m)

**Work area**

- Cone, drum or barricade
- Sign on post, panel or permanent support
- Flicker with traffic control sign
- Barricade or drum with flashing light
- Type III barricade with flashing light

**GENERAL NOTES**

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement requiring the closure of one traffic lane in an urban area.

**DATE** 1-1-11

**REVISIONS**

- Switched units to English (metric).
- Corrected sign No.'s.
CASE I
(Signs required for both directions)

1. Refer to SIGN SPACING TABLE for distances.
2. Required for speeds > 40 mph (70 km/h).
3. Required if work exceeds 500' (164 m) or 1 block.
4. For speeds exceeding 45 mph (80 km/h) contact the District Operations Office for approval of sign spacing.
5. Cones at 25' (8 m) centers for 250' (75 m). Additional cones may be placed at 15' (4.5 m) centers. When drums or type I or II barricades are used, the interval between devices may be doubled.
6. For approved alignment closures.
7. Cones, drums or barricades of 20' (6 m) centers in taper.
8. Use flagger sign only when flagger is present.

SYMBOLS
- Work area
- Barricade or drum with flashing light
- Flagger with traffic control sign
- Cone, drum or barricade (Cones for daytime use only)
- Sign on portable or permanent support

GENERAL NOTES
This Standard is used to close one lane of an urban, two lane, two way roadway with a bidirectional turn lane.

Case I applies when no workers are present, when workers are present, two lanes shall be closed and traffic control shall be according to Standard 701502.

Calculate L as follows:

\[ L = \frac{W \times S}{2} \]

WHERE
- \( W \) = Width of offset in feet (meters).
- \( S \) = Normal posted speed in miles per hour (km/h).

All dimensions are in inches (millimeters) unless otherwise shown.

URBAN LANE CLOSURE, 2L, 2W, WITH BIDIRECTIONAL LEFT TURN LANE
STANDARD 701502-05

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-11</td>
<td>Sheet 1 of 2</td>
</tr>
<tr>
<td>1-1-13</td>
<td>Revised</td>
</tr>
<tr>
<td>2-1-13</td>
<td>Reorganized</td>
</tr>
<tr>
<td>3-1-13</td>
<td>Omitted text 'WORKERS'</td>
</tr>
<tr>
<td>4-1-13</td>
<td>Added note 8.</td>
</tr>
<tr>
<td>5-1-13</td>
<td>SYMBOL legend. Revised</td>
</tr>
<tr>
<td>6-1-13</td>
<td>Omitted arrow board from sign.</td>
</tr>
<tr>
<td>7-1-13</td>
<td>Added note 8.</td>
</tr>
</tbody>
</table>
CASE II

URBAN LANE CLOSURE,
2L, 2W, WITH BIDIRECTIONAL
LEFT TURN LANE

(Assert 2 of 2)

STANDARD 701502-05
### Sign Spacing Table

<table>
<thead>
<tr>
<th>Postion</th>
<th>Sign spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 ft</td>
<td>500' (150 m)</td>
</tr>
<tr>
<td>200 ft</td>
<td>350' (100 m)</td>
</tr>
<tr>
<td>300 ft</td>
<td>200' (60 m)</td>
</tr>
<tr>
<td>400 ft</td>
<td></td>
</tr>
</tbody>
</table>

### Symbols

- **Arrow board**
- **Work area**
- **Barricade or drum with steady burning non-directional light**
- **Flagger with traffic control sign**
- **Cone, drum or barricade**
- **Sign on portable or permanent support**
- **Type III Barricade**

### General Notes

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement requiring the closure of one traffic lane in an Urban area.

If the work operation is performed between 9:00 a.m. and 3:00 p.m. and does not exceed 15 min., Traffic protection shall be as shown for Standard 70146.

Calculate L as follows:

\[ L = W \times S \]

where:
- \( L \) is the length of offset
- \( W \) is the width of offset
- \( S \) is the normal posted speed

### Case I

1. Refer to SIGN SPACING TABLE for distances.
2. Required if work exceeds 500' (164 m) or 1 block, repeat every 1 mile (1.6 km).
3. Required for speeds exceeding 45 mph (80 km/h) contact the District Operations Office for approved sign spacing.
4. Additional cones may be placed at 50' (15 m) centers. When drums or Type I or II barricades are used, the interval between devices may be doubled.
5. For approved sideroad closures.
6. Cones, drums or barricades at 20' (6 m) centers in taper.
7. Use flagger sign only when flagger is present.

### URBAN LANE CLOSURE, MULTILANE, 2W WITH BIDIRECTIONAL LEFT TURN LANE

#### Standard 701602-06
CASE IV

URBAN LANE CLOSURE, MULTILANE, 2W WITH BIDIRECTIONAL LEFT TURN LANE

STANDARD 701602-06
**GENERAL NOTES**

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement requiring the closure of one or more traffic lanes in an urban area.

Calculate L as follows:

\[ L = \frac{S \times W}{60} \]

Where:
- \( S \) = Speed in miles per hour
- \( W \) = Width of offset in feet

\[ L = \frac{S \times W}{150} \]

Where:
- \( S \) = Speed in kilometers per hour
- \( W \) = Width of offset in meters

\[ L = \frac{S \times W}{100} \]

Where:
- \( S \) = Speed in kilometers per hour
- \( W \) = Width of offset in millimeters

1. Refer to SIGN SPACING TABLE for distances.
2. Required for speeds > 40 mph.
3. Use flagger sign only when flagger is present.
4. For approved sideroad closures.
5. Cones at 25' (7.5 m) centers; for 250' (75 m), additional cones may be placed at 50' (15 m) centers. When drums or Type I or Type II barricades are used, the interval between devices may be doubled.
6. Cones, drums, or barricades at 20' (6 m) centers in taper.
7. Repeat every 1 mile (1.6 km).

**SYMBOLS**

- Arrow board
- Cone, drum, or barricade
- Sign on portable or permanent support
- Work area
- Barricade or drum with flashing lights
- Type III barricade with flashing lights
- Flagger with traffic control sign

**URBAN LANE CLOSURE, MULTILANE, 2W WITH MOUNTABLE MEDIAN**

**Standard 701606-08**

Date

**REVISIONS**

- 1-1-11 Revised flagger sign.
- 1-1-12 Omitted W21-1103(0)-48.
- 1-1-12 Repeat every 1 mile (1.6 km).
- 1-1-12 Added W-1-6R sign.
- 1-1-12 Corrected dimension in notes.
- 1-1-12 Shifting W20-48.
- 1-1-12 Revised flagger sign.
**AHEAD CONSTRUCTION ROAD OR PROJECTS**

**W20-I103(0)-48 for AHEAD WORK ROAD projects and utility maintenance W20-1(0)-48 for**

**SIDEWALK CLOSED**

**SIDEWALK CLOSED USE OTHER SIDE**

**CROSSWALK CLOSURE**

**CORNER CLOSURE**

**SIDEWALK, CORNER OR CROSSWALK CLOSURE**

**STANDARD 701801-05**

**Illinois Department of Transportation**

**APPROVED 1-1-97**

**APPROVED 1-1-2012**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ENGINEER OF SAFETY ENGINEERING**
All heights shown shall be measured above the pavement surface.

All dimensions are in inches (millimeters) unless otherwise shown.

Warning lights (if required)

#### GENERAL NOTES

**TRAFFIC CONTROL DEVICES**

STANDARD 701901-02

(Sheet 1 of 3)
**ROAD CONSTRUCTION NEXT X MILES**

- Dimensions:
  - Flares: 18 x 18 (450 x 450)
  - Orange flags: 18 x 18 (450 x 450)

**END CONSTRUCTION**

- Dimensions:
  - Flares: 18 x 18 (450 x 450)
  - Orange flags: 18 x 18 (450 x 450)

---

**SIGN ON TEMPORARY SUPPORTS**

- When work operations exceed four days, this dimension shall be 5' (1.5 m) min. If located behind other devices, the height shall be sufficient to be seen by motorists.

---

**STOP**

- Dimensions:
  - Front side: 8 x 7 (200 x 175)
  - Reverse side: 8 x 7 (200 x 175)

**SLOW**

- Dimensions:
  - Front side: 8 x 7 (200 x 175)
  - Reverse side: 8 x 7 (200 x 175)

---

**FLAGGER TRAFFIC CONTROL SIGN**

- Dimensions:
  - Front side: 8 x 7 (200 x 175)
  - Reverse side: 8 x 7 (200 x 175)

---

**HIGH LEVEL WARNING DEVICE**

- Dimensions:
  - Flares: 18 x 18 (450 x 450)
  - Orange flags: 18 x 18 (450 x 450)

---

**WORK LIMIT SIGNING**

- Dimensions:
  - Flares: 18 x 18 (450 x 450)
  - Orange flags: 18 x 18 (450 x 450)

---

**TRAFFIC CONTROL DEVICES**

- Dimensions:
  - Flares: 18 x 18 (450 x 450)
  - Orange flags: 18 x 18 (450 x 450)

---

All dimensions are in inches or millimeters unless otherwise shown.

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

- Engineer of Design and Environment
- Approved
- Engineer of Operations
- Issued 1-1-97

---

**NOTES**

- Post mounted signs:
  - When curb or paved shoulder are present, this dimension shall be 24 (600) to the face of curb or 8 (200) to the outside edge of the paved shoulder.

- SIGNS ON TEMPORARY SUPPORTS:
  - When work operations exceed four days, this dimension shall be 5' (1.5 m) min. If located behind other devices, the height shall be sufficient to be seen by motorists.

- POST MOUNTED SIGNS:
  - When curb or paved shoulder are present, this dimension shall be 24 (600) to the face of curb or 8 (200) to the outside edge of the paved shoulder.

---

**REFERENCES**

- Illinois Standards
- Federal Specifications
- Illinois Traffic Control Manual

---

**IMPRINT**

- Illinois Department of Transportation
- Engineer of Design and Environment
- Approved
- Engineer of Operations
- Issued 1-1-97

---

**REFERENCES**

- Illinois Standards
- Federal Specifications
- Illinois Traffic Control Manual

---

**NOTES**

- Post mounted signs:
  - When curb or paved shoulder are present, this dimension shall be 24 (600) to the face of curb or 8 (200) to the outside edge of the paved shoulder.

- SIGNS ON TEMPORARY SUPPORTS:
  - When work operations exceed four days, this dimension shall be 5' (1.5 m) min. If located behind other devices, the height shall be sufficient to be seen by motorists.

- POST MOUNTED SIGNS:
  - When curb or paved shoulder are present, this dimension shall be 24 (600) to the face of curb or 8 (200) to the outside edge of the paved shoulder.
Each F shape barrier shall be clearly marked with "ILLINOIS F SHAPE", the Producer's mark and the date of manufacture. The markings shall be indented on the barrier or painted thereon with waterproof paint/ink.

The insert for the (M12) bolt shall be capable of 3,000 lb (13 kN) pull-out strength.

When barrier separates opposing flows of traffic markers shall be on both sides of barrier.

See Standard 635011 for dimensions of Type C marker.

All dimensions are in inches (millimeters) unless otherwise shown.
**SIGN PANEL MOUNTING DETAILS**

**STANDARD 720001-01**

**WOOD OR TELESCOPING STEEL POSTS**

**LIGHT OR SIGNAL STANDARDS**

**BREAKAWAY STEEL TUBING POSTS**

*All dimensions are in inches (millimeters) unless otherwise shown.*

---

**SUPPORTING CHANNEL DETAILS**

**ROUTE MARKER ASSEMBLY**

**SIGN PANEL**

**DETAIL A**

**DETAIL B**

**DETAIL C**

---

**ENGLISH (METRIC)**

Switched units to Renum. Standard 2319-6.

---

**STEEL POSTS**

**WOOD OR TELESCOPING LIGHT OR SIGNAL STANDARDS**

**BREAKAWAY STEEL TUBING POSTS**

*Optional*

---

**STEEL**

- **Steel**: 2.50 in² (16.0 mm²)
- **Aluminum**: 0.50 in² (2458 mm²)

---

**SECTION MODULUS**

<table>
<thead>
<tr>
<th>Axis A</th>
<th>Axis B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>0.050</td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.150</td>
</tr>
</tbody>
</table>

---

**STANDARD**

**MOUNTING DETAILS**

---

**DATE**

**REVISIONS**

---

**ENGINEER OF DESIGN AND ENVIRONMENT APPROVED 1-1-97**

**ENGINEER OF OPERATIONS APPROVED 1-1-97**
**Table of Properties**

<table>
<thead>
<tr>
<th>Type</th>
<th>G</th>
<th>D</th>
<th>E</th>
<th>Area (in²)</th>
<th>Moment of Inertia (in⁴)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**General Notes**

- Dimensions shown for cross sections are minimum.
- All dimensions are in inches (millimeters) unless otherwise specified.
- Steel - 1.12 lbs./ft. (1.67 kg/m)
- Steel - 0.223 lbs./in.² (3.654 N/mm²)
- Steel - 0.435 lbs./in.² (7,128 N/mm²)
- Steel - 0.888 lbs./in.² (14,552 N/mm²)

**Switched Units to English (metric).**

**Switched Units to English (metric).**

**Steel - 1.12 lbs./ft. (1.67 kg/m)**

**Steel - 0.223 lbs./in.² (3.654 N/mm²)**

**Steel - 0.435 lbs./in.² (7,128 N/mm²)**

**Steel - 0.888 lbs./in.² (14,552 N/mm²)**

**Notes:**

- Taper optional
- Steel - 1.12 lbs./ft. (1.67 kg/m)
- Steel - 0.223 lbs./in.² (3.654 N/mm²)
- Steel - 0.435 lbs./in.² (7,128 N/mm²)
- Steel - 0.888 lbs./in.² (14,552 N/mm²)

**METAL POSTS FOR SIGNS, MARKERS & DELINEATORS**

**STANDARD 720011-01**
TYPICAL SIGN STYLES

SIGN STYLE | DIMENSIONS | LETTER SIZE | BORDER
--- | --- | --- | ---
Stout | A | B | C | D | E | F | H | I | J | - | - | - | 1/8 | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 10/12 | - | - | - | - | - | 1/8 | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 12/15 | - | - | - | - | - | 1/8 | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 14/18 | - | - | - | - | - | 1/8 | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 16/20 | - | - | - | - | - | 1/8 | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 18/24 | - | - | - | - | - | 1/8 | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 20/26 | - | - | - | - | - | 1/8 | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 22/30 | - | - | - | - | - | 1/8 | 1/16

Cub | A | B | C | D | E | F | H | I | J | - | - | - | - | - | - | - | 1/8 | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 10/12 | - | - | - | - | - | - | - | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 12/15 | - | - | - | - | - | - | - | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 14/18 | - | - | - | - | - | - | - | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 16/20 | - | - | - | - | - | - | - | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 18/24 | - | - | - | - | - | - | - | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 20/26 | - | - | - | - | - | - | - | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 22/30 | - | - | - | - | - | - | - | 1/16

R | A | B | C | D | E | F | H | I | J | - | - | - | - | - | - | - | 1/8 | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 10/12 | - | - | - | - | - | - | - | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 12/15 | - | - | - | - | - | - | - | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 14/18 | - | - | - | - | - | - | - | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 16/20 | - | - | - | - | - | - | - | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 18/24 | - | - | - | - | - | - | - | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 20/26 | - | - | - | - | - | - | - | 1/16
Var. | 24 | 180 | 140 | 120 | 100 | 60 | - | 22/30 | - | - | - | - | - | - | - | 1/16

* Supplemented Messages

GENERAL NOTES
All signs shall have a white, reflectorized legend and border on a green reflectorized background.
The sign panels shall be mounted as shown on Standard 720001 or as specified in the plans.
All dimensions are in inches, unless otherwise shown.

STREET NAME SIGNS

MOUNTING LOCATION

SUPPORTING CHANNELS

DATE | REVISIONS
--- | ---
1-1-09 | Revised table and figure per current MUTCD
1-1-09 | Revised column 42

MAST ARM MOUNTED

STANDARD 720016-03
FACE OF SIGN PANEL

6 (150) PANEL

TYPE B SIGN PANEL

TYPE C SIGN PANEL

SECTION A-A

SECTION B-B

SECTION C-C

SIGN MOLDING

SIGN PANELS

EXTRUDED ALUMINUM TYPE

STANDARD 720021-02

DATE
REVISIONS
1/1/09
Revised aluminum info.

English material.

1/1/04
Matched stainless steel

clip design, and

minor changes.

All dimensions are in inches (millimeters) unless otherwise shown.

Switched units to English (metric).

Added aluminum clip.

Minor changes.
GROUND MOUNT DETAIL

PAVEMENT MOUNT DETAIL

SPlice DETAIL

**GENERAL NOTES**

All bolts: 7/8" (M10) hex head zinc or cadmium plated.

All dimensions are in inches (millimeters) unless otherwise shown.

1-1-07

1-1-09

**TELESCOPING STEEL**

SIGN SUPPORT

STANDARD 728001-01

**DATE** | **REVISIONS**
---|---
1-1-07 | Switched units to English notation.
1-1-07 | New Standard. Used to be part of Standard 722006.
For diamond shaped sign with side S as shown, use required post size for a sign with W = 0.7S and D = 1.4S.

NOTE: Minimum of 2 bolts per post required.

GENERAL NOTES


LOADING: for 60 mph (95 km/h) wind velocity with 30% gust factor, normal to sign.

SOIL PRESSURE: Minimum allowable soil pressure 1.25 tsf (120 kPa).

APPLICATIONS OF TYPES A & B METAL POSTS (FOR SIGNS & MARKERS)

STANDARD 729001-01
Plan:

- Letters I, D, and H are 2 (50) series D raised.
- 1/4 in. hole 3 places

Section A-A:

- Washer shim. Additional washers shall be used to level the base when necessary.
- Lock washer
- 3/8 (M12x83) anchor bolt

Anchor Bolt Detail:

- 3/8 (M10) Galvanized carriage bolt

Post Assembly Detail:

- All dimensions are in inches (millimeters) unless otherwise shown.

Base for Telescoping Steel Sign Support

Standard 731001-01
Edge of pavement
Yellow
White

Edge of pavement
White
Yellow

2 LANE

LANE AND EDGE LINES

Notes:
The transverse spread of the "X" may vary according to lane width.

On multi-lane roads, the stop lines shall extend across all approach lanes and separate RXR symbols shall be placed adjacent to each other in each lane.

When the pavement marking symbol is used, a portion of the symbol should be located directly adjacent to the Advance Warning Sign (W10-1) as placed by Table 2C-4, Condition B of the MUTCD.

PAVEMENT MARKINGS AT
RAILROAD-HIGHWAY GRADE CROSSING

Notes:
All dimensions are in inches (millimeters) unless otherwise shown.
**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**APPROVED**

**ISSUED**

January 1, 2009

---

**MULTI-LANE UNDIVIDED**

- Reduce to 40' (12.2 m) o.c. on curves with posted or advisory speeds of 45 mph (70 km/h) or less.

---

**TWO-LANE / TWO-WAY**

---

**LANE REDUCTION TRANSITION**

---

**TWO-WAY LEFT TURN**

---

**FREEWAY EXIT RAMP**

---

**SOURCES**

- Illinois Department of Transportation

---

**TYPICAL APPLICATIONS**

**RAISED REFLECTIVE PAVEMENT MARKERS**

**STANDARD 781001-03**

---
CORNER ISLAND

Reflectors at 40' (12.2 m) centers

Reflectors at 20' (6.1 m) centers

Reflectors at 24 (600) centers

MEDIAN ISLAND

Reflectors at 24 (600) centers

Median reflector

Prismatic curb reflector, typical for median islands.

Curb

Face of curb

SECTION A-A

Prismatic curb reflector, typical for corner islands.

Amber prismatic curb reflector, typical for median islands.

Face of curb

GENERAL NOTES

Prismatic curb reflectors shall be monodirectional and oriented with the reflective face toward approaching traffic.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE REVISIONS

1-1-12 New standard.

Illinois Department of Transportation

PASSED

2012

ENGINEER OF OPERATIONS

2012

ENGINEER OF DESIGN AND ENVIRONMENT

APPROVED

1-1-97

Issued

January 1, 1997

January 1, 1997

PRISMATIC CURB

REFLECTORS

STANDARD 782001
The following equipment is to be furnished and installed on the TYPE C Installation:

1. Code in conduit, flexible cable, No. 6, 2/C except where otherwise specified.
2. Galvanized steel conduit, 1/2" (12) with bend.
4. Aluminum weatherproof box with gasketed cover. Weatherproof box shall be installed facing the adjacent property line. (See diagram for alternate installation.)
5. Ground stud for neutral connection.
7. Offset weatherproof fitting.
8. Circuit breaker.

All dimensions are in inches (millimeters) unless otherwise shown.

ALTERNATE INSTALLATION

Provided that weatherproof box cannot be installed facing the adjacent property line.

TYPE A

- Line
- Neutral
- Weatherhead
- Conduit clamps at 2'-0" (610 mm) intervals
- Two LVC No. 8 cables in 1 (25) conduit

TYPE B

- Line
- Neutral
- Weatherhead
- Conduit clamps at 2'-0" (610 mm) intervals
- Two LVC No. 8 cables in 1 (25) conduit
- Connector for non-metallic conduit, if required
- Steel conduit
- 1 (25) Galvanized conduit, if required
- Ground clamp
- Ground rod
- No. 6 bare copper wire

TYPE C

- Line
- Neutral
- Weatherhead
- Conduit clamps at 2'-0" (610 mm) intervals
- Two LVC No. 8 cables in 1 (25) conduit
- Connector for non-metallic conduit, if required
- Steel conduit
- 1/2" (12) Galvanized conduit
- Circuit breaker ISO immersed in weatherproof enclosure (NEMA)
- Ground clamp
- Ground stud for neutral connection
- Service cables
- Offset weatherproof fitting
- Circuit breaker

INSTALLATION DETAILS

ELECTRICAL SERVICE

STANDARD 805001-01

DATE
1-1-09

REVISIONS
Renum. Standard 2373-1
Flush hinge

Conduit

Conduit

ELEVATION

PORTLAND CEMENT CONCRETE

ELEVATION

COMPOSITE CONCRETE

French drain

Steel hooks

Galvanized

Conduit bells

Nonmetallic

French drain

Steel hooks

Galvanized

Conduit bells

Nonmetallic

All dimensions are in inches (millimeters) unless otherwise shown.
ELECTRIC SERVICE INSTALLATION

- 3-wire, 3-phase, 240V service.
- Down guy and anchor, as needed.
- 25' (7.5 m) Wood service pole.
- 3-No. 8 XLP cables in 1 1/2" rigid steel conduit.
- Multibend from conduit bend at 4 1/2" to 6" intervals.
- Water (when required).
- Service disconnect switch.
- Rigid steel conduit elbow.
- Conduit hub.
- PVC conduit in 1 (25) rigid steel conduit.
- 3-No. 8 XLP cables in 1 1/2" rigid steel conduit.
- Conduit hub.
- Service disconnect switch.
- Rigid steel conduit elbow.
- Controller enclosure, minimum dimensions: 15H x 12W x 8D
- Neutral bar.
- Equipment ground bar.
- Service conductors.
- Neutral bar.
- Ground bar.

CONTROL SCHEMATIC

- Photocell with integral surge arrester.
- HAND-OFF-AUTO selector switch.
- 60 amp, electrically held contactor.
- 15 amp, 1-pole circuit breaker.
- 20 amp, 2-pole circuit breaker.
- Surge arrester.
- Service disconnect switch - 2-pole, 3-wire, 30 amp, fused at 30 amp, solid neutral in NEMA 4X enclosure having knockouts for external handles.
- Size larger as needed.

GENERAL NOTES

- Provide enclosed name plate on front of enclosure reading: "LIGHTING".
- Controller enclosure shall be mounted to pole with gusset plates and lag-bolts.
- Provide 12x9x1 (305x225x25) watertight pouch for service disc. and contactor.
- Photocell with integral surge arrester.
- Photocell, 3-wire, 30 amp, fused at 30 amp, solid neutral in NEMA 4X enclosure having knockouts for external handles.
- Size larger as needed.

SERVICE INSTALLATION

- Size larger as needed.
- Or as directed by Utility Company.

LIGHTING CONTROLLER

POLE MOUNTED, 240V

STANDARD 825001-01
LIGHTING CONTROLLER
PEDESTAL MOUNTED, 480V

CONTROLLER ENCLOSURE, MINIMUM DIMENSIONS:
304 x 234 x 140 *
(770 x 600 x 355)

SERVICE CONDUCTORS:
4 (100) Pipe,
5 (125) Sch. 40
PVC conduit.

FEEDER CONDUCTORS:
1 (25) 45° Chamfer, Ground line.

GROUND LINE:
18 (600)
24 (450)
36 (1800)

TRANSFORMER:
1KVA*, 480V primary,
120/240V secondary, single-phase, 60Hz.

GROUND ROE IN ACCESS WELL:
(305 x 225 x 25)

GROUND BAR:
(Minimum dimensions:
30H x 20W x 14D)

EQUIPMENT GROUND BAR:
(760 x 510 x 355)

FEEDER CONDUCTORS, SIZE AS REQUIRED.

SERVICE DISCONNECT SWITCH:
2-pole, service disc., contactor and
disconnect switch as directed by Utility Company.

HAND-OFF-AUTO SELECTOR SWITCH.

SURGE ARRESTER:
Incandescent luminaire, enclosed and
having lockable external handle.

LIGHTING CONTROLLER:
Protocol with integral surge
arrester.

INCONDUCTOR LIMITER, ENCLOSED AND
GASKETTED WITH 100 WATT LAMP.

SERV-CIRCUIT BREAKER:
30 amp, two-pole circuit breaker.

SERVICE DISCONNECT SWITCH - 2-pole,
3-wire, 60 amp, rated at 60 amp, solid neutral in NEMA 4X enclosure
having lockable external handle.

PHOTOCELL WITH INTEGRAL SURGE
ARRESTER.

150 amp, electrically held contactor.

BRANCH LIGHTING CIRCUITS.

WORK PAD NOT SHOWN.

GFCI DUPLEX RECEPTACLE.

CIRCUIT BREAKERS:
60 amp, 2-pole circuit breaker.

15 amp, 2-pole circuit breaker.

120/240V SECONDARY, SINGLE-PHASE, 60Hz.

100 AMP*, ELECTRICALLY HELD CONTACTOR.

60 AMP*, 2-POLE CIRCUIT BREAKER.

15 AMP, 2-POLE CIRCUIT BREAKER.

PHOTOCELL:
Photocell with integral surge
arrester.

FEEDER CONDUCTORS, SIZE AS REQUIRED.

GROUND WIRE:
No. 6 bare copper wire.

GROUND ROD:
(450)
18
(600)
24

GAGE:
(1.2 m)
3'-7"
(900)
36

FEEDER CONDUCTORS:
1 (25) 45° Chamfer, Ground line.

GROUND ROD IN ACCESS WELL:
(305 x 225 x 25)

GROUND BAR:
(Minimum dimensions:
30H x 20W x 14D)

EQUIPMENT GROUND BAR:
(760 x 510 x 355)

FEEDER CONDUCTORS, SIZE AS REQUIRED.

SERVICE DISCONNECT SWITCH:
2-pole, service disc., contactor and
disconnect switch as directed by Utility Company.

HAND-OFF-AUTO SELECTOR SWITCH.

SURGE ARRESTER:
Incandescent luminaire, enclosed and
having lockable external handle.

LIGHTING CONTROLLER:
Protocol with integral surge
arrester.

INCONDUCTOR LIMITER, ENCLOSED AND
GASKETTED WITH 100 WATT LAMP.

SERV-CIRCUIT BREAKER:
30 amp, two-pole circuit breaker.

SERVICE DISCONNECT SWITCH - 2-pole,
3-wire, 60 amp, rated at 60 amp, solid neutral in NEMA 4X enclosure
having lockable external handle.

PHOTOCELL WITH INTEGRAL SURGE
ARRESTER.

150 amp, electrically held contactor.

BRANCH LIGHTING CIRCUITS.

WORK PAD NOT SHOWN.

GFCI DUPLEX RECEPTACLE.

CIRCUIT BREAKERS:
60 amp, 2-pole circuit breaker.

15 amp, 2-pole circuit breaker.

120/240V SECONDARY, SINGLE-PHASE, 60Hz.

100 AMP*, ELECTRICALLY HELD CONTACTOR.

60 AMP*, 2-POLE CIRCUIT BREAKER.

15 AMP, 2-POLE CIRCUIT BREAKER.

PHOTOCELL:
Photocell with integral surge
arrester.

FEEDER CONDUCTORS, SIZE AS REQUIRED.

GROUND WIRE:
No. 6 bare copper wire.

GROUND ROD:
(450)
18
(600)
24

GAGE:
(1.2 m)
3'-7"
(900)
36

FEEDER CONDUCTORS:
1 (25) 45° Chamfer, Ground line.

GROUND ROD IN ACCESS WELL:
(305 x 225 x 25)

GROUND BAR:
(Minimum dimensions:
30H x 20W x 14D)

EQUIPMENT GROUND BAR:
(760 x 510 x 355)

FEEDER CONDUCTORS, SIZE AS REQUIRED.

SERVICE DISCONNECT SWITCH:
2-pole, service disc., contactor and
disconnect switch as directed by Utility Company.

HAND-OFF-AUTO SELECTOR SWITCH.

SURGE ARRESTER:
Incandescent luminaire, enclosed and
having lockable external handle.

LIGHTING CONTROLLER:
Protocol with integral surge
arrester.

INCONDUCTOR LIMITER, ENCLOSED AND
GASKETTED WITH 100 WATT LAMP.

SERV-CIRCUIT BREAKER:
30 amp, two-pole circuit breaker.

SERVICE DISCONNECT SWITCH - 2-pole,
3-wire, 60 amp, rated at 60 amp, solid neutral in NEMA 4X enclosure
having lockable external handle.

PHOTOCELL WITH INTEGRAL SURGE
ARRESTER.

150 amp, electrically held contactor.

BRANCH LIGHTING CIRCUITS.

WORK PAD NOT SHOWN.

GFCI DUPLEX RECEPTACLE.

CIRCUIT BREAKERS:
60 amp, 2-pole circuit breaker.

15 amp, 2-pole circuit breaker.

120/240V SECONDARY, SINGLE-PHASE, 60Hz.

100 AMP*, ELECTRICALLY HELD CONTACTOR.

60 AMP*, 2-POLE CIRCUIT BREAKER.

15 AMP, 2-POLE CIRCUIT BREAKER.

PHOTOCELL:
Photocell with integral surge
arrester.

FEEDER CONDUCTORS, SIZE AS REQUIRED.

GROUND WIRE:
No. 6 bare copper wire.

GROUND ROD:
(450)
18
(600)
24

GAGE:
(1.2 m)
3'-7"
(900)
36

FEEDER CONDUCTORS:
1 (25) 45° Chamfer, Ground line.

GROUND ROD IN ACCESS WELL:
(305 x 225 x 25)

GROUND BAR:
(Minimum dimensions:
30H x 20W x 14D)

EQUIPMENT GROUND BAR:
(760 x 510 x 355)

FEEDER CONDUCTORS, SIZE AS REQUIRED.

SERVICE DISCONNECT SWITCH:
2-pole, service disc., contactor and
disconnect switch as directed by Utility Company.

HAND-OFF-AUTO SELECTOR SWITCH.

SURGE ARRESTER:
Incandescent luminaire, enclosed and
having lockable external handle.

LIGHTING CONTROLLER:
Protocol with integral surge
arrester.

INCONDUCTOR LIMITER, ENCLOSED AND
GASKETTED WITH 100 WATT LAMP.

SERV-CIRCUIT BREAKER:
30 amp, two-pole circuit breaker.

SERVICE DISCONNECT SWITCH - 2-pole,
3-wire, 60 amp, rated at 60 amp, solid neutral in NEMA 4X enclosure
having lockable external handle.

PHOTOCELL WITH INTEGRAL SURGE
ARRESTER.

150 amp, electrically held contactor.

BRANCH LIGHTING CIRCUITS.

WORK PAD NOT SHOWN.

GFCI DUPLEX RECEPTACLE.

CIRCUIT BREAKERS:
60 amp, 2-pole circuit breaker.

15 amp, 2-pole circuit breaker.
**ELECTRIC SERVICE INSTALLATION**

- Size larger as needed.
- **Or as directed by Utility Company.**
- When cold sequencing is required, provide a meter disconnect switch as directed by Utility Company.

---

**SERVICE POLES**

- 240/480 V, 3-phase, 3-wire, overhead service.
- 25' (7.5 m) Wood service pole.

**FEEDER CONDUCTORS**

- Malleable iron conduit, sized as required.
- PVC conduit, sized as required.

**SERVICE DISCONNECT SWITCH**

- 100 amp, electrically held contactor.
- 15 amp, 2-pole circuit breaker.
- 20 amp, 2-pole circuit breaker.
- 120/240V secondary, single-phase, 60Hz.

**GROUND Line**

- Concrete foundation.
- Ground rod in foundation.

**GROUNDING**

- Service conductors - in rigid conduit, sized as needed.
- Service disconnect switch.
- Service grounding rod.

**GROUNDING ROD MOUNTING BOARD**

- Insulated mounting board.

**CONTROL SCHEMATIC**

- Ground line.
- Neutral bar.
- Equipment ground bar.
- Branch lighting circuits.

---

**BASE MOUNTED, 480V**

**LIGHTING CONTROLLER**

- BASE MOUNTED, 480V LIGHTING CONTROLLER

---

**ANCHOR ROD DETAIL**

- Ground rod in access well.
- Equipment grounding bar.
- Branch lighting circuits.

---

**FEEDER CONDUCTORS**

- In rigid conduit to lighting controller.
- Additional wiring window on needed.

---

**GROUNDING**

- Ground line.
- Neutral bar.
- Equipment ground bar.
- Branch lighting circuits.

---

**SERVICE DISCONNECT SWITCH**

- 100 amp, electrically held contactor.
- 15 amp, 2-pole circuit breaker.
- 20 amp, 2-pole circuit breaker.

---

**GROUNDING**

- Concrete foundation.
- Ground rod in foundation.

---

**SERVICE POLES**

- 240/480 V, 3-phase, 3-wire, overhead service.
- 25' (7.5 m) Wood service pole.
LIGHTING CONTROLLER, 240V

NAVIGATION OBSTRUCTION

ELECTRIC SERVICE INSTALLATION
- Size larger as needed.
- Or as directed by Utility Company.

ANCHOR ROD

All dimensions are in inches (millimeters) unless otherwise shown.

LIGHTING CONTROLLER, 240V

STANDARD 826001
**NAVIGATION OBSTRUCTION LIGHTING CONTROLLER, 240V**

**STANDARD 826001**

Sheet 2 of 2

**CONTROL SCHEMATIC**

1. Photocell with integral surge arrester for roadway lighting.
2. Photocell with integral surge arrester for navigation lighting.
3. MNS/GF-630 selector switch.
4. 100 amp, electrically held contactor.
5. 60 amp, electrically held contactor.
6. 15 amp, triple circuit breaker.
7. 20 amp, double circuit breaker (two shown, quantity as required).
8. 20 amp, single-pole circuit breaker (two shown, quantity as required).
10. GFI duplex receptacle.
12. Incandescent luminaire, enclosed and gasketted with 100 watt lamp.
13. Service disconnect switch - 2-pole, 30 amp, fused at 100 amp, solid neutral in NEMA 4X enclosure having removable external handle.
14. 50 amp, 2-pole circuit breaker.
15. 30 amp, 2-pole circuit breaker.

* Size larger as needed.
ELECTRIC SERVICE INSTALLATION

- Size larger as needed.
- ** 0° as directed by Utility Company.
- *** When cold sequencing is required, provide a meter
  disconnect switch as directed by Utility Company.

** STANDARDS 826006

NAVIGATION OBSTRUCTION
LIGHTING CONTROLLER, 480V

(Sheet 1 of 2)
**CONTROL SCHEMATIC**

1. Photocell with integral surge arrester for roadway lighting.
2. MAN/ST-AUTO selector switch.
3. 100 amp, electrically held contactor.
4. 50 amp, electrically held contactor.
5. 15 amp, triple circuit breaker.
6. 20 amp, single pole circuit breaker (two spares required but not shown).
7. 20 amp, single pole circuit breaker (two shown, quantity as required).
8. Surge arrester.
9. GFI, duplex receptacle.
11. Incandescent luminaire, enclosed and gasketted with 100 watt lamp.
13. 60 amp, 2-pole circuit breaker.
14. 30 amp, 2-pole circuit breaker.
15. Transformer - 1 KVA, 480V primary, 120/240V secondary, single phase, 60 Hz.
16. 15 amp, 2-pole circuit breaker.

- Size larger as needed.
**MOUNTING HEIGHT**

- **MINIMUM SHAFT DIAMETER**
  - For 35' (10.7 m) or less: 8 tapered OD 4.75 to 4.94
  - Greater than 35' (10.7 m) to 45' (13.7 m): 10 tapered OD 6 to 6.25
  - Greater than 45' (13.7 m) to 50' (15.2 m): 10 tapered OD 6 to 6.25
  - Greater than 50' (15.2 m): 15 tapered OD 8.38 to 8.63

**POLE BASE**

- **BOLT CIRCLE DIAMETER**
  - For 35' (10.7 m) or less: 10 OD 4.75 to 4.94
  - Greater than 35' (10.7 m) to 45' (13.7 m): 15 OD 8.38 to 8.63

**GENERAL NOTES**

- See Standard 830001-01 for pole identification and grounding electrode.
- See Standard 720001 for pole identification banding to pole.
- Provide breakaway devices where required.
- All dimensions are in inches (millimeters) unless otherwise shown.

**LIGHT POLE ALUMINUM MAST ARM**

- Pole cap secured to pole with three 1/2 in. set screws.
- Mast arm length 16'-0" (4.88 m) min.
- Mast arm tapered to 2% (60) OD.
- (Single or twin mount)

**POLE BASE DETAIL**

- Pole identification banded to pole. See orientation detail.
- See pole base and foundation details.
### Pole Base

<table>
<thead>
<tr>
<th>Mounting Height</th>
<th>Bolt Circle Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>35' (10.7 m)</td>
<td>127/4</td>
</tr>
<tr>
<td>Greater than 35'</td>
<td>120/4</td>
</tr>
</tbody>
</table>

### Pole Lower Shaft

<table>
<thead>
<tr>
<th>Mounting Height</th>
<th>Lower Shaft Length</th>
<th>Minimum Shaft Diameter</th>
<th>Minimum Wall Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>30&quot; (76.2 cm)</td>
<td>6 tapered</td>
<td>200 to 114</td>
<td>0.25 (6)</td>
</tr>
<tr>
<td>35&quot; (88.9 cm)</td>
<td>6 tapered</td>
<td>200 to 114</td>
<td>0.25 (6)</td>
</tr>
<tr>
<td>40&quot; (101.6 cm)</td>
<td>10 tapered</td>
<td>250 to 150</td>
<td>0.25 (6)</td>
</tr>
<tr>
<td>45&quot; (114.3 cm)</td>
<td>10 tapered</td>
<td>250 to 150</td>
<td>0.25 (6)</td>
</tr>
<tr>
<td>50&quot; (127 cm)</td>
<td>10 tapered</td>
<td>250 to 150</td>
<td>0.25 (6)</td>
</tr>
</tbody>
</table>

### Section A-A
- Lower shaft length shall be from the bottom of the pole base to the bottom of the slip joint.
- 5" max. for unloaded pole, 12" max. for loaded pole.

### Section B-B
- Factory installed internal dampener.
- Light pole shaft.
- Pole identification bonded to pole. See orientation detail.

### Tenon Detail
- Flat washer and lock washer.
- 3/8" (8.9) OD.
- Tenon. Minimum wall thickness 0.188 (4.8).

### General Notes
- See Standard 836001 for pole identification bonding to pole.
- Provide breakaway devices where required.
- All dimensions are in inches (millimeters) unless otherwise shown.

### Light Pole Foundation and Grounding Electrode
- See Standard 720001 for grounding electrode.

---

**Light Pole Dimension Chart**

<table>
<thead>
<tr>
<th>Height (ft)</th>
<th>Diameter (in)</th>
<th>Wall Thickness (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>6</td>
<td>0.25</td>
</tr>
<tr>
<td>35</td>
<td>6</td>
<td>0.25</td>
</tr>
<tr>
<td>40</td>
<td>10</td>
<td>0.25</td>
</tr>
<tr>
<td>45</td>
<td>10</td>
<td>0.25</td>
</tr>
<tr>
<td>50</td>
<td>10</td>
<td>0.25</td>
</tr>
</tbody>
</table>

---

**Aluminum Davit Arm**

Light Pole Foundation and Grounding Electrode. See Standard 720001 for pole identification bonding to pole.
**Standards:**

- **Light Pole:**
  - **Mast Arm**
  - **Light Pole**
    - (Single or twin mount)
  - Pole identification banded to pole, see orientation detail.
  - Pole cap secured to pole with three 1/2 in. set screws.
  - Clamp type bracket with hex head bolts and hardware (1 type).

- **Base Plate:**
  - **Bolt Circle Diameter:**
  - **Base Plate Thickness:**

- **General Notes:**
  - See Standard 836001 for Light Pole Foundation and grounding electrode.
  - See Standard 780001 for pole identification banding to pole.
  - Provide breakaway devices where required.
  - All dimensions are in inches (millimeters) unless otherwise shown.

**Table:**

<table>
<thead>
<tr>
<th>MOUNTING HEIGHT</th>
<th>DIAMETER</th>
<th>WALL THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>35' (10.7 m) or less</td>
<td>8 tapered to 4</td>
<td>10 gage</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>10 tapered to 4</td>
<td>7 gage</td>
</tr>
<tr>
<td>Greater than 50' (15.2 m) to 60' (18.3 m)</td>
<td>10 tapered to 4</td>
<td>5 gage</td>
</tr>
</tbody>
</table>

**Sheet Information:**

- **Sheet 1 of 2**
- **DATE: 1-1-13**
- **APPROVED:**
  - ENGINEER OF DESIGN AND ENVIRONMENT
  - ENGINEER OF PRELIMINARY ENGINEERING

**Sheets:**

- **830011-01**

**New Standard:**

- **836001**
- **780001**
Traffic flow

Pole on median barrier wall.

Traffic flow

Pole on barrier wall or parapet.

Traffic flow

Pole on ground mounted foundation.

**POLE BASE DETAIL**

1. Omit leveling nuts when breakaway devices are required.

**ELEVATION**

Handhole and cover. See orientation detail.

**SECTION A-A**

LEFT HAND DETAIL

- Hex nut with washer.
- Washer shall cover entire slot (typ.).
- Nut covers required but not shown.
- Screen banded to pole base only, when used, metal foundation.
- Concrete foundation, barrier or retaining wall.
- Hex nut and lock washer on fully threaded rod for metal foundation.

**HANDHOLE DETAIL**

- Handhole frame.
- Handhole cover.
- Handhole gasket.

**HANDHOLE / IDENTIFICATION ORIENTATION DETAIL**

- Pole identification.
- Pole on ground mounted foundation.
- Pole on barrier wall or parapet.
- Pole on median barrier wall.
- Handhole.

Traffic flow

- Screen shall be screen banded to pole base only, when used, metal foundation.
- Metal foundation.
- Metal foundation, or parapet.
- Bolt circle.
- Tapped 1/2 x 13 hole for grounding connector.

**STEEL MAST ARM LIGHT POLE**

- Hex nut and lock washer on fully threaded rod for metal foundation.
- Concrete foundation, barrier or retaining wall.
- Hex nut with washer.
- Washer shall cover entire slot (typ.).
- Nut covers required but not shown.
- Screen banded to pole base only, when used, metal foundation.
<table>
<thead>
<tr>
<th>MOUNTING HEIGHT</th>
<th>BOLT CIRCLE DIAMETER</th>
<th>BASE PLATE THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>30' (9.1 m)</td>
<td>1½ (40D)</td>
<td>1 (125)</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>1½ (40D)</td>
<td>1 (125)</td>
</tr>
<tr>
<td>Greater than 50' (15.2 m) to 60' (18.3 m)</td>
<td>1½ (40D)</td>
<td>1 (125)</td>
</tr>
</tbody>
</table>

**SECTION A-A**

Davit arm length is 15'-0" (4.57 m) max. for single, 12'-0" (3.66 m) max. for double.

**SECTION B-B**

Pole identification banded to pole. See orientation detail.

Light pole shaft.

Flat washer and lock washer.

Davit arm.

Steel Davit Arm

Light Pole

**GENERAL NOTES**

See Standard 830001 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole identification banding to pole.

Provide breakaway devices where required.

All dimensions are in inches (millimeters) unless otherwise shown.

**DATE**

**REVISIONS**

1-11 Revised border of existing

1-12 New Standard

**STANDARD 830016-01**

1-12 New Standard.
Traffic flow

Handhole

Pole identification

Pole

Traffic flow

Pole on median barrier wall

Traffic flow

Davit arm

Handhole

Pole identification

Pole

Davit arm

Pole

Traffic flow

Handhole

Pole identification

Pole

Davit arm

Traffic flow

Handhole

Pole identification

Pole

Davit arm

Traffic flow

Handhole

Pole identification

Pole

ORIENTATION DETAIL

HANDHOLE / IDENTIFICATION

SECTION A-A

ELEVATION

POLE BASE DETAIL

1 1/2 x 1/2 x 50 bolt (typ.)

Tapped 1/8 x 33 hole for grounding connector

Bolt circle

Handhole frame

Handhole cover

Handhole gasket

Metal foundation

Concrete foundation, barrier or retaining wall

Screen banded to pole base and, when used, metal foundation.

Nut covers required but not shown.

Hex nut with washer, washer shall cover entire slot (typ.), nut covers required but not shown.

Leveled nut (typ.), 4 min.

Leveling nut (typ.)

Metal foundation, when used, metal foundation.

Metal foundation, when used.

Nut covers required.

See orientation detail.

3 Nut covers required.

Omit leveling nuts when breakaway devices are required.

Light pole

STEEL DAVIDT ARM

HANDHOLE DETAIL

STANDARD 830016-01

Sheet 2 of 2
TENON DETAIL

Light pole.

TWIN TENON DETAIL

Light pole.

GENERAL NOTES

See Standard 836001 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole identification banded to pole.

Provide breakaway devices where required.

All dimensions are in inches (millimeters) unless otherwise shown.

Pole identification—banded to pole. See orientation detail.

See pole base and baseplate detail.

TENON TOP LIGHT POLE
(single or twin mount)

BASE PLATE

<table>
<thead>
<tr>
<th>MOUNTING HEIGHT</th>
<th>BOLT CIRCLE DIAMETER</th>
<th>BASE PLATE THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>35' (10.7 m) or less</td>
<td>2½ (64)</td>
<td>2 (51)</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>1 (25)</td>
<td>2 (51)</td>
</tr>
<tr>
<td>Greater than 50' (15.2 m)</td>
<td>1 (25)</td>
<td>3 (76)</td>
</tr>
</tbody>
</table>

LIGHT POLE

<table>
<thead>
<tr>
<th>MOUNTING HEIGHT</th>
<th>MINIMUM SHAFT DIAMETER</th>
<th>MINIMUM WALL THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>35' (10.7 m) or less</td>
<td>8 (203)</td>
<td>10 guage</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>10 (254)</td>
<td>7 guage</td>
</tr>
<tr>
<td>Greater than 50' (15.2 m) to 60' (18.3 m)</td>
<td>10 (254)</td>
<td>5 guage</td>
</tr>
</tbody>
</table>

Steel tenon top.

Light pole.

Three 3½x(9x38) sheet metal screws (4 to 6).
MOUNTING BRACKET DETAILS

TWIN

SINGLE

LIGHT POLE WITH CIRCUIT ROUTED UNDERGROUND

LIGHTING CIRCUIT AT SERVICE/CONTROLLER

Provide guy wires with strain insulators and anchors, as needed.

GENERAL NOTES

See plans for wire and unit duct sizes and pole locations not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

TEMPORARY ROADWAY LIGHTING

STANDARD 830026
**General Notes**

See standard 637001 for barrier wall details.

When rock is encountered the foundation depth may be reduced 6 in. (150 mm) for every 12 in. (305 mm) of embedment in rock. The minimum foundation depth shall be 30 in. (760 mm) above bottom of excavated hole. See ring plate detail.

All dimensions are in inches (millimeters) unless otherwise shown.

---

**Concrete Median Barrier**

**Light Pole Foundation**

**Foundation Table**

<table>
<thead>
<tr>
<th>Light Pole</th>
<th>Mouting Height</th>
<th>Shaft Diameter</th>
<th>Shaft Depth</th>
<th>Anchor Rod Length</th>
<th>Anchor Rod Circle Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 in. (760 mm)</td>
<td>36 in. (914 mm)</td>
<td>24 in. (610 mm)</td>
<td>30 in. (762 mm)</td>
<td>48 in. (1220 mm)</td>
<td>60 in. (1524 mm)</td>
</tr>
<tr>
<td>36 in. (914 mm)</td>
<td>36 in. (914 mm)</td>
<td>24 in. (610 mm)</td>
<td>36 in. (914 mm)</td>
<td>54 in. (1372 mm)</td>
<td>66 in. (1676 mm)</td>
</tr>
<tr>
<td>42 in. (1067 mm)</td>
<td>36 in. (914 mm)</td>
<td>24 in. (610 mm)</td>
<td>42 in. (1067 mm)</td>
<td>60 in. (1524 mm)</td>
<td>72 in. (1829 mm)</td>
</tr>
<tr>
<td>48 in. (1220 mm)</td>
<td>36 in. (914 mm)</td>
<td>24 in. (610 mm)</td>
<td>48 in. (1220 mm)</td>
<td>66 in. (1676 mm)</td>
<td>78 in. (1981 mm)</td>
</tr>
</tbody>
</table>

1. Length does not include 4 (100) hook.

---

**Plan**

- Anchor rod circle.
- Top of conduit (25) below top of anchor rod. Thread and cap.
- Top of anchor rod even with top of barrier.
- 36 in. (914 mm) bend radius.
- 30 in. (760 mm) 46 bare copper wire out of barrier wall.
- 32 in. (815 mm) high barrier wall.

**Elevation**

- Stainless steel junction box.
- See Ring Plate Detail when rock is encountered.

---

**Ring Plate Detail**

- 1 (25) hex head nut (typ).
- Cut and thread anchor rods (typ).

---

**Junction Box Elevation**

- 2 (50) PVC conduit unless otherwise noted on lighting plans.
- 2 (50) PVC conduit, one or two required (see lighting plans).

---

**Concrete Median Barrier**

**Light Pole Foundation**

**Standard 836006**
**General Notes**

See standard 637006 for barrier wall details.

When rock is encountered the foundation depth may be reduced 6 (150) for every 12 (300) of embedment in rock. The minimum foundation depth shall be 30 (760) with cut anchor rods 6 (150) above bottom of excavated hole. See ring plate detail.

All dimensions are in inches (millimeters) unless otherwise shown.

**Foundation Details**

- **Foundation Table**
  - **Light Pole**
  - **Mounting Depth**
  - **Shift Diameter**
  - **Shift Depth**
  - **Anchor Rod Length**
  - **Anchor Rod Circle Dia.**

<table>
<thead>
<tr>
<th>Light Pole</th>
<th>Mounting Depth</th>
<th>Shift Diameter</th>
<th>Shift Depth</th>
<th>Anchor Rod Length</th>
<th>Anchor Rod Circle Dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>10' (305)</td>
<td>24</td>
<td>3-1/8</td>
<td>8-1/8</td>
<td>3-1/8</td>
</tr>
<tr>
<td>19-3/4</td>
<td>12' (366)</td>
<td>30</td>
<td>4-5/8</td>
<td>10-1/8</td>
<td>5-1/8</td>
</tr>
<tr>
<td>16-7/8</td>
<td>16' (488)</td>
<td>36</td>
<td>6-5/8</td>
<td>12-1/8</td>
<td>7-1/8</td>
</tr>
<tr>
<td>14-1/8</td>
<td>20' (610)</td>
<td>40</td>
<td>8-1/8</td>
<td>14-1/8</td>
<td>8-1/8</td>
</tr>
<tr>
<td>12-1/8</td>
<td>24' (731)</td>
<td>48</td>
<td>10-1/8</td>
<td>16-1/8</td>
<td>9-1/8</td>
</tr>
<tr>
<td>10-3/4</td>
<td>30' (914)</td>
<td>60</td>
<td>12-1/8</td>
<td>18-1/8</td>
<td>10-1/8</td>
</tr>
<tr>
<td>9</td>
<td>36' (914)</td>
<td>60</td>
<td>14-1/8</td>
<td>20-1/8</td>
<td>11-1/8</td>
</tr>
</tbody>
</table>

- **Lighting Conduit**
  - 2 (50) PVC conduit unless otherwise noted on lighting plans.

- **Junction Box**
  - 2 (50) PVC conduit, one or two required. (See lighting plans)

- **Elevation**
  - 1 (25) hex head nut (typ).

- **Ring Plate Detail**
  - 1/4" x 10" 1065 x 31 grounding electrode. 
  - 9 (25) dia.

- **Plan**
  - 30 (760) *6 bare copper wire out of barrier wall.
  - Top of anchor rod even with top of barrier.

- **Foundation Dimensions**
  - **Lighting Pole**
  - **42 in. (1065 mm)**

**Light Pole Foundation**

- **Concrete Median Barrier**

**Standard 836011**

**DATE**

**REVISIONS**

1-1-04

1-1-13
No. 4 bare copper grounding electrode conductor.

Anchor rod cage

Work pad

5 (125), 36 (95) sweep Sch. 40 PVC wiring window, 2 (50) min. projection above foundation.

2 (25) Chamfer

No. 4, No. 13 spiral
6 (150) pitch, (typ.)

No. 11 (No. 36) V-bars evenly spaced.

Three hoops min., top and bottom.

No. 11 (No. 36) V-bars evenly spaced.

Anchor rods evenly spaced.

Shaft length

SECTION A-A

+ See Rod and Reinforcement Table.

ground line

5 (125), 5 (125)

No. 4, No. 13 spiral

Electrode conductor.

No. 4 bare copper grounding electrode conductor.

5 (125), 36 (95) sweep Sch. 40 PVC sleeve.

Electrodes in 1 (25) (threaded) grounding (16 x 3 m) connected Two (min.) † x 10'

Three hoops min., top and bottom.

30°

Loose soil

Ground line

After forms are removed, compact impervious material a minimum of 18A x 18B (450 x 450) around foundation.

SECTION A-A

ELEVATION

Shaft length

5 (125), 5 (125)

No. 4, No. 13 spiral

Anchor rod cage

No. 4 bare copper grounding electrode conductor.

5 (125), 36 (95) sweep Sch. 40 PVC sleeve.

Electrodes in 1 (25) (threaded) grounding (16 x 3 m) connected Two (min.) † x 10'

Three hoops min., top and bottom.

30°

Loose soil

Ground line

After forms are removed, compact impervious material a minimum of 18A x 18B (450 x 450) around foundation.
The tower shall not be set for a minimum of 7 days or as approved by the Engineer. The foundation shall have no construction joints.

Grounding electrodes shall be installed in an access well when there is a conflict in using the method shown.

All foundation reinforcement steel shall be epoxy coated.

The cost of reinforcement shall be included in the cost of the foundation.

The tower shall be monolithically poured with the diameter of the anchor rod cage.

Coordinate the rod circle diameter of the tower with the diameter of the anchor rod cage.

The foundation shall be poured monolithically and shall have no construction joints.

Grounding electrodes shall be installed in an access well when there is a conflict in using the method shown.

All dimensions are in inches (millimeters) unless otherwise shown.

GENERAL NOTES

The shaft length(s) are based on soil borings in the plans. If different soils are encountered, the engineer shall be notified to provide a revised length.

Anchor rod quantity, diameter, and length shall be determined by the tower manufacturer and approved by the Engineer. Each foundation shall have a minimum of 8 anchor rods.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

Anchor rod quantity, diameter, and length shall be determined by the tower manufacturer and approved by the Engineer. Each foundation shall have a minimum of 8 anchor rods.

Anchor rod quantity, diameter, and length shall be determined by the tower manufacturer and approved by the Engineer. Each foundation shall have a minimum of 8 anchor rods.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

The foundation shall be poured monolithically and shall have no construction joints.

Grounding electrodes shall be installed in an access well when there is a conflict in using the method shown.

All foundation reinforcement steel shall be epoxy coated.

The cost of reinforcement shall be included in the cost of the foundation.

The tower shall be monolithically poured with the diameter of the anchor rod cage.

Coordinate the rod circle diameter of the tower with the diameter of the anchor rod cage.

The foundation shall be poured monolithically and shall have no construction joints.

Grounding electrodes shall be installed in an access well when there is a conflict in using the method shown.

All dimensions are in inches (millimeters) unless otherwise shown.

GENERAL NOTES

The shaft length(s) are based on soil borings in the plans. If different soils are encountered, the engineer shall be notified to provide a revised length.

Anchor rod quantity, diameter, and length shall be determined by the tower manufacturer and approved by the Engineer. Each foundation shall have a minimum of 8 anchor rods.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

Anchor rod quantity, diameter, and length shall be determined by the tower manufacturer and approved by the Engineer. Each foundation shall have a minimum of 8 anchor rods.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

The foundation shall be poured monolithically and shall have no construction joints.

Grounding electrodes shall be installed in an access well when there is a conflict in using the method shown.

All dimensions are in inches (millimeters) unless otherwise shown.

GENERAL NOTES

The shaft length(s) are based on soil borings in the plans. If different soils are encountered, the engineer shall be notified to provide a revised length.

Anchor rod quantity, diameter, and length shall be determined by the tower manufacturer and approved by the Engineer. Each foundation shall have a minimum of 8 anchor rods.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

Anchor rod quantity, diameter, and length shall be determined by the tower manufacturer and approved by the Engineer. Each foundation shall have a minimum of 8 anchor rods.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

The foundation shall be poured monolithically and shall have no construction joints.

Grounding electrodes shall be installed in an access well when there is a conflict in using the method shown.

All dimensions are in inches (millimeters) unless otherwise shown.

GENERAL NOTES

The shaft length(s) are based on soil borings in the plans. If different soils are encountered, the engineer shall be notified to provide a revised length.

Anchor rod quantity, diameter, and length shall be determined by the tower manufacturer and approved by the Engineer. Each foundation shall have a minimum of 8 anchor rods.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

Anchor rod quantity, diameter, and length shall be determined by the tower manufacturer and approved by the Engineer. Each foundation shall have a minimum of 8 anchor rods.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

The foundation shall be poured monolithically and shall have no construction joints.

Grounding electrodes shall be installed in an access well when there is a conflict in using the method shown.

All dimensions are in inches (millimeters) unless otherwise shown.
### GENERAL NOTES

CR1 and CR2 are 120VAC 3PDT Relays.

- Supervision Fail is Preempt No. 1, causing traffic signal controller to implement all-red flash following track clearance phase.
- Railroad Preempt is Preempt No. 2, causing traffic signal controller to implement all-red flash following 1 second delay.

### RELAYS IN NON-PREEMPT STATE - RAILROAD AND PREEMPT RELAYS ENERGIZED

- Preempt No. 1 and Preempt No. 2 shall have priority over all other preempts. The railroad preemption routine shall abbreviate each and all active pedestrian phases by immediately entering into flashing DON'T WALK and timing concurrently with the associated vehicle yellow change interval.
SINGLE LINE BLOCK DIAGRAM

Note: The power transfer relay may be internal to the inverter/charger.
BONDING A HANDBOLE
COVER & FRAME

HANDHOLE COVER & FRAME

BONDING AN EXISTING
HANDHOLE COVER & FRAME

HEAVY-DUTY
COMPRESSION TERMINAL

HEAVY-DUTY
GROUND ROD CLAMP

GROUNDING A MAST ARM POLE/POST

All dimensions are in inches (millimeters) unless otherwise shown.
PEDESTRIAN ONE PUSH BUTTON POST

PEDESTRIAN TWO PUSH BUTTON POST

All dimensions one in inches unless otherwise shown.
Mast arm length as specified on the plans.

This signal head only for area 50' (15.24 m) and larger.

This signal head only for area 50' (15.24 m) and one lane.

Mast arm length as specified on the plans.

This signal head only for area 50' (15.24 m) and one lane.

General Notes:

Signal heads, sign panels, and other attachments are shown for minimum design loading purposes only. Each signal head shall weigh 80 lb (36 kg) and have a projected area of 14.7 sq. ft. (1.37 sq. m).

All dimensions are in inches (millimeters) unless otherwise shown.

<table>
<thead>
<tr>
<th>Mast Arm Length</th>
<th>Bolt Circle</th>
<th>Anchor Rod Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>16' thru 20'</td>
<td>15</td>
<td>5/8 x 5' 138 x 2'</td>
</tr>
<tr>
<td>20' thru 30'</td>
<td>18</td>
<td>5/8 x 5' 138 x 2'</td>
</tr>
<tr>
<td>30' thru 40'</td>
<td>18</td>
<td>5/8 x 7' 144 x 2'</td>
</tr>
<tr>
<td>40' thru 55'</td>
<td>25</td>
<td>5/8 x 7' 144 x 2'</td>
</tr>
</tbody>
</table>

Date: 1-1-12
Revisions: 1-1-09

Steel Mast Arm Assembly and Pole 16' Through 55'

Standard 877001-05
Mast arm length as specified on the plans

Four spaces of 27" (686 mm) typ., 23" (584 mm) min.

This signal head only for arms 60' (18.3 m) and longer.

Bolt circle (see table)

Removable pole cap

Stepped height

Removable cap

Ground lug (6 required)

Stainless steel mesh

GENERAL NOTES

Signal heads, sign panels, and other attachments are shown for minimum design loading purposes only. Each signal head shall weigh 80 lbs. (36 kg) and have a projected area of 14.7 sq. ft. (1.37 sq. m). Dimensions are in inches or millimeters unless otherwise shown.

MAST ARM LENGTH & BOLT CYCLE & ANCHOR ROD SIZE

<table>
<thead>
<tr>
<th>MAST ARM LENGTH</th>
<th>BOLT CYCLE</th>
<th>ANCHOR ROD SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>56' thru 64'</td>
<td>24</td>
<td>3/8&quot; x 7&quot;</td>
</tr>
<tr>
<td>60' thru 75'</td>
<td>27</td>
<td>2 x 7-5/8&quot;</td>
</tr>
<tr>
<td>70' thru 78'</td>
<td>27</td>
<td>2 x 7-5/8&quot;</td>
</tr>
<tr>
<td>80' thru 90'</td>
<td>27</td>
<td>2 x 7-5/8&quot;</td>
</tr>
</tbody>
</table>

DATE

1-1-02

REVISIONS

1-1-12

1-1-09

English (metric). Switched units to English (metric).
<table>
<thead>
<tr>
<th>MAST ARM LENGTH</th>
<th>BOLT CIRCLE</th>
<th>ANCHOR ROD SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>16' thru 25' (4.87 m thru 7.62 m)</td>
<td>18 (450)</td>
<td>1 1/2 x 5' (38 x 150 mm)</td>
</tr>
<tr>
<td>22' thru 30' (6.67 m thru 9.14 m)</td>
<td>18 (450)</td>
<td>1 1/2 x 7' (38 x 210 mm)</td>
</tr>
<tr>
<td>32' thru 38' (9.75 m thru 11.60 m)</td>
<td>18 (450)</td>
<td>2 x 7'-6&quot; (51 x 220 mm)</td>
</tr>
<tr>
<td>40' thru 55' (12.20 m thru 16.80 m)</td>
<td>21 (535)</td>
<td>2 x 7'-6&quot; (51 x 220 mm)</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

Signal heads, sign panels, and other attachments are shown for minimum design loading purposes only. Each signal head shall weigh 86 to 106 kg and have a projected area of 14.7 sq. ft. (1.37 sq. m).

All dimensions are in inches (millimeters) unless otherwise shown.

**STEEL MAST ARM ASSEMBLY AND POLE WITH DUAL MAST ARMS**

**STANDARD 877006-04**
**FOUNDATION DETAILS**

**CONCRETE**

**STANDARD 878001-09**

**TOP VIEW**

- Vertical rebar equally spaced
- Ground clamp
- Ground rod
- No. 6 bare copper wire
- Stainless steel mesh
- 1 1/2" (40) Bevel
- Finished grade line
- 25' 463' Conduit
- Concrete
- Anchor rods, quantity and size as specified.
- Vertical rebar equally spaced
- No. 6 spiral with 6 pitch (No. 13 spiral with 150 pitch)
- 1 Loops min. top and bottom. Loops shall be spaced 7" 000 apart.

---

<table>
<thead>
<tr>
<th>Mast Arm Length</th>
<th>Foundation Depth</th>
<th>Spiral Diameter</th>
<th>Quantity of Rebars</th>
<th>Size of Rebars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 30' (9.1 m)</td>
<td>10'-0&quot; (3.0 m)</td>
<td>30 (750)</td>
<td>24 (600)</td>
<td>8</td>
</tr>
<tr>
<td>30' (9.1 m) and less</td>
<td>11'-0&quot; (3.4 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
</tr>
<tr>
<td>Greater than or equal to 30' (9.1 m)</td>
<td>14'-0&quot; (4.3 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
</tr>
<tr>
<td>Greater than or equal to 50' (15.2 m) and less than 30' (9.1 m)</td>
<td>16'-0&quot; (4.9 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
</tr>
<tr>
<td>Greater than or equal to 50' (15.2 m) and less than 30' (9.1 m)</td>
<td>20'-0&quot; (6.1 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
</tr>
<tr>
<td>Greater than or equal to 50' (15.2 m) and less than 30' (9.1 m)</td>
<td>25'-0&quot; (7.6 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
</tr>
<tr>
<td>Greater than or equal to 50' (15.2 m) and less than 30' (9.1 m)</td>
<td>25'-0&quot; (7.6 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
</tr>
<tr>
<td>Greater than or equal to 50' (15.2 m) and less than 30' (9.1 m)</td>
<td>25'-0&quot; (7.6 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
</tr>
</tbody>
</table>

*For standard and combination mast arm assemblies, Foundation depths for standard dual mast arms with the longest arm length which include 0' (0.0 m) shall be increased by 1' (0.3 m) of that shown in the table, based on the longer of the two arms.*

These foundation depths are for sites which have cohesive soils (clay, silt, etc.) along the length of the shaft, with an average Unconfined Compressive Strength (Qu) > 1.0 tsf (100 kPa). This strength shall be verified by boring data prior to construction or with testing by the Engineer during foundation drilling. The Bureau of Bridges & Structures should be consulted for a revised design if other conditions are encountered.
Drill hole through pavement. Insert conduit and fill with approved sealer.

Sawed slit for detector loop.

Approved sealer

Handhole, junction box, signal base, or controller base

Grade

Plastic tube

Large wire in plastic tube

Approved sealer

NOTE

Loop wire shall follow saw cut to bottom, forming slack section at joint.

DETECTOR LOOP LEAD-IN

DETECTOR LOOP INSTALLATION

DETECTOR LOOP AT PAVEMENT JOINT OR PAVEMENT CRACK

LOOP WIRE AND LEAD-IN CABLE SPLICE

1. * Lead-in cable (single pair or multipair)
2. * Lead-in cable shield
3. * Lead-in cable shield drain-wire
4. * Lead-in cable insulated conductor
5. * Bare conductor
6. * Loop wire in tube
7. * Loop wire insulated conductor
8. * Twisted and resin soldered conductor
9. * Electrical tape insulated splice
10. * Rigid mold
11. * Waterproof and dielectric resin

All dimensions are in inches unless otherwise shown.

DETECTOR LOOP INSTALLATIONS

STANDARD 886001-01

DATE

REVISIONS

+1-01

+1-02

English Metric

+1-09

+1-08

Revised units to English Metric

+1-01

Revised Standard 886001-01.
All dimensions are in inches (millimeters) unless otherwise shown.

**TYPICAL LAYOUTS FOR DETECTION LOOPS**
SECTION - 28' (8.4 m) OR LESS

<table>
<thead>
<tr>
<th>Width</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>28' (8.4 m) or less</td>
<td>Type E joint</td>
</tr>
</tbody>
</table>

SECTION - 28' (8.4 m) TO 35' (10.6 m) WIDTH

<table>
<thead>
<tr>
<th>Width</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>28' (8.4 m) to 35' (10.6 m)</td>
<td>Type E joint</td>
</tr>
</tbody>
</table>

SECTION - 35' (10.8 m) TO 48' (14.4 m) WIDTH

<table>
<thead>
<tr>
<th>Width</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>36' (10.8 m) to 48' (14.4 m)</td>
<td>Type E joint</td>
</tr>
</tbody>
</table>

CUL DE SAC

- OPEN CENTER
- FULLY PAVED

All dimensions are in inches (millimeters) unless otherwise shown.

See typical cross section on plans for thickness.
GENERAL NOTES

- All catch basins shall be separated from the pavement and curb by boxing out as shown in the detail. Manhole castings within the pavement limits shall be boxed in at the same manner except when telescoping-type castings are used.

- When a joint falls within 5 ft (1.5 m) of any crosswalks, basins, or other structures, shorten one or more panels either side of opening to permit joint to fall on the corners of the box out.

- When specified, roundouts as shown on Standard B.L.R. 42001 shall be used in lieu of the manhole detail shown herein.

- All transverse joints must extend through curbs and be continuous across pavement, except the transverse construction joints. Expansion joints shall be required as shown on the plans.

- When specified, the pavement structure thickness at intersections shall be increased. The requirement of Section 1050 of the Standard Specifications shall include all materials and labor.

- Joints shall be sawed to a depth of t/4 for transverse joints and t/3 for longitudinal joints. Tie joints shall be spaced with joint(s) meeting the requirements of Section 1050 of the Standard Specifications.

- The alternate construction is at the Contractor's option and shall be constructed in accordance with Section 606 of the Standard Specifications. The construction consists of curbs and gutter. If joint shall be measured in place and the area encompassed in sq. yards by meter. This work will be paid per cent. of the contract unit price per sq. yards (sq. meter) for portion of cement concrete pavement specified with integral curb of the thickness specified and shall include all materials and labor.

- Transverse joint spacing shall not exceed 15 ft (4.6 m).

- This alternate construction is at the Contractor's option and shall be constructed in accordance with Section 606 of the Standard Specifications. The construction consists of curbs and gutter. If joint shall be measured in place and the area encompassed in sq. yards by meter. This work will be paid per cent. of the contract unit price per sq. yards (sq. meter) for portion of cement concrete pavement specified with integral curb of the thickness specified and shall include all materials and labor.

- Transverse joint overlap shall be made continuous across the pavement, except tied transverse construction joints. Expansion joints shall be continuous across the pavement, except tied transverse construction joints.

- All transverse joints must extend through curbs and be continuous across the pavement, except the transverse construction joints. Expansion joints shall be required as shown on the plans.

- When specified, roundouts as shown on Standard B.L.R. 42001 shall be used in lieu of the manhole detail shown herein.

- All transverse joints must extend through curbs and be continuous across pavement, except tied transverse construction joints. Expansion joints shall be required as shown on the plans.
PORTLAND CEMENT CONCRETE
PAVEMENT (NONREINFORCED)

STANDARD B.L.R. 14-10

GENERAL NOTES


Skewed joints shall be used when specified by Special Provisions.

* = Pavement thickness (see Typical Cross Section)

All dimensions are in inches (millimeters) unless otherwise shown.

Sawed groove

1/8 (3) min. x 1/3

Sawed joint sealer

Hot poured

18 (450) Long dowel bars at 12 (300) cts.

Dowel bar assembly

~

15 (375) sawed joint

Sawed groove

1/8 (3) min. x 1/3

Hot poured joint sealer

Hot poured joint sealer

3/16 (6) to 1/4 (6)

Bituminous surface 4' (1250) H(x)

3' (90) to 6' (1800)

3' (90)

3' (90)

3' (90)

Stabilized base course 10' (2500) H(x)

~

(225)

9

t/2

t

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2

1/2
Resident traffic and day labor force's equipment to use road shoulder for passing barricades.

Use when shoulders are too narrow for passage of traffic.

Type III Barricades with standard sign R11-2 or R11-4 mounted as shown.

Reflective striping shall appear on both sides of barricades. Barricades shall be positioned so that vehicles slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange reflective backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

Dimensions are in inches (millimeters) unless otherwise shown.

Type III barricades to be width of pavement only.

Reflected striping shall appear on both sides of barricades. Barricades shall be positioned so that vehicles slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange reflective backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

Dimensions are in inches (millimeters) unless otherwise shown.

Type III barricades to be width of pavement only.

Reflective striping shall appear on both sides of barricades. Barricades shall be positioned so that vehicles slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange reflective backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

Dimensions are in inches (millimeters) unless otherwise shown.

Type III barricades to be width of pavement only.

Reflective striping shall appear on both sides of barricades. Barricades shall be positioned so that vehicles slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange reflective backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

Dimensions are in inches (millimeters) unless otherwise shown.

Type III barricades to be width of pavement only.

Reflective striping shall appear on both sides of barricades. Barricades shall be positioned so that vehicles slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange reflective backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

Dimensions are in inches (millimeters) unless otherwise shown.

Type III barricades to be width of pavement only.

Reflective striping shall appear on both sides of barricades. Barricades shall be positioned so that vehicles slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange reflective backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

Dimensions are in inches (millimeters) unless otherwise shown.

Type III barricades to be width of pavement only.

Reflective striping shall appear on both sides of barricades. Barricades shall be positioned so that vehicles slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange reflective backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

Dimensions are in inches (millimeters) unless otherwise shown.

Type III barricades to be width of pavement only.

Reflective striping shall appear on both sides of barricades. Barricades shall be positioned so that vehicles slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange reflective backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

Dimensions are in inches (millimeters) unless otherwise shown.

Type III barricades to be width of pavement only.

Reflective striping shall appear on both sides of barricades. Barricades shall be positioned so that vehicles slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange reflective backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

Dimensions are in inches (millimeters) unless otherwise shown.

Type III barricades to be width of pavement only.

Reflective striping shall appear on both sides of barricades. Barricades shall be positioned so that vehicles slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange reflective backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

Dimensions are in inches (millimeters) unless otherwise shown.

Type III barricades to be width of pavement only.

Reflective striping shall appear on both sides of barricades. Barricades shall be positioned so that vehicles slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange reflective backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

Dimensions are in inches (millimeters) unless otherwise shown.

Type III barricades to be width of pavement only.

Reflective striping shall appear on both sides of barricades. Barricades shall be positioned so that vehicles slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange reflective backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

Dimensions are in inches (millimeters) unless otherwise shown.

Type III barricades to be width of pavement only.

Reflective striping shall appear on both sides of barricades. Barricades shall be positioned so that vehicles slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange reflective backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

Dimensions are in inches (millimeters) unless otherwise shown.
GENERAL NOTES

Maintenance operations shall be confined to one lane of traffic only. All signs shall be installed to conform to the local authority but in no case to exceed the length of one-half day's operation or 4 miles (6 km), whichever is less.

When operations are on the pavement and stationary or moving at a speed less than 4 mph (6 kph), a ONE LANE AHEAD sign shall be installed. In each direction between the ROAD WORK AHEAD sign and the work area, the distance between this sign and the work area shall be a minimum of 400 (120 m) but in no case to exceed the length of one-half day's operation or 4 miles (6 km), whichever is less. The distance between the two signs shall be approximately 400 (120 m).

All signs are to be removed at completion of the day's operation.

Any unattended obstacles, excavation, or pavement drop off greater than 1.5 ft (0.45 m) in the work area shall be protected by Type I or Type II barricades with flashing lights. Longitudinal dimensions may be adjusted slightly to fit field conditions.

All vehicles, equipment, men, and their activities are restricted at all times to one side of the pavement.

Flashing lights or rotating beacons are required for all maintenance vehicles while in operation.

Applicable operations illustrated in Standard 701301 may be used when operations do not exceed 15 minutes on the pavement or 60 minutes on the shoulder respectively.

All warning signs shall have minimum dimensions of 36x36 (900x900) and have black legend on an orange reflectorized background.

When fluorescent signs are used, orange flags are not required.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

All dimensions are in inches (millimeters) unless otherwise shown.

TRAFFIC CONTROL DEVICES—DAY LABOR MAINTENANCE

STANDARD B.L.R. 18-5
When rail element is placed adjacent to a finished surface use timber wedge 'M' between the concrete and plate 'G'.

1 (25) Dia. anchor bolt with locknut furnished in place by the Contractor of the Concrete Structure. Place plate washer 'D' under head and nut.

* Splice bolts with washer under nut.

Traffic Barrier Terminal Type 5R (One each with Rub Rail) behind flange. Terminate Rub Rail face of guardrail above.

Plate 'G' placed between plate 'E' and rail element.

Plate 'E' placed between plate 'D' and rail element.

When rail element is placed adjacent to a finished surface use timber wedge 'M' between the concrete and plate 'G'.

1 (25) Dia. anchor bolt with locknut furnished in place by the Contractor of the Concrete Structure. Place plate washer 'D' under head and nut.

* Splice bolts with washer under nut.

Plate 'G' placed between plate 'E' and rail element.

Plate 'E' placed between plate 'D' and rail element.

When an expansion joint exists below the connector, bolts shall be provided with locknut or double nut and shall be tightened only to a point that will allow plate G to be free to move.

All dimensions are in inches (millimeters) unless otherwise shown.

SERVICEABILITY

Pay limits of other Type.

ELEVATION—TRAFFIC BARRIER TERMINAL TYPE 5R

SECTION A-A

GENERAL NOTES

See Standard B.L.R. 26 for details of guardrail not shown.

Install the face of the guardrail flush with the face of the parapet. Provide plate washer 'D' so that the 1 (25) projection fills the remainder of the slotted holes in the 1 (25) end plate on plate 'G' after the 1 (25) bolts are in place.

When an expansion joint exists below the connector, bolts shall be provided with locknut or double nut and shall be tightened only to a point that will allow plate G to be free to move.

See Alternate Soil Plate Connection for details of guardrail not shown.

Finished ground line

* See Alternate soil plate connection.

Plate 'R-1'

Plate 'R-2'

Plate 'R-3'

Rub rail (C6x8.2)

See Standard B.L.R. 26 for details of guardrail not shown.

Install the face of the guardrail flush with the face of the parapet. Provide plate washer 'D' so that the 1 (25) projection fills the remainder of the slotted holes in the 1 (25) end plate on plate 'G' after the 1 (25) bolts are in place.

When an expansion joint exists below the connector, bolts shall be provided with locknut or double nut and shall be tightened only to a point that will allow plate G to be free to move.

All dimensions are in inches (millimeters) unless otherwise shown.

TRAFFIC BARRIER TERMINAL-TYPE 5R

(Sheet 1 of 2)
SIGN MAY BE OMITTED
WHEN DISTANCE IS LESS
THAN 150' (45 m)

W20-3(O)-36

500' (150 m) MIN.

1000' (300 m) AND VARIABLE

500' (150 m) MIN.

1000' (300 m) AND VARIABLE

CONDITION I
When distance from closure to crossroad is less than 1500' (450 m)

CONDITION II
When distance from closure to crossroad is greater than 1500' (450 m)

SYMBOLS

Work area

Type III Barricade

Sign with 36" x 36" (900 x 900) min. orange flag attached

GENERAL NOTES
Type III Barricades and W20-3(O)-36 signs shall be positioned as shown in "Road Closed To All Traffic" detail on Highway Standard 10490.

Two Type A Low Intensity Flashing Lights shall be used on each approach in advance of the work area during hours of darkness, one light shall be installed above the barricades and the other above the first advance warning sign.

All warning signs shall have minimum dimensions of 36" x 36" (900 x 900) and have a black legend on an orange reflectorized background.

When fluorescent signs are used, orange flags are not required.

Longitudinal dimensions may be adjusted to fit field conditions.

When the distance between the barricade and the intersection is between 1500' (450 m) and 2000' (600 m), the advance sign shall be placed at the intersection. When the distance between the barricade and the intersection is over 2000' (600 m), an additional sign shall be placed at the intersection. The additional sign shall give the distance to the barricade in miles or fractions of a mile.

All dimensions are in inches (millimeters) unless otherwise shown.
**CONDITION I**

**APPROACH TRAFFIC STOPPED**

- **Road Closed 500 FT**
- **Stop**
- **Existing**

**SYMBOLS**

- **Work area**
- **Type II Barricade**
- **Sign with 18x18 (450x450) min. orange flag attached**

**GENERAL NOTES**

Type II Barricades and R11-4-6030 signs shall be placed as shown in the "Road Closed To All Traffic" detail on Highway Standard 701912. If the distance "D" exceeds 2000' (600 m), an additional set of barricades and R11-4-6030 shall be placed at each end of the work area.

Two Type A Low Intensity Flashing Lights shall be used on each approach in advance of the work area. One light shall be installed above each barricade. If only one barricade is required, the other light shall be installed above the first advance warning sign.

All warning signs shall have minimum dimensions of 36 x 36 (900 x 900) and have a black legend on an orange reflectiveized background.

When fluorescent signs are used, orange flags are not required.

Longitudinal dimensions may be adjusted to fit field conditions.

All dimensions are in inches (millimeters) unless otherwise shown.

**TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES FOR CONSTRUCTION ON RURAL LOCAL HIGHWAYS**

*Two-Lane Two Way Rural Traffic (Road Closed To Thru Traffic)*

**STANDARD B.L.R. 22-7**
GENERAL NOTES

See Standard B.L.R. 26 for details of guardrail not shown.

Posts at location 1 & 2 shall be wood breakaway posts. Posts other than 1 & 2 may be either standard wood posts or steel posts. At the option of the Contractor, if standard wood posts are used, one post shall be located midway between and in line at posts 4 & 5. The offset (Y) for this post shall be 12 (300).

A two-piece assembly may be substituted for the one-piece nose shown above.

The bearing plate K shall be held in position by (2) two eightpenny nails driven into the post and bent over the top of the plate.

When this terminal is used with Standard 630001, the guardrail shall transition down to the height of the terminal prior to post 8.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

US dimensions are in inches (millimeters) unless otherwise shown.
TYPICAL APPLICATION

MAILBOX ON FARSIDE OF ENTRANCE

MAILBOX ON NEARSIDE OF ENTRANCE

GENERAL NOTES

Mailboxes shall be located such that the face of the mailbox is 6 (150) to 12 (300) and a minimum of 24 (600) from the edge of the turnout surfacing.

All dimensions are in inches (millimeters) unless otherwise shown.

DIMENSIONS - ft. (m)

<table>
<thead>
<tr>
<th>Width of Shoulder (L)</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>15</th>
<th>18</th>
<th>20</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width of Pavement (W)</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>15</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>Turnout (Y)</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>15</td>
<td>18</td>
<td>20</td>
<td>24</td>
</tr>
</tbody>
</table>

Notes:
Dimensions for Township and District Roads may vary from the above dimensions.

DATE       REVISIONS
1-1-99      Switched units to English system
1-1-99      Added width of shoulder L

MAILBOX TURNOUT
FOR LOCAL ROADS

STANDARD B.L.R. 24-2
FOR NON–NHS ROUTES

TYPE 1A BARRICADE

STANDARD B.L.R. 25-1

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-03</td>
<td>switched units to English metric.</td>
</tr>
<tr>
<td>1-1-09</td>
<td>new standard from TCM-09</td>
</tr>
</tbody>
</table>

All dimensions are in inches (millimeters) unless otherwise shown.
Steel plate beam guardrail

**TYPE A**
6'-3'' (1.905 m) typical post spacing

**TYPE B**
8'-9'' (2.668 m) closed post spacing

**TYPE C**
6'/3'' (1.905 m) block-out spacing

**TYPE D**
Double steel plate beam guardrail
6'-3'' (1.905 m) typical post spacing

**GENERAL NOTES**
- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (mm).
- All dimensions are in inches (millimeters) unless otherwise shown.

**STANDARD B.L.R. 26-3**

---

**PLAN**

**ELEVATION**

**SECTION A-A**

**SECTION B-B**

**SECTION C-C**

---

**DATE**

---

**REVISIONS**

---

**APPENDIX**

---

**APPENDIX**

---

**APPENDIX**

---

**APPENDIX**

---
STEEL POST CONSTRUCTION

W6x9 (200x150) or
W6x9 (150x12.75)

STEEL BLOCK-OUT DETAIL

3/8” (9.5) Dia. holes

STEEL PLATE BEAM GUARDRAIL

WOOD POST CONSTRUCTION

8x6 (200x150) Rough

NOTE

Plate A shall be placed between
rail element and block-out at non-
splice mounting points only when
steel block-outs are used.

PLATE A

8x6 (150x12.75) or
8x6 (150x11.75)

1/2" (12.7) Dia. and depth
of recess to suit bolt

POST OR SPLICE BOLT & NUT

STEEL PLATE CONSTRUCTION

NOTE

Steel bolt with flat washer

Bolt not to extend
more than 1/4" (6)

Post bolt with hex nut

NOTE

Blunt end to block-out

Bolt not to extend
more than 1/4" (6)

Bolt not to extend
more than 1/4" (6)

NOTE

Steel block-outs are used.

splice mounting points only when
rail element and block-out at non-
splice mounting points are used.
NOTE

Anchor plate T shall be used to attach cable assembly to guardrail when required on traffic barrier terminals.

NOTE

When end shoe is attached to a bridge parapet which has an expansion joint, the bolts shall be provided with a locknut or double nut and shall be tightened only to a point that will allow guardrail movement.

The standard end shoe shall be attached to the concrete with pre-drilled or self-drilling anchor bolts. The anchor cone shall be set flush with the surface of the concrete.

Externally threaded studs protruding from the surface of the concrete will not be permitted.

STANDARD B.L.R. 26-3

STEEL PLATE BEAM GUARDRAIL

29" (731mm) HEIGHT
**Plan**

Optional round hole

- 1 (250) min. (Wood post)
- 10 (250) min. (Steel post)

**Guardrail Placed Behind Curb**

(0 - desirable to 17 (300) maximum)

**Elevation**

Footing for post when impervious material is encountered

**Wood Block-Out and Steel Post Details**

**Cable Assembly**

1. (M24) double nuts or locknuts and washers

(140,000 lbs. (63,000 kg) min. breaking strength)
Tighten to full tension.

**Steel Plate Beam Guardrail**

29" (731mm) Height

(Steel beam 14 x 14 1.5"
Steel plate beam guardrail [Std. 606001])

**Notes**

1. It is necessary for D to be more than 12 (300) and less than 10' 0" (3.0 m). Type 4-2 (410) curb and gutter (505001) shall be used in front of and in advance of the guardrail.

2. D = 0 desirable to 12 (300) maximum

3. (4") galvanized cable connected

4. Tighten to full tension.

5. Swage

STANDARD B.I.R. 26-3

Illinois Department of Transportation

ENGINEER OF DESIGN AND ENVIRONMENT

APPROVED

APPROVED

ENGINEER OF LOCAL ROADS AND STREETS

ISSUED 1-1-08

January 1, 2012

January 1, 2012

(Sheet 4 of 4)
GENERAL NOTES

See Standard B.L.R. 27-1 for details of guardrail not shown.

Practical plate washer D so the 1 (25) projection fills the remainder of the slotted holes in the 1 (M24) dia. bolts are in place.

When an expansion joint exists below the connector, bolts shall be provided with a locknut or double nuts and shall be tightened only to a point that will allow plate G to be free to move.

The face of the guardrail shall be installed flush with the face of the bridge rail.

When this terminal is used with Standard 630001, the guardrail shall transition down to the height of the terminal.

All dimensions are in inches (millimeters) unless otherwise shown.

Traffic Barrier Terminal Type 5A

Standard B.L.R. 27-1