Revision #223 of the Highway Standards, effective January 1, 2020, 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>Division 000 Index</td>
<td>Division 000 Index</td>
<td>Updated.</td>
</tr>
<tr>
<td>March 1, 2019</td>
<td>January 1, 2020</td>
<td></td>
</tr>
<tr>
<td>Division 200 Index</td>
<td>Division 200 Index</td>
<td>Updated.</td>
</tr>
<tr>
<td>March 1, 2019</td>
<td>January 1, 2020</td>
<td></td>
</tr>
<tr>
<td>Division 300 Index</td>
<td>Division 300 Index</td>
<td>Updated.</td>
</tr>
<tr>
<td>March 1, 2019</td>
<td>January 1, 2020</td>
<td></td>
</tr>
<tr>
<td>Division 400 Index</td>
<td>Division 400 Index</td>
<td>Updated.</td>
</tr>
<tr>
<td>March 1, 2019</td>
<td>January 1, 2020</td>
<td></td>
</tr>
<tr>
<td>Division 500 Index</td>
<td>Division 500 Index</td>
<td>Updated.</td>
</tr>
<tr>
<td>March 1, 2019</td>
<td>January 1, 2020</td>
<td></td>
</tr>
<tr>
<td>515001-03</td>
<td>515001-04</td>
<td>Revised F-shape to constant slope parapet.</td>
</tr>
<tr>
<td>Division 600 Index</td>
<td>Division 600 Index</td>
<td>Updated.</td>
</tr>
<tr>
<td>March 1, 2019</td>
<td>January 1, 2020</td>
<td></td>
</tr>
<tr>
<td>604001-04</td>
<td>604001-05</td>
<td>Revised dimension in Section B-B of cast open lid.</td>
</tr>
<tr>
<td>604021-03</td>
<td>604021-04</td>
<td>Revised dimension location in Section A-A.</td>
</tr>
<tr>
<td>630111</td>
<td>630111-01</td>
<td>Revised HHS to HSS in Top View on sheets 2-5.</td>
</tr>
</tbody>
</table>
Removed | Inserted | Remarks
--- | --- | ---
631031-15 | 631031-16 | Revised F-shape to constant slope parapet and added steel connector plate. Added two posts and revised post length.
631033-07 | 631033-08 | Added two posts and revised length of posts.
Division 700 Index | Division 700 Index | Updated.
March 1, 2019 | January 1, 2020 |
701316-12 | 701316-13 | Revised from F-shape to constant slope parapet.
701321-17 | 701321-18 | Revised from F-shape to constant slope parapet.
701446-09 | 701446-10 | Replaced flagger with spotter.
782006 | 782006-01 | Revised from F-shape to constant slope parapet, revised note 3 on sheet 3, and fixed typo.
Division 800 Index | Division 800 Index | Updated.
March 1, 2019 | January 1, 2020 |
812001 | 812001-01 | Revised from F-shape to constant slope parapet, added general note for steel connector plate, revised standard name, and fixed typo.
837001-04 | 837001-05 | Revised minimum anchor rod diameters.
877001-07 | 877001-08 | Revised mast arm length.
Division BLR Index | Division BLR Index | Updated.
March 1, 2019 | January 1, 2020 |
Standards by Subject/Title | Standards by Subject/Title | Updated.
March 1, 2019 | January 1, 2020 |

If you have any questions pertaining to the Highway Standards, please contact the Policy and Procedures Section in the Bureau of Design and Environment at (217) 782-7651.
<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>202001-01</td>
<td>Earth Median Ditch Check</td>
</tr>
<tr>
<td></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>353001-05</td>
<td>PCC Base Course with HMA Binder and Surface Courses</td>
</tr>
</tbody>
</table>
# Standards by Division

## 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>406001-06</td>
<td>Entrance Ramp Terminal (Flexible Ramp Pavement Adjacent to Flexible Mainline Pavement)</td>
</tr>
<tr>
<td>406101-05</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>420001-09</td>
<td>Pavement Joints</td>
</tr>
<tr>
<td>420101-06</td>
<td>24’ (7.2 m) Jointed PCC Pavement</td>
</tr>
<tr>
<td>420106-06</td>
<td>36’ (10.8 m) Jointed PCC Pavement</td>
</tr>
<tr>
<td>420111-04</td>
<td>PCC Pavement Roundouts</td>
</tr>
<tr>
<td>420201-11</td>
<td>Entrance Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to Jointed PCC Mainline Pavt.)</td>
</tr>
<tr>
<td>420206-12</td>
<td>Entrance Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to CRC Mainline Pavement)</td>
</tr>
<tr>
<td>420301-08</td>
<td>Exit Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to Jointed PCC Mainline Pavt.)</td>
</tr>
<tr>
<td>420306-10</td>
<td>Exit Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to CRC Mainline Pavement)</td>
</tr>
<tr>
<td>420401-13</td>
<td>Pavement Connector (PCC) for Bridge Approach Slab</td>
</tr>
<tr>
<td>420406</td>
<td>Pavement Connector (HMA) for Bridge Approach Slab</td>
</tr>
<tr>
<td>420501-07</td>
<td>PCC Pavement and PCC Base Course Adjacent to Railroad Grade Crossing</td>
</tr>
<tr>
<td>420701-03</td>
<td>Pavement Welded Wire Reinforcement</td>
</tr>
<tr>
<td>421001-03</td>
<td>Bar Reinforcement for CRC Pavement</td>
</tr>
<tr>
<td>421101-10</td>
<td>24’ (7.2 m) CRC Pavement (With Wide Flange Beam Terminal Joint)</td>
</tr>
<tr>
<td>421106-10</td>
<td>36’ (10.8 m) CRC Pavement (With Wide Flange Beam Terminal Joint)</td>
</tr>
<tr>
<td>421201-07</td>
<td>24’ (7.2 m) CRC Pavement (With Lug System)</td>
</tr>
<tr>
<td>421206-07</td>
<td>36’ (10.8 m) CRC Pavement (With Lug System)</td>
</tr>
<tr>
<td>424001-11</td>
<td>Perpendicular Curb Ramps for Sidewalks</td>
</tr>
<tr>
<td>424006-04</td>
<td>Diagonal Curb Ramps for Sidewalks</td>
</tr>
<tr>
<td>424011-04</td>
<td>Corner Parallel Curb Ramps for Sidewalks</td>
</tr>
<tr>
<td>424016-05</td>
<td>Mid-block Curb Ramps for Sidewalks</td>
</tr>
<tr>
<td>424021-05</td>
<td>Depressed Corner for Sidewalks</td>
</tr>
<tr>
<td>424026-03</td>
<td>Entrance / Alley Pedestrian Crossings</td>
</tr>
<tr>
<td>424031-02</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>442101-09</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>482011-03</td>
<td>HMA Shoulder Strips/Shoulders With Resurfacing or Widening and Resurfacing Projects</td>
</tr>
<tr>
<td>483001-05</td>
<td>PCC Shoulder</td>
</tr>
<tr>
<td>STD. NO.</td>
<td>TITLE</td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>BRIDGES</td>
<td></td>
</tr>
<tr>
<td>515001-04</td>
<td>Name Plate for Bridges</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>CULVERTS</td>
<td></td>
</tr>
<tr>
<td>542001-06</td>
<td>Concrete End Sections for Pipe Culverts 15&quot; (375 mm) thru 84&quot; (2100 mm) Diameter</td>
</tr>
<tr>
<td>542011-02</td>
<td>Concrete End Sections for Elliptical Pipe Culverts 15&quot; (375 mm) thru 72&quot; (1800 mm) Equivalent Diameter</td>
</tr>
<tr>
<td>542201-02</td>
<td>Reinforced Concrete End Sections for Pipe Culverts, 15&quot; (375 mm) thru 36&quot; (900 mm) Diameter Skewed With Roadway</td>
</tr>
<tr>
<td>542206-04</td>
<td>Reinforced Concrete End Sections for Pipe Culverts, 42&quot; (1050 mm) thru 60&quot; (1500 mm) Diameter Skewed With Roadway</td>
</tr>
<tr>
<td>542301-03</td>
<td>Precast Reinforced Concrete Flared End Section</td>
</tr>
<tr>
<td>542306-03</td>
<td>Precast Reinforced Concrete Elliptical Flared End Section</td>
</tr>
<tr>
<td>542311-07</td>
<td>Traverseable Pipe Grate for Concrete End Section</td>
</tr>
<tr>
<td>542401-03</td>
<td>Metal Flared End Section for Pipe Culverts</td>
</tr>
<tr>
<td>542406-03</td>
<td>Metal Flared End Section for Pipe Arches</td>
</tr>
<tr>
<td>542411</td>
<td>Sloped Metal End Sections for Pipe Culverts 15&quot; (375 mm) thru 60&quot; (1500 mm) Diameter</td>
</tr>
<tr>
<td>542416</td>
<td>Sloped Metal End Sections for Pipe Arch Culverts 15&quot; (375 mm) thru 72&quot; (1800 mm) Equivalent Diameter</td>
</tr>
<tr>
<td>542501-02</td>
<td>Inlet Box Type 24 (600) A</td>
</tr>
<tr>
<td>542506-03</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&quot;, 30&quot; or 36&quot; (600 mm, 750 mm or 900 mm)</td>
</tr>
<tr>
<td>542606-02</td>
<td>Reinforced Concrete Pipe Tee</td>
</tr>
</tbody>
</table>
## DIVISION 600    INCIDENTAL CONSTRUCTION

<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DRAINAGE RELATED ITEMS</strong></td>
<td></td>
</tr>
<tr>
<td>601001-05</td>
<td>Pipe Underdrains</td>
</tr>
<tr>
<td>601101-02</td>
<td>Concrete Headwall for Pipe Underdrain</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>602106-02</td>
<td>Drainage Structures, Types 4 &amp; 5</td>
</tr>
<tr>
<td>602301-04</td>
<td>Inlet, Type A</td>
</tr>
<tr>
<td>602306-03</td>
<td>Inlet, Type B</td>
</tr>
<tr>
<td>602401-06</td>
<td>Precast Manhole, Type A, 4’ (1.22 m) Diameter</td>
</tr>
<tr>
<td>602402-02</td>
<td>Precast Manhole, Type A, 5’ (1.52 m) Diameter</td>
</tr>
<tr>
<td>602406-10</td>
<td>Precast Manhole, Type A, 6’ (1.83 m) Diameter</td>
</tr>
<tr>
<td>602411-08</td>
<td>Precast Manhole, Type A, 7’ (2.13 m) Diameter</td>
</tr>
<tr>
<td>602416-08</td>
<td>Precast Manhole, Type A, 8’ (2.44 m) Diameter</td>
</tr>
<tr>
<td>602421-08</td>
<td>Precast Manhole, Type A, 9’ (2.74 m) Diameter</td>
</tr>
<tr>
<td>602426-02</td>
<td>Precast Manhole, Type A, 10’ (3.05 m) Diameter</td>
</tr>
<tr>
<td>602501-05</td>
<td>Precast Valve Vault, Type A, 4’ (1.22 m) Diameter</td>
</tr>
<tr>
<td>602506-02</td>
<td>Precast Valve Vault, Type A, 5’ (1.52 m) Diameter</td>
</tr>
<tr>
<td>602601-06</td>
<td>Precast Reinforced Concrete Flat Slab Top</td>
</tr>
<tr>
<td>602701-02</td>
<td>Manhole Steps</td>
</tr>
<tr>
<td>604001-05</td>
<td>Frame and Lids, Type 1</td>
</tr>
<tr>
<td>604006-05</td>
<td>Frame and Grate, Type 3</td>
</tr>
<tr>
<td>604011-05</td>
<td>Frame and Grate, Type 3V</td>
</tr>
<tr>
<td>604016-04</td>
<td>Frame and Grate, Type 4</td>
</tr>
<tr>
<td>604021-04</td>
<td>Base, Frame and Lids, Type 5</td>
</tr>
<tr>
<td>604026-03</td>
<td>Frame and Grate, Type 6</td>
</tr>
<tr>
<td>604031-03</td>
<td>Grate, Type 7</td>
</tr>
<tr>
<td>604036-03</td>
<td>Grate, Type 8</td>
</tr>
<tr>
<td>604041-03</td>
<td>Frame and Grate, Type 9</td>
</tr>
<tr>
<td>604046-03</td>
<td>Frame and Grate, Type 10</td>
</tr>
<tr>
<td>604051-04</td>
<td>Frame and Grate, Type 11</td>
</tr>
<tr>
<td>604056-04</td>
<td>Frame and Grate, Type 11V</td>
</tr>
<tr>
<td>604061-03</td>
<td>Frame and Grate, Type 12</td>
</tr>
<tr>
<td>604066-02</td>
<td>Frame and Lid, Type 15</td>
</tr>
<tr>
<td>604071-05</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>604086-03</td>
<td>Frame and Grate, Type 23</td>
</tr>
<tr>
<td>604091-03</td>
<td>Frame and Grate, Type 24</td>
</tr>
</tbody>
</table>
Median Inlet for 24" (600 mm) Reinforced Concrete Pipe
Median Inlet for 36" (900 mm) Reinforced Concrete Pipe
Concrete Curb Type B and Combination Concrete Curb and Gutter
Outlet for Concrete Curb and Gutter, Type B-6.24 (B-15.60)
Type A Gutter (Inlet, Outlet, and Entrance)
Outlet, Type I for Type A Gutter
Outlets, Type 2 for Type A Gutter
Type B Gutter (Inlet, Outlet, and Entrance)
Outlet, Type 1 for Type B Gutter
Outlets, Type 2 for Type B Gutter
PC Concrete Islands And Medians
Corrugated PC Concrete Medians
Type A Gutter (Inlet, Outlet, and Entrance)
Outlet, Type 1 for Type A Gutter
Outlets, Type 2 for Type A Gutter
Type B Gutter (Inlet, Outlet, and Entrance)
Outlet, Type 1 for Type B Gutter
Outlets, Type 2 for Type B Gutter
PC Concrete Islands And Medians
Corrugated PC Concrete Medians
Shoulder Inlet With Curb

SAFETY RELATED ITEMS
Steel Plate Beam Guardrail
Non-blocked Steel Plate Beam Guardrail
Strong Post Guardrail Attached to Culvert
Long-Span Guardrail Over Culvert
Weak Post Guardrail Attached to Culvert
Back Side Protection of Guardrail
PCC/HMA Stabilization at Steel Plate Beam Guardrail
Shoulder Widening for Type 1 (Special) Guardrail Terminals
Traffic Barrier Terminal, Type 1B
Traffic Barrier Terminal, Type 2
Traffic Barrier Terminal, Type 5
Traffic Barrier Terminal, Type 6
Traffic Barrier Terminal, Type 6A
Traffic Barrier Terminal, Type 6B
Traffic Barrier Terminal, Type 10
Traffic Barrier Terminal, Type 11
Delineators
Cable Road Guard Single Strand
Concrete Barrier Double Face, 44 in. (1120 mm) Height
Concrete Glare Screen
Sight Screen Precast Prestressed Concrete Panel Wall
Sight Screen Chain Link Fence
Sight Screen Cedar Stockade Fence Type S
Sight Screen Wood Plank Fence Type P
Shoulder Rumble Strips, 16 in.
Shoulder Rumble Strips, 8 in.
Sand Module Impact Attenuators

OTHER ITEMS
Chain Link Fence
Woven Wire Fence
Right-of-Way Markers
Drainage Markers
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>701006-05</td>
<td>Off-Road Operations, 2L, 2W, 15’ (4.5 m) to 24” (600 mm) From Pavement Edge</td>
</tr>
<tr>
<td>701011-04</td>
<td>Off-Road Moving Operations, 2L, 2W, Day Only</td>
</tr>
<tr>
<td>701101-05</td>
<td>Off-Road Operations, Multilane, 15’ (4.5 m) to 24” (600 mm) From Pavement Edge</td>
</tr>
<tr>
<td>701106-05</td>
<td>Lane Closure, 2L, 2W, Day Only, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701201-04</td>
<td>Lane Closure, 2L, 2W, Short Time Operations</td>
</tr>
<tr>
<td>701206-05</td>
<td>Lane Closure, 2L, 2W, Night Only, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701301-04</td>
<td>Lane Closure, 2L, 2W, Slow Moving Operations Day Only, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701316-02</td>
<td>Lane Closure, 2L, 2W, Moving Operations - Day Only</td>
</tr>
<tr>
<td>701316-03</td>
<td>Lane Closure, 2L, 2W, Bridge Repair, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701316-18</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>701331-05</td>
<td>Lane Closure, 2L, 2W, With Run-Around, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701336-07</td>
<td>Lane Closure, 2L, 2W, Work Areas in Series, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701400-09</td>
<td>Approach to Lane Closure, Freeway/Expressway</td>
</tr>
<tr>
<td>701401-12</td>
<td>Lane Closure, Freeway/Expressway</td>
</tr>
<tr>
<td>701402-12</td>
<td>Lane Closure, Freeway/Expressway, with Barrier</td>
</tr>
<tr>
<td>701406-12</td>
<td>Lane Closure, Freeway/Expressway, Day Operations Only</td>
</tr>
<tr>
<td>701411-09</td>
<td>Lane Closure, Multilane, at Entrance or Exit Ramp, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701416-11</td>
<td>Lane Closure, Freeway/Expressway, with Crossover and Barrier</td>
</tr>
<tr>
<td>701421-08</td>
<td>Lane Closure, Multilane, Day Operations Only, for Speeds ≥ 45 MPH to 55 MPH</td>
</tr>
<tr>
<td>701422-10</td>
<td>Lane Closure, Multilane, for Speeds ≥ 45 MPH to 55 MPH</td>
</tr>
<tr>
<td>701423-10</td>
<td>Lane Closure, Multilane, with Barrier, for Speeds ≥ 45 MPH to 55 MPH</td>
</tr>
<tr>
<td>701426-09</td>
<td>Lane Closure, Multilane, Intermittent or Moving Operation, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701427-05</td>
<td>Lane Closure, Multilane, Intermittent or Moving Operation, for Speeds ≤ 40 MPH</td>
</tr>
<tr>
<td>701428-01</td>
<td>Traffic Control, Setup and Removal, Freeway/Expressway</td>
</tr>
<tr>
<td>701431-13</td>
<td>Lane Closure, Multilane, Undivided with Crossover, for Speeds ≥ 45 MPH to 55 MPH</td>
</tr>
<tr>
<td>701446-10</td>
<td>Two Lane Closure, Freeway/Expressway</td>
</tr>
<tr>
<td>701451-05</td>
<td>Ramp Closure Freeway/Expressway</td>
</tr>
<tr>
<td>701456-05</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>701502-09</td>
<td>Urban Lane Closure, 2L, 2W, with Bidirectional Left Turn Lane</td>
</tr>
<tr>
<td>701601-09</td>
<td>Urban Lane Closure, Multilane, 1W or 2W with Nontraversable Median</td>
</tr>
<tr>
<td>701602-10</td>
<td>Urban Lane Closure, Multilane, 2W with Bidirectional Left Turn Lane</td>
</tr>
<tr>
<td>701606-10</td>
<td>Urban Single Lane Closure, Multilane, 2W with Mountable Median</td>
</tr>
<tr>
<td>701611-01</td>
<td>Urban Half Road Closure, Multilane, 2W with Mountable Median</td>
</tr>
<tr>
<td>701701-10</td>
<td>Urban Lane Closure, Multilane Intersection</td>
</tr>
</tbody>
</table>
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
Object and Terminal Markers
Telescoping Steel Sign Support
Applications of Types A and B Metal Posts (For Signs & Markers)
Base for Telescoping Steel Sign Support

Typical Pavement Markings
Typical Applications Raised Reflective Pavement Markers
Curb Reflectors
Guardrail and Barrier Wall Reflector Mounting Details
# DIVISION 800 ELECTRICAL

<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>
</tbody>
</table>

## WIREWAY AND CONDUIT SYSTEMS

<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>812001-01</td>
<td>Raceways Embedded in Structure</td>
</tr>
<tr>
<td>814001-03</td>
<td>Handholes</td>
</tr>
<tr>
<td>814006-02</td>
<td>Double Handholes</td>
</tr>
</tbody>
</table>

## LIGHTING – LUMINAIRES

<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>821001</td>
<td>Underpass Lighting Wall Mount</td>
</tr>
<tr>
<td>821006</td>
<td>Underpass Lighting Suspended</td>
</tr>
<tr>
<td>821101-02</td>
<td>Luminaire Wiring in Pole</td>
</tr>
</tbody>
</table>

## LIGHTING – CONTROLLERS

<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>825001-04</td>
<td>Lighting Controller, Pole Mounted, 240V</td>
</tr>
<tr>
<td>825006-03</td>
<td>Lighting Controller, Pole Mounted, 480V</td>
</tr>
<tr>
<td>825011-04</td>
<td>Lighting Controller, Pedestal Mounted, 240V</td>
</tr>
<tr>
<td>825016-04</td>
<td>Lighting Controller, Pedestal Mounted, 480V</td>
</tr>
<tr>
<td>825021-04</td>
<td>Lighting Controller, Base Mounted, 240V</td>
</tr>
<tr>
<td>825026-04</td>
<td>Lighting Controller, Base Mounted, 480V</td>
</tr>
<tr>
<td>826001-02</td>
<td>Navigation Obstruction Lighting Controller, 240V</td>
</tr>
<tr>
<td>826006-02</td>
<td>Navigation Obstruction Lighting Controller, 480V</td>
</tr>
</tbody>
</table>

## LIGHTING – POLES

<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>830001-03</td>
<td>Light Pole Aluminum Mast Arm</td>
</tr>
<tr>
<td>830006-05</td>
<td>Light Pole Aluminum Davit Arm</td>
</tr>
<tr>
<td>830011-03</td>
<td>Light Pole Steel Mast Arm</td>
</tr>
<tr>
<td>830016-03</td>
<td>Light Pole Steel Davit Arm</td>
</tr>
<tr>
<td>830021-03</td>
<td>Light Pole Steel Tenon Top</td>
</tr>
<tr>
<td>830026-01</td>
<td>Temporary Roadway Lighting</td>
</tr>
</tbody>
</table>

## LIGHTING – TOWERS

<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>835001-01</td>
<td>Light Tower</td>
</tr>
</tbody>
</table>

## LIGHTING – FOUNDATIONS

<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>836001-04</td>
<td>Light Pole Foundation</td>
</tr>
<tr>
<td>836011-02</td>
<td>Light Pole Foundation with 44 in. (1120 mm) Concrete Barrier</td>
</tr>
<tr>
<td>837001-05</td>
<td>Light Tower Foundation</td>
</tr>
</tbody>
</table>
LIGHTING – BREAKAWAY DEVICES
838001-01 Breakaway Devices

TRAFFIC SIGNALS - CONTROLLERS AND EQUIPMENT
857001-01 Standard Phase Designation Diagrams and Phase Sequences
857006-01 Supervised Railroad Interconnect Circuit
862001-01 Uninterruptable Power Supply (UPS)

TRAFFIC SIGNALS - WIRE AND CABLE
873001-02 Traffic Signal Grounding & Bonding

TRAFFIC SIGNALS - POSTS AND FOUNDATIONS
876001-04 Pedestrian Push Button Post
877001-08 Steel Mast Arm Assembly and Pole 16’ Through 55’
877002-04 Steel Mast Arm Assembly and Pole 56’ Through 75’
877006-06 Steel Mast Arm Assembly and Pole with Dual Mast Arms
877011-10 Steel Combination Mast Arm Assembly and Pole 16’ Through 55’
877012-07 Steel Combination Mast Arm Assembly and Pole 56’ Through 75’
878001-10 Concrete Foundation Details

TRAFFIC SIGNALS - SIGNAL HEADS
880001-01 Span Wire Mounted Signals and Flashing Beacon Installation
880006-01 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>000001-07</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>
<tr>
<td>STD. NO.</td>
<td>TITLE</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>BLR 10-7</td>
<td>PCC Pavement Special</td>
</tr>
<tr>
<td>BLR 14-12</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 18-6</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>BLR 28</td>
<td>Concrete Curb Type B and Combination Concrete Curb and Gutter</td>
</tr>
<tr>
<td>SUBJECT/TITLE</td>
<td>STD. NO.</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td>Abbreviations, Symbols and Patterns</td>
<td>000001</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td></td>
</tr>
<tr>
<td>Barricade, Type 1A for Non-NHS Routes</td>
<td>BLR 25</td>
</tr>
<tr>
<td>Barrier, Concrete, Double Face, 44 in. (1120 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><strong>C</strong></td>
<td></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, Concrete Type B and Combination Concrete Curb and Gutter</td>
<td>606001</td>
</tr>
<tr>
<td>Curb, Concrete Type B and Combination Concrete Curb and Gutter</td>
<td>BLR 28</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><strong>D</strong></td>
<td></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, Types 4 &amp; 5</td>
<td>602106</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td></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>
<tr>
<td>End Section, Metal Flared, for Pipe Arches</td>
<td>542406</td>
</tr>
<tr>
<td>End Section, Metal Flared, for Pipe Culverts</td>
<td>542401</td>
</tr>
<tr>
<td>End Sections, Sloped Metal, for Pipe Culverts 15&quot; (375 mm) thru 60&quot; (1500 mm)</td>
<td>542411</td>
</tr>
</tbody>
</table>
### End Sections, Sloped Metal, for Pipe Arch Culverts 15” (375 mm) thru 72” (1800 mm) Dia.
- End Sections, Reinforced Concrete:
  - Pipe Culverts, 15 in. (375 mm) thru 84 in. (2100 mm) Diameter
  - Pipe Culverts, Elliptical, 15 in. (375 mm) thru 72 in. (1800 mm) Equivalent Diameter
  - Skewed, for 15 in. (375 mm) thru 36 in. (900 mm) Diameter
  - Skewed, for 42 in. (1050 mm) thru 60 in. (1500 mm) Diameter

### Erosion Control Systems, Temporary
- ...280001

## 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, Concrete ..................................................... 638101
- Grate, Traversable Pipe for Concrete End Section .................. 542311
- Guardrail:
  - Protection of Back Side of............................................... 630116
  - Long Span Over Culverts ................................................. 630106
  - Steel Plate Beam, .......................................................... 630001
  - Steel Plate Beam, 29 in. (731 mm) Height ......................... BLR 26
  - Steel Plate Beam, Non-Blocked ....................................... 630006
  - Steel Plate Beam, PCC/HMA Stabilization ......................... 630201
  - Strong Post, Attached to Culvert .................................... 630101
  - Weak Post, Attached to Culvert ...................................... 630111
Standards by Subject

January 1, 2020

H
Handholes, Concrete and Polymer Concrete, Double ........................................ 814006
Handholes, Polymer Concrete, Single .......................................................... 814001
Headwall for Pipe Underdrains, 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
Lighting, Underpass, Suspended .................................................................. 821006
Lighting, Underpass, Wall Mount ................................................................ 821001
Light Pole, Aluminum, Mast Arm ................................................................. 830001
Light Pole, Aluminum, Davit Arm ............................................................... 830006
Light Pole, Breakaway Devices .................................................................. 838001
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 44 in. (1120 mm) Concrete Barrier .............................................. 836011
Light Tower Foundation ........................................................................................................ 837001
Luminaire Wiring in Pole ......................................................................................................... 821101

M
Mailbox Turnout, Local System .................................................................................................. 406201
Mailbox Turnout, State System .................................................................................................. 602401
Mailbox Turnout, State System .................................................................................................. 602402
Mailbox Turnout, State System .................................................................................................. 602406
Mailbox Turnout, State System .................................................................................................. 602410
Mailbox Turnout, State System .................................................................................................. 602416
Mailbox Turnout, State System .................................................................................................. 602421
Mailbox Turnout, State System .................................................................................................. 602426
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
Object and Terminal Markers ................................................................................................... 725001
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 .................................................................................................. 606201

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
Standards by Subject January 1, 2020

24' (7.2 m) Jointed PCC ................................................................. 420101
36' (10.8 m) Continuously Reinf. 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
Connector (HMA) for Bridge Approach Slab ................................................................. 420406
Connector (PCC) for Bridge Approach Slab ................................................................. 420401
Nonreinforced PCC .................................................................................. BLR 14
Reinforcement for Continuously Reinforced PCC Pavement ................................................................. 421001
Roundouts, PCC .................................................................................. 420111
Special, PCC .................................................................................. BLR 10
Welded Wire Reinforcement ........................................................................ 420701
Pavement Markers, Raised Reflective, Applications ................................................................. 781001
Pavement Markings .................................................................................. 780001
Pedestrian Crossings, Entrance / Alley ................................................................. 424026
Pedestrian Crossings, Median ........................................................................ 424031
Phase Sequences .................................................................................. 857001
Pipe Underdrains .................................................................................. 601001
Posts, Metal, Applications for Type A and B ................................................................. 729001
Posts, Metal, for Signs, Markers and Delineators ................................................................. 720001
Push Button Post .................................................................................. 876001

R

Raceways Embedded in Structure ........................................................................ 812001
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 Mounting Details, Guardrail and Barrier Wall ................................................................. 782006
Reflectors, Curb .................................................................................. 782001
Reinforcement Bars, Areas, Weights and Spacing ........................................................................ 001001
Revetment Mat, Fabric Formed Concrete ........................................................................ 285001
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 ................................................................. 482011
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

5 of 7
<table>
<thead>
<tr>
<th>Traffic Control</th>
<th>BLR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Barrier Terminal:</td>
<td></td>
</tr>
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<td>Type 1</td>
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<tr>
<td>Type 1B</td>
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<td>Type 2</td>
<td>631011</td>
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<td>Type 5A</td>
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<td>Type 5R</td>
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<td>Type 6</td>
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<td>Type 6A</td>
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<td>Type 10</td>
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<td>Type 11</td>
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<td>Traffic Control:</td>
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<td>Devices</td>
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<tr>
<td>Day Labor Construction</td>
<td>BLR 17</td>
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<td>Day Labor Maintenance</td>
<td>BLR 18</td>
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<tr>
<td>Typical Application of, for Construction on Rural Local Highways (Two-Lane Two Way Rural Traffic) (Road Closed to Thru Traffic)</td>
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<td>Lane Closure, 2L, 2W:</td>
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<td>Bridge Repair, for Speeds ≥ 45 MPH</td>
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<td>Bridge Repair with Barrier</td>
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<td>Day Only, for Speeds ≥ 45 MPH</td>
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<tr>
<td>Moving Operations - Day Only</td>
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<td>Night Only, for Speeds ≥ 45 MPH</td>
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<td>Pavement Widening, for Speeds ≥ 45 MPH</td>
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<td>Short Time Operations</td>
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<td>Slow Moving Operations Day Only, for Speeds ≥ 45 MPH</td>
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<td>With Run-Around, for Speeds ≥ 45 MPH</td>
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<td>Work Areas in Series, for Speeds ≥ 45 MPH</td>
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<td>Lane Closure, Freeway/Expressway</td>
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<td>Approach to</td>
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<tr>
<td>Day Operations Only</td>
<td>701406</td>
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<td>Sidewalk, Corner or Crosswalk Closure</td>
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Two Lane Closure ................................................................. 701446
with Barrier ........................................................................ 701402
with Crossover and Barrier .............................................. 701416
Lane Closure, Multilane:
at Entrance or Exit Ramp, for Speeds ≥ 45 MPH .................. 701411
Day Operations Only, for Speeds ≥ 45 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, Single Lane Closure, 2W with Mountable Median .. 701606
Multilane, Half Road, Closure, 2W with Mountable Median ... 701611
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
Setup and Removal, Freeway/Expressway ......................... 701428
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, Precast, Type A, 4 ft. (1.22 m) Diameter ........... 602501
Valve Vault, Precast, Type A, 5 ft. (1.52 m) Diameter ........... 602506
### LIGHTING (contd.)

| Pull Point | ⚡ | ⚡ |
| Handhole | ⚡ | ⚡ |
| Heavy Duty Handhole | ⚡ | ⚡ |
| Junction Box | ⚡ | ⚡ |
| Light Unit Comb | ⚡ | ⚡ |
| Electrical Ground | ⚡ | ⚡ |
| Traffic Flow Arrow | ⚡ | ⚡ |
| High Mast Pole (Half Size) | ⚡ | ⚡ |
| Light Unit 1 | ⚡ | ⚡ |

### PAVEMENT MARKINGS

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<tr>
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<tr>
<td>Heavy Duty Handhole</td>
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<tr>
<td>Light Unit Comb</td>
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<tr>
<td>Electrical Ground</td>
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<tr>
<td>Traffic Flow Arrow</td>
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<tr>
<td>High Mast Pole</td>
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<td>Light Unit 1</td>
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### PAVEMENT (MISC.)

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<tr>
<td>Keyed Long. Joint</td>
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<tr>
<td>Keyed Long. Joint w/Tie Bars</td>
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</tr>
<tr>
<td>Sawed Long. Joint w/Tie Bars</td>
<td>⚡</td>
</tr>
<tr>
<td>Bituminous Shoulder</td>
<td>⚡</td>
</tr>
<tr>
<td>Bituminous Taper</td>
<td>⚡</td>
</tr>
<tr>
<td>Stabilized Driveway</td>
<td>⚡</td>
</tr>
<tr>
<td>Widening</td>
<td>⚡</td>
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### STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS

- **Handicap Symbol**
- **RR Crossing**
- **Raised Marker Amber 1 Way**
- **Raised Marker Amber 2 Way**
- **Raised Marker Crystal 1 Way**
- **Two Way Turn Left**
- **Shoulder Diag. Pattern**
- **Skip-Dash White**
- **Skip-Dash Yellow**
- **Stop Line**
- **Solid Line**
- **Double Centerline**
- **Dotted Lines**
### Roadway Profiles

- **P.I. Indicator**
- **Point Indicator**
- **Earthworks Balance Point**
- **Begin Point**

### Vertical Curve Data

- **Ditch Profile Left Side**
- **Ditch Profile Right Side**
- **Roadway Profile Line**
- **Storm Sewer Profile Left Side**
- **Storm Sewer Profile Right Side**

### Signing Items

- **Cone, Drum or Barricade**
- **Barricade Type II**
- **Barricade Type III**
- **Barricade With Edge Line**
- **Flashing Light Sign**
- **Panels I**
- **Panels II**
- **Direction of Traffic**
- **Sign Flag**

### Right of Way Items

- **Access Control Line**
- **Access Control Line & ROW**
- **Access Control Line & ROW with Fence**
- **Excess ROW Line**

### Roadway Plan Items

- **Cable Barrier**
- **Concrete Barrier**
- **Edge of Pavement**
- **Bit Shoulders, Medians and C&G Line**
- **Aggregate Shoulder**
- **Sidewalks, Driveways**
- **Guardrail**
- **Guardrail Post**
- **Traffic Sign**
- **Corrugated Median**
- **Impact Attenuator**
- **North Arrow with District Office**
  - **(Half Size)**
- **Match Line**
- **Slope Limit Line**
- **Typical Cross-Section Line**

---

**Roadway Profiles (contd.)**

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<tr>
<td>P.I. Indicator</td>
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<tr>
<td>Point Indicator</td>
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**Signing Items (contd.)**

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<tr>
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<tr>
<td>Reverse Left W1-4L</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Reverse Right W1-4R</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Two Way Traffic Sign W6-3</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Detour Ahead W20-2(D)</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Left Lane Closed Ahead W20-3(LD)</td>
<td>(Half Size)</td>
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<tr>
<td>Right Lane Closed Ahead W20-5R(D)</td>
<td>(Half Size)</td>
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<tr>
<td>Road Closed Ahead W20-3(D)</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Road Construction Ahead W20-1(D)</td>
<td>(Half Size)</td>
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<tr>
<td>Single Lane Ahead</td>
<td>(Half Size)</td>
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<tr>
<td>Transition Left W4-2L</td>
<td>(Half Size)</td>
</tr>
<tr>
<td>Transition Right W4-2R</td>
<td>(Half Size)</td>
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<td>SIGNING ITEMS</td>
<td>EX</td>
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<tr>
<td>---------------</td>
<td>----</td>
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<tr>
<td>One Way Arrow Leg W2-6-(O) (Half Size)</td>
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<tr>
<td>Two Way Arrow Large W1-7-(O) (Half Size)</td>
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<tr>
<td>Detour M4-10L-(O) (Half Size)</td>
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<tr>
<td>Detour M4-10R-(O) (Half Size)</td>
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</tr>
<tr>
<td>One Way Left R6-3L (Half Size)</td>
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</tr>
<tr>
<td>One Way Right R6-3R (Half Size)</td>
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<tr>
<td>Left Turn Lane R3-100L (Half Size)</td>
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<tr>
<td>Keep Left R4-7AL (Half Size)</td>
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<tr>
<td>Keep Left R4-7BL (Half Size)</td>
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<tr>
<td>Keep Right R4-7AR (Half Size)</td>
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<tr>
<td>Keep Right R4-7BR (Half Size)</td>
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<tr>
<td>Stop Here On Red R10-6-AL (Half Size)</td>
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<tr>
<td>Stop Here On Red R10-6-AR (Half Size)</td>
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<td>No Left Turn R3-2 (Half Size)</td>
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<tr>
<td>No Right Turn R3-1 (Half Size)</td>
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<tr>
<td>Road Closed R11-2 (Half Size)</td>
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<td>Road Closed Thru Traffic R11-2 (Half Size)</td>
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<tr>
<td>Box Culvert Barrel</td>
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<td>Box Culvert Headwall</td>
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<td>Bridge Pier</td>
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<td>Bridge</td>
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<td>Retaining Wall</td>
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<td>Temporary Sheet Piling</td>
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<td>Cable Number</td>
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<tr>
<td>Left Turn Green</td>
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<tr>
<td>Left Turn Yellow</td>
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<tr>
<td>Signal Backplate</td>
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<tr>
<td>Signal Section 8&quot; (200 mm)</td>
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<tr>
<td>Signal Section 12&quot; (300 mm)</td>
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<tr>
<td>Walk/Don't Walk Letters</td>
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<td>Walk/Don't Walk Symbols</td>
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<td>Galv. Steel Conduit</td>
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<td>Underground Cable</td>
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<td>Detector Loop Line</td>
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<td>Detector Loop Large</td>
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<tr>
<td>Detector Loop Small</td>
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<tr>
<td>Detector Loop Quadrupole</td>
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### TRAFFIC SIGNAL ITEMS (contd.)

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<td>Aluminum Mast Arm</td>
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<td>Swivel Mast Arm</td>
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<td>Veh. Detector Magnetic</td>
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<td>Conduit Splice</td>
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<tr>
<td>Controller</td>
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<tr>
<td>Gulfbox Junction</td>
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<td>Wood Pole</td>
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<td>Temp. Signal Head</td>
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<td>Handhole</td>
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<tr>
<td>Double Handhole</td>
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<tr>
<td>Heavy Duty Handhole</td>
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<tr>
<td>Junction Box</td>
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<tr>
<td>Ped. Pushbutton Detector</td>
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<td>Ped. Signal Head</td>
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<td>Power Pole Service</td>
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<td>Priority Veh. Detector</td>
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<tr>
<td>Signal Head</td>
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<tr>
<td>Signal Head w/Backplate</td>
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<td>Signal Post</td>
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<td>Closed Circuit TV</td>
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<td>Video Detector System</td>
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### UNDERGROUND UTILITY ITEMS

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<tr>
<td>Electric Cable</td>
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<tr>
<td>Fiber Optic</td>
<td>FO</td>
<td></td>
<td>FO/</td>
</tr>
<tr>
<td>Gas Pipe</td>
<td>G</td>
<td></td>
<td>G/</td>
</tr>
<tr>
<td>Oil Pipe</td>
<td>O</td>
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<td>O/</td>
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<tr>
<td>Sanitary Sewer</td>
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<td></td>
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<tr>
<td>Telephone Cable</td>
<td>T</td>
<td></td>
<td>T/</td>
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<tr>
<td>Water Pipe</td>
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### UTILITIES ITEMS

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<td>Double Handhole</td>
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<tr>
<td>Fine Hydrant</td>
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<tr>
<td>GuyWire or Deadman Anchor</td>
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<tr>
<td>Handhole</td>
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<tr>
<td>Heavy Duty Handhole</td>
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<tr>
<td>Junction Box</td>
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<tr>
<td>Light Pole</td>
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<tr>
<td>Manhole</td>
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<tr>
<td>Monitoring Well (Gasoline)</td>
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<td>Pipeline Warning Sign</td>
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<td>Power Pole with Light</td>
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<td>Sanitary Sewer Cleanout</td>
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<td>Splice Box Above Ground</td>
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<td>Telephone Splice Box Above Ground</td>
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### UTILITY ITEMS (contd.)

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<td>Water Meter</td>
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<td>Water Meter Valve Box</td>
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<td>Profile Line</td>
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### VEGETATION ITEMS

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<td>Bush or Shrub</td>
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<td>Evergreen Tree</td>
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<tr>
<td>Shump</td>
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<tr>
<td>Orchard/Nursery Line</td>
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<td>Vegetation Line</td>
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<td>Woods &amp; Bush Line</td>
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### WATER FEATURE ITEMS

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<td>Water Surface Indicator</td>
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<td>Water Point</td>
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<td>Disappearing Ditch</td>
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<tr>
<td>Marsh</td>
<td></td>
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</tr>
<tr>
<td>Marsh/Swamp Boundary</td>
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</tbody>
</table>

### STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS

STANDARD 000001-07
### REINFORCEMENT BARS - ENGLISH (METRIC)

<table>
<thead>
<tr>
<th>Bar Size (English)</th>
<th>Dia. in.</th>
<th>Cross-Sectional Area sq. in. (sq. mm)</th>
<th>Weight ps. ft. kN/m</th>
<th>Spacing, 1n. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Area of Steel per Foot (Meter), sq. in. (sq. mm)</td>
</tr>
<tr>
<td>3 (20)</td>
<td>0.375</td>
<td>0.110 (0.560)</td>
<td>0.330 (7.301)</td>
<td>4 (115)</td>
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<tr>
<td></td>
<td>0.378</td>
<td>0.110 (0.560)</td>
<td>0.330 (7.301)</td>
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<td>0.380</td>
<td>0.110 (0.560)</td>
<td>0.330 (7.301)</td>
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<tr>
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<td>0.383</td>
<td>0.110 (0.560)</td>
<td>0.330 (7.301)</td>
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</tr>
<tr>
<td>4 (12)</td>
<td>0.500</td>
<td>0.196 (1.29)</td>
<td>0.668 (9.944)</td>
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<tr>
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<td>0.502</td>
<td>0.196 (1.29)</td>
<td>0.668 (9.944)</td>
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</tr>
<tr>
<td></td>
<td>0.504</td>
<td>0.196 (1.29)</td>
<td>0.668 (9.944)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.506</td>
<td>0.196 (1.29)</td>
<td>0.668 (9.944)</td>
<td></td>
</tr>
<tr>
<td>5 (10)</td>
<td>0.625</td>
<td>0.307 (1.99)</td>
<td>0.625 (9.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.627</td>
<td>0.307 (1.99)</td>
<td>0.625 (9.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.629</td>
<td>0.307 (1.99)</td>
<td>0.625 (9.5)</td>
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<tr>
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<td>0.631</td>
<td>0.307 (1.99)</td>
<td>0.625 (9.5)</td>
<td></td>
</tr>
<tr>
<td>6 (9)</td>
<td>0.750</td>
<td>0.443 (2.84)</td>
<td>0.750 (13.76)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.752</td>
<td>0.443 (2.84)</td>
<td>0.750 (13.76)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.754</td>
<td>0.443 (2.84)</td>
<td>0.750 (13.76)</td>
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<tr>
<td></td>
<td>0.756</td>
<td>0.443 (2.84)</td>
<td>0.750 (13.76)</td>
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</tr>
<tr>
<td>7 (8)</td>
<td>0.875</td>
<td>0.601 (3.87)</td>
<td>0.875 (15.9)</td>
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</tr>
<tr>
<td></td>
<td>0.877</td>
<td>0.601 (3.87)</td>
<td>0.875 (15.9)</td>
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<tr>
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<td>0.879</td>
<td>0.601 (3.87)</td>
<td>0.875 (15.9)</td>
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<tr>
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<td>0.881</td>
<td>0.601 (3.87)</td>
<td>0.875 (15.9)</td>
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</tr>
<tr>
<td>8 (6)</td>
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<td>0.785 (5.10)</td>
<td>1.000 (17.19)</td>
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</tr>
<tr>
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<td>1.002</td>
<td>0.785 (5.10)</td>
<td>1.000 (17.19)</td>
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<tr>
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<td>1.004</td>
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<td>1.000 (17.19)</td>
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<td>1.006</td>
<td>0.785 (5.10)</td>
<td>1.000 (17.19)</td>
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</tr>
<tr>
<td>9 (5)</td>
<td>1.128</td>
<td>1.000 (65)</td>
<td>3.400 (5.080)</td>
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</tr>
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<td></td>
<td>1.130</td>
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</tr>
<tr>
<td></td>
<td>1.132</td>
<td>1.000 (65)</td>
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</tr>
<tr>
<td></td>
<td>1.134</td>
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<td>3.400 (5.080)</td>
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<tr>
<td>10 (4)</td>
<td>1.270</td>
<td>1.297 (81.9)</td>
<td>4.303 (68.7)</td>
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</tr>
<tr>
<td></td>
<td>1.272</td>
<td>1.297 (81.9)</td>
<td>4.303 (68.7)</td>
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</tr>
<tr>
<td></td>
<td>1.274</td>
<td>1.297 (81.9)</td>
<td>4.303 (68.7)</td>
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<tr>
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<td>1.276</td>
<td>1.297 (81.9)</td>
<td>4.303 (68.7)</td>
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</tr>
<tr>
<td>11 (3)</td>
<td>1.410</td>
<td>1.561 (100.6)</td>
<td>5.313 (86.4)</td>
<td></td>
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<td>1.412</td>
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<td>5.313 (86.4)</td>
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<td>5.313 (86.4)</td>
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<td></td>
<td>1.416</td>
<td>1.561 (100.6)</td>
<td>5.313 (86.4)</td>
<td></td>
</tr>
</tbody>
</table>

**Switched units to English (metric)**

**DATE**

1-1-09

**REVISIONS**

AREAS OF REINFORCEMENT BARS

STANDARD 001001-02
### Table: Decimal of an Inch and of a Foot

<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>
<th>A</th>
<th>B</th>
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</thead>
<tbody>
<tr>
<td>0.0052</td>
<td>0.1785</td>
<td>0.0104</td>
<td>0.1771</td>
<td>0.01625</td>
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<td>0.0208</td>
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<td>0.0260</td>
<td>0.1927</td>
</tr>
<tr>
<td>0.007</td>
<td>0.028</td>
<td>0.0125</td>
<td>0.0197</td>
<td>0.0185</td>
<td>0.0203</td>
<td>0.0208</td>
<td>0.0240</td>
<td>0.0265</td>
<td>0.0292</td>
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<td>0.0087</td>
<td>0.0343</td>
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<td>0.0384</td>
<td>0.0205</td>
<td>0.0409</td>
<td>0.0224</td>
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<td>0.0083</td>
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<td>0.0129</td>
<td>0.0379</td>
<td>0.0285</td>
<td>0.044</td>
<td>0.0248</td>
<td>0.0356</td>
<td>0.0374</td>
<td>0.0388</td>
</tr>
<tr>
<td>0.0077</td>
<td>0.0383</td>
<td>0.0129</td>
<td>0.0405</td>
<td>0.0285</td>
<td>0.0441</td>
<td>0.0248</td>
<td>0.0356</td>
<td>0.0374</td>
<td>0.0388</td>
</tr>
<tr>
<td>0.0071</td>
<td>0.0383</td>
<td>0.0129</td>
<td>0.0405</td>
<td>0.0285</td>
<td>0.0441</td>
<td>0.0248</td>
<td>0.0356</td>
<td>0.0374</td>
<td>0.0388</td>
</tr>
</tbody>
</table>

### Notes:
- **B = Inch Equivalents to Foot Fractions**
- **A = Fractions of Inch or Foot**
- Decimal of an Inch
- Decimal of a Foot

### Standard 001006
Pavement
Shoulder
1:6
Shoulder
Pavement
1:6

DITCH CHECK FOR NARROW MEDIAN

VIEW OF NARROW MEDIAN

VIEW OF WIDE MEDIAN

DITCH CHECK FOR WIDE MEDIAN

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

EARTH MEDIAN
DITCH CHECK

STANDARD 202001-01
STEP 1

Rotate posts (stakes) together 180° clockwise and drive both posts (stakes) 18 (450) into ground.

STEP 2

ATTACHING TWO SILT FILTER FENCES

(Not applicable for J-hooks)

When the ditch check is within the clear zone and the road is open to traffic, the traffic approach slope of the aggregate shall be 1:4 (V:H).

AGGREGATE DITCH CHECK

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.

Sheet Flow

FILTER J-HOOK PLACEMENT

SILT FILTER J-HOOK PLACEMENT

Place posts (stakes) adjacent and bind at top with wire.
INLET AND PIPE PROTECTION

SEDIMENT BASIN

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

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

Outlet type as directed by Engineer.

TYPICAL CUT CROSS-SECTION

TYPICAL FILL CROSS-SECTION

TEMPORARY DITCHES FOR CUT & FILL SECTIONS
All dimensions are in inches (millimeters) unless otherwise shown.

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.

GENERAL NOTES

INSTALLATION DETAILS

1. Be careful to avoid breaking drop stitches.

2. Indicates sequence of pour.

TYPICAL SECTION THRU FILTER POINT MAT

TYPICAL FABRIC FORMED CONCRETE REVETMENT MAT LINED DITCH

TYPICAL LAP JOINTS W/ANCHOR WALL

CUT OFF WALL DETAILS

FABRIC FORMED CONCRETE REVETMENT MATS

STANDARD 285001-02
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 EXISTING PAVEMENT

TRANSVERSE CONSTRUCTION JOINT

SECTION A-A

(TYPICAL 2 LANE WITH SHOULDERS)

ALTERNATE SECTION A-A

(TYPICAL 2 LANE WITH SHOULDERS)

PLAN

GENERAL NOTES

PCC BASE COURSE WITH HMA BINDER AND SURFACE COURSES

STANDARD 353001-05
With a mainline horizontal curve to the left, 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 D-D, C-C, and B-B as shown, and the edge of the ramp between Sections C-C and B-B shall be constructed as a compound curve lying Section C-C.

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 inlet to enhance drainage.

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

When using a radius R1 less than the assumed mainline curve radius, 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.

Provide drainage swale in shaded area.

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 using a radius R1 less than the assumed mainline curve radius, 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 D-D, C-C, and B-B as shown, and the edge of the ramp between Sections C-C and B-B shall be constructed as a compound curve lying Section C-C.
**SECTION B-B**

Cross Sections When Mainline is on Tangent or Curved to the Right

**SECTION C-C**

Cross Sections When Mainline is Curved to the Left

**SECTION D-D**

Cross Sections When Mainline is on Tangent or Curved to the Right

**DETAIL A**

**DETAIL B**

**ENTRANCE RAMP TERMINAL**

(Flexible Ramp Pavement Adjacent to Flexible Mainline Pavement)

(Sheet 2 of 2)

STANDARD 406001-06
to their intersection.

When curved to the left

When on tangent or curved to the right

Vertical offset to ramp edge = 192 x (cross slope% or S.E.%) of mainline

Max. cross slope allowed is 4%
Min. cross slope allowed is 1.5%

Profile

Variable grade when mainline is curved to the right

Range of initial ramp grades when mainline is curved to the right and e = 8% for R1,

See Sheet 3 for GENERAL NOTES

DATE

REVISIONS

1-1-15
Corrected divergence angle

1-1-08
Switched cross to English (metric).

STANDARD 406101-05

EXIT RAMP TERMINAL
(FLEXIBLE RAMP PAVEMENT ADJACENT TO FLEXIBLE MAINLINE PAVEMENT)
(Sheet 1 of 3)
SECTION B-B

WHEN MAINLINE IS ON TANGENT OR CURVED TO THE RIGHT

WHEN MAINLINE IS CURVED TO THE LEFT
**GENERAL NOTES**

The initial ramp grade (G) is based on the line generated through the PI that is 105 ft. (32 m) past Section C-C and the point created by the vertical offset at Section D-D. See plans for actual grades.

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 340 ft. (100 m) tangent section.

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

**DETAILS FOR DRAINAGE IN NEUTRAL AREA**

<table>
<thead>
<tr>
<th>Sections</th>
<th>Machine on Tangent</th>
<th>Machine Curved Left</th>
<th>Machine Curved Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.18</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 192</td>
<td>S.E. % ML x 192</td>
</tr>
<tr>
<td>C</td>
<td>-15.4</td>
<td>5.5 % ML x 192</td>
<td>5.5 % ML x 192</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>5.5 % ML x 392</td>
<td>5.5 % ML x 392</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. 5.E. = Superelevation Rate

**EXIT RAMP TERMINAL**

(Flexible Ramp Pavement Adjacent to Flexible Mainline Pavement)

(Sheet 3 of 3)
**MAILBOX TURNOUT**

**TYPICAL APPLICATION**

**MAILBOX ON NEARSIDE OF ENTRANCE**

**MAILBOX ON FARSIDE OF ENTRANCE**

**GENERAL NOTES**

Mailboxes shall be mounted such that the face of the mailbox is 6 (150) to 12 (300) and the post a minimum of 24 (600) from the edge of the turnout surfacing.

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

No. 6x30 (No. 19x750) Tie bars at 36 (900) cts. (shown on support pins)

Sawed groove 6/3 (3) min. x 6/3

Hot poured joint sealer

LONGITUDINAL CONSTRUCTION JOINT

(TIE BAR FORMED IN PLACE OR MECHANICALLY INSERTED)

No. 6x30 (No. 19x750) Tie bars at 36 (900) cts.

LONGITUDINAL KEYED JOINT

* 8 (203) min. pavement thickness for keyed joints.

Tie bars at 36 (900) cts.

No. 6x24 (No. 19x600) Tie bars at 36 (900) cts.

DOWEL BAR TABLE.

Tie bars at 36 (900) cts. Revised

BAR SUPPORTS (shown in place only)

Preformed or drilled hole (bar size + 6/3)

Hot poured joint sealer

LONGITUDINAL CONSTRUCTION JOINT

(TIE BAR GRAVING IN PLACE)

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

Channel pin, size sufficient to securely hold joint in place, spaced not more than 3'-4" (1.02 m) cts.

SUPPORTING CHAIR

ALTERNATE

SUPPORTING CHAIR

ALTERNATE

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.

DATE
REVISIONS
1-1-18 Changed tie bar spacing to 36 (900) cts. Revised
Dowel Bar Table
1-1-08 Switched units to English (metric)

PAVEMENT JOINTS

(STANDARD 420001-09)
**TRANSVERSE EXPANSION JOINT**

*FOR PAVEMENTS WITH UNEQUAL THICKNESS*

- Expansion caps shall be installed on the exposed end of each dowel bar once the header has been removed and the joint filler material has been installed.

**TRANSVERSE EXPANSION JOINT**

*FOR PAVEMENTS WITH EQUAL THICKNESS*

**SEALING DETAIL**

**TRANSVERSE CONTRACTION JOINT**

**DOWEL BAR TABLE**

<table>
<thead>
<tr>
<th>PAVEMENT BAR THICKNESS</th>
<th>DOWEL BAR DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 (250) or greater</td>
<td>16 (138)</td>
</tr>
<tr>
<td>8 (200) thru 9.99 (249)</td>
<td>14 (122)</td>
</tr>
<tr>
<td>Less than 8 (200)</td>
<td>12 (102)</td>
</tr>
</tbody>
</table>

**PAVEMENT JOINTS**

(Sheet 2 of 2)
**SECTION A-A**  
(TYPICAL 2-LANE WITH SHOULDERS)

- **Longitudinal sawed joint**
- **Improved subgrade**
- **Stabilized subbase**
- **Slope 1.5%**
- **24' (7.2 m) JOINTED**
- **18 (450) Long dowel bars at 12 (300) cts.**
- **Header board drilled for bars**
- **Bar supports**

**PAVEMENT PLAN**

- **Transverse contraction joint**
- **Longitudinal sawed joint**
- **Lane edge or edge of pavement**
- **Lane edge or edge of pavement**
- **Transverse contraction joint**
- **Longitudinal keyed joint (typ.)**
- **1 (25) Preformed expansion joint filler-full depth (typ.)**
- **No. 6 (No. 19)**
- **18 (450)**

**GENERAL NOTES**

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

---

**PAVEMENT PLAN**

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

**DATE**

- **REVISIONS**
  - 1-1-18 curved spacing of tie bars to 36 (900)
  - 1-1-15 added dimension of tie bars from transverse contraction joints

---

**STANDARD 420101-06**
**SECTION A-A**

(TYPICAL 3-LANE, 1-WAY WITH SHOULDERS)

**GENERAL NOTES**

See Standard 420001 for details of joints not shown.

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

**PAVEMENT PLAN**

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

**TRANSVERSE CONSTRUCTION JOINT**

- 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. Adjust the tie bar spacing to maintain a clearance of 6 (150) from dowel bars.

**STANDARD 420106-06**

**36' (10.8 m) JOINTED PCC PAVEMENT**
CAST IN PLACE DETAIL
Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars at 36 (900) cts. for a distance of 100' (30 m) beginning at the 24 (600) stub. Joint line is parallel to ramp baseline.

Pavement thickness and joint type in the ramp taper, for a distance of 950' (290 m), shall be the same as the mainline. Joints shall be in prolongation with mainline pavement joints.

* This distance shall be adjusted to place the transverse expansion joint in prolongation with the existing joint in the mainline pavement.

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.

With a mainline horizontal curve to the left, 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 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 | REVISIONS
--- | ---
1-1-18 | Changed tie bar spacing to 36 (900) cts.
1-1-17 | Added longitudinal sawed joint to middle of ramp pavement.
CROSS SECTIONS WHEN MAINLINE IS ON TANGENT OR CURVED TO THE RIGHT

CROSS SECTIONS WHEN MAINLINE IS CURVED TO THE LEFT

ENTRANCE RAMP TERMINAL

(IJOINTED PCC RAMP PAVEMENT ADJACENT TO JOINED PCC MAINLINE PAVEMENT)
Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars at 36 (900) cts. for a distance of 100' (30 m) beginning at the 24 (600) stub. Joint line is parallel to ramp baseline.

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

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

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 using a radius R1 less than the indicated "A" and "B" grades for the ramp terminal are based on an assumed mainline grade of 0.00%.

With a mainline horizontal curve to the left, 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 D-D, C-C, and B-B as shown. From Section B-B, construct Sections C-C and D-D as shown. From Section A-A 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.

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

See Standard 483001 for ramp shoulder details.
ADJACENT TO CRC MAINLINE PAVEMENT

JOINTED PCC RAMP PAVEMENT

SECTION B-B

CROSS SECTIONS WHEN MAINLINE IS ON TANGENT OR CURVED TO THE RIGHT

SECTION C-C

SECTION D-D

CROSS SECTIONS WHEN MAINLINE IS CURVED TO THE LEFT

DETAIL A

DETAIL B
- When curved to the left, the joint shall be in prolongation with the existing joint in the mainline pavement.
- Variable grade when mainline is on tangent.
- Max. cross slope allowed is 4%
- Vertical offset range for ramp edge when mainline is curved to the left.
- Min. cross slope allowed is 1.5%
- Vertical offset range for ramp right edge when mainline is curved to the right.
- Right edge of ramp when mainline is on tangent.
- Vertical offset range for ramp edge when mainline is curved to the right.
- Min. cross slope allowed is 1.5%
- Right edge of ramp when mainline is curved to the right.
- Full superelevation attained.
- Stub vertical offset based on R x 192 (4900) x [cross slope% or S.E.%] of mainline.
- Vertical offset to ramp edge = G% x (90 m) x [cross slope] = G% x (12 m) x [cross slope].
- Vertical offset range for ramp right edge when mainline is curved to the left.
- Vertical offset range for ramp left edge when mainline is curved to the right.
- Vertical offset range for ramp right edge when mainline is curved to the right.
- Vertical offset range for ramp edge when mainline is curved to the right.
- Min. cross slope allowed is 1.5%
- Right edge of ramp when mainline is on tangent.
- Full superelevation attained.
- Shoulder width.
- Stubs.
### 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' (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**

---

**TABLE 1: Vertical offsets in inches for right edge of ramp, when \( e = 8\% \)**

<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>0.18</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 192</td>
<td>S.E. % ML x 192</td>
</tr>
<tr>
<td>C</td>
<td>-3.0</td>
<td>S.E. % ML x 192</td>
<td>-3.0</td>
</tr>
<tr>
<td>D</td>
<td>-15.4</td>
<td>-15.4</td>
<td>-15.4</td>
</tr>
</tbody>
</table>

**TABLE 2: Vertical offsets in mm for right edge of ramp, when \( e = 8\% \)**

<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>5.0</td>
<td>S.E. % ML x 300</td>
<td>S.E. % ML x 300</td>
</tr>
<tr>
<td>B</td>
<td>74.0</td>
<td>S.E. % ML x 4900</td>
<td>S.E. % ML x 4900</td>
</tr>
<tr>
<td>C</td>
<td>-74.0</td>
<td>S.E. % ML x 4900</td>
<td>-74.0</td>
</tr>
<tr>
<td>D</td>
<td>-392.0</td>
<td>-392.0</td>
<td>-392.0</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. = Superelevation Rate
Pavement and reinforcement in the ramp taper shall be the same as the mainline. Reinforcement shall be placed parallel and perpendicular to the mainline pavement.

Vertical offset range for ramp right edge when mainline is curved to the left:

\[ \text{Vertical offset} = 0.00\% \]

Min. cross slope allowed is 1.5% Max. cross slope allowed is 5%

When mainline is on tangent or curved to the right, right edge of ramp is parallel to mainline grade

Referring to sheet 3 for vertical offsets using \( e = 8\% \)

Range of initial ramp grades when mainline is curved to the right and \( e = 8\% \) for \( R \)

See Sheet 3 for GENERAL NOTES
1.5% and greater Mainline pavement

0.0% Slope

Mainline pavement

Stabilized Subbase (HMA required)

Improved subgrade

See DETAIL A

5 % max.

1.5 % min.

(300)

12

(100)

4'-0" (1.8 m)

6'-0"

Agg.

24 (600)

4 % min.

pcc shoulder

(450)

18

(150)

6

(4.9 m)

16'-0"

5 % max.

1.5 % min.

4 % min.

pcc shoulder

Agg.

24 (600)

(150)

18

(150)

6

(4.9 m)

16'-0"

5 % max.

1.5 % min.

4 % min.

pcc shoulder

Agg.

24 (600)

(150)

18

(150)

6

(4.9 m)

16'-0"

5 % max.

1.5 % min.

4 % min.

pcc shoulder

Agg.

24 (600)

(150)

18

(150)

6

(4.9 m)

16'-0"

5 % max.

1.5 % min.

4 % min.

pcc shoulder

Agg.

24 (600)

(150)

18

(150)

6

(4.9 m)

16'-0"

5 % max.

1.5 % min.

4 % min.

pcc shoulder

Agg.

24 (600)

(150)

18

(150)

6

(4.9 m)

16'-0"

5 % max.

1.5 % min.

4 % min.

pcc shoulder

Agg.

24 (600)

(150)

18

(150)

6

(4.9 m)

16'-0"

5 % max.

1.5 % min.

4 % min.

pcc shoulder

Agg.

24 (600)

(150)

18

(150)

6

(4.9 m)

16'-0"

5 % max.

1.5 % min.

4 % min.

pcc shoulder

Agg.

24 (600)

(150)

18

(150)

6

(4.9 m)

16'-0"

5 % max.

1.5 % min.

4 % min.

pcc shoulder

Agg.

24 (600)

(150)

18

(150)

6

(4.9 m)

16'-0"

5 % max.

1.5 % min.

4 % min.

pcc shoulder

Agg.

24 (600)

(150)

18

(150)

6

(4.9 m)

16'-0"

5 % max.

1.5 % min.

4 % min.

pcc shoulder

Agg.
DETAILS FOR DRAINAGE IN NEUTRAL AREA

1. Vertical offsets 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. = Superelevation Rate

GENERAL NOTES

The initial ramp grade (G) is based on the line generated through the PI that is 205' (62 m) tangent section. 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'-0" (43 m) tangent section.

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

**THICKNESS** - "t" = Thickness of Pavement.

- See Standard 420001 for pavement joint details not shown.
- See Standard 610001 for shoulder inlet with curb when required.
- See plans for details of bridge approach slab, approach footing and joint treatment.
- All dimensions are in inches (millimeters) unless otherwise shown.

**PAVEMENT CONNECTOR (PCC)**

**FOR BRIDGE APPROACH SLAB**

**STANDARD 420401-13**

**PLAN**

**NEW CONSTRUCTION**

- Variable 15'-0" (4.57 m) min.
- Limit of pavement connector
- Welded wire reinforcement (WWR) 1
- Limit of pavement connector
- Variable 15'-0" (4.57 m) min.
- Approach footing

**EXISTING CONSTRUCTION**

- Variable 15'-0" (4.57 m) min.
- Shoulder
- Existing shoulder
- Approach footing

**SECTION A-A**

- New pavement
- Existing pavement
- Improved subgrade
- See roadway plans.

**SECTION B-B**

- WWR shall be 0.11 sq. in./ft. (230 sq. mm/m) in both directions. Maximum wire spacing shall be 6 (150).
- Minimum lap distance shall be two cross wires.

- WWR shown.
- 2 (50) Transverse expansion joint. Omit when new payment is flexible.
- Improved subgrade, see roadway plans.

**REVISIONS**

1-1-19
- Changed rebar in pavement connector to welded wire reinforcement.

4-1-16
- Revised pavement connector
- New pavement connector
- New engineering.

**DATE**

1-1-19

**APPROVED**

2019

**ISSUED**

1-1-97
Limit of pavement connector
for bridge approach slab

Shoulder

Approach Footing

Variable, 10'-0" (3.00 m) min.

20'-0" (6.00 m)

Pavement connector (HMA) for
bridge approach slab

See DETAIL A

SECTION A-A

NEW or EXISTING CONSTRUCTION

GENERAL NOTES

THICKNESS: "T" = Thickness of Pavement.

See Standard 610001 for shoulder inlet with curb
when required.

See plans for details of bridge approach slab and
approach footing.

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

DATE

REVISIONS

4-1-16

New standard

APPROVED

STANDARD 420406

FOR BRIDGE APPROACH SLAB
When clipped bar mats are used, each bar intersection shall be clipped with W1.7 (3.74) wire.

* When the 12 (300) minimum cannot be achieved, the transverse joints shall be extended to either the longitudinal joint or edge of pavement.
See DETAIL A

**LAP DETAIL I**

- Edge of pavement
- #6 (#19) or #7 (#22) Longitudinal bars
- 3 Equal spaces
- 4'-0" (1.2 m)
- #4 (#13) Transverse bars
- 4'-0" (1.2 m) min.
- 10'-0" (3.0 m) max.

**LAP DETAIL II**

- 10'-0" (3.0 m) min.
- 15'-0" (4.5 m) max.

**LAP DETAIL III**

- 36 (900)
- 10'-0" (3.0 m) min.

---

**GENERAL NOTES**

Except as noted or shown, the dimensions and notes specified for LAP DETAIL I are typical for LAP DETAIL II and III.

The dimension and the distance from the end of the transverse bar to the edge of pavement may be increased by 2 (50) for slip form paving.

The minimum length of longitudinal bars shall be 30' (9 m) except as required to establish the lap arrangement selected.

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

---

**BAR REINFORCEMENT**

FOR CRC PAVEMENT

**STANDARD 421001-03**

**English (Inches)**

<table>
<thead>
<tr>
<th>Bar Size</th>
<th>Pavement Thickness</th>
<th>A (Approx. Spacing)</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>#6</td>
<td>7/8 in. Ø6</td>
<td>18 spaces (19 bars) @ 7/8 in.</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#6</td>
<td>5/8 in. Ø6</td>
<td>20 spaces (21 bars) @ 5/8 in.</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#6</td>
<td>9/16 in. Ø10</td>
<td>22 spaces (23 bars) @ 9/16 in.</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#6</td>
<td>11/32 in. Ø12</td>
<td>24 spaces (25 bars) @ 11/32 in.</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#7</td>
<td>5/8 in. Ø6</td>
<td>16 spaces (17 bars) @ 5/8 in.</td>
<td>35</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>#7</td>
<td>9/16 in. Ø10</td>
<td>18 spaces (19 bars) @ 9/16 in.</td>
<td>35</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>#7</td>
<td>11/32 in. Ø12</td>
<td>20 spaces (21 bars) @ 11/32 in.</td>
<td>35</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>#7</td>
<td>13/32 in. Ø14</td>
<td>22 spaces (23 bars) @ 13/32 in.</td>
<td>35</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>#7</td>
<td>15/32 in. Ø16</td>
<td>24 spaces (25 bars) @ 15/32 in.</td>
<td>35</td>
<td>3</td>
<td>26</td>
</tr>
</tbody>
</table>

**METRIC (mm)**

<table>
<thead>
<tr>
<th>Bar Size</th>
<th>Pavement Thickness</th>
<th>A (Approx. Spacing)</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>#19</td>
<td>200 mm Ø22</td>
<td>18 spaces (19 bars) @ 200 mm</td>
<td>90</td>
<td>75</td>
<td>900</td>
</tr>
<tr>
<td>#19</td>
<td>230 mm Ø25</td>
<td>21 spaces (22 bars) @ 230 mm</td>
<td>90</td>
<td>80</td>
<td>900</td>
</tr>
<tr>
<td>#19</td>
<td>260 mm Ø28</td>
<td>24 spaces (25 bars) @ 260 mm</td>
<td>90</td>
<td>80</td>
<td>900</td>
</tr>
<tr>
<td>#19</td>
<td>290 mm Ø31</td>
<td>26 spaces (27 bars) @ 290 mm</td>
<td>90</td>
<td>75</td>
<td>900</td>
</tr>
<tr>
<td>#19</td>
<td>320 mm Ø34</td>
<td>28 spaces (30 bars) @ 320 mm</td>
<td>90</td>
<td>80</td>
<td>900</td>
</tr>
<tr>
<td>#22</td>
<td>230 mm Ø25</td>
<td>21 spaces (22 bars) @ 230 mm</td>
<td>90</td>
<td>75</td>
<td>660</td>
</tr>
<tr>
<td>#22</td>
<td>260 mm Ø28</td>
<td>24 spaces (25 bars) @ 260 mm</td>
<td>90</td>
<td>75</td>
<td>660</td>
</tr>
<tr>
<td>#22</td>
<td>290 mm Ø31</td>
<td>26 spaces (27 bars) @ 290 mm</td>
<td>90</td>
<td>70</td>
<td>660</td>
</tr>
<tr>
<td>#22</td>
<td>320 mm Ø34</td>
<td>28 spaces (30 bars) @ 320 mm</td>
<td>90</td>
<td>75</td>
<td>660</td>
</tr>
<tr>
<td>#22</td>
<td>350 mm Ø37</td>
<td>30 spaces (32 bars) @ 350 mm</td>
<td>90</td>
<td>80</td>
<td>660</td>
</tr>
<tr>
<td>#22</td>
<td>380 mm Ø40</td>
<td>32 spaces (34 bars) @ 380 mm</td>
<td>90</td>
<td>80</td>
<td>660</td>
</tr>
<tr>
<td>#22</td>
<td>410 mm Ø43</td>
<td>34 spaces (36 bars) @ 410 mm</td>
<td>90</td>
<td>80</td>
<td>660</td>
</tr>
</tbody>
</table>

---

**DATE**

4-1-16

**REVISIONS**

4-1-16

Revise general notes with respect to 30° bar length

1-1-08

Switched units to English (inches)

---

**ISSUED**

2016

**APPROVED**

2016

**ENGINEER OF DESIGN AND ENVIRONMENT**

April 1,

**PASSED**

April 1,
Transverse Terminal Joint

SECTION B-B

Transverse Construction Joint

- Stabilized subbase (HMA required) 300 (7.5 m) wide
- End of stabilized shoulder
- Transverse terminal joint
- Transverse construction joint
- Longitudinal sawed joint

Concrete Pad

- (3.0 m) 10'-0" (3.0 m)
- (7.2 m) 24'-0" (7.2 m)
- (2.1 m) 7'-0" (2.1 m)
- (3.6 m) 12'-0" (3.6 m)

Pavement reinforcement

- 24'-0" (7.2 m)
- 12'-0" (3.6 m)
- 12'-0" (3.6 m)

Wood blocking.

General Notes

Sealant components for the wide flange beam terminal joint shall be as follows:

- The sealant shall be Dow Corning 888
- The tape shall be Polyethylene Tape No. 40.
- The primer, used on the metal only, shall be Dow Corning 1200.

See Standards 420001 and 420401 for details of pavement reinforcement.

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

24'-0" (7.2 m)

CRC PAVEMENT

(WITH WIDE FLANGE BEAM TERMINAL JOINT)

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

DATE

REVISIONS

1-1-97

1-1-14

1-1-18

2018

2018

2018
WIDE FLANGE BEAM TERMINAL JOINT

- Bend top flange at beam.
- Cut and remove sufficient material from web and bottom flange of beam to attain the required pavement cross slope.
- Rough finish.
- Use same reinforcement size and spacing as in continuous pavement.

DETAIL OF CUTTING AND WELDING BEAM

- Tape all exposed steel inner expansion joint filler.
- Bond breaker 10 mil (0.25) thick masonite.
- Preformed flexible foam or closed cell plastic expansion joint filler.
- Steel beam and concrete sleeper slab shall match pavement slope.
- Steel beam and concrete sleeper slab shall match pavement slope.
**ENGINEER OF DESIGN AND ENVIRONMENT**

**APPROVED**

**ENGINEER OF POLICY AND PROCEDURES**

**Illinois Department of Transportation**

---

**WIDE FLANGE BEAM TERMINAL JOINT**

- **3 (75) Preformed flexible foam or closed cell plastic expansion joint filler.**
- **Formed 3x12 (3x22) groove (see GROOVE DETAIL).**
- **Tape all exposed steel inner surface (6 layers).**
- **10 mil (0.25) Polyethylene bond breaker on steel trowel finish.**
- **Clip Rem (20x20) (typ.1).**

**DETAIL AT BEAM**

- **35: 11/8 (10.79 m) Beam (See Table).**

**DETAIL OF CUTTING AND WELDING BEAM**

- **Bend top flange of beam.**
- **Cut and remove sufficient material from web and bottom flange of beam to attain the required pavement cross slope.**

**VIEW OF GROOVE AT EDGE OF PAVEMENT**

**OPTIONAL ADJUSTABLE CHAIR**

- **Pavement thickness minus 4/3 (115).**

---

**MATERIALS REQUIRED FOR ONE TRANVERSE TERMINAL JOINT COMPLETE**

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete, cu. yds. (m³)</td>
<td>11.1 (8.1)</td>
<td></td>
</tr>
<tr>
<td>Reinforcement bars, lbs. (kg)</td>
<td>523 (236)</td>
<td></td>
</tr>
<tr>
<td>Pavement reinforcement, sq. yds. (m²)</td>
<td>20 (16.2)</td>
<td></td>
</tr>
</tbody>
</table>

---

**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 (lbs. (kg))</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>4</td>
<td>19'-8&quot; (5.8 m)</td>
<td>16x100 (144.5)</td>
<td>2455 (1115)</td>
</tr>
<tr>
<td>29</td>
<td>5</td>
<td>35'-8&quot; (10.7 m)</td>
<td>16x140 (215.5)</td>
<td>3040 (1360)</td>
</tr>
<tr>
<td>88</td>
<td>6</td>
<td>8'-4&quot; (2.6 m)</td>
<td>16x120 (104.5)</td>
<td>11.1 (8.1)</td>
</tr>
</tbody>
</table>

- Concrete, cu. yds. (m³)
- Reinforcement bars, lbs. (kg)
- Pavement reinforcement, sq. yds. (m²)

---

**CRC PAVEMENT**

**STANDARD 421106-10**

---

**Sheet 2 of 2**

---

**36' (10.8 m)**

---
**MATERIALS REQUIRED FOR CRC PAVEMENT SYSTEM**

(Excluding Pavement Concrete and 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>a</td>
<td>122</td>
<td>No. 8 (No. 25)</td>
<td>14' 0&quot; (4.25 m)</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>18</td>
<td>No. 5 (No. 16)</td>
<td>24' 9&quot; (7.43 m)</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>122</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>15' 9&quot; (4.83 m)</td>
<td></td>
</tr>
</tbody>
</table>

Concrete, cu. yds. (m³): 64.0 (48.9)
Reinforcing Bars, lbs. (kg): 8372 (3800)
Concrete Pad, sq. yds. (m²): 144 (120)
Improved Subgrade, sq. yds. (m²): 162 (135)

---

**ENGINEER OF POLICY AND PROCEDURES**

APPROVED January 1, 2018

**ENGINEER OF DESIGN AND ENVIRONMENT**

ISSUED 1-1-97

PASSED

---

**CRC PAVEMENT**

**(WITH LUG SYSTEM)**

STANDARD 421201-07
36'-0" (10.8 m) 

**SECTION A-A**

**TYPICAL 3-LANE 1-WAY WITH SHOULDERS**

**GENERAL NOTES**

See Standards 420001 and 420401 for details of pavement reinforcement.

See Standards 420001 and 420401 for joint details not shown.

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

---

**DATE**

1-1-18

**REVISIONS**

1-1-18

---

**STANDARD 421206-07**

---

**SECTION B-B**

**TRANSVERSE TERMINAL JOINT**

---

**CRC PAVEMENT**

(WITH LUG SYSTEM)

(With Lug System) Revised

---

**DATE**

1-1-18

**REVISIONS**

1-1-18

---

**GENERAL NOTES**

See Standards 420001 and 420401 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
LUG SYSTEM
(Excluding Pavement Concrete and Pavement Reinforcement)

<table>
<thead>
<tr>
<th>Bar</th>
<th>No.</th>
<th>Size</th>
<th>Length</th>
<th>Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>106</td>
<td>No. 8 (16)</td>
<td>14'-0'' (4.25 m)</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>18</td>
<td>No. 5 (16)</td>
<td>36'-9'' (11.30 m)</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>39</td>
<td>No. 5 (16)</td>
<td>20'-0'' (6.10 m)</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>22</td>
<td>No. 4 (13)</td>
<td>11'-9'' (3.52 m)</td>
<td></td>
</tr>
</tbody>
</table>

Concrete, cu. yds. (m³)
96.0 (73.4)

Reinforcing Bars, lbs. (kg)
12,550 (5695)

Concrete Pad, cu. yds. (m³)
216 (181)

Improved Subgrade, sq. yds. (m²)
208 (174)
Ramps in landscaped area

Setback ≤ 5'

Ramps in paved area

Setback ≤ 5'

SECTION A-A

The running slope of a curb ramp shall be 1:20 min. and 1:12 max. The running slope of a blended transition shall be 1:20 max.

SECTION B-B

The running slope of a curb ramp shall be 1:20 min. and 1:12 max. The running slope of a blended transition shall be 1:20 max.

PERPENDICULAR CURB RAMPS FOR SIDEWALKS

STANDARD 424001-11

See Sheet 2 for GENERAL NOTES.
GENERAL NOTES

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

Where the turning space is constrained on a side opposite a ramp, the minimum length of the turning space in the direction of the ramp-run shall be 3' (1.52 m).

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

Detectable warnings are shown in their ideal locations but the following placement tolerances are allowed.

Side border - Detectable warnings should extend the full width of the walking surface (excluding flared sides) but a border along each side up to 2 in. (50 mm) in width is allowed.

Curb Set-Back - Detectable warnings located at the back of curb should closely align with the curb but a gap up to 6 in. (150 mm) behind the curb is allowed.

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

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

PERPENDICULAR CURB RAMPS

FOR SIDEWALKS

STANDARD 424001-11
GENERAL NOTES

This Standard shall only be used for curb radii of 20 ft (6.1 m) or greater.

Where the turning space is constrained on a side opposite a ramp, the minimum length of the turning space in the direction of the ramp-run shall be 9 ft (1.8 m).

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

Detectable warnings are shown in their ideal locations but the following placement tolerances are allowed.

Side Border - Detectable warnings should extend the full width of the walking surface (excluding tailed sides) but a border along each side up to 2 in. (50 mm) in width is allowed.

Curb Set-Back - Detectable warnings located at the back of curb should closely align with the curb but a gap up to 6 in. (150 mm) behind the curb is allowed.

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

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

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

SECTION A-A

The running slope of a curb ramp shall be 1:20 min. and 1:12 max. The running slope of a blended transition shall be 1:20 max.

DETAIL A

DIAGONAL CURB RAMPS FOR SIDEWALKS

STANDARD 424006-04
Expansion joint

Side curb required

Turning space

5'x5' (152x152 mm) typical, 4'x4' (122x122 mm) min.

Clear space

4'x4' (122x122 mm) min.

Crosswalk

Tracking (opp.)

Depressed curb and gutter

Detectable warning

Sidewalk width = 7' (2.13 m)

Typical, pedestrian access route width 4' (1.22 m) min.

SECTION A-A

The running slope of a curb ramp shall be 1:20 min. and 1:12 max. The running slope of a blended transition shall be 1:20 max.

SECTION B-B

1:50 max.

SIDE CURB DETAIL

GENERAL NOTES

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

Where the turning space is constrained on a side opposite a ramp, the minimum length of the turning space in the direction of the ramp-run shall be 5' (1.52 m).

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

Detectable warnings are shown in their ideal locations but the following placement tolerances are allowed.

- Side Border - Detectable warnings should extend the full width of the walking surface (excluding flared sides) but a border along each side up to 2 in. (50 mm) in width is allowed.
- Curb Set-Back - Detectable warnings located at the back of curb should closely align with the curb but a gap up to 6 in. (150 mm) behind the curb is allowed.

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

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

CORNER PARALLEL CURB RAMPS FOR SIDEWALKS

STANDARD 424011-04

DATE

REVISIONS

1-1-19

Removed upper landing, added blended transition and detectable warning tolerances.

1-1-19

Revised sidewalk width to include 24 in. (600 mm) behind curb.
DEPRESSED CORNER

SECTION A-A

1. The running slope of a curb ramp shall be 1:20 min. and 1:12 max. The running slope of a blended transition shall be 1:20 max.

SECTION B-B

GENERAL NOTES

This standard shall only be used for curb radii of 6 ft. (1.83 m) or greater.

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.

Detectable warnings are shown in their ideal placement but the following placement tolerances are allowed:

| Side Border | Detectable warnings should extend the full width of the walking surface (excluding flared sides) but a border along each side up to 2 in. (50 mm) in width is allowed. |
| Curb Set-Back | Detectable warnings located at the back of curb should closely align with the curb but a gap up to 6 in. (150 mm) behind the curb is allowed. |

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

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

DETAIL A

SIDE CURB DETAIL

DEPRESSED CORNER

FOR SIDEWALKS

STANDARD 424021-05
Ramp (150)
6 top of sidewalk roadway curb and Flush with top of
2 (50) R Variable thickness Ramp areas landscaped
Side curb in 1:50 max. crossing Pedestrian 1:10 max.
alley return Entrance or
1:50 max. Pedestrian crossing
1:50 max. Entrance or
1:50 max. Pedestrian crossing
1:50 max. Entrance or
Sidewalk width 5' (1.52 m) typical, 4' (1.22 m) min.

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.
Detectable warnings are shown in their ideal locations but the following placement tolerances are allowed:

Side Border - Detectable warnings should extend the full width of the walking surface (excluding tiered sides) but a border along each side up to 2 in. (50 mm) in width is allowed.

Curb Set-Back - Detectable warnings located at the back of curb should closely align with the curb but a gap up to 6 in. (150 mm) behind the curb is allowed.

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

Iliinois Department of Transportation 2019
APPROVED
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED 1-1-12
ENGINEER OF POLICY AND PROCEDURES
DATE
REVISIONS
SECTION A-A

Omit detectable warnings when distance between back of curbs is less than 6" (1.83 m).

GENERAL NOTES

All slope notes 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.

Detectable warnings are shown in their ideal locations but the following placement tolerances are allowed.

Side Border - Detectable warnings should extend the full width of the walking surface (excluding turn-in sides) but a border along each side up to 2 in. (50 mm) in width is allowed.

Curb Set-Back - Detectable warnings located at the back of curb should closely align with the curb but a gap up to 6 in. (150 mm) behind the curb is allowed.

See Standard 606001 for details of depressed curb locations but the following placement tolerances are allowed.

All dimensions are in inches (millimeters) unless otherwise shown.
### PAVEMENT SAWING DETAIL

**HMA SHOULDER**

- **Partial depth saw cut**
- **Wheel saw cut (optional)**
- **Center section**
- **Tight transverse crack**
- **Shoulder removal**

**Interior saw cut**

**End section**

**Pavement edge**

**Full depth saw cut**

**Wheel saw cut**

**Interior saw cut**

**Partial depth saw cut**

**Tight transverse crack**

**Hand removal**

**Saw cut full length of patch**

### ALTERNATE SAWING DETAIL

**PCC SHOULDER**

- **Partial depth saw cut**
- **Wheel saw cut (optional)**
- **Center section**
- **Tight transverse crack**
- **Subbase**

**Interior saw cut**

**End section**

**Full depth saw cut**

**Wheel saw cut**

**Interior saw cut**

**Partial depth saw cut**

**Tight transverse crack**

### 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.

### REINFORCEMENT BARS

<table>
<thead>
<tr>
<th>No.</th>
<th>4&quot; (100)</th>
<th>5&quot; (125)</th>
<th>5-1/2&quot; (140)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1/6&quot;</td>
<td>1/4&quot;</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>8</td>
<td>1/4&quot;</td>
<td>1/2&quot;</td>
<td>5/8&quot;</td>
</tr>
<tr>
<td>12</td>
<td>3/8&quot;</td>
<td>7/16&quot;</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>16</td>
<td>1/2&quot;</td>
<td>5/16&quot;</td>
<td>5/8&quot;</td>
</tr>
</tbody>
</table>

### DATE

| 1-1-08 | Revised General Notes |

### STANDARD 442001-04

(Revised General Notes)

(Classes of Patching Materials)

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-08</td>
<td>Revised General Notes</td>
</tr>
</tbody>
</table>
Edge of lane

No. 6 (No. 19) rebar

Transverse rebar will be tied to longitudinal rebar.

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

**SHOULDER REMOVAL**

Existing pavement edge.

**REBAR**

Bars at 12 (300) cts.

**SUBBASE**

2 (50) min. cl.

**PAVEMENT REINFORCEMENT DETAIL**

**PATCHING DETAIL**

* 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.

*** Variable: Where $S_1$ and $S_2$ are 2\(\phi\) (65) min. and 12 (300) max; $D_1 = 2(5S_1)$ and $D_2 = 2(5S_2)$.**
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 welded wire reinforcement.

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

Class B Patches

Dowel Bar Table

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Diameter</th>
<th>Hole Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 (250) or greater</td>
<td>1 3/8 (35)</td>
<td>1 3/4 (41)</td>
</tr>
<tr>
<td>8 (200 thru 99 (249)</td>
<td>1 3/8 (32)</td>
<td>1 3/4 (41)</td>
</tr>
<tr>
<td>Less than 8 (200)</td>
<td>3 (25)</td>
<td>1 3/4 (41)</td>
</tr>
</tbody>
</table>

January 1, 2019

Illinois Department of Transportation

Split A

Revised Dowel Bar Table.

Revised Reference to Standard 420701 in General Notes.

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

PASSED

DATE

REVISIONS

1-1-19

1-1-18

CLASS B PATCHES

STANDARD 442101-09
See sealing details

*Traffic*

METHOD I

(WITHOUT RESURFACING)

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

6'-0" (1.8 m) min.

6'-0" (1.8 m) min.

METHOD II

(WITH RESURFACING)

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

6'-0" (1.8 m) min.

*NOTE*

* 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 B PATCHES

STANDARD 442101-09
Longitudinal joints shall be as detailed on Standard 420001, except:
Note: Longitudinal joints shall be as detailed on Standard 420001, except: tie bars are not required for patches 20'-0" (6.0 m) or less in length.

Existing tie bars shall be either cut or removed. Marginal bars shall be cut.

All dimensions are in inches (millimeters) unless otherwise shown.
Flexible pavement
variable thickness

Slope 1.5%

Improved subgrade

Subbase granular material, Type C.

HMA shoulder

Slope 4%

Aggregate shoulder Type B

Variable slope

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)

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

SHOULDER FOR SUPERELEVATED PAVEMENT
(INSIDE OF CURVE)

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.

DATE
REVISIONS
1/1/08
Switched units to English (metric).
1/1/07
Switched to Hot-Mix Asphalt (HMA), terminology.

HMA SHOULDER ADJACENT TO FLEXIBLE PAVEMENT

STANDARD 482001-02
**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 the pavement and shoulder will not be greater than 8%.

**SHOULDER FOR SUPERELEVATED PAVEMENT (OUTSIDE OF CURVE)**

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

**SHOULDER FOR SUPERELEVATED PAVEMENT (INSIDE OF CURVE)**

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 unit of horizontal displacement (V:H).

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

5'-0'' (1.5 m) min.

The shoulder slope may be broken at this line to 4%.

5'-0'' (1.5 m) min.

See Note 3

SHOULDER FOR SUPERELEVATED PAVEMENT

OUTSIDE OF CURVE

The shoulder slope shall be the same as the superelevation rate but not less than 4%.

5'-0'' (1.5 m) min.

See Note 3

SHOULDER FOR SUPERELEVATED PAVEMENT

INSIDE OF CURVE

Notes:

Note 1: Does not apply when sub-surface 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 this 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 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 the pavement and shoulder slopes will not be greater than 8%.

GENERAL NOTES

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

Transverse expansion joints shall be as detailed on Standard 420001 except that down bars will not be required.

See Standard 420001 for details not shown.

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

DATE
REVISIONS
1-1-18
Modified PL/A view

1-1-08
Switched units to English (metric)

1-1-97

PCC SHOULDER

STANDARD 483001-05
MULTI-SPAN CULVERTS
(Unless otherwise noted on the plans, name plates are not required for structures less than 20' (6.1 m) in length)

PLATE NAME

Place on back side of 12' (3000) rail.

1. Place on back side of 12' (3000) rail.

2. 9 (225) min. to 36 (900) max. Space to miss rail post.

STEEL RAILS

PARAPET
(Typical)

Name Plate

Brace to diagonal about 5'-0" (1.5 m) above bridge deck

NAME PLATE

PIERS ON FGI ROUTES

For column type piers, Q of column nearest approaching traffic. For solid piers, 3'-0" is from end of pier closest to approaching traffic.

GENERAL NOTES
On one-way traffic structures, place name plate on right side of approach end. On two-way traffic structures, place name plate on right side of approach end with passing in the direction of increasing stationing.

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

DATE REVISIONS
1-1-20 Revised I-shape to constant slope parapet
1-1-09 Switched units to English (metric)
1-1-02 Added pier details
1-1-02 Removed Placement note on sh. 2
1-1-02 Added brace note on sh. 1

STANDARD 515001-04
SEE DESIGN PLANS FOR LETTERING

Center of \( \frac{3}{4} \) (12) dia. holes for bolts when required

NOTE:
Border and lettering.
Raised \( \frac{3}{8} \) (3), square cut and not tapered.

NAME PLATE FOR BRIDGES

STANDARD 515001-04
This dimension shall be increased by 1½ (38) for Culvert end section ties or mid-height of one section joint, typ.

GENERAL NOTES

This Standard is for use with single pipe culverts and multiple culvert installations. For multiple culvert installations, place the end sections side-by-side leaving a 3-½" space between adjacent and section walls and fill the space with Class 51 concrete.

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.

See roadway plans for slope (V:H) and pipe inside diameter.

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

2½ x 3½ x ½ 156 x 88 x 8 plate washers shall be provided under each end required for the anchor rods. Holes in the wall for the culvert tie assembly may be drilled using core bits in lieu of formed holes.

See Standard 54231 for end sections having traversable pipe gaskets.

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.

CONCRETE END SECTIONS FOR PIPE CULVERTS

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

DATE REVISIONS

STANDARD 542001-06

(Sheet 1 of 31)
**LONGITUDINAL SECTION**  
(Showing bottom slab and backwall reinforcement.)

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

<table>
<thead>
<tr>
<th>Pipe I.D.</th>
<th>Bar Size</th>
<th>Bar Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (75) cl. typ.</td>
<td>#4 (13)</td>
<td>12 (300) cts. max.</td>
</tr>
<tr>
<td>1-#5 (16) bars for each face</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-#5 (16) bars at 12 (300) cts., for pipe diameter &gt; 48 (1200), typ. each face</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SECTION C-C**

**REINFORCEMENT SCHEDULE**

<table>
<thead>
<tr>
<th>Pipe I.D.</th>
<th>Bar Size</th>
<th>Bar Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (75) cl. typ.</td>
<td>#4 (13)</td>
<td>12 (300) cts. max.</td>
</tr>
<tr>
<td>1-#5 (16) bars for each face</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-#5 (16) bars at 12 (300) cts., for pipe diameter &gt; 48 (1200), typ. each face</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SECTION D-D**

**LAP DIMENSION**

- #4 (13) bar ± 17 (425)
- #6 (19) bar ± 25 (625)
- #8 (21) bar ± 33 (750)
- #10 (26) bar ± 42 (1050)
- #12 (30) bar ± 54 (1350)
- #14 (37) bar ± 66 (1650)
- #16 (41) bar ± 84 (2100)

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

**CONCRETE END SECTIONS FOR PIPE CULVERTS**

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

(Sheet 2 of 3)
### Quantities

<table>
<thead>
<tr>
<th>Pipe No.</th>
<th>Concrete yd/cu ft</th>
<th>Reinforcement Without Lap lbs (kg)</th>
<th>Reinforcement With Lap lbs (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Slope of End Section</td>
<td>Slope of End Section</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>1.1</td>
<td>2.6</td>
<td>3.5</td>
</tr>
<tr>
<td>21</td>
<td>1.3</td>
<td>3.8</td>
<td>5.2</td>
</tr>
<tr>
<td>40/50</td>
<td>0.8</td>
<td>2.5</td>
<td>3.5</td>
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### Notes
- **Concrete yd/cu ft**
- **Reinforcement Without Lap lbs (kg)**
- **Reinforcement With Lap lbs (kg)**

---

**Concrete End Sections for Pipe Culverts**

15" (375 mm) thru 84" (2100 mm) Dia.

*Sheet 3 of 3*

**STANDARD 542001-06**
### PIPE CULVERT END SECTION DIMENSIONS

<table>
<thead>
<tr>
<th>Equivalent Round Size</th>
<th>Pipe Span</th>
<th>Pipe Rise</th>
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<th>B</th>
<th>C</th>
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### PIPE CULVERTS 15" (375 mm)

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**Notes:**
- The concrete end sections for elliptical pipe culverts 15" (375 mm) through 72" (1800 mm) equivalent diameter are shown on Sheet 3 for General Notes.
LONGITUDINAL SECTION

SECTION B-B

SECTION C-C

SECTION D-D

TIE PLATE DETAIL

REINFORCEMENT SCHEDULE

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

STANDARD 542011-02
For cast-in-place construction, increase concrete volumes by approximately 13%.

### Quantities

<table>
<thead>
<tr>
<th>Pipe I.D. (in.)</th>
<th>Pipe I.D. (mm)</th>
<th>Reinforcement Without Lap lbs. (kg)</th>
<th>Reinforcement With Lap lbs. (kg)</th>
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<td>12 (315)</td>
<td>2.4 (60)</td>
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<td>14 (350)</td>
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<td>16 (410)</td>
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<td>48 (1200)</td>
<td>14.0 (356)</td>
<td>1980 (891.1)</td>
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### General Notes

This Standard is used with single pipe culverts and multi-pipe culvert installations. If the end sections are to be placed in a 3:1 ratio, use the sections placed next to the end sections placed at an angle of 90 degrees with respect to the end section. The length and number of precast sections required to construct the end section shall be determined by the Contractor.

See roadway plans for slope (V:1) and pipe inside diameter. The end sections may be placed up to 15 degrees skew to the roadway. Holes in the walls for the culvert tie rods shall be provided as shown on the plans. 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.

See Standard 5423-01 for end sections having traversable pipe grate. All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:1). All dimensions are in inches (millimeters) unless otherwise shown.

---

**Standard 5420-01**

**Concrete End Sections for Elliptical Pipe Culverts 15" (375 mm) Through 72" (1800 mm) Equivalent Diameter**

(Sheet 3 of 3)
culvert Pipe

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

For a 1:1 slope, wings are not required.

No. 2 - No. 5 (No. 16) h1 bars, or 1:2 slope.

BAR - h1 Bent in field, two req. for each headwall.

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

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.

PLAN

SECTION A-A

END VIEW

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.

REINFORCED CONCRETE END SECTIONS
FOR PIPE CULVERTS
15' (375 mm) THRU 36' (900 mm) DIA.
SKewed with roadway
(Sheet 1 of 5)

DATE REVISIONS
1-1-09 Switched units to English metrics.
1-1-07 Soft converted metric reinforcement bars.
Added h1 bars

STANDARD 542201-02
### Dimensions for Concrete

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### Reinforcement for Concrete End Sections

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#### 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**

**11° (305 mm) Thru 12° (305 mm) Dia.**

---

**REINFORCED CONCRETE END SECTIONS**

FOR PIPE CULVERTS

---

**STANDARD 542201-02**
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Reinforced Concrete End Sections

For Pipe Culverts

15° (375 mm) THRU 36° (900 mm) Dia.
SKEWED WITH ROADWAY

Sheet 3 of 5

STANDARD 542201-02
**WINGS FOR 1:2 SLOPE**

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**STANDARD 542201-02**

**FOR PIPE CULVERTS**
## WINGS FOR 1:2 SLOPE

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### REINFORCED CONCRETE END SECTIONS (Sheet 5 of 5)

**Note:** Dimensions are in inches and feet. The tolerances for the concrete sections are ±1%.
Provide wings for 1:2 slope. If the embankment slope above the headwall is flatter than 1:2, provide wings for 1:3 slope.

Use two layers of welded wire reinforcement in back face of wings.

**GENERAL NOTES**

Build tops of headwalls parallel to grade line.

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

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.

### REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS

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

**DATE** | **REVISIONS**
--- | ---
6-1-16 | Changed terminology to welded wire reinforcement.
1-1-14 | Corrected skew angles in table on Sheet 5.

STANDARD 542206-04
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## ENGINEER OF BRIDGES AND STRUCTURES

### APPROVED

### ENGINEER OF DESIGN AND ENVIRONMENT

---

**PLAN**

- **End connection to fit pipe used.**

- **Slope**

- **Same reinforcement as outer cage.**

- **Standard reinforcement for concrete Class II, Wall B, reinforced concrete pipe.**

- **Precast or cast in place end block.**

---

**SECTION A-A**

- **End View**

---

**END VIEW**

- **Optional 24 bar dia. min. splice.**

---

### 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.

---

### PRECAST REINFORCED CONCRETE FLARED END SECTION

- **DATE**

- **REVISIONS**

- **STANDARD 542301-03**
**End connection to fit pipe used.**

**Plan**

- 2 - No. 4 (No. 13) bars
- Slope
- Span
- A
- B
- C
- D
- E
- H
- A
- R₁
- R₂
- APPROX. SLOPE

**Table: REINFORCEMENT LAP**

<table>
<thead>
<tr>
<th>Span</th>
<th>Rise</th>
<th>Equiv. Dia.</th>
<th>Wall</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>H</th>
<th>A</th>
<th>R₁</th>
<th>R₂</th>
<th>APPROX. SLOPE</th>
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<td>73</td>
<td>16</td>
<td>18</td>
<td>70</td>
<td>8</td>
<td>20</td>
<td>36</td>
<td>1.43 m</td>
<td>0.6'</td>
<td>36</td>
<td>94</td>
<td>5%</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>50</td>
<td>19</td>
<td>24</td>
<td>43</td>
<td>5</td>
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<td>38</td>
<td>24</td>
<td>30</td>
<td>50</td>
<td>6</td>
<td>6'</td>
<td>24</td>
<td>1.32 m</td>
<td>0.6'</td>
<td>36</td>
<td>95</td>
<td>5%</td>
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<td>36</td>
<td>81</td>
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<td>1.1'</td>
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<td>96</td>
<td>5%</td>
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<td>53</td>
<td>34</td>
<td>42</td>
<td>108</td>
<td>10</td>
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<td>3.52 m</td>
<td>1.5'</td>
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<td>97</td>
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<td>10</td>
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<td>43</td>
<td>54</td>
<td>135</td>
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<td>12</td>
<td>36</td>
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<td>98</td>
<td>5%</td>
<td>12</td>
<td>12</td>
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<td>76</td>
<td>50</td>
<td>60</td>
<td>162</td>
<td>14</td>
<td>14</td>
<td>36</td>
<td>7.72 m</td>
<td>5.1'</td>
<td>36</td>
<td>99</td>
<td>5%</td>
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<td>57</td>
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<td>189</td>
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<td>16</td>
<td>36</td>
<td>9.82 m</td>
<td>7.1'</td>
<td>36</td>
<td>100</td>
<td>5%</td>
<td>16</td>
<td>16</td>
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<tr>
<td>100</td>
<td>64</td>
<td>70</td>
<td>216</td>
<td>18</td>
<td>18</td>
<td>36</td>
<td>12.0 m</td>
<td>9.9'</td>
<td>36</td>
<td>101</td>
<td>5%</td>
<td>18</td>
<td>18</td>
</tr>
</tbody>
</table>

**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 noted.

**End View**

- Optional welded wire reinforcement lap (See detail)

**Standard 542306-03**

**CONCRETE ELLIPTICAL FLARED END SECTION**

**Date: 4-1-16**

- Changed terminology to "welded wire reinforcement."
- Corrected min. lap dimension.
- Switched units to English (metric).
Steel anchor pipe details not shown. (See Detail A for dimensions and intermediate space at 2'-0" (600 mm) max.)

**LONGITUDINAL SECTION**

* Provide intermediate support for grate pipe lengths > 20'-0" (6.00 m)

**PLAN VIEW**

* Provide intermediate support

**VIEW A-A**

- 2 thru bolts w/ (19) Ø anchor rods
- 2 hardened washers
- (19) Ø thru bolts
- (63 x 63 x 8) ¢ washer
- (13) Ø
- (22) Ø hole
- (19) Ø bolt
- (38) 2 hardened washers
- (100 x 100 x 9 x 75) x 3
- (100 x 100 x 9 x 75) x 3
- (100 x 100 x 9 x 75) x 3

**SECTION B-B**

Steel anchor pipe

**SECTION D-D**

- Measured perpendicular to top of culvert wall. In addition, measured horizontally from any vertical joints necessary for construction of the culvert end section.

**VIEW C-C**

- (19) Ø bolt
- (63 x 63 x 8) ¢ washer

**DETAIL B**

- (13) Ø
- (22) Ø hole
- (19) Ø bolt
- (100 x 100 x 9 x 75) x 3

**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 2½ (65) unless noted otherwise.

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

**TRAVERSABLE PIPE GRATE FOR CONCRETE END SECTIONS**

**DATE**

1-1-97

**REVISIONS**

1-1-97 Corrected typo.

4-1-16 Corrected typo.

Illinois Department of Transportation

APPROVED

1-1-97

ENGINEER OF BRIDGES AND STRUCTURES

APPROVED

1-1-97

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

STANDARD 542311-07

(Sheet 1 of 2)
### PIPE-GRATE SCHEDULE FOR PIPE CULVERT END SECTIONS

<table>
<thead>
<tr>
<th>Pipe</th>
<th>Main Pipe No. / Length</th>
<th>Int. Support No. / Length</th>
<th>Total Length of Pipe</th>
<th>Main Pipe No. / Length</th>
<th>Int. Support No. / Length</th>
<th>Total Length of Pipe</th>
<th>Main Pipe No. / Length</th>
<th>Int. Support No. / Length</th>
<th>Total Length of Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>2 @ (7.95 m)</td>
<td>N/A</td>
<td>(20.50 m)</td>
<td>2 @ (12.15 m)</td>
<td>N/A</td>
<td>(27.30 m)</td>
<td>2 @ (17.95 m)</td>
<td>N/A</td>
<td>(28.30 m)</td>
</tr>
<tr>
<td>30</td>
<td>2 @ (9.75 m)</td>
<td>N/A</td>
<td>(21.15 m)</td>
<td>2 @ (11.54 m)</td>
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<td>(27.14 m)</td>
<td>2 @ (18.15 m)</td>
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<td>(29.30 m)</td>
</tr>
<tr>
<td>32</td>
<td>2 @ (12.15 m)</td>
<td>N/A</td>
<td>(32.30 m)</td>
<td>2 @ (13.54 m)</td>
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<td>2 @ (20.15 m)</td>
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<td>(37.30 m)</td>
</tr>
<tr>
<td>55</td>
<td>2 @ (16.87 m)</td>
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<td>(57.14 m)</td>
<td>2 @ (19.56 m)</td>
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<td>(68.56 m)</td>
<td>2 @ (26.15 m)</td>
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<td>(65.30 m)</td>
</tr>
<tr>
<td>36</td>
<td>2 @ (19.36 m)</td>
<td>N/A</td>
<td>(87.48 m)</td>
<td>2 @ (19.36 m)</td>
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<td>2 @ (27.15 m)</td>
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<td>(87.48 m)</td>
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<tr>
<td>37</td>
<td>2 @ (20.95 m)</td>
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<td>(107.90 m)</td>
<td>2 @ (20.05 m)</td>
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<td>(107.95 m)</td>
<td>2 @ (29.15 m)</td>
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<td>(107.95 m)</td>
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### PIPE-GRATE SCHEDULE FOR ELLIPTICAL PIPE CULVERT END SECTIONS

<table>
<thead>
<tr>
<th>Pipe</th>
<th>Main Pipe No. / Length</th>
<th>Int. Support No. / Length</th>
<th>Total Length of Pipe</th>
<th>Main Pipe No. / Length</th>
<th>Int. Support No. / Length</th>
<th>Total Length of Pipe</th>
<th>Main Pipe No. / Length</th>
<th>Int. Support No. / Length</th>
<th>Total Length of Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>1 @ (8.27 m)</td>
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<td>(15.67 m)</td>
<td>1 @ (11.2 m)</td>
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<td>(19.2 m)</td>
<td>1 @ (15.75 m)</td>
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<td>(15.75 m)</td>
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<tr>
<td>84</td>
<td>2 @ (4.34 m)</td>
<td>N/A</td>
<td>(12.68 m)</td>
<td>2 @ (4.34 m)</td>
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<td>2 @ (4.34 m)</td>
<td>N/A</td>
<td>(12.68 m)</td>
</tr>
<tr>
<td>48</td>
<td>3 @ (9.68 m)</td>
<td>N/A</td>
<td>(32.04 m)</td>
<td>3 @ (4.34 m)</td>
<td>N/A</td>
<td>(32.04 m)</td>
<td>3 @ (4.34 m)</td>
<td>N/A</td>
<td>(32.04 m)</td>
</tr>
<tr>
<td>101</td>
<td>2 @ (9.01 m)</td>
<td>N/A</td>
<td>(18.02 m)</td>
<td>2 @ (9.01 m)</td>
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<td>(18.02 m)</td>
<td>2 @ (9.01 m)</td>
<td>N/A</td>
<td>(18.02 m)</td>
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<tr>
<td>1200</td>
<td>3 @ (8.15 m)</td>
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<td>(30.45 m)</td>
<td>3 @ (8.15 m)</td>
<td>N/A</td>
<td>(30.45 m)</td>
<td>3 @ (8.15 m)</td>
<td>N/A</td>
<td>(30.45 m)</td>
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### TABLE

<table>
<thead>
<tr>
<th>PIPE OIA</th>
<th>THICKNESS</th>
<th>A</th>
<th>B</th>
<th>M</th>
<th>L</th>
<th>W</th>
<th>BODY</th>
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<td>(64)</td>
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<td>(64)</td>
<td>Type 4</td>
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<td>(67)</td>
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<td>(64)</td>
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<td>(64)</td>
<td>(71)</td>
<td>(64)</td>
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<td>(64)</td>
<td>(68)</td>
<td>(64)</td>
<td>(73)</td>
<td>(64)</td>
<td>Type 4</td>
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<td>(4.27)</td>
<td>(64)</td>
<td>(68)</td>
<td>(64)</td>
<td>(74)</td>
<td>(64)</td>
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<td>(75)</td>
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<td>(68)</td>
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<td>(68)</td>
<td>(64)</td>
<td>(78)</td>
<td>(64)</td>
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<tr>
<td>(900)</td>
<td>(4.27)</td>
<td>(64)</td>
<td>(68)</td>
<td>(64)</td>
<td>(79)</td>
<td>(64)</td>
<td>Type 4</td>
</tr>
<tr>
<td>(960)</td>
<td>(4.27)</td>
<td>(64)</td>
<td>(68)</td>
<td>(64)</td>
<td>(80)</td>
<td>(64)</td>
<td>Type 4</td>
</tr>
</tbody>
</table>

### NOTES

1. Types 1 and 2 for pipes with annular ends only.

2. Type 3 connection may be used for all pipe sizes and includes 12 (300) of the pipe length. The connector section shall be attached to the end section by rivets or bolts and shall be the same metal thickness as the end section. Stub shall be either 25 (68) pitch x (13) depth or (3) pitch x 1 (26) depth annular corrugated pipe.

3. Type 4 connection can be used for all pipe sizes. Coupler shall be 35 x 10 (68 x 3) dimple, hugger, or annular band of 3x1 (75x25). The dimple, hugger, or annular band may be used with corrugated metal pipes having annular ends. For corrugated metal pipes having holical ends, only the dimple band will be allowed.

**All dimensions are in inches (millimeters)**.
### TYP. ARCH DIMENSIONS

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<th>DIMENSIONS</th>
<th>SLOPE</th>
<th>BODY</th>
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<td>17</td>
<td>(1956)</td>
<td>0.064</td>
<td>1 Pc.</td>
</tr>
<tr>
<td>(432)</td>
<td>(253)</td>
<td>(0.63)</td>
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</tr>
<tr>
<td>21</td>
<td>(2108)</td>
<td>0.064</td>
<td>1 Pc.</td>
</tr>
<tr>
<td>(533)</td>
<td>(383)</td>
<td>(0.63)</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>(2108)</td>
<td>0.056</td>
<td>1 Pc.</td>
</tr>
<tr>
<td>(610)</td>
<td>(457)</td>
<td>(0.63)</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>(2711)</td>
<td>0.056</td>
<td>1 Pc.</td>
</tr>
<tr>
<td>(610)</td>
<td>(508)</td>
<td>(0.63)</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>(609)</td>
<td>0.077</td>
<td>1 Pc.</td>
</tr>
<tr>
<td>(1245)</td>
<td>(705)</td>
<td>(0.20)</td>
<td></td>
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<tr>
<td>52</td>
<td>(2678)</td>
<td>0.077</td>
<td>1 Pc.</td>
</tr>
<tr>
<td>(1448)</td>
<td>(705)</td>
<td>(0.20)</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>(1956)</td>
<td>0.100</td>
<td>2 Pc.</td>
</tr>
<tr>
<td>(533)</td>
<td>(383)</td>
<td>(0.27)</td>
<td></td>
</tr>
<tr>
<td>57</td>
<td>(1248)</td>
<td>0.100</td>
<td>2 Pc.</td>
</tr>
<tr>
<td>(610)</td>
<td>(457)</td>
<td>(0.27)</td>
<td></td>
</tr>
<tr>
<td>64</td>
<td>(2108)</td>
<td>0.100</td>
<td>2 Pc.</td>
</tr>
<tr>
<td>(1448)</td>
<td>(705)</td>
<td>(0.20)</td>
<td></td>
</tr>
<tr>
<td>72</td>
<td>(2108)</td>
<td>0.138</td>
<td>3 Pc.</td>
</tr>
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<td>(1448)</td>
<td>(705)</td>
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</tr>
<tr>
<td>77</td>
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<td>0.168</td>
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<td>(705)</td>
<td>(0.27)</td>
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<td>83</td>
<td>(2108)</td>
<td>0.168</td>
<td>3 Pc.</td>
</tr>
<tr>
<td>(1448)</td>
<td>(705)</td>
<td>(0.27)</td>
<td></td>
</tr>
</tbody>
</table>

### NOTES

For the 77x52 (1956x1321) and 83x57 (2108x1448) sizes, reinforced edges shall be supplemented with 2x2x (51x51x6.4) stiffener angles. The angles shall be attached by % (M10) rivets or bolts.

Angle reinforcement shall be placed under the center panel seams on the 77x52 (1956x1321) and 83x57 (2108x1448) sizes.

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

### METAL FLARED END SECTIONS FOR PIPE ARCHES

### STANDARD 542406-03

**TYPE 1**

*For 17x13 (432x330) thru 28x20 (711x508) only*  
(See Note 1)

**TYPE 2**

*For 27x13 (452x330) thru 57x13 (1448x1448) only*  
(See Note 2)

**TYPE 3**

(See Note 3)

**TYPE 4**

(See Note 3)

### CONNECTIONS OF END SECTIONS

**METAL FLARED END SECTIONS FOR PIPE ARCHES**

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-16</td>
<td>Renamed standard</td>
</tr>
<tr>
<td>4-1-16</td>
<td>Revised THICKNESS values in table</td>
</tr>
</tbody>
</table>

**CONNECTIONS OF END SECTIONS**

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 arch sizes and includes 12 (300) of the pipe length. The annular connector section 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 helical ends, only the dimple type coupling band shall be used.

3. **TYPE 4 connection** can be used with all pipe arch sizes. The end section band shall be either a dimple, hugger, 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.
METAL END SECTIONS FOR ROUND PIPE CULVERT

**TABLE 1.**

<table>
<thead>
<tr>
<th>PIPE DIA. (in)</th>
<th>METAL THICK. (mm)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>METAL END SECTIONS</th>
<th>L</th>
<th>SLOPE 1:4</th>
<th>SLOPE 1:6</th>
</tr>
</thead>
<tbody>
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<td>15 (375)</td>
<td>1.63</td>
<td>10</td>
<td>150</td>
<td>225</td>
<td>320</td>
<td>57</td>
<td>37</td>
<td>50</td>
</tr>
<tr>
<td>16 (400)</td>
<td>1.63</td>
<td>10</td>
<td>150</td>
<td>225</td>
<td>320</td>
<td>57</td>
<td>37</td>
<td>50</td>
</tr>
<tr>
<td>18 (450)</td>
<td>1.63</td>
<td>10</td>
<td>150</td>
<td>225</td>
<td>320</td>
<td>57</td>
<td>37</td>
<td>50</td>
</tr>
<tr>
<td>20 (500)</td>
<td>1.63</td>
<td>10</td>
<td>150</td>
<td>225</td>
<td>320</td>
<td>57</td>
<td>37</td>
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</tr>
<tr>
<td>24 (600)</td>
<td>1.63</td>
<td>10</td>
<td>150</td>
<td>225</td>
<td>320</td>
<td>57</td>
<td>37</td>
<td>50</td>
</tr>
<tr>
<td>30 (750)</td>
<td>1.38</td>
<td>8</td>
<td>120</td>
<td>180</td>
<td>240</td>
<td>43</td>
<td>44</td>
<td>50</td>
</tr>
<tr>
<td>36 (900)</td>
<td>1.38</td>
<td>8</td>
<td>120</td>
<td>180</td>
<td>240</td>
<td>43</td>
<td>44</td>
<td>50</td>
</tr>
<tr>
<td>42 (1050)</td>
<td>1.38</td>
<td>8</td>
<td>120</td>
<td>180</td>
<td>240</td>
<td>43</td>
<td>44</td>
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</tr>
<tr>
<td>48 (1200)</td>
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<td>8</td>
<td>120</td>
<td>180</td>
<td>240</td>
<td>43</td>
<td>44</td>
<td>50</td>
</tr>
<tr>
<td>54 (1350)</td>
<td>1.38</td>
<td>8</td>
<td>120</td>
<td>180</td>
<td>240</td>
<td>43</td>
<td>44</td>
<td>50</td>
</tr>
<tr>
<td>60 (1500)</td>
<td>1.38</td>
<td>8</td>
<td>120</td>
<td>180</td>
<td>240</td>
<td>43</td>
<td>44</td>
<td>50</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

See roadway plans for slope (V:H) and pipe diameter.

Provide traversable pipe grate when specified.

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

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

**CONNECTIONS OF END SECTION**

- Bolt surfaces together (typ.)
- Edge of sidewall sheet rolled against steel rod
- Top of end section to fit pipe

**SECTION A-A**

- Reinforced edge full
- Toe plate
- Side lug shall be bolted to end section

**SECTION B-B**

- Sloped metal end sections
- Corrugation sized to fit pipe

**END SECTION PERSPECTIVE VIEW**

**PLAN**

- Overall width
- Pipe diameter
- End view
- Elevations

**ELEVATION**

- Overall width
- Pipe diameter

**END SECTION**

- Toe plate
- Bolt surfaces together (typ.)
- Reinforced edge full

**SLOPED METAL END SECTIONS**

FOR PIPE CULVERTS 15" (375 mm) THRU 60" (1500 mm) DIA.

**STANDARD 542411**
Provide longitudinal bars when the span exceeds 30 (750). Provide additional longitudinal bars as needed so that spacing does not exceed 30 (750) for larger end sections.
SLOPED METAL END SECTIONS FOR PIPE ARCH CULVERTS 15" (375 mm) THRU 72" (1800 mm) EQUIVALENT DIA.

GENERAL NOTES

See roadway plans for slope (V:H) and pipe diameter.

Provide traversable pipe grate when specified.

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.

SLOPED METAL END SECTIONS FOR PIPE ARCH CULVERTS 15" (375 mm) THRU 72" (1800 mm) EQUIVALENT DIA.

(See Sheet 1 of 2)

STANDARD 542416
CROSS DRAINAGE
END SECTION - ELEVATION

Parallel bars

SAFETY BAR DETAILS

LONGITUDINAL DRAINAGE BAR

PARALLEL BARS

SLOPED METAL END SECTIONS FOR PIPE
ARCH CULVERTS 15" (375 mm) THRU
72" (1800 mm) EQUIVALENT DIA.

TYPICAL INSTALLATION

Provide longitudinal bars when the span exceeds 30 (750). Provide additional longitudinal bars as needed so that spacing does not exceed 30 (750) for larger end sections.

Illinois Department of Transportation
Traffic

SECTION A-A

Plan showing location and direction of box in relation to ξ median.

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

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. 6</td>
<td>7'-9&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(No. 13)</td>
<td>(2.30 m)</td>
</tr>
<tr>
<td>w</td>
<td>10</td>
<td>No. 6</td>
<td>6'-3&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(No. 13)</td>
<td>(1.90 m)</td>
</tr>
<tr>
<td>v</td>
<td>6</td>
<td>No. 6</td>
<td>5'-8&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(No. 13)</td>
<td>(1.70 m)</td>
</tr>
<tr>
<td>v1</td>
<td>4</td>
<td>No. 6</td>
<td>4'-4&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(No. 13)</td>
<td>(1.30 m)</td>
</tr>
<tr>
<td>v2</td>
<td>2</td>
<td>No. 6</td>
<td>3'-4&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(No. 13)</td>
<td>(1.05 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 (89) O.D. galv.</td>
<td>(2.38 m)</td>
</tr>
</tbody>
</table>

Steel Pipe

Concrete

Reinf. Bars

Bars u & u1

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.

INLET BOX

TYPE 24 (600) A

(Sheet 1 of 2)

STANDARD 542501-02
**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.

**PLAN OF REINFORCEMENT**

**SECTION A-A**

**PLAN**

**INLET BOX**

**TYPE 24 (600) B**

**STANDARD 542506-03**

---

**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>4</td>
<td>No. 4 (No. 13)</td>
<td>12'-4&quot; (3.76 m)</td>
</tr>
<tr>
<td>h1</td>
<td>2</td>
<td>No. 4 (No. 13)</td>
<td>9'-4&quot; (2.84 m)</td>
</tr>
<tr>
<td>h2</td>
<td>2</td>
<td>No. 4 (No. 13)</td>
<td>12'-8&quot; (3.86 m)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>No. 4 (No. 13)</td>
<td>2'-0&quot; (0.60 m)</td>
</tr>
<tr>
<td>u</td>
<td>7</td>
<td>No. 4 (No. 13)</td>
<td>6'-5&quot; (1.95 m)</td>
</tr>
<tr>
<td>u1</td>
<td>5</td>
<td>No. 4 (No. 13)</td>
<td>5'-11&quot; (1.80 m)</td>
</tr>
<tr>
<td>u2</td>
<td>2</td>
<td>No. 4 (No. 13)</td>
<td>5'-10&quot; (1.75 m)</td>
</tr>
<tr>
<td>v</td>
<td>2</td>
<td>No. 4 (No. 13)</td>
<td>3'-4&quot; (1.00 m)</td>
</tr>
<tr>
<td>v1</td>
<td>4</td>
<td>No. 4 (No. 13)</td>
<td>2'-10&quot; (0.80 m)</td>
</tr>
<tr>
<td>v2</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>1'-10&quot; (0.50 m)</td>
</tr>
</tbody>
</table>

**Concrete**

<table>
<thead>
<tr>
<th>Cubic Yards</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.9</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Reinforcement Bars**

<table>
<thead>
<tr>
<th>Bar</th>
<th>Size</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>u</td>
<td>No. 4 (No. 13)</td>
<td>141 lbs. (63.6 kg)</td>
</tr>
<tr>
<td>u1</td>
<td>No. 4 (No. 13)</td>
<td>133 lbs. (60.3 kg)</td>
</tr>
<tr>
<td>u2</td>
<td>No. 4 (No. 13)</td>
<td>133 lbs. (60.3 kg)</td>
</tr>
</tbody>
</table>

**Galvanized Steel Pipe**

<table>
<thead>
<tr>
<th>Length</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>8'-0&quot; (2.44 m)</td>
<td>6&quot; (150 mm)</td>
</tr>
</tbody>
</table>

---
SECTION A-A

PLAN

PLAN OF REINFORCEMENT

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.

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>3'-0&quot; (3.6 m)</td>
</tr>
<tr>
<td>v</td>
<td>13</td>
<td>No. 4</td>
<td>6'-5&quot; (1.95 m)</td>
</tr>
<tr>
<td>u1</td>
<td>3</td>
<td>No. 4</td>
<td>3'-11&quot; (1.2 m)</td>
</tr>
<tr>
<td>u2</td>
<td>2</td>
<td>No. 4</td>
<td>3'-10&quot; (1.25 m)</td>
</tr>
<tr>
<td>v</td>
<td>8</td>
<td>No. 4</td>
<td>3'-10&quot; (1.25 m)</td>
</tr>
<tr>
<td>u1</td>
<td>6</td>
<td>No. 4</td>
<td>2'-4&quot; (0.75 m)</td>
</tr>
<tr>
<td>u2</td>
<td>6</td>
<td>No. 4</td>
<td>2'-4&quot; (0.75 m)</td>
</tr>
</tbody>
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Concrete
Reinf. Bars
Galv. Steel Pipe

<table>
<thead>
<tr>
<th>Cu. yds.</th>
<th>Lbs.</th>
<th>O.D.</th>
<th>Lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>83</td>
<td>1.9</td>
<td>83</td>
</tr>
<tr>
<td>24</td>
<td>610</td>
<td>1.45</td>
<td>610</td>
</tr>
<tr>
<td>18</td>
<td>460</td>
<td></td>
<td>460</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(89)</td>
<td>(133)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.91)</td>
<td>(1.45)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.11 m)</td>
<td>(1.45 m)</td>
</tr>
</tbody>
</table>

Bars u, u1 & u2

3/8" (8mm) O.D. galv.
steelpipe

Traffic

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

DATE
1-1-97

REVISIONS
1-1-09
Switched units to English (metric). Convert metric to
1-1-07
reinforcement bars.

INLET BOX
TYPE 24 (600) C

STANDARD 542511-02

(Sheet 1 of 2)
**INLET BOX**

**TYPE 24 (600) D**

**PLAN OF REINFORCEMENT**

**SECTION A-A**

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
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<td>No. 4</td>
<td>3.56 m</td>
</tr>
<tr>
<td>h1</td>
<td>10</td>
<td>No. 4</td>
<td>3.35 m</td>
</tr>
<tr>
<td>v</td>
<td>3</td>
<td>No. 4</td>
<td>0.70 m</td>
</tr>
<tr>
<td>v1</td>
<td>4</td>
<td>No. 4</td>
<td>1.94 m</td>
</tr>
<tr>
<td>v2</td>
<td>2</td>
<td>No. 4</td>
<td>2.24 m</td>
</tr>
<tr>
<td>v3</td>
<td>16</td>
<td>No. 4</td>
<td>1.60 m</td>
</tr>
<tr>
<td>v4</td>
<td>6</td>
<td>No. 4</td>
<td>0.60 m</td>
</tr>
<tr>
<td>v5</td>
<td>8</td>
<td>No. 4</td>
<td>0.40 m</td>
</tr>
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</table>

**Concrete**

<table>
<thead>
<tr>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.75 m</td>
<td>2.22 m</td>
</tr>
<tr>
<td>30</td>
<td>0.60 m</td>
<td>1.82 m</td>
</tr>
<tr>
<td>24</td>
<td>0.40 m</td>
<td>1.17 m</td>
</tr>
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</table>

**Galv. Steel Pipe**

<table>
<thead>
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<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>1.68 m</td>
<td>220 lbs</td>
</tr>
<tr>
<td>30</td>
<td>0.75 m</td>
<td>220 lbs</td>
</tr>
<tr>
<td>18</td>
<td>0.60 m</td>
<td>120 lbs</td>
</tr>
</tbody>
</table>

**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.

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

3'-7" (1.09 m) 3 (75) Below normal slope

**SECTION B-B**

**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.

**INLET BOX**

**TYPE 24 (600) E**

**PLAN**

Bars u, u1 & u2

**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>8</td>
<td>No. 4</td>
<td>12'-0&quot; (3.66 m)</td>
</tr>
<tr>
<td>h1</td>
<td>2</td>
<td>No. 4</td>
<td>9'-0&quot; (2.75 m)</td>
</tr>
<tr>
<td>v</td>
<td>5</td>
<td>No. 4</td>
<td>5'-0&quot; (1.50 m)</td>
</tr>
<tr>
<td>u</td>
<td>9</td>
<td>No. 4</td>
<td>6'-0&quot; (1.80 m)</td>
</tr>
<tr>
<td>u1</td>
<td>3</td>
<td>No. 4</td>
<td>5'-0&quot; (1.50 m)</td>
</tr>
<tr>
<td>u2</td>
<td>2</td>
<td>No. 4</td>
<td>5'-0&quot; (1.50 m)</td>
</tr>
<tr>
<td>v1</td>
<td>6</td>
<td>No. 4</td>
<td>24 (610)</td>
</tr>
<tr>
<td>v2</td>
<td>6</td>
<td>No. 4</td>
<td>18 (460)</td>
</tr>
<tr>
<td>Concrete</td>
<td>36</td>
<td>0.0</td>
<td>12'-3 1/2&quot; (3.72 m)</td>
</tr>
<tr>
<td>Reinforcement Bars</td>
<td>24</td>
<td>175 (79.4)</td>
<td></td>
</tr>
<tr>
<td>Galv. Steel Pipe</td>
<td>35</td>
<td>899</td>
<td>12'-0&quot; (3.66 m)</td>
</tr>
</tbody>
</table>

**Concrete**

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>8</td>
<td>No. 4</td>
<td>12'-0&quot; (3.66 m)</td>
</tr>
<tr>
<td>h1</td>
<td>2</td>
<td>No. 4</td>
<td>9'-0&quot; (2.75 m)</td>
</tr>
<tr>
<td>v</td>
<td>5</td>
<td>No. 4</td>
<td>5'-0&quot; (1.50 m)</td>
</tr>
<tr>
<td>u</td>
<td>9</td>
<td>No. 4</td>
<td>6'-0&quot; (1.80 m)</td>
</tr>
<tr>
<td>u1</td>
<td>3</td>
<td>No. 4</td>
<td>5'-0&quot; (1.50 m)</td>
</tr>
<tr>
<td>u2</td>
<td>2</td>
<td>No. 4</td>
<td>5'-0&quot; (1.50 m)</td>
</tr>
<tr>
<td>v1</td>
<td>6</td>
<td>No. 4</td>
<td>24 (610)</td>
</tr>
<tr>
<td>v2</td>
<td>6</td>
<td>No. 4</td>
<td>18 (460)</td>
</tr>
<tr>
<td>Concrete</td>
<td>36</td>
<td>0.0</td>
<td>12'-3 1/2&quot; (3.72 m)</td>
</tr>
<tr>
<td>Reinforcement Bars</td>
<td>24</td>
<td>175 (79.4)</td>
<td></td>
</tr>
<tr>
<td>Galv. Steel Pipe</td>
<td>35</td>
<td>899</td>
<td>12'-0&quot; (3.66 m)</td>
</tr>
</tbody>
</table>

**Concrete**

Material required for one inlet box
**TOP ANCHOR PLATE**

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

Traffic

1:6 Slope

Median

Traffic

**SECTION D-D**

**SECTION C-C**

**1/2 (M12) U BOLT**

Type 24 (600) E

Inlet Box

Illinois Department of Transportation

January 1, 2009

Engineer of Policy and Procedures

Approved January 1, 2009

Engineer of Design and Environment

Issued 1-1-97

Passed
GENERAL NOTES

If field conditions permit, the bottom of the inlet box shall have a 2 (50) slope.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:4).

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

Traffic

1:10 Slope

Q Median

SECTION A-A

PLAN

DETAIL A

IFIELD BOX TYPE 24 (600) F

INLET BOX

SECTION A-A

PLAN

DETAIL A

IFIELD BOX TYPE 24 (600) F

INLET BOX

SECTION A-A

PLAN

DETAIL A

INLET BOX

SECTION A-A

PLAN

DETAIL A

INLET BOX

SECTION A-A

PLAN

DETAIL A

INLET BOX

SECTION A-A

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DETAIL A

INLET BOX

SECTION A-A

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DETAIL A

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PLAN

DETAIL A

INLET BOX

SECTION A-A

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SECTION A-A

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DETAIL A

INLET BOX

SECTION A-A

PLAN

DETAIL A
TYPICAL STEEL GRATING

Cut or grind flush

TYPICAL CORNER OF STEEL GRATING FRAME

SECTION B-B

Material Required for One Inlet Box

<table>
<thead>
<tr>
<th>Bar</th>
<th>No.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>6</td>
<td>No. 6</td>
<td>22'-0&quot; (6.71 m)</td>
</tr>
<tr>
<td>h1</td>
<td>2</td>
<td>No. 6</td>
<td>11'-0&quot; (3.35 m)</td>
</tr>
<tr>
<td>L</td>
<td>6</td>
<td>No. 6</td>
<td>24 (400)</td>
</tr>
<tr>
<td>u</td>
<td>17</td>
<td>No. 6</td>
<td>6'-0&quot; (1.83 m)</td>
</tr>
<tr>
<td>u1</td>
<td>6</td>
<td>No. 6</td>
<td>5'-11&quot; (1.80 m)</td>
</tr>
<tr>
<td>u2</td>
<td>5</td>
<td>No. 6</td>
<td>5'-10&quot; (1.78 m)</td>
</tr>
<tr>
<td>v</td>
<td>2</td>
<td>No. 6</td>
<td>30 (600)</td>
</tr>
<tr>
<td>v1</td>
<td>6</td>
<td>No. 6</td>
<td>27 (450)</td>
</tr>
<tr>
<td>v2</td>
<td>6</td>
<td>No. 6</td>
<td>24 (400)</td>
</tr>
<tr>
<td>v3</td>
<td>10</td>
<td>No. 6</td>
<td>18 (400)</td>
</tr>
</tbody>
</table>

Concrete

cu. yds. (m³) 3.4 (2.6)

Reinf. Bars

lbs. (kg) 250 (113)

Grating

(sq. ft.) 70.4 (6.54)

INLET BOX

TYPICAL CAST GRATING

SECTION C-C

DETAIL C

SECTION D-D

BARS u, u1 & u2

3'-5" (1.04 m) u & u1
3'-4" (1.02 m) u2

Illinois Department of Transportation

ENGINEER OF POLICY AND PROCEDURES APPROVED

January 1, 2011

ENGINEER OF DESIGN AND ENVIRONMENT ISSUED

1-1-97

PASSED STANDARD 542526-03
NOTE:
Culvert pipe may exit from the side (or sides) by changing reinforcement bars in that area and in the headwall end of box.

SECTION A-A

Detail showing exit from side (or sides)
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>11</td>
<td>No. 4 (No. 13)</td>
<td>14'-5&quot; (4.35 m)</td>
</tr>
<tr>
<td>h2</td>
<td>8</td>
<td>No. 4 (No. 13)</td>
<td>4'-8&quot; (1.40 m)</td>
</tr>
<tr>
<td>h3</td>
<td>3</td>
<td>No. 4 (No. 13)</td>
<td>5'-6&quot; (1.70 m)</td>
</tr>
<tr>
<td>v</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>8'-0&quot; (2.40 m)</td>
</tr>
<tr>
<td>v2</td>
<td>8</td>
<td>No. 4 (No. 13)</td>
<td>6'-0&quot; (1.80 m)</td>
</tr>
<tr>
<td>v3</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>1'-6&quot; (0.45 m)</td>
</tr>
<tr>
<td>v2</td>
<td>13</td>
<td>No. 4 (No. 13)</td>
<td>3'-0&quot; (0.90 m)</td>
</tr>
<tr>
<td>v3</td>
<td>10</td>
<td>No. 4 (No. 13)</td>
<td>5'-0&quot; (1.50 m)</td>
</tr>
</tbody>
</table>

Concrete

Reinf. Bars

Galv. Steel Pipe

Bar u & u1

**PLAN**

SECTION A-A

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.

INLET BOX

TYPE 48 (1200) A

(Sheet 1 of 2)
TOP ANCHOR PLATE  
(2 - required)

SECTION B-B

SECTION C-C

END VIEW

DETAIL AT BLOCKOUTS

INLET BOX
TYPE 48 (1200) A

STANDARD 542541-02
**Steel Frame & Grate**

**Section A-A**
- 4x3½ (10x90) Main bearing bars
- 3½ (100) cts.
- 4½ (100) cts.
- 3½ (100) cts.
- 1½ (15) dia. bars
- 3½ (100) cts.
- 3½ (100) cts.
- 3½ (100) cts.
- 3½ (100) cts.

**Section B-B**
- Sketch showing location and direction of main bearing bars in relation to Q median

**Section C-C**
- Complete penetration weld (typ.)
- Complete penetration weld (typ.)

**Section D-D**
- Cast frame & grate

**Summary**

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

**Additional Information**

- Switched units to English (metric).
- Revisions: 1-1-97
- Illinois Department of Transportation
- Standard 542546-01
- Illinois Department of Transportation

**Note**

- The drawing shows the layout and construction details for a median flush inlet box with steel frame and grate. It includes sections and details for various components, such as main bearing bars, frame, and grate. The dimensions are specified in inches and millimeters.

**Optional Joint**

- Sketch showing location and direction of main bearing bars in relation to Q median.
Remove concrete along these lines. Clean reinforcement for either tied or welded laps of longitudinal and circumferential reinforcement.

2. Each reinforcement shall have a minimum of 0.049 sq. in. (31.61 sq. mm) nominal area when opening is greater than 25° (65).

For wire dia. W14 - W6 (10.72 - 7.01), length of weld shall be 6 (20) min.
For wire dia. W5.5 - W2.9 (6.73 - 4.88), length of weld shall be 6 (18) min.
Other wire dia. shall be tied per detail.

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

See DETAIL A
for laps.

Great with mortar
Mortar shall be
flush with pipe.

21 (530) min.

1½ (40) min., 2½ (65) max. (Tied lap)
1½ (40) min., 6 (120) max. (Welded lap)

(Reinforced concrete pipe elbow)

STANDARD 542601-03

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

DATE
REVISIONS
2-1-11  Corr. weld sym on WELDED
LAP det. Added pipe dia. to
3-1-10  Corrected pipe diameter

dimension lines.

REINFORCED CONCRETE PIPE
ELBOW 24", 30" OR 36"
(600 mm, 750 mm OR 900 mm)

(Reinforced concrete pipe)

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

For 24 (600) pipe riser, tie outer reinforcement cage of barrel to inner reinforcement cage of riser.

Inner cage circumferential reinforcement = 0.17 sq. in./ft. (360 mm²/m) (min.)
Longitudinal reinforcement = 0.049 sq. in./ft. (104 mm²/m) (min.) spaced at 6 (150) cts.

Other wire gauges shall be tied per detail.

For wire W12 thru W2.5 (10.008 thru 4.496), length of weld shall be 3% (10) min.
For wire W5.5 thru W2 (6.655 thru 7.188), length of weld shall be 3% (10) min.
Other wire gauges shall be tied per detail.

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

End connection to fit pipe used.

Grout with mortar

Pipe (24 (600)), 36 (900), 42 (1050), 24 (600), 30 (750), 6' (1.8 m)

Other wire gauges shall be tied per detail.

(10) min. 8
3

(3) min.

Welded laps of longitudinal and circumferential line. Clean reinforcement for either tied or welded laps of longitudinal and circumferential reinforcement per detail.

(20) min.

(13)

(13)

(64)
2
1
2

(25)
1

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CONCRETE HEADWALL FOR PIPE UNDERDRAINS

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.

DATE: 4-1-16

REVISIONS

Renamed standard to be consistent with specs and other standards.

Later 1-1-99

Switched units to English (metric).
Pipe to be laid on a minimum grade of 1%.

Outside dia. of pipe or greater

Undisturbed ground

Pipe or greater

Sand cushion

Sand cushion

ALTERNATE BOTTOM SLAB

<table>
<thead>
<tr>
<th>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'-0&quot; (1.2 m)</td>
<td>3'-0&quot; (0.9 m)</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Brick Masonry</td>
<td>4'-0&quot; (1.2 m)</td>
<td>3'-0&quot; (0.9 m)</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Precast Reinforced Concrete Section</td>
<td>4'-0&quot; (1.2 m)</td>
<td>3'-0&quot; (0.9 m)</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Cast-in-place Concrete</td>
<td>4'-0&quot; (1.2 m)</td>
<td>3'-0&quot; (0.9 m)</td>
<td>5 (125)</td>
</tr>
</tbody>
</table>

* For precast reinforced concrete sections, dimension "C" may vary from the dimension given to 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).

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 top.

See Standard 602701 for details of steps.

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

SECTION A-A
(Grating removed to show plan of baffles.)

MATERIALS REQUIRED FOR ONE (1)

<table>
<thead>
<tr>
<th>Type 7 grate</th>
</tr>
</thead>
</table>

<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>3</td>
<td>No. 4 (No. 13)</td>
<td>3'-5'' (1.02 m)</td>
<td></td>
</tr>
<tr>
<td>u1</td>
<td>3</td>
<td>No. 4 (No. 13)</td>
<td>5'-9'' (1.72 m)</td>
<td></td>
</tr>
<tr>
<td>v</td>
<td>14</td>
<td>No. 4 (No. 13)</td>
<td>7'-0'' (2.10 m)</td>
<td></td>
</tr>
<tr>
<td>u2</td>
<td>14</td>
<td>No. 4 (No. 13)</td>
<td>8'-6'' (2.59 m)</td>
<td></td>
</tr>
<tr>
<td>x</td>
<td>16</td>
<td>No. 4 (No. 13)</td>
<td>6'-9'' (2.06 m)</td>
<td></td>
</tr>
<tr>
<td>x3</td>
<td>3</td>
<td>No. 4 (No. 13)</td>
<td>1'-11'' (0.58 m)</td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td></td>
<td></td>
<td></td>
<td>2.5 (1.90)</td>
</tr>
<tr>
<td>Reinforcement bars</td>
<td></td>
<td></td>
<td></td>
<td>2.0 (95)</td>
</tr>
</tbody>
</table>

All bars shall be at 12 (300) centers unless otherwise shown. Reinforcement bar clearance shall be 16 (400).

GENERAL NOTES
See Standard 602701 for details of steps.
All dimensions are in inches (millimeters) unless otherwise shown.

[diagram and notes regarding dimensions and materials]
**ALTERNATE MATERIALS FOR WALLS**

<table>
<thead>
<tr>
<th>Material</th>
<th>T (mins)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precast Reinforced Concrete</td>
<td>3 (75)</td>
</tr>
<tr>
<td>Masonry Unit</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Cast-in-Place Concrete</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Reinforced Concrete Slab, when</td>
<td></td>
</tr>
<tr>
<td>the precast reinforced concrete</td>
<td></td>
</tr>
<tr>
<td>slabs are used.</td>
<td></td>
</tr>
<tr>
<td>Brick Masonry</td>
<td>8 (200)</td>
</tr>
</tbody>
</table>

**ALTERNATE BOTTOM SLAB**

- Precast reinforced concrete slab
- Prefabricated concrete sections alternate is used.
- Reinforced cast-in-place concrete shall be reinforced with a minimum of 0.27 sq. in./ft. (570 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.

**GENERAL NOTES**

- Bottom slabs shall be reinforced with a minimum of 0.27 sq. in./ft. (570 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**

- 1-1-11: Detailed rev. in slabs.
- Added max. limit to height.
- Added general notes.

**REVISIONS**

- 1-1-09: Switched units to English (Metric).
**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 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 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>Material</th>
<th>D</th>
<th>C*</th>
<th>T (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Masonry Unit</td>
<td>36</td>
<td>15</td>
<td>5 (12.5)</td>
</tr>
<tr>
<td>Brick Masonry</td>
<td>36</td>
<td>15</td>
<td>8 (200)</td>
</tr>
<tr>
<td>Precast Reinforced Concrete</td>
<td>36</td>
<td>15</td>
<td>4 (100)</td>
</tr>
<tr>
<td>Cast-in-Place Concrete</td>
<td>36</td>
<td>15</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).
GENERAL NOTES

These structures are for use with concrete barrier, double face, 44 (1120) height (Standard 637006).

The reinforcement shown in the front elevation of the Type 5 is typical for both elevations of all types.

See Standard 602701 for details of steps.

Exposed edges shall be beveled % (19).

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

DRAINAGE STRUCTURES

TYPES 4 & 5

STANDARD 602106-02
REINFORCED LID - TYPE 4 & 5

DRAINAGE STRUCTURES
TYPES 4 & 5

ILLINOIS DEPARTMENT OF TRANSPORTATION

ENGINEER OF POLICY AND PROCEDURES
APPROVED
January 1, 2019

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
4-1-04

PASSED
STANDARD 602106-02

No. 4 (No. 13) Bar h
No. 3 (No. 10) Bar s
No. 5 (No. 16) Bar t
No. 6 (No. 19) Bar t
For precast reinforced concrete sections, this dimension may vary from the dimension given to plus 6 (150).

**ALTERNATE BOTTOM SLAB**

- Precast reinf. conc. slab when the precast reinf. conc. sections alternate is used.
- Precast reinforced concrete slab
- Sand cushion

**MATERIALS FOR WALLS**

<table>
<thead>
<tr>
<th>Materials</th>
<th>T (min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Masonry Unit</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Brick Masonry</td>
<td>8 (200)</td>
</tr>
<tr>
<td>Precast Reinforced Concrete Section</td>
<td>3 (75)</td>
</tr>
<tr>
<td>Cast-In-Place Concrete</td>
<td>6 (150)</td>
</tr>
</tbody>
</table>

**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 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 Top.

All dimensions are in inches (millimeters) unless otherwise shown.
FLAT SLAB TOP JOINT CONFIGURATIONS

SECTION PARALLEL TO PIPE

SECTION PERPENDICULAR TO PIPE

BASE SLAB JOINT CONFIGURATIONS

GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES

1. A minimum of 9 (200) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 24 (600).
2. A minimum 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).
3. A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.
4. Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint splice for every location around the perimeter of the joint where the inside arc length between pipe penetration holes is < 24 (600). See joint splice detail.
5. The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).
6. Only pipe penetration holes ≤ 15 (380) are allowed in riser sections.

SHEAR KEY GEOMETRY

Reinforcement not shown for clarity.

BAR C

BAR C

Optional Joint

Optional Joint

Single-element shear key at center of slab

Concrete fill, 2% max.

Concrete fill, 2% max.

4'-0" (1.22 m)

4'-0" (1.22 m)

Flatter slab top

Flatter slab top

See geometric limits for pipe penetration holes.

See base slab joint configurations.

Cut bars to fit.

A minimum of 9 (200) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 24 (600).

A minimum 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).

A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.

Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint splice for every location around the perimeter of the joint where the inside arc length between pipe penetration holes is < 24 (600). See joint splice detail.

The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).

Only pipe penetration holes ≤ 15 (380) are allowed in riser sections.

GENERAL NOTES

The manufacturer shall ensure that all precast manhole sections are additionally reinforced where required to resist damage from handling, shipping and installation stresses.

Lifting holes shall be located in the sections as per the manufacturer's recommendations, except as noted.

See Standard 602701 for details of manhole steps.

All dimensions are in inches (millimeters) unless otherwise noted.
**PLAN - FLAT SLAB TOP**

*Showing layout of reinforcement bars and c bars*

**FLAT SLAB TOP REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>Rebar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A (min.)</td>
<td>Spacing (max.)</td>
</tr>
<tr>
<td></td>
<td>s</td>
<td>A (min.)</td>
</tr>
<tr>
<td>Bottom</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>0.62 sq. in./ft.</strong></td>
<td>#6</td>
</tr>
<tr>
<td>Riser</td>
<td>0.12 sq. in./ft.</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>(254 sq. mm/m)</td>
<td>(150)</td>
</tr>
<tr>
<td>Barrel</td>
<td>0.05 sq. in./ft.</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>(95 sq. mm/m)</td>
<td></td>
</tr>
<tr>
<td>Riser</td>
<td>0.12 sq. in./ft.</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>(254 sq. mm/m)</td>
<td>(150)</td>
</tr>
<tr>
<td>Barrel</td>
<td>0.16 sq. in./ft.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>(339 sq. mm/m)</td>
<td></td>
</tr>
<tr>
<td>Riser</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td>6</td>
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**WALL REINFORCEMENT**

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<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>WWR or Rebar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Circumferential</td>
<td>0.12 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.04 sq. in./ft.</td>
</tr>
<tr>
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<td>Circumferential</td>
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</tr>
<tr>
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<tr>
<td></td>
<td>Vertical</td>
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<td></td>
<td>Circumferential</td>
<td>0.12 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.04 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>Circumferential</td>
<td>0.12 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.04 sq. in./ft.</td>
</tr>
</tbody>
</table>

**BASE SLAB REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Total height</th>
<th>WWR or Rebar (each direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤ 20 ft. (6.10 m)</td>
<td>0.24 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>(508 sq. mm/m)</td>
<td>(100)</td>
</tr>
<tr>
<td></td>
<td>&gt; 20 ft. (6.16 m)</td>
<td>0.24 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>(508 sq. mm/m)</td>
<td>(100)</td>
</tr>
</tbody>
</table>

**TIE PLATE**

**CONNECTION ANGLE**

**JOINT SPLICE**

**PLATE - FLAT SLAB TOP**

*Showing layout of welded wire reinforcement and c bars*
**GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES**

1. A minimum of 9 (230) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 32 (810).
2. A minimum of 9 (230) of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).
3. A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.
4. Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint splice for every location around the perimeter of the joint where the inside arc length between pipe penetration holes is ≤ 24 (600). See joint splice detail.
5. The recommended pipe penetration hole is equal to the D.O. of the pipe plus 4 (100).
6. Only pipe penetration holes ≤ 15 (380) are allowed in riser sections.

**BASE SLAB JOINT CONFIGURATIONS**

**SECTION PERPENDICULAR TO PIPE**

**SECTION PARALLEL TO PIPE**

**FLAT SLAB TOP JOINT CONFIGURATIONS**

(Shown at access holes)

**GENERAL NOTES**

Pipe holes shall be formed to facilitate proper placement of hole reinforcement.

The manufacturer shall ensure that all precast manhole sections are additionally reinforced where required to resist damage from handling, shipping and installation stresses.

Lifting holes shall be located in the sections as per the manufacturer's recommendations, except as noted.

See Standard 602701 for details of manhole steps.

All dimensions are in inches (millimeters) unless otherwise noted.
* #5 (#16) bars for risers ≤ 10 ft. (3.05 m) tall or #6 (#19) bars for risers > 10 ft. (3.05 m) tall bottom. Bundle first bar with closest WWR bar to the opening and place second bar ±3 (75) away.

**PLAN - FLAT SLAB TOP**

(Showing layout of bottom reinforcement bars and c bars)

**PLAN - FLAT SLAB TOP**

(Showing layout of welded wire reinforcement and c bars)
Holes in the walls may be drilled using core bits in lieu of formed holes.

All nuts shall be brought to a snug tight condition. Tie washers under each nut.

## FLAT SLAB TOP REINFORCEMENT

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (ft)</th>
<th>WWRR</th>
<th>Rebar (each direction)</th>
<th># Bar Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>All</td>
<td>0.11 sq. in./ft.</td>
<td>18</td>
<td>0.11 sq. in./ft.</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>0.06 sq. in./ft.</td>
<td>6</td>
<td>See plan view for bar size</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>RH &gt; 10 ft. (3.05 m)</td>
<td>0.08 sq. in./ft.</td>
<td>6</td>
<td>See plan view for bar size</td>
</tr>
</tbody>
</table>

**Only one layer of WWRR permitted to avoid congestion.**

### WALL REINFORCEMENT

<table>
<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>WWRR or Rebar</th>
<th>A&lt;sub&gt;s&lt;/sub&gt; (min.)</th>
<th>Spacing (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 ft. (1.22 m) Ø Riser</td>
<td>Circumferential</td>
<td>0.12 sq. in./ft.</td>
<td>6</td>
<td>(136)</td>
</tr>
<tr>
<td>6 ft. (1.83 m) Ø Barrel</td>
<td>Vertical</td>
<td>0.045 sq. in./ft.</td>
<td>8</td>
<td>(200)</td>
</tr>
<tr>
<td>6 ft. (1.83 m) Ø Barrel</td>
<td>Circumferential</td>
<td>0.18 sq. in./ft.</td>
<td>6</td>
<td>(310)</td>
</tr>
<tr>
<td>6 ft. (1.83 m) Ø Barrel</td>
<td>Vertical</td>
<td>0.045 sq. in./ft.</td>
<td>8</td>
<td>(200)</td>
</tr>
</tbody>
</table>

### BASE SLAB REINFORCEMENT

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (ft)</th>
<th>Total Height (TH)</th>
<th>WWRR or Rebar (each direction)</th>
<th>A&lt;sub&gt;s&lt;/sub&gt; (min.)</th>
<th>Spacing (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>&amp; TH ≤ 20 ft. (6.10 m)</td>
<td>0.48 sq. in./ft.</td>
<td>6</td>
<td>(150)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>RH &gt; 10 ft. (3.05 m)</td>
<td>or TH &gt; 20 ft. (6.10 m)</td>
<td>0.45 sq. in./ft.</td>
<td>6</td>
<td>(150)</td>
</tr>
</tbody>
</table>

**Only one layer of WWRR permitted to avoid congestion.**
GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES

1. A minimum of 12 (300) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 15 (380). Length shall be sufficient to intersect the vertical #3 (#10) bars as shown.

2. A minimum 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).

3. A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.

4. Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint splice for every location around the perimeter of the joint where the inside arc length between pipe penetration holes is < 24 (600). See joint splice detail.

5. The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).

6. Only pipe penetration holes > 15 (380) are allowed in manhole sections.

GENERAL NOTES

Pipe holes shall be formed to facilitate proper placement of hole reinforcement.

The manufacturer shall ensure that all precast manhole sections are additionally reinforced where required to resist damage from handling, shipping and installation stresses.

Lifting holes shall be located in the sections as per the manufacturer's recommendations, except as noted.

See Standard 602701 for details of manhole steps.

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

DATE REVISIONS
1-1-19 Moved wall reinforcement from inside face to middle
1-1-19 Expanded/Refined reinforcement options, increased manhole depth

STANDARD 602411-08

PRECAST MANHOLE TYPE A
7' (2.13 m) DIAMETER

(Sheet 1 of 3)
**PLAN - FLAT SLAB TOP**  
(Showing layout of bottom reinforcement bars and c bars)

Bar c #5 (#16),  
8'-2" (2.49 m)  
length, 3'-8" (1.12 m)  
radius top and bottom

Bar c #5 (#16),  
11'-2" (3.40 m)  
length, 3'-8" (1.12 m)  
radius top and bottom

* #5 (#16) bars bottom. Bundle first bar with closest WWR bar to the opening and place second bar ±3 (75) away.

**PLAN - FLAT SLAB TOP**  
(Showing layout of Welded Wire Reinforcement and c bars)  
WWR not permitted for riser heights > 10' (3.05 m).

Bar c #5 (#16),  
8'-2" (2.49 m)  
length, 3'-8" (1.12 m)  
radius top and bottom

PRECAST MANHOLE TYPE A  
7' (2.13 m) DIAMETER  
(Showing layout of top reinforcement bars and c bars)  
WHR not permitted for riser heights > 10' (3.05 m).
**GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES**

1. A minimum of 12 (300) of monolithic reinforced concrete shall be maintained above pipe penetration holes \( \geq 3'-4'' (1.02 \text{ m}) \).
2. A minimum 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes \( \geq 15 (380) \).
3. A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.
4. Horizontal joints that intersect pipe penetration holes \( \geq 15 (380) \) shall have one joint splice for every location around the perimeter of the joint where the inside arc length between pipe penetration holes is \( \geq 24 (600) \). See joint splice detail.
5. The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).
6. Only pipe penetration holes \( \geq 15 (380) \) are allowed in riser sections.

**BASE SLAB JOINT CONFIGURATIONS**

- Single-element joint at center of slab
- Optional Joint
- See geometric limits for pipe penetration holes.
- See base slab joint configurations

**SECTION PARALLEL TO PIPE**

- Without conical top riser
- Cut bars to fit.
- Steps spaced at 12 (300) to 16 (400) cts.
- Cut bars to fit.
- Evenly spaced 14-#5 (#16) bars or equivalent, evenly spaced around perimeter. Cut bars to fit.

**SECTION PERPENDICULAR TO PIPE**

- Without conical top riser
- Cut bars to fit.
- Steps spaced at 12 (300) to 16 (400) cts.
- Cut bars to fit.
- Evenly spaced 19-#5 (#16) bars evenly spaced around perimeter. Cut bars to fit.

**GENERAL NOTES**

Pipe holes shall be formed to facilitate proper placement of horizontal reinforcement.

The manufacturer shall ensure that all precast manhole sections are additionally reinforced where required to resist damage from handling, shipping and installation stresses.

Lifting holes shall be located in the sections as per the manufacturer's recommendations, except as noted.

See Standard 602701 for details of manhole steps.

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

**DATE**

- 2-19: Moved wall reinforcement from inside face to middle.
- 1-19: Expanded/Refined reinforcement options, increased manhole depths.

**PRECAST MANHOLE TYPE A**

**8' (2.44 m) DIAMETER**

**STANDARD 602416-08**
PLAN - FLAT SLAB TOP

(Showing layout of bottom reinforcement bars and c bars)

I. PRECAST MANHOLE TYPE A
8' (2.44 m) DIAMETER

STANDARD 602416-08

Bar c #5 (#16), 12'-6" (3.81 m) length, 4'-2" (1.27 m) radius top and bottom

Bar c #5 (#16), 9'-2" (2.79 m) length, 4'-2" (1.27 m) radius top and bottom

Bar c #5 (#16), 12'-6" (3.81 m) length, 4'-2" (1.27 m) radius top and bottom

Bar c #5 (#16), 9'-2" (2.79 m) length, 4'-2" (1.27 m) radius top and bottom

Radius top and bottom length, 4'-2" (1.27 m)

Bar c #5 (#16), 12'-6" (3.81 m) length, 4'-2" (1.27 m) radius top and bottom

Bar c #5 (#16), 9'-2" (2.79 m) length, 4'-2" (1.27 m) radius top and bottom

BAR TO THE OPENING AND PLACE SECOND BAR ±3 (75) AWAY.

* #6 (#19) bars bottom. Bundle first bar with closest WWB
bar to the opening and place second bar ±3 (75) away.
**FLAT SLAB TOP REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Height (RH)</th>
<th>WWR (each direction)</th>
<th>Rebar (each direction except as noted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>All</td>
<td>0.12 sq. in./ft.</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(233 sq. mm/m)</td>
<td>(150)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>0.24 sq. in./ft.</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>RH &gt; 10 ft. (3.05 m)</td>
<td>WWR not permitted</td>
<td>See plan view for rebar orientation and spacing and this table for bar size</td>
</tr>
</tbody>
</table>

**WALL REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>WWR or Rebar</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 ft. (1.22 m) Ø Riser</td>
<td>Circumferential</td>
<td>0.12 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.04 sq. in./ft.</td>
</tr>
<tr>
<td>8 ft. (2.44 m) Ø Barrel</td>
<td>Circumferential</td>
<td>0.24 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.04 sq. in./ft.</td>
</tr>
</tbody>
</table>

**BASE SLAB REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Height (RH)</th>
<th>WWR or Rebar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>0.26 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>or TH &gt; 20 ft. (6.10 m)</td>
<td>0.60 sq. in./ft.</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>All</td>
<td>0.11 sq. in./ft.</td>
</tr>
</tbody>
</table>

- Only one layer of WWR permitted to avoid congestion.

**PRECAST MANHOLE TYPE A**

8' (2.44 m) DIAMETER

STANDARD 602416-08
Illinois Department of Transportation

DATE: 4-1-06

REVISIONS: 1-1-19

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

ENGINEER OF POLICY AND PROCEDURES

(300) to 16 (400) cts.

Steps spaced at 12

(600)

24

m in.

9' (2.74 m) DIAMETER

PRECAST MANHOLE TYPE A

9'-0" (2.74 m)

FLAT SLAB TOP JOINT CONFIGURATIONS

(Shown at access hole)

SECTION PARALLEL TO PIPE

(SECTION PERPENDICULAR TO PIPE)

General Notes

Pipe holes shall be formed to facilitate proper placement of hole reinforcement.

The manufacturer shall ensure that all precast manhole sections are additionally reinforced where required to resist damage from handling, shipping and installation stresses.

Lifting holes shall be located in the sections as per the manufacturer's recommendations, except as noted.

See Standard 602701 for details of manhole steps.

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

GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES

1. A minimum of 12 (300) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 3'-8" (1.12 m).

2. A minimum 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).

3. A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.

4. Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint splice for every location around the perimeter of the joint where the inside arc length between pipe penetration holes is < 24 (600). See joint splice detail.

5. The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).

6. Only pipe penetration holes < 15 (380) are allowed in riser sections.

BASE SLAB JOINT CONFIGURATIONS

SHEAR KEY GEOMETRY

Bar c

GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES

(Figure not shown for clarity)

Pipe holes shall be formed to facilitate proper placement of hole reinforcement.

Sand cushion

Concrete fill, 1.5 % max.

Concrete fill

Flat slab top

Sand cushion

Base slab

SHEAR KEY GEOMETRY

Center of slab shear key at

1. Single-element shear key at center of slab

2. Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint splice for every location around the perimeter of the joint where the inside arc length between pipe penetration holes is < 24 (600). See joint splice detail.

3. The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).

4. Only pipe penetration holes < 15 (380) are allowed in riser sections.

GENERAL NOTES

Pipe holes shall be formed to facilitate proper placement of hole reinforcement.

The manufacturer shall ensure that all precast manhole sections are additionally reinforced where required to resist damage from handling, shipping and installation stresses.

Lifting holes shall be located in the sections as per the manufacturer's recommendations, except as noted.

See Standard 602701 for details of manhole steps.

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

DATE: 3-1-19

REVISIONS

3-1-19

(Added wall reinforcement from inside face to middle)

2-#3 (#10) radius bars above holes greater than 3'-8" (1.12 m). Length shall be sufficient to intersect the vertical #3 (#10) bars as shown.

See geometric limits for pipe penetration holes.

A minimum 12 (300) inside arc length of reinforced concrete shall be maintained above pipe penetration holes > 15 (380).

A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.

16 #5 (8) bars or equivalent, evenly spaced around perimeter. Cut bars to fit.

16 #5 (8) bars or equivalent, evenly spaced around perimeter. Cut bars to fit.

Options, increased manhole depths.
PLAN - FLAT SLAB TOP

(Showing layout of bottom reinforcement bars and c bars)

Bar c #5 (#16),
13'-7" (4.14 m)
length, 4'-8" (1.42 m)
radius top and bottom

Bar c #5 (#16),
9'-2" (2.79 m)
length, 4'-8" (1.42 m)
radius top and bottom

PLAN - FLAT SLAB TOP

(Showing layout of welded wire reinforcement and c bars)

WWR not permitted for riser heights > 10' (3.05 m).

* #6 (419) bars bottom. Bundle first bar with closest WWR bar to the opening and place second bar ±3 (75) away.

** #6 (419) bars bottom. Bundle first bar with closest WWR bar to the opening and place second bar ±3 (75) away.

PRECAST MANHOLE TYPE A
9' (2.74 m) DIAMETER

(Sheet 2 of 3)

STANDARD 602421-08
**Illinois Department of Transportation**

**APPROVED**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED**

**PASSED**

**ENGINEER OF POLICY AND PROCEDURES**

4-1-06

**9' (2.74 m) DIAMETER**

**PRECAST MANHOLE TYPE A**

(Sheet 3 of 3)

**STANDARD 602421-08**

---

**Connections and Splices**

- **Joint Splice**
  - 1¼" (32) Ø Threaded rods
  - with 2½x2½x3 (65x65x8) washers under each nut
  - All nuts shall be brought to a snug tight condition.
  - Holes in the walls may be drilled using core bits in lieu of formed holes.

**Flat Slab Top Reinforcement**

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (Rt)</th>
<th>WWR (each direction)</th>
<th>Rebar (each direction except as noted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>All</td>
<td>0.11 sq. in./ft. (233 sq. mm/in)</td>
<td>0.11 sq. in./ft. (233 sq. mm/in)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>RH ≤ 10 ft (3.05 m)</td>
<td>0.086 sq. in./ft. (1803 sq. mm/in)</td>
<td>6</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>RH &gt; 10 ft (3.05 m)</td>
<td>WWR not permitted</td>
<td>See plan view for bar size and spacing and this table for bar size</td>
</tr>
</tbody>
</table>

**Notes:**
- Only one layer of WWR permitted to avoid congestion.

**Location**
- **WWR or Rebar**
- A, (min.)
- Spacing (max.)

**Wall Reinforcement**

- **Orientation**
  - Circumferential
  - Vertical

<table>
<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>Spacing (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 ft. (1.22 m) Ø Riser</td>
<td>Circumferential</td>
<td>0.12 sq. in./ft. (234 sq. mm/in)</td>
</tr>
<tr>
<td>9 ft. (2.74 m) Ø Barrel</td>
<td>Circumferential</td>
<td>0.12 sq. in./ft. (234 sq. mm/in)</td>
</tr>
<tr>
<td>9 ft. (2.74 m) Ø Barrel</td>
<td>Vertical</td>
<td>0.045 sq. in./ft. (95 sq. mm/in)</td>
</tr>
</tbody>
</table>

**Base Slab Reinforcement**

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (Rt)</th>
<th>WWR or Rebar (each direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>RH ≤ 10 ft (3.05 m) &amp; TH ≤ 20 ft (6.10 m)</td>
<td>0.04 sq. in./ft. (931 sq. mm/in)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>All</td>
<td>0.11 sq. in./ft. (233 sq. mm/in)</td>
</tr>
</tbody>
</table>

**Notes:**
- **Rebar (each direction except as noted)**
  - Mat
  - Top
  - Bottom
  - Mat
  - Mat
  - Mat
  - Mat

- **Bar Size**
  - #6
  - #8
  - #10 or #12
  - #14 (10) or #16 (12)

**Location**
- **Spacing (max.)**
  - 0.44 sq. in./ft. (95 sq. mm/m)
  - 0.11 sq. in./ft. (233 sq. mm/m)
  - 0.045 sq. in./ft. (95 sq. mm/m)
  - 0.12 sq. in./ft. (234 sq. mm/m)

**Base Slab Reinforcement**

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (Rt)</th>
<th>WWR or Rebar (each direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>RH ≤ 10 ft (3.05 m) &amp; TH ≤ 20 ft (6.10 m)</td>
<td>0.04 sq. in./ft. (931 sq. mm/in)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>All</td>
<td>0.11 sq. in./ft. (233 sq. mm/in)</td>
</tr>
</tbody>
</table>

**Notes:**
- **Rebar (each direction except as noted)**
  - Mat
  - Top
  - Bottom
  - Mat
  - Mat
  - Mat
  - Mat
  - Mat

- **Bar Size**
  - #6
  - #8
  - #10 or #12
  - #14 (10) or #16 (12)

**Location**
- **Spacing (max.)**
  - 0.44 sq. in./ft. (95 sq. mm/m)
  - 0.11 sq. in./ft. (233 sq. mm/m)
  - 0.045 sq. in./ft. (95 sq. mm/m)
  - 0.12 sq. in./ft. (234 sq. mm/m)

---

**Riser Height (RH)**

- **Total Height (TH)**
  - RH ≤ 10 ft (3.05 m) & TH ≤ 20 ft (6.10 m)
  - RH > 10 ft (3.05 m) & TH > 20 ft (6.10 m)

**Notes:**
- **Mat**
  - Top
  - Bottom
  - Mat
  - Mat
  - Mat
  - Mat

- **Location**
  - 4 ft. (1.22 m) Ø Riser
  - 9 ft. (2.74 m) Ø Barrel

---

**Tie Plate**

- Ø 1¼ (25) Ø Threaded rods with 2½x2½x3 (65x65x8) washers under each nut.
- All nuts shall be brought to a snug tight condition.
- Holes in the walls may be drilled using core bits in lieu of formed holes.

---

**Riser Height (RH)**

- **Total Height (TH)**
  - RH ≤ 10 ft (3.05 m) & TH ≤ 20 ft (6.10 m)
  - RH > 10 ft (3.05 m) & TH > 20 ft (6.10 m)

**Notes:**
- **Mat**
  - Top
  - Bottom
  - Mat
  - Mat
  - Mat
  - Mat

- **Location**
  - 4 ft. (1.22 m) Ø Riser
  - 9 ft. (2.74 m) Ø Barrel

---

**Base Slab Reinforcement**

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (Rt)</th>
<th>WWR or Rebar (each direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>RH ≤ 10 ft (3.05 m) &amp; TH ≤ 20 ft (6.10 m)</td>
<td>0.04 sq. in./ft. (931 sq. mm/in)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>All</td>
<td>0.11 sq. in./ft. (233 sq. mm/in)</td>
</tr>
</tbody>
</table>

**Notes:**
- **Rebar (each direction except as noted)**
  - Mat
  - Top
  - Bottom
  - Mat
  - Mat
  - Mat
  - Mat

- **Bar Size**
  - #6
  - #8
  - #10 or #12
  - #14 (10) or #16 (12)

**Location**
- **Spacing (max.)**
  - 0.44 sq. in./ft. (95 sq. mm/m)
  - 0.11 sq. in./ft. (233 sq. mm/m)
  - 0.045 sq. in./ft. (95 sq. mm/m)
  - 0.12 sq. in./ft. (234 sq. mm/m)
**GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES**

1. A minimum of 12 (300) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 4'-0" (1.22 m).
2. A minimum 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).
3. A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.
4. Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint splice for every location around the perimeter of the joint where the inside arc length between pipe penetration holes is < 24 (600). See joint splice detail.
5. The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).
6. Only pipe penetration holes ≤ 15 (380) are allowed in riser sections.

**GENERAL NOTES**

Pipe holes shall be formed to facilitate proper placement of hole reinforcement.

The manufacturer shall ensure that all precast manhole sections are additionally reinforced where required to resist damage from handling, shipping, and installation stresses.

Lifting holes shall be located in the sections as per the manufacturer’s recommendations.

See Standard 602701 for details of manhole steps.

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

---

**BASE SLAB JOINT CONFIGURATIONS**

**SECTION PARALLEL TO PIPE**

(flown at access hole)

**SECTION PERPENDICULAR TO PIPE**

(with conical top riser)

**FLAT SLAB TOP JOINT CONFIGURATIONS**

(shown at access hole)
PLAN - FLAT SLAB TOP
(Showing layout of bottom reinforcement bars and c bars)

Bar c #5 (#18)
4'-3" (1.29 m)
length, 5'-2" (1.57 m)
radius top and bottom

Bar c #5 (#18)
10'-1" (3.07 m)
length, 5'-2" (1.57 m)
radius top and bottom

Bar c #5 (#18)
14'-4" (4.34 m)
length, 5'-2" (1.57 m)
radius top and bottom

Bar c #5 (#18)
10'-1" (3.07 m)
length, 5'-2" (1.57 m)
radius top and bottom

#6 (#19) bars bottom. Bundle first bar with closest WWR bar to the opening and place second bar ±3 (75) away.

* WWR not permitted for riser heights > 10' (3.05 m).
**FLAT SLAB TOP REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (RH)</th>
<th>WWR (each direction)</th>
<th>Ribber (each direction except as noted)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A&lt;sub&gt;x&lt;/sub&gt; (min.)</td>
<td>Spacing (max.)</td>
</tr>
<tr>
<td>Top</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mat</td>
<td></td>
<td>0.11 sq. in./ft. (123 sq. mm/mm)</td>
<td>18</td>
</tr>
<tr>
<td>Bottom</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td><strong>0.06 sq. in./ft. (75 sq. mm/mm)</strong></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>RH &gt; 10 ft. (3.05 m)</td>
<td><strong>0.06 sq. in./ft. (75 sq. mm/mm)</strong></td>
<td>6</td>
</tr>
</tbody>
</table>

**BASE SLAB REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (RH)</th>
<th>Total Height (TH)</th>
<th>WWR or Ribber (each direction)</th>
<th>A&lt;sub&gt;x&lt;/sub&gt; (min.)</th>
<th>Spacing (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>RH ≤ 10 ft. (3.05 m) &amp; TH ≤ 20 ft. (6.10 m)</td>
<td>0.48 sq. in./ft. (889 sq. mm/mm)</td>
<td>6</td>
<td>(150)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RH &gt; 10 ft. (3.05 m) &amp; TH &gt; 20 ft. (6.10 m)</td>
<td>0.78 sq. in./ft. (1453 sq. mm/mm)</td>
<td>6</td>
<td>(150)</td>
<td></td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>All</td>
<td>0.33 sq. in./ft. (233 sq. mm/mm)</td>
<td>6</td>
<td>(150)</td>
<td></td>
</tr>
</tbody>
</table>

**WALL REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>WWR or Ribber</th>
<th>A&lt;sub&gt;x&lt;/sub&gt; (min.)</th>
<th>Spacing (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 ft. (1.22 m) Ø Riser</td>
<td>Inside Mat</td>
<td>0.12 sq. in./ft. (150 sq. mm/mm)</td>
<td>6</td>
<td>(150)</td>
</tr>
<tr>
<td></td>
<td>10 ft. (3.05 m) Ø Barrel</td>
<td>0.045 sq. in./ft. (95 sq. mm/mm)</td>
<td>8</td>
<td>(200)</td>
</tr>
<tr>
<td></td>
<td>10 ft. (3.05 m) Ø Barrel</td>
<td>0.045 sq. in./ft. (95 sq. mm/mm)</td>
<td>8</td>
<td>(200)</td>
</tr>
<tr>
<td></td>
<td>20 ft. (6.10 m) Ø Barrel</td>
<td>0.045 sq. in./ft. (95 sq. mm/mm)</td>
<td>8</td>
<td>(200)</td>
</tr>
</tbody>
</table>

**JOINT SPLICE**

- **Connection Angle**
- **TIE PLATE**
- **FLAT SLAB TOP REINFORCEMENT**
- **BASE SLAB REINFORCEMENT**
- **WALL REINFORCEMENT**
- **PRECAST MANHOLE TYPE A**

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**APPROVED ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED 1-1-18**

**PASSED ENGINEER OF POLICY AND PROCEDURES**

**10’ (3.05 m) DIAMETER PRECAST MANHOLE TYPE A**
ILEINOIS DEPARTMENT OF TRANSPORTATION

DATE

REVISIONS

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

ENGINEER OF POLICY AND PROCEDURES

STANDARD 602501-05

1-1-19

1-1-97

4' (1.22 m) DIAMETER

PRECAST VALVE VAULT TYPE A

SECTION THRU VALVE VAULT

(Without conical top)

SECTION THRU VALVE VAULT

(With conical top)

SECTION THRU VALVE VAULT

(With concentric conical top)

GENERAL NOTES

Use this standard for water mains ≤ 8 (200).

The manufacturer shall ensure that all precast manhole sections are additionally reinforced where required to resist damage from handling, shipping and installation stresses.

Lifting holes shall be located in the sections as per the manufacturer’s recommendations, except as noted.

See Standard 602701 for details of manhole steps.

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

DATE

REVISIONS

1-1-19

Moved wall reinforcement from inside face to middle.

1-1-19

Expanded / refined reinforcement options. Increased vault depths.

STANDARD 602501-05

(Sheet 1 of 2)
**FLAT SLAB TOP REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR or Rebar</th>
<th>A (min)</th>
<th>Spacing (max)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Bar c #5 (#16), 4'-10" (1.47 m) | (250) | 6 |
|   length, 26 (660) radius bottom |

10-#4 (#13) bars or equivalent, evenly spaced around perimeter.
Cut bars to fit.

**WALL REINFORCEMENT**

<table>
<thead>
<tr>
<th>Orientation</th>
<th>WWR or Rebar</th>
<th>A (min)</th>
<th>Spacing (max)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Circumferential</th>
<th>Vertical</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.12 sq. in./ft</td>
<td>0.055 sq. in./ft</td>
</tr>
</tbody>
</table>

**BASE SLAB REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Weight</th>
<th>WWR or Rebar (each direction)</th>
<th>A (min)</th>
<th>Spacing (max)</th>
</tr>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Mat</th>
<th>Top</th>
<th>&gt; 25 ft. (7.62 m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0.24 sq. in./ft.</td>
</tr>
<tr>
<td>Bottom</td>
<td></td>
<td>(508 sq. mm/m)</td>
</tr>
</tbody>
</table>

Optional Joint

**BASE SLAB JOINT CONFIGURATIONS**

**SHEAR KEY GEOMETRY**

Single element shear key at center of slab
(Reinforcement not shown for clarity)
SECTION THRU VALVE VAULT (Without conical top)

- Base slab
- Sand cushion

SECTION THRU VALVE VAULT (With conical top)

- Base slab
- Sand cushion

GENERAL NOTES

- Use this standard for water mains ≥ 10 (250).

- The manufacturer shall ensure that all precast manhole sections are additionally reinforced where required to resist damage from handling, shipping and installation stresses.

- Lifting holes shall be located in the sections as per the manufacturer's recommendations, except as noted.

- See Standard 602701 for details of manhole steps.

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

STANDARD 602506-02
**Illinois Department of Transportation**

**APPROVED ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED 1-1-18**

**PASSED ENGINEER OF POLICY AND PROCEDURES**

---

**5' (1.52 m) DIAMETER**

**PRECAST VALVE VAULT TYPE A**

**PLAN - FLAT SLAB TOP**

(Showing layout of bottom reinforcement bars and c bars)

**BASE SLAB JOINT CONFIGURATIONS**

**BASE SLAB REINFORCEMENT**

**FLAT SLAB TOP REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>WW R or Rebar (each direction)</th>
<th>Bar Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mat. Top</td>
<td>0.13 sq. in./ft. (3.53 sq. mm/mm)</td>
<td>#4 (450)</td>
</tr>
<tr>
<td>Mat. Bottom</td>
<td>0.40 sq. in./ft. (150)</td>
<td>#6 (150)</td>
</tr>
</tbody>
</table>

**WALL REINFORCEMENT**

<table>
<thead>
<tr>
<th>Orientation</th>
<th>WW R or Rebar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circumferential</td>
<td>0.15 sq. in./ft. (0.13 sq. mm/mm)</td>
</tr>
<tr>
<td>Vertical</td>
<td>0.05 sq. in./ft. (150)</td>
</tr>
</tbody>
</table>

---

**SHEAR KEY GEOMETRY**

(Reinforcement not shown for clarity)

---

**BASE SLAB REINFORCEMENT**

**WALL REINFORCEMENT**

**FLAT SLAB TOP REINFORCEMENT**

---

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**ISSUED 1-1-18**

**PASSED ENGINEER OF POLICY AND PROCEDURES**

---

**5' (1.52 m) DIAMETER**

**PRECAST VALVE VAULT TYPE A**

**PLAN - FLAT SLAB TOP**

(Showing layout of welded wire reinforcement and c bars)
FLAT SLAB TOP JOINT CONFIGURATIONS
FOR D = 36 (900) AND D = 4'-0" (1.22 m)

(Shown at access hole)

FLAT SLAB TOP JOINT CONFIGURATIONS
D = 5'-0" (1.52 m)

(Shown at access hole)

SECTION THRU FLAT SLAB TOP
FOR D = 36 (900) AND D = 4'-0" (1.22 m)

(Showing layout of reinforcement bars and c bars)

SECTION THRU FLAT SLAB TOP
FOR D = 5'-0" (1.52 m)

(Showing layout of welded wire reinforcement and c bars)

GENERAL NOTES
The flat slab top may be used in lieu of the tapered tops shown on Standards 602001, 602016, or 602306 at the option of the Contractor or when field conditions prohibit the use of tapered tops.

Lifting holes shall be located in the sections as per the manufacturer’s recommendations.

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

TABLE

<table>
<thead>
<tr>
<th>D</th>
<th>T</th>
<th>D₁/min.</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>(900)</td>
<td>4 (150)</td>
<td>4 (150)</td>
</tr>
<tr>
<td>4'-0&quot; (1.22 m)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5'-0&quot; (1.52 m)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
FLAT SLAB TOP REINFORCEMENT FOR D = 36 (900)

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>Spacing (max.)</th>
<th>A (min.)</th>
<th>Spacing (max.)</th>
<th>Bar Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom</td>
<td>0.60 sq. in./ft.</td>
<td>6</td>
<td>See plan view for rebar orientation and spacing and this table for bar size</td>
<td>#6</td>
<td></td>
</tr>
<tr>
<td>Mat.</td>
<td>1332 sq. mm/mm</td>
<td>1200</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FLAT SLAB TOP REINFORCEMENT FOR D = 4'-0" (1.22 m)

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>Spacing (max.)</th>
<th>A (min.)</th>
<th>Spacing (max.)</th>
<th>Bar Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom</td>
<td>0.62 sq. in./ft.</td>
<td>6</td>
<td>See plan view for rebar orientation and spacing and this table for bar size</td>
<td>#5</td>
<td></td>
</tr>
<tr>
<td>Mat.</td>
<td>1332 sq. mm/mm</td>
<td>1200</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FLAT SLAB TOP REINFORCEMENT FOR D = 5'-0" (1.52 m)

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>Spacing (max.)</th>
<th>A (min.)</th>
<th>Spacing (max.)</th>
<th>Bar Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>0.11 sq. in./ft.</td>
<td>18</td>
<td>0.11 sq. in./ft.</td>
<td>18</td>
<td>#3 or #4</td>
</tr>
<tr>
<td>Mat.</td>
<td>233 sq. mm/mm</td>
<td>(450)</td>
<td>(450)</td>
<td>(450)</td>
<td>(#10) (#13)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>Spacing (max.)</th>
<th>A (min.)</th>
<th>Spacing (max.)</th>
<th>Bar Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom</td>
<td>0.60 sq. in./ft.</td>
<td>6</td>
<td>See plan view for rebar orientation and spacing and this table for bar size</td>
<td>#4</td>
<td></td>
</tr>
<tr>
<td>Mat.</td>
<td>1847 sq. mm/mm</td>
<td>(320)</td>
<td></td>
<td></td>
<td>(#13)</td>
</tr>
</tbody>
</table>

* Only one layer of WWR permitted to avoid congestion.
CAST FRAME

6 Gaskets shown
10 permitted

10 permitted
6 Gussets shown
Dia. 23 (584)
23
(533)
21
(864)

CAST OPEN LID

SECTION A-A
Gray Iron

SECTION B-B
CAST OPEN LID

SECTION C-C

SECTION D-D
CAST CLOSED LID
Gray Iron Lid

SECTION E-E

SECTION F-F

CAST FRAME

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

DATE
REVISIONS
1-1-20 Revised dimension in Section B-B
of cast open lid
1-1-15 Revised dimensioning of
Frame. Added ADA compliant
open lid
1-1-09 Switched units to English (metric)

FRAME AND LIDS
TYPE 1
STANDARD 604001-05
Curb box adjustable from 5/8 (153) to 9 (225).

All dimensions are in inches (millimeters) unless otherwise shown.
Curb box adjustable from 
5/8 (153) to 9 (225).

\( \frac{3}{8} \) (16) bolt, nut and washer.

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

DETAIL OF BOLTING

FRAME TO BASE

NOTE: Bolts shall be removed after pavement has been placed.

GENERAL NOTES

- Switched units to English (metric).
- Added ADA compliant open lid.
- Passed Section A-A.
- Revised dimension location in Section A-A.
FRAME AND GRATE

TYPE 6

STANDARD 604026-03

SECTION A-A

CAST FRAME

SECTION B-B

CAST GRATE

SECTION C-C

SECTION D-D

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

DATE

REVISIONS

1-1-15
Revised dimensions of frame and grate.

1-1-97
Switched units to English (metric).

1-1-09

Illinois Department of Transportation

APPROVED

DATE

REVISIONS

January 1, 2015

January 1, 2015

January 1, 2015
All dimensions are in inches (millimeters) unless otherwise shown.

SECTION A-A

CAST GRATE

SECTION B-B

GRATE TYPE 7

STANDARD 604031-03
CAST GRATE

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

ALTERNATE CURB BOX

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

CAST GRATE

SECTION E-E

STANDARD 604051-04

FRAME AND GRATE

TYPE 11

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

DATE
REVISIONS

1-1-15 Revised dimensions of frame and alternate curb box.

4-1-09 Switched units to English (metric).

ENGINEER OF POLICY AND PROCEDURES
APPROVED

January 1, 2015

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

1-1-97

PASSED

DATE

REVISIONS

January 1, 2015

Illinois Department of Transportation
CAST FRAME

SECTION B-B

ALTERNATE CURB BOX

SECTION E-E

CAST GRATE

FRONT VANE DETAIL

SIDE RIB DETAIL

MIDDLE RIB DETAIL

ALL DIMENSIONS ARE IN INCHES (MILLIMETERS) UNLESS OTHERWISE SHOWN.
⅛ (13) Dia. tapped holes for bolting down grate, four places.

⅛ (14) Dia. holes for grate alignment, two places.

Safety bar 22½"x9"x1" (572x19x25)

⅜ (152) 6

⅜ (152) 6

⅛ (13) Dia. stainless steel bolts with washers, through counter bored holes or slots, four places.

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

One gusset shown each side, two permitted.

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

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

⅛ (13) Dia. tapped holes for bolting down grade, four places.
Bolting down grate, four places each frame.

\(\frac{3}{8}\) (13) Dia. tapped holes for grate alignment, two places each frame.

\(\frac{3}{8}\) (14) Dia. holes for grate alignment, two places each frame.

Safety bar 22\(\frac{5}{8}\)x8x1
(572x19x25)

\(\frac{3}{8}\) (19)

\(\frac{3}{8}\) (19) Dia. holes, three places each frame.

\(\frac{3}{8}\) (13) Dia. stainless steel bolts with washers, through counter bored holes or slots, four places each grate.

Three \(\frac{5}{8}\) x 2\(\frac{1}{2}\) (M16 x 64) galv. hex. head bolt & nut with galv. washers.

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

FRAMES AND GRATES
TYPE 22

STANDARD 604081-04
Concrete apron, 4 (100) thick

Welded wire fabric (13) PJF (circumference of pipe)

1 :4 or 1 :6

Traffic

8

GATE

45° Slope

Riser pipe joint

SECTION B-B

SECTION A-A

LOCATION SKETCH - PLAN

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.

DATE

REVISIONS

1-1-97

76

1-1-97

Switched units to

English (metric).

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

DATE

REVISIONS

1-1-97

STANDARD 604106-01

REINFORCED CONCRETE PIPE

MEDIAN INLET for 36" (900 mm)
**Concrete Curb Type B and Combination**

**Concrete Curb and Gutter**

- **Depressed Curb**
  - Adjacent to Flexible Pavement
  - ON DISTURBED SUBGRADE
  - ON UNDISTURBED SUBGRADE

- **Barrier Curb**
  - Adjacent to Flexible Pavement
  - Adjacent to PCC Pavement or PCC Base Course

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

- **Engineer of Policy and Procedures**
- **PASSED**

**STANDARD 606001-07**
For Section A-A to E-E and curtain wall =
2.38 cu. yds. (1.84 m³) concrete for 10 (250) pav’t.
2.38 cu. yds. (1.82 m³) concrete for 9 (225) pav’t.

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

GENERAL NOTES
Tie bars shall be No. 6 (No. 19) at 36 (900) centers unless otherwise shown.

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

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 (millimeters) unless otherwise shown.

OUTLETS FOR CONCRETE CURB AND GUTTER
TYPE B-6.24 (B-15.60)

STANDARD OUTLET

EDGES OF SHOULDER TO THE SLOPE OF SHOULDER

EDGE OF OUTLET TO CONFORM TO THE SLOPE OF SHOULDER

WELDED WIRE REINFORCEMENT
WEIGHTING NOT LESS THAN 58 LBS./100 SQ. FT. (2.83 KG/M²) TO BEGIN HERE.

FOR SECTION F-F =
2.38 CU. YDS. (1.84 M³) CONCRETE FOR 10 (250) PAV'T.
2.38 CU. YDS. (1.82 M³) CONCRETE FOR 9 (225) PAV'T.

FOR SECTION F-F =
0.069 CU. YDS. (0.17 M³) CONCRETE PER FT. (M)

ILLINOIS DEPARTMENT OF TRANSPORTATION
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED 1-1-97
ENGINEER OF POLICY AND PROCEDURES
ISSUED 1-1-18
PASSED 4-1-16
REVISIONS 1-1-18

REVISED GENERAL NOTES
FOR TIE BAR SPACING TO 36 (900) CENTERS
CHANGED TERMINOLOGY TO 'WELDED WIRE REINFORCEMENT.'
shoulder
paved
Edge of
casting
Drainage
joint
Expansion
joints
Contraction
joints
(300)
12
No. 4 (No. 13) rebar
dowel bars
1x18 (25x450)
min.
3' (1 m)
with HMA shoulders
or at 25' (7.6 m) cts.
Placed in prolongation
with pct shoulder joints
or at 25' (7.6 m) cts.
with HMA shoulders
No. 4 (No. 13) rebar
placed at mid-depth
(one each side of casting)

PLAN

SECTION A-A

SECTION B-B

Rolled
edge

SECTION C-C

Flow line

in inches (millimeters)
unless otherwise shown.

QUANTITY OF CONCRETE
Section A-A to C-C
0.93 cu. yd. (0.71 m³)

EXPANSION JOINT

1x18 (25x450)
dowel bar

Flow line

18
(450)

INLET

INLET, OUTLET & ENTRANCE

TYPE A GUTTER

SECCTION D-D

Illinois Department of Transportation
2016
PROJECT 8107
Sheet 1 of 3

ENGINEER OF POLICY AND PROCEDURES
APPROVED
2016
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
April 1,
PASSED
DATE
REVISIONS

STANDARD 606101-05

SECTION A-A

SECTION B-B

SECTION C-C

PLAN

PLAN

SECTION D-D

TYPE A GUTTER

INLET

INLET, OUTLET & ENTRANCE

CONTRACTOR: XYZ COMPANY

ILLINOIS DEPARTMENT OF TRANSPORTATION

BONES DEPARTMENT OF TRANSPORTATION

DATE
REVISIONS
4-1-16
Changed terminology to welded wire reinforcement.
4-1-16
Switched units to English (metric). Changed radii, adjusted qty's.
1-1-09
**Joint**

Contraction dowel bars 1x18 (25x450)

**Flow line**

Shoulder paved 45°

Section (A-A to B-B) + (C-C to D-D) = 1.79 cu. yd. (1.37 m³).

Section B-B to C-C = 0.20 cu. yd./ft. (0.50 m³/m).

**All Other Entrances:**

Section (A-A to B-B) + (C-C to D-D) = 2.26 cu. yd. (1.73 m³).

Section B-B to C-C = 0.25 cu. yd./ft. (0.62 m³/m).

**Commercial Entrances:**

QUANTITIES OF CONCRETE

<table>
<thead>
<tr>
<th>Edge</th>
<th>Rolled</th>
<th>Shoulder</th>
<th>Dowel Bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shld.</td>
<td>3 (75)</td>
<td>6 (150)</td>
<td>8 (200)</td>
</tr>
</tbody>
</table>

*NOTE:* Welded wire reinforcement shall be installed at mid-depth from Section A-A to D-D.

(58 lbs./100 sq. ft. [2.83 kg/m²])

**NOTE:**

Welded wire reinforcement shall be installed at mid-depth from Section A-A to D-D.

(58 lbs./100 sq. ft. [2.83 kg/m²])

**Edges of paved shoulder**

**Sections A-A & D-D**

**Sections B-B & C-C**

**Type A Gutter**

(INLET, OUTLET & ENTRANCE)

Sheet 2 of 3

Illinois Department of Transportation

2016

Engineer of Policy and Procedures

APPROVED 1-1-97

Engineer of Design and Environment

ISSUED 4-1-97

PASSED 4-1-97

STANDARD 606101-05
NOTE
If the average grade of pavement for the distance A-D exceeds 2%, this distance shall be increased 6' (1.8 m) for each 1% increase in grade.

QUANTITY OF CONCRETE
Section A-A to Section E-E = curtain wall = 3.53 cu. yd. (2.70 m³) of concrete.
Section F-F = 0.079 cu. yd./ft. (0.2 m³/m).

NOTE
If the average grade of pavement for the distance A-D exceeds 2%, this 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.

The gutter outlet shall be No. 6 (No. 19) at 36 (900) centers unless otherwise shown.

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

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>3.6</td>
<td>2.5</td>
</tr>
<tr>
<td>Cast Iron Grate - Ea.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Pipe Drain - Dia. in. (mm)</td>
<td>15</td>
<td>18</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.

Tie bars shall be No. 6 (No. 19) at 36 (900) centers unless otherwise shown.

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

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

**Outlet Type 1 for Type A Gutter**

**Standard 606106-05**
NOTE
If the average grade of pavement for the distance A-E exceeds 3%, this distance shall be increased 6 ft. (1.8 m) for each 1% increase in grade.

NOTE
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.

SECTION A-A
Rolled edge

SECTION B-B
Rolled edge

SECTION C-C
Rolled edge

SECTION D-D
Rolled edge

SECTION E-E

SECTION F-F

SECTION G-G

QUANTITIES

<table>
<thead>
<tr>
<th>Material</th>
<th>Single</th>
<th>Double</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete - cu. yd.</td>
<td>3.07</td>
<td>4.33</td>
</tr>
<tr>
<td>Cast Iron Grate - Ea.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cast Iron Cover - Ea.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Pipe Drain - Dia. in.</td>
<td>115</td>
<td>18</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.

DATE
1/1/09

REVISIONS
1/1/09 - Switched units to English (metric)
1/1/07 - Removed weight of grate and cover.

OUTLETS TYPE 2
FOR TYPE A GUTTER

STANDARD 606111-03

GRATE AND COVER TYPE 2A
NOTE
If the average grade of pavement
for the distance A-D exceeds 2%, this
distance shall be increased 6' (1.8 m)
for each 1% increase in grade.

QUANTITY OF CONCRETE
Section A-A to E-E and curtain wall
1.9 cu. yd. (1.45 m³) concrete.
Section F-F = 0.068 cu. yd./ft.
(0.17 m³/m).

SECTION A-A
Rolled edge

SECTION B-B
Rolled edge

SECTION C-C
Rolled edge

SECTION D-D
Rolled edge

SECTION E-E
Rolled edge

SECTION F-F
Rolled edge

SECTION AT END OF OUTLET
Rolled edge

Welded wire reinforcement (not less
than 56 lbs./100 sq. ft. (2.83 kg/m²))
to begin here.

Tie bars

Flow line

Edge of outlet to conform
to edge of shoulder

Center line of outlet

ETHEL DOlWILFson
STANDARD 606201-04

(INLET, OUTLET & ENTRANCE)

OUTLET

Welded wire reinforcement

SECTION B-B

SECTION C-C

SECTION D-D

SECTION E-E

SECTION F-F

TYPE B GUTTER

(I NLET, OUTLET & ENTRANCE)
OUTLETS TYPE 2 FOR TYPE B GUTTER
STANDARD 606211-04

GENERAL NOTES

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

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.

<table>
<thead>
<tr>
<th>Material</th>
<th>Single</th>
<th>Double</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete - cu. yd. (m³)</td>
<td>1.84</td>
<td>2.18</td>
</tr>
<tr>
<td>Cast Iron Grate - Ea.</td>
<td>1</td>
<td>1</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>13</td>
<td>15</td>
</tr>
</tbody>
</table>

Tie bars

Revised tie bar notes to be consistent with other gutter Highway Standards.

Switched units to English (metric).

DATE

REVISIONS

1-1-18

1-1-18

January 1, 2018

ENGINEER OF POLICY AND PROCEDURES

APPROVED

Issued

Passed

CONSTRUCTION

Illinois Department of Transportation

January 1, 2018

ENGINEER OF DESIGN AND ENVIRONMENT
Curb and gutter

See DETAIL II

Grooves

(SEE SHEET 2 FOR DETAILS OF RAMPED NOSES)

24 (600) max.

Var. radius

Grooves

Face of curb

(1.95 m)

6'-6"

DETAIL I

See DETAIL I

Grooves

90°

(FREE FLOW DESIGN)

urban conditions

36 (900) Offset for

B

R

(1.2 m)

4'

B

2'

1

B

11 (280) min. to

Var. radius

for right turn lane design

corner angles less than 90° and for other corners with radius greater than 24 (600).

Typical detail when corner angle

NOTE:
The blockouts B for the islands shall be extended so that the termination will line up with proposed or existing pavement joint.

Pavement or pcc base course thickness.

Noses 1 and 2 shall be ramped unless noted otherwise on the plans. (See sheet 2 for length)

The blockouts B for the islands shall be extended so that the termination will line up with proposed or existing pavement joint.

NOTE:
The blockouts B for the islands shall be extended so that the termination will line up with proposed or existing pavement joint.

Noses 1 and 2 shall be ramped unless noted otherwise on the plans. (See sheet 2 for length)

The blockouts B for the islands shall be extended so that the termination will line up with proposed or existing pavement joint.

Noses 1 and 2 shall be ramped unless noted otherwise on the plans. (See sheet 2 for length)

The blockouts B for the islands shall be extended so that the termination will line up with proposed or existing pavement joint.

Noses 1 and 2 shall be ramped unless noted otherwise on the plans. (See sheet 2 for length)
Align with joint in adjacent pavement.

PEJF = Preformed expansion joint filler.

Median layout and radii shall be as shown on the plans.

Keyed longitudinal construction joints shall be constructed without tie bars.

X = PCC base course plus HMA thickness.

t = Pavement or pcc base course thickness.

Welded wire reinforcement 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.
Joints in prolongation with existing joints in pavements.

No. 6 (No. 19) Tie bars or expansion anchor ties at 36 (900) cts.

No. 4 (No. 13) bars or 7 (175) cts. each direction (typ.)

Slope (Std. 483001 or 482001)

Cast in place concrete thrust block 24x24x24
(600x600x600).

Pipe drain
(600x600x600).

General Notes

See Standard 420001 for joint details not shown.

See Standard 542401 for details of guardrail in Standard 542401.

For placement of drainage elements on existing construction with existing rigid pavement, substitute expansion anchor ties for tie bars.

For nonrigid pavements or monolithic construction of PCC slab and shoulder, omit tie bars.

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

Unless otherwise shown.

All exposed edges of the inlet, except the upper perimeter, shall be beveled. ½ (20).

GENERAL NOTES

See Standard 630001 for details of guardrail not shown.

For placement of drainage elements on existing construction with existing rigid pavement, substitute expansion anchor ties for tie bars.

For nonrigid pavements or monolithic construction of PCC slab and shoulder, omit tie bars.

All dimensions are in inches (millimeters) unless otherwise shown.
DETAIL OF CAST GRATE

Type G requires 1 grate
Type E requires 2 grates
Type F requires 3 grates

1/3 (13) Dia. stainless steel bolts with washers (typ.), through slot.

SECTION C-C

INLET BOX

REQUIRED MATERIAL

<table>
<thead>
<tr>
<th>TYPE F</th>
<th>Bar Qty</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>u1</td>
<td>8</td>
<td>No. 4</td>
<td>9'-9&quot; (2.96 m)</td>
</tr>
<tr>
<td>u2</td>
<td>3</td>
<td>No. 4</td>
<td>11'-10&quot; (3.57 m)</td>
</tr>
<tr>
<td>u3</td>
<td>6</td>
<td>No. 4</td>
<td>13'-10&quot; (4.21 m)</td>
</tr>
</tbody>
</table>

Concrete

Grating

Bar u1, u2, & u5

<table>
<thead>
<tr>
<th>TYPE E</th>
<th>Bar Qty</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>u1</td>
<td>6</td>
<td>No. 4</td>
<td>9'-9&quot; (2.96 m)</td>
</tr>
<tr>
<td>u2</td>
<td>3</td>
<td>No. 4</td>
<td>11'-9&quot; (3.57 m)</td>
</tr>
<tr>
<td>u3</td>
<td>6</td>
<td>No. 4</td>
<td>13'-9&quot; (4.21 m)</td>
</tr>
</tbody>
</table>

Concrete

Grating

Bar u3, u4, u5 & u6

{1} (13) Dia. tapped hole for bolting down grate, four places each frame.

SECTION D-D

DETAIL C

SECTION E-E

DETAIL OF CAST FRAME

(Type E shown)

SHOULDER INLET

WITH CURB

ILLINOIS DEPARTMENT OF TRANSPORTATION

STANDARD 610001-08

January 1, 2018

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

1-1-97
Steel plate beam guardrail with bolt slots at 375 (953) centers

6'-3" (1.905 m) Typical post spacing

When S<3 for Type A

SECTION A-A
* When S is less than 3 and the distance from the back of post is less than 24 (600), the post shall be steel and the embedment shall be 76% (1.93 m) and the minimum top of rail height shall be 31 (787).

SECTION B-B
** When connecting Type D guardrail to an impact attenuator, adjust this dimension to match over a distance of 25'-0" (7.62 m) from point of connection if necessary.

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
STANDARD 630001-12
**Wood Post Construction**

- 12x8 (305x12) Rough sawn timber blockout toe-nailed to post with 160 nails.
- 8x6 (200x150) Rough sawn timber post

**Steel Post Construction**

- Post bolt with std. hex nut.
- Std. flat washer
- Bolt not to extend more than 1" (4) past nut

**Steel Plate Beam Guardrail**

- STEEL POST DETAILS
- WOOD BLOCK-OUT AND STEEL POST DETAILS
- TWO-PIECE WOOD BLOCKOUT OPTION

**Notes**

- All holes %3 (20) dia.

**Engineer of Design and Environment**

- Illinois Department of Transportation

**Approved**

- January 1, 2018

**Issued**

- January 1, 1997

**Steel Plate Beam Guardrail Standard**

- 630001-12 (Sheet 2 of 4)
CABLE ASSEMBLY

(42,800 lbs. (190 kN) min. breaking strength)
Tighten to load tension.

ANCHOR PLATE T DETAILS

NOTE
Anchor plate T shall be used to attach cable assembly to guardrail when required on traffic barrier terminals.

RAIL ELEMENT SPLICE

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.

END SHOE
<table>
<thead>
<tr>
<th>V</th>
<th>W</th>
<th>L</th>
<th>Steel Post</th>
<th>Wood Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 6 (152)</td>
<td>24</td>
<td>24</td>
<td>21 (529)</td>
<td>23 (589)</td>
</tr>
<tr>
<td>&gt; 6 - 18 (168 - 458)</td>
<td>16</td>
<td>16</td>
<td>14 (49)</td>
<td>14 (49)</td>
</tr>
<tr>
<td>&gt; 18 - 31 (458 - 787)</td>
<td>12</td>
<td>12</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>&gt; 31 (787 - 150)</td>
<td>12</td>
<td>10</td>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>

**Note:** Ledge line is top of rock ledge or hard slag fit. Drilled hole

**Finished ground line**

**Aggregate backfill (CA 11)**

**Steel or wood post (steel shown)**

**HMA or PCC pavement**

**Low-strength Material (CLSM)**

**Finished ground line**

**Aggregate backfill (CA 11)**

**Steel or wood post (steel shown)**

**HMA or Controlled Low-strength Material (CLSM)**

**2 (50) max.**

**If greater than 8 (200) apply FOOTING FOR POST WHEN IMPERVIOUS MATERIAL IS ENCOUNTERED, but do not shorten post.**

**PLAN**

**GUARDRAIL PLACED BEHIND CURB**

Note: "D" shall not exceed 6 (152) for design speeds greater than 45 mph.

**FOOTING FOR POST WHEN IMPERVIOUS MATERIAL IS ENCOUNTERED**

**LEAVE-OUT FOR POST WHEN PAVED MATERIAL IS ENCOUNTERED**

**STEEL PLATE BEAM GUARDRAIL**

**ELEVATION**

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**APPROVED 2018**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED 1-1-97**

**ENGINEER OF POLICY AND PROCEDURES**

**STANDARD 630001-12**

(Sheet 4 of 4)
When connecting to long-span guardrail over culvert, the next post may be the third (farthest from culvert) CR7 wood post (See Standard 630106).

When "S" is less than 3 and the distance from the back of post is less than 24 (610), the post embedment shall be 76 (193) m and the minimum top of rail height shall be 31 (787).

Back-up plate nested between guardrail and steel post.

Steel post (See Standard 630106).

For details of guardrail elements not shown, see Standard 630001.

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).

Standard 630006.
Note: Ledge line is top of rock ledge or hard slag fill.

 finished ground line

Drilled hole

Steel post

Aggregate backfill (CA 11)

HMA or PCC pavement

If greater than 8 (200) apply footing for post when impervious material is encountered, but do not shorten post.

footing for post when impervious material is encountered

leave-out for post when paved material is encountered

plan

ELEVATION

PLATE BEAM GUARDRAIL

STANDARD 630006

NON-BLOCKED STEEL
For Case IV.

Revised weld detail unless otherwise shown.

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

Nuts and standard washers.

All threaded rods shall be installed with heavy hex nuts and standard washers.

GENERAL NOTES

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.
Pay limits of other type

62'-6" (19.05 m) min. of other type of guardrail
(May include terminals)

6'-3" (1.905 m)

12'-6", 18'-9" or 25'-0"

62'-6" (19.05 m) min. of other type of guardrail
(May include terminal)

Steel posts
CRT wood posts

ELEVATION

SECTION A-A

6 (1528)
8 (203)
12 (305)

CRT WOOD POST

GENERAL NOTES

See Standard 630001 for details of guardrail not shown.

Blockouts shown at steel posts shall be omitted when NON-BLOCKED STEEL PLATE BEAM GUARDRAIL is specified. See Standard 630006 for details not shown.

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

STANDARD 630106-02

OVER CULVERT

ENGINEER OF POLICY AND PROCEDURES
APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

PASSED

DATE
REVISIONS
Pay limits of Guardrail Attached to Culvert

Steel post

Post standoff

70 xx, both ends

Steel backup plate nested between guardrail and steel post.

Steel plate beam guardrail

Steel post at culvert

SQUARE WASHER A

DETAIL A

POST STANDOFF

Steel socket. See Cases I - VI for assembly and mounting details

SQUARE WASHER A

DETAIL B

STEEL POST

53x5.7 (576x8.5) steel post

Post standoff

No mounting details for welding of post standoffs

弥补的栏杆

Steel post standoff

Steel post

Culvert head wall

Single 1:10 or flatter

See DETAIL A for attachment to post.

See DETAIL B for welding of post standoffs

GENERAL NOTES

See Standard 630001 for details of guardrail not shown.

See Standard 630006 for details of non-blocked guardrail not shown.

All threaded rods and bolts shall be installed with heavy hex nuts and standard washers unless noted otherwise.

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

Pay limits of Guardrail Attached to Culvert

50’ (15.24 m) min. of other guardrail type required prior to barrier terminal.

(Non-blocked guardrail shown)

Pay limits of Guardrail Attached to Culvert

50’ (15.24 m) min. of other guardrail type required prior to barrier terminal.

(Blocked guardrail shown)
CROSS SECTION

CASE II, \((H+T-R) < 18\) (457), SIDE-MOUNT THROUGH-BOLT

Steel post:
\(\frac{3}{4} \times 5\) (M16 x 127) hex bolt and nut

Socket assembly:
Two \(\frac{3}{4} \times 2\) (M13 x 50) hex bolts

Greater of \(\frac{5}{8}(140)\) or \(R+2\frac{1}{2}(R=64)\)

* \(R\) varies between 0 to 6 (152)

ELEVATION

CASE II, \((H+T-R) < 18\) (457), SIDE-MOUNT THROUGH-BOLT

Steel post:

\(\frac{3}{4} \times 5\) (M16 x 127) hex bolt and nut

Socket assembly:
Two \(\frac{3}{4} \times 2\) (M13 x 50) hex bolts

Greater of \(\frac{5}{8}(140)\) or \(R+2\frac{1}{2}(R=64)\)

* \(R\) varies between 0 to 6 (152)

ELEVATION

CASE III, \((H+T-R) < 18\) (457), SIDE-MOUNT ANCHORED

Steel post:

\(\frac{3}{4} \times 5\) (M16 x 127) hex bolt and nut

Socket assembly:
Two \(\frac{3}{4} \times 2\) (M13 x 50) hex bolts

Greater of \(\frac{5}{8}(140)\) or \(R+2\frac{1}{2}(R=64)\)

* \(R\) varies between 0 to 6 (152)
Steel post

1/2 x 5 (M16 x 127) hex bolt and nut
Socket assembly

Two 1/2 x 7 (M13 x 178) threaded rods secured with chemical adhesive

Two 3/8 (19) threaded rods secured with chemical adhesive. Length shall be W + 4 (302).

SQUARE WASHER B

* R varies between 0 to 6 (152)

CROSS SECTION
CASE V, (H+T-R) > 18 (457), SIDE-MOUNT, THROUGH-BOLT

Steel post

1/2 x 5 (M16 x 127) hex bolt and nut
Socket assembly

Two 1/2 x 7 (M13 x 178) threaded rods secured with chemical adhesive

* R varies between 0 to 6 (152)

CROSS SECTION
CASE VI, (H+T-R) ≥ 18 (457), SIDE-MOUNT ANCHORED

1/2 x 11 (M19 x 379) threaded rods secured with chemical adhesive
For details of guardrail elements not shown, see Standard 630081.

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

GENERAL NOTES
See Standard 630001 for detail of wave-out for guardrail line posts.

**Variable slope**

**Slope 1:1 max.**

**Shoulder stabilization end treatment**

**Proposed HMA stabilization 36 (900) & var.**

**Proposed PCC/HMA stabilization 36 (900) & var.**

(material same as shoulder)

**Variable depending on normal shoulder slope**

**Transition to shoulder surface**

**Proposed HMA & var. stabilization 36 (900)**

**Proposed PCC/HMA shoulder paved width**

**Proposed standard shoulder paved width**

**Variable shoulder paved width**

**Resurfacing**

**New Construction**

**GENERAL NOTES**

See Standard 482001, 482006, 483001 and 630001 for details not shown.

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

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-17</td>
<td>Revised wave-outs, moved dimensions to Standard 630001</td>
</tr>
<tr>
<td>1-1-09</td>
<td>Switched units to English (metric)</td>
</tr>
</tbody>
</table>

PCC / HMA

STABILIZATION AT STEEL PLATE BEAM GUARDRAIL

STANDARD 630201-07
**SHOULDER WIDENING TRANSITION FOR TANGENT TERMINAL**

**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.

**SECTION A-A**

- Edge of pavement
- Edge of shoulder and guardrail extruder head
- Top of rail
- Top of tube
- Ground line, slope 1:10 or flatter

**Notes regarding the taper/flare**

- Taper according to manufacturer's specifications to ensure extruder head will not encroach on shoulder.
- Beginning length of need point varies by manufacturer. Typically occurs between posts 1 and 3.

**SLOPE 1:2.5 max.**

- (If fill height exceeds 3'-0" (1.3 m) use 1:3 max.) 1:4 desirable

**STANDARD 630301-09**

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

- January 1, 2019
- APPROVED
- January 1, 2019
- ENGINEER OF DESIGN AND ENVIRONMENT
- ISSUED 1-1-00
- PASSED
- ENGINEER OF POLICY AND PROCEDURES

**DATE**

- 1-1-18
- Removed pay limits. Revised notes regarding the taper/flare and length of need point.
- 1-1-19

**REVISIONS**

- 1-1-18
- Omitted posts from Pay limits of other type.

**SHOULDER WIDENING FOR TYPE 1 (SPECIAL) GUARDRAIL TERMINALS**

- Sheet 1 of 2

**STANDARD 630301-09**
SHOULDER WIDENING TRANSITION
FOR FLARED TERMINAL

Wall thickness, 38" (962 mm): Variable
Top of tube

Slope 1:10
or flatter

Beginning length of need point
varies by manufacturer. Typically
occurs between posts 1 and 3.

SHOULDER WIDENING FOR
TYPE 1 (SPECIAL)
GUARDRAIL TERMINALS

Section B-B

(Impact Head omitted for clarity.)

Slope 1:24 max.
(If fill height exceeds
5'-0" (1.5 m) use 1:3 max.)
3'-4" desirable

Top of tube

Variable
38" (962 mm) 6'-0" (1.8 m)

Edge of pavement

Edge of shoulder

10'-0" (3.0 m) min.
35'-0" (10.0 m) min.

3'-0" (1.0 m) desirable
100'-0" (30.0 m) min.

Flare according to manufacturer’s specifications

28'-0" (8.5 m)

1:4 desirable
(If fill height exceeds
5'-0" (1.5 m) use 1:3 max.)

22'-0" (6.7 m)

10'-0" (3.0 m)

5'-0" (1.5 m)

30" (762 mm) to 4'-0" (1.2 m)

25'-0" (7.5 m)

25'-0" (7.5 m)

8'-0" (2.4 m) max.

25'-0" (7.5 m) min.

35'-0" (10.0 m) min.

Impact Head omitted for clarity.
**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.
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.

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.

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 5

**GENERAL NOTES**

Install 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 (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.

See Standard 630001 for details of guardrail not shown.

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

**DATE** | **REVISIONS**
---|---
1-1-15 | Revised post spacing, dimensions on elevation.
1-1-09 | Switched units to English (metric).

**TRAFFIC BARRIER TERMINAL, TYPE 5**

**STANDARD 631026-06**
GENERAL NOTES

See Standard 630001 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.

TRAFFIC BARRIER TERMINAL, TYPE 6

1-1-20 Revised F-Shape to constant slope parapet and added steel connector plate. Added two posts and revised post length

1-1-17 Revised length of thrie beam. Revised length of posts

1-1-17 Revised length of posts.
Five M20 anchor bolts secured with chemical adhesive and five standard washers. After tightening, cut the anchor bolts flush with the nuts, and damage the nuts to prevent them from loosening.

Pay limits of TRAFFIC BARRIER TERMINAL, TYPE 6 (1 each)

Approach curb, see plans for details.

12'-6" (3.81 m) Single section of thrie beam
One set inside the other

6'-3" (1.91 m) Single section of thrie beam

4'-3" (1.30 m) Single transition section of thrie beam

12'-6" (3.81 m) Single section of w-beam
When no curb is present within this limit.

Two sections of w-beam, one set inside the other, when curb is present within this limit.

**PLAN**

**ELEVATION**

Pay limits of other type

**TERMINAL, TYPE 6**

**TRAFFIC BARRIER**

**STANDARD 631031-16**

Illinois Department of Transportation

January 1, 2020

ENGINEER OF POLICY AND PROCEDURES

APPROVED January 1, 2020

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

PASSED
THREE BEAM END SHOE DETAIL

POSTS 1-11 WOOD BLOCKOUT DETAIL

POST 12 WOOD BLOCKOUT DETAIL

(See Standard 630001 for post 13-17 blockouts.)

TRANSITION SECTION

(Traffic Barrier Terminal, Type 6)

PARAPET STEEL BEARING PLATE DETAIL

(See Standard 630001 for post 13-17 blockouts.)
Steel connector plate shall be fabricated from AASHTO M 319 Grade 36 (M 319M Grade 250) steel and galvanized according to AASHTO M 111. All dimensions are in inches (millimeters) unless otherwise shown.

**WELDING INSTRUCTION**

- Back side of plate shown.

**STEEL CONNECTOR PLATE FOR CONSTANT SLOPE**

**PLATE AND STIFFENER IDENTIFICATION**

- Back side of plate shown.

**CONNECTOR PLATE DIMENSION (PER ASSEMBLY)**

<table>
<thead>
<tr>
<th>PLATE</th>
<th>QUANTITY</th>
<th>SHAPE</th>
<th>SIZE A x B x C x D x E</th>
<th>THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>1</td>
<td>20 x 20</td>
<td>(508 x 508)</td>
<td>%</td>
</tr>
<tr>
<td>P2</td>
<td>1</td>
<td>20 x 20</td>
<td>(508 x 508)</td>
<td>%</td>
</tr>
<tr>
<td>P3</td>
<td>1</td>
<td>36 x 36</td>
<td>(933 x 87 x 528 x 433)</td>
<td>%</td>
</tr>
<tr>
<td>S1</td>
<td>4</td>
<td>18 x 18</td>
<td>(476 x 87 x 476 x 6)</td>
<td>%</td>
</tr>
<tr>
<td>S2</td>
<td>1</td>
<td>8 x 8</td>
<td>(205 x 43 x 33 x 175)</td>
<td>%</td>
</tr>
</tbody>
</table>
For side-mount bridge rail, flare, curb face to edge of deck.

Bridge approach curb, see plans for details.

Modified thrie beam end shoe

Transition section (see detail) included in TRAFFIC BARRIER TERMINAL TYPE 6

Pay limits of TRAFFIC BARRIER TERMINAL TYPE 6A (1 each)

End Rail Post

Pay limits of other type

C

1 (25) holes

C

1 (23) holes

"Bridge rail"

Pay limits of other type

PLAN

Two sections of thrie beam, one set inside the other

Transition section (see details) included in TRAFFIC BARRIER TERMINAL TYPE 6

Pay limits of other type

PLAN

SECTION A-A

SECTION B-B

This standard shows attachment to curb mounted bridge rail. Attachment to side mounted bridge rail is similar.

See Standard 630001 for details of guardrail net 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.

GENERAL NOTES

TRAFFIC BARRIER TERMINAL, TYPE 6A

Illinois Department of Transportation

APPROVED

1-1-2003

STA ND AR D 631032-09

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-17

DATE

REVISIONS

1-1-17 Revised length of thrie beam. Revised length of posts.

1-1-13 Added note to see plans for bridge approach curb details.
Bolts (A307) with washers and self-locking nut, or nut and jam nut. Top bolt, \( \frac{3}{8} \times 9 \) (22x229). Bottom bolt, \( \frac{3}{8} \times 5 \) (22x127) for curb mount or \( \frac{3}{8} \times 7 \) (22x179) for side mount.

Note:
Side mounted rail similar as to connection details.

Finished surface

**Thrie beam end shoe**

Section C-C

Posts 1-9 wood blockout detail

Post 10 wood blockout detail

(See Standard 630001 for post 11-15 blockouts.)

Transition section

(10 gauge 3.4 rail element)

Traffic barrier

Terminal, Type 6A

Standard 631032-09

Illinois Department of Transportation

January 1, 2017

Engineer of Policy and Procedures

Approved January 1, 2017

Engineer of Design and Environment

Issued

Passed 1-1-2003
GUARDRAIL CONNECTION PLATE ASSEMBLY DETAILS
(Mirror for opposite end)

VIEW D-D

LEGEND
• for ¼ (22) H.S. bolts and nuts

Drill and tap 3 holes for ¼ (22) H.S. bolts.

SECTION E-E

DEPARTURE END VIEW

CONNECTION ANGLES:
[Install angles to rail cap (By others)]
washers and self-locking nuts or nuts and jam nuts to be provided by others]
See details of Wood Blockouts A, B, C, & D

* With standard washers. After tightening, cut the anchor bolts flush with the nuts and damage the nuts to prevent them from loosening.

See Standard 630001 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.
POSTS 1-11 WOOD BLOCKOUT DETAIL

POST 12 WOOD BLOCKOUT DETAIL
(See Standard 630001 for post 13-17 blockouts.)

THRIE BEAM END SHOE DETAIL

WOOD BLOCKOUT A & B

WOOD BLOCKOUT D

WOOD BLOCKOUT C

WOOD BLOCKOUT A, B, C, & D

MODIFIED THICKNESS DETAIL

CONCRETE STRUCTURE

Thrie beam

6 (152)

Concrete Structure

Thrie beam

3⁄8 (M20) anchor bolt secured with chemical adhesive

3⁄4 (M20) bolt with washer and nut. (direction reversed)

1 (25) Dia holes (typ.)

3x2 1 1⁄2 (19x64) slotted holes (typ.)

1x2 (25x51) slotted holes (typ.)
**TRAFFIC BARRIER TERMINAL TYPE 11**

**TEMPORARY CONCRETE BARRIER**

1/4 (M22) anchor bolts with standard washers. **

Wood block treated
3½x6x6x13 (89x152x330)
1½ (38) dim. at cts.

1½ (M16) bolts with standard washers.

4-2 Unit expanding, or self-drilling anchors for 1½ (M16) bolts with standard washers.


1/2 (25) x 102 (1.905 m)

**GENERAL NOTES**

For details of guardrail not shown, see Standard 630001.

Install the face of the guardrail flush with the face of the temporary bridge rail. Install 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 (M24) diameter bolts are in place.

* Bolts shall be provided with a lock nut or double 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 nuts, and damage the bolt head to prevent them from loosening.

All dimensions are in inches (millimeters) unless otherwise shown.
Delineators shall be placed 24 (600) from break point on all interchange ramps and wherever pavement superelevation exceeds 6%.

- **Type C** Metal post (1.2 m)
- **4' (900)**
- 36

Delineators shall be placed on curves.

- **Single reflector units on tangent sections of main line ramps.**
- **Double reflector units shall be used on the outside of all acceleration and deceleration lanes.**
- **Provide when double reflector unit is required.**

### Space in Advance and Beyond Curve

<table>
<thead>
<tr>
<th>Radius of Curve</th>
<th>Spacing on Curve</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Feet (m)</strong></td>
<td><strong>Feet (m)</strong></td>
</tr>
<tr>
<td>-----------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Less than 100</td>
<td>20 (6)</td>
</tr>
<tr>
<td>100 - 174</td>
<td>30 (9)</td>
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<tr>
<td>175 - 224</td>
<td>35 (10)</td>
</tr>
<tr>
<td>225 - 274</td>
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<td>275 - 349</td>
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<td>80 (25)</td>
</tr>
<tr>
<td>850 - 949</td>
<td>85 (30)</td>
</tr>
<tr>
<td>950 - 1049</td>
<td>90 (35)</td>
</tr>
<tr>
<td>1050 - 1149</td>
<td>100 (45)</td>
</tr>
<tr>
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<td>1250 - 1349</td>
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<td>1350 - 1449</td>
<td>130 (60)</td>
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<td>140 (60)</td>
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<td>1550 - 1649</td>
<td>150 (70)</td>
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<td>170 (80)</td>
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<td>1850 - 1949</td>
<td>180 (80)</td>
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<td>1950 - 2049</td>
<td>190 (90)</td>
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<td>200 (90)</td>
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<td>3950 - 4049</td>
<td>390 (125)</td>
</tr>
<tr>
<td>4050 - 4149</td>
<td>400 (125)</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

- Delineators on tangent sections of main line roadways shall be placed at 400 (120 m) spacing.
- Delineators on ramps and acceleration and deceleration lanes shall be placed at a maximum spacing of 100 (30 m) spacing.
- 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 placed on outside of all curved sections of ramps.
- All dimensions are in inches (millimeters) unless otherwise shown.

**DATE**

- **4-1-16**: Added detail of reflector attached to post. Revised signature block.
- **1-1-09**: Switched units to English (metric). Revised notes.

**REVISIONS**

- **ILLINOIS DEPARTMENT OF TRANSPORTATION**
- **ENGINEER OF DESIGN AND ENVIRONMENT**
- **ENGINEER OF OPERATIONS**

**STANDARD 635001-02**
NOTES

V + W shall not exceed 38 (990). When V is 0 to 15 (380), W = 24 (610), and posts shall be shortened as required. When V exceeds 15 (380), W shall be shortened correspondingly.

T = 15 (380) when U = 33 (840) or less. When U exceeds 33 (840), the impervious material shall be removed and the post 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

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 Cross-Section**

**Variable Cross-Section**

**New Monolithic PCC Base**
- 8 (2000) mm
- 10.3° batter

**New or Existing Bit/PCC Base with Overlay Confinement**
- 8 (2000) mm
- 6 (150) mm
- 6 (150) Tie bars at 30 (760) cts. (staggered side to side)
- 6 mils (0.15) Polyethylene bond breaker

**New or Existing PCC Base**
- 6 (150) mm
- 7 (180) mm
- 14 (360) mm

**Existing PCC Base with Longitudinal Joint**
- 6 (150) mm
- 7 (180) mm
- 8 (2000) mm

**Anchoring Methods**

**General Notes**

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 additional light pole foundation details where required in concrete barrier.

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

**Concrete Barrier, Double Face, 44 in. (1120 mm) Height**

**DATE**

**REVISIONS**

1/1/19: Revised from F-shape to constant slope, increased height, and renamed standards
1/1/13: Revised general note to Reference standard 836006 for light pole foundation

**STANDARD 637006-04**
Plan at Lighting Foundation:

- Expansion joint
- Conduit
- Anchor rod
- Smooth header drilled for bars
- Preformed expansion joint filler
- Dowel bars

Elevation at Lighting Foundation:

- Barrier base
- Grounding electrode
- PVC sleeve for 38 sch. 40
- Dowel bars
- Expansion joint
- Plastic caps
- Joint filler

Concrete Barrier, Double Face, 44 in. (1120 mm) Height

Standard 637006-04
**Typical Application at Median Obstructions**

- **Expansion Joint**
- **No. 4 (No. 13) Bar**
- **Bend in field**
- **Concrete glare barrier**
- **Concrete (750)**
- **30 (2.1 m)**
- **7'-0"**
- **Typical Application at Median Obstructions**

**Elevation**

- Center on concrete barrier
- No. 4 (No. 13) Bar
- No. 4 (No. 13) Bar 18 (450) long (typ.)
- Bend in field

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

**DATE**

**REVISIONS**

- 1-1-04 Switched units to English (metric)
- 1-1-97 Revised for F shape barrier

**CONCRETE GLARE SCREEN**

**STANDARD 638101-02**
Each alternate pair of panels shall have a textured surface finish as shown, and shall be alternated with pairs having a smooth finish. The intersection of every two panels having the same finish shall point toward the road as shown.

**PLAN**

**ELEVATION**

Top of wall

Finished grade

36 (900) min. embankment at low point of finished grade (typ.)

**SECTION A-A**

Coarse aggregate backfill

15 (380) min. thick

**SECTION B-B**

Threaded inserts for 3/8 (M12) bolts, precut or field drilled, as necessary, into panels.

Showing typical metal band connector dimensions.

Showing typical shear key dimensions.

**GENERAL NOTES**

Loading for 80 mph (130 km/h) wind with 30% gust factor, normal to wall. Maximum allowable soil bearing pressure:

Minimum allowable soil bearing pressure: = 1.25 tsf (120 kPa)

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

**ALLOWABLE STRESSES:**

Concrete:

f_c = 3,300 psi (24 MPa)

f_{ck} = 3,250 psi (22 MPa)

f_{ck} = 27,000 psi (186 MPa)

Reinforcing Steel:

f_y = 40,000 psi min. (270 MPa)

Minimum allowable soil bearing pressure: = 1.25 tsf (120 kPa)

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

**DESIGNER:**

January 1, 2009

ENGINEER OF BRIDGES AND STRUCTURES

APPROVED

January 1, 2009

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

DATE

REVISIONS

1-1-09

Switched units to English imperial.

1-1-07

Soft converted metric reinforcement bars & corrected dimensions.

SIGHT SCREEN

PRECAST PRESTRESSED CONCRETE PANEL WALL

(1 sheet of 2)

STANDARD 639001-02
* 5° left or right as required by geometry of wall

**Bars**

**No. 4 (No. 13) strands**

**PRESTRESSING**

**Surface finish**

**For panels with smooth surface finish**

**No. 4 (No. 13) bars shall be alternated above and below prestressing strands.**

**NOTE**

Each prestressing strand shall be stressed to 16,000 lbs. (71.2 kN)

**NOTE**

Pitch may vary from 19 (38) to 25 (65), but shall be constant for entire width of panel.

**TEXTURED SURFACE FINISH DETAIL**

**NOTE**

t = thickness of form liner used to obtain surface finish.

**SIGHT SCREEN**

**PRECAST PRESTRESSED CONCRETE PANEL WALL**

**STANDARD 639001-02**

**ELEVATION**

**SECTION E-E**

(For panels with smooth surface finish)

**SECTION E-E**

(For panels with textured surface finish)

**SECTION C-C**

**PANEL ELEVATION**

(Spearing location of metal band connector)

**Nominal Panel Size**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>8'-0&quot; x 8'-0&quot;</td>
<td>6</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>(2.4 m x 2.4 m)</td>
<td>(150)</td>
<td>(300)</td>
<td>(225)</td>
</tr>
<tr>
<td>8'-0&quot; x 9'-9&quot;</td>
<td>3</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>(2.4 m x 3.3 m)</td>
<td>(75)</td>
<td>(135)</td>
<td>(90)</td>
</tr>
<tr>
<td>8'-0&quot; x 12'-0&quot;</td>
<td>3</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>(2.4 m x 3.6 m)</td>
<td>(75)</td>
<td>(180)</td>
<td>(150)</td>
</tr>
</tbody>
</table>

**Illinois Department of Transportation**

**APPROVED** January 1, 2009

**ENGINEER OF BRIDGES AND STRUCTURES**

**APPROVED** January 1, 2009

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED** 1-1-97
Terms of all footings shall be rounded. Tops of all footings shall be rounded.

DETAIL A
- Post
- Line
- Truss rod
- Cable
- Turnbuckle

DETAIL B
- Post
- Line
- Truss rod
- Cable
- Turnbuckle

DETAIL C
- Post
- Line
- Truss rod
- Cable
- Turnbuckle

**ELEVATION - 6' (1.83 m) FENCE**

*(Looking toward Highway)*

- Fence fabric shall be tied to all line posts, tension cable and brace rails with 9 ga. (0.76) wire tied at 12 (300) cts.

**ELEVATION - 8' (2.43 m) & 10' (3.05 m) FENCES**

*(Looking toward Highway)*

**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

**DATE**

1-1-09

**REVISIONS**

Switched units to English (metric).

Revised General Notes.

1-1-97

Revised Standard 2365-6

**STANDARD 640001-01**
SECTION A-A
(Showing method of fastening bottom tension cable and fence fabric to pull posts.)

DETAIL B
(Showing typical method of attaching middle brace rails to posts.)

DETAIL C
(Looking toward highway)

DETAIL A
(Looking from highway)

DETAIL OF FABRIC
DETAIL A

- 3x4 (75x100) Rails (nominal dim.)
- Cedar pickets
- Posts

3-4" (2.2 m) Spacing (typ.)

PLAN
(Facing Highway)

DETAIL B

Fence height

75 ± 50

3 ± 2

A

B

C

D

6'-0" (1.8 m)
8'-0" (2.4 m)

Post Size
(nominal dim.)

6 x 6 (150x150)
6 x 8 (200x200)

Post Length
3'-0" (1.0 m)
4'-0" (1.2 m)

Post Embedment
A

B

C

D

12 (300)

15 (380)

18 (460)

33 (870)

18 (460)

33 (870)

15 (380)

SEC. A-A

Vertical posts
(typ.)

Slope rails parallel
to grade

ELEVATION

(Showing treatment with sloping ground)

Aggregate

15 (380) Dia. hole
for post

1/2" (12.7) Dia. hole
in timbers.

30° min.

DETAIL A

(Showing typical pocket
to rail attachment)


DETAIL B

(Showing typical panel to post
connection at each rail)

SECTION B-B

(Notch pickets when required
to clear washer and bolt head)

GENERAL NOTES

Loading is based on 80 mph (130 km/h) with 30%
gust factor. Minimum allowable soil pressure =
1.25 tlf (125 kPa).

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

DATE
1-1-97
1-1-99

REVISIONS
Sec. B-B to Detail B.

SIGHT SCREEN
CEDAR STOCKADE FENCE
TYPE S

STANDARD 641001-01

ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
January 1,
2009

ENGINEER OF BRIDGES AND STRUCTURES
APPROVED
January 1,
2009

Illinois Department of Transportation
APPROVED
January 1,
2009

STANDARD 641001-01

SIGHT SCREEN
CEDAR STOCKADE FENCE
TYPE S

STANDARD 641001-01

ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
January 1,
2009

ENGINEER OF BRIDGES AND STRUCTURES
APPROVED
January 1,
2009

Illinois Department of Transportation
APPROVED
January 1,
2009
On Portland cement concrete shoulders, no shoulder rumble strip shall be located closer than 6 (150) to a transverse joint.

Omit shoulder rumble strips across structures.

All dimensions are in inches (millimeters) unless otherwise shown.
SHOULDER RUMBLE STRIPS, 8 in.

**GENERAL NOTES**

Omit shoulder rumble strips across structures and at mailbox turnouts.

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

_TYPICAL APPLICATION AT AN INTERSECTION OR ENTRANCE_

- See Section A-A

**PLAN**

- Rumble strip over 48' (14.6 m) span
- 12' (3.6 m) gap
- Rumble strip over 48' (14.6 m) span

**SECTION A-A**

**SECTION B-B**

_Edges of pavement_

_Edges of paved shoulder_

_Varies_

_1 \pm 1.6_

_4_
**General Notes**

Pull posts shall be placed at locations determined by the Engineer. They shall be placed at 660' (200 m) intervals between posts to which the ends of the fabric are clamped or midway between such posts when the distance is less than 1320' (400 m) and greater than 660' (200 m).

When X is 0 - 9 (0 - 225), then Y = 15 (375) and the post shall be shortened as required. When X exceeds 9 (225), 15 (380), or 21 (525), then Y shall be decreased correspondingly. When X + Y exceeds 24 (600), 30 (750), or 36 (900), as applicable, then Y = 15 (375) and the post shall be shortened as required. When X exceeds 9 (225), 15 (380), or 21 (525), then Y shall be decreased correspondingly.

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

**LINE 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</td>
<td>48.3</td>
</tr>
<tr>
<td>Pipe Type B</td>
<td>1.90</td>
<td>48.3</td>
</tr>
<tr>
<td>Pipe Type C</td>
<td>1.90</td>
<td>48.3</td>
</tr>
<tr>
<td>H 1.875 x 1.625</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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>2.375</td>
<td>60.3</td>
</tr>
<tr>
<td>Pipe Type B</td>
<td>2.375</td>
<td>60.3</td>
</tr>
<tr>
<td>Pipe Type C</td>
<td>2.375</td>
<td>60.3</td>
</tr>
<tr>
<td>Roll Formed 35 x 35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sq. Tubing 2 x 2</td>
<td>63.5 x 63.5</td>
<td>4.32</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>1.66</td>
<td>42.2</td>
</tr>
<tr>
<td>Pipe Type B</td>
<td>1.66</td>
<td>42.2</td>
</tr>
<tr>
<td>Pipe Type C</td>
<td>1.66</td>
<td>42.2</td>
</tr>
<tr>
<td>H 1.31 x 1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roll Formed 35 x 35</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GATE POSTS**

<table>
<thead>
<tr>
<th>Gate Opening * H (m)</th>
<th>Pipe Type A</th>
<th>Pipe Type B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>Double</td>
<td>Single</td>
</tr>
<tr>
<td>Size (O.D.)</td>
<td>kg/m</td>
<td>lbs./ft.</td>
</tr>
<tr>
<td>Up to 4 (1.2)</td>
<td>2.375</td>
<td>(60.3)</td>
</tr>
<tr>
<td>Over 4 (1.2) to 8 (2.5)</td>
<td>2.675</td>
<td>(63.5)</td>
</tr>
<tr>
<td>Over 8 (2.5) to 16 (5.0)</td>
<td>3.55</td>
<td>(89.0)</td>
</tr>
</tbody>
</table>

* * The 35 x 35 (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).
**STANDARD GROUND**

**COUNTERPOISE GROUND**

**PROTECTIVE ELECTRICAL GROUNDS**

**INSTALLATION ON SLOPES**

**PLAN AT STREAM CROSSING**

The chain link fabric shall be replaced by barbed wire strands at 12 (300) maximum centers between the double posts shown on DETAIL A when shown on the plans.

**INSTALLATION AT CORNERS**

**INSTALLATION OVER STREAM**

End post assembly

The chain link fabric shall be replaced by barbed wire strands at 12 (300) maximum centers between the double posts shown on DETAIL A when shown on the plans.

**INSTALLATION AROUND HEADWALL**

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.

**DETAIL A**

36 (900) for 4' (1.2 m) fence. 3'-6" (1.0 m) for over 4' (1.2 m) fence.
**FENCE USING METAL POSTS**

**WOVEN WIRE FENCE**

**GENERAL NOTES**

1. Barbed wires shall be tied to each post. Top and bottom wires of woven fence shall be tied to each post. Tie every other wire between, alternated on successive posts.

2. Barbed wires and line wires of woven fence shall be be fastened to the corner, end, pull, and gate posts by wrapping the wires around the post and tying back on itself with not less than 3 twists tightly wrapped.

3. Bracing for gate posts shall be the same type used for end posts.

4. The clearance between the bottom fence wire and the ground may be up to 3 (75) for a maximum distance of 9' (2.74 m) when uneven ground is encountered.

5. 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 1320' (400 m) and greater than 660' (200 m).

6. Bracing for gate posts shall be the same type used for end posts.

**NOTES**

- The clearance between the bottom fence wire and the ground may be up to 3 (75) for a maximum distance of 9' (2.74 m) when uneven ground is encountered.

**Illinois Department of Transportation**

January 1, 2009

ENGINEER OF POLICY AND PROCEDURES

APPROVED January 1, 2009

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED January 1, 2009

PASSED

DATE

REVISIONS

1-1-97 Switched units to English (metric).

1-1-02 Corrected dimensions on Sheet 3 and 4.

1-1-09 Sheet 1 of 4

STANDARD 665001-02
Details of the double and single gates are the same as those for metal posts.

Fence shall be overlapped for a distance of 5'6" (1.67 m) for metal bracing.

Brace posts:
- Wood brace
- Wood blocks
- Ground line

Pull post:
- Ground line
- Wood blocks

Line post:
- Barbed wire
- Line post
- Wood brace

Corner or end post:
- Brace wires stapled to posts on 3 sides

Staple every other wire between, and bottom wire of woven fence shall be stapled to each post. Top barbed wires shall be stapled to each post, alternating on successive posts.

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.
- Metal line posts may be used in lieu of wood line posts.

Illinois Department of Transportation

January 1, 2009

ENGINEER OF POLICY AND PROCEDURES

APPROVED

January 1, 2009

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

PASSED

STANDARD 665001-02

(Sheet 2 of 8)
### METAL ITEMS

#### GATE FRAMES

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A: Pipe 1.66 (42.2) O.D.</td>
<td>1.82 (2.71)</td>
</tr>
<tr>
<td>Type B: Pipe 1.66 (42.2) O.D.</td>
<td>1.83 (2.72)</td>
</tr>
<tr>
<td>Type C: Pipe 1.66 (42.2) O.D.</td>
<td>2.27 (3.43)</td>
</tr>
</tbody>
</table>

#### CORNER, END or PULL POSTS

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A: Pipe 2.375 (60.3) O.D.</td>
<td>3.09 (4.60)</td>
</tr>
<tr>
<td>Type B: Pipe 2.375 (60.3) O.D.</td>
<td>4.37 (6.43)</td>
</tr>
<tr>
<td>Type C: Pipe 2.375 (60.3) O.D.</td>
<td>4.1 (6.10)</td>
</tr>
</tbody>
</table>

#### LINE POSTS

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A: Pipe 3.15 (79.4) O.D.</td>
<td>3.65 (5.43)</td>
</tr>
<tr>
<td>Type B: Pipe 3.15 (79.4) O.D.</td>
<td>3.11 (4.63)</td>
</tr>
<tr>
<td>Type C: Pipe 3.15 (79.4) O.D.</td>
<td>3.09 (4.60)</td>
</tr>
</tbody>
</table>

#### BRACES

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A: Pipe 2.375 (60.3) O.D.</td>
<td>1.82 (2.71)</td>
</tr>
<tr>
<td>Type B: Pipe 2.375 (60.3) O.D.</td>
<td>1.83 (2.72)</td>
</tr>
<tr>
<td>Type C: Pipe 2.375 (60.3) O.D.</td>
<td>1.84 (2.73)</td>
</tr>
</tbody>
</table>

### METAL ITEMS

#### GATE POSTS

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single gate up to 4 ft. (1.22 m)</td>
<td>3.09 (4.60)</td>
</tr>
<tr>
<td>Double gate up to 8 ft. (2.44 m)</td>
<td>2.875 (43.0) O.D.</td>
</tr>
<tr>
<td>Section</td>
<td>lbs./ft. (kg/m)</td>
</tr>
<tr>
<td>---------</td>
<td>----------------</td>
</tr>
<tr>
<td>Type A: Pipe 2.375 (60.3) O.D.</td>
<td>3.65 (5.43)</td>
</tr>
<tr>
<td>Type B: Pipe 2.375 (60.3) O.D.</td>
<td>3.11 (4.63)</td>
</tr>
<tr>
<td>Type C: Pipe 2.375 (60.3) O.D.</td>
<td>3.09 (4.60)</td>
</tr>
<tr>
<td>Tubing 2.5 (63.5) Sq.</td>
<td>5.76 (8.62)</td>
</tr>
<tr>
<td>or Approved structural shapes</td>
<td>6.1 (9.08)</td>
</tr>
</tbody>
</table>

### WOOD ITEMS

#### GATE, CORNER, END or PULL POSTS

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 to 7 (150 to 175) Top dia. 4x6 (150x150)</td>
<td>2.875 (43.0) O.D.</td>
</tr>
<tr>
<td>4 to 5 (100 to 125) Top dia. 4x4 (100x100)</td>
<td>2.875 (43.0) O.D.</td>
</tr>
<tr>
<td>3 (75.2) Sq.</td>
<td>5.78 (8.60)</td>
</tr>
</tbody>
</table>

#### BRACES and LINE POSTS

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x8x18 (50x200x450)</td>
<td>4.1 (6.10) min.</td>
</tr>
<tr>
<td>or other approved structural shapes</td>
<td>6.1 (9.08) min.</td>
</tr>
</tbody>
</table>

#### BLOCKS

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x8x18 (50x200x450)</td>
<td>2.875 (43.0) O.D.</td>
</tr>
</tbody>
</table>

### OVERVIEW

- **GATE FRAMES**
  - Single gate up to 4 ft. (1.22 m)
  - Double gate up to 8 ft. (2.44 m)
- **CORNER, END or PULL POSTS**
  - Type A: Pipe 1.66 (42.2) O.D.
  - Type B: Pipe 1.66 (42.2) O.D.
  - Type C: Pipe 1.66 (42.2) O.D.
- **LINE POSTS**
  - Type A: Pipe 2.375 (60.3) O.D.
  - Type B: Pipe 2.375 (60.3) O.D.
  - Type C: Pipe 2.375 (60.3) O.D.
- **BRACES**
  - Type A: Pipe 3.15 (79.4) O.D.
  - Type B: Pipe 3.15 (79.4) O.D.
  - Type C: Pipe 3.15 (79.4) O.D.
- **WOOD ITEMS**
  - 2x8x18 (50x200x450)
Concrete Ledge

**Metal Post**

**Wood Post**

*Footings for Posts When Rock Ledge is Encountered*

- Shallow V cut in brace when round post is used.
- Bolt (10x100)
- Stool pin

*Alternate Details for Fastening Wood Brace to Wood Post*

15°

*Installation at Corners*

- 15° corner post
- Fabric

*Protective Electrical Grounding for Wood Post Fence Installation*

*Installation on Slopes*

*Plan at Stream Crossing*

*Plan at Headwall*

*Elevation*

**Elevation**

**Installation Over Stream**

**Installation Around Headwall**

**Detail A**

*Woven Wire Fence*

Illinois Department of Transportation

January 1, 2009

**Engineer of Policy and Procedures**

*Approved*

January 1, 2009

**Engineer of Design and Environment**

ISSUED 1-1-97

PASSED

STANDARD 665001-02

**Metal Post**

**Wood Post**

**NOTE**

- X + Y shall not exceed 27 (685), 33 (840), or 3'-9" (1.14 m)
- Where X is less than 27 (685), 33 (840), or 3'-9" (1.14 m), X + Y shall not exceed 15° line posts may be used.
- Where fence line has a change in direction of 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.
- When the tension of the fence tends to pull the posts from the ground, the posts shall be anchored with the applicable concrete or wood anchor specified for corner posts.

**NOTE**

- Barbed wire
- Woven wire
- Fabric

**NOTE**

- Where grade line has a change in slope of 15° or more, a corner post with bracing as required shall be placed as shown above.
- Where grade line has a change in slope of 15° or more, a corner post with bracing as required shall be placed as shown above.
- Where grade line has a change in slope of 15° or more, a corner post with bracing as required shall be placed as shown above.

*NOTE*

- Where grade line has a change in slope of 15° or more, a corner post with bracing as required shall be placed as shown above.
**GENERAL NOTE**

Reinforcement bars shall be No. 3 (No. 10) unless otherwise specified.

A 2½x12¼ (70x310) shadow box with beveled edges, and a ¾x (5) thick indentation may be used with the standard lettering shown.

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

---

**METHOD A**

- Edge of pavement
- R.O.W. line
- R.O.W. posts

**METHOD B**

- Edge of pavement
- R.O.W. line
- R.O.W. posts

---

**SECTION A-A**

- a bar
- 2 handles

---

**MARKERS**

Illinois Department of Transportation

January 1, 2009

ENGINEER OF POLICY AND PROCEDURES

APPROVED

January 1, 2009

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

PASSED

DATE

REVISIONS

1-1-97

Replaced Standard 1744-6

1-1-99

Switched units to English Inventory

STANDARD 666001-01

RIGHT OF WAY
DRAINAGE MARKERS

SECTION A-A

Ground line

SECTION B-B

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

STANDARD 667001-01

DATE
1-1-09

REVISIONS
Switched units to English (metric).

January 1,
2009

English (metric).

January 1,
2009

PASSED

DATE
1-1-97

REVISIONS

January 1,
2009

DRAINAGE MARKERS

STANDARD 667001-01
Use cement and water or product from approved list of chemical adhesives to seal marker tablet in rock ledge, concrete pavement, or structure. Hole shall be 1½ (40) in diameter.

**ALUMINUM TABLET**

Magnet when required

½ (13) Ga.

⅛ (6) thick

**DETAIL A**

**TYPE I**

**TYPE II**

**PRECAST MARKER**

**CAST-IN-PLACE MARKER**

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

**SURVEY MARKERS**

**STANDARD 667101-02**

January 1, 2012

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

DATE

REVOLUTIONS

1-1-12

1-1-12

English (metric)

1-1-09

Switched units to metric

1-1-09

Switched unit references to chemical adhesives
See DETAIL A

Ground Surface

Concrete

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.

DETAIL A

ELEVATION
TYPICAL APPLICATIONS

- Landscaping work
- Utility work
- Fencing contracts and maintenance
- Clearing 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) clear zone in any one hour, traffic control shall be according to Standard 701006.

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

- Utility operations
- Culvert extensions
- Side slope changes
- Guardrail installation and maintenance
- Delineator installation
- Landscaping operations
- Shoulder repair
- Sign installation and maintenance

SYMBOLS

- Work area
- Sign
- Cone, drum or barricade

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:

\[ L = \begin{cases} \frac{W}{60} & \text{if } W \leq 40 \\ \frac{W}{150} & \text{if } W > 40 \end{cases} \]

Where:
- \( W \) is the width of the offset in feet (meters)
- \( S \) is the normal posted speed in miles per hour (kilometers per hour)

W = Width of offset (in feet (meters))
S = Normal posted speed (mph (km/h))

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

FORMULAS

- English (Metric)
- \( W \leq 40 \):
  \[ L = \frac{W}{60} \]
- \( W > 40 \):
  \[ L = \frac{W}{150} \]
- \( S \geq 40 \) or less:
  \[ L = \frac{W}{150} \]
- \( S \leq 40 \) or greater:
  \[ L = \frac{W}{60} \]

DATE REVISIONS

1-1-14 Revised workers sign
1-1-13 Omitted text: WORKERS

OFF-RD OPERATIONS, 2L, 2W,
15' (4.5 m) TO 24" (600 mm)
FROM PAVEMENT EDGE

STANDARD 701006-05
AHEAD
MOWING
ROAD
AHEAD
WORK
ROAD
AHEAD
CONSTRUCTION
For contract projects and utility maintenance
For W20-I103(0)-48
Or W20-1(0)-48
W21-I101(0)-48
1000' (300 m) max.
500' (150 m) min.
Varies

Utility operations
Shoulder work
Varies
(4.5 m)
15'
W21-1(0)-48
W20-I103(0)-48
W20-1(0)-48
W21-I101(0)-48
Or

1-1-14
Revised workers sign
number to agree with
Current RM/CD.
1-1-13
Deleted text "WORKERS"
Sign.

DATE
REVISIONS
1-1-14
Revised workers sign
number to agree with
Current RM/CD.
1-1-13
Deleted text "WORKERS"
Sign.

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 60 minutes, traffic control may be according to Standard 70101.

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

SYMBOLS
- Work area
- Sign
- Flagger with traffic control sign when required

TYPICAL APPLICATIONS
Shoulder work
Utility operations

Minimum distance is 200' (60 m). Maximum distance to be determined by the Engineer but should not exceed ½ the length required for one normal working day's operation, or 4 miles (6.4 km) whichever is less.

W20-101(0)-48
W21-101(0)-48
W21-1(0)-48
 W20-101(0)-48
W21-101(0)-48

W20-I103(0)-48
W20-1(0)-48
W20-1(0)-48
W21-I101(0)-48
W21-I103(0)-48

STANDARD 701011-04
OFF-RD MOVING OPERATIONS,
2L, 2W, DAY ONLY
Illinois Department of Transportation
January 1,
2014
APPROVED
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
ENGINEER OF SAFETY ENGINEERING
DATE
REVISIONS
1-1-14
Revised workers sign
number to agree with
Current RM/CD.
1-1-13
Deleted text "WORKERS"
Sign.

January 1,
2014
DATE
REVISIONS
1-1-14
Revised workers sign
number to agree with
Current RM/CD.
1-1-13
Deleted text "WORKERS"
Sign.

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 60 minutes, traffic control may be according to Standard 70101.

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

SYMBOLS
- Work area
- Sign
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TYPICAL APPLICATIONS
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Utility operations

Minimum distance is 200' (60 m). Maximum distance to be determined by the Engineer but should not exceed ½ the length required for one normal working day's operation, or 4 miles (6.4 km) whichever is less.

W20-101(0)-48
W21-101(0)-48
W21-1(0)-48
 W20-101(0)-48
W21-101(0)-48

W20-I103(0)-48
W20-1(0)-48
W20-1(0)-48
W21-I101(0)-48
W21-I103(0)-48

STANDARD 701011-04
OFF-RD MOVING OPERATIONS,
2L, 2W, DAY ONLY
Illinois Department of Transportation
January 1,
2014
APPROVED
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
ENGINEER OF SAFETY ENGINEERING
DATE
REVISIONS
1-1-14
Revised workers sign
number to agree with
Current RM/CD.
1-1-13
Deleted text "WORKERS"
Sign.

January 1,
2014
DATE
REVISIONS
1-1-14
Revised workers sign
number to agree with
Current RM/CD.
1-1-13
Deleted text "WORKERS"
Sign.

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 60 minutes, traffic control may be according to Standard 70101.

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

SYMBOLS
- Work area
- Sign
- Flagger with traffic control sign when required

TYPICAL APPLICATIONS
Shoulder work
Utility operations

Minimum distance is 200' (60 m). Maximum distance to be determined by the Engineer but should not exceed ½ the length required for one normal working day's operation, or 4 miles (6.4 km) whichever is less.
**TYPICAL APPLICATIONS**

- Utility operations
- Culvert extensions
- Side slope changes
- Shoulder repair
- Delineator installation
- Landscaping operations
- Sign installation and maintenance

When the work operation exceeds one hour, cones, drums or barricades shall be placed at 25' (8 m) centers for \( \frac{L}{3} \) distance, and at 50' (15 m) centers through the remainder of the work area.

**SYMBOLS**

- Work area
- Sign
- Cone, drum or barricade

**FORMULAS**

\[
L = \frac{W^2}{S^2} \\
L = 150W^2 \quad \text{for speeds} \leq 40 \text{ mph (60 km/h)}
\]

\[
L = \frac{W(S)(S)}{150} \quad \text{for speeds} > 40 \text{ mph (60 km/h)}
\]

Where:
- \( W \) = Width of offset in feet (meters)
- \( S \) = Normal posted speed in mph (km/h)

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

**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:

**SPEED LIMIT**

<table>
<thead>
<tr>
<th>Speed Limit</th>
<th>English</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mph (60 km/h) or less</td>
<td>( L = \frac{W^2}{S^2} )</td>
<td>( L = 150W^2 )</td>
</tr>
<tr>
<td>45 mph (80 km/h) or greater</td>
<td>( L = \frac{W(S)(S)}{150} )</td>
<td>( L = 0.65W(S) )</td>
</tr>
</tbody>
</table>

The width of offset shall be 15' (4.5 m) to 24' (600 mm) from the pavement edge.
Median

TYPICAL APPLICATIONS
Landscaping work
Utility work
Fencing contracts

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) clear zone in any one hour, traffic control shall be according to Standard 701101.

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.
Devices at 20' (6 m) centers in the taper.
2. Cones at 25' (8 m) centers for the first 150' (45 m).
   Additional cones may be placed at 50' (15 m) centers.
   When drums or barricades are used, these intervals between devices may be doubled.

### TYPICAL APPLICATIONS
- Isolated patching
- Utility operations
- Storm sewer
- Culverts
- Cable placement
- Side road patch
- Patch
- For contract construction projects
- For maintenance and utility projects

### SYMBOLS
- Work area
- Sign
- Barricade or drum
- Cone, drum or barricade
- Flagger with traffic control sign

### GENERAL NOTES
This Standard is used where at any time, any vehicles, 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

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-9</td>
<td>Revised device spacing in taper</td>
</tr>
<tr>
<td>1-1-11</td>
<td>Revised flagger sign</td>
</tr>
</tbody>
</table>

STANDARD 701201-05
**Road Ahead Work**

- Cones at 25' (8 m) centers for the first 150' (45 m). Additional cones may be placed at 50' (15 m) centers. When barricades or drums are used, these intervals between devices may be doubled.

**Typical Applications**
- Isolated patch
- Installation of drainage structure
- Utility operations

**Symbols**
- Work area
- Sign
- Flagger with traffic control sign
- Cone, drum or barricade
- 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 701206-05**
For any operation that encroaches in the area between the centerline and a line 24 (600) outside the edge of the pavement for a period of less than 15 minutes.

Vehicle with dual flashers or flashing amber dome light operating.

For any operation that is more than 24 (600) outside the edge of the pavement for a period of less than 60 minutes.

Vehicle with dual flashers or flashing amber dome light operating.

For any operation that encroaches in the area between the centerline and a line 24 (600) outside the edge of the pavement for a period in excess of 15 minutes but less than 60 minutes.

Cleaning up debris on pavement

Utility operations

String line

Field survey

Marking patches

Work area

TYPICAL APPLICATIONS

SYMBOLS

<table>
<thead>
<tr>
<th>Date</th>
<th>Revisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-11</td>
<td>Revised flagger sign</td>
</tr>
<tr>
<td>1-1-09</td>
<td>Switched units to English (metric)</td>
</tr>
</tbody>
</table>

STANDARD 701301-04
ROAD AHEAD
WORK
ROAD AHEAD
CONSTRUCTION
ONE LANE
ROAD AHEAD
CONSTRUCTION
1000' (300 m) max.
500' (150 m) min.
W20-I103(0)-48
W20-1(0)-48
W20-I103(0)-48
W20-4(0)-48

TYPICAL APPLICATIONS
Bituminous resurfacing
Milling operations
Utility operations
Shoulder operations

SYMBOLS

\[\text{W20-I103(0)-48}\]
\[\text{W20-1(0)-48}\]
\[\text{W20-I103(0)-48}\]
\[\text{W20-4(0)-48}\]

Minimum distance is 200' (60 m). Maximum distance to be determined by the Engineer but should not exceed 5L the length required for one normal working day's operation or 2 miles (3200 m), whichever is less.

GENERAL NOTES
This Standard is used wherever 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 15 mph (1 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.

LANE CLOSURE, 2L, 2W, SLOW MOVING OPERATIONS DAY ONLY, FOR SPEEDS ≥ 45 MPH

STANDARD 701306-04
**TYPICAL APPLICATIONS**
- Landscaping work
- Utility work
- Pavement marking
- Weed spraying
- Roadometer measurements
- Debris cleanup
- Crack pouring

**SYMBOLS**
- Arrow board (Hazard Mode only)
- Truck with headlights, emergency flashers and flashing amber light.
- (visible from all directions)
- 18x18 (450x450) mm 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 DETAIL A, Standard 701426.

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

**DATE**
- Revisions

**LANE CLOSURE 2L, 2W MOVING OPERATIONS - DAY ONLY**

**STANDARD 701311-03**
**TRAFFIC SIGNAL SEQUENCE**

<table>
<thead>
<tr>
<th>PHASE</th>
<th>INTERVAL</th>
<th>EASTBOUND</th>
<th>NORTHBOUND OR WESTBOUND</th>
<th>SOUTHBOUND OR EASTBOUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ADVISORY SPEED LIMIT**

<table>
<thead>
<tr>
<th>INTERVAL</th>
<th>EASTBOUND</th>
<th>NORTHBOUND OR WESTBOUND</th>
<th>SOUTHBOUND OR EASTBOUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

This Standard is used where, at any time any vehicle, equipment, workers 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 7011201 or 7011206.

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.

**LANE CLOSURE, 2L, 2W, BRIDGE REPAIR, FOR SPEEDS ≥ 45 MPH**

Sheet 2 of 2

STANDARD 701316-13
**Traffic Signal Sequence**

<table>
<thead>
<tr>
<th>PHASE</th>
<th>INTERVAL</th>
<th>EASTBOUND</th>
<th>NORTHBOUND OR WESTBOUND</th>
<th>SOUTHBOUND OR WESTBOUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1-2</td>
<td>1-2-3-4-5-6</td>
<td>1-2-3-4-5-6</td>
<td>1-2-3-4-5-6</td>
</tr>
<tr>
<td>B</td>
<td>4-6</td>
<td>4-5-6</td>
<td>4-5-6</td>
<td>4-5-6</td>
</tr>
</tbody>
</table>

**Temporary Concrete Barrier**

<table>
<thead>
<tr>
<th>Posted Speed</th>
<th>Taper Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mph and above</td>
<td>12:1</td>
</tr>
<tr>
<td>Below 40 mph</td>
<td>8:1</td>
</tr>
</tbody>
</table>

**Advisory Speed Limit**

<table>
<thead>
<tr>
<th>Speed Limit</th>
<th>Normal</th>
<th>Advisory</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>

**General Notes**

This Standard is used where, at any time, any vehicle, 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.

**Temporary Pavement Marking**

White temporary pavement marking

**Vertical Panels**

(Post mounted, one each side)

**General Information**

- Illinois Department of Transportation
- January 1, 2020
- APPROVED
- January 1, 2020
- PASSED
- 1-1-97
- ISSUED
- ENGINEER OF SAFETY PROG. AND ENGINEERING

**Lane Closure, 2L, 2W,**

**Bridge Repair with Barrier**

*Sheet 2 of 2*

**Standard 701321-18**
This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach on the pavement during widening operations.

Two flaggers are required for each separate operation.

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

SYMBOLS

- Work area
- Active Work area
- Sign
  - Barricade, drum, or vertical panels
  - Flagger with traffic control sign

1. Minimum distance is 200’ (60 m). Maximum distance to be determined by the Engineer but in no case to exceed the length of ½ days normal operation or 2 miles (3200 m) whichever is less.

2. Signs are not required if distance between work operations is less than 2000’ (600 m) unless restricted sight distance exists.

GENRAL NOTES

DATE
REVISIONS
1-1-11 Revised flagger sign.
1-1-09 Switched units to English inches.
Corrected sign No.’s

LANE CLOSURE, 2L, 2W, PAVEMENT WIDENING, FOR SPEEDS ≥ 45 MPH

STANDARD 701326-04
**ROAD AHEAD CONSTRUCTION**

**TYPICAL APPLICATIONS**
- Bridge construction
- Culvert construction

**SYMBOLS**
- Traffic signs
- Work area
- Signs
- Barricade or drum with steady burn bi-directional light
- Double vertical panel
- Type III barricade

**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 at 50' (15 m) centers shall be used in lieu of vertical panels on the detour where they are to be placed on new or existing pavement.

Where the tangent distance on the temporary run-around exceeds 600' (180 m), crystal delineators at 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.

**DATE** | **REVISIONS**
---|---
1-1-18 | Changed signs on drums to bi-directional.
1-1-11 | Changed vertical panel to double vertical panel.

**STANDARD 701331-05**

**LANE CLOSURE, 2L, 2W, WITH RUN-AROUND, FOR SPEEDS ≥ 45 MPH**
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 the pavement.

Two flaggers shall be required for each separate lane closure. The flagger shall be a minimum of 200' (60 m) and a maximum of ½ day's operation beyond the flagger sign. When the distance between successive patch sizes exceeds 2000 (600 m), additional flaggers, warning signs, and tapers shall be placed as shown.

Barricades/drum shall be placed at intervals not greater than 100 (30 m) or cones shall be placed at intervals not greater than 50' (15 m) centers throughout the work zone. When the spacing between open holes is greater than 50' (15 m), two barricades/drums shall be placed in front of each open hole and one on the backside close to the centerline. When the spacing between open holes exceeds 2000 (600 m), additional flaggers, warning signs, and tapers shall be placed as shown.

Barricades/drums shall be placed at intervals not greater than 100 (30 m) or cones shall be placed at intervals not greater than 50' (15 m) centers throughout the work zone. When the spacing between open holes is greater than 50' (15 m), two barricades/drums shall be placed in front of each open hole and one on the backside close to the centerline. When the spacing between open holes exceeds 2000 (600 m), additional flaggers, warning signs, and tapers shall be placed as shown.

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

TYPICAL APPLICATIONS

Patching

SYMBOLS

- Patches
- Sign
- Flagger with traffic control sign
- Barricade or drum
- Cone, barricade or drum

LONE CLOSURE, 2L, 2W, WORK AREAS IN SERIES, FOR SPEEDS ≥ 45 MPH

STANDARD 701336-07
1. The Road Construction Ahead sign shall be located 3 to 5 miles in advance of the project limits.
2. The message and size of the Work Zone Public Information Sign shall be as specified by the Department.
3. The message board shall be used to display status of lanes within the project. The primary messages shall be:
   - "Right Lane Closed" / " x Miles Ahead"
   - "Left Lane Closed" / " x Miles Ahead"
   - "All Lanes Open"
4. Three, Type II barricades, drums, or vertical barricades at 25' (8 m) centers.
5. This sign shall be used when 2 lanes are closed.
6. This sign shall be omitted when median width is less than 10' (3 m).
7. This sign shall only be used if the existing speed limit is greater than 65 mph.

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

This Standard must always be used in combination with Standard 701400.

When work is being performed in the left lane, the set up would be a mirror image to what is shown.

Temporary concrete barrier shall be according to Standard 704001.

Calculate L as follows:

\[
L = 0.65(W)(S)
\]

**FORMULAS**

\[
L = \frac{W(S)}{25}
\]

**POSTED SPEED**

**NORMAL**

45 mph (80 km/h) or more

**POSTED SPEED**

45 mph (80 km/h)

W = Width of offset in feet (meters).

S = Normal posted speed in mph (km/h).

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

**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
- Temporary concrete barrier
- Monodirectional guardrail/barrier wall reflector
- Impact attenuator

**LANE CLOSURE, FREEWAY/EXPRESSWAY, WITH BARRIER**

**STANDARD 701402-12**

1-1-17 Revised END WORK ZONE

**REVIEWS**

- 1-1-17 Revised END WORK ZONE
- 1-1-17 Revised END WORK ZONE
- 4-1-16 Added reference to Standards 704001 and 782006 in note 2.
- 782006 in note (2).
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 operation.

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.

SYMBOLS

- Arrow board
- Work area
- Sign
- Direction indicator barricade
- Cone, drum or barricade
- Spouter

TYPICAL APPLICATIONS

Pavement patch
Utility operations
Bituminous resurfacing

WORK ZONE

SPEED LIMIT

END WORK ZONE

SPEED LIMIT

WORK ZONE

SPEED LIMIT

WORK ZONE

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 operation.

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.

SYMBOLS

- Arrow board
- Work area
- Sign
- Direction indicator barricade
- Cone, drum or barricade
- Spouter

TYPICAL APPLICATIONS

Pavement patch
Utility operations
Bituminous resurfacing

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 operation.

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.
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 motorists' line of sight, through, between, or over the delineation devices.

GENERAL NOTES

This Standard is used where, at any time any vehicles, equipment, workers or their activities require a lane closure in close proximity of an exit or entrance ramp and supplements other traffic control Standards for lane closures.

These applications also apply when work is being performed in the left lanes and the ramps enter and exit on the left. Under these conditions, the Exit sign arrow and the Side road symbol sign shall be changed.

Cones may be utilized during daylight operations, at one half the spacing of drums/barricades.

Use of these APPLICATION NO. 1 and APPLICATION NO. 3 shall be limited to five days per location.

When work does not exceed five days, pavement marking tape may be omitted.

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

DATE | REVISIONS
--- | ---
1-1-15 | Revised gen. notes to limit App’s 1 and 3 to five days.
and omit tape for ≤ 5 days.
1-1-12 | Revised gen. notes to agree with MUTCD. Dimensioned EXIT
OPEN AHEAD sign.

STANDARD 701411-09

LANE CLOSURE, MULTILANE, AT ENTRANCE OR EXIT RAMP, FOR SPEEDS ≥ 45 MPH
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.

APPLICATION NO. 4
Application No. 4 depicts an extension of the normal exit ramp. This method shall be used whenever existing geometrics can be retained. Consideration should be given to the exiting motorists's line of sight through, between or over the delineation devices.
**GENERAL NOTES**

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 making 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 701400.

All barricades, drums, and vertical panels shall be at 50 ft. (15 m) centers.

Temporary concrete barrier shall be according to Standard 704001.

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

**SYMBOLS**

- Arrow board
- Work area
- Sign
- Direction indicator barricade with steady burn monodirectional light
- Type II barricade with steady burn monodirectional light
- Drum with steady burn monodirectional light
- Vertical Panel
- Type III barricade with flashing lights
- Temporary concrete barrier
- Drum

"L" and "T" shall be as shown on the plan details.

**DATE**

1-1-97

**REVISIONS**

1-1-17 Revised END WORK ZONE

1-1-18 Revised END WORK ZONE

**STANDARD 701416-11**

**LANE CLOSURE, FREEWAY / EXPRESSWAY, WITH CROSSOVER AND BARRIER**

Illinois Department of Transportation
January 1, 2018

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

ENGINEER OF SAFETY PROG. AND ENGINEERING
For contract construction projects

For maintenance and utility projects

GENERAL NOTES

For contract construction projects, \( L = \text{lane width} \times \text{taper ratio} \)

SYMBOLS

\begin{verbatim}
<table>
<thead>
<tr>
<th>Normal Posted Speed</th>
<th>Taper Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>55/1</td>
</tr>
<tr>
<td>45</td>
<td>45/1</td>
</tr>
</tbody>
</table>
\end{verbatim}

1. Undivided roadway only with left lane closure in opposite direction.
2. Omitted when median is less than 10' (3 m).
3. ReflectORIZED temporary pavement marking tape shall be placed throughout the taper and for 300' (90 m) along-side the work zone where the closure time is greater than fourteen days. The edge line shall be white for right lane closures and yellow for left lane closures.
4. FLAGGER signs shall be moved as necessary to maintain the required spacing between the sign and each separate work activity.
5. Three Type II barricades, drums, or vertical barricades at 25' (8 m) centers.

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 operation exceeding one day.

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, signs shall be added in the opposite direction as shown.

A check barricade shall be placed in the middle of the closed lane and at the shoulder at 1000' (300 m) centers.

All dimensions are in feet (meters) unless otherwise shown.
This standard is used where at any time any vehicular or 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 barriers are 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:

\[ L = 0.65(W)(S) \]

\[ W = \text{Width of offset} \]
\[ S = \text{Normal posted speed} \]

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

<table>
<thead>
<tr>
<th>SYMBOLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrow board</td>
</tr>
<tr>
<td>Work area</td>
</tr>
<tr>
<td>Sign</td>
</tr>
<tr>
<td>Direction indicator barricade with steady burn monodirectional light</td>
</tr>
<tr>
<td>Type II barricade, drum, or vertical barricade with steady burn monodirectional light</td>
</tr>
<tr>
<td>Temporary concrete barrier</td>
</tr>
<tr>
<td>Monodirectional guardrail/barrier wall reflector</td>
</tr>
<tr>
<td>Impact attenuator</td>
</tr>
<tr>
<td>Type II barricade, drum, or vertical barricade with monodirectional flashing light</td>
</tr>
</tbody>
</table>

GENERAL NOTES

This standard is used where at any time any vehicular or 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 barriers are 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:

\[ L = 0.65(W)(S) \]

\[ W = \text{Width of offset} \]
\[ S = \text{Normal posted speed} \]

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

**FORMULAS**

\[ 45 \text{ mph (80 km/h)} \]
\[ W = \text{Width of offset} \]
\[ S = \text{Normal posted speed} \]

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-17</td>
<td>Revised END WORK ZONE SPEED LIMIT sign, Changed device</td>
</tr>
<tr>
<td>4-16</td>
<td>Corrected reference to standard in note (6)</td>
</tr>
</tbody>
</table>
When a shoulder does not exist or is narrow, use Detail B.

NOTE

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 should 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.

REVISIONS

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-97</td>
<td>Revised 'NOTE' on DETAIL A to use DETAIL B in lieu of DETAIL C.</td>
</tr>
<tr>
<td>4-1-16</td>
<td>Added trailer option for attenuator symbol. Added note (A) Revised gen. notes.</td>
</tr>
<tr>
<td>1-1-17</td>
<td>Revised gen. notes.</td>
</tr>
</tbody>
</table>

TYPICAL APPLICATIONS

- Crack pouring
- Debris cleanup
- Roadometer measurements
- Weed spraying
- Pavement marking
- Utility work
- Landscaping work
- Arrow board
- Work area
- Truck with flashing amber light
- Truck/Trailer mounted attenuator
- Flagger with traffic control sign
- Sign

GENERAL NOTES

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 should 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.
PAINT \ WET \ ROAD \ AHEAD \ CONSTRUCTION 
RIGHT LANE CLOSED AHEAD WORK SHOULDER ROAD AHEAD CONSTRUCTION ROAD AHEAD CONSTRUCTION CLOSED RIGHT LANES 2

**NOTE:** When a shoulder does not exist or is narrow, use Detail B.

### DETAIL A

- Arrow board
- Work zone
- Truck with flashing amber light
- Truck/Trailer mounted attenuator
- Flagger with traffic control sign
- Sign

**SYMBOLS**

- KEEP LEFT
- KEEP RIGHT
- SHOULDER WORK
- WORK AREA
- TRUCK WITH FLASHING AMBER LIGHT
- FLARGER WITH TRAFFIC CONTROL SIGN
- WORK AREA
- WORK ZONE
- TRUCK WITH FLASHING AMBER LIGHT
- TRUCK/TRAILER MOUNTED ATTENUATOR
- SIGN

### TYPICAL APPLICATIONS

- Pavement marking
- Roadometer measurements
- Debris cleanup
- Crack pouring
- Weed spraying
- Utility work
- Landscaping work

### 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 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.

**DATE** 2-1-17
**REVISIONS**

- 1-1-11 Added gen. notes. Added "NOTE" on DETAIL A
- 1-1-17 Rev. dist. between work and lead truck.
- 4-1-16 Rev. gen. notes. Added "NOTE" on DETAIL A

**STANDARD 701427-05**

**LANE CLOSURE, MULTILANE, INTERMITTENT OR MOVING OPER., FOR SPEEDS ≤ 40 MPH**
CASE I
CASE I depicts the setup of delineating devices for a single outside lane closure. The single lane closure device setup as depicted in CASE I shall be performed prior to the setup for the second lane closure.

CASE II
CASE II depicts the setup of delineating devices for a two lane closure. The single lane closure taper(s) and attenuators shall be in place as shown for the setup and removal of the lane closure taper(s) and the first 100' (30 m) of channelizing devices in the tangent(s).

GENERAL NOTES
This Standard is used for setup and removal of lane closures on freeways/expressways having ADT greater than 25,000.

Trucks with arrow boards and truck-mounted attenuators shall be placed as shown for the setup and removal of the lane closure taper(s) and the first 100' (30 m) of channelizing devices in the tangent(s).

This Standard is also applicable when work is being performed in the left lane(s) or on the median shoulder. Under these conditions arrow board indications shall be directed to the right.

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

SYMBOLS
- Arrow board
- Truck with flashing amber light
- Truck/Trailer mounted attenuator
- Devices in lane closure taper
- Devices in tangent

See plans or appropriate Standard for delineating devices, spacing and length of tangent.
1/2 MILE CONSTRUCTION ROAD
NARROWS RAMP ROAD AHEAD

1:20 taper from edge of ramp to edge of work zone

Drums at 25 (7.6 m) cts.
500' (150 m)
500' (150 m)
1000' (460 m)

Drums at 25 (7.6 m) cts.

1-1-18
W20-12(BD)-48
W20-3(BD)-48
W13-4p 3636

1-1-17
Type III barricade.
Added flashing lights in tangent.
Omitted lights on drums

W20-12(BD)-48
W20-3(BD)-48
W13-4p 3636

PARTIAL EXIT RAMP CLOSURE

SYMBOLS

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>🟢</td>
<td>Sign</td>
</tr>
<tr>
<td>🟢</td>
<td>Type III barricade with flashing lights</td>
</tr>
<tr>
<td>⚫</td>
<td>Drum with steady burning light</td>
</tr>
<tr>
<td>⬜️</td>
<td>Work area</td>
</tr>
<tr>
<td>⬜️</td>
<td>Flagger with traffic control sign</td>
</tr>
<tr>
<td>⬜️</td>
<td>Drum</td>
</tr>
</tbody>
</table>

All dimensions are in inches (millimeters) unless otherwise shown.
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' (150 m) or 1 block.
4. Cones at 25' (8 m) centers for 250' (75 m) on approach. 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.

SYMBOLS

- Work area
- Barricade or drum with flashing lights
- Flagger with traffic control sign
- Cone, drum or barricade
- Sign on portable or permanent support
- Type III barricade with flashing lights

SIGN SPACING

<table>
<thead>
<tr>
<th>Posting Speed</th>
<th>Sign Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>55-45</td>
<td>300-1000 ft</td>
</tr>
<tr>
<td>&lt;45</td>
<td>200-300 ft</td>
</tr>
</tbody>
</table>

FORMULAS

\[
L = \frac{W S^2}{60}
\]

\[
L = 0.65(W/S)
\]

SPEED LIMIT

- 40 mph (70 km/h) or less:
  \[
  L = \frac{WS^2}{60}
  \]
  \[
  L = 0.65(W/S)
  \]
- 45 mph (70 km/h) or greater:

W = Width of offset in feet (meters).
S = Normal posted speed in mph (km/h).

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 701501.

Calculate L as follows:

**FORMULAS**

<table>
<thead>
<tr>
<th>English</th>
<th>Metric</th>
</tr>
</thead>
</table>
| 40 mph (70 km/h) or less: | \[
  L = \frac{WS^2}{60}
  \]
  \[
  L = 0.65(W/S)
  \] | \[
  L = \frac{W S^2}{60}
  \]
  \[
  L = 0.65(W/S)
  \] |
**GENERAL NOTES**

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement during shoulder operations or where construction requires lane closures in urban areas.

Calculate L as follows:

**FORMULAS**

\[
L = \begin{cases} 
\text{WS}^2 & \text{if } \text{Speed Limit} \\
L = 0.65(W)(S) & \text{if } S = \text{Speed Limit} \\
L = (W)(S) & \text{if } S = 45 \text{ mph (70 km/h)}, \text{or less} \\
L = (W)(S) & \text{if } S = 45 \text{ mph (70 km/h)}, \text{or greater} \\
\end{cases}
\]

Where:

- \( W \) = Width of offset, in feet (meters).
- \( S \) = Normal posted speed, mph (km/h).

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

**STANDARD 701601-09**

**URBAN LANE CLOSURE, MULTILANE, 1W OR 2W WITH NONTRAVERSABLE MEDIAN**
CASE I

1. Refer to SIGN SPACING TABLE for distances.
2. Required for speeds > 40 mph (70 km/h).
3. Required if work exceeds 500' (150 m) or 1 block, repeat every 1 mile (1.6 km).
4. Cones at 25' (8 m) centers for 250' (75 m) on approach. 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.

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 701426.

Calculate L as follows:

SPEED LIMIT

\[
L = \frac{W(S)}{60}
\]

or

\[
L = \frac{W(S)}{150}
\]

FOR FORMULAS

- English
- Metric

40 mph (70 km/h)

or less:

\[
L = \frac{W(S)}{60}
\]

45 mph (70 km/h)
or greater:

\[
L = \frac{W(S)}{150}
\]

W = Width of offset
in feet (meters)

S = Normal posted speed
mph (km/h)

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

DATE

REVISIONS

1-1-13

- Revised to allow cones at night.

1-1-19

- Moved arrow boards into
- Moved arrow boards for construction
- Added CASE I

STANDARD 701602-10
CASE IV

URBAN LANE CLOSURE, MULTILANE, 2W WITH BIDIRECTIONAL LEFT TURN LANE

ENGINEER OF DESIGN AND ENVIRONMENT
January 1, 2019
APPROVED
ENGINEER OF SAFETY PROG. AND ENGINEERING
January 1, 2019
APPROVED

ILLINOIS DEPARTMENT OF TRANSPORTATION

STANDARD 701602-10

(Sheet 4 of 4)
**URBAN SINGLE LANE CLOSURE, MULTILANE, 2W WITH MOUNTABLE MEDIAN**

**STANDARD 701606-10**

---

**GENERAL NOTES**

This Standard is used when 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.

Calculate L as follows:

**FORMULAS**

<table>
<thead>
<tr>
<th>Speed Limit</th>
<th>Formula 1</th>
<th>Formula 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 mph (70 km/h) or less</td>
<td>( L = \frac{W S^2}{45} )</td>
<td>( L = \frac{WS^2}{45} )</td>
</tr>
<tr>
<td>45 mph (70 km/h) or greater</td>
<td>( W = 0.65(m) )</td>
<td>( L = 0.65WS(S) )</td>
</tr>
</tbody>
</table>

**TABLE for distances.**

Refer to SIGN SPACING TABLE for distances.

**SYMBOLS**

- Arrow board
- Cone, drum or barricade
- Sign on portable or permanent support
- Work area
- Barricade or drum with flashing light
- Flagger with traffic control sign

1. Refer to SIGN SPACING TABLE for distances.
2. Required for speeds > 40 mph.
3. Use flagger sign only when flagger is present.
4. Cones at 25' (8 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.
5. Cones, drums or barricades at 20' (6 m) centers in taper.
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 more than one traffic lane in an Urban area.

The closure of more than one traffic lane in an Urban area. 

**SPEED LIMIT**

- 40 mph (60 km/h) or less
- 45 mph (70 km/h) or greater

W = Width of offset

S = Normal posted speed

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

**TABLE for distances.**

<table>
<thead>
<tr>
<th>Posted Speed</th>
<th>Sign Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;45 mph (70 km/h)</td>
<td>500' (150 m)</td>
</tr>
<tr>
<td>45-49 mph (70-80 km/h)</td>
<td>350' (100 m)</td>
</tr>
<tr>
<td>&gt;49 mph (80 km/h)</td>
<td>200' (60 m)</td>
</tr>
</tbody>
</table>

**FOR ALL OVERTAKING:**

- 200' (60 m) centers in taper.
- Cones, drums or barricades at 25' (8 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.
- Cones or barricades at 100' (30 m) centers in taper.
- Cones, drums or barricades at 20' (6 m) centers in taper.
- Repeat every 1/2 mile (0.8 km).

**SYMBOLS**

- Arrow board
- Sign on portable or permanent support
- Work area
- Barricade or drum with flashing light
- Type II barricade with flashing lights
- Flagger with traffic control sign

**FORMULAS**

- L = W \cdot S^2
- L = 0.65(W)(S)

**ENGLISH (METRIC)**

- L = 150 WS^2
- L = 0.65(W)(S)

**SPEED LIMIT**

- 40 mph (60 km/h) or less
- 45 mph (70 km/h) or greater

W = Width of offset

S = Normal posted speed

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

**GENERAL NOTES**

Refer to SIGN SPACING TABLE for distances.

Required for speeds > 40 mph.

Use flagger sign only when flagger is present.

For approved sideload closures.

Cone, drum or barricade

Work area

Barricade or drum with flashing light

Type II barricade with flashing lights

Flagger with traffic control sign.

**DATE**

- 4-1-16

**REVISIONS**

- New Standard

**URBAN HALF ROAD CLOSURE, MULTILANE, 2W WITH MOUNTABLE MEDIAN**

**STANDARD 701611-01**
ROAD AHEAD
CONSTRUCTION
TURN LANE CLOSED AHEAD
LEFT

English (Metric)

L = 60\ WS²
L = 150\ WS²

L = (W)(S)
L = 0.65\ (W)(S)
in feet (meters).

Width of offset
mph (km/h).

Normal posted speed

FORMULAS

SIGN SPACING

Posted Speed

<45
500' (150 m)
350' (100 m)
200' (60 m)

55
50-45

SPEED LIMIT

Calculate L as follows:

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement during shoulder operations or where construction requires lane closures in an urban area.

Required for speed > 40 mph.

Cone, drum or barricade at 25' (8 m) centers. When drums or Type I or Type II barricades are used, the interval between devices may be doubled.

Use flagger sign only when flagger is present.

Omit this sign when median is less than 10' (3 m) or for bi-directional turn lanes.

Cone, drums or barricades at 20' (6 m) centers in taper.

Advanced arrow board required for speeds > 45 mph.

Three Type II barricades, drums or vertical barricades at 50' (15 m) centers.

SYMBOLS

Work area
@ Cone, drum or barricade
\ Sign on portable or permanent support

Arrow board

\ Arrow board

\@ Barricade or drum with flashing light

@@ Flagger with traffic control sign

GENERAL NOTES

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement during shoulder operations or where construction requires lane closures in an urban area.

Calculate L as follows:

FORMULAS

SPEED LIMIT

40 mph (70 km/h) or less:

L = \frac{W}{60} \text{ ft} (W/180 \text{ m})

45 mph (80 km/h) or greater:

L = \frac{W}{60} \text{ ft} (W/180 \text{ m})

W = Width of offset in feet (meters).

S = Normal posted speed
mph (km/h).

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

DATE
REVISIONS

4-16
Corrected sign number for
LEFT TURN LANE CLOSING AHEAD.

4-1-16
Added devices at arrow.

1-1-14
Revised sign number.

STANDARD 701701-10

URBAN LANE CLOSURE,
MULTILANE INTERSECTION
All heights shown shall be measured above the pavement surface.

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

Warning lights (if required)
**POST MOUNTED SIGNS**

**When curbs or paved shoulder are present this dimension shall be 24 (600) to the face of curb or 6' (1.8 m) to the outside edge of the paved shoulder.**

---

**MAX WIDTH**

**XX' - XX"**

**X MILES AHEAD**

W12-I103-4848

**WIDTH RESTRICTION SIGN**

**XX'-XX" width and X miles are variable.**

---

**STOP**

**SLOW**

FRONT SIDE

REVERSE SIDE

**FLAGGER TRAFFIC CONTROL SIGN**

---

**SIGN ON TEMPORARY SUPPORTS**

***When work operations exceed four days, this dimension shall be 5' (1.5 m). If located behind other devices, the height shall be sufficient to be seen completely above the devices.***

---

**HIGH LEVEL WARNING DEVICE**

---

**WORK LIMIT SIGNING**

---

**ROAD CONSTRUCTION NEXT X MILES**

---

**END CONSTRUCTION**

---

**SPEED ZONE SIGNS**

---

**HIGHWAY CONSTRUCTION LIMIT SIGNING**

---

**TRAFFIC CONTROL DEVICES**

---

**STANDARD 701901-08**
ARROW BOARDS

SECTION A-A

TEMPORARY RUMBLE STRIPS

TYPICAL APPLICATIONS OF
TYPE III BARRICADES CLOSING A ROAD

TRAFFIC CONTROL DEVICES

STANDARD 701901-08
CIRCULAR SLOT

VERTICAL

DIA.

HOLE

(38)

IOPT.

LIFTING SLOT

SECTION A-A

END VIEW

SHOWING LIFTING SLOT

ELEVATION

SHOWING CONNECTING LOOP BARS AND VERTICAL PANEL BOLT/INSERT

PLAN

CONNECTING DETAIL

CONNECTING LOOP BAR

CONNECTING AND ANCHOR PINS

(End may be beveled 1 (25) pin max.)

GENERAL NOTES

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 insertion for the 3/8 (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 782006 for dimensions of Type C reflector.

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

DATE

REVISIONS

CONNECTING DETAIL

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

REVISIONS

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

Vaseline, Department of Transportation

F SHAPE DESIGN

STANDARD 704001-08

TEMPORARY CONCRETE BARRIER

1-1-16

1-1-02

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-16

1-1-02

Vaseline, Department of Transportation

BARRIER WALL REFLECTORS

GENERAL NOTES

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 insertion for the 3/8 (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 782006 for dimensions of Type C reflector.

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

DATE

REVISIONS

CONNECTING DETAIL

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

REVISIONS

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

Vaseline, Department of Transportation

BARRIER WALL REFLECTORS

GENERAL NOTES

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 insertion for the 3/8 (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 782006 for dimensions of Type C reflector.

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

DATE

REVISIONS

CONNECTING DETAIL

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

REVISIONS

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

Vaseline, Department of Transportation

BARRIER WALL REFLECTORS

GENERAL NOTES

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 insertion for the 3/8 (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 782006 for dimensions of Type C reflector.

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

DATE

REVISIONS

CONNECTING DETAIL

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

REVISIONS

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

Vaseline, Department of Transportation

BARRIER WALL REFLECTORS

GENERAL NOTES

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 insertion for the 3/8 (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 782006 for dimensions of Type C reflector.

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

DATE

REVISIONS

CONNECTING DETAIL

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

REVISIONS

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

Vaseline, Department of Transportation

BARRIER WALL REFLECTORS

GENERAL NOTES

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 insertion for the 3/8 (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 782006 for dimensions of Type C reflector.

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

DATE

REVISIONS

CONNECTING DETAIL

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

REVISIONS

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

Vaseline, Department of Transportation

BARRIER WALL REFLECTORS

GENERAL NOTES

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 insertion for the 3/8 (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 782006 for dimensions of Type C reflector.

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

DATE

REVISIONS

CONNECTING DETAIL

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

REVISIONS

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Vaseline, Department of Transportation

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When barrier separates opposing flows of traffic markers shall be on both sides of barrier.

See Standard 782006 for dimensions of Type C reflector.

All dimensions are in inches (millimeters) unless otherwise shown.
Sign panel 36 (900) wide or less

Sign panel over 36 (900) wide

WOOD OR TELESCOPING STEEL POSTS

LIGHT OR SIGNAL STANDARDS

BREAKAWAY STEEL TUBING POSTS

(All sign panel sizes)

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

MOUNTING DETAILS

DETAIL A

DETAIL B

DETAIL C

SUPPORTING CHANNEL DETAILS

ROUTE MARKER ASSEMBLY

Section modulus (minimum)

<table>
<thead>
<tr>
<th>Material</th>
<th>Axis A</th>
<th>Axis B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>0.050 in.³ (819 mm³)</td>
<td>0.105 in.³ (1720 mm³)</td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.150 in.³ (2456 mm³)</td>
<td>0.315 in.³ (5162 mm³)</td>
</tr>
</tbody>
</table>

Optional

(All sign panel sizes)

1-1-97


1-1-09

English (metric).

1-1-09

Switched units to English (metric).

Illinois Department of Transportation

January 1, 2009

APPROVED

January 1, 2009

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

ENGINEER OF OPERATIONS

DATE

REVISIONS

STANDARD 720001-01
TYPICAL INSTALLATIONS

Signs in any area shall be erected in a uniform height above the edge of the pavement.

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

SIGN PANEL
ERECCTION DETAILS

DATE
1-1-14
1-1-12
1-1-07

REVISIONS
Added shoulders and slopes.
Changed sign distances from roadway and shoulder.
New sign elev. for multilane

STANDARD 720006-04
Dimensions shown for cross sections are minimum.

All holes are \( \frac{7}{8}\) (10).

\( S_x-x \) is the minimum section modulus about the \( x-x \) axis of the post as shown. For posts in which holes are punched or drilled for more than half their length, \( S_x-x \) shall be computed for the net section.

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

### General Notes

**Steel** - 1.12 lbs./ft. (1.67 kg/m) unless otherwise shown.

**Aluminum** - 0.22 lbs./ft. (0.36 kg/m) unless otherwise shown.

<table>
<thead>
<tr>
<th>Type</th>
<th>a (in)</th>
<th>b (in)</th>
<th>c (in)</th>
<th>( S_x-x ) (in²)</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A</td>
<td>Steel</td>
<td>3%</td>
<td>3%</td>
<td>( \frac{1}{4}) (6.4)</td>
<td>3,245</td>
</tr>
<tr>
<td></td>
<td>Aluminum</td>
<td>3%</td>
<td>3%</td>
<td>( \frac{1}{4}) (6.4)</td>
<td>3.405</td>
</tr>
<tr>
<td>Type B</td>
<td>Steel</td>
<td>3%</td>
<td>3%</td>
<td>( \frac{1}{4}) (6.4)</td>
<td>3,245</td>
</tr>
<tr>
<td></td>
<td>Aluminum</td>
<td>3%</td>
<td>3%</td>
<td>( \frac{1}{4}) (6.4)</td>
<td>3.405</td>
</tr>
</tbody>
</table>

**TYPE A**

Type A posts have an optional taper.

**SECTION D-D**

Min. 55 holes spaced at 1.25" cts.

**TYPE B**

Type B posts have a standard taper.

**SECTION E-E**

Steel - 1 32 lbs./ft. (1.61 kg/m)

**TYPE C**

Type C posts have an optional taper.

**SECTION F-F**

Steel - 1 32 lbs./ft. (1.61 kg/m)

**MARKERS & DELINEATORS**

**METAL POSTS FOR SIGNS,**

**ENGINEER OF POLICY AND PROCEDURES**

**APPROVED**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED**

1-1-09

1-1-97

METAL POSTS FOR SIGNS,
MARKERS & DELINEATORS

STANDARD 720011-01

REVISIONS

1-1-97


1-1-09

Switched units to English (metric).

DATE

1-1-97

1-1-09
When road classification only is on the second line, it should not be abbreviated.

TYPICAL SIGN STYLES

<table>
<thead>
<tr>
<th>SIGN STYLE</th>
<th>DIMENSIONS</th>
<th>LETTER SIZE</th>
<th>BORDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.b.o.</td>
<td>A B C D E F G H</td>
<td>I J K</td>
<td>L</td>
</tr>
<tr>
<td>Var 1</td>
<td>13 (330) 7 (175) 6 (150) 4 (100)</td>
<td>- -</td>
<td>6/4 (150/115)</td>
</tr>
<tr>
<td>Var 2</td>
<td>10 (250) 7 (175) 6 (150) 4 (100)</td>
<td>- -</td>
<td>6/4 (150/115)</td>
</tr>
<tr>
<td>Var 3</td>
<td>7 (175) 7 (175) 6 (150) 4 (100)</td>
<td>- -</td>
<td>6/4 (150/115)</td>
</tr>
<tr>
<td>c.e.</td>
<td>A B C D E F G H</td>
<td>I J K</td>
<td>L</td>
</tr>
<tr>
<td>Var 1</td>
<td>19 (490) 10 (260) 8 (200) 4 (100)</td>
<td>- -</td>
<td>7/5 (175/125)</td>
</tr>
<tr>
<td>Var 2</td>
<td>16 (400) 9 (230) 6 (150) 4 (100)</td>
<td>- -</td>
<td>7/5 (175/125)</td>
</tr>
<tr>
<td>Var 3</td>
<td>13 (330) 8 (200) 6 (150) 4 (100)</td>
<td>- -</td>
<td>7/5 (175/125)</td>
</tr>
<tr>
<td>r</td>
<td>A B C D E F G H</td>
<td>I J K</td>
<td>L</td>
</tr>
<tr>
<td>Var 1</td>
<td>24 (600) 15 (380) 9 (230) 6 (150)</td>
<td>- -</td>
<td>6/4 (150/115)</td>
</tr>
<tr>
<td>Var 2</td>
<td>21 (500) 12 (300) 7 (175) 4 (100)</td>
<td>- -</td>
<td>6/4 (150/115)</td>
</tr>
<tr>
<td>Var 3</td>
<td>18 (450) 9 (230) 6 (150) 4 (100)</td>
<td>- -</td>
<td>6/4 (150/115)</td>
</tr>
</tbody>
</table>

* Supplemental Messages

GENERAL NOTES

All signs shall have a white reflectorized legend and border on a green reflectorized background. All signs shall be mounted as shown on Standard 720001 or as specified in the plans.

The sign panels shall be mounted on a green reflectorized background with border on a green reflectorized background. All dimensions are in inches (millimeters) unless otherwise shown.

DATE | REVISIONS
--- | ---
1-1-16 | Revised MOUNTING LOCATION
1-1-12 | Revised table and lettering to upper/lower case per current MUTCD

MAST ARM MOUNTED STREET NAME SIGNS

STANDARD 720016-04
FACE OF SIGN PANEL

TYPE B SIGN PANEL

TYPE C SIGN PANEL

SECTION A-A

SECTION B-B

SECTION C-C

SIGN MOLDING

EXTRUDED ALUMINUM TYPE
**TERMINAL MARKER DETAILS**

**COLOR:** Black / Yellow reflectorized

* The width and height (a, b) of the terminal marker shall be within approximately 1 (25) of the outer edge of the terminal end.

**DIRECT APPLIED**

**POST MOUNTED**

**SHEETING POSITION: CASE II**

**TYPE 1 OR TYPE 4**

**TYPE 2**

**TYPE 3**

**GENERAL NOTES**

See detail on Standard 729001 for mounting markers to posts.

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

**DATE**

1-1-17

**REVISIONS**

- Limited minimum reflective area requirement for terminal marker.
- Renumbered standard from 635006

**STANDARD 725001-01**

* Illinois Department of Transportation

**APPROVED**

January 1, 2017
A  Top
C  Base
(5 0)
2
m in.
8 (2 0 0)
(1.5 m)
Sleeve
(90)
36
PCC
BC
A  Top
D  Sleeve
E  Base
(75 | 25)
3 | 1
(75 | 25)
(150)
m in.
(3)
8
1
All dimensions are in inches (millimeters) unless otherwise shown.

GENERAL NOTES
All bolts 1/2 (M10) hex head zinc or cadmium plated.

TELESCOPING STEEL
SIGN SUPPORT
STANDARD 728001-01

ILLINOIS DEPARTMENT OF TRANSPORTATION
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
1-1-09
ISSUED
1-1-07
PASSED
ENGINEER OF OPERATIONS
DATE
REVISIONS
1-1-09
Switched units to English (metric).
1-1-07
New Standard. Used in part of Standard.
For diamond shaped sign with side S as shown, use required post size for a sign with W = 0.75 and D = 1.45.

**Applications of Types A & B Metal Posts**

FOR SIGNS & MARKERS

**General Notes**


Loading: for 60 mph (95 km/h) wind velocity with 36% gust factor, normal to sign.

SOIL PRESSURE: Minimum allowable soil pressure 1.25 tsf (120 kPa).

See Standard 720011 for details of Types A and B posts.

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

**Date**

REVISIONS

- 1-1-09: Switched scales to English imperial.

**Standard 729001-01**
1. Squared hole (Sq. hole) 120° Sq. hole 3 pieces

2. Letters I, D, and H are 2 (50 series D raised).  

3. Washer shim. Additional washers shall be used to level the base when necessary.

4. \( \frac{1}{2} \) x 3\( \frac{1}{4} \) (M12x83) anchor bolt.

5. \( \frac{1}{4} \) (13) hole 3 pieces

6. Letters I, D, and H are 2 (50 series D raised).

7. \( \frac{1}{4} \) (13) hole 3 pieces

8. Washer shim. Additional washers shall be used to level the base when necessary.

9. \( \frac{1}{2} \) x 3\( \frac{1}{4} \) (M12x83) anchor bolt.

10. 1 (25) R

11. Lock washer carriage bolt. (M10) Galvanized

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

DATE: 1-1-09

REVISIONS:

1-1-07

New Standard. Used to be part of Standard.

STANDARD 731001-01
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 RRR 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

Approximately 15 (4.5 m) from nearest 264 of 8-1/4" rigid black metal gate, if present. Stop line placed perpendicular to center line.

On multi-lane roads, the stop lines shall extend across all approach lanes and separate RRR 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.

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

Legend

Size

Arrow

6' (1.8 m)

Small

2.9 (74)

8' (2.4 m)

Large

3.8 (96)

The space between adjacent letters or numerals should be approximately 3 (75) for 6' (1.8 m) legend and 4 (100) for 8' (2.4 m) legend.

LETTER AND ARROW GRID SCALE

TYPICAL PAVEMENT MARKINGS
Reduce to 40' (12.2 m) o.c. on curves with posted or advisory speeds of 45 mph (70 km/h) or less.

** Notes:

- ** See MULTI LANE DIVIDED detail for lane marker notes.
- * See MULTI LANE DIVIDED detail for lane marker notes.
- ** Where double lane line markers are specified, they shall be spaced as shown.

** Symbols:

- Yellow stripe
- White stripe
- One-way amber marker
- One-way crystal marker
- Two-way amber marker

** Dimension Notes:

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

** Special Notes:

- REVISIONS:
  - April 1, 1997: Illinois Department of Transportation
  - April 1, 2016: Illinois Department of Transportation

** Standard:

- STANDARD 781001-04
  - RAISED REFLECTIVE PAVEMENT MARKERS
  - TWO-LANE / TWO-WAY
  - MULTI-LANE UNDIVIDED
  - MULTI-LANE DIVIDED
  - RURAL LEFT TURN
  - FREEWAY EXIT RAMP
  - TWO-WAY LEFT TURN
  - LANE REDUCTION TRANSITION
  - MULTI-LANE DIVIDED

** Unit Conversion:

- Switched units to English (metric).
- MUTCD W4-2 to agree with current Revised LANE ENDS sign.

** Revisions:

- 4-1-16: Revised LANE ENDS sign
- 1-1-09: Switched units to English (metric)
CURB REFLECTORS

MIDIAN ISLAND

SECTION A-A
(Similar for corner islands.)

GENERAL NOTES
Curb reflectors shall be monodirectional and oriented with the reflective face toward approaching traffic.

All dimensions are in inches (millimeters) unless otherwise shown.
**GUARDRAIL AND BARRIER WALL REFLECTOR MOUNTING DETAILS**

**REFLECTOR TYPE A**

- Monodirectional shown

**REFLECTOR TYPE B**

- Bidirectional shown

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.

---

**DATE**

1-1-20: Revised from F-shape to constant

3-1-20: Slope parapet, revised note 3 on

4-1-20: Added reflector spacing

MOVE TERMINAL

MARKER to std. 725001.

---

**REVISIONS**

- 1-1-20: Revised from F-shape to constant
- 4-1-20: Added reflector spacing
Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base 7.0 sq. in. (4536 mm²)

3 min. adhesive weep holes or slots each side, variable spacing.

Cross section may be "T" or "L" shaped and may have side supports at ends.

REFLECTOR TYPE C

TYPICAL MOUNTING DETAIL
FOR GUARDRAIL REFLECTOR

TYPICAL MOUNTING DETAIL
FOR BRIDGE RAIL REFLECTOR

TYPICAL MOUNTING DETAIL
FOR BARRIER WALL REFLECTOR
Terminal marker
See standards 725001

Spacing 80 ft. (24 m) max. for first 400 ft. (122 m) or curve spacing shown in Standard 635001, whichever is less (min. 4 reflectors regardless of length).

After 400 ft. (122 m), transition to normal delineator spacing shown in Standard 635001, and continue as required.

Where the shoulder width is reduced to less than 24 ft (6.1 m), use bidirectional crystals/crystal in lieu of monodirectional crystal.

ONE-WAY TRAFFIC

TWO-WAY TRAFFIC

GUARDRAIL / BARRIER WALL
REFLECTOR PLACEMENT DETAIL
Weatherhead Neutral at 5' (1.52 m) intervals

Conduit clamps in 1 (25) conduit

Two 1/C No. 8 cables in 1 (25) conduit

Steel conduit

1 (25) Galvanized conduit, if required

Connector for non-metallic conduit, if required

Meter

Circuit breaker (50 amperes) in conduit

(13) Galvanized 2

Ground clamp

To controller

No. 6 bare copper wire

Ground rod

30°

Property line

ALTERNATE INSTALLATION
(Installation when weatherproof box cannot be installed facing the adjacent property line.)

The following equipment is to be furnished and installed on the TYPE C installation:

1. Cable in conduit (electric cable, No. 6, 2/C except where otherwise specified)
2. Galvanized steel conduit 1/4 (32) with bend
3. Galvanized conduit clamps
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
6. Service cables
7. Offset weatherproof fitting
8. Circuit breaker

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

ELECTRICAL SERVICE INSTALLATION DETAILS

DATE
1-1-09
1-1-02

REVISIONS
Switched units to English (metric)

STANDARD 805001-01
INTEGRAL/SEMI-INTEGRAL ABUTMENT WITH PARAPET ON APPROACH PAVEMENT

JOINTED ABUTMENT WITH PARAPET ON APPROACH PAVEMENT

GENERAL NOTES

The barrel in the expansion fitting shall be fully embedded in the concrete on one side of the expansion joint. One half the length of the deflection fitting shall be embedded in the concrete on the other side of the expansion joint.

The Contractor shall install combination expansion deflection fittings at all bridge expansion joints. With the approval of the Engineer, the Contractor may substitute two 12 x 12 x 6 (300 x 300 x 150) min. stainless steel junction boxes attached to back of wall and connected with liquidtight flexible nonmetallic conduit for all expansion joints.

See Standard 631031 for details of steel connector plate for constant slope parapet.

All dimensions are in inches (millimeters) unless otherwise shown.
**Jointed Abutment with Parapet Ending on Bridge Deck**

**ELEVATION**

- **Guardrail terminal**
- **Wingwall**
- **Parapet wall on bridge deck**
- **Expansion joint**
- **Stainless steel conduit with bushing**
- **10' x 2 (3 m x 50) stainless steel conduit with bushing**
- **2 (50) PVC conduit embedded in structure**
- **2 (50) liquidtight flexible nonmetallic conduit: 6" (1.83 m) max. length**
- **Stainless steel junction box: 12 x 12 x 6 (300 x 300 x 150) mm.**

**PLAN**

- **Guardrail terminal**
- **Wingwall**
- **Parapet wall on bridge deck**
- **Expansion joint**
- **Stainless steel conduit with bushing**
- **10' x 2 (3 m x 50) stainless steel conduit with bushing**
- **2 (50) PVC conduit embedded in structure**
- **2 (50) liquidtight flexible nonmetallic conduit: 6" (1.83 m) max. length**
- **Stainless steel junction box: 12 x 12 x 6 (300 x 300 x 150) mm.**

**VIEW B-B**

- **Guardrail terminal**
- **Parapet wall on bridge deck**
- **Bridge**
- **2 (50) PVC conduit embedded in structure**
- **2 (50) liquidtight flexible nonmetallic conduit: 6" (1.83 m) max. length**
- **Stainless steel junction box: 12 x 12 x 6 (300 x 300 x 150) mm.**

**Raceways Embedded in Structure**

**Institution:** Illinois Department of Transportation

**Approved:** January 1, 2020

**Engineer of Design and Environment:**

**Issued:** 1-1-15

**Standard 812001-01**

**Terminal Guardrail on Bridge Deck**

**Parapet Wall on Bridge Deck**

**Raceways Embedded in Structure**
1 (25) conduit clamped to bridge deck.

Luminaire hanger assembly, four per luminaire required. See detail.

Underpass luminaire suspended from bridge deck.

1 (25) conduit clamped to structure. Route to next junction box if required.

Direction of traffic.

1 (25) conduit mounted to top of pier or abutment wall.

Luminaire numbering decal bracket. See detail.

Concrete pier or abutment wall.

36 X 1/4 X 1/8 (914 X 41 X 41) hot dipped galvanized u-channel wire tied to top of bottom reinforcement bars in bridge deck.

Stainless steel conduit shall be used beneath any parts of the luminaire or attached conduit 1 (25) above the bottom of the beams with no openings in the bridge deck.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaires shown routed from underground. Branch circuits may also be routed from bridge parapet above.

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

See plans for underpass luminaire locations.

Underpass luminaires shall be centered between beams unless otherwise directed by the Engineer.

Optics of underpass luminaires shall be installed underpass luminaire suspended from bridge deck. Route to adjacent pier if required.

1 (25) min. conduit attached to beam. Route to adjacent pier if required.

1 (25) min. liquidtight flexible nonmetallic conduit.

Conduit clamp as needed (typ.).

Steel conduit to beam. Route to adjacent pier if required.

Conduit clamp as needed (typ.).

Stainless steel junction box. See plans for size and reductions.

Conduit bushing, three required.

1 (25) conduit clamped to bridge deck.

2 (50) min. stainless steel conduit to junction box.

1 (150) min. conduit attached to structure. Route to adjacent pier if required.

Nonmetallic conduit.

1 (25) liquidtight flexible nonmetallic conduit.

1 (25) conduit.

Stainless steel lock nut, lock washer and flat washer.

Stainless steel vibration damper assembly.

Stainless steel spring.

Luminaire mounting tab.

Luminaire hanger assembly, four per luminaire required. See detail (typ.).

Luminaire numbering decal bracket. See detail.

Concrete pier or abutment wall.

Unit duct. See plans for size and reductions.

24 (610) radius stainless steel elbow.

Spring loaded u-channel nut.

Bridge deck nut.

Stainless steel lock nut, lock washer and flat washer.

Stainless steel vibration damper assembly.

Stainless steel spring.

Luminaire mounting tab.

Luminaire hanger assembly, four per luminaire required. See detail (typ.).

Luminaire numbering decal bracket. See detail.

Concrete pier or abutment wall.

36 X 1/4 X 1/8 (914 X 41 X 41) hot dipped galvanized u-channel wire tied to top of bottom reinforcement bars in bridge deck.

Stainless steel conduit shall be used beneath any parts of the luminaire or attached conduit 1 (25) above the bottom of the beams with no openings in the bridge deck.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaires shown routed from underground. Branch circuits may also be routed from bridge parapet above.

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

See plans for underpass luminaire locations.

Underpass luminaires shall be centered between beams unless otherwise directed by the Engineer.

Optics of underpass luminaires shall be installed
Conductors up to luminaire(s).

Transformer base, clamp.

Ground rod base.

In transformer grounding nut conductors.

Lighting circuit See plans for branch luminaire(s).

Breakaway fuse holder with fuses (typ.).

Light pole handhole with ground lug.

See plans for branch lighting circuit conductors.

Green equipment grounding conductor. See plans for size.

Conductor splice (typ.).

Conductor splice (typ.).

Surge arrester (typ.).

Surge arrester (typ.).

Breakaway fuse holder with fuses (typ.).

Breakaway fuse holder with fuses (typ.).

Light pole handhole with ground lug.

See plans for branch lighting circuit conductors.

Metal foundation.

Conductor splice (typ.).

Green equipment grounding conductor. See plans for size.

Conductor splice (typ.).

Green equipment grounding conductor. See plans for size.

Light pole handhole with ground lug.

General Notes:

Wiring for twin luminaire installation shown. Omit one fuse holder and one surge arrester with connections for single luminaire installation.

All conductors originating in pole shall be No. 10 unless noted otherwise. Conductors extended into light poles shall be of a length sufficient for splices to be withdrawn 18 (450) out of pole handhole.

Any voids in the foundation shall be filled with fine aggregate.

See Standard 836001 for Light Pole Foundation and ground rod.

All dimensions are in inches (millimeters) unless otherwise shown.
3-wire, overhead service.

- 25' (7.5 m) Wood service pole.
- 3-No. 8 XLP cables in 1 (25) rigid steel conduit.
- Malleable iron conduit clamps at 5' (1.5 m) intervals.
- Meter (when required).
- Controller enclosure.
- Service disconnect switch.
- Rigid steel conduit elbow.
- Ground line.
- No. 6 bare copper wire.
- No. 8 Wire.

**Controller enclosure, minimum dimensions:** 18H x 12W x 8D (450 x 300 x 200)

**Service conductors:**

- 3-channel or mounting bracket, 2 required.
- Photocell.
- Controller enclosure.
- Rigid steel conduit elbow.

**Neutral bar:**

- Branch lighting circuits.
- Ground bar.

**GENERAL NOTES**

Provide 12x9x1 (305x225x25) watertight pouch mounted inside controller door with as built plans and schematics.

Provide engraved nameplate on front of enclosure reading "LIGHTING".

Enclosure shall be mounted to pole with pole-bands and lag-bolts.

Work pad not shown.

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

Size larger as needed.

Corrected connection at terminal block.

**LIGHTING CONTROLLER**

**POLE MOUNTED, 240V**

**STANDARD 825001-04**
ELECTRIC SERVICE INSTALLATION

- 120/240 V, 3-phase, 3-wire, overhead service.
- Downguy and anchor, as needed.
- 25' (7.5 m) Wood service pole.
- 3 No. 6 XLP cables in 1 (25) rigid steel conduit.
- Malleable iron conduit clamps at 5' (1.25 m) intervals.
- Meter (when required).
- Conduit hub.
- Service disconnect switch.
- Rigid steel conduit elbow.
- (12) 1/2" Schedule 40 PVC conduit.
- Ground wire.
- No. 6 bare copper wire.
- Ground rod.
- Controller enclosure.
- Conduit elbow.
- Ground bar.
- Equipment ground bar.
- Branch lighting circuits.
- No. 6 Wire.*
- Neutral bar.
- Branch lighting circuits in unit duct(s).
- Controller enclosure, minimum dimensions: 308 x 200 x 140* (780 x 510 x 355)
- Insulated mounting board.
- U-channel or mounting bracket, two required.
- Photocell with integral surge arrester.
- HAND-OFF-AUTO selector switch.
- 100 amp*, electrically held contactor.
- 15 amp, 1-pole circuit breaker.
- 20 amp*, 2-pole circuit breaker (two spares required but not shown).
- Surge arrester.
- GFCI duplex receptacle.
- Single-pole, single-throw switch.
- Incandescent luminaire, enclosed and gasketed with 100 watt lamp.
- Service disconnect switch - 2 pole, 3 wire, 60 amp* fused at 60 amp*.
- Solid neutral in NEMA 4X enclosure having lockable external handle.
- Terminal block sized for conductors as shown on plans.
- Size larger as needed.

NOTES

- Preservative. Consult utility company standards for exact requirements.
- *Size larger as needed.

LIGHTING CONTROLLER
POLE MOUNTED, 240V

STANDARD 825001-04

[Sheet 2 of 2]
ELECTRIC SERVICE INSTALLATION

3-wire, overhead service.

240/480 V, 1-phase, service pole.

Weatherhead

Down guy and anchor, as needed.

3 No. 6 XLP cables in 1 (25) rigid steel conduit.

Malleable iron conduit camas at 9 / (1.5 m) intervals.

Meter (when required).**

Conduit hub.

Service disconnect switch.

Rigid steel conduit elbow.

G (1) 50 ft. 40 PVC conduit.

Rigid steel conduit.

Service conductors.

Controller enclosure, minimum dimensions: 30W x 20H x 24D. *(760 x 510 x 355)

Insulating mounting board.

U-channel or mounting bracket, two required.

Ventilator

Controller enclosure.

Rigid steel conduit elbow.

Neutral bar.

Equipment ground bar.

Branch lighting circuits in unit duct(s).

GENERAL NOTES

Provide (12x9x1) (305x225x25) watertight pouch inside controller door with as-built plans and schematics.

Provide engraved nameplate on front of enclosure reading "LIGHTING".

Enclosure shall be mounted to pole with pole-bands and lag-bolts.

Work pad not shown.

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

3-wire, overhead 240/480 V, 1-phase, Weatherhead.

needed. anchor, as Downguy and service pole. *

25' (7.5 m) Wood sized as required.

rigid steel conduit, Service conductors in intervals.

clamps at 5' (1.5 m) Malleable iron conduit

Conduit hub.

Service disconnect switch.

PVC conduit. (13) Sch. 40

Ground line.

copper wire.

rods. (4) 18 (75)

24 (760 )

Ground line.

(1 .08  m )

3'-7"

(900 )

36

(600)

24

(450)

18

(600)

24

Neutral bar.

Equipment ground bar.

Branch lighting circuits.

3-wire, 60 amp*, fused at 60 amp*,

service, 1-phase, 60Hz.

Transformer - 1KVA*, 480V primary,

having lockable external handle.

3-wire, 60 amp*, fused at 60 amp*,

~ Size larger as needed.

Ground rod in access well.

No. 6 bare copper wire.

Insulated conductors.

Service disconnect switch as shown on plans.

Neutral bar.

Equipment ground bar.

Branch lighting circuits.

3-wire, 60 amp*, fused at 60 amp*,
ELECTRIC SERVICE INSTALLATION

Typical overhead service shown. Cut pole off for underground service and treat cut surface with preservative. Consult utility company standards for exact requirements. * Size larger as needed.

SERVICE DISCONNECT SWITCH

25' (7.5 m) Wood service pole. * Maleable iron conduct clamp at 5' (1.5 m) intervals. Malleable iron conduit required.

CONDUIT HUB

Ground rod. No. 6 bare copper wire.

GROUND LINE

To service pole

FEEDER CONDUCTORS

in rigid conduit to lighting controller.

GROUND Rod

12 x 9 x 1
(305 x 229 x 25)
waterlight pouch mounted inside door with as built drawings and schematics.

ANCHOR ROD

DETAIL

Foundation, concrete

minimum dimensions:

Controller enclosure, maximum dimensions: 504 x 368 x 170 * (1270 x 915 x 430)

Insulated mounting board.

Service conductors.

Additional wiring window as needed.

Controller enclosure.

Engraved name plate.

METER (when required)

Service conductors sized as required.

FEEDER LINE CONDUCTORS

in rigid steel conduit, sized as required.

GROUND LINE

Concrete (25"

1 x (900)

36"

1"

Foundation.

Concrete

ENCLOSURE.

Controller enclosure, maximum dimensions: 504 x 368 x 170 * (1270 x 915 x 430)

Insulated mounting board.

Service conductors.

Additional wiring window as needed.

Controller enclosure.

Engraved name plate.

METER (when required)

Service conductors sized as required.

FEEDER LINE CONDUCTORS

in rigid steel conduit, sized as required.

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Additional wiring window as needed.

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Service conductors sized as required.

FEEDER LINE CONDUCTORS

in rigid steel conduit, sized as required.

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1 x (900)

36"

1"

Foundation.

Concrete

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Additional wiring window as needed.

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Service conductors sized as required.

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in rigid steel conduit, sized as required.

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in rigid steel conduit, sized as required.

GROUND LINE

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36"

1"

Foundation.

Concrete

ENCLOSURE.

Controller enclosure, maximum dimensions: 504 x 368 x 170 * (1270 x 915 x 430)

Insulated mounting board.

Service conductors.

Additional wiring window as needed.

Controller enclosure.

Engraved name plate.
LIGHTING service.
3-wire, overhead 240/480 V, 1-phase, Weatherhead.

* anchor, as needed.
Downguy and cover overhang.
in underside of Slotted ventilator service pole.

25' (7.5 m) Wood conduit, sized as required.

Conduit hub.

Malleable iron conduit.

Meter (when required). **

Feeder conductors, sized as required.

No. 6 bare copper wire.

Concrete pole.

Foundation.

Service disconnect switch.

Ground rod.

Service conductors in rigid steel conduit, sized as required.

Neutral bar.

Controller enclosure, minimum dimensions: 50H x 36W x 17D (1270 x 915 x 430)

Service conductors, sized as required.

Additional wiring window as needed.

Feeder conductors, sized as required.

Photoelectric lighting controller.

100 amp*, 2-pole circuit breaker.

GFCI duplex receptacle.

Single-pole, single-throw switch.

Incandescent luminaire.

Photocell with integral surge arrester.

100 amp* electrically held contactor.

Surge arrester.

GFCI duplex receptacle.

Single-pole, single-throw switch.

SERVICE INSTALLATION

Typical overhead service shown. Cut pole off for underground service and treat cut surface with preservative. Consult utility company standards for exact requirements.

Size larger as needed.

When cold sequencing is required, provide a meter disconnect switch as directed by utility company.

No. 6 bare copper wire.

Concrete pole.

Foundation.

Service disconnect switch.

Ground rod.

Service conductors in rigid steel conduit, sized as required.

Neutral bar.

Controller enclosure, minimum dimensions:

50H x 36W x 17D

(1270 x 915 x 430)

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Concrete pole.

Foundation.

Service disconnect switch.

Ground rod.

Service conductors in rigid steel conduit, sized as required.

Neutral bar.

Controller enclosure, minimum dimensions:

50H x 36W x 17D

(1270 x 915 x 430)

Service conductors, sized as required.

Additional wiring window as needed.

Feeder conductors, sized as required.

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No. 6 bare copper wire.

Concrete pole.

Foundation.

Service disconnect switch.

Ground rod.

Service conductors in rigid steel conduit, sized as required.

Neutral bar.

Controller enclosure, minimum dimensions:

50H x 36W x 17D

(1270 x 915 x 430)

Service conductors, sized as required.

Additional wiring window as needed.

Feeder conductors, sized as required.

Photoelectric lighting controller.

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GFCI duplex receptacle.

Single-pole, single-throw switch.

Incandescent luminaire.

Photocell with integral surge arrester.

100 amp* electrically held contactor.

Surge arrester.

GFCI duplex receptacle.

Single-pole, single-throw switch.

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Typical overhead service shown. Cut pole off for underground service and treat cut surface with preservative. Consult utility company standards for exact requirements.

Size larger as needed.

When cold sequencing is required, provide a meter disconnect switch as directed by utility company.

No. 6 bare copper wire.

Concrete pole.

Foundation.

Service disconnect switch.

Ground rod.

Service conductors in rigid steel conduit, sized as required.

Neutral bar.

Controller enclosure, minimum dimensions:

50H x 36W x 17D

(1270 x 915 x 430)

Service conductors, sized as required.

Additional wiring window as needed.

Feeder conductors, sized as required.

Photoelectric lighting controller.

100 amp*, 2-pole circuit breaker.

GFCI duplex receptacle.

Single-pole, single-throw switch.

Incandescent luminaire.

Photocell with integral surge arrester.

100 amp* electrically held contactor.

Surge arrester.

GFCI duplex receptacle.

Single-pole, single-throw switch.

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When cold sequencing is required, provide a meter disconnect switch as directed by utility company.

No. 6 bare copper wire.

Concrete pole.

Foundation.

Service disconnect switch.

Ground rod.

Service conductors in rigid steel conduit, sized as required.

Neutral bar.

Controller enclosure, minimum dimensions:

50H x 36W x 17D

(1270 x 915 x 430)

Service conductors, sized as required.

Additional wiring window as needed.

Feeder conductors, sized as required.

Photoelectric lighting controller.

100 amp*, 2-pole circuit breaker.

GFCI duplex receptacle.

Single-pole, single-throw switch.

Incandescent luminaire.

Photocell with integral surge arrester.

100 amp* electrically held contactor.

Surge arrester.

GFCI duplex receptacle.

Single-pole, single-throw switch.

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Typical overhead service shown. Cut pole off for underground service and treat cut surface with preservative. Consult utility company standards for exact requirements.

Size larger as needed.

When cold sequencing is required, provide a meter disconnect switch as directed by utility company.

No. 6 bare copper wire.

Concrete pole.

Foundation.

Service disconnect switch.

Ground rod.

Service conductors in rigid steel conduit, sized as required.

Neutral bar.

Controller enclosure, minimum dimensions:

50H x 36W x 17D

(1270 x 915 x 430)

Service conductors, sized as required.

Additional wiring window as needed.

Feeder conductors, sized as required.

Photoelectric lighting controller.

100 amp*, 2-pole circuit breaker.

GFCI duplex receptacle.

Single-pole, single-throw switch.

Incandescent luminaire.

Photocell with integral surge arrester.

100 amp* electrically held contactor.

Surge arrester.

GFCI duplex receptacle.

Single-pole, single-throw switch.

SERVICE INSTALLATION

Typical overhead service shown. Cut pole off for underground service and treat cut surface with preservative. Consult utility company standards for exact requirements.

Size larger as needed.

When cold sequencing is required, provide a meter disconnect switch as directed by utility company.

No. 6 bare copper wire.

Concrete pole.

Foundation.

Service disconnect switch.

Ground rod.

Service conductors in rigid steel conduit, sized as required.

Neutral bar.

Controller enclosure, minimum dimensions:

50H x 36W x 17D

(1270 x 915 x 430)

Service conductors, sized as required.

Additional wiring window as needed.

Feeder conductors, sized as required.

Photoelectric lighting controller.

100 amp*, 2-pole circuit breaker.

GFCI duplex receptacle.

Single-pole, single-throw switch.

Incandescent luminaire.

Photocell with integral surge arrester.

100 amp* electrically held contactor.

Surge arrester.

GFCI duplex receptacle.

Single-pole, single-throw switch.
NAVIGATION OBSTRUCTION
LIGHTING CONTROLLER, 240V

**ELECTRIC SERVICE INSTALLATION**

Typical overhead service as shown. Cut pole off for underground service and treat cut surface with preservative. Consult utility company standards for exact requirements.

**ANCHOR ROD DETAIL**

- * Size larger as needed.
Controller enclosure, minimum dimensions:
39H x 44W x 26D = (1500 x 1120 x 660)

Service conductors, sized as required.

Feeder conductors, sized as required.

Insulated mounting board.

Aborted dimension.

Equipment ground bar.

Neutral bar.

Service disconnect switch - 2-pole, 3-wire, 100 amp*, fused at 100 amp*, solid neutral in NEMA 4X enclosure having lockable external handle.

60 amp*, 2-pole circuit breaker.

30 amp*, 2-pole circuit breaker.

Controller enclosure, neutral bar in access well.

Neutral bar.

Equipment ground bar.

Roadway lighting circuits.

Navigation lighting circuits.

GFCI duplex receptacle.

Single-pole, single-throw switch.

Incandescent luminaire, enclosed and gasketed with 100 watt lamp.

Service disconnect switch - 2-pole, 3-wire, 100 amp*, fused at 100 amp*, solid neutral in NEMA 4X enclosure having lockable external handle.

60 amp*, 2-pole circuit breaker.

30 amp*, 2-pole circuit breaker.

Terminal block sized for conductors as shown or plans.

* Size larger as needed.

HAND-OFF-AUTO selector switch.

100 amp*, electrically held contactor.

60 amp*, electrically held contactor.

15 amp, 1-pole circuit breaker.

20 amp*, 2-pole circuit breaker (two spares required but not shown).

20 amp*, single-pole circuit breaker (two shown, quantity as required).

Surge arrester.

Surge arrester for navigation lighting.

Photocell with integral surge arrester for roadway lighting.

Photocell with integral surge arrester for roadway lighting.

Navigation arrester.

Navigation arrester for roadway lighting.

Photocell with integral surge arrester for roadway lighting.

Navigation arrester.

Navigation arrester for roadway lighting.

Photocell with integral surge arrester for roadway lighting.

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Navigation arrester.

Navigation arrester for roadway lighting.

Photocell with integral surge arrester for roadway lighting.

Navigation arrester.

Navigation arrester for roadway lighting.

Photocell with integral surge arrester for roadway lighting.

Navigation arrester.
**ELECTRIC SERVICE INSTALLATION**

(Typical overhead service shown. Cut pole off for underground service and treat cut surface with preservative. Consult utility company standards for exact requirements.)

- Size larger as needed.
- When cold sequencing is required, provide a meter disconnect switch as directed by utility company.

**FOUNDRATION PLAN**

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

**NAVIGATION OBSTRUCTION**

**LIGHTING CONTROLLER, 480V**

(Date: 1-1-19) Replaced ** note with new note regarding utility company standards. Made *** the ** note. 1-1-15 Added note **.
**CONTROL SCHEMATIC**

1. Photocell with integral surge arrester for navigation lighting.
2. Photocell with integral surge arrester for roadway lighting.
3. HAND-OFF-AUTO selector switch.
4. 100 amp*, electrically held contactor.
5. 60 amp*, electrically held contactor.
6. 15 amp, 1-pole circuit breaker.
7. 20 amp, 2-pole circuit breaker (two spares required but not shown).
8. 20 amp*, single-pole circuit breaker (two shown, quantity as required).
10. GFCI duplex receptacle.
12. Incandescent luminaire, enclosed and gasketted with 100 watt lamp.
13. Service disconnect switch - 2-pole, 3-wire, 100 amp*, fused at 100 amp*, solid neutral in NEMA 4X enclosure having lockable external handle.
14. 60 amp*, 2-pole circuit breaker.
15. 30 amp*, 2-pole circuit breaker.
16. Transformer - 1 KVA*, 480V primary, 120/240V secondary, single phase, 60 Hz.
17. 15 amp, 2-pole circuit breaker.
18. Terminal block sized for conductors as shown on plans.

* Size larger as needed.

---

**Controller enclosure, minimum dimensions:** 59H x 44W x 26D (1500 x 1120 x 660)
GENERAL NOTES

See Standard 830001 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole identification banding to pole.

Voids in light pole base shall be sealed to prevent rodent entry.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

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

* Unless directed otherwise by the Engineer.

PROCESS: ENGINEER OF DESIGN AND ENVIRONMENT

DATE: 1-1-15

REVISIONS: 1-1-15 Revised note set

HANDHOLE DETAIL

1-1-16 Added pole mounted on bridge parapet. Modified attachment of screen.

STANDARD 830001-03
**DAVIT LIGHT POLE**

(Single or twin mount)

- Unless directed otherwise by the Engineer.

---

**LIGHT POLE ALUMINUM DAVIT ARM**

**DAVIT ARM LENGTH**

- 15'-0" (4.57 m) max. for single
- 12'-0" (3.66 m) max. for double.

**MOUNTING HEIGHT**

- 3'-9" (1.14 m) R.
- See tenon detail.

**Davit arm**

- Minimum wall thickness 0.188 (4.8).
- 3'-2" (1.24 m) H.

**POLE BASE**

<table>
<thead>
<tr>
<th>MOUNTING HEIGHT</th>
<th>BOLT CIRCLE DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>35' (10.7 m) or less</td>
<td>115 (290)</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>75 (180)</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>35' (9.1 m)</td>
<td>31'-1&quot; to 36'-1&quot;</td>
<td>6 tapered (125 to 150)</td>
<td>0.25 (6)</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>28'-7&quot; to 31'-1&quot;</td>
<td>6 tapered (125 to 150)</td>
<td>0.25 (6)</td>
</tr>
<tr>
<td>40' (12.2 m)</td>
<td>33'-1&quot; to 36'-1&quot;</td>
<td>8 tapered (125 to 150)</td>
<td>0.25 (6)</td>
</tr>
<tr>
<td>Greater than 40' (12.2 m) to 50' (15.2 m)</td>
<td>38'-1&quot; to 41'-1&quot;</td>
<td>8 tapered (125 to 150)</td>
<td>0.312 (8)</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

- Lower shaft length shall be from the bottom of the pole base to the bottom of the slip joint.
- 5" max. for unloaded pole, 1.5" max. for loaded pole.

- Provide breakaway devices where required.

- Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

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

---

**STANDARD 830006-05**

(Not shown)
Traffic flow

Traffic flow

Traffic flow

Traffic flow

Pole identification.

Pole identification.

Pole identification.

Pole identification.

Pole on ground mounted barrier wall.

Pole on barrier wall, retaining wall or parapet.

Pole on median barrier wall.

Davit arm.

Handhole.

Handhole.

Handhole.

Handhole.

1½ x 2 (32 x 30) slot (typ.)

Bolt circle.

Hex nut with washer. Washer shall cover entire shell (typ.). Nut covers required but not shown.

Screen wrapped around nuts and anchor rods between foundation and bottom of pole base. Provide 6 (130) minimum overlap and wire-tie with matching wire.

Concrete foundation, barrier or retaining wall.

See Bridge Parapet.

Screen wrapped around nuts and anchor rods between foundation and bottom of pole base. Provide 6 (150) minimum overlap and wire-tie with matching wire.

Handhole and cover. See orientation detail.

ELEVATION AT CONCRETE FOUNDATION, METAL FOUNDATION OR RETAINING WALL

Omit leveling nuts when breakaway devices are required.

4 x 8 (100 x 200) min. Handhole and cover. See orientation detail.

ELEVATION AT BRIDGE PARAPET

POLE BASE DETAILS

HANDHOLE DETAIL

HANDHOLE IDENTIFICATION ORIENTATION DETAIL

HANDHOLE / IDENTIFICATION

SECTION A-A (no dimensions shown)
**General Notes**

See Standard 836001 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole identification banding to pole.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

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

---

**Light Pole Steel Mast Arm**

(See Standard 830011-03)

**General Notes**

- See Standard 836001 for Light Pole Foundation and grounding electrode.
- See Standard 720001 for pole identification banding to pole.
- Provide breakaway devices where required.
- Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.
- All dimensions are in inches (millimeters) unless otherwise shown.

---

**Light Pole Steel Mast Arm**

(See Standard 830011-03)
**Traffic Flow**

- Pole on median barrier wall.
- Pole on ground mounted foundation.
- Pole on barrier wall, retaining wall or parapet.

**SECTION A-A (Bolts not shown)**

- Tapped 6 (13) hole for grounding connector.
- Hex nut with washer. Washer shall cover entire slot (typ.). Nut covers required but not shown.
- Screen wrapped around nuts and anchor rods between foundation and bottom of pole base. Provide 6 (150) minimum overlap and wire-tie with matching wire.

**DETAILED D**

- 2½ O.D. x ½ (64 x 13) washers both sides of 2½ O.D. x ½ (64 x 13) min. isolation washer.
- ½ (13) min. isolation pad
- ½ (13) min. leveling plate sized to match pole base.
- 1 (25) leveling nut.

- See Bridge Plans for 1 (25) anchor rod by others.

**POLE BASE DETAILS**

- Screen wrapped around nuts and anchor rods between foundation and bottom of leveling plate. Provide 6 (150) minimum overlap and wire-tie with matching wire.

**ELEVATION AT BRIDGE PARAPET**

- Hex nut and lock washer on fully threaded rod for metal foundation.
- Nut covers required.

**ELEVATION AT CONCRETE FOUNDATION, METAL FOUNDATION OR RETAINING WALL**

- See DETAIL A.

**HANDHOLE DETAIL**

- Handhole frame.
- Handhole gasket.
- Handhole cover.

**ELEVATION AT CONCRETE FOUNDATION, METAL FOUNDATION OR RETAINING WALL**

- See DETAIL A.
- Nut covers required.

**HANDHOLE DETAIL**

- Handhole frame.
- Handhole gasket.
- Handhole cover.

**HANDHOLE / IDENTIFICATION ORIENTATION DETAIL**

- Pole identification.
- Pole.
- Handhole.
- Pole on ground mounted foundation.
- Pole on median barrier wall.
- Pole on barrier wall, retaining wall or parapet.
Lower shaft length shall be from the bottom of the pole base to the bottom of the slip joint.

3° max. for unloaded pole, 1.5° max. for loaded pole.
**Traffic flow**

- Pole on median barrier wall.
- Pole on ground mounted barrier wall.

**Handhole and cover**

See orientation detail.

Hex nut with washer. Washer shall cover entire slot (typ.). Nut covers required but not shown.

Screen wrapped around nuts and anchor rods between foundation and bottom of pole base. Provide 6 (150) minimum overlap and wire-tie with matching wire.

Concrete foundation, barrier or retaining wall.

**Foundation, Metal Foundation or Retaining Wall**

Omit leveling nuts when breakaway devices are required.

**Elevation at Concrete Foundation, Metal Foundation or Retaining Wall**

4 x 8 (100 x 200) min. handhole and cover. See orientation detail.

**Elevation at Bridge Parapet**

See DETAIL A.

**Pole Base Details**

- 2½ O.D. x ½ (64 x 7) 3 (25) self-locking nuts without washers.
- 2½ O.D. x ½ (64 x 13) min. isolation washer with matching wire.
- ½ (13) min. isolation pad sized to match pole base.
- ½ (13) min. leveling plate sized to match pole base.
- 1 (25) leveling nut.

Screen wrapped around nuts and anchor rods between foundation and bottom of leveling plate. Provide 6 (150) minimum overlap and wire-tie with matching wire.

Bridge parapet.

**Section A-A (Bolts not shown)**

- 3½ x 2 (42 x 50) 30 (typ.)
- Tapped ⅜ (13) hole for grounding connector.

**Detail A**

- Handhole frame.
- Handhole gasket.

**Handhole Detail**

- Pole on barrier wall, retaining wall or parapet.

**Handhole / Identification Orientation Detail**

- Pole on ground mounted foundation.
### GENERAL NOTES

See Standard 836001 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole identification banding to pole.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

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

---

**STEEL TENON TOP LIGHT POLE**

* Tenon top, see detail.

**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>1½ (38)</td>
<td>7 (25)</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>15 (380)</td>
<td>1½ (32)</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 tapered to 4</td>
<td>25 gauge</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>10 tapered to 4</td>
<td>7 gauge</td>
</tr>
</tbody>
</table>

---

**TENON DETAIL**

- Pole identification banded to pole. See orientation detail.
- See pole base and handhole detail.

**TWIN TENON DETAIL**

- Three 5/16" x 38 self tapping screws at 120°.

**LIGHT POLE**

- 2½ (64) I.D. schedule 40 pipe with cap at top.
**GENERAL NOTES**

See plans for wire and unit duct sizes and pole locations not shown.

Provide guy wires with strain insulators and anchors, as needed.

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

**TWIN SINGLE MOUNTING BRACKET DETAILS**

- **SERVICE POLE:**
  - Weather head
  - Heavy duty insulated pulley clevis with mounting bolt and hardware.

- **LUMINAIRE MOUNTING DETAILS**
  - Mounting height 43' - 44' (13.1 m - 13.4 m)

- **LIGHT POLE WITH CIRCUIT ROUTED UNDERGROUND**
  - **SERVICE INSTALLATION:**
  - Three #10 XLP-USE cable.
  - Waterproof, two-pole fuse holder with fuses.
  - Waterproof insulation piercing tap connector.
  - Heavy duty insulated pulley clevis with mounting bolt and hardware.
  - Ground clamp.
  - 1 (2) rigid steel conduit.
  - Malleable iron conduit clamp below "C" condulet.
  - Threaded conduit reducer.
  - "C" condulet, threaded.
  - 1½ (40) rigid steel conduit.
  - Conduit bushing.
  - #6 bare copper ground wire to 10 ft. ground rod, every third light pole.
  - Unit duct.
  - Wire tie.
  - Malleable iron conduit clamp below "C" condulet.
  - Size larger as needed.

**LIGHTING CIRCUIT AT SERVICE/CONTROLLER**

- See standard 835001 for service installation.

- **AERIAL CABLE WITH MESSAGER TO LUMINAIRES:**
  - Malleable iron conduit clamps at 5' (1.5 m) centers.
  - Rigid steel conduit with lighting circuit conductors down to lighting controller.

**REVISIONS**

- 1-1-19 Revised Luminaire to be horizontal.
- 1-1-13 New standard.

**STANDARD 830026-01**

**TEMPORARY ROADWAY LIGHTING**
## Metal Foundation

<table>
<thead>
<tr>
<th>Light Pole Mounting Height</th>
<th>Bolt Circle Diameter</th>
<th>Shaft Diameter</th>
<th>Top Plate (mm)</th>
<th>Shaft Diameter</th>
<th>Shaft Depth</th>
<th>Anchor Rod Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'-10&quot; (1.42 m)</td>
<td>11 3/4&quot; (297)</td>
<td>8 1/4&quot; (203)</td>
<td>12&quot; x 12 1/2&quot;</td>
<td>24&quot; (610)</td>
<td>4&quot; (100)</td>
<td>15 (381)</td>
</tr>
<tr>
<td>5'-0&quot; (1.52 m)</td>
<td>11 3/4&quot; (297)</td>
<td>8 1/4&quot; (203)</td>
<td>12&quot; x 12 1/2&quot;</td>
<td>24&quot; (610)</td>
<td>4&quot; (100)</td>
<td>15 (381)</td>
</tr>
<tr>
<td>5'-10&quot; (1.80 m)</td>
<td>12&quot; (305)</td>
<td>10 3/8&quot; (267)</td>
<td>13&quot; x 13 1/2&quot;</td>
<td>30&quot; (762)</td>
<td>6&quot; (150)</td>
<td>17 (432)</td>
</tr>
<tr>
<td>6'-0&quot; (1.83 m)</td>
<td>12&quot; (305)</td>
<td>10 3/8&quot; (267)</td>
<td>13&quot; x 13 1/2&quot;</td>
<td>30&quot; (762)</td>
<td>6&quot; (150)</td>
<td>17 (432)</td>
</tr>
<tr>
<td>6'-6&quot; (1.98 m)</td>
<td>12&quot; (305)</td>
<td>10 3/8&quot; (267)</td>
<td>13&quot; x 13 1/2&quot;</td>
<td>30&quot; (762)</td>
<td>6&quot; (150)</td>
<td>17 (432)</td>
</tr>
<tr>
<td>7'-0&quot; (2.13 m)</td>
<td>12&quot; (305)</td>
<td>10 3/8&quot; (267)</td>
<td>13&quot; x 13 1/2&quot;</td>
<td>30&quot; (762)</td>
<td>6&quot; (150)</td>
<td>17 (432)</td>
</tr>
<tr>
<td>7'-6&quot; (2.29 m)</td>
<td>12&quot; (305)</td>
<td>10 3/8&quot; (267)</td>
<td>13&quot; x 13 1/2&quot;</td>
<td>30&quot; (762)</td>
<td>6&quot; (150)</td>
<td>17 (432)</td>
</tr>
</tbody>
</table>

### General Notes
- All foundations are designed to be located on slopes not exceeding 2:1 where soils have an unconfined compressive strength of at least 1.0 TSF. The Contractor shall verify the soil strength during drilling for concrete foundations or by monitoring installation resistance of metal foundations and notify the Engineer if other conditions are encountered.
- 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 4.6" (117 mm) with cut anchor rods 6 (150) above bottom of excavated hole. See ring plate detail.
- Anchor rods shall be increased in diameter as needed for 60 (152 mm) mounting height or above. The Contractor shall match the breakaway device size or slotted hole size in the plate base plate to accommodate larger rod sizes.
- Transformer bases shall not be used on metal foundations.
- All dimensions are in inches (millimeters) unless otherwise shown.

## Concrete Foundation

- **Top Plate Detail**: Cut and thread rod, provide matching hex head nut fully seated.
- **Ring Plate Detail**: Use 1/2" (12 mm) hex head nut.
- **Concrete Foundation**: The Contractor shall match the breakaway device size or slotted hole size in the plate base plate to accommodate larger rod sizes.

### Pole Setback
- Maximum pole setback shall be 30' (9 m) from edge of pavement and shall be located no closer than 5' (1.5 m) behind guardrail or other protective barriers, or as directed by the Engineer.

---

**LIGHT POLE FOUNDATION**

**STANDARD 836001-04**

---

**Illinois Department of Transportation**

---

**Bolt circle diam. shall be 17 (430) when a transformer base is used.**

---

**Provide dirt as needed to meet 5' (1.52 m) chord fill around foundation top. Grade dirt level with bottom of top plate.**

---

**Use dirt removed from foundation to meet 5' (1.52 m) chord fill around foundation top. Grade dirt level with bottom of concrete chamber.**

---

**5 (125) I.D. Schedule 40 P.V.C. wiring window. Fill with fine aggregate.**

---

**Plate to be installed when required (See ring plate detail).**

---

**Anchor rod 1 (25) diameter with 9 (230) threads.**

---

**For foundation behind barrier or guardrail, use self-locking nut and flat washer. Do not use lock washer.**

---

**No. 6 bare copper grounding electrode conductor.**

---

**Top of wiring window shall be flush with top of foundation.**

---

**Finished grade formed grade.**

---

**Ring Plate Detail when rock is encountered.**

---

**Pole Foundation Setback:**

---

**1-1-18**

---

**1-1-19**

---

**Omitted multimount luminaire to agree with BDE Manual.**

---

**Replaced rod hooks with bolts.**

---

**Mapping West Transportation**
GENERAL NOTES
See standard 637006 for barrier wall details.

Provide 2 (50) min. separation between all conduits.

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 TABLE

<table>
<thead>
<tr>
<th>LIGHT POLE MOUNTING HEIGHT</th>
<th>SHAFT DIAMETER</th>
<th>SHAFT DEPTH</th>
<th>ANCHOR ROD LENGTH</th>
<th>ANCHOR ROD CIRCLE BOX</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 ft (6.1 m)</td>
<td>6 (150)</td>
<td>24</td>
<td>3-1/2 (88)</td>
<td>3 (76)</td>
</tr>
<tr>
<td>24 ft (7.3 m)</td>
<td>6 (150)</td>
<td>24</td>
<td>3-1/2 (88)</td>
<td>3 (76)</td>
</tr>
<tr>
<td>30 ft (9.1 m)</td>
<td>6 (150)</td>
<td>24</td>
<td>3-1/2 (88)</td>
<td>3 (76)</td>
</tr>
<tr>
<td>36 ft (10.9 m)</td>
<td>7 (178)</td>
<td>24</td>
<td>3-1/2 (88)</td>
<td>3 (76)</td>
</tr>
<tr>
<td>42 ft (12.7 m)</td>
<td>7 (178)</td>
<td>24</td>
<td>3-1/2 (88)</td>
<td>3 (76)</td>
</tr>
<tr>
<td>48 ft (14.6 m)</td>
<td>7 (178)</td>
<td>30</td>
<td>4-1/2 (114)</td>
<td>4 (102)</td>
</tr>
</tbody>
</table>

ELEVATION

JUNCTION BOX ELEVATION

ANCHOR ROD CIRCLE DETAIL

LIGHT POLE FOUNDATION

RING PLATE DETAIL

PLAN

44 IN. (1120 mm) LIGHT POLE FOUNDATION WITH CONCRETE BARRIER

44 (1120) IN HIGH BARRIER WALL.
**LIGHT TOWER FOUNDATION**

**SOIL CONSISTENCY**

<table>
<thead>
<tr>
<th>Qu in ft</th>
<th>80'</th>
<th>90'</th>
<th>100'</th>
<th>110'</th>
<th>120'</th>
<th>130'</th>
<th>140'</th>
<th>150'</th>
<th>160'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qu in lb/in</td>
<td>Qu in lb/in</td>
<td>Qu in lb/in</td>
<td>Qu in lb/in</td>
<td>Qu in lb/in</td>
<td>Qu in lb/in</td>
<td>Qu in lb/in</td>
<td>Qu in lb/in</td>
<td>Qu in lb/in</td>
<td>Qu in lb/in</td>
</tr>
<tr>
<td>55 (50)</td>
<td>60 (55)</td>
<td>65 (60)</td>
<td>70 (65)</td>
<td>75 (70)</td>
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<td>85 (80)</td>
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<td>95 (90)</td>
<td>100 (95)</td>
</tr>
<tr>
<td>10 to 25</td>
<td>15 to 30</td>
<td>20 to 40</td>
<td>25 to 50</td>
<td>30 to 60</td>
<td>35 to 70</td>
<td>40 to 80</td>
<td>45 to 90</td>
<td>50 to 100</td>
<td>55 to 110</td>
</tr>
<tr>
<td>0.5 to 1</td>
<td>0.75 to 1.5</td>
<td>1 to 2</td>
<td>1.25 to 2.5</td>
<td>1.5 to 3</td>
<td>1.75 to 3.5</td>
<td>2 to 4</td>
<td>2.5 to 5</td>
<td>3 to 6</td>
<td>3.5 to 7.5</td>
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<tr>
<td>5 to 10</td>
<td>10 to 20</td>
<td>15 to 30</td>
<td>20 to 40</td>
<td>25 to 50</td>
<td>30 to 60</td>
<td>35 to 70</td>
<td>40 to 80</td>
<td>45 to 90</td>
<td>50 to 100</td>
</tr>
<tr>
<td>0.25 to 0.5</td>
<td>0.5 to 1</td>
<td>0.75 to 1.5</td>
<td>1 to 2</td>
<td>1.25 to 2.5</td>
<td>1.5 to 3</td>
<td>1.75 to 3.5</td>
<td>2 to 4</td>
<td>2.5 to 5</td>
<td>3 to 6</td>
</tr>
</tbody>
</table>

**SHAFT LENGTH TABLE**

<table>
<thead>
<tr>
<th>Shaft Diameter (in)</th>
<th>60'</th>
<th>90'</th>
<th>120'</th>
<th>150'</th>
<th>180'</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (76)</td>
<td>5.5</td>
<td>7.5</td>
<td>9.5</td>
<td>11.5</td>
<td>13.5</td>
</tr>
<tr>
<td>4 (102)</td>
<td>7.5</td>
<td>10</td>
<td>12.5</td>
<td>15</td>
<td>17.5</td>
</tr>
<tr>
<td>5 (127)</td>
<td>9.5</td>
<td>12.5</td>
<td>15.5</td>
<td>18.5</td>
<td>21</td>
</tr>
<tr>
<td>6 (152)</td>
<td>11</td>
<td>14</td>
<td>17</td>
<td>20</td>
<td>23</td>
</tr>
</tbody>
</table>

**SECTION A-A**

* See Rod and Reinforcement Table.
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.

All foundation reinforcement steel shall be epoxy coated.

The cost of reinforcement shall be included in the cost of the foundation.

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.

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.
**BREAKAWAY COUPLINGS ON CONCRETE FOUNDATION FOR STEEL LIGHT POLE**

(Provide pole base skirt around wire cloth when required.)

- Wire cloth wrapped around couplings between foundation and pole base. Provide 6 (150) minimum overlap and wire tie at three locations at each end of overlap.

- Concrete foundation.

- Breakaway coupling.

- Washer.

- Hex nut with washer.

- Light pole base.

**BREAKAWAY COUPLINGS ON METAL FOUNDATION FOR STEEL POLE**

(Provide pole base skirt around wire cloth when required.)

- Wire cloth wrapped around couplings between foundation and pole base. Provide 6 (150) minimum overlap and wire tie at three locations at each end of overlap.

- Metal foundation.

- Breakaway coupling.

- Washer.

- Hex nut with lock washer.

- Stud bolt.

**BREAKAWAY TRANSFORMER BASE FOR STEEL OR ALUMINUM POLE**

(Steel pole shown)

- Concrete foundation.

- Light pole handhole.

- 1 (25) hex head bolt with washer. Hex head covers required but not shown.

- Pole base.

- 2¼ (70) O.D. x ½ (13) thick flat washer.

- Hex nut.

- Anchor rod.

- Hex nut.

- 2¼ (70) O.D. x ½ (13) thick flat washer.

- Seal all gaps between transformer base and concrete foundation.

- Light pole base.
**BASIC CONSTRUCTION**

**General Notes:**

- Use light pole standard for details not shown.
- Transformer bases shall not be installed on wooden foundations.
- Washer on top of pole base shall cover the entire bolt slot.

**See** Standard 836001 for Light Pole Foundation.

Wire cloth shall be stainless steel, have a maximum opening of 6/150 (4), and have a minimum wire size of AWG No. 16 (1.6).

**Breakaway Couplings for Aluminum Poles**

(Provide pole base skirt around wire cloth when required.)

**View B-B**

- Light pole base
- Three stainless steel wire ties: top, middle, and bottom of overlap
- Overlap wire cloth 6 (150) min. and tie together with stainless steel wire
- Depression in cast aluminum base, depending on the manufacturer
- Wire cloth
- Three stainless steel wire ties: top, middle, and bottom of overlap
- Wire cloth wrapped around breakaway couplings. Breakaway coupling installation same as for steel pole.

**View A-A**

- Light pole shaft
- Aluminum nut cover
- Lightpole base
- Concrete or metal foundation (concrete shown)
- When encountered, cut wire cloth to conform to depressions in bottom of pole base

- Washers on top of pole base shall cover the entire bolt slot

**STANDARD 838001-01**

**Breakaway Devices**

Illinois Department of Transportation

January 1, 2018

APPROVED January 1, 2018

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-12

PASSED

ENGINEER OF PRELIMINARY ENGINEERING
Coordinated phase

MAJOR STREET

NEMA EIGHT PHASE DUAL RING
ACTUATED CONFIGURATION

LEGEND

1. Vehicular phase no. x
2. Pedestrian phase no. x
3. Right turn overlaps where:

A = B + C
B = A + D
C = A + D
D = B + C

NEMA
National Electrical Manufacturers Association

STANDARD PHASE DESIGNATION DIAGRAM (NEMA)
24V DC Monitor

Preempt Interlock
(Relay & Controller Harness)

Supervision Fail
Preempt No. 1

Railroad Preempt
Preempt No. 2

Logic Common
LC

AC-

In-line fuse
2 Amp

#10 AWG to AC-

All three shields

Separately shielded conductors

RR Facility

RED
FRONT

BLUE
BACK

BLACK
HEEL

facility end.

All three shields shall be isolated at the railroad facility end.

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.

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 railroad preemption routine following 1 second delay.

GENERAL NOTES

CR1 PREEMPT RELAY
CR2 SUPERVISORY RELAY

SUPERVISED RAILROAD INTERCONNECT CIRCUIT

DATE: 1-1-09
REVISIONS: Omitted note regarding units of length.
APPROVED: January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED: 1-1-04
PASSED: ENGINEER OF OPERATIONS

DATE: 1-1-04
REVISIONS: New Standard.

SUPERVISORY RAILROAD INTERCONNECT CIRCUIT

STANDARD 857006-01
Note: The power transfer relay may be internal to the inverter/charger.
**Bonding a Handhole Cover & Frame**

- **Cable hooks**
- **Recessed cover**
- **Equipment grounding connector to controller**
- **Double handhole.**
- **To pole or post**

**Bonding an Existing Handhole Cover & Frame**

- **Handhole Frame and cover**
- **Heavy-duty compression terminal (typical)**
- **1/4 x 3/4 (13 x 31) stainless steel bolt with split lock washer and nylon insert locknut, anti-corrosion compound shall be applied to frame and cover (typical).**
- **Anti-corrosion compound shall be applied to each assembly.**

**Grounding a Mast Arm Pole/Post**

- **Access cover**
- **Grounding electrode conductor**
- **Equipment grounding**
- **1/4 x 10" (19 x 3.0 m) copper clad grounding electrode**

---

**Heavy Duty Compression Terminal**

- **Heavy-duty compression terminal**

**Heavy Duty Ground Rod Clamp**

- **1/4 (19) Clamp Size**

---

**Traffic Signal Grounding & Bonding**

- **Illinois Department of Transportation**
- **January 1, 2009**
- **APPROVED**
- **ENGINEER OF DESIGN AND ENVIRONMENT**
- **ISSUED**
- **ENGINEER OF OPERATIONS**

---

**STANDARD 873001-02**

**DATE**

1-1-09

1-1-07

**REVISIONS**

Switched units to English (metric)

Revised terminology

---

**GROUNDING & BONDING**

TRAFFIC SIGNAL

COVER & FRAME

BONDING A HANDHOLE

DETAIL "A"

HANDHOLE COVER & FRAME

BONDING AN EXISTING

GROUNDING AN EXISTING

HANDHOLE COVER & FRAME

HEAVY-DUTY COMPRESSION TERMINAL

HEAVY-DUTY GROUND ROD CLAMP

---

All dimensions are in inches (millimeters) unless otherwise shown.
PEDESTRIAN PULL BUTTON POST

- M8 (8 mm) dia. Stainless steel bolts
- 6 (11 mm) dia. Stainless steel bolts
- 3/4" (19 mm) max 30 (762) mm
- 3/4" (19 mm) max 30 (762) mm
- 30 (762) min.
- 3'-6" (1.05 m) max.
- 30 (762) min.
- 36 (915) preferred

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

DATE | REVISIONS
--- | ---
6-1-16 | Revised sign numbers for consistency with current MUTCD
1-1-14 | Revised and added dimensions for PROWAG

STANDARD 876001-04
Mast arm length as specified on the plans

**Typ.**

12' (3.6 m)

**Min.**

8' (2.4 m)

36x36 (900x900)

Removable cap

Sign panel or blankout sign
100 lb (45 kg) max.

This signal head only for arms 36' 110.97 m) and longer.

- 20 sq. ft. (1.86 sq. m) max. sign panel or blankout sign 100 lb (45 kg) max.
- 14.7 sq. ft. (1.37 sq. m) for each signal head
- Steel mesh
- Stainless steel

 **ANCHOR ROD DETAIL**

- Rod circle
- Anchor rod 2 (50)
- Rod hooks
- Anchor rod detail
- Bolt covers for each anchor rod

**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).
- See Standard 720016 for location of sign panel or blankout sign closest to pole.
- All dimensions are in inches (millimeters) unless otherwise shown.

**STEEL MAST ARM ASSEMBLY AND POLE 16' THROUGH 55'**

**STANDARD 877001-08**

1-1-02

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

1-1-20

PASSED

ENGINEER OF OPERATIONS

1-1-18

Revised mast arm length.

Revised table for LRFD reqs.

Revised GEN. NOTES for sign location. Replaced nut hooks with nuts.

<table>
<thead>
<tr>
<th>MAST ARM LENGTH</th>
<th>ANCHOR ROD CIRCLE</th>
<th>ANCHOR ROD SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 thru 40</td>
<td>18</td>
<td>1/8 x 7</td>
</tr>
<tr>
<td>(3.05 m thru 12.20 m)</td>
<td>(440)</td>
<td>(44 x 2.10 m)</td>
</tr>
<tr>
<td>12 thru 55</td>
<td>21</td>
<td>1/8 x 7</td>
</tr>
<tr>
<td>(3.68 m thru 16.80 m)</td>
<td>(535)</td>
<td>(44 x 2.10 m)</td>
</tr>
</tbody>
</table>
### MAST ARM LENGTH

<table>
<thead>
<tr>
<th>MAST ARM LENGTH</th>
<th>ANCHOR ROD CIRCLE</th>
<th>ANCHOR ROD SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>36' thru 64'</td>
<td>24</td>
<td>1½ x 7'</td>
</tr>
<tr>
<td>(17.07 m thru 19.53 m)</td>
<td>(610)</td>
<td>(44 x 2.10 m)</td>
</tr>
<tr>
<td>65' thru 75'</td>
<td>27</td>
<td>2 x 7'-6&quot;</td>
</tr>
<tr>
<td>(19.81 m thru 22.86 m)</td>
<td>(685)</td>
<td>(54 x 2.29 m)</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 80 lbs. (36 kg) and have a projected area of 14.8 sq. ft. (1.37 sq. m).
- See Standard 700016 for location of sign panel or blackout sign closest to pole.
- All dimensions are in inches (millimeters) unless otherwise shown.

---

**STEEL MAST ARM ASSEMBLY AND POLE**

**56' THROUGH 75'**

**STANDARD 877002-04**
MSD ARM LENGTH | ANCHOR ROD CIRCLE | ANCHOR ROD SIZE
--- | --- | ---
16' thru 35' (4.87 m thru 10.67 m) | 38 (450) | 1⅜ x 7' (44 x 2.10 m)
36' thru 55' (10.97 m thru 16.80 m) | 21 (530) | 1¾ x 7' (44 x 2.10 m)

Distance from top of pole base to bottom of hand hole shall match the inside diameter of the pole at the midpoint of the hand hole.

Thread bottom of anchor rod 2 (50) and provide matching hex head nut fully seated, typ.

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).

See Standard 821008 for location of sign panel or blankout sign closest to pole.

See standard 821101 for luminaire wiring diagram.

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

Steel Comb., Mast Arm Assembly and Pole

16' THROUGH 55'

STANDARD 877011-10
**CONCRETE FOUNDATION DETAILS**

STANDARD 878001-10

---

**TYPE A**

*For Ground Mounted Controller Cabinet and UPS Battery Cabinet*

- Copper wire: No. 6 bare
- Ground clamp
- Bushing
- Bevel 1 (25)
- Grade line
- Finished rod
- Anchor
- Concrete

**TYPE C**

*For Ground Mounted Controller Cabinet*

- Copper wire: No. 6 bare
- Ground clamp
- Bushing
- Bevel 1 (25)
- Grade line
- Finished rod
- Conduit (size as required)

**TYPE D**

*For Ground Mounted Controller Cabinet*

- Copper wire: No. 6 bare
- Ground clamp
- Bushing
- Bevel 1 (25)
- Grade line
- Finished rod
- Conduit (size as required)

---

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

**DATE**

1-1-15

**REVISIONS**

1-1-15 Revised TYPE A detail.

1-1-12 Replaced rebar No.'s with Vertical for TYPE E Foundation detail.
Boil circle and quantity of anchor rods as specified.

Vertical rebar equally spaced.

Foundation drilling. The Bureau of Bridges & Structures should be contacted.

Compressive Strength (Qu) > 1.0 tsf (100 kPa). This strength shall be verified by

30' (9.1 m) shall be increased by 1' (0.3 m) of that shown in the table,

mast arm assemblies. Foundation depths for

These foundation depths are for sites which have cohesive soils (clayey silt,

55' (16.8 m) shall be increased by 1' (0.3 m) of that shown in the table,

Greater than or equal to 50' (15.2 m) and up to 55' (16.8 m)

Greater than or equal to 50' (15.2 m) and less than 55' (16.8 m)

Greater than or equal to 56' (16.8 m) and less than 65' (19.8 m)

Greater than or equal to 65' (19.8 m) and up to 75' (22.9 m)

<table>
<thead>
<tr>
<th>Mast Arm Length</th>
<th>Foundation Depth *</th>
<th>Foundation Diameter</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>20'-0&quot; (6.0 m)</td>
<td>30 (750)</td>
<td>24 (600)</td>
<td>8</td>
<td>6 (13)</td>
</tr>
<tr>
<td>Greater than or equal to 30' (9.1 m) and less than 40' (12.2 m)</td>
<td>33'-0&quot; (10 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
<td>12 (22)</td>
</tr>
<tr>
<td>Greater than or equal to 40' (12.2 m) and less than 50' (15.2 m)</td>
<td>43'-0&quot; (13.1 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
<td>12 (22)</td>
</tr>
<tr>
<td>Greater than or equal to 50' (15.2 m) and up to 55' (16.8 m)</td>
<td>55'-0&quot; (16.8 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
<td>12 (22)</td>
</tr>
<tr>
<td>Greater than or equal to 56' (16.8 m) and less than 65' (19.8 m)</td>
<td>65'-0&quot; (19.8 m)</td>
<td>42 (1060)</td>
<td>36 (900)</td>
<td>16</td>
<td>16 (25)</td>
</tr>
<tr>
<td>Greater than or equal to 65' (19.8 m) and up to 75' (22.9 m)</td>
<td>75'-0&quot; (22.9 m)</td>
<td>42 (1060)</td>
<td>36 (900)</td>
<td>16</td>
<td>16 (25)</td>
</tr>
</tbody>
</table>

* For standard and combination mast arm assemblies. Foundation depths for standard dual mast arms with the longest arm length up to and including 55' (16.8 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 (clayey silt, sandy clay, etc.) along the length of the shaft, with an average Unconfined Compressive Strength (Qu) > 1.0 tef (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 contacted for a revised design if other conditions are encountered.
with approved sealer.
Insert conduit and fill
Drill hole through pavement.

Curb and gutter

where installed)
Handhole, junction box, signal box, or
controller base

Grade

Sealed slot for
detector loop

2% min. slope
toward handhole

Approved
sealer.

PCC PAVEMENT
ASPHALT PAVEMENT

Sawed slot

Approved
sealer

Pavement joint
of crack

Sealed slot

Loop wire in
plastic tube

SECTION A-A

NOTE
Loop wire shall follow saw
cut to bottom, forming
slack section at joint.

DETECTOR LOOPS
AT PAVEMENT
JOINT OR PAVEMENT CRACK

LOOP WIRE AND LEAD-IN CABLE SPLICE

DETECTOR LOOP INSTALLATIONS

= Lead-in cable (single pair or multipair)
= Lead-in cable shield
= Lead-in cable shield drain-wire
= Lead-in cable insulated conductor
= Bare conductor
= Loop wire in tube
= Loop wire insulated conductor
= Twisted and resin soldered conductor
= Electrical tape insulated splice
= Rigid mold
= Waterproof and dielectric resin

All dimensions are in inches (millimeters)
unless otherwise shown.
**SECTION - 28' (8.4 m) OR LESS**

- Existing pavement
- Type E joint
- Space

**SECTION - 28' (8.4 m) TO 35' (10.6 m) WIDTH**

- Existing pavement
- Type E joint
- Space

**SECTION - 35' (10.6 m) TO 48' (14.4 m) WIDTH**

- Existing pavement
- Type E joint
- Space

---

**CUL DE SAC OPEN CENTER**

**CUL DE SAC FULLY PAVED**

---

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

---

**ENGINEER OF LOCAL ROADS AND STREETS**

**January 1, 2018**

**APPROVED**

**PCC PAVEMENT SPECIAL**

**(NONREINFORCED)**

**STANDARD B.L.R. 10-7**

---

**REVISIONS**

1-1-18: Changed No. 6 (No. 19) bars to No. 5 (No. 16) bars.

1-1-09: Switched units to English (metric).
**Joint 2018 2018**

**APPROVED ENGINEER OF LOCAL ROADS AND STREETS**

**Illinois Department of Transportation**

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**TIED TRANSVERSE CONSTRUCTION JOINT**

### Type A

**Expansion Joint**

- **Joint Filler:** Preformed expansion joint filler
- **Expansion:** Preformed (Tied Transverse Construction Joint)
- **January 1, 5'-0" (1.5 m)**
- **Back of curb:** 8 (200)

---

**Keyed Joint**

- **January 1, 5'-0" (1.5 m)**
- **Back of curb:** 8 (200)

---

**Sawed Transverse Joint**

- **January 1, 5'-0" (1.5 m)**
- **Back of curb:** 8 (200)

---

**Longitudinal Construction Joint**

- **January 1, 5'-0" (1.5 m)**
- **Back of curb:** 8 (200)

---

**Sawed Longitudinal Joint**

- **January 1, 5'-0" (1.5 m)**
- **Back of curb:** 8 (200)

---

**Catch Basin Detail**

- **Type A:** Expansion Joint
- **Type B:** Keyed Joint
- **Type C:** Sawed Transverse Joint
- **Type D:** Tied Transverse Construction Joint
- **Type E:** Sawed Longitudinal Joint

---

**Manhole Detail**

- **Showing Joint Types**
- **Tie bars at:** No. 5 x 30
- **Outside of Basin:** (See G.N.)
- **Type C:** Joint

---

**Comb. Curb & Gutter Detail**

- **Alt. conic. see G.N.**
- **1%-3%:** Slope 6%
- **C & G section as per std. 606001**
- **No. 5 x 24**
- **Tie bars at:** 36 (900) cts.

---

**Integral Curb**

- **See DETAIL A for crosswalks and DETAIL B for driveways.**
Closed Road

Sign R11-2 or R11-4 mounted as shown.

Type III Barricades with Standard equipment to use road shoulder for passing resident traffic and day labor force's passage of traffic.

Use when shoulders are too narrow for min. 12 (300) min. 12 (300)

60' (18.3 m) max.

30' (9.1 m) min.

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

General Notes

Type III barricades to be width of pavement only.

Reflecterized striping shall appear on both sides of barricades. Barricades shall be positioned so that stripes 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 reflecterized 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.

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

Two-Lane, Two-Way Traffic, Rural Operations Exceeding One Daylight Period
ROAD AHEAD
WORK AHEAD
MOWING

4 miles (6 km), whichever is less.
length of one-half day's operation or
authority but in no case to exceed the
distance to be determined by the local
area is 700' (215 m). Maximum
distance between the sign and

* Varies

W20-1(O)-36

W21-I101(O)-36

* Varies

TWO-LANE, TWO-WAY TRAFFIC
RURAL OPERATIONS
DAY OPERATIONS ONLY

SYMBOLS

Work area
Sign with 18x18 (450x450) min.
orange flag attached.

TYPICAL APPLICATIONS

MOWING
SPRAYING, AGGREGATE
WEED SPRAYING
SURFACE MAINTENANCE
REMODELING RESURFACING
CRACK FILLING
SHOULDER REPAIR
CLEANING DITCHES

GENERAL NOTES

Maintenance operations shall be confined to one traffic lane, leaving the opposite lane open to traffic. All operations shall be available for traffic movement between work areas at intervals not greater than 1000' (300 m).

When operations are on the pavement and stationary or moving at a speed less than 4 mph (6 kph), a ONE LANE AHEAD, or other appropriate 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 obstacle, excavation, or pavement drop off greater than 3 (75) 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 30 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 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. 18-6
When rail element is placed adjacent to a tapered surface, use timber wedge 'M' between the concrete and plate 'G'.

1 (M25) Dia. anchor bolt with locknut furnished in place by the Contractor. Place plate washer 'D' under nut. 1 (M25) Dia. anchor bolt with flat washer under nut.

1 (M25) Dia. anchor bolts with locknut or double nut provided with locknut or double nut. Splice bolts with washer under nut.

See alternate soil plate connection.

Plate 'R-3' 1\% (19) Dia. holes (typ.)

Soil plate 'F'

4\% (M16) Dia. hex head bolts with std. hex nut

\( \frac{1}{4} \) (6) Thick soil plate 'F' on these 4 posts only

ELEVATION-TRAFFIC BARRIER TERMINAL TYPE 5R

Installed plate 'G' to be free to move. When an expansion joint exists below the connector, "G" after the 1 (25) bolts are in place.

Termination height of barrier terminal up to height of guardrail above length of barrier terminal.

GENERAL NOTES

Install the face of the guardrail flush with the face of the parapet. Install 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

STANDARD B.L.R. 20-7
**CONDITION I**

When distance from closure to crossroad is less than 1500' (450 m)

- Variable W20-3(O)-36
- 500' (150 m) min.
- 1000' (300 m) max.

**CONDITION II**

When distance from closure to crossroad is greater than 1500' (450 m)

- Variable W20-3(O)-36
- 500' (150 m) min.
- 1000' (300 m) max.

**SYMBOLS**

- Work area
- Type III Barricade
- Sign with 18x18 (450x450) 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 70/103.

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), an additional 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

CONDITION II
APPROACH TRAFFIC DOES NOT STOP

SYMBOLS
- Work area
- Type III Barricade
- Sign with 18 x 18 (450 x 450) min. orange flag attached

GENERAL NOTES
Type III Barricades and R11-4-6030 signs shall be positioned as shown in the "Road Closed To All Traffic" detail on Highway Standard 70109. 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 reflectorized 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)
**SHOULDER WIDENING TRANSITION**

**WOOD BREAKAWAY POSTS**

**TUBULAR STEEL FOUNDATIONS**

**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, as the option of the Contractor. If standard wood posts are used, one post shall be located midway between and in lieu of 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) 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).

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

---

**OFFSETS TO FACE OF RAIL**

<table>
<thead>
<tr>
<th>Offset</th>
<th>X (ft)</th>
<th>Y (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>27</td>
<td>1.905</td>
</tr>
<tr>
<td>2</td>
<td>27</td>
<td>1.905</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
<td>1.32</td>
</tr>
<tr>
<td>4</td>
<td>26</td>
<td>1.22</td>
</tr>
<tr>
<td>5</td>
<td>31</td>
<td>1.22</td>
</tr>
<tr>
<td>6</td>
<td>26</td>
<td>0.95</td>
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<tr>
<td>7</td>
<td>27</td>
<td>0.95</td>
</tr>
<tr>
<td>8</td>
<td>27</td>
<td>0.00</td>
</tr>
</tbody>
</table>

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**TRAFFIC BARRIER TERMINAL TYPE 1**

**DATE**

1-1-12

**REVISIONS**

1-1-12 Revised barrier terminal height and width

breakaway post

1-1-09 Switched units to English (metric).

---

**EXITING DEPARTMENT OF TRANSPORTATION**

**APPROVED**

January 1, 2012

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED**

1-1-08

**PASSED**

ENGINEER OF LOCAL ROADS AND STREETS

**DATE**

November 1, 2012

**REVISIONS**

---

**STANDARD B.L.R. 23-4**

(SECOND SHEET OF 2)
WOOD BREAKAWAY POST
(2 ea.)

STEEL TUBE
(2 ea.)

DIAPHRAGM
(2 ea.)

PLATE WASHER F
(1 ea.)

SOIL PLATE H
(2 ea.)

ALTERNATE SOIL PLATE CONNECTION

BEARING PLATE K
(1 ea.)

WOOD BREAKAWAY POST

STEEL TUBE

ALTERNATE SOIL PLATE CONNECTION

BEARING PLATE K
GENERAL NOTES

Mailboxes shall be mounted such that the face of the mailbox is 6 (150) to 12 (300) and the post a minimum of 24 (600) from the edge of the turnout surfacing.

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

Note: Dimensions for Township and District Roads may vary from the above dimensions.

DIMENSIONS - ft. (m)

<table>
<thead>
<tr>
<th>Width of Shoulder (X)</th>
<th>12 (3.6)</th>
<th>10 (3.0)</th>
<th>8 (2.4)</th>
<th>6 (1.8)</th>
<th>5 (1.5)</th>
<th>4 (1.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width of Turnout (Y)</td>
<td>(2.4)</td>
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</tr>
<tr>
<td>L1</td>
<td>30 (9.0)</td>
<td>20 (6.0)</td>
<td>15 (4.5)</td>
<td>12 (3.6)</td>
<td>10 (3.0)</td>
<td>8 (2.4)</td>
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<tr>
<td>L2</td>
<td>20 (6.0)</td>
<td>15 (4.5)</td>
<td>15 (4.5)</td>
<td>12 (3.6)</td>
<td>10 (3.0)</td>
<td>8 (2.4)</td>
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<td>12 (3.6)</td>
<td>10 (3.0)</td>
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</table>

Note: Dimensions for Township and District Roads may vary from the above dimensions.

GENERAL NOTES

Mailboxes shall be mounted such that the face of the mailbox is 6 (150) to 12 (300) and the post a minimum of 24 (600) from the edge of the turnout surfacing.

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

Note: Dimensions for Township and District Roads may vary from the above dimensions.

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<td>(2.4)</td>
</tr>
<tr>
<td>L1</td>
<td>30 (9.0)</td>
<td>20 (6.0)</td>
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<td>12 (3.6)</td>
<td>10 (3.0)</td>
<td>8 (2.4)</td>
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<tr>
<td>L2</td>
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</tr>
</tbody>
</table>

Note: Dimensions for Township and District Roads may vary from the above dimensions.

GENERAL NOTES

Mailboxes shall be mounted such that the face of the mailbox is 6 (150) to 12 (300) and the post a minimum of 24 (600) from the edge of the turnout surfacing.

All dimensions are in inches (millimeters) unless otherwise shown.
All dimensions are in inches (millimeters) unless otherwise shown.
NOTE
Plate A shall be placed between
rail element and block-out at non-
splice mounting points only when
steel block-outs are used.

STEEL BLOCK-OUT DETAIL

STEEL POST CONSTRUCTION

WOOD POST CONSTRUCTION

STEEL PLATE BEAM GUARDRAIL
29'' (731mm) HEIGHT

STEEL POST CONSTRUCTION

STEEL BLOCK-OUT DETAIL

PLATE A

NOTE
Plate A shall be placed between
rail element and block-out at non-
splice mounting points only when
steel block-outs are used.

STEEL POST CONSTRUCTION

STEEL BLOCK-OUT DETAIL

PLATE A

NOTE
Plate A shall be placed between
rail element and block-out at non-
splice mounting points only when
steel block-outs are used.
NOTE

Anchor plate T shall be used to attach cable assembly to guardrail when required on traffic barrier terminals.

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 PLACED BEHIND CURB**

(D = 0 desirable to 12 (300) maximum)

**PLAN**

- Optional round hole
- 9 (203) min. (Steel post)
- 10 (250) min. (Wood post)

**ELEVATION**

- Drilled Hole
- Aggregate backfill (CA 11)
- Ledge
- Finished ground line

**FOOTING FOR POST WHEN IMPERVIOUS MATERIAL IS ENCOUNTERED**

**WOOD BLOCK-OUT AND STEEL POST DETAILS**

**CABLE ASSEMBLY**

<table>
<thead>
<tr>
<th>V</th>
<th>W</th>
<th>L</th>
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</thead>
<tbody>
<tr>
<td>0 - 14f</td>
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<td></td>
</tr>
<tr>
<td>0 - 4f</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 14f - 28f</td>
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<td></td>
</tr>
<tr>
<td>&gt; 28f - 30f</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 30f - 98f</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(40,000 lbs. (18,100 kg) min. breaking strength)

Tighten to taut tension.

**STANDARD B.L.R. 26-3**

**STEEL PLATE BEAM GUARDRAIL**

29'' (731mm) HEIGHT

(Sheet 6 of 4)

Illinois Department of Transportation

January 1, 2012

APPROVED

January 1, 2012

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-08

PASSED

ENGINEER OF LOCAL ROADS AND STREETS
Type 5A - Steel Bridge Rail

PLATE WASHER D

Placement of Plate Washer D

PLATE WASHER F

GENERAL NOTES

See Standard B.L.R. 26 for details of guardrail not shown.

Install plate washer D so the 1 (25) projection fits the remainder of the slotted holes in the 1 (25) end plate on plate G after the 1 (25) 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 63001, the guardrail shall transition down to the height of the terminal.

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

**GENERAL NOTES**

- Pavement expansion joint (such as entrance, side streets and ramp returns).
- Short radius curve (such as entrance, side streets and ramp returns).
- Tie bar
- Drainage casting with curb box
- Back of curb
- Construction joint
- PCC base course
- PCC base course
t (other types permitted)

**TABLE OF DIMENSIONS**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>R1</th>
<th>R2</th>
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<tr>
<td>(M-15.45)</td>
<td>600</td>
<td>450</td>
<td>300</td>
<td>150</td>
<td>150</td>
<td>150</td>
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<td>(M-15.25)</td>
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<td>(M-15.10)</td>
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**Dowel Bar Table**

<table>
<thead>
<tr>
<th>PAVEMENT BAR THICKNESS</th>
<th>DOWEL BAR DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 (250) or greater</td>
<td>16 (38)</td>
</tr>
<tr>
<td>6 (160)</td>
<td>12 (32)</td>
</tr>
<tr>
<td>Less than 6 (200)</td>
<td>1 (25)</td>
</tr>
</tbody>
</table>

**DATE**

- 1-3-18 New standard

**CONCRETE CURB TYPE B AND COMBINATION CURVE AND GUTTER (Sheet 1 of 2)**

B.L.R. 28
Short radius curve

A

A

A

A

A

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