Revision #225 of the Highway Standards, effective January 1, 2022, 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 January 1, 2021</td>
<td>Division 000 Index January 1, 2022</td>
<td>Updated.</td>
</tr>
<tr>
<td>Division 200 Index January 1, 2021</td>
<td>Division 200 Index January 1, 2022</td>
<td>Updated.</td>
</tr>
<tr>
<td>Division 300 Index January 1, 2021</td>
<td>Division 300 Index January 1, 2022</td>
<td>Updated.</td>
</tr>
<tr>
<td>Division 400 Index January 1, 2021</td>
<td>Division 400 Index January 1, 2022</td>
<td>Updated.</td>
</tr>
<tr>
<td>420001-09</td>
<td>420001-10</td>
<td>Revised DOWEL BAR TABLE on Sheet 2.</td>
</tr>
<tr>
<td>420101-06</td>
<td>420101-07</td>
<td>Revised spacing of transverse contraction joints and header board callout.</td>
</tr>
<tr>
<td>420106-06</td>
<td>420106-07</td>
<td>Revised spacing of transverse contraction joints and header board callout.</td>
</tr>
<tr>
<td>420201-11</td>
<td>420201-12</td>
<td>Revised General Note for joints and joint spacing.</td>
</tr>
<tr>
<td>420206-12</td>
<td>420206-13</td>
<td>Revised General Note for joints and joint spacing.</td>
</tr>
<tr>
<td>Removed</td>
<td>Inserted</td>
<td>Remarks</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>420301-08</td>
<td>420301-09</td>
<td>Revised General Note for joints and joint spacings.</td>
</tr>
<tr>
<td>420306-10</td>
<td>420306-11</td>
<td>Revised General Note for joints and joint spacing.</td>
</tr>
<tr>
<td>483001-05</td>
<td>483001-06</td>
<td>Revised header board callout, Detail A and spacing of transverse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>contraction joints.</td>
</tr>
<tr>
<td>Division 500 Index</td>
<td>Division 500 Index</td>
<td>Updated.</td>
</tr>
<tr>
<td>January 1, 2021</td>
<td>January 1, 2022</td>
<td></td>
</tr>
<tr>
<td>Division 600 Index</td>
<td>Division 600 Index</td>
<td>Updated.</td>
</tr>
<tr>
<td>January 1, 2021</td>
<td>January 1, 2022</td>
<td></td>
</tr>
<tr>
<td>604071-06</td>
<td>604071-07</td>
<td>Removed slots in frame which held the “safety bar”.</td>
</tr>
<tr>
<td>604076-05</td>
<td>604076-06</td>
<td>Removed slots in frame which held the “safety bar”.</td>
</tr>
<tr>
<td>604081-05</td>
<td>604081-06</td>
<td>Removed slots in frame which held the “safety bar”.</td>
</tr>
<tr>
<td>604086-04</td>
<td>604086-05</td>
<td>Removed slots in frame which held the “safety bars”.</td>
</tr>
<tr>
<td>604091-04</td>
<td>604091-05</td>
<td>Removed slots in frame which held the “safety bar”.</td>
</tr>
<tr>
<td>606001-07</td>
<td>606001-08</td>
<td>Revised contraction joint spacing adjacent to PCC pavement.</td>
</tr>
<tr>
<td>631061</td>
<td></td>
<td>New Standard</td>
</tr>
<tr>
<td>642001-02</td>
<td>642001-03</td>
<td>Revised location of rumbles relative to the shoulder joints in Plan View</td>
</tr>
<tr>
<td>Division 700 Index</td>
<td>Division 700 Index</td>
<td>Updated.</td>
</tr>
<tr>
<td>January 1, 2021</td>
<td>January 1, 2022</td>
<td></td>
</tr>
<tr>
<td>701400-10</td>
<td>701400-11</td>
<td>Corrected work zone speed limit sign number.</td>
</tr>
</tbody>
</table>
## Removed

<table>
<thead>
<tr>
<th>Removed</th>
<th>Inserted</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>701401-12</td>
<td>701401-13</td>
<td>Corrected work zone speed limit sign numbers.</td>
</tr>
<tr>
<td>701406-12</td>
<td>701406-13</td>
<td>Corrected work zone speed limit sign numbers.</td>
</tr>
<tr>
<td>720021-02</td>
<td>720021-03</td>
<td>Removed stainless steel clip option and minor typos.</td>
</tr>
</tbody>
</table>

## Division 800 Index

<table>
<thead>
<tr>
<th>Division 800 Index January 1, 2021</th>
<th>Division 800 Index January 1, 2022</th>
<th>Updated</th>
</tr>
</thead>
</table>

## Division B.L.R. Index

<table>
<thead>
<tr>
<th>Division B.L.R. Index January 1, 2021</th>
<th>Division B.L.R. Index January 1, 2022</th>
<th>Updated</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.L.R. 10-7</td>
<td>B.L.R. 10-8</td>
<td>Revised spacing of transverse joints in General Notes.</td>
</tr>
<tr>
<td>B.L.R. 14-12</td>
<td>B.L.R. 14-13</td>
<td>Revised spacing of transverse contraction joints, dowel bar table and header board callout.</td>
</tr>
<tr>
<td>B.L.R. 28</td>
<td>B.L.R. 28-1</td>
<td>Revised contraction joint spacing adjacent to PCC pavt. and DOWEL BAR TABLE.</td>
</tr>
</tbody>
</table>

## Standards by Subject/Title

<table>
<thead>
<tr>
<th>Standards by Subject/Title January 1, 2021</th>
<th>Standards by Subject/Title January 1, 2022</th>
<th>Updated</th>
</tr>
</thead>
</table>

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.
### DIVISION 200  EARTHWORK, LANDSCAPING, and EROSION CONTROL

<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARTHWORK</td>
<td></td>
</tr>
<tr>
<td>202001-01</td>
<td>Earth Median Ditch Check</td>
</tr>
<tr>
<td>EROSION CONTROL</td>
<td></td>
</tr>
<tr>
<td>280001-07</td>
<td>Temporary Erosion Control Systems</td>
</tr>
<tr>
<td>285001-02</td>
<td>Fabric Formed Concrete Revetment Mats</td>
</tr>
</tbody>
</table>
# DIVISION 300  SUBGRADES, SUBBASES, and BASE COURSES

<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASE COURSE</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>420001-10</td>
<td>Pavement Joints</td>
</tr>
<tr>
<td>420101-07</td>
<td>24' (7.2 m) Jointed PCC Pavement</td>
</tr>
<tr>
<td>420106-07</td>
<td>36' (10.8 m) Jointed PCC Pavement</td>
</tr>
<tr>
<td>420111-04</td>
<td>PCC Pavement Roundouts</td>
</tr>
<tr>
<td>420201-12</td>
<td>Entrance Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to Jointed PCC Mainline Pavement)</td>
</tr>
<tr>
<td>420206-13</td>
<td>Entrance Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to CRC Mainline Pavement)</td>
</tr>
<tr>
<td>420301-09</td>
<td>Exit Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to Jointed PCC Mainline Pavement)</td>
</tr>
<tr>
<td>420306-11</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>421201-11</td>
<td>Perpendicular Curb Ramps for Sidewalks</td>
</tr>
<tr>
<td>424006-05</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>424021-06</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>483001-06</td>
<td>PCC Shoulder</td>
</tr>
</tbody>
</table>
### Standards by Division

#### DIVISION 500  BRIDGES and CULVERTS

<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BRIDGES</strong></td>
<td></td>
</tr>
<tr>
<td>515001-04</td>
<td>Name Plate for Bridges</td>
</tr>
<tr>
<td><strong>CULVERTS</strong></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>Traversable Pipe Grate for Concrete End Section</td>
</tr>
<tr>
<td>542401-04</td>
<td>Metal Flared End Section for Pipe Culverts</td>
</tr>
<tr>
<td>542406-04</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>
<tr>
<td>STD. NO.</td>
<td>TITLE</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
</tr>
<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>602106-03</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>602401-07</td>
<td>Precast Manhole, Type A, 4’ (1.22 m) Diameter</td>
</tr>
<tr>
<td>602402-03</td>
<td>Precast Manhole, Type A, 5’ (1.52 m) Diameter</td>
</tr>
<tr>
<td>602406-11</td>
<td>Precast Manhole, Type A, 6’ (1.83 m) Diameter</td>
</tr>
<tr>
<td>602411-09</td>
<td>Precast Manhole, Type A, 7’ (2.13 m) Diameter</td>
</tr>
<tr>
<td>602416-09</td>
<td>Precast Manhole, Type A, 8’ (2.44 m) Diameter</td>
</tr>
<tr>
<td>602421-09</td>
<td>Precast Manhole, Type A, 9’ (2.74 m) Diameter</td>
</tr>
<tr>
<td>602426-03</td>
<td>Precast Manhole, Type A, 10’ (3.05 m) Diameter</td>
</tr>
<tr>
<td>602501-06</td>
<td>Precast Valve Vault, Type A, 4’ (1.22 m) Diameter</td>
</tr>
<tr>
<td>602506-03</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>604071-07</td>
<td>Frame and Grate, Type 20</td>
</tr>
<tr>
<td>604076-06</td>
<td>Frame and Grate, Type 21</td>
</tr>
<tr>
<td>604081-06</td>
<td>Frames and Grates, Type 22</td>
</tr>
<tr>
<td>604086-05</td>
<td>Frame and Grate, Type 23</td>
</tr>
<tr>
<td>604091-05</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
Paved Ditch
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
Traffic Barrier Terminal, Type 13
Delineators
Cable Road Guard Single Strand
Concrete Barrier Double Face, 44 in. (1120 mm) Height
Concrete Glare Screen
Traffic Barrier Terminal, Type 12
Traffic Barrier Terminal, Type 11
Traffic Barrier Terminal, Type 10
Traffic Barrier Terminal, Type 13
Traffic Barrier Terminal, Type 14
Traffic Barrier Terminal, Type 15
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
## Standards by Division

**DIVISION 700**

**WORK ZONE TRAFFIC CONTROL AND PROTECTION, SIGNING, AND PAVEMENT MARKING**

<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WORK ZONE TRAFFIC CONTROL AND PROTECTION</strong></td>
<td></td>
</tr>
<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&quot; (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&quot; (600 mm) From Pavement Edge</td>
</tr>
<tr>
<td>701201-05</td>
<td>Lane Closure, 2L, 2W, Day Only, for Speeds ≥ 45 MPH</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, Short Time Operations</td>
</tr>
<tr>
<td>701306-04</td>
<td>Lane Closure, 2L, 2W, Slow Moving Operations Day Only, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701311-03</td>
<td>Lane Closure, 2L, 2W, Moving Operations - Day Only</td>
</tr>
<tr>
<td>701316-13</td>
<td>Lane Closure, 2L, 2W, Bridge Repair, for Speeds ≥ 45 MPH</td>
</tr>
<tr>
<td>701321-18</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>701400-11</td>
<td>Approach to Lane Closure, Freeway/Expressway</td>
</tr>
<tr>
<td>701401-13</td>
<td>Lane Closure, Freeway/Expressway</td>
</tr>
<tr>
<td>701402-12</td>
<td>Lane Closure, Freeway/Expressway, with Barrier</td>
</tr>
<tr>
<td>701406-13</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>701446-11</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>
701801-06 Sidewalk, Corner or Crosswalk Closure
701901-08 Traffic Control Devices
704001-08 Temporary Concrete Barrier

**SIGNING**
720001-01 Sign Panel Mounting Details
720006-04 Sign Panel Erection Details
720111-01 Metal Posts for Signs, Markers and Delineators
720164-04 Mast Arm Mounted Street Name Signs
720021-03 Sign Panels, Extruded Aluminum Type
725001-01 Object and Terminal Markers
728001-01 Telescoping Steel Sign Support
729001-01 Applications of Types A and B Metal Posts (For Signs & Markers)
731001-01 Base for Telescoping Steel Sign Support

**PAVEMENT MARKING**
780001-05 Typical Pavement Markings
781001-04 Typical Applications Raised Reflective Pavement Markers
782001-01 Curb Reflectors
782006-01 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></td>
<td><strong>GENERAL ELECTRICAL REQUIREMENTS</strong></td>
</tr>
<tr>
<td>805001-01</td>
<td>Electrical Service Installation Details</td>
</tr>
<tr>
<td></td>
<td><strong>WIREWAY AND CONDUIT SYSTEMS</strong></td>
</tr>
<tr>
<td>812001-01</td>
<td>Raceways Embedded in Structure</td>
</tr>
<tr>
<td>814001-03</td>
<td>Handholes</td>
</tr>
<tr>
<td>814006-03</td>
<td>Double Handholes</td>
</tr>
<tr>
<td></td>
<td><strong>LIGHTING – LUMINAIRES</strong></td>
</tr>
<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>
<tr>
<td></td>
<td><strong>LIGHTING – CONTROLLERS</strong></td>
</tr>
<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>826001-03</td>
<td>Obstruction Warning Lighting Controller, 240V</td>
</tr>
<tr>
<td>826006-03</td>
<td>Obstruction Warning Lighting Controller, 480V</td>
</tr>
<tr>
<td></td>
<td><strong>LIGHTING – POLES</strong></td>
</tr>
<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>
<tr>
<td></td>
<td><strong>LIGHTING – TOWERS</strong></td>
</tr>
<tr>
<td>835001-01</td>
<td>Light Tower</td>
</tr>
<tr>
<td></td>
<td><strong>LIGHTING – FOUNDATIONS</strong></td>
</tr>
<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’
878001-11 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
### MISCELLANEOUS TABLES

<table>
<thead>
<tr>
<th>STD. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>000001-08</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 10-8</td>
<td>PCC Pavement Special</td>
</tr>
<tr>
<td>BLR 14-13</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 28-1</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>Abbreviations, Symbols and Patterns</td>
<td>000001</td>
</tr>
<tr>
<td>Barricade, Type 1A for Non-NHS Routes</td>
<td>BLR 25</td>
</tr>
<tr>
<td>Barrier, Concrete, 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>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>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>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) Dia</td>
<td>542411</td>
</tr>
</tbody>
</table>
## Standards by Subject

**January 1, 2022**

<table>
<thead>
<tr>
<th>End Sections, Sloped Metal, for Pipe Arch Culverts 15” (375 mm) thru 72” (1800 mm) Dia.</th>
<th>542416</th>
</tr>
</thead>
<tbody>
<tr>
<td>End Sections, Reinforced Concrete:</td>
<td></td>
</tr>
<tr>
<td>Pipe Culverts, 15 in. (375 mm) thru 84 in. (2100 mm) Diameter</td>
<td>542001</td>
</tr>
<tr>
<td>Pipe Culverts, Elliptical, 15 in. (375 mm) thru 72 in. (1800 mm) Equivalent Diameter</td>
<td>542011</td>
</tr>
<tr>
<td>Skewed, for 15 in. (375 mm) thru 36 in. (900 mm) Diameter</td>
<td>542201</td>
</tr>
<tr>
<td>Skewed, for 42 in. (1050 mm) thru 60 in. (1500 mm) Diameter</td>
<td>542206</td>
</tr>
<tr>
<td>Erosion Control Systems, Temporary</td>
<td>280001</td>
</tr>
</tbody>
</table>

### F

| Fence, Chain Link | 664001 |
| Fence, Woven Wire | 665001 |
| Flashing Beacon Installation | 880001 |
| Flat Slab Top, Precast Reinforced Concrete | 602601 |
| Foundations, Details, Concrete | 878001 |

#### Frames, Grates and Lids:

| Type 1 Frame and Lids | 604001 |
| Type 3 Frame and Grate | 604006 |
| Type 3V Frame and Grate | 604011 |
| Type 4 Frame and Grate | 604016 |
| Type 5 Base, Frame and Lids | 604021 |
| Type 6 Frame and Grate | 604026 |
| Type 7 Grate | 604031 |
| Type 8 Grate | 604036 |
| Type 9 Frame and Grate | 604041 |
| Type 10 Frame and Grate | 604046 |
| Type 11 Frame and Grate | 604051 |
| Type 11V Frame and Grate | 604056 |
| Type 12 Frame and Grate | 604061 |
| Type 15 Frame and Lid | 604066 |
| Type 20 Frame and Grate | 604071 |
| Type 21 Frame and Grate | 604076 |
| Type 22 Frames and Grates | 604081 |
| Type 23 Frame and Grate | 604086 |
| Type 24 Frame and Grate | 604091 |

### G

| Glare Screen, 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 |
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, Obstruction Warning, 240V.................................................... 826001
Lighting Controller, Obstruction Warning, 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 .................................................................................................. BLR-24
Mailbox Turnout, State System .................................................................................................... 406201
Manhole, Precast, Type A, 4 ft. (1.22 m) Diameter ................................................................. 602401
Manhole, Precast, Type A, 5 ft. (1.52 m) Diameter ................................................................. 602402
Manhole, Precast, Type A, 6 ft. (1.83 m) Diameter ................................................................. 602406
Manhole, Precast, Type A, 7 ft. (2.13 m) Diameter ................................................................. 602411
Manhole, Precast, Type A, 8 ft. (2.44 m) Diameter ................................................................. 602416
Manhole, Precast, Type A, 9 ft. (2.74 m) Diameter ................................................................. 602421
Manhole, Precast, Type A, 10 ft. (3.05 m) Diameter ............................................................... 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 Combination ........................................ 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
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

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 Concrete 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 Concrete 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

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
Traffic Barrier Terminal:

<table>
<thead>
<tr>
<th>Type</th>
<th>BLR Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>BLR-23</td>
</tr>
<tr>
<td>Type 1B</td>
<td>631006</td>
</tr>
<tr>
<td>Type 1 Special, Shoulder Widening for</td>
<td>630301</td>
</tr>
<tr>
<td>Type 2</td>
<td>631011</td>
</tr>
<tr>
<td>Type 5A</td>
<td>BLR 27</td>
</tr>
<tr>
<td>Type 5R</td>
<td>BLR 20</td>
</tr>
<tr>
<td>Type 6</td>
<td>631031</td>
</tr>
<tr>
<td>Type 6A</td>
<td>631032</td>
</tr>
<tr>
<td>Type 6B</td>
<td>631033</td>
</tr>
<tr>
<td>Type 10</td>
<td>631046</td>
</tr>
<tr>
<td>Type 11</td>
<td>631051</td>
</tr>
<tr>
<td>Type 13</td>
<td>631061</td>
</tr>
</tbody>
</table>

Traffic Control:

<table>
<thead>
<tr>
<th>Devices</th>
<th>BLR Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1A Barricade for Non-NHS Routes</td>
<td>BLR 25</td>
</tr>
<tr>
<td>Day Labor Construction</td>
<td>BLR 17</td>
</tr>
<tr>
<td>Day Labor Maintenance</td>
<td>BLR 18</td>
</tr>
<tr>
<td>Typical Application of, for Construction on Rural Local Highways</td>
<td>BLR 21</td>
</tr>
<tr>
<td>Typical Application of, for Construction on Rural Local Highways (Two-Lane Two Way Rural Traffic) (Road Closed to Thru Traffic)</td>
<td>BLR 22</td>
</tr>
</tbody>
</table>

Lane Closure, 2L, 2W:

<table>
<thead>
<tr>
<th>Operations</th>
<th>BLR Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Repair, for Speeds $\geq$ 45 MPH</td>
<td>701316</td>
</tr>
<tr>
<td>Bridge Repair with Barrier</td>
<td>701321</td>
</tr>
<tr>
<td>Day Only, for Speeds $\geq$ 45 MPH</td>
<td>701201</td>
</tr>
<tr>
<td>Moving Operations - Day Only</td>
<td>701311</td>
</tr>
<tr>
<td>Night Only, for Speeds $\geq$ 45 MPH</td>
<td>701206</td>
</tr>
<tr>
<td>Pavement Widening, for Speeds $\geq$ 45 MPH</td>
<td>701326</td>
</tr>
<tr>
<td>Short Time Operations</td>
<td>701301</td>
</tr>
<tr>
<td>Slow Moving Operations Day Only, for Speeds $\geq$ 45 MPH</td>
<td>701306</td>
</tr>
<tr>
<td>With Run-Around, for Speeds $\geq$ 45 MPH</td>
<td>701331</td>
</tr>
<tr>
<td>Work Areas in Series, for Speeds $\geq$ 45 MPH</td>
<td>701336</td>
</tr>
<tr>
<td>Lane Closure, Freeway/Expressway</td>
<td>701401</td>
</tr>
</tbody>
</table>

Lane Closure, Freeway/Expressway:

<table>
<thead>
<tr>
<th>Operations</th>
<th>BLR Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach to</td>
<td>701400</td>
</tr>
<tr>
<td>Day Operations Only</td>
<td>701406</td>
</tr>
</tbody>
</table>

Sight Screen, Concrete Panel Wall, Precast Prestressed ................................................................. 639001
Sight Screen, Wood Fence, Cedar Stockade ................................................................................................. 641001
Sight Screen, Wood Fence, Wood Plank ....................................................................................................... 641006
Sign Panel, Erection Details ..................................................................................................................... 720006
Sign Panel, Extruded Aluminum Type ......................................................................................................... 720021
Sign Panel, Mounting Details ...................................................................................................................... 720001
Sign Support, Telescoping Steel .................................................................................................................. 728001
Sign Support, Telescoping Steel, Base for ................................................................................................... 731001
Symbols, Abbreviations, and Patterns ........................................................................................................ 000001

T
<table>
<thead>
<tr>
<th>Category</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sidewalk, Corner or Crosswalk Closure</td>
<td>701801</td>
</tr>
<tr>
<td>Two Lane Closure</td>
<td>701404</td>
</tr>
<tr>
<td>with Barrier</td>
<td>701406</td>
</tr>
<tr>
<td>with Crossover and Barrier</td>
<td>701408</td>
</tr>
<tr>
<td>Lane Closure, Multilane:</td>
<td></td>
</tr>
<tr>
<td>at Entrance or Exit Ramp, for Speeds $\geq 45$ MPH</td>
<td>701411</td>
</tr>
<tr>
<td>Day Operations Only, for Speeds $\geq 45$ MPH to 55 MPH</td>
<td>701421</td>
</tr>
<tr>
<td>for Speeds $\geq 45$ MPH to 55 MPH</td>
<td>701422</td>
</tr>
<tr>
<td>Intermittent or Moving Operation, for Speeds $\geq 45$ MPH</td>
<td>701426</td>
</tr>
<tr>
<td>Intermittent or Moving Operation, for Speeds $\leq 40$ MPH</td>
<td>701427</td>
</tr>
<tr>
<td>Undivided With Crossover, for Speeds $\geq 45$ MPH to 55 MPH</td>
<td>701431</td>
</tr>
<tr>
<td>with Barrier, for Speeds $\geq 45$ MPH to 55 MPH</td>
<td>701423</td>
</tr>
<tr>
<td>Lane Closure, Urban:</td>
<td></td>
</tr>
<tr>
<td>2L, 2W, Undivided</td>
<td>701501</td>
</tr>
<tr>
<td>2L, 2W, with Bidirectional Left Turn Lane</td>
<td>701502</td>
</tr>
<tr>
<td>Multilane, 1W or 2W with Nontraversable Median</td>
<td>701601</td>
</tr>
<tr>
<td>Multilane, 2W with Bidirectional Left Turn Lane</td>
<td>701602</td>
</tr>
<tr>
<td>Multilane, Single Lane Closure, 2W with Mountable Median</td>
<td>701606</td>
</tr>
<tr>
<td>Multilane, Half Road, Closure, 2W with Mountable Median</td>
<td>701611</td>
</tr>
<tr>
<td>Multilane Intersection</td>
<td>701701</td>
</tr>
<tr>
<td>Off-Road Operations:</td>
<td></td>
</tr>
<tr>
<td>2L 2W, 15 ft. (4.5 m) to 24 in (600 mm) From Pavement Edge</td>
<td>701006</td>
</tr>
<tr>
<td>2L 2W, More Than 15 ft. (4.5 m) Away</td>
<td>701001</td>
</tr>
<tr>
<td>Moving, 2L 2W, Day Only</td>
<td>701011</td>
</tr>
<tr>
<td>Multilane, 15 ft. (4.5 m) to 24 in. (600 mm) From Pavement Edge</td>
<td>701101</td>
</tr>
<tr>
<td>Multilane, More Than 15 ft. (4.5 m) Away</td>
<td>701106</td>
</tr>
<tr>
<td>Setup and Removal, Freeway/Expressway</td>
<td>701428</td>
</tr>
<tr>
<td>Traffic Signal Grounding &amp; Bonding</td>
<td>873001</td>
</tr>
<tr>
<td>Traffic Signal Mounting Details, Post and Bracket Mounted</td>
<td>880006</td>
</tr>
<tr>
<td>Traffic Signal Mounting Details, Span Wire Mounted and Flashing Beacon</td>
<td>880001</td>
</tr>
<tr>
<td>U-Z</td>
<td></td>
</tr>
<tr>
<td>Uninterruptable Power Supply (UPS)</td>
<td>862001</td>
</tr>
<tr>
<td>Valve Vault, Precast, Type A, 4 ft. (1.22 m) Diameter</td>
<td>602501</td>
</tr>
<tr>
<td>Valve Vault, Precast, Type A, 5 ft. (1.52 m) Diameter</td>
<td>602506</td>
</tr>
</tbody>
</table>
ABV
AC
AD
AG
AH
AGP
AUX
AGC
AVE
AX
BK
B-B
BMP
B
BL
BON
BM
BND
BT
BV
BRK
BBX
BLDG
CATV
CIP
CBL
C-C
CL
CLF
CTR
CHEAD
CS
CT
CLO
CLD
CLT
CO
COB
COMB
COM
COE
CONC
CONST
CONT
COR
C C P
CYP
CYP-A
CH
CSE
K
m
m"
### EROSION & SEDIMENT CONTROL ITEMS

- Cleaning & Grading Limits
- Dike
- Erosion Control Fence
- Perimeter Erosion Barrier
- Temporary Fence
- Ditch Check Temporary
- Ditch Check Permanent
- Inlet & Pipe Protection
- Sediment Basin
- Erosion Control Blanket
- Fabric Formed Concrete Revetment Mat
- Turf Reinforcement Mat
- Mulch Temporary
- Mulch Method 1
- Mulch Method 2 Stabilized
- Mulch Method 3 Hydraulic

### NON-HIGHWAY IMPROVEMENT ITEMS

- Noise Attn./Levee
- Field Line
- Fence
- Base of Levee
- Mailbox
- Multiple Mailboxes
- Pay Telephone
- Advertising Sign
- ITS Camera
- Wind Turbine
- Cellular Tower
- Intelligent Transportation Systems

### LANDSCAPING ITEMS

- Contour Mounding Line
- Fence
- Force Post
- Shrubs
- Mowline
- Perennial Plants
- Seeding Class 2
- Seeding Class 2A
- Seeding Class 4
- Seeding Class 5
- Seeding Class 7
- Seedings Type 1
- Seedings Type 2
- Sodding
- Mowstake w/Sign
- Tree Trunk Protection
- Evergreen Tree
- Shade Tree
- Duct
- Conduit
- Electrical Aerial Cable
- Electrical Buried Cable
- Controller
- Underpass Luminaire
- Power Pole

### ABBREVIATIONS

- ITS: Intelligent Transportation Systems
- EX: Engineering
- PR: Project Record

### STANDARDS

- Illinois Department of Transportation
- January 1, 2021
- 2021
- 2021
- Illinois
- Standard 000001-08

---

**Notes:**

- Final Department of Transportation
- Standards:
  - 1-1-97
  - 1-1-97
  - 2-1-97
  - 2-1-97
  - 2-1-97
- Standard Symbols, Abbreviations and Patterns (Sheet 3 of 9)
### Right of Way Items (contd.)

<table>
<thead>
<tr>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access Control Line</td>
<td>AC</td>
</tr>
<tr>
<td>Access Control Line &amp; ROW</td>
<td>AC</td>
</tr>
<tr>
<td>Access Control Line &amp; ROW with fence</td>
<td>AC</td>
</tr>
<tr>
<td>Excess ROW Line</td>
<td>XS</td>
</tr>
</tbody>
</table>

### Roadway Plan Items

<table>
<thead>
<tr>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable Barrier</td>
<td></td>
</tr>
<tr>
<td>Concrete Barrier</td>
<td></td>
</tr>
<tr>
<td>Edge of Pavement</td>
<td></td>
</tr>
<tr>
<td>Bit Shoulders, Medians and C&amp;S Line</td>
<td></td>
</tr>
<tr>
<td>Aggregate Shoulder</td>
<td></td>
</tr>
<tr>
<td>Sidewalks, Driveways</td>
<td></td>
</tr>
<tr>
<td>Guardrail</td>
<td></td>
</tr>
<tr>
<td>Guardrail Post</td>
<td></td>
</tr>
<tr>
<td>Traffic Sign</td>
<td>b</td>
</tr>
<tr>
<td>Corrugated Median</td>
<td></td>
</tr>
<tr>
<td>Impact Attenuator</td>
<td></td>
</tr>
<tr>
<td>North Arrow with District Office (half size)</td>
<td></td>
</tr>
<tr>
<td>Match Line</td>
<td></td>
</tr>
<tr>
<td>Slope Limit Line</td>
<td></td>
</tr>
<tr>
<td>Typical Cross-Section Line</td>
<td></td>
</tr>
</tbody>
</table>

### Roadway Profiles

<table>
<thead>
<tr>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.I. Indicator</td>
<td>△</td>
</tr>
<tr>
<td>Point Indicator</td>
<td>□</td>
</tr>
<tr>
<td>Earthenworks Balance Point</td>
<td></td>
</tr>
<tr>
<td>Begin Point</td>
<td></td>
</tr>
<tr>
<td>Vert. Curve Data</td>
<td></td>
</tr>
<tr>
<td>Ditch Profile Left Side</td>
<td></td>
</tr>
<tr>
<td>Ditch Profile Right Side</td>
<td></td>
</tr>
<tr>
<td>Roadway Profile Line</td>
<td></td>
</tr>
<tr>
<td>Storm Sewer Profile Left Side</td>
<td></td>
</tr>
<tr>
<td>Storm Sewer Profile Right Side</td>
<td></td>
</tr>
</tbody>
</table>

### Signing Items (contd.)

<table>
<thead>
<tr>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detour Ahead W20-2(D) (half size)</td>
<td></td>
</tr>
<tr>
<td>Right Lane Closed Ahead W20-3L(0) (half size)</td>
<td></td>
</tr>
<tr>
<td>Road Closed Ahead W20-30(D) (half size)</td>
<td></td>
</tr>
<tr>
<td>Road Construction Ahead W20-1(0D) (half size)</td>
<td></td>
</tr>
<tr>
<td>Single Lane Ahead (half size)</td>
<td></td>
</tr>
<tr>
<td>Transition Left W4-2L (half size)</td>
<td></td>
</tr>
<tr>
<td>Transition Right W4-2R (half size)</td>
<td></td>
</tr>
</tbody>
</table>
**SIGNING ITEMS** (contd.)

<table>
<thead>
<tr>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Way Arrow Leg, W2-6-O (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>Two Way Arrow Large W1-7-c(O) (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>Detour M4-30L-(O) (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>Detour M4-30R-(O) (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>One Way Left R6-1L (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>One Way Right R6-1R (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>Left Turn Lane R31100L (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>Keep Left R4-7AL (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>Keep Left R4-7BL (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>Keep Right R4-7AR (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>Keep Right R4-7BR (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>Stop Here On Red R10-6-AL (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>Stop Here On Red R10-6-AR (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>No Left Turn R3-2 (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>No Right Turn R3-1 (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>Road Closed R11-2 (Half Size)</td>
<td>←</td>
</tr>
<tr>
<td>Road Closed Thru Traffic R11-2 (Half Size)</td>
<td>←</td>
</tr>
</tbody>
</table>

**STRUCTURES ITEMS**

<table>
<thead>
<tr>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box Culvert Barrel</td>
<td>←</td>
</tr>
<tr>
<td>Box Culvert Headwall</td>
<td>←</td>
</tr>
<tr>
<td>Bridge Pier</td>
<td>←</td>
</tr>
<tr>
<td>Bridge</td>
<td>←</td>
</tr>
<tr>
<td>Retaining Wall</td>
<td>←</td>
</tr>
<tr>
<td>Temporary Sheet Piling</td>
<td>←</td>
</tr>
</tbody>
</table>

**TRAFFIC SHEET ITEMS**

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

**TRAFFIC SIGNAL ITEMS**

<table>
<thead>
<tr>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galv. Steel Conduit</td>
<td>←</td>
</tr>
<tr>
<td>Underground Cable</td>
<td>←</td>
</tr>
<tr>
<td>Detector Loop Line</td>
<td>←</td>
</tr>
<tr>
<td>Detector Loop Large</td>
<td>←</td>
</tr>
<tr>
<td>Detector Loop Small</td>
<td>←</td>
</tr>
<tr>
<td>Detector Loop Quadrapole</td>
<td>←</td>
</tr>
</tbody>
</table>
### TRAFFIC SIGNAL ITEMS (contd.)

<table>
<thead>
<tr>
<th>Item</th>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detector Raceway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminum Mast Arm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel Mast Arm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veh. Detector Magnetic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convert Splice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controller</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gulfbox Junction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood Pole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp. Signal Head</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handhole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Double Handhole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy Duty Handhole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junction Box</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ped. Pushbutton Detector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ped. Signal Head</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Pole Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Priority Veh. Detector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signal Head</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signal Head w/Backplate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signal Post</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Closed Circuit TV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Video Detector System</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### UNDERGROUND UTILITY ITEMS

<table>
<thead>
<tr>
<th>Item</th>
<th>EX</th>
<th>PR</th>
<th>ABANDONED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable TV</td>
<td>CT</td>
<td></td>
<td>CT</td>
</tr>
<tr>
<td>Electric Cable</td>
<td>E</td>
<td></td>
<td>E</td>
</tr>
<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>
<td></td>
<td>O</td>
</tr>
<tr>
<td>Sanitary Sewer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telephone Cable</td>
<td>T</td>
<td></td>
<td>T</td>
</tr>
<tr>
<td>Water Pipe</td>
<td>W</td>
<td></td>
<td>W</td>
</tr>
</tbody>
</table>

### UTILITIES ITEMS

<table>
<thead>
<tr>
<th>Item</th>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Double Handhole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire hydrant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GuyWire or Deadman Anchor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handhole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy Duty Handhole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junction Box</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light Pole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manhole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring Well (Gasoline)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipeline Warning Sign</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Pole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Pole with Light</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanitary Sewer Cleanout</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Splice Box Above Ground</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telephone Splice Box Above Ground</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telephone Pipe</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### UTILITY ITEMS (contd.)

<table>
<thead>
<tr>
<th>Item</th>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Signal Control Box</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Meter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Meter Valve Box</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profile Line</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### VEGETATION ITEMS

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

### WATER FEATURE ITEMS

<table>
<thead>
<tr>
<th>Item</th>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stream or Drainage Ditch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waters Edge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Surface Indicator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Point</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disappearing Ditch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marsh</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marsh/Swamp Boundary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS

STANDARD 000001-08
## REINFORCEMENT BARS - ENGLISH (METRIC)

<table>
<thead>
<tr>
<th>Bar Size (inch)</th>
<th>Dia. (mm)</th>
<th>Cross-Sectional Area (sq. in.)</th>
<th>Weight (lbs./ft.)</th>
<th>Spacing, 1s (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (30)</td>
<td>0.375</td>
<td>0.330</td>
<td>0.264</td>
<td>0.200</td>
</tr>
<tr>
<td>4 (12)</td>
<td>0.500</td>
<td>0.527</td>
<td>0.558</td>
<td>0.500</td>
</tr>
<tr>
<td>5 (8)</td>
<td>0.625</td>
<td>0.647</td>
<td>0.626</td>
<td>0.600</td>
</tr>
<tr>
<td>6 (10)</td>
<td>0.750</td>
<td>0.706</td>
<td>0.798</td>
<td>0.775</td>
</tr>
<tr>
<td>7 (12)</td>
<td>0.875</td>
<td>1.043</td>
<td>0.921</td>
<td>0.900</td>
</tr>
<tr>
<td>8 (19)</td>
<td>1.000</td>
<td>1.179</td>
<td>1.064</td>
<td>1.040</td>
</tr>
<tr>
<td>9 (20)</td>
<td>1.128</td>
<td>1.375</td>
<td>1.211</td>
<td>1.190</td>
</tr>
<tr>
<td>10 (22)</td>
<td>1.270</td>
<td>1.600</td>
<td>1.442</td>
<td>1.420</td>
</tr>
<tr>
<td>11 (36)</td>
<td>1.410</td>
<td>1.884</td>
<td>1.712</td>
<td>1.690</td>
</tr>
</tbody>
</table>

### AREA OF STEEL PER FOOT (METER), sq. in. (sq. mm)

<table>
<thead>
<tr>
<th>Bar Size (inch)</th>
<th>Dia. (mm)</th>
<th>Cross-Sectional Area (sq. in.)</th>
<th>Weight (lbs./ft.)</th>
<th>Spacing, 1s (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (30)</td>
<td>0.375</td>
<td>0.330</td>
<td>0.264</td>
<td>0.200</td>
</tr>
<tr>
<td>4 (12)</td>
<td>0.500</td>
<td>0.527</td>
<td>0.558</td>
<td>0.500</td>
</tr>
<tr>
<td>5 (8)</td>
<td>0.625</td>
<td>0.647</td>
<td>0.626</td>
<td>0.600</td>
</tr>
<tr>
<td>6 (10)</td>
<td>0.750</td>
<td>0.706</td>
<td>0.798</td>
<td>0.775</td>
</tr>
<tr>
<td>7 (12)</td>
<td>0.875</td>
<td>1.043</td>
<td>0.921</td>
<td>0.900</td>
</tr>
<tr>
<td>8 (19)</td>
<td>1.000</td>
<td>1.179</td>
<td>1.064</td>
<td>1.040</td>
</tr>
<tr>
<td>9 (20)</td>
<td>1.128</td>
<td>1.375</td>
<td>1.211</td>
<td>1.190</td>
</tr>
<tr>
<td>10 (22)</td>
<td>1.270</td>
<td>1.600</td>
<td>1.442</td>
<td>1.420</td>
</tr>
<tr>
<td>11 (36)</td>
<td>1.410</td>
<td>1.884</td>
<td>1.712</td>
<td>1.690</td>
</tr>
</tbody>
</table>

### SPACING, in.

<table>
<thead>
<tr>
<th>Bar Size (inch)</th>
<th>Dia. (mm)</th>
<th>Cross-Sectional Area (sq. in.)</th>
<th>Weight (lbs./ft.)</th>
<th>Spacing, 1s (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (30)</td>
<td>0.375</td>
<td>0.330</td>
<td>0.264</td>
<td>0.200</td>
</tr>
<tr>
<td>4 (12)</td>
<td>0.500</td>
<td>0.527</td>
<td>0.558</td>
<td>0.500</td>
</tr>
<tr>
<td>5 (8)</td>
<td>0.625</td>
<td>0.647</td>
<td>0.626</td>
<td>0.600</td>
</tr>
<tr>
<td>6 (10)</td>
<td>0.750</td>
<td>0.706</td>
<td>0.798</td>
<td>0.775</td>
</tr>
<tr>
<td>7 (12)</td>
<td>0.875</td>
<td>1.043</td>
<td>0.921</td>
<td>0.900</td>
</tr>
<tr>
<td>8 (19)</td>
<td>1.000</td>
<td>1.179</td>
<td>1.064</td>
<td>1.040</td>
</tr>
<tr>
<td>9 (20)</td>
<td>1.128</td>
<td>1.375</td>
<td>1.211</td>
<td>1.190</td>
</tr>
<tr>
<td>10 (22)</td>
<td>1.270</td>
<td>1.600</td>
<td>1.442</td>
<td>1.420</td>
</tr>
<tr>
<td>11 (36)</td>
<td>1.410</td>
<td>1.884</td>
<td>1.712</td>
<td>1.690</td>
</tr>
</tbody>
</table>

### AREAS OF STEEL PER METER, sq. mm

<table>
<thead>
<tr>
<th>Bar Size (inch)</th>
<th>Dia. (mm)</th>
<th>Cross-Sectional Area (sq. in.)</th>
<th>Weight (lbs./ft.)</th>
<th>Spacing, 1s (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (30)</td>
<td>0.375</td>
<td>0.330</td>
<td>0.264</td>
<td>0.200</td>
</tr>
<tr>
<td>4 (12)</td>
<td>0.500</td>
<td>0.527</td>
<td>0.558</td>
<td>0.500</td>
</tr>
<tr>
<td>5 (8)</td>
<td>0.625</td>
<td>0.647</td>
<td>0.626</td>
<td>0.600</td>
</tr>
<tr>
<td>6 (10)</td>
<td>0.750</td>
<td>0.706</td>
<td>0.798</td>
<td>0.775</td>
</tr>
<tr>
<td>7 (12)</td>
<td>0.875</td>
<td>1.043</td>
<td>0.921</td>
<td>0.900</td>
</tr>
<tr>
<td>8 (19)</td>
<td>1.000</td>
<td>1.179</td>
<td>1.064</td>
<td>1.040</td>
</tr>
<tr>
<td>9 (20)</td>
<td>1.128</td>
<td>1.375</td>
<td>1.211</td>
<td>1.190</td>
</tr>
<tr>
<td>10 (22)</td>
<td>1.270</td>
<td>1.600</td>
<td>1.442</td>
<td>1.420</td>
</tr>
<tr>
<td>11 (36)</td>
<td>1.410</td>
<td>1.884</td>
<td>1.712</td>
<td>1.690</td>
</tr>
</tbody>
</table>

### Soft converted English

- Deleted metric table.
- Switched units to English (metric).
- English 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>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0052</td>
<td>0.0170</td>
<td>0.0071</td>
<td>0.0185</td>
<td>0.0092</td>
<td>0.0200</td>
<td>0.0044</td>
<td>0.0240</td>
<td>0.0055</td>
<td>0.0295</td>
<td>0.0067</td>
<td></td>
</tr>
<tr>
<td>0.0034</td>
<td>0.0147</td>
<td>0.0056</td>
<td>0.0175</td>
<td>0.0076</td>
<td>0.0195</td>
<td>0.0049</td>
<td>0.0251</td>
<td>0.0055</td>
<td>0.0307</td>
<td>0.0068</td>
<td></td>
</tr>
<tr>
<td>0.0012</td>
<td>0.0131</td>
<td>0.0026</td>
<td>0.0181</td>
<td>0.0039</td>
<td>0.0207</td>
<td>0.0047</td>
<td>0.0226</td>
<td>0.0054</td>
<td>0.0265</td>
<td>0.0062</td>
<td></td>
</tr>
<tr>
<td>0.0067</td>
<td>0.0040</td>
<td>0.0134</td>
<td>0.0064</td>
<td>0.0092</td>
<td>0.0170</td>
<td>0.0059</td>
<td>0.0244</td>
<td>0.0066</td>
<td>0.0308</td>
<td>0.0073</td>
<td></td>
</tr>
<tr>
<td>0.0085</td>
<td>0.0096</td>
<td>0.0104</td>
<td>0.0114</td>
<td>0.0129</td>
<td>0.0130</td>
<td>0.0146</td>
<td>0.0158</td>
<td>0.0159</td>
<td>0.0161</td>
<td>0.0168</td>
<td></td>
</tr>
</tbody>
</table>

A = Fractions of Inch or Foot  
B = Inch Equivalents to Foot Fractions
All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

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

Place end-post (stake) of first silt fence adjacent to end post (stake) of second silt fence with fabric positioned as shown.

STEP 2

ATTACHING TWO SILT FILTER FENCES

(Not applicable for J-hooks)

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

ATTACHING TWO SILT FILTER FENCES

(Not applicable for J-hooks)

STEP 1

Place end-post (stake) of first silt fence adjacent to end post (stake) of second silt fence with fabric positioned as shown.

STEP 2

ATTACHING TWO SILT FILTER FENCES

(Not applicable for J-hooks)

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

ATTACHING TWO SILT FILTER FENCES

(Not applicable for J-hooks)

STEP 1

Place end-post (stake) of first silt fence adjacent to end post (stake) of second silt fence with fabric positioned as shown.

STEP 2

ATTACHING TWO SILT FILTER FENCES

(Not applicable for J-hooks)

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

ATTACHING TWO SILT FILTER FENCES

(Not applicable for J-hooks)

STEP 1

Place end-post (stake) of first silt fence adjacent to end post (stake) of second silt fence with fabric positioned as shown.

STEP 2

ATTACHING TWO SILT FILTER FENCES

(Not applicable for J-hooks)

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

ATTACHING TWO SILT FILTER FENCES

(Not applicable for J-hooks)

STEP 1

Place end-post (stake) of first silt fence adjacent to end post (stake) of second silt fence with fabric positioned as shown.

STEP 2

ATTACHING TWO SILT FILTER FENCES

(Not applicable for J-hooks)

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

ATTACHING TWO SILT FILTER FENCES

(Not applicable for J-hooks)
**INLET AND PIPE PROTECTION**

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

**ELEVATION**

Outlet type as directed by Engineer.

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

**PLAN**

Tie down stakes

Silt filter fence

Spacers

Straw or hay bales

**TYPICAL CUT CROSS-SECTION**

TYPICAL FILL CROSS-SECTION

**TEMPORARY DITCHES FOR CUT & FILL SECTIONS**

STANDARD 280001-07
Width to be measured along the slope of the top surface of the fabric formed concrete revetment mat in place from end to end.

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

Cut off walls shall be installed at the upstream and downstream ends.

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

INSTALLATION DETAILS

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

GENERAL NOTES

Dimensions given with minimum limits shall be adjusted for field conditions as directed by the Engineer.

All anchor walls on side slopes and at lap joints, as well as cut off walls, shall be installed in trenches.

Cut off walls shall be installed at the upstream and downstream ends.

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

REVETMENT MATS

TYPICAL SECTION THRU FILTER POINT MAT

TYPICAL FABRIC FORMED CONCRETE REVETMENT MAT LINED DITCH

CUT OFF WALL DETAILS

TYPICAL LAP JOINTS W/ANCHOR WALL

FABRIC FORMED CONCRETE REVETMENT MATS

STANDARD 285001-02
Provide drainage swale in shaded area.

End full super-elevation

Pavement in the ramp taper (hatched area) for a distance of 950' (290 m) shall be the same thickness as the mainline.

15.5 (395)

5.0:1 Taper rate

End aggregate shoulder

G = 0.00%

Right edge of ramp when mainline is curved right.

Left edge of ramp when mainline is curved left.

When using 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 length 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.

With a mainline horizontal curve to the left, keep the gore nose dimensions of Sections C-C and D-D as shown. From Section C-C to Section 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.

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 minimum, verify the required acceleration length will be provided.

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

[Diagram showing alignment and cross-sections with labeled dimensions and notes]

**Profile**

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

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

Vertical offset range for ramp right edge when mainline is on tangent

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

When mainline is on tangent or curved to the right

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

Refer to Sheet 3 for vertical offsets using e = 8%
DETAILS FOR DRAINAGE IN NEUTRAL AREA

Vertical offsets in inches for right edge of ramp, when e = 8%

<table>
<thead>
<tr>
<th>Sections</th>
<th>Machine on Tangent</th>
<th>Machine Curved Right</th>
<th>Machine Curved Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.18</td>
<td>-5.6 % ML x 12 (300)</td>
<td>-5.6 % ML x 300</td>
</tr>
<tr>
<td>B</td>
<td>-3.0</td>
<td>-5.6 % ML x 190</td>
<td>-5.6 % ML x 4900</td>
</tr>
<tr>
<td>C</td>
<td>3.0</td>
<td>-5.6 % ML x 190</td>
<td>-5.6 % ML x 4900</td>
</tr>
<tr>
<td>D</td>
<td>15.6</td>
<td>15.6</td>
<td>15.6</td>
</tr>
</tbody>
</table>

Vertical offsets in mm for right edge of ramp, when e = 8%

<table>
<thead>
<tr>
<th>Sections</th>
<th>Machine on Tangent</th>
<th>Machine Curved Right</th>
<th>Machine Curved Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-5</td>
<td>-5.6 % ML x 300</td>
<td>-5.6 % ML x 300</td>
</tr>
<tr>
<td>B</td>
<td>-74</td>
<td>-5.6 % ML x 4900</td>
<td>-5.6 % ML x 4900</td>
</tr>
<tr>
<td>C</td>
<td>-74</td>
<td>-5.6 % ML x 4900</td>
<td>-5.6 % ML x 4900</td>
</tr>
<tr>
<td>D</td>
<td>-392</td>
<td>-392</td>
<td>-392</td>
</tr>
</tbody>
</table>

- Vertical offset values are calculated and based on the right edge of mainline pavement at 0.0% grade.
- The vertical offsets of these points are above the mainline pavement and lie on an upgrade in relationship to the mainline grade.
- S.E. = Superelevation Rate
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. 19x75) Tie bars at 36 (900) cts. (shown on support pins)

Sawed groove 1/4 (3) min. x 1/3

Hot poured joint sealer

LONGITUDINAL CONSTRUCTION JOINT

(TIE BAR FORMED IN PLACE
OR MECANICALLY INSERTED)

No. 6x30 (No. 19x75)

Tie bars at 36 (900) cts.

First pour

Form

15
(137)

15
(137)

15
(375)

LONGITUDINAL KEYED JOINT

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

LONGITUDINAL CONSTRUCTION JOINT

(TIE BAR GRouted IN PLACE)

No. 6x24 (No. 19x600)

Tie bars at 36 (900) cts.

First pour

No. 6x24 (No. 19x600)

Tie bars at 36 (900) cts.

Second pour

Preformed or drilled hole (bar size + 1/4 (6)

Hot poured joint sealer

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.

PAVEMENT JOINTS

Ticket 420001-10

STANDARD 420001-10

1-1-97

1-1-22

1-1-18

DOWEL BAR TABLE.
**TRANSVERSE EXPANSION JOINT**  
*FOR PAVEMENTS WITH UNEQUAL THICKNESS*

- **18 (450) Long dowel bars at 12 (300) cts.**
- **Expansion cap * **
- **Dowel bar assembly**

*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*

- **18 (450) Long dowel bars at 12 (300) cts.**
- **Expansion cap * **
- **Dowel bar assembly**

**SEALING DETAIL**

- Hot poured joint sealer
- Finish corners with edger

**Dowel Bar Table**

<table>
<thead>
<tr>
<th>PAVEMENT BAR THICKNESS</th>
<th>DOWEL BAR DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 (250) and greater</td>
<td>16 (138)</td>
</tr>
<tr>
<td>8.01 (200) to 9.99 (249)</td>
<td>16 (132)</td>
</tr>
<tr>
<td>8 (200) and less</td>
<td>10 (155)</td>
</tr>
</tbody>
</table>

**TRANSVERSE CONTRACTION JOINT**

18 (450) max. x 1/3 sawed groove

**TRANSVERSE CONTRACTION JOINT**  
*FOR CAM, CFA AND LFA BASE COURSE MIXTURES*

- **Expansion cap * **
- **Dowel bar assembly**

**STANDARD 420001-10**

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**ENGINEER OF POLICY AND PROCEDURES**

**APPROVED**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED**

**PASSED**
### General Notes
See Standard 420001 for details of joints not shown.

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

### Pavement Plan

- **SECTION A-A**
  - Typical 2-Lane with Shoulders
  - Longitudinal sawed joint
  - Stabilized subgrade
  - Improved subgrade

### Transverse Construction Joint

- **GENERAL NOTES**
  - **When placed adjacent to existing PCC pavement,** use a spacing between 12' (3.6 m) and 18' (5.5 m) so the joints are in prolongation with existing transverse joints. Also adjust the spacing of tie bars in the longitudinal joints to maintain a clearance of 9 (225) from the end of the dowel bars.

### Detail of Added Reinforcement for Pavement Blocks-Outs

- **PCC Pavement**
  - 24' (7.2 m) Jointed

### Table: Spacing of Transverse Construction Joints

<table>
<thead>
<tr>
<th>Pavement Thickness</th>
<th>Spacing of Transverse Construction Joints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10 (250)</td>
<td>32 (3.6 m) *</td>
</tr>
<tr>
<td>10 (250) and greater</td>
<td>15 (4.5 m) *</td>
</tr>
</tbody>
</table>

* *When placed adjacent to existing PCC pavement, use a spacing between 12' (3.6 m) and 18' (5.5 m) so the joints are in prolongation with existing transverse joints. Also adjust the spacing of tie bars in the longitudinal joints to maintain a clearance of 9 (225) from the end of the dowel bars.*

### Date

- **1-1-22** Revised spacing of transverse contraction joints and header board callout.
- **1-1-18** Changed spacing of tie bars to 36 (900) cts.

---

**Illinois Department of Transportation**

**January 1, 2022**

**Engineer of Policy and Procedures**

**Approved January 1, 2022**

**Engineer of Design and Environment**

**Issued 1-1-97**

**Passed 1-1-22**

**DATE**

**REVISIONS**

- Revised spacing of transverse contraction joints and header board callout.
- Changed spacing of tie bars to 36 (900) cts.
SECTION A-A
(TYPICAL 3-LANE, 1-WAY WITH SHOULDERS)

**Casting outside limits** placed at pavement mid-depth reinforcemement bars (8 total)

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

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

**CASTING OUTSIDE LIMITS**

**TRANVERSE CONSTRUCTION JOINT**

**DETAILED ADDED REINFORCEMENT FOR PAVEMENT BLOCK-OUTS**

<table>
<thead>
<tr>
<th>Pavement Thickness</th>
<th>Spacing of Transverse Construction Joints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 15 (380)</td>
<td>12 (3.6 m) *</td>
</tr>
<tr>
<td>15 (380) and greater</td>
<td>15 (4.5 m) *</td>
</tr>
</tbody>
</table>

*D When placed adjacent to existing PCC pavement, use a spacing between 12' (3.6 m) and 18' (5.5 m) so the joints are in prolongation with existing transverse joints. Also adjust the spacing of tie bars in the longitudinal joints to maintain a clearance of 9 (225) from the end of the dowel bars.**

**GENERAL NOTES**

See Standard 420106-1 for details of joints not shown.

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

6 No. 6 (19) Tie bars equally spaced 3'-6" (1.1 m) dia. to be removed before concrete added.

No. 6 (19) Inner hoop bar 3'-6" (1.1 m) dia. (typ.)

No. 6 (19) Outer hoop bar 3'-6" (1.1 m) dia. (typ.)

Hoop reinforcement shall be one piece construction with nonshrink grout.

Circular form shall be removed prior to drill and grout of tie bars.

Contractor shall be anchored to the structure to prevent movement during the paving operation.

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

GENERAL NOTES

Transverse joints may be moved to accommodate roundout. Edge of circular joint shall be minimum 24 (600) from transverse joint. Relocated transverse joint shall be continuous from edge of pavement to edge of pavement.

The transverse joint spacing should be adjusted to use the DETAIL NEAR TRANSVERSE JOINT. If the joint cannot be adjusted to give the 12 (300) min offset, use the DETAIL AT TRANSVERSE JOINT and ensure the joint is centered in the structure as shown.

Circular form shall be removed prior to drill and grout of tie bars.

Dowels to be aligned horizontally and parallel to 4 (100) clearance of form. 4 (100) clearance outer loop to joint (typ.).

GENERAL NOTES

Transverse joints may be moved to accommodate roundout. Edge of circular joint shall be minimum 24 (600) from transverse joint. Relocated transverse joint shall be continuous from edge of pavement to edge of pavement.

The transverse joint spacing should be adjusted to use the DETAIL NEAR TRANSVERSE JOINT. If the joint cannot be adjusted to give the 12 (300) min offset, use the DETAIL AT TRANSVERSE JOINT and ensure the joint is centered in the structure as shown.

Circular form shall be removed prior to drill and grout of tie bars.

Dowels to be aligned horizontally and parallel to 4 (100) clearance of form. 4 (100) clearance outer loop to joint (typ.).

GENERAL NOTES

Transverse joints may be moved to accommodate roundout. Edge of circular joint shall be minimum 24 (600) from transverse joint. Relocated transverse joint shall be continuous from edge of pavement to edge of pavement.

The transverse joint spacing should be adjusted to use the DETAIL NEAR TRANSVERSE JOINT. If the joint cannot be adjusted to give the 12 (300) min offset, use the DETAIL AT TRANSVERSE JOINT and ensure the joint is centered in the structure as shown.

Circular form shall be removed prior to drill and grout of tie bars.

Dowels to be aligned horizontally and parallel to 4 (100) clearance of form. 4 (100) clearance outer loop to joint (typ.).

GENERAL NOTES

Transverse joints may be moved to accommodate roundout. Edge of circular joint shall be minimum 24 (600) from transverse joint. Relocated transverse joint shall be continuous from edge of pavement to edge of pavement.

The transverse joint spacing should be adjusted to use the DETAIL NEAR TRANSVERSE JOINT. If the joint cannot be adjusted to give the 12 (300) min offset, use the DETAIL AT TRANSVERSE JOINT and ensure the joint is centered in the structure as shown.

Circular form shall be removed prior to drill and grout of tie bars.

4 (100) min. to get frame closer inner hoop may be cut or refer to longitudinal joint detail.

No tie bars within 18 (450) of form

If roundout falls at an intersection of joints, refer to detail at transverse joint, omitting the two contraction dowel bars but adding longitudinal tooled joint.

No tie bars within 18 (450) of form

If roundout falls at an intersection of joints, refer to detail at transverse joint, omitting the two contraction dowel bars but adding longitudinal tooled joint.

No tie bars within 18 (450) of form

Corrected 'T/2' dim. on 1-1-11

Revised standard for 36 (900) Tie bar spacing. Revised

General Notes.

Corrected 3/24 dim. on

DETAIL OF REINFORCEMENT

FOR PAVEMENT ROUNDOUT.
ROUNDOUT FOR SQUARE FRAME & GRATE

AND MANHOLES

Drill and Grout No. 6 (19) Tie Bar 24 (600)
No. 6 (19) Outer loop rein.
No. 6 (19) Inner loop rein.

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

Note: Type 1 or Type 5 Frame and Grate may be used

DETAIL OF REINFORCEMENT
FOR PAVEMENT ROUNDOUT

CAST IN PLACE DETAIL

No. 4 (13) 12 (300) long bars to be pounded into subgrade as chairs and tied, (min. of 4 for inner hoop and 8 for outer hoop)

Inner hoops may rest on dowel bars or tie bars which do not interfere in the alignment.

All dimensions same for the majority of circular frame & grates. For larger structures increase hoop bar and circular form diameter by 12 (300) each and add two additional equally spaced tie bars.

Circular form

No. 6 (19) bar placed at pavement midpoint

Circular Joint

Frame

Structure

Sub-Base

No. 5 (16) Support bar

2'-6" (0.76 m)

0.53 m

5'-0" (1.5 m)

No. 5 (16) Support bar

PCC PAVEMENT

ROUNDOUTS

STANDARD 420111-04

Illinois Department of Transportation

January 1, 2018

ENGINEER OF POLICY AND PROCEDURES

APPROVED

JANUARY 1, 2018

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

PASSED

0.53 m

2'-0" (0.53 m)

2'-6" (0.76 m)

0.61 m

1'-9" (0.53 m)

0.76 m

2'-6"

0.76 m

2'-0"

0.53 m

2'-6"

0.76 m

2'-0"

0.53 m

2'-0"
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.

Edge of pcc

Shoulder

Width

End full superelevation

Arc 130' (40 m)

Tangent 200' (60 m)

35.3 Taper rate

P.T. R. (1.2 m)

4' (30 m)

*100'

A = +0.30 %

A = +0.25 %

BE = 0.04 %

Right edge of mainline

Right edge of ramp when mainline is on tangent or curved to the right.

Calculate G %

Calculate G %

Calculate G %

Right edge of ramp when mainline is on tangent or curved to the left.

G = 0.00 %

100

12 (300) x 5.6 % of mainline

150' (45 m)

VC

P.I. Elev. 4.3 (110)

Elev. 7.3 (185)

Elev. 13.1 (335)

End of S.V.C.

End of C.V.C.

V.C.

150' (450 m)

Calculate G %

Right edge of ramp when mainline is on curve to the left.

G % = G % - 2 x S.E.% of mainline %

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.

Pavement joints and joint spacing shall be as shown on Standards 420001, 420101 and 420106.

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 radius R1 less than the minimum, verify the required acceleration length will be provided.

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

With a mainline horizontal curve to the left, keep the gore nose dimensions at Sections B-B, C-C, and D-D 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.
CROSS SECTIONS WHEN MAINLINE IS ON TANGENT OR CURVED TO THE RIGHT

CROSS SECTIONS WHEN MAINLINE IS CURVED TO THE LEFT

DETAIL A

DETAIL B

ENTRANCE RAMP TERMINAL

(JOINTED PCC RAMP PAVEMENT ADJACENT TO JOINTED PCC MAINLINE PAVEMENT)

STANDARD 420201-12
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.

Pavement joints and joint spacings shall be as shown on Standards 420001, 420101 and 420106.

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 R3 less than the minimum, verify the required acceleration length will be provided.

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 lying Section C-C.

All dimensions are in inches (millimeters) unless otherwise shown.
When curved to the left, vertical offset range for ramp right edge when mainline is curved to the left:

- Stub vertical offset based on (12 (300) x [cross slope% or S.E.%] of mainline)
- Vertical offset range for ramp right edge when mainline is curved to the left
- Max. cross slope allowed is 4%
- Min. cross slope allowed is 1.5%
- Right edge of mainline

When curved to the right:

- G = (G - 0.46%)
- Right edge of mainline (ML)
- Vertical offset range for ramp right edge when mainline is curved to the right

When on tangent or curved to the right:

- Vertical offset range for ramp right edge when mainline is on tangent
- Min. cross slope allowed is 1.5%
- Max. cross slope allowed is 5%
- Right edge of ramp parallel to mainline grade

Refer to Sheet 3 for vertical offsets using e = 8%
### Table: Pavement Details

<table>
<thead>
<tr>
<th>Location</th>
<th>Subgrade</th>
<th>Subbase</th>
<th>Mainline</th>
<th>Pavement</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 (100) Stabilized subbase</td>
<td>Improved subgrade</td>
<td>1.5% and greater</td>
<td>Mainline pavement</td>
<td></td>
</tr>
</tbody>
</table>

### Diagrams

**SECTION B-B**
- Mainline point
- Ramp point
- Improved subgrade
- 4 (100) Stabilized subbase

**SECTION CAH - CAH**
- Mainline point
- Ramp pavement
- Improved subgrade
- 4 (100) Stabilized subbase

**SECTION CBK - CBK**
- Mainline point
- Ramp pavement
- Improved subgrade
- 4 (100) Stabilized subbase

**When Mainline is on Tangent or Curved to the Right**

### When Mainline is Curved to the Left

See Sheet 3 for GENERAL NOTES.

---

**Exit Ramp Terminal**

Joining PCC Ramp Pavement

Adjacent to Jointed PCC Mainline Pavement

Illinois Department of Transportation

January 1, 2022

Engineer of Policy and Procedures

Approved

January 1, 2022

Engineer of Design and Environment

Issued

1-1-97

Passed
GENERAL NOTES

The initial ramp grade (E) 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.

Pavement joints and joint spacings shall be as shown on Standards 420001, 420101, and 420106.

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

JOINED PCC RAMP PAVEMENT
ADJACENT TO JOINED PCC MAINLINE PAVEMENT

STANDARD 420301-09
When curved to the left:

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

When tangent or curved to the right:

Vertical offset range for ramp right edge:

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

When mainline is on tangent or curved to the right:

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

Refer to Sheet 3 for vertical offsets using e = 8%
DETAILS FOR DRAINAGE IN NEUTRAL AREA

GENERAL NOTES

The initial ramp grade (G) is based on the line generated through the PI that is at 305 (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 141' (43 m) tangent section.

All dimensions are in millimeters (meters) unless otherwise shown.
**NEW CONSTRUCTION**

- **Bridge Approach Slab**
  - Variable 15'-0" (4.57 m) min.
  - Shoulder
  - Approach Footing
  - Longitudinal sawed joint
  - Longitudinal sawed joint or longitudinal construction joint
  -限位板
  - 6 (150) from longitudinal joint (typ.)

**EXISTING CONSTRUCTION**

- **Bridge Approach Slab**
  - Variable 15'-0" (4.57 m) min.
  - Shoulder
  - Existing Shoulder
  - Approach Footing
  - Longitudinal sawed joint
  - 6 (150) from longitudinal joint (typ.)

**SECTION A-A**

- **Bridge Approach Slab**
- **Pavement Connector** (PCC)
- **Welded wire reinforcement (WWR)**
- **Limit of pavement connector**
- **See Bridge Plans for details.**
- **Approach Footing**
- **Pavement connector**
- **3 (75)**

**SECTION B-B**

- **Bridge approach slab**
- **Pavement connector**
- **WWR**
- **Limit of pavement connector**
- **See Bridge Plans for details.**

**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.

**DATE**

- **1-1-19**
  - Changed slab in pavement
  - Connector to welded wire reinforcement

**REVISIONS**

- **4-1-16**
  - Revised pavement connector
  - To be rigid only. Omitted WFB
  - term, joint, renamed std.
Limit of pavement connector for bridge approach slab

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

Improved subgrade,
Approach Footing

36
4-1-16

(3.00 m)

10'-0"

Shoulder

See DETAIL A

SECTION A-A

Bridge approach slab
Pavement connector (HMA) for
bridge approach slab

15
(380)

SHOULD

Shoulder

Approach Footing

36

10'-0"

(3.00 m)

10'-0"

(3.00 m)

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.

DETAIL A

Shoulder

Approach Footing

PAVEMENT CONNECTOR (HMA)
FOR BRIDGE APPROACH SLAB

STANDARD 420406
PLAN

SECTION A-A
(FOR PCC PAVEMENT)

SECTION B-B
(FOR PCC BASE COURSE WITH HMA SURFACE)

GENERAL NOTES
See Standard 420501 for joint details not shown.
All dimensions are in inches (millimeters) unless otherwise shown.
GENERAL NOTES

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

Welded wire reinforcement which is lapped longitudinally shall have a minimum lap of 6 (150). Welded wire reinforcement may be positioned with the transverse wires on top or bottom of the longitudinal wires. All dimensions are in inches (millimeters) unless otherwise shown.

DETAIL OF ADDED REINFORCEMENT FOR PAVEMENT BLOCKS-OUTS

** TYPE A **

- 1 (2) Preformed expansion joint file-full depth (typ.)
- 2-No. 5 x 4' (No. 16 x 1.2 m) Reinforcement bars (8 total) placed at joint mid-depth
- Place casting to grade and fill with full depth concrete after pavement has cured.
- Casting outside limits
- Longitudinal keyed joint
- Lane edge

** TYPE B **

- Welded wire reinforcement when required to end approximately 6 (150) from joints
- Approximately 63 lbs./100 sq. ft. (3.07 kg/m²)

Approximately 63 lbs./100 sq. ft. (3.07 kg/m²)

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.

Reinforcement pay length

Variable

36 (900)

6 (150)

6 (150)

Approximately 63 lbs./100 sq. ft. (3.07 kg/m²)

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

Reinforcement pay length

Variable

36 (900)

6 (150)

6 (150)
**LAP DETAIL I**

- **Bar Size**
- **Pavement Thickness**
- **(Approx. Spacing)**

<table>
<thead>
<tr>
<th>Bar Size</th>
<th>Pavement Thickness</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>#6</td>
<td>7% thru 9%</td>
<td>18 spaces @ 75%</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#6</td>
<td>8% thru 9%</td>
<td>20 spaces @ 65%</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#6</td>
<td>9% thru 10%</td>
<td>22 spaces @ 60%</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#6</td>
<td>10% thru 11%</td>
<td>24 spaces @ 55%</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#7</td>
<td>11% thru 12%</td>
<td>27 spaces @ 50%</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#7</td>
<td>12% thru 13%</td>
<td>30 spaces @ 45%</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#7</td>
<td>13% thru 14%</td>
<td>33 spaces @ 40%</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#7</td>
<td>14% thru 15%</td>
<td>36 spaces @ 35%</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#7</td>
<td>15% thru 16%</td>
<td>39 spaces @ 30%</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
</tbody>
</table>

**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 **C** dimension and the distance from the end of the transverse bar to the edge of pavement may be increased by 1.25x 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.

---

**LAP DETAIL II**

- **10'-4" (3.2 m) min.**
- **15'-8" (4.8 m) max.**

**LAP DETAIL III**

- **36" (900) min.**
Pavement reinforcement shall be placed at a reasonably uniform spacing across the 12'-0" (3.6 m) width and shall be placed between normal longitudinal steel for transverse joints (typ.).

Pavement reinforcement shall match pavement slope.

Concrete pad shall match pavement slope.

End of shoulder

Transverse terminal joint

Transverse construction joint

Concrete pad (3.0 m)

10'-0" (3.0 m)

24'-0" (7.2 m) long at 18 (450) cts.

7 No. 4 (No. 13) Transverse bars, 23'-6" (7.05 m) long at 18 (450) cts.

24 No. 5 (No. 16) Longitudinal bars, 9'-6" (2.85 m) long at 12 (300) cts.

12 Dowel bars at 12 (300) cts.

12 Dowel bars at 12 (300) cts. (strip & dowel when placed adjacent to existing pcc pavement)

12 (300) Improved subgrade

4 (100) Preformed sleeper slab

Wide flange beam terminal joint complete

Concrete pad slope shall match pavement slope.

Pavement reinforcement

Sleeper slab

PCC shoulder

General Notes:

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

- The sealant shall be Dow Corning 888 Silicone Highway Joint Sealant. The tape, used on the metal only, shall be Dow Corning 1300. At the Contractor’s option the joint may be sealed as shown in the optional groove detail.

- See Standards 420001 and 420401 for joint details not shown.

- See Standard 421001 for details of pavement reinforcement.

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

24' (7.2 m)

(CRC PAVEMENT

(WITH WIDE FLANGE BEAM TERMINAL JOINT)

Sin 3 at 32)

STANDARD 421101-10

Illinois Department of Transportation

January 1, 2018

APPROVED

1-1-18

REVISIONS

1-1-18 Changed tie bar spacing to 36 (900) cts.

1-1-14 Added exp. jnt. in shlds. & omitted bars, cnst. jnt. over wide flange beam slpr slab
**WIDE FLANGE BEAM TERMINAL JOINT**

- **Steel beam and concrete sleeper slab shall match pavement slope.**
- **A** Pavement thickness minus 43 (115)
- **B** Steel plate to be welded to ends of beam
- **C** Diagram of cutting and welding beam
- **D** Details of cutting and welding beam

**DETAIL AT BEAM**

- **1.5 (380)**
- **2.3 (50)**
- **4.4 (115)**
- **3.2 (81)**

**TERMINAL JOINT COMPLETED**

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

**MATERIALS REQUIRED FOR ONE WIDE FLANGE BEAM TERMINAL JOINT COMPLETE**

<table>
<thead>
<tr>
<th>Material</th>
<th>Concrete, cu. yds. (m³)</th>
<th>Reinforcement bars, lbs. (kg)</th>
<th>Pavement reinforcement, sq. yds. (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Concrete</strong></td>
<td>31.1 (24.5)</td>
<td>5.23 (3.26)</td>
<td>20 (16.2)</td>
</tr>
<tr>
<td><strong>Reinforcement bars</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pavement reinforcement</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**36' (10.8 m) CRC PAVEMENT (WITH WIDE FLANGE BEAM TERMINAL JOINT)**

**STANDARD 421106-10**
**Section AT LUG W**

- 44 c bars at 6'/6 (183) cts. (Bend in field to fit)
- d bars at 4'-0" (1.2 m) cts.

**Section AT LUG X**

- a bars at 6'/6 (183) cts. (Bend top portion in field as shown)

**Section AT LUG Y**

- 10 mil (0.25) Polyethylene bond breaker
- Improved subgrade (When applicable)

---

**Materials Required for 1 (1) CRC Pavement (Wth Lug System)**

<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>132</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>132</td>
<td>No. 5 (No. 16)</td>
<td>20'-0&quot; (6.09 m)</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>28</td>
<td>No. 4 (No. 13)</td>
<td>15'-9&quot; (4.80 m)</td>
<td></td>
</tr>
</tbody>
</table>

- Concrete, cu. yds. (m³): 64.0 (48.9)
- Reinforcing Bars, lbs. (kg): 8373 (3800)
- Concrete Pad, sq. yds. (m²): 144 (120)
- Improved Subgrade, sq. yds. (m²): 162 (135)

*Illinois Department of Transportation*

**PASSED**

**CRC Pavement**

**Standard 421201-07**
36'-6" (10.8 m) Continuously reinforced pcc pavement

PLATE

Limit of lug system

End of pavement

End of stabilized shoulder

Split header board
Support

Pavement reinforcement

No. 6 (No. 19) tie bars spaced at 36 (900) cts.

Concrete pad

Concrete pad slope

Lap reinforcing steel 36 (900) when pavement is extended

Extended steel to be blocked up with wood blocking.

Entire top surface shall be steel trowel finished.

36'-6" (10.8 m) Transverse construction joint

36'-6" (10.8 m) Transverse terminal joint

SECTION A-A

SECTION B-B

GENERAL NOTES

See Standards 420001 and 420401 for joint reinforcement.

See Standard 421001 for details of pavement reinforcement.

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

DATE\n1-1-97
1-1-08

REVISIONS
\n1-1-18
\n
WITH LUG SYSTEM

CRC PAVEMENT

(English (metric). Revised Switched units to English (metric). Revised Lug Sys Table.)

36' (10.8 m) CRC PAVEMENT

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

STANDARD 421206-07

Illinois Department of Transportation

ENGINEER OF POLICY AND PROCEDURES
APPROVED
January 1, 2018

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
1-1-97
PASSED

DATE
REVISIONS

1-1-18
1-1-08
RAMPs IN LANDSCAPED AREA

SETBACK ≤ 5'

- 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.

RAMPs IN PAVED AREA

SETBACK ≤ 5'

- 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 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.

See Sheet 2 for GENERAL NOTES.

PERPENDICULAR CURB RAMPS FOR SIDEWALKS

STANDARD 424001-11
RAMP IN LANDSCAPED AREA
SETBACK > 5'  

RAMP IN PAVED AREA
SETBACK > 5'

SECTION C-C

1. No turning space not required for blended transitions.
2. 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.

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, 1:48 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 6 in. (150 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.
**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 5’ (1.52 m).

Where the 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’ (50) 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’ (150) 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.

---

**RAMP IN LANDSCAPED AREA**

- **Turning space** 5’x5’ (1.52x1.52 m) typical, 4’x4’ (1.22x1.22 m) min.
- **Crosswalk marking** (typ.)
- **Clear space** 4’x4’ (1.22x1.22 m) min.
- **Detectable warning**

**RAMP IN PAVED AREA**

- **Turning space** 5’x5’ (1.52x1.52 m) typical, 4’x4’ (1.22x1.22 m) min.
- **Crosswalk marking** (typ.)
- **Clear space** 4’x4’ (1.22x1.22 m) min.
- **Detectable warning**

**SIDE CURB DETAIL**

- **Ramp**
- **Variable**
- **Flush with top of roadway curb and top of sidewalk**

**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.

**DETAIL A**

- **Expansion Joint**

**DIAGONAL CURB RAMPS FOR SIDEWALKS**

- **DATE**
- **REVISIONS**
  - 1-1-21: Clarified minimum crosswalk width and locations.
  - 1-1-19: Reversed "15-foot rule", added "blended transitions" and placement tolerances for detectable warning.

**STANDARD 424006-05**
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 including 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.

### CORNER PARALLEL CURB RAMPS FOR SIDEWALKS

**STANDARD 424011-04**

**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.
**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 604001 for details of depressed curb adjacent to curb ramps.

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.

---

**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.

---

**SECTION C-C**

Flush with top of roadway curb and top of sidewalk.

---

**SIDE CURB DETAIL**

**DETAIL A**

---

**PERPENDICULAR MID-BLOCK CURB RAMP**

---

**PARALLEL MID-BLOCK CURB RAMP**

---

**MID-BLOCK CURB RAMPS FOR SIDEWALKS**

---

**STANDARD 424016-05**
Expansion joint

SIDE CURB DETAIL

DEPRESSED CORNER

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.

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 tolerances but the following placement tolerances are allowed:

- Side Border: Detectable warnings should extend the full width of the walking surface (excluding fared sides) but a border along each side up to 3 in (76 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.

STANDARD 424021-06

DEPRESSED CORNER FOR SIDEWALKS

DATE
1-1-21
1-1-19

REVISIONS
Added crosswalk striping and
a "buffer" for wide sidewalks.
Removed upper landings; added
blended transition and detectable
warning tolerances.

APPROVED January 1, 2021
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED 1-1-12
PASSED ENGINEER OF POLICY AND PROCEDURES
DATE
REVISIONS
1-1-21
1-1-19
Detectable warning shall only be installed at entries/alleys with permanent traffic control devices (i.e. stop signs, signals).

Where possible, maintain the grade of the sidewalk across the entrance/alleys to avoid the need for ramps and turning spaces.

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:

**Curb 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.

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

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:

**Curb 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.

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

- **Face of roadway curb, typical**
  - Location:
    - See DETAIL A
  - Variable

- **Depressed curb and gutter, typical**
  - Location:
    - See DETAIL A
  - Variable

- **Detectable warning**
  - Location:
    - See DETAIL A
  - Variable

- **Depressed curb and gutter**
  - Location:
    - See DETAIL A
  - Variable

- **Variable Expansion joint**
  - Location:
    - See DETAIL A
  - Variable

- **Crosswalk warning - type I**
  - Location:
    - See DETAIL A
  - Variable

**Variable Expansion joint**

- Location:
  - See DETAIL A
  - Variable

- **Variable Expansion joint**
  - Location:
    - See DETAIL A
  - Variable

- **Detectable warning**
  - Location:
    - See DETAIL A
  - Variable

- **Detectable warning**
  - Location:
    - See DETAIL A
  - Variable

- **Detectable warning**
  - Location:
    - See DETAIL A
  - Variable

- **Detectable warning**
  - Location:
    - See DETAIL A
  - Variable

**SECTION A-A**

- **Detectable warning**
  - Omit detectable warnings when distance between back of curbs is less than 6' (1.83 m).
No. 6 (No. 19) rebar tied to longitudinal rebar.

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

Transverse rebar will be tied to longitudinal rebar.

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\(\frac{1}{2}\) (65) min. and 12 (300) max. $D_1 = \frac{S_1}{2}$ and $D_2 = \frac{S_2}{2}$.
**PADMENT SAWING DETAIL**

- **(HMA SHOULDER)**
  - Full depth saw cuts
  - Hand removal
  - Shoulder removal
  - Full depth saw cut

**ALTERNATE SAWING DETAIL**

- **(PCC SHOULDER)**
  - Full depth saw cut
  - Wheel saw cut
  - Shoulder removal
  - Edge of pavr.

**PAVEMENT SAWING DETAIL**

- **(HMA SHOULDER)**
  - Full depth saw cuts
  - Hand removal
  - Shoulder removal
  - Wheel saw cut
  - Edge of pavr.

- **(PCC SHOULDER)**
  - Full depth saw cut
  - Wheel saw cut
  - Saw cut full length of patch
  - Edge of pavr.

**12' (3.6 m) WIDE LANES**

- **Centerline Joint**
  - Transverse joint (typ.)
  - % (6) Fibreboard bond breaker or equivalent.
  - Dowel bars at 12 (300) cts.
  - Drilled hole
  - Hot poured joint sealer

**14' (4.2 m) WIDE RAMP**

- **Centerline Joint**
  - Dowel bars at 6 (150) cts.

**16' (4.8 m) WIDE RAMP**

- **Centerline Joint**
  - Dowel bars at 7 (180) cts.

**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.

**Dowel Bar Table**

<table>
<thead>
<tr>
<th>PAVEMENT THICKNESS</th>
<th>DOWEL BAR DIAMETER</th>
<th>HOLE DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 (250) or greater</td>
<td>1/2 (38)</td>
<td>1/8 (4)</td>
</tr>
<tr>
<td>8 (200) to 9.99 (249)</td>
<td>1/2 (32)</td>
<td>1/8 (4)</td>
</tr>
<tr>
<td>Less than 8 (200)</td>
<td>3/8 (25)</td>
<td>1/8 (4)</td>
</tr>
</tbody>
</table>
See sealing details

Hot poured joint sealer

Joint sealer
Hot poured

Saw cut
Full depth

PCC pavement
Existing

Tie bars anchored into existing pavement at 12 (300) cts.

METHOD I
(Without Resurfacing)

6'-0" (1.8 m) min.

Traffic*

Expansion Cap

Existing subbase

No. 10x18 (No. 32x450)
Tie bars anchored into existing pavement at 12 (300) cts.

METHOD II
(With Resurfacing)

6'-0" (1.8 m) min.

Traffic*

Present HMA surface course

Proposed HMA binder course

Existing subbase

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

No. 10x18 (No. 32x450)
Tie bars anchored into existing pavement at 12 (300) cts.

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 C

Angles not less than 60°

Existing longitudinal joint

36 (900) min.

SECTION A-A

Built in two operations

CLASS D

Angles not less than 60°

Existing longitudinal joint

SECTION B-B

SECTION C-C

SECTION D-D

SECTION E-E

GENERAL NOTES

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

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

DATE
REVISIONS
1-1-08
Switched units to English Charting
1-1-07
Revised Note for Class C patches.

CLASS C and D PATCHES

STANDARD 442201-03

Illinois Department of Transportation

January 1, 2008

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

PASSED

DATE

REVISIONS
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.

HMA SHOULDER ADJACENT TO FLEXIBLE PAVEMENT

STANDARD 482001-02

DATE REVISIONS

1-1-08 Switched units to English (metric).
1-1-07 Switched to HMA Mix.
1-1-97 Revisions.
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%.

GENERAL NOTES

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

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

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

- Shoulder width
- Paved width
- Wedge portion
- Aggregate shoulder Type B (typ.)
- Improved subgrade
- Subbase granular material, Type C.
- Skidded subbase 4 (100) min. (typ.)
- Shoulder slope 4% min. (See Note 2)

**SHOULDER FOR SUPERELEVATED PAVEMENT**

- Shoulder width
- Paved width
- Wedge portion
- Aggregate shoulder Type B (typ.)
- Improved subgrade
- Subbase granular material, Type C.
- Skidded subbase 4 (100) min. (typ.)
- Shoulder slope 4% min. (See Note 2)

**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 super-elevation rate of the pavement is between 0% and 4%, the shoulder shall be sloped at 4%. When the super-elevation 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 dowel bars will not be required.
- See Standard 420001 for details not shown.

**DATE**

<table>
<thead>
<tr>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-22</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>1-1-18</td>
</tr>
</tbody>
</table>

**PCC SHOULDER**

**STANDARD 483001-06**
MULTI-SPAN CULVERTS
(Unless otherwise noted on the plans, name plates are not required for structures less than 20' (6.1 m) in length)

PARAPET
(Typical)

SPACE TO MISS RAIL POST.

PIERS ON FAI ROUTES

STEEL RAILS

TRUSSES

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

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

DATE
REVISIONS
1-1-20
Added Bracing note on sht. 1.

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

1-1-02
Switched units to English (metric).

Illinois Department of Transportation
APPROVED
January 1, 2020
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
January 1, 2020
ENGINEER OF BRIDGES AND STRUCTURES

STANDARD 515001-04
NAME PLATE FOR BRIDGES
(Sheet 1 of 2)
SEE DESIGN PLANS FOR LETTERING

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

NOTE:
Border and lettering:
Raised \( \frac{3}{4} \) (3), square cut and not tapered.
**General Notes**

This Standard is for use with single pipe culverts and multiple pipe culvert installations. For multiple pipe culvert installations, place the end sections side-by-side leaving a 3 (75) space between adjacent and section walls and fill the space(s) with Class SI 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 with roadway.

2/4 x 2/6 x 3/8 x 16 x 56 x 83 plate washers shall be provided under each Ends 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 54321 for tie 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 unless otherwise shown.

**Concrete End Sections for Pipe Culverts**

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

<table>
<thead>
<tr>
<th>Pipe Dia.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>12' (3700)</td>
<td>19</td>
<td>28</td>
<td>27</td>
<td>27</td>
<td>21</td>
</tr>
<tr>
<td>16' (4000)</td>
<td>25</td>
<td>38</td>
<td>38</td>
<td>37</td>
<td>28</td>
</tr>
<tr>
<td>20' (5000)</td>
<td>32</td>
<td>46</td>
<td>46</td>
<td>45</td>
<td>36</td>
</tr>
<tr>
<td>24' (6000)</td>
<td>40</td>
<td>56</td>
<td>56</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>28' (7000)</td>
<td>48</td>
<td>70</td>
<td>71</td>
<td>70</td>
<td>55</td>
</tr>
<tr>
<td>32' (8000)</td>
<td>56</td>
<td>80</td>
<td>81</td>
<td>80</td>
<td>65</td>
</tr>
<tr>
<td>36' (9000)</td>
<td>64</td>
<td>94</td>
<td>95</td>
<td>94</td>
<td>75</td>
</tr>
</tbody>
</table>

**Diagram Notes**

- This dimension shall be increased by 1/2 (38) for CIP field construction. See General Notes.
- Drain holes (See Roadway Plans)
- Restraint angle with tie plate detail. Limit between multiple and sections.
- Restraint angle with tie plate detail.
LONGITUDINAL SECTION

SECTION B-B

SECTION C-C

SECTION D-D

REINFORCEMENT SCHEDULE

<table>
<thead>
<tr>
<th>Pipe Dia. (in.)</th>
<th>Bar Size</th>
<th>Bar Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>#6 (13)</td>
<td>12 (300) cts.</td>
</tr>
<tr>
<td>18</td>
<td>#6 (13)</td>
<td>12 (300) cts.</td>
</tr>
<tr>
<td>24</td>
<td>#4 (13)</td>
<td>12 (300) cts.</td>
</tr>
<tr>
<td>30</td>
<td>#4 (13)</td>
<td>12 (300) cts.</td>
</tr>
<tr>
<td>36</td>
<td>#4 (13)</td>
<td>12 (300) cts.</td>
</tr>
<tr>
<td>42</td>
<td>#4 (13)</td>
<td>12 (300) cts.</td>
</tr>
<tr>
<td>48</td>
<td>#4 (13)</td>
<td>12 (300) cts.</td>
</tr>
<tr>
<td>54</td>
<td>#4 (13)</td>
<td>12 (300) cts.</td>
</tr>
<tr>
<td>60</td>
<td>#4 (13)</td>
<td>12 (300) cts.</td>
</tr>
<tr>
<td>66</td>
<td>#4 (13)</td>
<td>12 (300) cts.</td>
</tr>
<tr>
<td>72</td>
<td>#4 (13)</td>
<td>12 (300) cts.</td>
</tr>
<tr>
<td>84</td>
<td>#8 (19)</td>
<td>8 (200)</td>
</tr>
</tbody>
</table>

CONCRETE END SECTIONS FOR PIPE CULVERTS

15” (375 mm) THRU 84” (2100 mm) DIA.

STANDARD 542001-06
<table>
<thead>
<tr>
<th>Pipe No</th>
<th>Concrete yd/m³ (t)</th>
<th>Reinforcement Without Lap</th>
<th>Reinforcement With Lap (deg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Slope of End Section</td>
<td>Slope of End Section</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>225</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>300</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>750</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15&quot; (375 mm) THRU 84&quot; (2100 mm) DIA.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Quantities

- **Reinforcement Without Lap**
- **Reinforcement With Lap (deg)**

**Sheet 3 of 3**

---

**FOR CONCRETE YIELDING**: Increase concrete volume by approximately 15%.

**CONCRETE END SECTIONS FOR PIPE CULVERTS**

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

**STANDARD 542001-06**
For cast-in-place construction, increase concrete volumes by approximately 13%. 

### General Notes

This Standard is used with single pipe culverts and multi-pipe culvert installations. For multiple culvert installations, place the end sections pipe-side-by-side leaving a 3.75" space between adjacent end section walls and fill the space(s) with Class SI concrete.

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 with roadway. 2½ x 2½ x 3½ x 56 x 56 x 8 plate washers shall be provided under each nut required for the anchor rods. Holes in the walls for the culvert tie assembly may be drilled using core bits in lieu of rods. Holes in the walls for the culvert tie assembly may be drilled using core bits in lieu of rods. See Standard 452311 for end sections having traversable pipe grate. 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.

#### Quantities

<table>
<thead>
<tr>
<th>Round Size</th>
<th>Concrete yd²/m²</th>
<th>Reinforcement Without Lap lbs (kg)</th>
<th>Reinforcement With Lap lbs (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe I.D.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1800)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1500)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1200)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1650)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1350)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(900)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(700)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(750)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(450)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(525)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(375)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### End Section

**QUANTITIES**

<table>
<thead>
<tr>
<th>Pipe I.D.</th>
<th>Round Size</th>
<th>Reinforcement Without Lap lbs (kg)</th>
<th>Reinforcement With Lap lbs (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1800)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1500)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1200)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1650)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1350)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(900)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(700)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(750)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(450)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(525)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(375)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### GENERAL NOTES

This Standard is used with single pipe culverts and multi-pipe culvert installations. For multi-pipe culvert installations, place the end sections pipe-side-by-side leaving a 3.75" space between adjacent end section walls and fill the space(s) with Class SI concrete.

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 with roadway. 2½ x 2½ x 3½ x 56 x 56 x 8 plate washers shall be provided under each nut required for the anchor rods. Holes in the walls for the culvert tie assembly may be drilled using core bits in lieu of rods. Holes in the walls for the culvert tie assembly may be drilled using core bits in lieu of rods. See Standard 452311 for end sections having traversable pipe grate. 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 Elliptical Pipe Culverts 15" (375 mm)

**THRU 72" (1800 mm) EQUIVALENT DIAMETER**

(Sheet 3 of 3)
If the embankment slope above the headwall is steeper than 1:2, provide 1 1/2" wings for a 1:2 slope.

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

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.

15" (375 mm) THRU 36" (900 mm) DIA.

**GENERAL NOTES**

Switched units to English (metric).

Soft converted metric reinforcement bars.

Added h bars.
<table>
<thead>
<tr>
<th>Section</th>
<th>Rein/ Bars</th>
<th>2 End Section</th>
<th>Bars</th>
<th>2 End Sections</th>
<th>Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>G</td>
<td>H</td>
<td>I</td>
<td>J</td>
<td>K</td>
<td>M</td>
</tr>
</tbody>
</table>

**Concrete for Reinforcement: 1:1**

**WINGS FOR 1:1 SLOPE**

**For Pipe Culverts 15" (375 mm) Thrus 36" (900 mm) Dia.**

**Sheet 2 of 5**

**REINFORCED CONCRETE END SECTIONS**

**SKEWED WITH ROADWAY**

**STANDARD 542201-02**
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>05 15-2</td>
<td>(333)</td>
<td>38</td>
<td>10</td>
<td>29</td>
<td>19</td>
<td>4-78</td>
<td>4-95</td>
<td>4-13</td>
<td>7</td>
<td>4-6</td>
<td>6-4</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>05 19-2</td>
<td>(400)</td>
<td>38</td>
<td>13</td>
<td>32</td>
<td>22</td>
<td>4-108</td>
<td>4-65</td>
<td>4-36</td>
<td>7</td>
<td>4-5</td>
<td>5-5</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>05 25-2</td>
<td>(450)</td>
<td>40</td>
<td>16</td>
<td>35</td>
<td>25</td>
<td>4-207</td>
<td>4-77</td>
<td>4-38</td>
<td>7</td>
<td>4-6</td>
<td>6-4</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>05 30-2</td>
<td>(500)</td>
<td>42</td>
<td>19</td>
<td>38</td>
<td>28</td>
<td>4-260</td>
<td>4-77</td>
<td>4-38</td>
<td>7</td>
<td>4-6</td>
<td>6-4</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>05 35-2</td>
<td>(550)</td>
<td>44</td>
<td>22</td>
<td>40</td>
<td>31</td>
<td>4-260</td>
<td>4-77</td>
<td>4-38</td>
<td>7</td>
<td>4-6</td>
<td>6-4</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>05 40-2</td>
<td>(600)</td>
<td>46</td>
<td>25</td>
<td>43</td>
<td>34</td>
<td>4-260</td>
<td>4-77</td>
<td>4-38</td>
<td>7</td>
<td>4-6</td>
<td>6-4</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>05 45-2</td>
<td>(650)</td>
<td>48</td>
<td>28</td>
<td>46</td>
<td>37</td>
<td>4-260</td>
<td>4-77</td>
<td>4-38</td>
<td>7</td>
<td>4-6</td>
<td>6-4</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>05 50-2</td>
<td>(700)</td>
<td>50</td>
<td>31</td>
<td>49</td>
<td>40</td>
<td>4-260</td>
<td>4-77</td>
<td>4-38</td>
<td>7</td>
<td>4-6</td>
<td>6-4</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>05 55-2</td>
<td>(750)</td>
<td>52</td>
<td>34</td>
<td>52</td>
<td>43</td>
<td>4-260</td>
<td>4-77</td>
<td>4-38</td>
<td>7</td>
<td>4-6</td>
<td>6-4</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>05 60-2</td>
<td>(800)</td>
<td>54</td>
<td>37</td>
<td>55</td>
<td>46</td>
<td>4-260</td>
<td>4-77</td>
<td>4-38</td>
<td>7</td>
<td>4-6</td>
<td>6-4</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>05 65-2</td>
<td>(850)</td>
<td>56</td>
<td>40</td>
<td>58</td>
<td>49</td>
<td>4-260</td>
<td>4-77</td>
<td>4-38</td>
<td>7</td>
<td>4-6</td>
<td>6-4</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>05 70-2</td>
<td>(900)</td>
<td>58</td>
<td>43</td>
<td>61</td>
<td>52</td>
<td>4-260</td>
<td>4-77</td>
<td>4-38</td>
<td>7</td>
<td>4-6</td>
<td>6-4</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
</tr>
</tbody>
</table>

**DIMENSIONS FOR CONCRETE**

- **Lgth.**
- **D**
- **(DS 750-2)
- **(DS 375-2)
- **(DS 375-2)
- **(DS 750-2)
- **(DS 375-2)
- DS 30-2
- **DS 24-2
- **DS 18-2

**Concrete_sections**

- **n**
- **h**
- **l**
- **t**
- **v-bars**
- **Bars for End Sections (No. of)**

**Rein. Bars - 2 End Sections**

- **n**
- **h**
- **l**
- **t**
- **v-bars**
- **Bars for End Sections (No. of)**

**WINGS FOR 1:2 SLOPE**

- **Wings**
- **for**
- **1:2 SLOPE**

- **Shea Angle**
- **Design No.**
- **Nominal Pipe Dia.**
- **A**
- **B**
- **C**
- **D**
- **E**
- **F**
- **G**
- **H**
- **I**
- **J**
- **K**
- **L**
- **M**
- **N**
- **R**

---

**Sheet 4 of 5**

**STANDARD 542201-02**

**REINFORCED CONCRETE END SECTIONS**

FOR PIPE CULVERTS

- **15° (375 mm) THRU 36° (900 mm) DIA.**
- **SKEWED WITH ROADWAY**

---
### WINGS FOR 1:2 SLOPE

<table>
<thead>
<tr>
<th>Slope</th>
<th>Design No.</th>
<th>Nominal Pipe Dia.</th>
<th>Concrete Rein. Bars: 2 End Sections</th>
<th>Concrete Rein. Bars: 2 End Sections</th>
<th>Rein.</th>
<th>Bars for 2 End Sections</th>
<th>Bars for 2 End Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>3°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40°</td>
<td>DS 36-2</td>
<td>(1.32 in)</td>
<td>2 End Sections</td>
<td>2 End Sections</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Provide wings for 1:2 slope. If the embankment slope above the headwall is flatter than 1:2, provide wings for 1:3 slope.

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.

**General Notes**

**Plan**

**Section A-A**

**End View**

**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\(^\prime\) (1050 mm) THRU 60\(^\prime\) (1500 mm) DIA. SKEWED WITH ROADWAY

**Standard 542206-04**

**Revisions**

<table>
<thead>
<tr>
<th>Date</th>
<th>Revisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-1-14</td>
<td>Changed terminology to &quot;welded wire reinforcement&quot;</td>
</tr>
<tr>
<td>1-1-14</td>
<td>Corrected skew angles in table on Sheet 3</td>
</tr>
</tbody>
</table>
## WINGS FOR 1:1 1/2 SLOPE

<table>
<thead>
<tr>
<th>Slope Angle</th>
<th>Nominal Pipe Dia.</th>
<th>Dimensions for Concrete</th>
<th>Concrete 2 End Secs. (cu. yd.)</th>
<th>Welded Wire Reinforcement 2 End Secs. (sq. yd.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>5°</td>
<td>42</td>
<td>4'-3&quot;</td>
<td>4'-10&quot;</td>
<td>4'-3/4&quot;</td>
</tr>
<tr>
<td></td>
<td>(120) 1.25 m</td>
<td>(1.25 m)</td>
<td>(1.25 m)</td>
<td>(1.25 m)</td>
</tr>
<tr>
<td>10°</td>
<td>48</td>
<td>4'-6&quot;</td>
<td>4'-10&quot;</td>
<td>4'-3/4&quot;</td>
</tr>
<tr>
<td></td>
<td>(120) 1.5 m</td>
<td>(1.5 m)</td>
<td>(1.5 m)</td>
<td>(1.5 m)</td>
</tr>
<tr>
<td>15°</td>
<td>54</td>
<td>4'-9&quot;</td>
<td>4'-11&quot;</td>
<td>4'-3/4&quot;</td>
</tr>
<tr>
<td></td>
<td>(120) 1.8 m</td>
<td>(1.8 m)</td>
<td>(1.8 m)</td>
<td>(1.8 m)</td>
</tr>
<tr>
<td>20°</td>
<td>60</td>
<td>5'-2&quot;</td>
<td>5'-11&quot;</td>
<td>5'-3/4&quot;</td>
</tr>
<tr>
<td></td>
<td>(120) 2.1 m</td>
<td>(2.1 m)</td>
<td>(2.1 m)</td>
<td>(2.1 m)</td>
</tr>
<tr>
<td>25°</td>
<td>66</td>
<td>5'-5&quot;</td>
<td>5'-13&quot;</td>
<td>5'-3/4&quot;</td>
</tr>
<tr>
<td></td>
<td>(120) 2.4 m</td>
<td>(2.4 m)</td>
<td>(2.4 m)</td>
<td>(2.4 m)</td>
</tr>
<tr>
<td>30°</td>
<td>72</td>
<td>5'-8&quot;</td>
<td>5'-15&quot;</td>
<td>5'-3/4&quot;</td>
</tr>
<tr>
<td></td>
<td>(120) 2.7 m</td>
<td>(2.7 m)</td>
<td>(2.7 m)</td>
<td>(2.7 m)</td>
</tr>
</tbody>
</table>

---

**REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS**

42" (1060 mm) THRU 60" (1500 mm) DIA. SKEWED WITH ROADING

(Worksheet 2 of 5)
## WINGS FOR 1:1 1/2 SLOPE

### Concrete End Secs. 2 cu. yd. (m³)

<table>
<thead>
<tr>
<th>Nominal Pipe Dia.</th>
<th>4&quot;</th>
<th>5&quot;</th>
<th>6&quot;</th>
<th>7&quot;</th>
<th>8&quot;</th>
<th>9&quot;</th>
<th>10&quot;</th>
<th>11&quot;</th>
<th>12&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>16&quot;</td>
<td>15&quot;</td>
<td>14&quot;</td>
<td>13&quot;</td>
<td>12&quot;</td>
<td>11&quot;</td>
<td>10&quot;</td>
<td>9&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>E</td>
<td>12&quot;</td>
<td>11&quot;</td>
<td>10&quot;</td>
<td>9&quot;</td>
<td>8&quot;</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>F</td>
<td>8&quot;</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
<td>3&quot;</td>
<td>2&quot;</td>
<td>1&quot;</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>4&quot;</td>
<td>3&quot;</td>
<td>2&quot;</td>
<td>1&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4&quot;</td>
<td>3&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8&quot;</td>
<td>7&quot;</td>
<td>6&quot;</td>
</tr>
<tr>
<td>J</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12&quot;</td>
<td>11&quot;</td>
<td>10&quot;</td>
</tr>
<tr>
<td>K</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16&quot;</td>
<td>15&quot;</td>
<td>14&quot;</td>
</tr>
<tr>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20&quot;</td>
<td>19&quot;</td>
<td>18&quot;</td>
</tr>
</tbody>
</table>

### Welded Wire Reinforcement 2 end secs. sq. yd. (m²)

<table>
<thead>
<tr>
<th>Nominal Pipe Dia.</th>
<th>4&quot;</th>
<th>5&quot;</th>
<th>6&quot;</th>
<th>7&quot;</th>
<th>8&quot;</th>
<th>9&quot;</th>
<th>10&quot;</th>
<th>11&quot;</th>
<th>12&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>16&quot;</td>
<td>15&quot;</td>
<td>14&quot;</td>
<td>13&quot;</td>
<td>12&quot;</td>
<td>11&quot;</td>
<td>10&quot;</td>
<td>9&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>E</td>
<td>12&quot;</td>
<td>11&quot;</td>
<td>10&quot;</td>
<td>9&quot;</td>
<td>8&quot;</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>F</td>
<td>8&quot;</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
<td>3&quot;</td>
<td>2&quot;</td>
<td>1&quot;</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>4&quot;</td>
<td>3&quot;</td>
<td>2&quot;</td>
<td>1&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4&quot;</td>
<td>3&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8&quot;</td>
<td>7&quot;</td>
<td>6&quot;</td>
</tr>
<tr>
<td>J</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12&quot;</td>
<td>11&quot;</td>
<td>10&quot;</td>
</tr>
<tr>
<td>K</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16&quot;</td>
<td>15&quot;</td>
<td>14&quot;</td>
</tr>
<tr>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20&quot;</td>
<td>19&quot;</td>
<td>18&quot;</td>
</tr>
</tbody>
</table>

### Pipe Culverts

<table>
<thead>
<tr>
<th>Nominal Pipe Dia.</th>
<th>4&quot;</th>
<th>5&quot;</th>
<th>6&quot;</th>
<th>7&quot;</th>
<th>8&quot;</th>
<th>9&quot;</th>
<th>10&quot;</th>
<th>11&quot;</th>
<th>12&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>16&quot;</td>
<td>15&quot;</td>
<td>14&quot;</td>
<td>13&quot;</td>
<td>12&quot;</td>
<td>11&quot;</td>
<td>10&quot;</td>
<td>9&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>E</td>
<td>12&quot;</td>
<td>11&quot;</td>
<td>10&quot;</td>
<td>9&quot;</td>
<td>8&quot;</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>F</td>
<td>8&quot;</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
<td>3&quot;</td>
<td>2&quot;</td>
<td>1&quot;</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>4&quot;</td>
<td>3&quot;</td>
<td>2&quot;</td>
<td>1&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4&quot;</td>
<td>3&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8&quot;</td>
<td>7&quot;</td>
<td>6&quot;</td>
</tr>
<tr>
<td>J</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12&quot;</td>
<td>11&quot;</td>
<td>10&quot;</td>
</tr>
<tr>
<td>K</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16&quot;</td>
<td>15&quot;</td>
<td>14&quot;</td>
</tr>
<tr>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20&quot;</td>
<td>19&quot;</td>
<td>18&quot;</td>
</tr>
</tbody>
</table>

### Welded Wire Reinforcement 2 end secs. sq. yd. (m²)

<table>
<thead>
<tr>
<th>Nominal Pipe Dia.</th>
<th>4&quot;</th>
<th>5&quot;</th>
<th>6&quot;</th>
<th>7&quot;</th>
<th>8&quot;</th>
<th>9&quot;</th>
<th>10&quot;</th>
<th>11&quot;</th>
<th>12&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>16&quot;</td>
<td>15&quot;</td>
<td>14&quot;</td>
<td>13&quot;</td>
<td>12&quot;</td>
<td>11&quot;</td>
<td>10&quot;</td>
<td>9&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>E</td>
<td>12&quot;</td>
<td>11&quot;</td>
<td>10&quot;</td>
<td>9&quot;</td>
<td>8&quot;</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>F</td>
<td>8&quot;</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
<td>3&quot;</td>
<td>2&quot;</td>
<td>1&quot;</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>4&quot;</td>
<td>3&quot;</td>
<td>2&quot;</td>
<td>1&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4&quot;</td>
<td>3&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8&quot;</td>
<td>7&quot;</td>
<td>6&quot;</td>
</tr>
<tr>
<td>J</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12&quot;</td>
<td>11&quot;</td>
<td>10&quot;</td>
</tr>
<tr>
<td>K</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16&quot;</td>
<td>15&quot;</td>
<td>14&quot;</td>
</tr>
<tr>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20&quot;</td>
<td>19&quot;</td>
<td>18&quot;</td>
</tr>
</tbody>
</table>

### Reinforced Concrete End Sections

**FOR PIPE CULVERTS**

42" (1060 mm) THRU 60" (1500 mm) DIA. SKEWED WITH ROADWAY

---

*For further details, please refer to Sheet 3 of 5.*
<table>
<thead>
<tr>
<th>Slew Angle</th>
<th>Nominal Pipe Slope</th>
<th>Dimensions for Concrete</th>
<th>Concrete End Secs.</th>
<th>Welded Wire Reinforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>5°</td>
<td>42</td>
<td>5°-5&quot;</td>
<td>26</td>
<td>3°-10&quot;</td>
</tr>
<tr>
<td></td>
<td>48</td>
<td>3°-5&quot;</td>
<td>32</td>
<td>2°-10&quot;</td>
</tr>
<tr>
<td></td>
<td>54</td>
<td>5°-5&quot;</td>
<td>38</td>
<td>3°-10&quot;</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>7°-5&quot;</td>
<td>44</td>
<td>5°-10&quot;</td>
</tr>
<tr>
<td></td>
<td>66</td>
<td>9°-5&quot;</td>
<td>50</td>
<td>7°-10&quot;</td>
</tr>
<tr>
<td>10°</td>
<td>54</td>
<td>6°-5&quot;</td>
<td>26</td>
<td>3°-10&quot;</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>7°-5&quot;</td>
<td>32</td>
<td>2°-10&quot;</td>
</tr>
<tr>
<td></td>
<td>66</td>
<td>9°-5&quot;</td>
<td>38</td>
<td>5°-10&quot;</td>
</tr>
<tr>
<td>15°</td>
<td>54</td>
<td>6°-5&quot;</td>
<td>26</td>
<td>3°-10&quot;</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>7°-5&quot;</td>
<td>32</td>
<td>2°-10&quot;</td>
</tr>
<tr>
<td></td>
<td>66</td>
<td>9°-5&quot;</td>
<td>38</td>
<td>5°-10&quot;</td>
</tr>
<tr>
<td>20°</td>
<td>54</td>
<td>6°-5&quot;</td>
<td>26</td>
<td>3°-10&quot;</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>7°-5&quot;</td>
<td>32</td>
<td>2°-10&quot;</td>
</tr>
<tr>
<td></td>
<td>66</td>
<td>9°-5&quot;</td>
<td>38</td>
<td>5°-10&quot;</td>
</tr>
<tr>
<td>25°</td>
<td>54</td>
<td>6°-5&quot;</td>
<td>26</td>
<td>3°-10&quot;</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>7°-5&quot;</td>
<td>32</td>
<td>2°-10&quot;</td>
</tr>
<tr>
<td></td>
<td>66</td>
<td>9°-5&quot;</td>
<td>38</td>
<td>5°-10&quot;</td>
</tr>
<tr>
<td>30°</td>
<td>54</td>
<td>6°-5&quot;</td>
<td>26</td>
<td>3°-10&quot;</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>7°-5&quot;</td>
<td>32</td>
<td>2°-10&quot;</td>
</tr>
<tr>
<td></td>
<td>66</td>
<td>9°-5&quot;</td>
<td>38</td>
<td>5°-10&quot;</td>
</tr>
<tr>
<td>Slew Angle</td>
<td>Nominal Pipe Dia.</td>
<td>Dimensions for Concrete</td>
<td>Concrete @ 2 cu. yd. (m³)</td>
<td>Welded Wire Reinforcement @ 2 cu. yd. (m³)</td>
</tr>
<tr>
<td>------------</td>
<td>------------------</td>
<td>--------------------------</td>
<td>-----------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>35°</td>
<td>5-5/8&quot; (150 mm)</td>
<td>A: 26 B: 26 C: 10-10&quot; (255 mm) D: 11-1/2&quot; (305 mm) E: 11-1/2&quot; (305 mm) F: 11-1/2&quot; (305 mm) G: 11-1/2&quot; (305 mm) H: 11-1/2&quot; (305 mm) J: 11-1/2&quot; (305 mm) K: 11-1/2&quot; (305 mm) M: 11-1/2&quot; (305 mm) N: 11-1/2&quot; (305 mm) B: 11-1/2&quot; (305 mm)</td>
<td>10.8</td>
<td>75</td>
</tr>
<tr>
<td>40°</td>
<td>6-7/8&quot; (170 mm)</td>
<td>A: 36 B: 36 C: 11-1/2&quot; (305 mm) D: 11-1/2&quot; (305 mm) E: 11-1/2&quot; (305 mm) F: 11-1/2&quot; (305 mm) G: 11-1/2&quot; (305 mm) H: 11-1/2&quot; (305 mm) J: 11-1/2&quot; (305 mm) K: 11-1/2&quot; (305 mm) M: 11-1/2&quot; (305 mm) N: 11-1/2&quot; (305 mm) B: 11-1/2&quot; (305 mm)</td>
<td>13.6</td>
<td>100</td>
</tr>
<tr>
<td>45°</td>
<td>7-5/8&quot; (190 mm)</td>
<td>A: 48 B: 48 C: 11-1/2&quot; (305 mm) D: 11-1/2&quot; (305 mm) E: 11-1/2&quot; (305 mm) F: 11-1/2&quot; (305 mm) G: 11-1/2&quot; (305 mm) H: 11-1/2&quot; (305 mm) J: 11-1/2&quot; (305 mm) K: 11-1/2&quot; (305 mm) M: 11-1/2&quot; (305 mm) N: 11-1/2&quot; (305 mm) B: 11-1/2&quot; (305 mm)</td>
<td>17.0</td>
<td>140</td>
</tr>
<tr>
<td>50°</td>
<td>8-7/8&quot; (220 mm)</td>
<td>A: 60 B: 60 C: 11-1/2&quot; (305 mm) D: 11-1/2&quot; (305 mm) E: 11-1/2&quot; (305 mm) F: 11-1/2&quot; (305 mm) G: 11-1/2&quot; (305 mm) H: 11-1/2&quot; (305 mm) J: 11-1/2&quot; (305 mm) K: 11-1/2&quot; (305 mm) M: 11-1/2&quot; (305 mm) N: 11-1/2&quot; (305 mm) B: 11-1/2&quot; (305 mm)</td>
<td>19.5</td>
<td>170</td>
</tr>
<tr>
<td>55°</td>
<td>9-5/8&quot; (240 mm)</td>
<td>A: 72 B: 72 C: 11-1/2&quot; (305 mm) D: 11-1/2&quot; (305 mm) E: 11-1/2&quot; (305 mm) F: 11-1/2&quot; (305 mm) G: 11-1/2&quot; (305 mm) H: 11-1/2&quot; (305 mm) J: 11-1/2&quot; (305 mm) K: 11-1/2&quot; (305 mm) M: 11-1/2&quot; (305 mm) N: 11-1/2&quot; (305 mm) B: 11-1/2&quot; (305 mm)</td>
<td>23.1</td>
<td>220</td>
</tr>
</tbody>
</table>

REINFORCED CONCRETE END SECTIONS
FOR PIPE CULVERTS
42" (1060 mm) THRU 60" (1500 mm) DIA.
SKEWED WITH ROADWAY
(Draft 8 of 8)

STANDARD 542206-04
**SECTION A-A**

| SPAN (V:H) | RISE (250) | EQUIV. WALL (500) | WALL (500) | A | B | C | D | E | F | H | A | R₁ | R₂ | APPROX SLOPE |
|------------|------------|-------------------|------------|---|---|---|---|---|---|---|---|---|---|---|---------------|
| 73         | (355)      | 16                | (350)      | 18 | 16 | 18 | 25 | 36 | 36 | 5% | 6 | 153 | 153 | 1.3:1         |
| 30         | (463)      | 24                | (600)      | 83 | 39 | 83 | 191 | 99 | 120 | 175 | 175 | 1.3:8         |
| 30         | (864)      | 27                | (675)      | 89 | 229 | 89 | 1319 | 610 | 1203 | 1743 | 1743 | 1.2:0         |
| 30         | (865)      | 24                | (750)      | 91 | 212 | 91 | 1378 | 610 | 1203 | 1743 | 1743 | 1.2:0         |
| 30         | (864)      | 27                | (750)      | 91 | 212 | 91 | 1378 | 610 | 1203 | 1743 | 1743 | 1.2:0         |
| 30         | (1143)     | 36                | (1146)     | 226 | 36 | 226 | 1346 | 610 | 1203 | 1977 | 1977 | 1.2:7         |
| 30         | (1143)     | 34                | (1278)     | 175 | 36 | 175 | 1203 | 610 | 1203 | 1977 | 1977 | 1.2:7         |
| 30         | (1143)     | 34                | (1278)     | 175 | 36 | 1203 | 1203 | 610 | 1203 | 1977 | 1977 | 1.2:7         |
| 30         | (1143)     | 34                | (1278)     | 175 | 36 | 1203 | 1203 | 610 | 1203 | 1977 | 1977 | 1.2:7         |
| 30         | (1143)     | 34                | (1278)     | 175 | 36 | 1203 | 1203 | 610 | 1203 | 1977 | 1977 | 1.2:7         |
| 30         | (1143)     | 34                | (1278)     | 175 | 36 | 1203 | 1203 | 610 | 1203 | 1977 | 1977 | 1.2:7         |
| 30         | (1143)     | 34                | (1278)     | 175 | 36 | 1203 | 1203 | 610 | 1203 | 1977 | 1977 | 1.2:7         |
| 30         | (1143)     | 34                | (1278)     | 175 | 36 | 1203 | 1203 | 610 | 1203 | 1977 | 1977 | 1.2:7         |
| 30         | (1143)     | 34                | (1278)     | 175 | 36 | 1203 | 1203 | 610 | 1203 | 1977 | 1977 | 1.2:7         |
| 30         | (1143)     | 34                | (1278)     | 175 | 36 | 1203 | 1203 | 610 | 1203 | 1977 | 1977 | 1.2:7         |
| 30         | (1143)     | 34                | (1278)     | 175 | 36 | 1203 | 1203 | 610 | 1203 | 1977 | 1977 | 1.2:7         |
| 30         | (1143)     | 34                | (1278)     | 175 | 36 | 1203 | 1203 | 610 | 1203 | 1977 | 1977 | 1.2:7         |

**OPTIONAL WELDED WIRE REINFORCEMENT LAP**

- Precast or cast in place end block.
- Fits pipe used.
- Per. 70 (500) x 36 (900) = 8 (2000) x 36 (900) * 70 (500) > 36 (900) *

**END VIEW**

**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.
- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).
- General Notes:
  - Changed terminology to "welded wire reinforcement".
  - Corrected min. lap dimension.
  - Switched units to English (metric).

**DATE**

- 2016 RISE
- 2016 TD
- 2016

**REVISIONS**

- 4-1-16
- 1-1-09

**STANDARD 542306-03**

**CONCRETE ELLIPTICAL FLARED END SECTION**

- General Notes:
  - Changed terminology to "welded wire reinforcement".
  - Corrected min. lap dimension.
  - Switched units to English (metric).
LONGITUDINAL SECTION

PLAN VIEW

SECTION B-B

SECTION D-D

GENERAL NOTES

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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>3 @ (15.24 m)</td>
<td>2 @ (14.60 m)</td>
<td>1 @ (13.96 m)</td>
<td>1 @ (13.32 m)</td>
<td>1 @ (12.68 m)</td>
<td>1 @ (12.04 m)</td>
<td>1 @ (11.40 m)</td>
<td>1 @ (10.76 m)</td>
<td>1 @ (10.12 m)</td>
</tr>
<tr>
<td>4-6</td>
<td>1 @ (10.45 m)</td>
<td>1 @ (10.45 m)</td>
<td>1 @ (10.45 m)</td>
<td>1 @ (10.45 m)</td>
<td>1 @ (10.45 m)</td>
<td>1 @ (10.45 m)</td>
<td>1 @ (10.45 m)</td>
<td>1 @ (10.45 m)</td>
<td>1 @ (10.45 m)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>3 @ (13.71 m)</td>
<td>2 @ (13.07 m)</td>
<td>1 @ (12.43 m)</td>
<td>1 @ (11.80 m)</td>
<td>1 @ (11.16 m)</td>
<td>1 @ (10.52 m)</td>
<td>1 @ (9.88 m)</td>
<td>1 @ (9.24 m)</td>
<td>1 @ (8.60 m)</td>
</tr>
<tr>
<td>4-6</td>
<td>1 @ (8.82 m)</td>
<td>1 @ (8.82 m)</td>
<td>1 @ (8.82 m)</td>
<td>1 @ (8.82 m)</td>
<td>1 @ (8.82 m)</td>
<td>1 @ (8.82 m)</td>
<td>1 @ (8.82 m)</td>
<td>1 @ (8.82 m)</td>
<td>1 @ (8.82 m)</td>
</tr>
</tbody>
</table>

**Note:** The table continues with similar entries for different sections and pipe numbers.
### Dimension Table

<table>
<thead>
<tr>
<th>Pipe Dia</th>
<th>Thick.</th>
<th>A</th>
<th>B</th>
<th>h</th>
<th>L</th>
<th>W</th>
<th>Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>(150)</td>
<td>12</td>
<td>32</td>
<td>80</td>
<td>232</td>
<td>250</td>
<td>1:2</td>
</tr>
<tr>
<td>42</td>
<td>(150)</td>
<td>12</td>
<td>32</td>
<td>80</td>
<td>232</td>
<td>250</td>
<td>1:25</td>
</tr>
<tr>
<td>54</td>
<td>(215)</td>
<td>12</td>
<td>32</td>
<td>80</td>
<td>232</td>
<td>250</td>
<td>1:25</td>
</tr>
<tr>
<td>60</td>
<td>(215)</td>
<td>12</td>
<td>32</td>
<td>80</td>
<td>232</td>
<td>250</td>
<td>1:25</td>
</tr>
<tr>
<td>72</td>
<td>(215)</td>
<td>12</td>
<td>32</td>
<td>80</td>
<td>232</td>
<td>250</td>
<td>1:25</td>
</tr>
<tr>
<td>84</td>
<td>(215)</td>
<td>12</td>
<td>32</td>
<td>80</td>
<td>232</td>
<td>250</td>
<td>1:25</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 connection section shall be attached to the end section by rivets or bolts and shall be the same metal thickness as the end section. A stub shall be either 26 (660) pitch x 6 (150) depth or 3 (75) pitch x 1 (25) depth annular corrugated pipe.

3. Type 4 connection can be used for all pipe sizes. Coupler shall be 25 x 6 (60 x 150) with either 1 (25) or 2 (50) depth annular band, depending on pipe size. For corrugated metal pipes having annular ends, the annular band will be allowed. For corrugated metal pipes having helical ends, the annular band will be allowed unless otherwise stated.

### Connections of End Sections

**Type 1**
- For 24 (600) thru 24 (600) only
- See Note 1

**Type 2**
- For 36 (900) and 36 (900) only
- See Note 2

**Type 3**
- (See Note 3)

**Type 4**
- (See Note 4)

### Metal Flared End Section for Pipe Culverts

**STANDARD 542401-04**

All dimensions are in inches (millimeters) unless otherwise stated.
ALTERNATE STRAP CONNECTOR

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

TYPE 2
For 17x13 (432x330) thru 57x38 (1448x965) only
(See Note 2)

TYPE 3
(See Note 3)

TYPE 4
(See Note 3)

CONNECTIONS OF END SECTIONS

END SECTION

NOTES

1. Type 1 and 2 connection shall be used only with pipes with annular ends.

2. Type 3 connection can be used with all pipe 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. When coupling the type 3 end section to a pipe with helical ends, the dimple type coupling band shall be attached to the end section by rivets or bolts. Band shop bolts shall be the same metal thickness as the end section.

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, the dimple end section band will be allowed.

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

METAL FLARED END SECTION FOR PIPE ARCHES

STANDARD 542406-04

DATE
1-1-21

REVISIONS
1-1-21

1.

2.

3.

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).
**OVERALL WIDTH**

- **Pipe Diameter**
- **Overall Width**
- **Pipe Diameter**

**METAL END SECTIONS FOR ROUND PIPE CULVERT**

<table>
<thead>
<tr>
<th>PIPE DIA. (mm)</th>
<th>METAL THICK. (min.)</th>
<th>A</th>
<th>B</th>
<th>W</th>
<th>OVERALL W. (min.)</th>
<th>SLOPE 1:4</th>
<th>SLOPE 1:6</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 (755)</td>
<td>0.004 (0.16)</td>
<td>8</td>
<td>6</td>
<td>21</td>
<td>(950)</td>
<td>39</td>
<td>39</td>
</tr>
<tr>
<td>20 (800)</td>
<td>0.004 (0.16)</td>
<td>8</td>
<td>6</td>
<td>24</td>
<td>(900)</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>24 (900)</td>
<td>0.004 (0.16)</td>
<td>8</td>
<td>8</td>
<td>30</td>
<td>(1200)</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>30 (1200)</td>
<td>0.009 (0.36)</td>
<td>12</td>
<td>9</td>
<td>36</td>
<td>(1600)</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>36 (1350)</td>
<td>0.009 (0.36)</td>
<td>12</td>
<td>9</td>
<td>42</td>
<td>(1800)</td>
<td>79</td>
<td>79</td>
</tr>
<tr>
<td>42 (1500)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>46</td>
<td>(1800)</td>
<td>102</td>
<td>106</td>
</tr>
<tr>
<td>48 (1750)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>54</td>
<td>(2100)</td>
<td>126</td>
<td>126</td>
</tr>
<tr>
<td>54 (2000)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>60</td>
<td>(2150)</td>
<td>154</td>
<td>154</td>
</tr>
<tr>
<td>60 (2250)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>66</td>
<td>(2300)</td>
<td>189</td>
<td>189</td>
</tr>
<tr>
<td>66 (2500)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>72</td>
<td>(2350)</td>
<td>224</td>
<td>224</td>
</tr>
<tr>
<td>72 (2750)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>78</td>
<td>(2400)</td>
<td>260</td>
<td>260</td>
</tr>
<tr>
<td>78 (3000)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>84</td>
<td>(2450)</td>
<td>295</td>
<td>295</td>
</tr>
<tr>
<td>84 (3250)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>90</td>
<td>(2500)</td>
<td>331</td>
<td>331</td>
</tr>
<tr>
<td>90 (3500)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>96</td>
<td>(2550)</td>
<td>366</td>
<td>366</td>
</tr>
<tr>
<td>96 (3750)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>102</td>
<td>(2600)</td>
<td>402</td>
<td>402</td>
</tr>
<tr>
<td>102 (4000)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>108</td>
<td>(2650)</td>
<td>437</td>
<td>437</td>
</tr>
<tr>
<td>108 (4250)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>114</td>
<td>(2700)</td>
<td>473</td>
<td>473</td>
</tr>
<tr>
<td>114 (4500)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>120</td>
<td>(2750)</td>
<td>508</td>
<td>508</td>
</tr>
<tr>
<td>120 (4750)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>126</td>
<td>(2800)</td>
<td>543</td>
<td>543</td>
</tr>
<tr>
<td>126 (5000)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>132</td>
<td>(2850)</td>
<td>578</td>
<td>578</td>
</tr>
<tr>
<td>132 (5250)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>138</td>
<td>(2900)</td>
<td>613</td>
<td>613</td>
</tr>
<tr>
<td>138 (5500)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>144</td>
<td>(2950)</td>
<td>648</td>
<td>648</td>
</tr>
<tr>
<td>144 (5750)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>150</td>
<td>(3000)</td>
<td>683</td>
<td>683</td>
</tr>
<tr>
<td>150 (6000)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>156</td>
<td>(3050)</td>
<td>718</td>
<td>718</td>
</tr>
<tr>
<td>156 (6250)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>162</td>
<td>(3100)</td>
<td>753</td>
<td>753</td>
</tr>
<tr>
<td>162 (6500)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>168</td>
<td>(3150)</td>
<td>788</td>
<td>788</td>
</tr>
<tr>
<td>168 (6750)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>174</td>
<td>(3200)</td>
<td>823</td>
<td>823</td>
</tr>
<tr>
<td>174 (7000)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>180</td>
<td>(3250)</td>
<td>858</td>
<td>858</td>
</tr>
<tr>
<td>180 (7250)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>186</td>
<td>(3300)</td>
<td>893</td>
<td>893</td>
</tr>
<tr>
<td>186 (7500)</td>
<td>0.010 (0.40)</td>
<td>16</td>
<td>12</td>
<td>192</td>
<td>(3350)</td>
<td>928</td>
<td>928</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 units of vertical displacement to units of horizontal displacement (V:1H).
- All dimensions are in inches (millimeters) unless otherwise shown.

**SLOPED METAL END SECTIONS**

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

**DATE**

- 1-1-18

**REVISIONS**

- 1-1-18 New standard.

**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.

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

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

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

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

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

Cross drainage end section with traversable pipe grate shown, typ.

Typical Installation

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

STANDARD 542416

Sketch showing location and direction (2.46 m) 8'-3" (150)

Normal slope line

4

6

8'-3" (2.46 m)

SECTION A-A

PLAN

Bars u & u1

Concrete cu. yds. (m³) 1.3 (0.9)

Reinf. Bars lbs. (kg) 115 (52.2)

3/5 (89) O.D. galv. pipe

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>u</td>
<td>10</td>
<td>No. 6</td>
<td>7'-9&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(No. 13)</td>
<td>(2.35 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'-9&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(No. 13)</td>
<td>(1.45 m)</td>
</tr>
<tr>
<td>v2</td>
<td>2</td>
<td>No. 6</td>
<td>6'-6&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(No. 13)</td>
<td>(1.98 m)</td>
</tr>
<tr>
<td>Galv. Steel Pipe</td>
<td>19 (525)</td>
<td>O.D.</td>
<td>8'-0&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2.43 m)</td>
</tr>
<tr>
<td>Concrete</td>
<td>cu. yds.</td>
<td>(m³)</td>
<td>1.3 (0.9)</td>
</tr>
</tbody>
</table>

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

English (metric) Switched units to reinforcement bars.

Soft converted metric

INLET BOX TYPE 24 (600) A

DATE REVISIONS
1-1-09 Switched units to English (metric)

1-1-07 Soft converted metric reinforcement bars.

STANDARD 542501-02
### 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>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; (1.05 m)</td>
</tr>
<tr>
<td>v1</td>
<td>4</td>
<td>No. 4 (No. 13)</td>
<td>2'-0&quot; (0.60 m)</td>
</tr>
<tr>
<td>v2</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>18&quot; (450)</td>
</tr>
</tbody>
</table>

**Concrete**
- cu. yds. (m³): 1.9 (1.5)

**Reinf. Bars**
- lbs. (kg): 141 (64.0)

**Galv. Steel Pipe**
- "Ø: 8 5 12'-5" (3.80 m)
- O.D.: 89 mm (3.50 in)
- I.D.: 80 mm (3.15 in)

### 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**

- **Bars u, u1 & u2**
  - 3'-5" (1.05 m) u & u1
  - 3'-8" (1.11 m) u2

- **u Bars**
  - 1 top & 1 btm.

---

**INLET BOX**

**TYPE 24 (600) B**

**DATE**

4-1-97

**REVISIONS**

6-1-97

- Increased length of inlet box to provide clearance for top u-bolt.

---

**STANDARD 542506-03**

---

**Illinois Department of Transportation**

ENGINEER OF POLICY AND PROCEDURES

APPROVED 2016

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

PASSED April 1, 2016

---

**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.
### 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

- **Bar h1**: 10 (No. 13) 12'-0" (3.66 m)
- **Bar u & u1**: 8 (No. 13) 4'-5" (1.35 m)

### 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 (No. 13)</td>
<td>12'-0&quot; (3.66 m)</td>
</tr>
<tr>
<td>h1</td>
<td>8</td>
<td>No. 4 (No. 13)</td>
<td>4'-5&quot; (1.35 m)</td>
</tr>
<tr>
<td>u</td>
<td>3</td>
<td>No. 4 (No. 13)</td>
<td>2'-0&quot; (0.61 m)</td>
</tr>
<tr>
<td>u1</td>
<td>14</td>
<td>No. 4 (No. 13)</td>
<td>6'-5&quot; (1.94 m)</td>
</tr>
<tr>
<td>v</td>
<td>2</td>
<td>No. 4 (No. 13)</td>
<td>7'-5&quot; (2.26 m)</td>
</tr>
<tr>
<td>v1</td>
<td>16</td>
<td>No. 4 (No. 13)</td>
<td>10'-0&quot; (3.05 m)</td>
</tr>
<tr>
<td>v2</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>24'-0&quot; (7.32 m)</td>
</tr>
</tbody>
</table>

- Concrete: 220 cu. yds. (168 m³)
- Reinforcement Bars: 220 lbs. (99.8 kg)
- Galv. Steel Pipe: 3" (76.2 mm), 11'-7" (3.55 m)

### PLAN OF INLET BOX

- **Bar h1**: 10 (No. 13)
- **Bar u & u1**: 8 (No. 13)
- **v**: 2-0" (0.61 m)
- **v1**: 2-0" (0.61 m)
- **v2**: 2-0" (0.61 m)
- **v3**: 2-0" (0.61 m)

### CONSTRUCTION NOTES

- 1-1-11: Corrected two bars in wall to v2
- 1-1-09: Switched units to English (metric)

**STANDARD 542516-03**
TOP ANCHOR PLATE
11 required.

SECTION B-B

SECTION C-C

DETAIL AT BLOCKOUTS

INLET BOX
TYPE 24 (600) D

STANDARD 542516-03
SECTION A-A

3'-7" (1.10 m) above normal slope

Materials required for one inlet box

<table>
<thead>
<tr>
<th>Material</th>
<th>Cu. Yd.</th>
<th>Lbs.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>30</td>
<td>24</td>
<td>4'' (No. 13)</td>
<td>5'-0&quot;</td>
</tr>
<tr>
<td>Reinforcement Bars</td>
<td>15</td>
<td>175</td>
<td>5/16''</td>
<td>5'-0&quot;</td>
</tr>
<tr>
<td>Galv. Steel Pipe</td>
<td>89</td>
<td>89</td>
<td>2.0 (1.5)</td>
<td>9'-0&quot;</td>
</tr>
</tbody>
</table>

Plan of Reinforcement

Bars u, u1, & u2

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

STANDARD 542521-02
Sketch showing location and direction of box in relation to $\theta$ median.
Traffic

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/H).

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

DATE

1-1-11

REVIEWS

1-1-11

Corrected weld symbols on Sheet 2.

1-1-09

Switched units to English (metric). Revised General Notes.

STANDARD 542526-03

INLET BOX

TYPE 24 (600) F

(Sheet 1 of 2)
### Material Required for One Inlet Box

<table>
<thead>
<tr>
<th>Bar No.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>No. 6 (No. 13)</td>
<td>23'-0&quot; (7.02 m)</td>
</tr>
<tr>
<td>h1</td>
<td>No. 6 (No. 13)</td>
<td>13'-0&quot; (3.96 m)</td>
</tr>
<tr>
<td>l</td>
<td>No. 6 (No. 13)</td>
<td>4'-0&quot; (1.22 m)</td>
</tr>
<tr>
<td>u</td>
<td>No. 6 (No. 13)</td>
<td>6'-0&quot; (1.83 m)</td>
</tr>
<tr>
<td>u1</td>
<td>No. 6 (No. 13)</td>
<td>5'-11&quot; (1.80 m)</td>
</tr>
<tr>
<td>u2</td>
<td>No. 6 (No. 13)</td>
<td>5'-10&quot; (1.78 m)</td>
</tr>
<tr>
<td>v</td>
<td>No. 6 (No. 13)</td>
<td>30'-0&quot; (9.14 m)</td>
</tr>
<tr>
<td>v1</td>
<td>No. 6 (No. 13)</td>
<td>27'-0&quot; (8.23 m)</td>
</tr>
<tr>
<td>v2</td>
<td>No. 6 (No. 13)</td>
<td>24'-0&quot; (7.32 m)</td>
</tr>
<tr>
<td>v3</td>
<td>No. 6 (No. 13)</td>
<td>18'-0&quot; (5.48 m)</td>
</tr>
<tr>
<td>Concrete</td>
<td>cu. yds.</td>
<td>3.4 (2.6)</td>
</tr>
<tr>
<td>Reinf. Bars</td>
<td>lbs.</td>
<td>250 (113)</td>
</tr>
<tr>
<td>Grating</td>
<td>(sq. ft.)</td>
<td>70.4 (6.54)</td>
</tr>
</tbody>
</table>

### Section B-B

- **TYPICAL CORNER OF STEEL GRATING FRAME**
- **TYPICAL STEEL GRATING**
- **VIEW E-E**

### Section C-C

- **DETAIL B**
- **DETAIL C**
- **SECTION D-D**

### Inlet Box

**Type 24 (600) F**

**Material Required for One Inlet Box**

<table>
<thead>
<tr>
<th>Bar No.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>No. 6 (No. 13)</td>
<td>23'-0&quot; (7.02 m)</td>
</tr>
<tr>
<td>h1</td>
<td>No. 6 (No. 13)</td>
<td>13'-0&quot; (3.96 m)</td>
</tr>
<tr>
<td>l</td>
<td>No. 6 (No. 13)</td>
<td>4'-0&quot; (1.22 m)</td>
</tr>
<tr>
<td>u</td>
<td>No. 6 (No. 13)</td>
<td>6'-0&quot; (1.83 m)</td>
</tr>
<tr>
<td>u1</td>
<td>No. 6 (No. 13)</td>
<td>5'-11&quot; (1.80 m)</td>
</tr>
<tr>
<td>u2</td>
<td>No. 6 (No. 13)</td>
<td>5'-10&quot; (1.78 m)</td>
</tr>
<tr>
<td>v</td>
<td>No. 6 (No. 13)</td>
<td>30'-0&quot; (9.14 m)</td>
</tr>
<tr>
<td>v1</td>
<td>No. 6 (No. 13)</td>
<td>27'-0&quot; (8.23 m)</td>
</tr>
<tr>
<td>v2</td>
<td>No. 6 (No. 13)</td>
<td>24'-0&quot; (7.32 m)</td>
</tr>
<tr>
<td>v3</td>
<td>No. 6 (No. 13)</td>
<td>18'-0&quot; (5.48 m)</td>
</tr>
<tr>
<td>Concrete</td>
<td>cu. yds.</td>
<td>3.4 (2.6)</td>
</tr>
<tr>
<td>Reinf. Bars</td>
<td>lbs.</td>
<td>250 (113)</td>
</tr>
<tr>
<td>Grating</td>
<td>(sq. ft.)</td>
<td>70.4 (6.54)</td>
</tr>
</tbody>
</table>
SECTION A-A

NOTE:

Culvert pipe may exit from the side (or sides) by changing reinforcement bars in that area and in the headwall end of box.

GENERAL NOTES

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

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

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

Bars equal spaced

Support bar, each end

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>10</td>
<td>No. 4 (No. 13)</td>
<td>20' 6&quot; (6.20 m)</td>
</tr>
<tr>
<td>u</td>
<td>17</td>
<td>No. 4 (No. 13)</td>
<td>6'-5&quot; (1.96 m)</td>
</tr>
<tr>
<td>u1</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>8'-11&quot; (2.70 m)</td>
</tr>
<tr>
<td>u2</td>
<td>1</td>
<td>No. 4 (No. 13)</td>
<td>5'-6&quot; (1.68 m)</td>
</tr>
<tr>
<td>v</td>
<td>2</td>
<td>No. 4 (No. 13)</td>
<td>3' (0.90 m)</td>
</tr>
<tr>
<td>v1</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>6' (1.80 m)</td>
</tr>
<tr>
<td>v2</td>
<td>10</td>
<td>No. 4 (No. 13)</td>
<td>24' (7.32 m)</td>
</tr>
<tr>
<td>v3</td>
<td>10</td>
<td>No. 4 (No. 13)</td>
<td>18' (5.49 m)</td>
</tr>
</tbody>
</table>

Concrete

Reinf. Bars

Grating

Inlet Box

Type 24 (600) G

Standard 542531-04

Illinois Department of Transportation

January 1, 2011

Engineer of Policy and Procedures

Approved January 1, 2011

Engineer of Design and Environment

Issued 1-1-97

PASSED
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>9</td>
<td>No. 4 (900)</td>
<td>17'-6&quot; (5.32 m)</td>
</tr>
<tr>
<td>h1</td>
<td>4</td>
<td>No. 4 (900)</td>
<td>6'-3&quot; (1.90 m)</td>
</tr>
<tr>
<td>h2</td>
<td>8</td>
<td>No. 4 (900)</td>
<td>5'-6&quot; (1.68 m)</td>
</tr>
<tr>
<td>l</td>
<td>6</td>
<td>No. 4 (900)</td>
<td>15'-0&quot; (4.57 m)</td>
</tr>
<tr>
<td>u</td>
<td>21</td>
<td>No. 4 (900)</td>
<td>7'-3&quot; (2.22 m)</td>
</tr>
<tr>
<td>v</td>
<td>10</td>
<td>No. 4 (900)</td>
<td>36 (910)</td>
</tr>
<tr>
<td>v1</td>
<td>14</td>
<td>No. 4 (900)</td>
<td>7'-0&quot; (2.13 m)</td>
</tr>
<tr>
<td>v2</td>
<td>8</td>
<td>No. 4 (900)</td>
<td>5'-0&quot; (1.52 m)</td>
</tr>
<tr>
<td>v3</td>
<td>10</td>
<td>No. 4 (900)</td>
<td>18 (457)</td>
</tr>
<tr>
<td>Concrete</td>
<td>cu. yds.</td>
<td>3-9</td>
<td></td>
</tr>
<tr>
<td>Rein. Bars</td>
<td>lbs. (kg)</td>
<td>319 (144)</td>
<td></td>
</tr>
<tr>
<td>Galv. Steel Pipe</td>
<td>O.D.</td>
<td>2 at 18'-10&quot; (5.69 m)</td>
<td></td>
</tr>
<tr>
<td>Galv. Steel Angle</td>
<td></td>
<td>2 at 15'-10&quot; (4.77 m)</td>
<td></td>
</tr>
</tbody>
</table>

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

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 36 (900) A

STANDARD 542536-03
TOP ANCHOR PLATE

END VIEW

SECTION B-B

SECTION C-C

DETAIL AT BLOCKOUTS

INLET BOX
TYPE 36 (900) A

STANDARD 542536-03

Illinois Department of Transportation

January 1, 2010

ENGINEER OF POLICY AND PROCEDURES
APPROVED

January 1, 2010

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

1-1-97

PASSED
Remove concrete along these lines. Clean reinforcement for either tied or welded laps of longitudinal and circumferential reinforcement.

Longitudinal and circumferential length of weld shall be

For wire dia. W1 - W2 (10.72 - 4.88), length of weld shall be \( \frac{2}{3} \) (20) min.

For wire dia. W3 - W6 (6.73 - 4.88), length of weld shall be \( \frac{2}{3} \) (10) min.

Other wire dia. shall be tied per detail.

Each reinforcement shall have a minimum of 0.049 sq. in. (31.61 sq. mm) nominal area when opening is greater than 2\( \frac{1}{2} \) in. (65).

Mortar shall be

Grout with mortar, Mortar shall be flush with pipe.

See DETAIL A for laps.

21 (530) min.

1\( \frac{1}{2} \) (40) min., 2\( \frac{1}{2} \) (60) max. (Tied lap)

1\( \frac{1}{2} \) (40) min., 2\( \frac{2}{3} \) (65) max. (Welded lap)

Other wire dia. shall be tied per detail.

For wire dia. W1 - W6 (10.72 - 7.03), length of weld shall be \( \frac{3}{4} \) (20) min.

For wire dia. W3 - W6 (6.73 - 4.88), length of weld shall be \( \frac{2}{3} \) (10) min.

Other wire dia. shall be tied per detail.

All dimensions are in inches (millimeters) unless otherwise shown.
Inner cage circumferential reinforcement = 0.01 sq. in./ft. (212 mm²/m) (min.) longitudinal reinforcement is same as for 36 (900) riser.

End connection to fit pipe used.

Inner cage circumferential reinforcement = 0.17 sq. in./ft. (360 mm²/m) (min.) longitudinal reinforcement = 0.068 sq. in./ft. (104 mm²/m) (min.) spaced at 6 (150) cts. max. or equivalent to W2.5 (4.496) spaced at 6 (150) cts.

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

For wire W5.5 thru W2.5 (6.655 thru 4.496), length of weld shall be 6% (10) min.

Other wire gauges shall be tied per detail.

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.

All dimensions are in inches (millimeters) unless otherwise shown.
Width min. = O.D. + 4 (100)
Width max. = 12 (300)

SECTION A-A
(PCC SHOULDER)

SECTION B-B
(HMA SHOULDER)

SECTION C-C
(Sag locations)

SECTION D-D
(Backfill)

TRENCH FOR CORRUGATED POLYETHYLENE TUBING ALTERNATE

EXISTING CONSTRUCTION
(Except as noted or shown, dimensions and notes specified for Existing Construction are the same as those of New Construction)

GENERAL NOTES
See Standard 601101 for details of concrete headwall.
See Standards 482001, 482006 and 483001 for details of shoulders not shown.
The 24 (600) radius on the drainage fitting is only a minimum. Larger radii meeting the approval of the Engineer may be substituted.

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

DATE
REVISIONS
4-1-16
Renamed standard. Deleted drainage mat option.
1-1-11
Added PCC and HMA to SECTION A-A titles.

PASSED
April 1, 2016

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
1-1-97

PCC or flexible pav't.

Trench shall be placed adjacent to the edge of pav't.

4 (100) min. pipe underdrain

Concrete headwall

Section A-A

Subbase (when required)

180° bedding groove

10 (250) max.

PCC shoulder

2% slope

Improved subgrade

Backfill

PCC or flexible pavement

Remove wedge when flexible pavement.

PCC pav't.

Width max. = 18 (450)

Width min. = (2 x O.D.) + 6 (150)

Width max. = 12 (300)

Width min. = O.D. + 4 (100)

FA-1 or FA-2

24 (600) R. (min.) (typ.)

Elbow

Flow

Flow

Flow

Case end of pipe

D.4% min. slope

Proposed

Existing

HMA shoulder

Material (plug)

HMA shoulder

Existing

Edge of pavement

PCC or flexible pavement

Edge of shoulder

Backfill

Proposed shoulder

Improved subgrade

Concrete headwall

4 (100) min. pipe underdrain (Special)

PCC or flexible pavement

Flexible wedge

Removal wedge

O.D. + 6 (150)

Width max. = 28 (700)

Width min. = 12 x O.D. + 4 (100)

4 (100) min. pipe underdrain (Special)

4 (100) min. pipe underdrain (Special)

4-0-16

Illinois Department of Transportation

2016

ENGINEER OF POLICY AND PROCEDURES
APPROVED
2016

DATE
REVISIONS

PIPE UNDERDRAINS

STANDARD 601001-05
Rodent shield inserted 4 - 6 (100-150) into pipe.

End of pipe

Optional handling hole and 24 (600) long No. 4 (No. 13) reinf. bar

SIDE VIEW

No. 4 (No. 13) bar h

GENERAL NOTES

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

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

DATE

REVISIONS

4-1-16

Renamed standard to be consistent with specs and

Switched units to English (metric)

PASSED

2016

ENGINEER OF POLICY AND PROCEDURES

APPROVED

April 1, 2016

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

Illinois Department of Transportation

CONCRETE HEADWALL FOR PIPE UNDERDRAINS

STANDARD 601101-02
Pipe to be laid on a minimum grade of 1%. Half trap to be used when noted on the plans. Sand cushion shall be 2'-0" (610 mm) thick, unless otherwise shown.

**ALTERNATE BOTTOM SLAB**

<table>
<thead>
<tr>
<th>MATERIALS FOR WALLS</th>
<th>D</th>
<th>C*</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Masonry Unit</td>
<td>4'-0&quot; (1.2 m)</td>
<td>30 (750)</td>
<td>5 (125)</td>
</tr>
<tr>
<td></td>
<td>5'-0&quot; (1.5 m)</td>
<td>30 (750)</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Brick Masonry</td>
<td>4'-0&quot; (1.2 m)</td>
<td>30 (750)</td>
<td>8 (200)</td>
</tr>
<tr>
<td></td>
<td>5'-0&quot; (1.5 m)</td>
<td>30 (750)</td>
<td>8 (200)</td>
</tr>
<tr>
<td>Precast Reinforced Concrete Section</td>
<td>4'-0&quot; (1.2 m)</td>
<td>30 (750)</td>
<td>4 (100)</td>
</tr>
<tr>
<td></td>
<td>5'-0&quot; (1.5 m)</td>
<td>30 (750)</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Cast-in-place Concrete</td>
<td>4'-0&quot; (1.2 m)</td>
<td>30 (750)</td>
<td>6 (150)</td>
</tr>
<tr>
<td></td>
<td>5'-0&quot; (1.5 m)</td>
<td>30 (750)</td>
<td>6 (150)</td>
</tr>
</tbody>
</table>

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

**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 at 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

MATERIALS REQUIRED FOR ONE (1)

**TYPE B CATCH BASIN**

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty</th>
<th>Size</th>
<th>Shape</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>1</td>
<td>No. 4 (No. 13)</td>
<td>3'-5&quot; (1.05 m)</td>
<td></td>
</tr>
<tr>
<td>h1</td>
<td>3</td>
<td>No. 4 (No. 13)</td>
<td>5'-9&quot; (1.75 m)</td>
<td></td>
</tr>
<tr>
<td>v</td>
<td>14</td>
<td>No. 4 (No. 13)</td>
<td>7'-6&quot; (2.10 m)</td>
<td></td>
</tr>
<tr>
<td>u</td>
<td>14</td>
<td>No. 4 (No. 13)</td>
<td>4'-6&quot; (1.35 m)</td>
<td></td>
</tr>
<tr>
<td>x</td>
<td>16</td>
<td>No. 4 (No. 13)</td>
<td>6'-9&quot; (2.07 m)</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>3</td>
<td>No. 4 (No. 13)</td>
<td>1'-11&quot; (0.58 m)</td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td>cu. yd. (yd.)</td>
<td>2.5 (1.90)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reinforcement bars</td>
<td>Lbs. (Kg)</td>
<td>230 (95)</td>
<td></td>
</tr>
</tbody>
</table>

All bars shall be at 12 (300) centers unless otherwise shown. Reinforcement bar clearance shall be 16 (40).

GENERAL NOTES

See Standard 602701 for details of steps.

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

DATE | REVISIONS
--- | ---
1-1-13 | Revised and relocated steps
1-1-11 | Added additional bar identification

CATCH BASIN

TYPE B

STANDARD 602006-04
ALTERNATE MATERIALS FOR WALLS

<table>
<thead>
<tr>
<th>Material</th>
<th>T (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precast Reinforced Concrete</td>
<td>3 (75)</td>
</tr>
<tr>
<td>Concrete Masonry Unit</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Cast-in-Place Concrete</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Brick Masonry</td>
<td>8 (200)</td>
</tr>
</tbody>
</table>

ALTERNATE BOTTOM SLAB

ELEVATION

GENERAL NOTES

Bottom slabs shall be reinforced with a minimum of 0.22 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.
MATERIALS FOR WALLS

<table>
<thead>
<tr>
<th>ALTERNATE WALLS</th>
<th>D (in)</th>
<th>C* (mm)</th>
<th>T (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Masonry Unit</td>
<td>36 (900)</td>
<td>15 (380)</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Brick Masonry</td>
<td>36 (900)</td>
<td>15 (380)</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Precast Reinforced Concrete Section</td>
<td>36 (900)</td>
<td>15 (380)</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Cast-in-Place Concrete</td>
<td>36 (900)</td>
<td>15 (380)</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

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 602401 for optional precast reinforced concrete flat slab top.

All dimensions are in inches (millimeters) unless otherwise shown.
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 45° (19).

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

DRAINAGE STRUCTURES
TYPES 4 & 5

STANDARD 602106-03
**REINFORCED LID - TYPE 4 & 5**

**Type 5 - 4'-0" (1.22 m)**
2 - No. 4 (No. 13) bars, top and bottom
9 - t bars at 4 (100) cts. (typ.)
5 - s bars at 4 (100) cts. (typ.)

**Type 4 - 24 (610)**
2 - No. 6 (No. 19) bars, top and bottom
3 - No. 4 (No. 13) bars top and bottom at 4 (100) cts

---

**No. 4 (No. 13) Bar h**

**No. 3 (No. 10) Bar s**

**No. 6 (No. 19) Bar t**

**No. 5 (No. 16) Bar t1**

---

Illinois Department of Transportation

January 1, 2021

ENGINEER OF POLICY AND PROCEDURES

APPROVED January 1, 2021

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 4-1-04

PASSED

STANDARD 602106-03

---

DRAINAGE STRUCTURES

TYPES 4 & 5

(Sheet 2 of 21)

STANDARD 602106-03
Top of masonry

Concrete fill, 4%

Diameter 24 (600)

Pipe size.

See plans for minimum grade of 1%

Pipe to be laid on a concrete slab

Precast reinforced concrete section

ALTERNATE MATERIALS FOR WALLS

<table>
<thead>
<tr>
<th>Material</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRICK MASONRY</td>
<td>8 (200)</td>
</tr>
<tr>
<td>CAST-IN-PLACE CONCRETE</td>
<td>4 (150)</td>
</tr>
<tr>
<td>CONCRETE MASONRY UNIT</td>
<td>3 (125)</td>
</tr>
<tr>
<td>PRECAST REINFORCED CONCRETE SECTION</td>
<td>3 (75)</td>
</tr>
</tbody>
</table>

PLAN

Reinforced cast-in-place concrete

ELEVATION

PRECAST REINFORCED CONCRETE SLAB

Sand cushion

ALTERNATE METHODS

Bottom slabs shall be reinforced with a minimum of 0.24 sq. in./ft. (0.75 sq. cm/in.) in both directions with a maximum spacing of 10 (250).

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

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

INLET - TYPE A

STANDARD 602301-04
For precast reinforced concrete sections, this dimension may vary from the dimension given to plus 6 (150).

**ELEVATION - ECCENTRIC**

**ELEVATION - CONCENTRIC**

**ALTERNATE BOTTOM SLAB**

**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 river as determined by the fabricator, however, only a single row of reinforcement around the perimeter may be utilized.

See Standard 602306-03 for optional Precast Reinforced Concrete Flat Slab Top.

All dimensions are in inches (millimeters) unless otherwise shown.
**Concrete fill, 2% max.**

- **Section Parallel to Pipe**
  - (Without conical top riser)
  - (With conical top riser)

- **Section Perpendicular to Pipe**
  - (With conical top riser)

**Geometric Limits for Pipe Penetration Holes**

- **Note 1:** A minimum of 9 (230) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 32 (800).
- **Note 2:** A minimum 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).
- **Note 3:** A maximum of 60% of the inside perimeter of the reinforced concrete manhole walls may be removed.
- **Note 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.
- **Note 5:** The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).
- **Note 6:** 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. See Standard 602701 for details of manhole steps. All dimensions are in inches (millimeters) unless otherwise noted.
GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES

Note 1: A minimum of 9 (230) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 32 (810).

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

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

Note 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.

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

Note 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.

DATE
REVISIONS
1-1-21
Revised Note 1, Note 2 and
lifting hole general note.

3-1-19
Moved wall reinforcement from
inside face to middle.
PLAN - FLAT SLAB TOP
(Showing layout of bottom reinforcement bars and c bars)

Bar c #5 (#16),
10'-3" (3.12 m)
length, 3'-2" (0.96 m)
radius top and bottom

Bar c #6 (#19),
9'-4" (2.84 m)
length, 3'-2" (0.96 m)
radius top and bottom

* #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 welded wire reinforcement and c bars)

Bar c #5 (#16),
10'-3" (3.12 m)
length, 3'-2" (0.96 m)
radius top and bottom

Bar c #6 (#19),
9'-4" (2.84 m)
length, 3'-2" (0.96 m)
radius top and bottom

* #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.
**Connection Angle**

- **Location**: Riser Height (RH)
- **WWR or Rebar**: 0.12 sq. in./ft. (3.14 sq. mm/mm)
- **Spacing (max.)**: 6 (150)
- **Bar Size**: 
  - #5 (#16)

**BASE SLAB REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Height (TH)</th>
<th>Location</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td><strong>12.0 (307)</strong> sq. in./ft.</td>
<td>RH = 10 ft. (3.05 m)</td>
<td>0.45 sq. in./ft. (114 sq. mm/mm)</td>
</tr>
<tr>
<td>Mat</td>
<td></td>
<td>or TH &gt; 20 ft. (6.10 m)</td>
<td>0.45 sq. in./ft. (114 sq. mm/mm)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td><strong>24.0 (609)</strong> sq. in./ft.</td>
<td>All</td>
<td>0.11 sq. in./ft. (2.78 sq. mm/mm)</td>
</tr>
</tbody>
</table>

**FLAT SLAB TOP REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td><strong>12.0 (307)</strong> sq. in./ft.</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td><strong>24.0 (609)</strong> sq. in./ft.</td>
</tr>
</tbody>
</table>

**Base Slab Reinforcement**

- Location: Total Height (TH)
- Value: 0.45 sq. in./ft. (114 sq. mm/mm)

**Wall Reinforcement**

<table>
<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>Circumferential</td>
<td>0.18 sq. in./ft. (468 sq. mm/mm)</td>
</tr>
<tr>
<td>Mat</td>
<td>Vertical</td>
<td>0.045 sq. in./ft. (114 sq. mm/mm)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>Circumferential</td>
<td>0.18 sq. in./ft. (468 sq. mm/mm)</td>
</tr>
<tr>
<td>Mat</td>
<td>Vertical</td>
<td>0.045 sq. in./ft. (114 sq. mm/mm)</td>
</tr>
</tbody>
</table>

**Joint Splice**

- **Location**: Joint
- **WWR**: 0.18 sq. in./ft. (468 sq. mm/mm)
- **Spacing (max.)**: 6 (150)
- **Bar Size**: 
  - #5 (#16)

**Tie Plate**

- **Location**: Tie R
- **Value**: 0.11 sq. in./ft. (2.78 sq. mm/mm)

**Manhole Wall**

- **Location**: Inside of manhole wall
- **Value**: 0.18 sq. in./ft. (468 sq. mm/mm)

**Joint Splice**

- **Location**: Joint
- **WWR**: 0.18 sq. in./ft. (468 sq. mm/mm)
- **Spacing (max.)**: 6 (150)
- **Bar Size**: 
  - #5 (#16)

**Tie Plate**

- **Location**: Tie R
- **Value**: 0.11 sq. in./ft. (2.78 sq. mm/mm)

**Connection Angle**

- **Location**: Connection angle
- **WWR**: 0.18 sq. in./ft. (468 sq. mm/mm)
- **Spacing (max.)**: 6 (150)
- **Bar Size**: 
  - #5 (#16)

**Base Slab Reinforcement**

- Location: Total Height (TH)
- Value: 0.45 sq. in./ft. (114 sq. mm/mm)

**Wall Reinforcement**

- Location: Orientation
- Value: 0.18 sq. in./ft. (468 sq. mm/mm)

**Joint Splice**

- Location: Joint
- WWR: 0.18 sq. in./ft. (468 sq. mm/mm)
- Spacing (max.): 6 (150)
- Bar Size: 
  - #5 (#16)

**Tie Plate**

- Location: Tie R
- Value: 0.11 sq. in./ft. (2.78 sq. mm/mm)
**SHEAR KEY GEOMETRY**

Illinois Department of Transportation

**APPROVED 2021**

**ENGINEER OF DESIGN AND ENVIRONMENT 4-1-06**

**ISSUED 4-1-06**

**PASSED**

**DATE**

**ENGINEER OF POLICY AND PROCEDURES**

---

**Sand cushion**

**Bar c**

**Flat slab top**

**Sand cushion**

**Center of slab**

**Shear key at single-element**

**Notes:**

- **Note 1:** A minimum of 12 (300) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 36 (900). Length shall be sufficient to intersect the horizontal #3 (#10) bars as shown.
- **Note 2:** A minimum 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380). Length shall be sufficient to intersect the horizontal #3 (#10) bars as shown.
- **Note 3:** A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.
- **Note 4:** Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint every 24 (600) inside arc length. Length shall be sufficient to intersect the horizontal #3 (#10) bars as shown.
- **Note 5:** The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100). Length shall be sufficient to intersect the horizontal #3 (#10) bars as shown.
- **Note 6:** Only pipe penetration holes ≤ 15 (380) are allowed in riser sections.

---

**GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES**

**SECTION PARALLEL TO PIPE**

(Without conical top riser)

**SECTION PERPENDICULAR TO PIPE**

(With conical top riser)

**FLAT SLAB TOP JOINT CONFIGURATIONS**

(Drawn at access hole)

---

**BASE SLAB JOINT CONFIGURATIONS**

**GENERAL NOTES**

Pipe holes shall be formed to facilitate proper placement of new 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.

---

**Note:**

- **Note 1:** See Standard 602701 for details of manhole steps.
- **Note 2:** Revised Note 1 and lifting hole.
- **Note 3:** Moved wall reinforcement from inside face to middle.

---

**DATE**

**REVISIONS**

**1-1-21:** Revised Note 3 and lifting hole

**3-1-19:** Moved wall reinforcement from inside face to middle

**STANDARD 602411-09**
**PLAN - FLAT SLAB TOP**

(Showing layout of bottom reinforcement bars and c bars)

Bar c #5 (#16), 2'-2" (0.66 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

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

Bar c #5 (#16), 8'-2" (2.49 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).
PRECAST MANHOLE TYPE A

7' (2.13 m) DIAMETER

STANDARD 602411-09

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

**FLAT SLAB TOP REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser 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>0.045 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>0.12 sq. in./ft.</td>
<td>(233 sq. mm/mm)</td>
<td>(95 sq. mm/mm)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>0.21 sq. in./ft.</td>
<td>0.045 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>0.21 sq. in./ft.</td>
<td>(445 sq. mm/mm)</td>
<td>(95 sq. mm/mm)</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></td>
<td></td>
<td>A&lt;sub&gt;v&lt;/sub&gt; (min.)</td>
</tr>
<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>0.045 sq. in./ft.</td>
</tr>
<tr>
<td>7 ft. (2.13 m) Ø Barrel</td>
<td>Circumferential</td>
<td>0.21 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.045 sq. in./ft.</td>
</tr>
</tbody>
</table>

**BASE SLAB REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (RH)</th>
<th>WWR or Rebar each direction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Height (TH)</td>
<td>A&lt;sub&gt;v&lt;/sub&gt; (min.)</td>
</tr>
<tr>
<td>Top Mat</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>0.32 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>0.32 sq. in./ft.</td>
<td>(120 sq. mm/mm)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>RH &gt; 10 ft. (3.05 m)</td>
<td>0.15 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>0.15 sq. in./ft.</td>
<td>(450)</td>
</tr>
</tbody>
</table>

**JOINT SPLICE**

- Ø (25) threaded rods
- 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.
- Ø 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.

**TIE PLATE**

- 2¼x2¼xƉ (55x55x8)
- #5

**PRECAST MANHOLE TYPE A**

7' (2.13 m) DIAMETER

STANDARD 602411-09
**GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES**

Note 1: A minimum of 12 (300) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 3'-4" (1.02 m).

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

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

Note 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.

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

Note 6: Only pipe penetration holes ≥ 15 (380) are allowed in riser sections.

**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.

See Standard 602701 for details of manhole steps.

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

**DATE**

3-1-19  Moved wall reinforcement from inside face to middle

**REVISIONS**

3-1-19  Moved wall reinforcement from inside face to middle

**STANDARD 602416-09**

**SCHEMATIC DRAWING**

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ENGINEER OF POLICY AND PROCEDURES**

**APPROVED**

**ISSUED**

**PASSED**

**PRECAST MANHOLE TYPE A**

**8' (2.44 m) DIAMETER**

**BASE SLAB JOINT CONFIGURATIONS**

**SECTION PERPENDICULAR TO PIPE**

**SECTION PARALLEL TO PIPE**

**FLAT SLAB TOP JOINT CONFIGURATIONS** (Shown at access hole)

**SHEAR KEY GEOMETRY** (Reinforcement not shown for clarity)

**NOTE 1**

**NOTE 2**

**NOTE 3**

**NOTE 4**

**NOTE 5**

**NOTE 6**
3 (75)
Connection angle
MANHOLE WALL
Inside of
manhole wall

4 (100)
6
6 (150)

Connection angle

FLAT SLAB TOP REINFORCEMENT

<table>
<thead>
<tr>
<th>Location</th>
<th>Rise 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>Bottom Mat</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>0.045 sq in./ft.</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 rebar orientation and spacing and this table for bar size</td>
</tr>
</tbody>
</table>

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

WALL REINFORCEMENT

<table>
<thead>
<tr>
<th>Orientation</th>
<th>Location</th>
<th>WWR or Rebar</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 ft. (1.22 m) Ø Riser</td>
<td>Circumferential</td>
<td>0.045 sq in./ft. (233 sq. mm/m)</td>
</tr>
<tr>
<td>4 ft. (1.22 m) Ø Riser</td>
<td>Vertical</td>
<td>0.04 sq in./ft. (200 sq. mm/m)</td>
</tr>
<tr>
<td>8 ft. (2.44 m) Ø Barrel</td>
<td>Circumferential</td>
<td>0.045 sq in./ft. (233 sq. mm/m)</td>
</tr>
<tr>
<td>8 ft. (2.44 m) Ø Barrel</td>
<td>Vertical</td>
<td>0.04 sq in./ft. (200 sq. mm/m)</td>
</tr>
</tbody>
</table>

BASE SLAB REINFORCEMENT

<table>
<thead>
<tr>
<th>Location</th>
<th>Rise Height (RH)</th>
<th>WWR or Rebar each direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>0.13 sq in./ft. (69 sq. mm/m)</td>
</tr>
<tr>
<td>Top Mat</td>
<td>RH &gt; 10 ft. (3.05 m)</td>
<td>0.06 sq in./ft. (32 sq. mm/m)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>All</td>
<td>0.13 sq in./ft. (69 sq. mm/m)</td>
</tr>
</tbody>
</table>

Illinois Department of Transportation
APPROVED
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
PASSED
ENGINEER OF POLICY AND PROCEDURES
4-1-06

STANDARD 602416-09
8' (2.44 m) DIAMETER

PRECAST MANHOLE TYPE A

(Sheet 3 of 3)
**Illinois Department of Transportation**

**DATE:** 1-1-21

**REVISIONS:** Revised Note 3 and lifting hole

**APPROVED:**
- Engineer of Design and Environment
- Engineer of Policy and Procedures

---

**SECTION PARALLEL TO PIPE**
(Without conical top riser)

- **FLAT SLAB TOP JOINT CONFIGURATIONS**
  - (Shown at access hole)
  - See base slab joint configurations

**SECTION PERPENDICULAR TO PIPE**
(With conical top riser)

- **BASE SLAB JOINT CONFIGURATIONS**
- **SHEAR KEY GEOMETRY**
  - Center of slab shear key at
  
- **GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES**
  - **Note 1:** A minimum of 12 (300) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 3'-8'' (1.12 m).
  
  - **Note 2:** A minimum 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).
  
  - **Note 3:** A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.

- **Note 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 s < 24 (600). See joint splice detail.

- **Note 5:** The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100). Move wall reinforcement from inside face to middle.

- **Note 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.

---

**PREFECT MANHOLE TYPE A**
9' (2.74 m) DIAMETER

**DATE:** 1-1-21

**REVISIONS:** Revised Note 3 and lifting hole

**APPROVED:**
- Engineer of Design and Environment
- Engineer of Policy and Procedures
**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)

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.
**FLAT SLAB TOP REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (ft)</th>
<th>WWR or Rebar (each direction) Spacing (max.)</th>
<th>Steel bar direction except as noted A6 (min.) Spacing (max.)</th>
<th>Bar Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>All</td>
<td>0.11 sq. in./ft. (223 sq. mm²)</td>
<td>18 (450)</td>
<td>0.11 sq. in./ft. (223 sq. mm²)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>0.88 sq. in./ft. (1863 sq. mm²)</td>
<td><strong>6 (150)</strong></td>
<td>See plan view for rebar orientation and spacing and this table for bar size.</td>
</tr>
<tr>
<td></td>
<td>RH &gt; 10 ft. (3.05 m)</td>
<td>WWR not permitted</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**WALL REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>WWR or Rebar (each direction) Spacing (max.)</th>
<th>A6 (min.) 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. mm²)</td>
<td>6 (150)</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.045 sq. in./ft. (95 sq. mm²)</td>
<td>8 (200)</td>
</tr>
<tr>
<td>9 ft. (2.74 m) Ø Barrel</td>
<td>Circumferential</td>
<td>0.27 sq. in./ft. (616 sq. mm²)</td>
<td>6 (150)</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.045 sq. in./ft. (95 sq. mm²)</td>
<td>8 (200)</td>
</tr>
</tbody>
</table>

**BASE SLAB REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (ft)</th>
<th>WWR or Rebar (each direction) Spacing (max.)</th>
<th>A6 (min.) Spacing (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>RH ≤ 10 ft. (3.05 m) or TH ≤ 20 ft. (6.10 m)</td>
<td>0.64 sq. in./ft. (1331 sq. mm²)</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>RH &gt; 10 ft. (3.05 m) or TH &gt; 20 ft. (6.10 m)</td>
<td>0.72 sq. in./ft. (1524 sq. mm²)</td>
<td>6 (150)</td>
</tr>
</tbody>
</table>

**FLAT SLAB TOP REINFORCEMENT**

- Location: All
- Riser Height: 6 (150)
- WWR or Rebar (each direction) Spacing (max.): 6 (150)
- Steel bar direction except as noted: #3 or #4 (#10 or #13)

**WALL REINFORCEMENT**

- Location: 4 ft. (1.22 m) Ø Riser
  - Orientation: Circumferential
  - WWR or Rebar (each direction) Spacing (max.): 0.12 sq. in./ft. (234 sq. mm²)
  - A6 (min.) Spacing (max.): 6 (150)

- Location: 9 ft. (2.74 m) Ø Barrel
  - Orientation: Circumferential
  - WWR or Rebar (each direction) Spacing (max.): 0.27 sq. in./ft. (616 sq. mm²)
  - A6 (min.) Spacing (max.): 6 (150)

**BASE SLAB REINFORCEMENT**

- Location: All
  - Riser Height: 6 (150)
  - WWR or Rebar (each direction) Spacing (max.): 0.64 sq. in./ft. (1331 sq. mm²)
  - A6 (min.) Spacing (max.): 6 (150)
**GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES**

- **Note 1:** A minimum of 12 (300) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 4'-0" (1.22 m).
- **Note 2:** A minimum 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).
- **Note 3:** A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.
- **Note 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.
- **Note 5:** The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100). Moving wall reinforcement of holes greater than 15 (380).
- **Note 6:** A minimum of 12 (300) inside arc length of reinforced concrete shall be maintained above pipe penetration holes > 4'-0" (1.22 m).
- **Note 7:** A minimum 12 (300) inside arc length of reinforced concrete shall be maintained above pipe penetration holes > 4'-0" (1.22 m).

**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 PERPENDICULAR TO PIPE**

- See base slab joint configurations

**SECTION PARALLEL TO PIPE**

- See base slab joint configurations

**FLAT SLAB TOP JOINT CONFIGURATIONS**

- See Standard 602426-03

**PRECINCT MANHOLE TYPE A**

10' (3.05 m) DIAMETER

**STANDARD 602426-03**

(Date: 1 of 3)
10' (3.05 m) DIAMETER

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)

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

* #6 (1/19) bars bottom. Bundle first bar with closest WWR to the opening and place second bar ±3 (75) away.

STANDARD 602426-03
FLAT SLAB TOP JOINT CONFIGURATIONS
(Shown at access hole)

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.

See Standard 602701 for details of manhole steps.

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

DATE
REVISIONS
1-1-21 Revised lifting hole general note.
3-1-19 Moved wall reinforcement from inside face to middle.

PRECAST VALVE VAULT TYPE A
4' (1.22 m) DIAMETER

STANDARD 602501-06
**SHEAR KEY GEOMETRY**

- Single element shear key at center of slab

**BASE SLAB JOINT CONFIGURATIONS**

- Optional Joint
- Cut bars to fit.
- Bar c #5 (#16), 6'-10" (2.08 m) length, 26 (660) radius bottom
- Optional Joint
- Cut bars to fit.
- #5 (#16) bars bottom. Bundle first bar with closest WWR bar to the opening and place second bar #3 (75) away.
- 10-#4 (#13) bars or equivalent, evenly spaced around perimeter. Cut bars to fit.
- 10-#4 (#13) bars or equivalent, evenly spaced around perimeter. Cut bars to fit.
- 10-#4 (#13) bars evenly spaced drilled and grouted in place at center of slab
- * Only one layer of WWR permitted to avoid congestion.
- * Only one layer of WWR permitted to avoid congestion.

**BASE SLAB REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>WWR (each direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td><strong>Aₚ (min.)</strong></td>
<td><strong>Spacing (max.)</strong></td>
</tr>
<tr>
<td><strong>Top Mat</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 20 ft. (6.10 m)</td>
<td>0.04 sq. in./ft. (508 sq. mm/m)</td>
<td>6 (150)</td>
</tr>
<tr>
<td>&gt; 20 ft. (6.10 m)</td>
<td>0.04 sq. in./ft. (508 sq. mm/m)</td>
<td>8 (200)</td>
</tr>
</tbody>
</table>

**WALL REINFORCEMENT**

<table>
<thead>
<tr>
<th>Orientation</th>
<th>WWR or Rebar</th>
<th>WWR or Rebar</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Orientation</strong></td>
<td><strong>Aₚ (min.)</strong></td>
<td><strong>Spacing (max.)</strong></td>
</tr>
<tr>
<td>Circumferential</td>
<td>0.12 sq. in./ft. (250 sq. mm/m)</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Vertical</td>
<td>0.045 sq. in./ft. (99 sq. mm/m)</td>
<td>8 (200)</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>WWR or Rebar (each direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td><strong>Aₚ (min.)</strong></td>
<td><strong>Spacing (max.)</strong></td>
<td><strong>Aₚ (min.)</strong></td>
</tr>
<tr>
<td><strong>Top Mat</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 20 ft. (6.10 m)</td>
<td>0.04 sq. in./ft. (508 sq. mm/m)</td>
<td>6 (150)</td>
<td>0.04 sq. in./ft. (508 sq. mm/m)</td>
</tr>
<tr>
<td>&gt; 20 ft. (6.10 m)</td>
<td>0.04 sq. in./ft. (508 sq. mm/m)</td>
<td>8 (200)</td>
<td>0.04 sq. in./ft. (508 sq. mm/m)</td>
</tr>
</tbody>
</table>

**FLAT SLAB TOP REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>WWR (each direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td><strong>Aₚ (min.)</strong></td>
<td><strong>Spacing (max.)</strong></td>
</tr>
<tr>
<td><strong>Bottom Mat</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Only one layer of WWR permitted to avoid congestion.</td>
<td>See plan view for rebar orientation and spacing and this table for bar size.</td>
<td>#5 (#16)</td>
</tr>
</tbody>
</table>

**PRECAST VALVE VAULT TYPE A**

4' (1.22 m) DIAMETER

**STANDARD 602501-06**
**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.

See Standard 602701 for details of manhole steps.

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

---

**DATE**

1-1-21

**REVISIONS**

1-1-21 Revised lifting hole general note.

3-1-19 Moved wall reinforcement from inside face to middle.

**STANDARD 602506-03**

**PREFACE**

Illinois Department of Transportation

DATE

APPROVED

REVISIONS

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

(Sheet 1 of 2)
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>G</th>
<th>T</th>
<th>Dₚ</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>36 (900)</td>
<td>D = 6’-0” (1.83 m)</td>
<td>4 (130)</td>
<td>4 (130)</td>
</tr>
<tr>
<td>4’-0” (1.22 m)</td>
<td>4 (130)</td>
<td>4 (130)</td>
<td></td>
</tr>
<tr>
<td>5’-0” (1.52 m)</td>
<td>4 (130)</td>
<td>4 (130)</td>
<td></td>
</tr>
</tbody>
</table>

PRECAST REINFORCED CONCRETE FLAT SLAB TOP

(Showing layout of welded wire reinforcement and c bars)
PLAN VIEW

ELEVATION VIEW

CAST IRON STEPS

MANHOLE STEPS

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

DATE
1-1-09

REVISIONS
Switched units to English inches.

1-1-09

4-1-06

Revised title, drawings, and added plastic steps on sheet 2.

STANDARD 602701-02

(1127x500)(Sheet 1 of 2)
PLAN VIEW

ELEVATION VIEW

SECTION A-A

3 (75) mm

4 (100)

Inside face of structure

9 (13) Reinforcement bar

10 (250) mm

Reinforcement bar

MANHOLE STEPS

ILLINOIS DEPARTMENT OF TRANSPORTATION

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

STANDARD 602701-02

(Sheet 2 of 2)
6 Gaskets shown
10 permitted

Gray Iron Lid

CAST OPEN LID

22% (578)
6% (159)

21 (533)
22 (578)

CAST FRAME

CAST CLOSED LID

Gray Iron Lid

CAST OPEN LID

ADA COMPLIANT

CAST OPEN LID

CAST FRAME

SECTION C-C

SECTION F-F

SECTION B-B

SECTION E-E

SECTION D-D

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

FRAME AND LIDS

TYPE 1

STANDARD 604001-05

DATE

1-1-20
1-1-15
1-1-09
1-1-97

REVISIONS

Revised dimension in Section B-B of cast open lid
Revised dimensioning of
Frame, Added ADA compliant open lid
Switched units to English (metric)

Illinois Department of Transportation

ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
ISSUED
PASSED

1-1-97
1-1-09
1-1-15
1-1-20

1048x749
CAST FRAME

CAST GRATE

ALTERNATE CURB BOX

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

SECTION E-E

CAST FRAME

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

SECTION E-E

CAST GRATE

ALTERNATE CURB BOX

Curb box adjustable from 5\% (135) to 9 (225).

\( \frac{3}{8} \times \frac{3}{4} (16 \times 120) \) slotted hole for galvanized \( \frac{1}{2} \) (M12) bolt, nut and washer.

\( 4 \) 1-1-15

Illinois Department of Transportation

January 1, 2015

ENGINEER OF POLICY AND PROCEDURES

APPROVED

January 1, 2015

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

PASSED

DATE REVISIONS

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

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

STANDARD 604006-05

FRAME AND GRATE TYPE 3

All dimensions are in inches (millimeters) unless otherwise shown.
Q. ½ (136) dia. hole and ¾ x 4½ (16 x 120) slotted hole for galvanized ¾ (M12) bolt, nut and washer.

Curb box adjustable from 5½ (140) to 9 (225).

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

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

CAST GRATE

FRAME AND GRATE

TYPE 4

STANDARD 604016-04

DATE
REVISIONS

4-1-16 Corrected dimension on
SECTION A-A

1-1-15 Revised dimensions of frame
and grate
NOTE: Bolts shall be removed after pavement has been placed.

4 holes
1 16°
 Dia.

SECTION A-A
CAST BASE
Gray Iron

DETAIL OF BOLTING
FRAME TO BASE
NOTE: Bolts shall be removed after pavement has been placed.

BASE, FRAME AND LIDS TYPE 5
STANDARD 604021-04

CREASES

DATE
REVISIONS
1-1-20  Revised dimension location in Section A-A
1-1-15  Added ADA compliant open lid
1-1-09  Switched units to English (metric)

Illinois Department of Transportation

ENGINEER OF POLICY AND PROCEDURES
APPROVED

1-1-20

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

1-1-97

PASSED DATE
REVISIONS
SECTION A-A

CAST GRATE

SECTION B-B

STANDARD 604031-03

GRATE TYPE 7

Illinois Department of Transportation

January 1, 2015

ENGINEER OF POLICY AND PROCEDURES

APPROVED January 1, 2015

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED January 1, 2015

PASSED

DATE

REVISIONS

1-1-09

Switched units to

English (metric).

1-1-15

Revised grate thickness.

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

GRATE TYPE 7

STANDARD 604031-03
6 lugs shown. 3 permitted.

CAST GRATE

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

GRATE TYPE 8

STANDARD 604036-03
All dimensions are in inches (millimeters) unless otherwise shown.

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

CAST FRAME

CAST GRATE

FRAME AND GRATE

TYPE 9

STANDARD 604041-03
All dimensions are in inches (millimeters) unless otherwise shown.

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

CAST FRAME

CAST GRATE

FRAME AND GRATE

TYPE 10

STANDARD 604046-03
CAST FRAME

SECTION A-A

CAST GRATE

SECTION C-C

ALTERNATE CURB BOX

SECTION B-B

SECTION D-D

SECTION E-E

FRAME AND GRATE

TYPE 11

STANDARD 604051-04
Curb box adjustable from 4½ (115) to 9 (225) bolt, nut, and washer.

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

Switched units to English (metric).

Revised dimensions of frame and alternate curb box.

1-1-15

1-1-09

1-1-97

PASSED

ISSUED

APPROVED

ENGINEER OF POLICY AND PROCEDURES

ENGINEER OF DESIGN AND ENVIRONMENT

DATE

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

FRAME AND GRATE

CAST FRAME

CAST GRATE

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

Illinois Department of Transportation

ENGINEER OF POLICY AND PROCEDURES
APPROVED
January 1, 2015

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
1-1-97

PASSED

DATE
REVISIONS

1-1-15
Revised dimensions of frame and grate

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

STANDARD 604061-03
NOTE: Warp sloping face of curbs in a distance of 5 (1.5 m) to the cross section shown at the frame.

No. 6 x 36 (No. 20 x 900) re-bar required when X = 5 (125) or more

Slope pavement or gutter flag 12% at inlet.

SECTION B-B

Slope pavement or gutter flag 12% at inlet.

SECTION Z-Z

SECTION D-D

See DETAIL E

CASE II

CASE I

DETAIL E

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

FRAME AND LID

TYPE 15

STANDARD 604066-02

DATE REVISIONS
1-1-97 Switched units to English (metric).
1-1-94 Removed weights.
1-1-04

Illinois Department of Transportation
ENGINEER OF POLICY AND PROCEDURES
APPROVED
January 1, 2009

Illinois Department of Transportation
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
1-1-97

PASSED
\( \frac{3}{4} (13) \) Dia. tapped holes for bolting down grate, four places.

One gusset shown each side, two permitted.

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

\( \frac{3}{4} (13) \) Dia. stainless steel bolts with washers, through counter bored holes or slots, four places.

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

**DATE** | **REVISIONS**
--- | ---
1-1-22 | Removed slots in frame which held the "safety bar".
1-1-22 | Removed "safety bar" from frame.

**FRAME AND GRATE**

**TYPE 20**

**STANDARD 604071-07**
\( \frac{2}{3} \) (13) Dia. tapped holes for bolting down grate, four places.

\( \frac{1}{4} \) (14) Dia. holes for grate alignment, two places.

\( \frac{3}{4} \) (14) Gev. bolt, nut & washer.

\( \frac{9}{16} \) (12) Bolt, through counter bored holes or slots, bolts with washers, through stainless steel bolts with washers, through counter bored holes or slots, four places.

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

\( \frac{3}{8} \) (13) Dia. tapped holes for bolting down grate, four places.

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

FRAME AND GRATE

TYPE 21

STANDARD 604076-06
Places each frame.

\( \frac{1}{2} \) (13) Dia. tapped holes for bolting down grate, four places each frame.

\( \frac{1}{4} \) (14) Dia. holes for grate alignment, two places each frame.

\( \frac{1}{2} \) (16) Dia. bolts with washers, through counter bored holes or slots, four places each grate.

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

\( \frac{1}{2} \) (13) Dia. stainless steel bolts with washers, through counter bored holes or slots, four places each grate.

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

1-1-22  Removed slots in frame which held the "safety bar".

1-1-21  Removed "safety bar" from frame.
Concrete apron, 4 (100) thick

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).

LOCATION SKETCH - PLAN

GENERAL NOTES

DATE REVISIONS

REINFORCED CONCRETE PIPE

STANDARD 604101-01

January 1, 2009

ENGINEER OF POLICY AND PROCEDURES
APPROVED

Illinois Department of Transportation

January 1, 2009

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

PASSED

DATE

REVISIONS

STANDARD 604101-01

1-1-97

**Pavement Expansion Joint**

- Short radius curve (such as entrances, side streets and ramp returns).

- Saw at 4 to 24 hours, and seal.

- Joint filler.

**General Notes**

1. Form with % (3) trick steel template 7 (50) deep, and seal.
2. Saw at 4 to 24 hours, and seal.

**Required for monolithic construction.**

See Standard 606301 for details of corner islands.

- Full depth & width 1 (25), - thick (min.) preferred expansion joint filler.

- Longitudinal joint tie bars shall be No. 6 (No. 19) at 36 (900) centers in accordance with details for longitudinal construction joint shown on Standard 420001.

- A minimum clearance of 2 (50) between the end of the tie bar and the back of the curb shall be maintained.

- The dowel bars in contraction joints will only be required for monolithic construction.

See Standard 606301 for details of corner islands.

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

**Concrete Curb Type B and Combination Concrete Curb and Gutter**

**Revisions**

1-1-18 Revised General Note for tie bar spacing to 36 (900) CT.

**Plan**

- Adjacent to PCC pavement or PCC base course.

- Drainage casting without curb box back of curb.

- Failure cap 12 (300) min.

- Gutter flag width 7 17.75 (177.5)

- Full depth & width 1 (25) thick (min.) preferred expansion joint filler.

**Barrier Curb**

<table>
<thead>
<tr>
<th>Table of Dimensions</th>
<th>Barrier Curb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>A</td>
</tr>
<tr>
<td>M-2.06 (M-5.15)</td>
<td>6</td>
</tr>
<tr>
<td>M-2.12 (M-5.30)</td>
<td>6</td>
</tr>
<tr>
<td>M-2.4 (M-5.60)</td>
<td>6</td>
</tr>
</tbody>
</table>

**Mountable Curb**

<table>
<thead>
<tr>
<th>Table of Dimensions</th>
<th>Mountable Curb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>A</td>
</tr>
<tr>
<td>M-2.06 (M-5.15)</td>
<td>6</td>
</tr>
<tr>
<td>M-2.12 (M-5.30)</td>
<td>6</td>
</tr>
<tr>
<td>M-2.4 (M-5.60)</td>
<td>6</td>
</tr>
<tr>
<td>M-2.6 (M-5.92)</td>
<td>6</td>
</tr>
</tbody>
</table>

**Concrete Curb Type B**

- M-2.06 (M-5.15) and M-2.12 (M-5.30)
**CONCRETE CURB TYPE B**

**AND COMBINATION CURB AND GUTTER**

**STANDARD 606001-08**

---

**PLAN**

**SHORT RADIUS CURVE**

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

- **Undoweled contraction joint (typ.) construction options:**
  1. Form with 1/4 (3) thick steel template
     2 (50) deep, and seal.
  2. Saw 2 (50) deep at 4 to 24 hours, and seal.
  3. Insert 3/8 (20) thick preformed joint filler
     full depth and width.

**Drainage casting with curb box**

**Back of curb**

**Construction joint**

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

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

**Edge of pavement**

**ON DISTURBED SUBGRADE**

**ON UNDISTURBED SUBGRADE**

**CONCRETE CURB TYPE B**

---

**ADJACENT TO FLEXIBLE PAVEMENT**

**Depressed Curb**

**Barrier Curb**

---

**ADJACENT TO PCC PAVEMENT OR PCC BASE COURSE**

**Depressed Curb**

**Barrier Curb**

---

**CONSTRUCTION JOINTS**

- A
- B
- C
- D

---

**MOUNTABLE CURB SHOWN (OTHER TYPES PERMITTED)**

**HMA Surfacing**

**Base Course**

**Edge of Pavement**

---

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**INSTRUCTIONAL MANUAL**

**STANDARD 606001-08**

**APPROVED**

**ENGINEER OF POLICY AND PROCEDURES**

**APPROVED**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED**

**1-1-97**

**PASSED**

---
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 constructionJoint 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.

QUANTITIES

For Section A-A to E-E and curtain wall =

2.38 cu. yds. (1.82 m³) concrete for 10 (250) pavers.

For Section F-F =

0.069 cu. yds. (0.17 m³) concrete per ft. (m)

OUTLETS FOR CONCRETE CURB AND GUTTER

TYPE B-6.24 (B-15.60)

For each 1% increase in grade.

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.

QUANTITIES

For Section A-A to E-E and curtain wall =

2.38 cu. yds. (1.82 m³) concrete for 10 (250) pavers.

For Section F-F =

0.069 cu. yds. (0.17 m³) concrete per ft. (m)

OUTLETS FOR CONCRETE CURB AND GUTTER

TYPE B-6.24 (B-15.60)

For each 1% increase in grade.

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.

QUANTITIES

For Section A-A to E-E and curtain wall =

2.38 cu. yds. (1.82 m³) concrete for 10 (250) pavers.

For Section F-F =

0.069 cu. yds. (0.17 m³) concrete per ft. (m)

OUTLETS FOR CONCRETE CURB AND GUTTER

TYPE B-6.24 (B-15.60)

For each 1% increase in grade.

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.

QUANTITIES

For Section A-A to E-E and curtain wall =

2.38 cu. yds. (1.82 m³) concrete for 10 (250) pavers.

For Section F-F =

0.069 cu. yds. (0.17 m³) concrete per ft. (m)
1.98 cu. yds. (1.54 m³) concrete for 9 (225) pav't.
2.01 cu. yds. (1.58 m³) concrete for 10 (250) pav't.

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

STANDARD 606006-04

(Sheet 2 of 2)
shoulder
paved
Edge of
casting
Drainage
joint
Expansion
joint
Contraction
joints

No. 4 (No. 13) rebar
placed at mid-depth (one each side of casting)

1x18 (25x450) dowel bars

placed in prolongation
with pcc shoulder joints
or at 25' (7.6 m) cts.
with HMA shoulders

Flow line

3' (1 m) min.

5' (1.5 m)

6'-0" (1.8 m)

1.45 m)

4'-9" (1.45 m)

450)

18

18

18

18

Rolled edge

Rolled edge

Rolled edge

Rolled edge

1x18 (25x450) dowel bar

Preformed expansion joint
filler, 1 (25) thick (mm),
placed full depth & width.

EXPANSION JOIN

SECTION A-A

SECTION B-B

SECTION C-C

INLET

SECTION D-D

EXAMPLE

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

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

Quadrant A:
Section B-B to C-C = 0.20 cu. yd./ft. (0.50 m³/m).
Section A-A to B-B + (C-C to D-D) = 1.79 cu. yd. (1.37 m³).

Quadrant B:
Section B-B to C-C = 0.20 cu. yd./ft. (0.50 m³/m).
Section A-A to B-B + (C-C to D-D) = 1.79 cu. yd. (1.37 m³).

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))

For all others.

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))

For commercial entrances and 6 (150) for all others.
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.

NOTE

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).
The gutter outlet shall be cast 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 in accordance with details for longitudinal construction joint shown on Standard 420001.

The gutter outlet shall be cast 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 in accordance with details for longitudinal construction joint shown on Standard 420001.

The gutter outlet shall be cast 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 in accordance with details for longitudinal construction joint shown on Standard 420001.

If the average grade of pavement for the distance A-D exceeds 2%, this distance shall be increased 6 (18 m) for each 1% increase in grade.

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

Concrete - cu. yd. (m³) 3.3 (2.5) 6.3 (5)

Cast Iron Grate - Ea. 1 2

Pipe Drain - Dia. in. (mm) 15 (375) 18 (450)

GENERAL NOTES

The gutter outlet shall be cast 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 in accordance with details for longitudinal construction joint shown on Standard 420001.

If the average grade of pavement for the distance A-D exceeds 2%, this distance shall be increased 6 (18 m) for each 1% increase in grade.

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

Tie bars shall be installed in all joints when the gutter is constructed adjacent to flexible pavement.

Two 1-1/4 x 18 (32 x 450) dowel bars shall be installed in all joints when the gutter is constructed adjacent to flexible pavement.

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

Section (C-C to B'-B') + (B-B to A-A) = 0.44 cu. yd. (0.34 m³)

Section B'-B' to B-B = 0.076 cu. yd./ft. (0.19 m³/m)

QUANTITY OF CONCRETE

Section A-A to C-C
0.64 cu. yd. (0.49 m³)

Section (C-C to B'-B') + (B-B to A-A) = 0.44 cu. yd. (0.34 m³)

Section B'-B' to B-B = 0.076 cu. yd./ft. (0.19 m³/m)

QUANTITY OF CONCRETE

Section A-A to C-C
0.64 cu. yd. (0.49 m³)

Section (C-C to B'-B') + (B-B to A-A) = 0.44 cu. yd. (0.34 m³)

Section B'-B' to B-B = 0.076 cu. yd./ft. (0.19 m³/m)

GENERAL NOTES

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

Two 1-1/4 x 18 (32 x 450) dowel bars shall be installed in all joints when the gutter is constructed adjacent to flexible pavement.

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

Section (C-C to B'-B') + (B-B to A-A) = 0.44 cu. yd. (0.34 m³)

Section B'-B' to B-B = 0.076 cu. yd./ft. (0.19 m³/m)

QUANTITY OF CONCRETE

Section A-A to C-C
0.64 cu. yd. (0.49 m³)

Section (C-C to B'-B') + (B-B to A-A) = 0.44 cu. yd. (0.34 m³)

Section B'-B' to B-B = 0.076 cu. yd./ft. (0.19 m³/m)

GENERAL NOTES

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

Two 1-1/4 x 18 (32 x 450) dowel bars shall be installed in all joints when the gutter is constructed adjacent to flexible pavement.

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

Section (C-C to B'-B') + (B-B to A-A) = 0.44 cu. yd. (0.34 m³)

Section B'-B' to B-B = 0.076 cu. yd./ft. (0.19 m³/m)

GENERAL NOTES

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

Two 1-1/4 x 18 (32 x 450) dowel bars shall be installed in all joints when the gutter is constructed adjacent to flexible pavement.

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

Section (C-C to B'-B') + (B-B to A-A) = 0.44 cu. yd. (0.34 m³)

Section B'-B' to B-B = 0.076 cu. yd./ft. (0.19 m³/m)

GENERAL NOTES

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

Two 1-1/4 x 18 (32 x 450) dowel bars shall be installed in all joints when the gutter is constructed adjacent to flexible pavement.

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

Section (C-C to B'-B') + (B-B to A-A) = 0.44 cu. yd. (0.34 m³)

Section B'-B' to B-B = 0.076 cu. yd./ft. (0.19 m³/m)

GENERAL NOTES

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

Two 1-1/4 x 18 (32 x 450) dowel bars shall be installed in all joints when the gutter is constructed adjacent to flexible pavement.

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

Section (C-C to B'-B') + (B-B to A-A) = 0.44 cu. yd. (0.34 m³)

Section B'-B' to B-B = 0.076 cu. yd./ft. (0.19 m³/m)

GENERAL NOTES

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

Two 1-1/4 x 18 (32 x 450) dowel bars shall be installed in all joints when the gutter is constructed adjacent to flexible pavement.

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

Section (C-C to B'-B') + (B-B to A-A) = 0.44 cu. yd. (0.34 m³)

Section B'-B' to B-B = 0.076 cu. yd./ft. (0.19 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.

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
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F

OUTLET

Welded wire reinforcement (not less than 50 lbs./100 sq. ft. (2.63 kg/m²)) to begin here.

Sections 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).

Illinois Department of Transportation
ENGINEER OF POLICY AND PROCEDURES
ENGINEER OF DESIGN AND ENVIRONMENT

STANDARD 606201-04

(INLET, OUTLET & ENTRANCE)

1-1-97
PASSED

12 (300) 9 (225)
18 (450)
18 (450)

18 (450)
18 (450)

18 (450)
18 (450)

18 (450)
18 (450)
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.

**GRATE AND COVER TYPE 2B**

**OUTLETS TYPE 2 FOR TYPE B GUTTER**

**STANDARD 606211-04**

**Tie bars**

**Edge of pavement**

**Plan - Single Outlet**

**Plan - Double Outlet**

**Section F-F**

**Section E-E**

**Section A-A**

**Section B-B**

**Section C-C**

**Section D-D**

**Section H-H**

**Section G-G**

**Quantities**

<table>
<thead>
<tr>
<th>Material</th>
<th>Single</th>
<th>Double</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete - cu. yd. (m³)</td>
<td>1.47</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>12</td>
<td>15</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.
Typical Plan of Median Island

Typical Plans of Corner Islands

TYPICAL PLAN OF MEDIAN ISLAND

(SEE SHEET 2 FOR DETAILS OF RAMPED NOSES)

INTERMEDIATE ISLAND

(FOR RIGHT TURN LANE DESIGN)

SMALL ISLAND

TYPICAL PLANS OF CORNER ISLANDS

(SEE SHEET 2 FOR DETAILS OF RAMPED NOSES)

NOTE:
The blockouts 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)

GENERAL NOTES

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.

See Standard 420001 and 606001 for details not shown.

* ½ (20) PEJF conforming to the full cross section of the curb, gutter and median surface.

X = PCC base course plus HMA thickness.

t = Pavement or pcc base course thickness.

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

PC CONCRETE ISLANDS

AND MEDIANS

STANDARD 606301-04

(Sheet 1 of 2)
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.

Engineering Division

Illinois Department of Transportation

PASSED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

APPROVED

DATE

REVISIONS

4.1.16

4.1.16

1.1.09

Switched units to English (metric).

ILLINOIS DEPARTMENT OF TRANSPORTATION

CORRUGATED PC CONCRETE MEDIANS

STANDARD 606306-04
shoulder

PCC or HMA

PCC slab

shoulder

PCC or HMA

of pavement

Outside edge

with existing joints in

pavements.

Joints in prolongation

with existing joints in

pavements.

No. 6x30 (No. 19x750)

Tie bars or expansion

anchor ties at 36 (900) cts.

Slope (Std. 483001 or 482001)

No. 5x15 (No. 16x380)

Tie bar at 36 (900) cts.

PCC or HMA shoulder

PCC slab

ANCHOR BOLT

(u3, u4, or u6)

Pipe drain

12 (300) min.

13 (330)

6 (150)

4% (65)

(u1, u2, or u5)

Pipe Elbow

Inlet box

Inside width

Inside length

SHOULDER INLET

WITH CURB

PLAN

No. 4 (No. 13) bars or 3 (75) cts. each
direction (Typ.)

Improved subgrade

Hex bolt

Concrete collar

Anchor bolt

u bars

End section

(see Standard 542401)

65 (1650)

18 (450)

16 (400)

7.5 (1900)

15'-0" (4.5 m)

min.

5'-0" (1.5 m)

max.

5'-0" (1.5 m)

min.

10'-0" (3.0 m)

4'-4" (1.325 m)

3'-11" (1.195 m)

2'-6" (0.780 m)

1'-10" (0.365 m)

12 (300)

Pipe outlet, anchor bolts, rebar

end section (Typ.)

Cut bar to fit

PCC slab thickness

same as adjacent

shoulder.

 alike as adjacent

shoulder

Pipe drain

(600x600x600)

thrust block 24x24x24

Cast in place concrete collar

(4 6 0)

1 8

6 (150)

1 5 4

1 3 7

1 9 2

4 (100)

A

B

C

B

C

A

C

B

A

B

C

12 3 (330)

8 (200)

SECTION B-B

INLET TYPE

SHOULDER WIDTH

O-O GRATING FRAME

INLET BOX

INSIDE WIDTH

INLET BOX INSIDE LENGTH

Type E

8" (203.2 mm)

4'-4" (1.325 m)

3'-11" (1.195 m)

18 (460)

Type F

10" (254 mm)

6'-5" (1.960 m)

6'-9" (2.063 m)

18 (460)

Type G

5'-11.5" (1.812 m)

27 (690)

22 (558)

18 (460)

Bolt (M20)

END OF SHEET

DATE

REVISIONS

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-18

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-18

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-18

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-18

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-20

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-20

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-20

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-21

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-20

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-20

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-20

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-20

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-20

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-20

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-20

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-20

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-20

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-20

Revised Section B-B, precast

box outlet, anchor bolts, rebar

and curb details. Added pipe

elebbs and WWR note.

1-1-20
DETAIL C

SECTION D-D

6% (175) 6% (162) 6% (136) 6% (135) 5% (72) 5% (135)

SECTION C-C

DETAIL OF CAST GRATE

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

BARS u1, u2, & u5

25% (70) 25% (59)

BARS u3, u4 & u6

7'-5" (2.26 m) 5'-10" (1.83 m)

25% (60) 25% (59)

SECTION F-F

27 (690) Type G, 4'-4" (1.325 m) Type E
or 6'-10" (2.03 m) Type F

SECTION E-E

DETAIL OF CAST FRAME

(Type E shown)

INLET BOX

REQUIRED MATERIAL

TYPE F

<table>
<thead>
<tr>
<th>Bar</th>
<th>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>12'-6&quot; (3.78 m)</td>
</tr>
<tr>
<td>u3</td>
<td>4</td>
<td>No. 4</td>
<td>7'-0&quot;  (2.14 m)</td>
</tr>
</tbody>
</table>

Concrete

No. 500 (250)

Rein. bars

No. 4 (69)

Grating

sq. ft. (2.42 ft²)

(0.22)

TYPE G

<table>
<thead>
<tr>
<th>Bar</th>
<th>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>12'-0&quot; (3.66 m)</td>
</tr>
<tr>
<td>u3</td>
<td>4</td>
<td>No. 4</td>
<td>7'-12&quot; (2.40 m)</td>
</tr>
</tbody>
</table>

Concrete

No. 500 (250)

Rein. bars

No. 6 (99)

Grating

sq. ft. (2.42 ft²)

(0.68)

TYPE E

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>u1</td>
<td>4</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>12'-0&quot; (3.66 m)</td>
</tr>
<tr>
<td>u3</td>
<td>4</td>
<td>No. 4</td>
<td>7'-12&quot; (2.40 m)</td>
</tr>
</tbody>
</table>

Concrete

No. 500 (250)

Rein. bars

No. 6 (99)

Grating

sq. ft. (2.42 ft²)

(0.34)

NOTES

Welded wire reinforcement (WWR) may be used in lieu of reinforcement bars. Only one layer of WWR is permitted to avoid congestion.

SHOULDER INLET
WITH CURB

STANDARD 610001-09

(Sheet 2 of 2)
ELEVATION

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

SECTION A-A
* When "S" is less than 3 and the distance from the back of post is less than 24 (610), 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 26'-0" (7.92 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 Post Construction**

- Post bolt with std. hex nut
- W6x9 (W150x12.75) steel post

**Wood Post Construction**

- Bolt not to extend more than \( \frac{1}{2} \) (6) past nut
- 12x6 (305x152) Rough sawn timber blockout toenailed to post with 160 nails
- Red (200x150) Rough sawn timber post

**Steel Plate Beam Guardrail**

**Wood Block-Out and Steel Post Details**

- Note: All holes \( \frac{3}{8} \) (20) dia.

**Two-Piece Wood Blockout Option**

- Std. flat washer with 16d nails
- Toe nail w/ 16D nail.

---

Illinois Department of Transportation

APPROVED 2019

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

ENGINEER OF POLICY AND PROCEDURES

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

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

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
0 ≤ D < 6 (150 m)

4'-0" (1.2 m) ≤ D ≤ 12'-0" (3.7 m)

GUARDRAIL PLACED BEHIND CURB

Note: "D" shall not exceed 6 (150) for design speeds greater than 45 mph.

<table>
<thead>
<tr>
<th>V</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 6 (0 - 152)</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>&gt; 6 - 18 (&gt; 152 - 458)</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>&gt; 18 - 31 (&gt; 458 - 787)</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>&gt; 31 - 40 (&gt; 787 - 1,02 m)</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

Aggregate backfill (CA 11)

Steel or wood post (steel shown)

ELEVATION

STANDARD 630001-12

STEEL PLATE BEAM GUARDRAIL

ILLINOIS DEPARTMENT OF TRANSPORTATION
APPROVED 2018
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED 1-1-97
ENGINEER OF POLICY AND PROCEDURES

Illinois Department of Transportation
APPROVED 2018
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED 1-1-97
ENGINEER OF POLICY AND PROCEDURES
When connecting to long-span guardrail or flatter, the next post may be the third (farthest from culvert) CRT 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).

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

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

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

8 (200) min.

**Elevation**

**Footings for Post When Impervious Material Is Encountered**

- Steel post
- Aggregate backfill (CA 11)
- Drilled hole
- Ledge line
- Note: Ledge line is top of rock ledge or hard slag fill.

**Finish ground line**

**Table**

<table>
<thead>
<tr>
<th>V</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 6 (0 - 152)</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>&gt; 6 - 18 (152 - 458)</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>&gt; 18 - 31 (458 - 787)</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>&gt; 31 - 40 (787 - 1020)</td>
<td>12 - 0</td>
<td></td>
</tr>
<tr>
<td>&gt; 40 (1020)</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

**Leave-out for Post When Paved Material Is Encountered**

- Steel post
- Aggregate backfill (CA 11)
- HMA or PCC pavement
- Steel post
- Smoothed cored holes with sides
- Leave-out or overlapping material

**Notes**

- If greater than 8 (200) apply footing for post when impervious material is encountered, but do not shorten post.
- Material is encountered at 8 (200) min.
- HMA or Controlled Low-strength material (CLSM)
- Pavement material

**Illinois Department of Transportation**

**Engineer of Policy and Procedures**

**Issued**

**January 1, 2017**

**Passed**

**Standards 630006**

**Non-blocked Steel Plate Beam Guardrail**

(Sheet 2 of 21)
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 LONG-SPAN GUARDRAIL OVER CULVERT

- **Steel posts**:
  - Min. dia. hole: (89 mm) 2
  - Min. dia. hole: (62 mm) 1

- **CRT wood posts**:
  - Min. dia. hole: (181 mm) 8
  - Min. dia. hole: (62 mm) 4

### 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.

### PLAN

- **Long-span guardrail over culvert**
  - Min. (305 mm) 12
  - Min. (305 mm) 12
  - (1.905 m) 6'-3" 6'-3" 12'-6", 18'-9" or 25'-0"

### ELEVATION

- **Steel posts**
- **CRT wood posts**
- Top of culvert
- **Example of guardrail**

### SECTION A-A

- **CRT wood post**
- **SIDE**
- **FRONT**

### STANDARD 630106-02

- **DATE**: 1-1-11
- **REVISIONS**:
  - 1-1-17: Revised general notes for non-blocked guardrail option.
  - 1-1-17: Revised pay limits.
  - 1-1-17: Added min. dim. from guardrail to headwall. Added dim. rail to section A-A.
Pay limits of Guardrail Attached to Culvert

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

 wśród (non-blocked guardrail shown)

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

(blocked guardrail shown)

See DETAIL A for attachment to post.

See DETAIL B for assembly and mounting details

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.

WEAK POST GUARDRAIL
ATTACHED TO CULVERT

(Non-blocked guardrail shown)

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

(Blocked guardrail shown)
**CROSS SECTION**

**CASE I, (H+T-R) < 18 (457), TOP MOUNT**

- Steel post
- $\frac{3}{4} \times 5$ (M16 x 22) hex bolt and nut
- Two $\frac{3}{8} \times 2$ (M13 x 50) hex bolts and nuts
- Greater of $\frac{3}{16}$ (130) or $\frac{1}{2} \times 2\frac{5}{16}$ (R=64)

* For $R$ greater than 3 (76) provide BRACKET A. For $R$ less than or equal to 3 (76) provide BRACKET B.

* R varies between 0 to 6 (152)

**ELEVATION**

- Two $\frac{3}{8} \times 7$ (M19 x 178) threaded rods secured with chemical adhesive

**TOP VIEW**

- For $R$ greater than 3 (76) provide BRACKET A. For $R$ less than or equal to 3 (76) provide BRACKET B.

**SIDE VIEW**

- Two expansion bolts

**FRONT VIEW**

- Steel post

**WEAK POST GUARDRAIL ATTACHED TO CULVERT**

* For $R$ greater than 3 (76) provide BRACKET A. For $R$ less than or equal to 3 (76) provide BRACKET B.

* R varies between 0 to 6 (152)
For R greater than 3 (76) provide BRACKET A. For R less than or equal to 3 (76) provide BRACKET B. (BRACKET A shown)

* R varies between 0 to 6 (152)

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

ELEVATION

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

SOCKET ASSEMBLY
FOR CASES II & III
CROSS SECTION
CASE IV, (H+T-R) > 18 (457), TOP MOUNT

ELEVATION

TOP VIEW

SIDE VIEW

FRONT VIEW

SOCKET ASSEMBLY
FOR CASE IV

Steel post

\% x 5
(M16 x 127) hex bolt and nut

Socket assembly

Two ½ x 7 (M19 x 178) threaded rods secured with chemical adhesive

Two ½ x 7 (M13 x 178) threaded rods secured with chemical adhesive

* R varies between 0 to 6 (152)

HSS 4 x 4 x \% with chemical adhesive

H

(102)

(10)

(19)
dia.

(114)

(51)

(114)

(10)

(8)

(3)

70 xx

% (10)

% (10)

% (10)

12 (305)

min.

Illinois Department of Transportation

January 1, 2020

ENGINEER OF POLICY AND PROCEDURES

APPROVED

January 1, 2020

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-17

PASSED

WEAK POST GUARDRAIL
ATTACHED TO CULVERT

STANDARD 630111-01

(Sheet 4 of 6)
Steel post

% x 5
(M16 x 127)

hex bolt
and nut

Socket assembly

Two % x 7 (M13 x 178) threaded rods secured with chemical adhesive

* R varies between 0 to 6 (152)

CROSS SECTION

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

Steel post

% x 5
(M16 x 127)

hex bolt
and nut

Socket assembly

Two % 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) \( \geq 18 \) (457), SIDE-MOUNT ANCHORED
New standard.

Steel post

2 x 10 (50 x 254) S4S treated timber. Install flush with top of post.

A

ELEVATION WITH
W-BEAM GUARDRAIL

Top of post and timber

½ (6) gap where boards meet

VIEW A-A

Four bolts shown where boards meet. Only two required for continuous board.

Top of W-beam guardrail

B

ELEVATION WITH
THREE-BEAM GUARDRAIL

Top of post and timber

½ (6) gap where boards meet

VIEW B-B

Four bolts shown where boards meet. Only two required for continuous board.

Top of three-beam guardrail

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

GENERAL NOTES

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

Illinois Department of Transportation

January 1, 2017

ENGINEER OF POLICY AND PROCEDURES
APPROVED
January 1, 2017

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

PASSED

DATE

REVISIONS

1-1-17 New standard

STANDARD 630116

BACK SIDE PROTECTION
OF GUARDRAIL
See Standard 630001 for detail of wave-out for guardrail line posts.

Variable width

Steel plate beam guardrail

Proposed HMA stabilization 36 (900) & var.

12 (610) min.

Variable

New grade line of shoulder

Variable slope

Transition to normal shoulder slope

Variable end treatment depending on

Proposed PCC/HMA stabilization 36 (900) & var. (material same as shoulder)

24 (610) min.

Variable

Proposed standard shoulder paved width

Proposed HMA shoulder surface

Existing standard shoulder paved width

12 (610) min.

Variable

Slope 1:1 max.

New grade line of shoulder

Variable slope

Proposed PCC/HMA shoulder

Existing PCC/HMA shoulder

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.

DATE

REVISIONS

1-1-17

Revised wave-outs, moved dimensions to Standard

630001

1-1-09

Switched units to

English (metric).

PCC / HMA

STABILIZATION AT STEEL

PLATE BEAM GUARDRAIL

STANDARD 630201-07
**SHOULDER WIDENING TRANSITION**

**FOR TANGENT TERMINAL**

**SECTION A-A**

(Notes: Impact head omitted for clarity.)

- **Edge of pavement**
- **Edge of shoulder and guardrail extruder head**
- **Top of rail**
- **Top of tube**

**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**
1-1-19

**REVISIONS**

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

1-1-19 Omit posts from ‘Pay’ notes of other type.

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

Variable:
- 38' (11.6 m) min.
- 42' (12.8 m) max.

Slope 1:10 or flatter

- Top of tube: 24.5' (7.5 m) min.

35'-0" (10.0 m) min.
100'-0" (30.0 m) desirable

5'-0" (1.5 m) min.
22'-6" (7.0 m) min.
25'-0" (7.5 m) min.
100'-0" (30.0 m) desirable
35'-0" (10.0 m) min.

Specifications to manufacturer's specifications.

Flare according to manufacturer's specifications.

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

Section B-B

(Impact Head omitted for clarity.)
BEARING PLATE K

WOOD POST

WOOD POST

STEEL TUBE

CABLE STRUT

GENERAL NOTES

See Standard 630001 for details of guardrail not shown.

The bearing plate K shall be held in position by two eight penny nails driven into the post and bent over the top of the plate.

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

TRAFFIC BARRIER TERMINAL, TYPE 1B

STANDARD 631006-08
**Diagram of Traffic Barrier Terminal Type 2**

**BEARING PLATE K**
- ½ (39) Dia. hole
- ½ (19) Dia. hole
- ½ (22) Dia. hole

**WOOD POST**
- ½ (68) Dia. hole
- 5% (140) Dia. hole
- ½ (25) Dia. hole

**YOKE**
- ⅛ (15) Thick steel

**CABLE STRUT**
- ⅛ Ø x 2 (22 x 51) Slotted

**STEEL TUBE**
- C & Symmetrical
- 6 - 8 (LS3)

**GENERAL NOTES**
- See Standard 630001 for details of guardrail not shown.
- The bearing plate K shall be held in position by two eight penny nails driven into the post and bent over the top of the plate.
- All dimensions are in inches (millimeters) unless otherwise shown.

**TRAFFIC BARRIER TERMINAL TYPE 2**

**PLAN**
- Lapped rail over end section
- To center of first bolt-hole in anchor plate.

**ELEVATION**
- Lap rail over end section
- Lapped rail over plate K.

**STANDARD 631011-10**
TRAFFIC BARRIER TERMINAL TYPE 5 (one each)

Pay limits of other type

<table>
<thead>
<tr>
<th>Pay limits of other type</th>
<th>375</th>
<th>430</th>
<th>2056</th>
<th>2466</th>
</tr>
</thead>
<tbody>
<tr>
<td>plating E and rail element.</td>
<td>(955)</td>
<td>(1.985 m)</td>
<td>(523)</td>
<td>(667)</td>
</tr>
</tbody>
</table>

When a rail element is placed adjacent to a tapered surface, use timber wedge M between the concrete and plate G.

Place bolts with plate washer F placed under head and nut.

When an expansion joint exists below the concrete, bolts shall be provided with a locknut or double nuts and shall be tightened only to a point that will allow plate G to be free to move.

See Standard 631026-06 for details of guardrail not shown.

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

Revised post spacing

Install plate washer D so 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.

GENERAL NOTES

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 631001 for details of guardrail not shown.

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

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.

**DATE**

1-1-21

1-1-20

**REVISIONS**

Added Detail A and revised plate dimensions on sheet 4.

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

TRAFFIC BARRIER TERMINAL, TYPE 6

(STANDARD 631031-17)
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.

Approach curb, see plans for details.

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

<table>
<thead>
<tr>
<th>Length</th>
<th>Type</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>12'-6&quot;</td>
<td>3.81 m</td>
<td>Two sections of thrie beam, one set inside the other</td>
</tr>
<tr>
<td>6'-3&quot;</td>
<td>1.91 m</td>
<td>Single section of thrie beam</td>
</tr>
<tr>
<td>6'-3&quot;</td>
<td>1.91 m</td>
<td>Transition section of thrie beam</td>
</tr>
<tr>
<td>12'-6&quot;</td>
<td>3.81 m</td>
<td>Single section of w-beam when no curb is present within this limit.</td>
</tr>
</tbody>
</table>

**PLAN**

Pay limits of other type

**ELEVATION**

24 (610) min. all posts

Wood Blockout

<table>
<thead>
<tr>
<th>Slope 1:10 or flatter</th>
</tr>
</thead>
</table>

W6x9.0 (W150x13.5) Steel post, typ.

**SECTION B-B**

TRAFFIC BARRIER TERMINAL, TYPE 6

(Sheet 2 of 4)

Illinois Department of Transportation

STANDARD 631031-17
THREE BEAM END SHOE DETAIL

POSTS 1-11 WOOD BLOCKOUT DETAIL

(See Standard 630001 for post 13-17 blockouts.)

PARAPET STEEL BEARING PLATE DETAIL

(5 each individual 5x3x9 (123x76x23) steel plates with centered 1 (25) holes may be substituted for the plate shown.)

TRAFFIC BARRIER
TERMINAL, TYPE 6

STANDARD 631031-17
STEEL CONNECTOR PLATE FOR CONSTANT SLOPE

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></td>
<td>$20 \times 20$ ($508 \times 508$)</td>
<td>(10)</td>
</tr>
<tr>
<td>P2</td>
<td>2</td>
<td></td>
<td>$19\frac{1}{2} \times 20 \times 27\frac{3}{4}$ ($492 \times 508 \times 706$)</td>
<td>(10)</td>
</tr>
<tr>
<td>P3</td>
<td>2</td>
<td></td>
<td>$20 \times 3\frac{1}{2} \times 37\frac{3}{8} \times 37\frac{3}{8}$ ($508 \times 95 \times 956 \times 6 \times 456$)</td>
<td>(10)</td>
</tr>
<tr>
<td>S1</td>
<td>4</td>
<td></td>
<td>$18\frac{3}{4} \times \frac{1}{4} \times 26\frac{5}{8} \times 3\frac{5}{8}$ ($465 \times 6 \times 673 \times 95$)</td>
<td>(10)</td>
</tr>
<tr>
<td>S2</td>
<td>1</td>
<td></td>
<td>$19\frac{3}{4} \times 13\frac{3}{4} \times 8\frac{5}{6} \times 8\frac{5}{6}$ ($333 \times 44 \times 205 \times 10 \times 175$)</td>
<td>(10)</td>
</tr>
</tbody>
</table>

Steel connector plate shall be AASHTO M 270 Grade 36 (M 270M Grade 250) steel and galvanized according to AASHTO M 311.

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

DETAIL A
(Back side of plate shown)

WELDING INSTRUCTION
(Back side of plate shown)

PLATE AND STIFFENER IDENTIFICATION
(Back side of plate shown)

STEEL CONNECTOR PLATE FOR CONSTANT SLOPE

TRAFFIC BARRIER
TERMINAL, TYPE 6
(Sheet 4 of 4)

STANDARD 631031-17
For side-mount bridge rail, flare curb face to edge of deck.

Bridge approach curb, see plans for details.

Two sections of thrie beam, one set inside the other

Single section of w-beam when no curb is present

Transition section (see detail) included in TRAFFIC BARRIER TERMINAL TYPE 6.
Bolts (A307) with washers and self-locking nut, or nut and jam nut. Top bolt $\frac{3}{8}$x9 (22x229). Bottom bolt $\frac{3}{8}$x5 (22x127) for curb mount or $\frac{3}{8}$x7 (22x179) for side mount.

**Note:** Side mounted rail similar to connection details.

**Finished surface**

**SECTION C-C**

**POSTS 1-9 WOOD BLOCKOUT DETAIL**

(See Standard 630001 for post 11-15 blockouts.)

**POST 10 WOOD BLOCKOUT DETAIL**

**MODIFIED THRIE BEAM END SHOE DETAIL**

**TRANSITION SECTION**

(16 gauge (3.4) rail element)

**TRAFFIC BARRIER
TERMINAL, TYPE 6A**

**STANDARD 631032-09**
**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 6B**

**STANDARD 631033-08**
4-2 Unit expanding, or self-drilling anchors for % (M16) bolts with standard washers.

Washer D and locknut.

Bolt with plate

1x4 (M24x102) Machine bolt with plate washer D and locknut.

4 Epoxy grouted % (M22) anchor bolts with standard washers. **

**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.

For details of guardrail not shown, see Standard 630001.
Face of bridge rail

sections of thrie beam

transition section of thrie beam

Pay limits of TRAFFIC BARRIER TERMINAL TYPE 13 (1 each)

Pay limits of other type

PLAN

SECTION A-A

Posts 1-3

SECTION B-B

* Posts 4-8
** Post 9

GENERAL NOTES

This standard shows attachment to side mounted bridge railing, Type IL-OH.

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 13

(Sheet 1 of 3)

STANDARD 631061
ANGLE CUT TUBE ASSEMBLY

END PLATE

THRU (TYP.)

THRU (TYP.)

End plate

Tube

Middle Transition Rail Assembly (Type IL-OH)

2 - ⅞ (19) dia. x 21 (533) Round head bolts

with heavy hex locknuts and flat washers

Bottom Transition Rail Assembly (Type IL-OH)

5 - ¾ (19) dia. x 7½ (191) Round head bolts

with heavy hex locknuts and flat washers

559

36

24

12

6

⅞ (22) dia.

thru (typ.)

⅞ (22) dia.

thru (typ.)

⅛ (6) Radius

⅛ (6) Radius

PLAN

ELEVATION

PLAN

ELEVATION

SECTION C-C

ANGLE CUT TUBE ASSEMBLY - END PLATE

PLAN

ELEVATION

BRIDGE RAIL CONNECTION DETAIL

Middle Transition Rail Assembly (Type II-OH)

2 - ⅞ (19) dia. x 21 (533) Round head bolts

with heavy hex locknuts and flat washers

Bottom Transition Rail Assembly (Type II-OH)

5 - ¾ (19) dia. x 7½ (191) Round head bolts

with heavy hex locknuts and flat washers

⅞ (22) dia.

thru (typ.)

⅞ (22) dia.

thru (typ.)

⅛ (6) Radius

⅛ (6) Radius

PLAN

ELEVATION
Delineators shall be placed 24 (600) feet from break point on all interchange ramps and wherever pavement superelevation exceeds 6% and wherever pavement on all interchange ramps 24 (600) feet from break point. Delineators shall be placed at a maximum spacing of 100' (30 m).

Reflexors may be used on outside of lanes. Single reflector units shall be used on outside of all acceleration and deceleration lanes. Double reflector units shall be used on the outside of all acceleration and deceleration lanes. Delineators on ramps and acceleration and deceleration roadways shall be placed at 400' (120 m) spacing. Delineators on tangent sections of main line roadways shall be placed at 800' (240 m) spacing of 100' (30 m).

Refer to Standard 720011 for details of metal post.

Double reflector units shall be used on the outside of all acceleration and deceleration lanes. Single reflector units shall be used on ramps. Delineators shall be used on outside of all curved sections of ramps.

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

SPACING FOR DELINEATORS ON HORIZONTAL CURVES

<table>
<thead>
<tr>
<th>Radius of Curve</th>
<th>Spacing on Curve</th>
<th>1st Space (m)</th>
<th>2nd Space (m)</th>
<th>3rd Space (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 100</td>
<td>20 (5)</td>
<td>40 (10)</td>
<td>60 (15)</td>
<td>80 (20)</td>
</tr>
<tr>
<td>(100 - 174)</td>
<td>30 (7.5)</td>
<td>60 (15)</td>
<td>90 (22.5)</td>
<td>120 (30)</td>
</tr>
<tr>
<td>(175 - 224)</td>
<td>35 (8.8)</td>
<td>70 (17.5)</td>
<td>100 (25)</td>
<td>125 (32.5)</td>
</tr>
<tr>
<td>(225 - 274)</td>
<td>40 (10)</td>
<td>80 (20)</td>
<td>100 (25)</td>
<td>125 (32.5)</td>
</tr>
<tr>
<td>(275 - 349)</td>
<td>50 (12.5)</td>
<td>95 (24)</td>
<td>120 (30)</td>
<td>150 (38)</td>
</tr>
<tr>
<td>(350 - 449)</td>
<td>55 (14)</td>
<td>110 (28)</td>
<td>140 (35)</td>
<td>170 (43)</td>
</tr>
<tr>
<td>(450 - 549)</td>
<td>60 (15)</td>
<td>125 (32)</td>
<td>150 (38)</td>
<td>190 (48)</td>
</tr>
<tr>
<td>(550 - 649)</td>
<td>65 (16.5)</td>
<td>140 (36)</td>
<td>170 (43)</td>
<td>200 (50)</td>
</tr>
<tr>
<td>(650 - 749)</td>
<td>70 (18)</td>
<td>150 (38)</td>
<td>200 (50)</td>
<td>250 (63)</td>
</tr>
<tr>
<td>(750 - 849)</td>
<td>75 (19)</td>
<td>165 (41)</td>
<td>225 (57)</td>
<td>300 (76)</td>
</tr>
<tr>
<td>(850 - 949)</td>
<td>80 (20)</td>
<td>180 (45)</td>
<td>275 (69)</td>
<td>400 (100)</td>
</tr>
<tr>
<td>(950 - 1049)</td>
<td>85 (21)</td>
<td>190 (48)</td>
<td>350 (89)</td>
<td>600 (150)</td>
</tr>
<tr>
<td>(1050 - 1249)</td>
<td>90 (23)</td>
<td>200 (50)</td>
<td>500 (125)</td>
<td>1000 (250)</td>
</tr>
<tr>
<td>(1350 - 1649)</td>
<td>100 (25)</td>
<td>225 (57)</td>
<td>700 (175)</td>
<td>2000 (500)</td>
</tr>
<tr>
<td>(1650 - 1999)</td>
<td>125 (32)</td>
<td>275 (69)</td>
<td>1000 (250)</td>
<td>4000 (1000)</td>
</tr>
<tr>
<td>(1999 - 2400)</td>
<td>150 (38)</td>
<td>350 (89)</td>
<td>2000 (500)</td>
<td>10000 (2500)</td>
</tr>
<tr>
<td>(2400 - 2999)</td>
<td>200 (50)</td>
<td>500 (125)</td>
<td>4000 (1000)</td>
<td>20000 (5000)</td>
</tr>
<tr>
<td>(2999 - 3499)</td>
<td>250 (63)</td>
<td>750 (190)</td>
<td>10000 (2500)</td>
<td>50000 (12500)</td>
</tr>
<tr>
<td>(3499 - 4000)</td>
<td>300 (75)</td>
<td>1000 (250)</td>
<td>20000 (5000)</td>
<td>100000 (25000)</td>
</tr>
<tr>
<td>(4000 or greater)</td>
<td>400 (100)</td>
<td>20000 (5000)</td>
<td>50000 (12500)</td>
<td>100000 (25000)</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).

Refer to Standard 720011 for details of metal post.

Double reflector units shall be used on the outside of all acceleration and deceleration lanes. Single reflector units shall be used on ramps. Delineators shall be used on outside of all curved sections of ramps.

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

### General Notes

- The cross sections are shown for the protection of the general notes.

- All notes are applicable to all sections of the cable road guard unless otherwise noted.

### Table: Typical Wood Materials

<table>
<thead>
<tr>
<th>Item</th>
<th>Size</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post</td>
<td>Block</td>
<td>Rail</td>
</tr>
<tr>
<td></td>
<td>(150x100x1.83 m)</td>
<td>(50x300x450)</td>
</tr>
<tr>
<td></td>
<td>4x4x6'-0&quot;</td>
<td>2x12x18</td>
</tr>
<tr>
<td></td>
<td>(50x150x150)</td>
<td>2x6x6</td>
</tr>
</tbody>
</table>

### Diagram: Footings for Post and Anchor

- Edge of shoulder post
- Dummy post
- Plate E post end
- See DETAIL H
- Cable end ground line with concrete post hole shall be filled to
- When V is 6 (150) or less, See DETAIL J
- Ledge concrete

### Footings Arrangement

- End anchor arrangement
- Intermediate anchor arrangement
- Dead end anchor arrangement

### Notes

- When impervious material is encountered:
  - $V = 15$ (380) when $U = 33$ (840) or less,  
  - posts shall be used.
- When $U$ exceeds 33 (840), the impervious material for anchoring.
- The Engineer will determine the stability of the deadman and general note.
**TYPICAL CROSS-SECTION**

- Height: 44 in. (1120 mm)
- Double face, concrete barrier
- Bond breaker: Polyethylene, 6 mils (0.15 mm)
- Shoulder: 10.9° permitted
- Batter: 1:48 permitted when the barrier is confined by earth.

**VARIABLE CROSS-SECTION**

- Existing PCC base
- New or existing HMA / PCC base
- New or existing PCC base with longitudinal joint

**GENERAL NOTES**

- The Variable Cross-Section shall be used when there is a difference in base 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.

**FIVE ANCHORING METHODS**

1. **NEW MONOLITHIC PCC BASE w/ KEYWAY**
   - This dimension shall be 10 (250) min. when the barrier is confined by earth.

2. **NEW OR EXISTING HMA / PCC BASE w/ HMA OVERLAY CONFINEMENT**
   - No. 6 (No. 19) Hook bars at 30 (760) cts.

3. **NEW OR EXISTING PCC BASE w/ HOOK BARS**
   - New or exist. PCC base

4. **EXISTING PCC BASE WITH LONGITUDINAL JOINT**
   - 6 mils (0.15 mm) Polyethylene bond breaker

5. **HOOK BAR DETAIL** (Side View)
   - 1:48 batter

**CONCRETE BARRIER, DOUBLE FACE, 44 in. (1120 mm) HEIGHT**

**DATE** | **REVISIONS**
--- | ---
1-1-71 | Revised Typical and Variable Cross-Sections. Added keyway anchor method and hook bars.
1-1-19 | Revised from F-shape to constant

**STANDARD 637006-05**
**EXPANSION JOINT**

- Smooth header drilled for bars
- Dowel bars w/ plastic caps
- Preformed expansion joint filler

**CONSTRUCTION JOINT**

- 1½x18 (32x450) Dowel bars

---

**PLAN AT LIGHTING FOUNDATION**

- 7 in. (180 mm) Drilled for bars
- PVC sleeve for grounding electrode
- Conduit

**ELEVATION AT LIGHTING FOUNDATION**

- 4½ (38) w/ 4D grounding electrode
- Anchor rod

---

**CONCRETE BARRIER, DOUBLE FACE, 44 in. (1120 mm) HEIGHT**

Illinois Department of Transportation

ENGINEER OF POLICY AND PROCEDURES

APPROVED

January 1, 2021

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

PASSED

STANDARD 637006-05
Expansion Joint

No. 4 (No. 13) Bar 18 (450) long (typ.)

Bend in field screen

Concrete glare

(750)

3

barrier

Concrete

(750)

30

(2.1 m)

7'-0"

and spacing in concrete barrier)

(Joints to match joint type at 4'-0'' (1.2 m) ± cts.

No. 4 (No. 13) Bars

(300)

12

(typ.)

12

(typ.)

12

(typ.)

3

2 (50) min.

2 (50) min.

1/4 (13) Chamfer

(typ.)

typ.)

Center on concrete barrier

23 (600) min.

6 (150)

8

(200)

10

(480)

19

dependent upon geometrics

Necessity for glare screen is

TYPICAL APPLICATION AT MEDIAN OBSTRUCTIONS

Concrete barrier

Concrete glare screen

Glare Screen

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

DATE

REVISIONS

1-1-97

Switched units to English (metric).

1-1-04

Revised for F shape barrier.

January 1, 2009

ENGINEER OF POLICY AND PROCEDURES

APPROVED

January 1, 2009

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

PASSED

DATE

REVISIONS

1-1-09

English (metric).

January 1, 2009

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

General Notes

Loading for 80 mph (130 km/h) wind with 30% gust factor, normal to wall.  

Allowable Stresses:

Concrete:
- $f_c = 3,300$ psi (24 MPa)
- $f_{ct} = 3,250$ psi (22 MPa)

 Prestressing Steel:
- $f_y = 270,000$ psi (1860 MPa)
- $f_{ps} = 169,000$ psi (1100 MPa)

 Reinforcing Steel:
- $f_y = 40,000$ psi min. (270 MPa)
- $f_{ps} = 20,000$ psi (138 MPa)

 Structural Steel:
- Minimum allowable stress: $f = 36,000$ psi (250 MPa)

 Bearing pressure:
- $= 1.25$ psf (120 kPa)

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

**Construction:**

- 36 (900) min. embankment at low point of finished grade (typ.)

**Bolts:**
- $\frac{1}{4}$ (6x65) plate, bent to wall configuration
- $\frac{1}{2}$ (M12) bolt with standard washer
- Threaded inserts for $\frac{1}{4}$ (M12) bolts, precast or field drilled, as necessary, into panels.

**Reinforcement Bars & Connectors:**
- Casting reinforcement bars & connectors dimensions
- Showing typical metal band key dimensions

**Concrete Panel Wall**

**Sight Screen**
Bars No. 4 (No. 13) strands at B cts.

NOTE
Each prestressing strand shall be stressed to 16,000 lbs. (71.2 kN.)

For panels with textured surface finish:

No. 4 (No. 13) bars shall be alternated above and below prestressing strands.

Smooth vertical appearance.

Pitch may vary from 19/3 (65) to 25/3 (83), but shall be constant for entire width of panel.

Panel elevation (Showing location of metal band connector)

Textured surface finish detail
Terminal pull post
Dome type caps on pull posts
Loop type caps on line posts

Tops of all footings shall be rounded

DETAIL A

DETAIL B

DETAIL C

Packet
Line
Truss rod
cable
Tension
buckle

10'-0" (3 m) (max.) post spacing

HEIGHT
POST
SECTION (O.D.)
FENCE
lbs./ft.
(kg/m)

(1.83 m)
6 ft.
4
(13.6)
9.11

(2.43 m)
8 ft.
4
(18.6)
12.51

(3.05 m)
10 ft.
4
(34)
22.85

MINIMUM SOIL PRESSURE

Loading for wind 80 mph (130 km/h)
with 30% gust factor. Minimum allowable soil
pressure = 1.25 tsf (120 kPa).

GENERAL NOTES

Post sizes other than those shown may be used subject
to approval by the Engineer.

Fence fabric shall be tied to all line posts,
tension cable and brace rails with 9 ga.
(3.76) wire tied at 12 (300) cts.

ELEVATION - 6' (1.83 m) FENCE

(Looking toward Highway)

ELEVATION - 8' (2.43 m) & 10' (3.05 m) FENCES

(Looking toward Highway)

SIGHT SCREEN

CHAIN LINK FENCE

(Sheet 1 of 2)

STANDARD 640001-01

DATE
1-1-97

REVISIONS
Revised General Notes.

1-1-09

Switched units to
English (metric).

REVISIONS

(a) Illinois Department of Transportation
Revised March 2010
Approved September 2009
January 1, 2009
ENGINEER OF BRIDGES AND STRUCTURES
APPROVED
January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

1-1-97

1-1-09

REVISIONS

(a) Illinois Department of Transportation
Revised March 2010
Approved September 2009
January 1, 2009
ENGINEER OF BRIDGES AND STRUCTURES
APPROVED
January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

1-1-97

1-1-09

REVISIONS

(a) Illinois Department of Transportation
Revised March 2010
Approved September 2009
January 1, 2009
ENGINEER OF BRIDGES AND STRUCTURES
APPROVED
January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

1-1-97

1-1-09

REVISIONS

(a) Illinois Department of Transportation
Revised March 2010
Approved September 2009
January 1, 2009
ENGINEER OF BRIDGES AND STRUCTURES
APPROVED
January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

1-1-97

1-1-09
**DETAIL B**

(Showing typical method of attaching middle brace rails to posts.)

1. **Malleable iron or pressed steel clamps**
2. **1 3/4 (42) Brace rail**
3. **Malleable iron or pressed steel clamps**

**OR**

1. **Steel clamps**
2. **2 1/2 (102) Post**
3. **Steel clamps**

**PLAN**

1. **9 ga. (3.76) Galvanized steel tie wire or approved clamp**
2. **1 3/16 (10) Dia. cable**

**DETAIL A**

1. **2 1/4 (60x25) or 2 1/4 (60x8) thick wood slat (typ.)**
2. **9 ga. (3.76) Galvanized or aluminum-coated steel wire**
3. **3 1/6 (89x227) diamond mesh**
4. **Knuckled selvages.**

**DETAIL OF FABRIC**

(Looking from highway)

1. **13x9 (80x127) mesh**
2. **9 ga. (3.76) Galvanized steel wire or aluminum-coated steel wire.**
3. **2x6 (6x19) or 2x6 (6x12) thick wood slat (typ.)**

**DETAIL C**

(Looking toward highway)

1. **2 1/4 (60x25) or 2 1/4 (60x8) thick wood slat (typ.)**
2. **9 ga. (3.76) Galvanized or aluminum-coated steel wire**
3. **3 1/6 (89x227) diamond mesh**
4. **Knuckled selvages.**

**SECTION A-A**

(Showing method of fastening bottom tension cable and fence fabric to pull posts.)

1. **0.0: post**
2. **Loop cable around post and tie with an approved cable clamp.**
3. **1/8 (10) Dia. tension cable**
4. **1 3/16 (10) Dia. wood slat (typ.)**
5. **32 ga. x 1 (2.6x25) Slat bar**
6. **Stretcher bar bands at 12 (300) Cts.**

**FENCE INSTALLATION ON SLOPES**

1. **Line post**
2. **Pull post**
3. **Truss rods**
4. **Tension cable**

**PROTECTIVE ELECTRICAL GROUND**

1. **No. 6 stranded, bare copper wire**
2. **Tension cable**
3. **3/8 (16) Dia. min. copper clad steel rod**

**SIGHT SCREEN**

CHAIN LINK FENCE

(APPROVED 1-1-97)

STANDARD 640001-01

(Engineer of Design and Environment)

(Illinois Department of Transportation)

APPROVED January 1, 2009
**DETAIL A**

- 3x4 (75x100) Rails (nominal dim.)
- Pickets vertical with fine across tops parallel to grade
- 7'-4" (2.2 m) Spacing (typ.)

**DETAIL B**

<table>
<thead>
<tr>
<th>Fence Height</th>
<th>Post Size (nominal dim.)</th>
<th>Post Length</th>
<th>Post Embedment</th>
</tr>
</thead>
<tbody>
<tr>
<td>6'-0&quot; (1.8 m)</td>
<td>6x14 (200x300)</td>
<td>10'-0&quot; (3.0 m)</td>
<td>4&quot; (1.2 m)</td>
</tr>
<tr>
<td>8'-0&quot; (2.4 m)</td>
<td>8x18 (300x300)</td>
<td>14'-0&quot; (4.3 m)</td>
<td>6&quot; (1.8 m)</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

- Loading is based on 80 mph (130 km/h) with 30% gust factor. Minimum allowable soil pressure = 1.25 tsf (120 kPa).
- All dimensions are in inches (millimeters) unless otherwise shown.

**SIGHT SCREEN CEDAR STOCKADE FENCE TYPE S**

**STANDARD 641001-01**

**ELEVATION**

- Vertical posts (Typ.)
- Slope rails parallel to grade

**SECTION B-B**

- Notch pickets when required to clear washer and bolt head.

**SECTION A-A**

- 2\(\frac{1}{2}\) (13) dia. holes in timbers.
- Series M12 bolt with std. nut and 1\(\frac{1}{8}\)x4 (32x100) plate washers under nut and bolt head.
- Aggregate for post embedment (typ.)

**PLAN**

- Facing highway

**SPECIFICATIONS**

- Post Size
- Post Length
- Post Embedment

**TABLE**

<table>
<thead>
<tr>
<th>Height</th>
<th>Post Size (nominal dim.)</th>
<th>Post Length</th>
<th>Post Embedment</th>
</tr>
</thead>
<tbody>
<tr>
<td>6'-0&quot;</td>
<td>6x14 (200x300)</td>
<td>10'-0&quot; (3.0 m)</td>
<td>4&quot; (1.2 m)</td>
</tr>
<tr>
<td>8'-0&quot;</td>
<td>8x18 (300x300)</td>
<td>14'-0&quot; (4.3 m)</td>
<td>6&quot; (1.8 m)</td>
</tr>
</tbody>
</table>

---

**Notes:**

- Switched units to English (metric).
- Deleted DN Symbol.
- Approved January 1, 2009.
### Fence Height

<table>
<thead>
<tr>
<th>Fence Height</th>
<th>Post Size (nominal dim)</th>
<th>Post Length</th>
<th>Post Embedment</th>
</tr>
</thead>
<tbody>
<tr>
<td>6'-0&quot; (1.8 m)</td>
<td>3x4 (100x250)</td>
<td>4'-0&quot; (1.2 m)</td>
<td>A</td>
</tr>
<tr>
<td>8'-0&quot; (2.4 m)</td>
<td>4x6 (150x200)</td>
<td>4'-0&quot; (1.2 m)</td>
<td>B</td>
</tr>
<tr>
<td>10'-0&quot; (3.0 m)</td>
<td>4x8 (200x200)</td>
<td>4'-0&quot; (1.2 m)</td>
<td>C</td>
</tr>
<tr>
<td>12'-0&quot; (3.6 m)</td>
<td>4x10 (250x250)</td>
<td>4'-0&quot; (1.2 m)</td>
<td>D</td>
</tr>
</tbody>
</table>

### Plan (Facing highway)

- 3x4 (75x100) Rails (nominal dim.)
- 1x4 (25x100) rough sawn or surfaced wood planks (nominal dim.)

### General Notes

- Loading was based on 80 mph (130 km/h) with 30% gust factor. Minimum allowable soil pressure = 1.25 t/ft² (120 kPa).
- All dimensions are in inches (millimeters) unless otherwise shown.

### Diagrams

- **Detail A**
  - (Showing treatment with sloping ground)
  - Vertical posts of sufficient length to have a minimum of sufficient length to have a minimum of 3 (75) projection to clinch nails in back.

- **Detail B**
  - (Showing typical panel to post connection details)
  - 1/8 (M12) bolt with std. nut and 1 1/4" plate washers (12 x 2) under nut and bolt head. 1/8 (15) dia. holes in timbers.

### SIGHT SCREEN WOOD PLANK FENCE TYPE P

**STANDARD 641006-01**

**DATE** | **REVISIONS**
---|---
1-1-97 | Revised Standard 2367-2.
1-1-99 | Switched units to English (metric). Changed DN Symbol.
1-1-09 | Switched to EN symbols.

**Illinois Department of Transportation**

APPROVED: January 1, 2009

ENGINEER OF BRIDGES AND STRUCTURES

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED: 1-1-97

REVISIONS:
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.
See Section A-A.

6' (1.2 m) preferred, 3' (1.0 m) minimum where the paved shoulder is considered a bicycle accommodation.

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

SHOULDER RUMBLE STRIPS, 8 in.

DATE REVISIONS
1-3-21 Added minimum width of paved shoulder for bicycle accommodations.
1-3-12 New standard.
**ROLL FORMED SECTION OF BRACE**

**ROLL FORMED SECTION OF TERMINAL & GATE POST**

**METHOD OF FASTENING STRETCHER BAR TO POST**

**METHOD OF TYING FABRIC TO TENSION WIRES**

---

**LINE POST**

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Type A 1.90 (48.3) O.D.</td>
<td>1.07 (4.05)</td>
</tr>
<tr>
<td>Pipe Type B 1.90 (48.3) O.D.</td>
<td>1.09 (4.30)</td>
</tr>
<tr>
<td>Pipe Type C 1.90 (48.3) O.D.</td>
<td>1.08 (4.18)</td>
</tr>
<tr>
<td>H 1.875 x 1.625 (47.6 x 41.3)</td>
<td>1.60 (6.36)</td>
</tr>
<tr>
<td>I</td>
<td>1.80 (6.80)</td>
</tr>
</tbody>
</table>

**TERMINAL POST**

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Type A 2.375 (60.3) O.D.</td>
<td>3.65 (16.3)</td>
</tr>
<tr>
<td>Pipe Type C 2.375 (60.3) O.D.</td>
<td>3.11 (14.0)</td>
</tr>
<tr>
<td>Roll Formed 35 x 35 (89 x 89)</td>
<td>3.08 (13.0)</td>
</tr>
<tr>
<td>50 Tubing 2 x 2 x 2 (63.5 x 63.5)</td>
<td>4.21 (18.2)</td>
</tr>
</tbody>
</table>

**HORIZONTAL BRACES**

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Type A 1.66 (42.2) O.D.</td>
<td>1.83 (8.18)</td>
</tr>
<tr>
<td>Pipe Type C 1.66 (42.2) O.D.</td>
<td>1.82 (8.15)</td>
</tr>
</tbody>
</table>

**GATE POSTS**

<table>
<thead>
<tr>
<th>Gate Opening * ft. (m)</th>
<th>Pipe Type A</th>
<th>Sr. Tubing</th>
<th>Pipe Type B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>Double</td>
<td>Single</td>
<td>Double</td>
</tr>
<tr>
<td>Up to 4 (1.2)</td>
<td>Up to 8 (2.5)</td>
<td>2.35 (10.7)</td>
<td>3.70 (16.7)</td>
</tr>
<tr>
<td>Over 4 (1.2) to 6 (1.8)</td>
<td>Over 8 (2.5) to 16 (5.0)</td>
<td>3.875 (15.3)</td>
<td>6.75 (28.8)</td>
</tr>
<tr>
<td>Over 6 (1.8) to 12 (3.6)</td>
<td>Over 16 (5.0) to 24 (7.4)</td>
<td>5.80 (23.5)</td>
<td>8.60 (37.8)</td>
</tr>
</tbody>
</table>

* The 35 x 35 (89 x 89) 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** (ALTERNATE)

**PROTECTIVE ELECTRICAL GROUNDS**

**INSTALLATION ON SLOPES**

**INSTALLATION AT CORNERS**

**INSTALLATION OVER STREAM**

**INSTALLATION AROUND HEADWALL**

The chain link fabric shall be replaced by bared wire strands at 12 (300) maximum centers between the double posts shown on DETAIL A when shown on the plans.

When fence line has a change in direction of 15° or more, a terminal post shall be placed as shown above.

Where angle is less than 15° and existing conditions require a terminal post, they shall be placed as directed by the Engineer.

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.

**PLAN AT STREAM CROSSING**

**PLAN AT HEADWALL**

**ELEVATION AT HEADWALL**

**ELEVATION INSTALLATION AT CORNERS**

**INSTALLATION AT CORNERS**
Fence using metal posts

General notes

- Pull posts shall be placed at the locations determined by the Engineer. They shall be placed at 660' (200 m) intervals between posts to which the ends of the fabric and barbed wires are fastened or midway between such posts when the distance is less than 1320' (400 m) and greater than 660' (200 m).

- Bracing for gate posts shall be the same type used for end posts.

- The clearance between the bottom fence wire and the ground may be up to 3 (75) more than 3 twists tightly wrapped.

- The ground may be up to 3 (75) more than 3 twists tightly wrapped.

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

- 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, alternating on successive posts.

- Barbed wires and line wires of woven fence shall 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.

Concrete (12/1000 Dia. min. typ.)

- Gates over 12' (3.66 m) long, and 2 braces spaced on gates over 12' (3.66 m) long

- Plunger rod and latch with provisions for padlocking

- Center brace on gates 7' (2.13 m) to 12' (3.66 m) long, and 2 braces spaced on gates over 12' (3.66 m) long

- Gate frame

- Padlocking with provisions for gate latch with gate post

- Steel rod (typ.) dia. galvanized (10)

- Truss rod - Gate post

- Truss rod

- Brace (300)

- Gate post

- Ground line

- Gate stop

- Line post

- Woven wire fence

- Barbed wire

- Pull post

- Line post

- Corner or end post

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

DATE

REVISIONS

1:1:02

Corrected dimensions on Sheet 3 and 4

STANDARD 665001-02

(Sheet 1 of 4)
Brace post
Wood brace
Ground line
Wood blocks

Fence shall be overlapped for a distance of 5'-6" (1.67 m) for metal gates are the same as those for metal posts.

Details of the double and single gates are the same as those for metal posts.

Wood blocks nailed to post (typ.)

Wood posts (1.5 m ± 50 mm)

Pull post

Not less than 3 twists tightly wrapped

Fence shall be overlapped for a distance of 5'-6" (1.67 m) for metal posts.

Pull gate post

Fence shall be overlapped for a distance of 5'-6" (1.67 m) for metal posts.

Brace posts

Barbed wire 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.

Wood brace

Corner or end post

Brace wires stapled to posts on 3 sides.

Brace wires

Corner or end post

Brace post

Wood post

Brace wire

Wood blocks

Woven wire fence

Line post

Barbed wire

Line post

Brace post

Brace post

Corner or end post

Two bays of bracing for run of fence 250'-464" (76 m to corner, end, or gate post.

Three bays of bracing for run of fence 360'-972" (110 m) or more to corner, end, or gate post.

Brace posts

Wood brace

Wood posts

Wood blocks

SINGLE OR DOUBLE GATE

PULL POST

SECTION X-X

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.

FENCE USING WOOD POSTS

LINE POST

CORNER OR END POST

WOVEN WIRE FENCE

STANDARD 665001-02

(Submitted as of 2009)
### 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>2.27 (3.38)</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>1.86 (2.71)</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>3.65 (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>4.37 (6.43)</td>
</tr>
<tr>
<td>Angle 2x2x3/16 (64x64x4.4)</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 3.155 (31.4) O.D.</td>
<td>1.68 (2.50)</td>
</tr>
<tr>
<td>Type B: Pipe 3.155 (31.4) O.D.</td>
<td>1.34 (1.98)</td>
</tr>
<tr>
<td>Type C: Pipe 3.155 (31.4) O.D.</td>
<td>1.33 (1.98)</td>
</tr>
<tr>
<td>Tubing 2 (50.8) Sq.</td>
<td>1.33 (1.98)</td>
</tr>
</tbody>
</table>

#### BRACES

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angle 2x2x1/8 (64x64x4)</td>
<td>3.19 (4.75)</td>
</tr>
<tr>
<td>or other approved structural shapes</td>
<td>3.1 (4.61) min.</td>
</tr>
</tbody>
</table>

#### Structural Shapes

- H, I, U
- or other approved structural shapes

---

### Wood Items

#### GATE 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>3.65 (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>4.37 (6.43)</td>
</tr>
<tr>
<td>Angle 2x2x3/16 (64x64x4)</td>
<td>4.1 (6.10)</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>6 to 7 (150 to 175) Top dia.</td>
<td>4 to 5 (100 to 125) Top dia.</td>
</tr>
<tr>
<td>6x6 (150x150)</td>
<td>4x4 (100x100)</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>2x6x18 (50x150x300)</td>
</tr>
</tbody>
</table>

---

**GATE, CORNER, END or PULL POSTS**

**BRACES and LINE POSTS**

**BLOCKS**

---

**Metal Items**

**GATE FRAMES**

- 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.

**CORNER, END or PULL 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.
- Tubing 2.5 (63.5) Sq.
- Angle 2x2x3/16 (64x64x4)

**LINE POSTS**

- Type A: Pipe 3.155 (31.4) O.D.
- Type B: Pipe 3.155 (31.4) O.D.
- Type C: Pipe 3.155 (31.4) O.D.
- Tubing 2 (50.8) Sq.

**BRACES**

- Angle 2x2x1/8 (64x64x4)
- or other approved structural shapes

---

**Wood Items**

**GATE 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.
- Tubing 2.5 (63.5) Sq.
- Angle 2x2x3/16 (64x64x4)

**BRACES and LINE POSTS**

- 6 to 7 (150 to 175) Top dia.
- 6x6 (150x150)

**BLOCKS**

- 2x8x18 (50x200x450)

---

**Engineer of Design and Environment**

**Issued**: 1-1-97

**Passed**: January 1, 2009

**Engineer of Policy and Procedures**

**Approved**: January 1, 2009

---

**Woven Wire Fence**

**Standard 665001-02**

---

**Illinois Department of Transportation**

**January 1, 2009**
Concrete Ledge

When X exceeds 12 (300), 18 (450), or 30 (760), Y shall be decreased correspondingly.

When X is 0 to 12 (300), 18 (450), or 30 (760), X + Y shall not exceed 27 (685), 33 (840), or 3'-9" (1.14 m) + 3 (75) min.

**NOTE**

**FOOTING FOR POSTS WHEN ROCK LEDGE IS ENCOUNTERED**

**ALTERNATE DETAILS FOR FASTENING**

**WOOD BRACE TO WOOD POST**

**INSTALLATION AT CORNERS**

**INSTALLATION OVER STREAM**

**INSTALLATION AROUND HEADWALL**

**PROTECTIVE ELECTRICAL GROUNDING FOR WOOD POST FENCE INSTALLATION**
All dimensions are in inches (millimeters) unless otherwise shown.
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
¾ (19 mm)
¼ (8) thick

Cap

Cement or approved chemical adhesive

Tablet constructed in rock ledge or concrete.

PRECAST MARKER

CAST-IN-PLACE MARKER

No. 3 (No. 10) Bars

No. 3 (No. 10) Bars

Concrete

Concrete

No. 3 (No. 10) Bars

No. 3 (No. 10) Bars

Detail A

See DETAIL A

Ground surface

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

15' (4.5 m) AWAY

OFF-RD OPERATIONS,
2L, 2W, MORE THAN

November 1, 2008
APPROVED
Illinois Department of Transportation

DATE
REVISIONS
1-1-09
Switched units to English (metric).
1-1-05
Revised title and notes.

STANDARD 701001-02
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>English (Metric)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 mph (50 km/h) or less:</td>
</tr>
<tr>
<td>L = [ \frac{W S^2}{60} ]</td>
</tr>
<tr>
<td>45 mph (80 km/h) or greater:</td>
</tr>
<tr>
<td>L = ( W (S/5) ) or ( 0.65 (W S) )</td>
</tr>
</tbody>
</table>

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

- Work area
- Sign
- Cone, drum or barricade

TYPICAL APPLICATIONS

- Utility operations
- Culvert extensions
- Side slope changes
- Guardrail installation and maintenance
- Delineator installation
- Landscaping operations
- Shoulder repair
- Sign installation and maintenance

When the work operation exceeds one hour, cones, drums or barricades shall be placed at 35' (11 m) centers for L/3 distance, and at 50' (15 m) centers through the remainder of the work area.

OFF-RD OPERATIONS, 2L, 2W
15' (4.5 m) TO 24" (600 mm)
FROM PAVEMENT EDGE

STANDARD 701006-05

APPROVED
January 1, 2014
ENGINEER OF DESIGN AND ENVIRONMENT

STANDARD 701006-06

REVISED
1-1-14
Revised workers sign
number to agree with current MUTCD

PASSED
January 1, 2014
ENGINEER OF SAFETY ENGINEERING

RELATED STANDARDS

1-1-97
Revised workers sign

1-1-13
Ontarget text: WORKERS

DATE
REVISIONS
For contract construction projects

For maintenance and utility projects

**Typical Applications**

- Shoulder work
- Utility operations

**Symbols**

- Work area
- Sign
- Flagger with traffic control sign when required

**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 70180.

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

**Date**

1-1-14 Revised workers sign number to agree with current RM/CD.  
1-1-13 Deleted text "WORKERS" sign.

**Revisions**

- 1-1-14 Revised workers sign

**Standard 701011-04**
**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:

### FORMULAS

<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 S^2}{60} )</td>
<td>( L = \frac{W S^2}{18} )</td>
</tr>
<tr>
<td>45 mph (70 km/h) or greater</td>
<td>( L = (W)(S) )</td>
<td>( L = 0.65(WS) )</td>
</tr>
</tbody>
</table>

\( W = \) Width of offset in feet (meters).
\( S = \) Normal posted speed in mph (km/h).

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

**SYMBOLS**

- **W** Work area
- **S** Sign
- **O** Cone, drum or barricade

**TYPICAL APPLICATIONS**

- Utility operations
- Culvert extensions
- Side slope changes
- Shoulder repair
- Sign installation and maintenance
- Delineator installation
- Landscaping operations
- Guardrail installation and maintenance
- Culvert extensions
- Utility operations

When the work operation exceeds one hour, cones, drums or barricades shall be placed at 25' (8 m) centers for L/3 distance, and at 50' (15 m) centers through the remainder of the work area.

**OFF-RD OPERATIONS, MULTILANE, 15' (4.5 m) TO 24" (600 mm) FROM PAVEMENT EDGE**

STANDARD 701101-05
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.

**TYPICAL APPLICATIONS**
- Landscaping work
- Utility work
- Fencing contracts

**GENERAL NOTES**

**DATE**
1-1-05

**REVISONS**
- Switched units to English (metric).
- Revised title.
1. 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 30' (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

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.

L seperate devices may be placed at 30' (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

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

STANDARD 701201-05

DATE REVISIONS
1-1-9 Revised device spacing in taper
1-1-11 Revised flagger sign

APPROVED
January 1, 2019
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
1-1-97
ENGINEER OF SAFETY PROG. AND ENGINEERING
APPROVED
January 1, 2019
Illinois Department of Transportation
ROAD AHEAD WORK
ROAD AHEAD
CONSTRUCTION
ONE LANE ROAD AHEAD

1000' (300 m) max.
500' (150 m) min.
25' (8 m) min.

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

For contract construction projects
For maintenance and utility projects

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.

DATE
REVISIONS
1-1-19 Revised device spacing in taper and added cones as an option.
1-1-18 Omitted steady burning lights in tangents.
ROAD AHEAD
CONSTRUCTION
ONE LANE
ROAD AHEAD
1000' (300 m) max.
500' (150 m) min.

W20-I103(0)-48
W20-1(0)-48
W20-4(0)-48

STANDARD 701306-04

TYPICAL APPLICATIONS
Bituminous resurfacing
Milling operations
Utility operations
Shoulder operations

SYMBOLS
Work area
Sign on portable or permanent support
Flagger with traffic control sign

MINIMUM DISTANCE
Minimum distance is 200' (60 m). Maximum distance to be determined by the Engineer but should not exceed 9\(\frac{1}{2}\) the length required for one normal working day's operation or 2 miles (3200 m), whichever is less.

GENERAL NOTES
This Standard is used where at any time, any vehicle, equipment, workers or their activities require an intermittent or continuous moving operation on the pavement where the average speed of movement is greater than \(\frac{1}{2}\) 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

DATE
REVISIONS
3-1-18
Revised lower speed limit
for operation to \(\frac{1}{2}\) mph.
3-1-11
Revised flagger sign.

ENGINEER OF SAFETY PROG. AND ENGINEERING
1-1-11
Revised flagger sign.

APPROVED
January 1,
2018

 ENGINEER OF DESIGN AND ENVIRONMENT
1-1-97

Illinois Department of Transportation
January 1,
2018

PASSED
DATE
REVISIONS
1-1-11
Revised flagger sign.
**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.

**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.

**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.
1. Type III barricade to be placed when no work is being performed.
2. Guardrail/barrier wall reflectors at 25' (7.6 m) cts. See Standards T04003 & 782006.
3. Vertical panels at 25' (7.6 m) cts. Throughout lane shift. These devices may be omitted when the guardrail, workers, extends to at least this point on the taper.
4. The edge of the post mounted signal head shall be between 24 (600) and 6' (1.8 m) from edge of shoulder.

**SYMBOLS**
- Work area
- Sign
- Traffic signal
- Detector loops
- Type III barricade with flashing lights
- Drum with steady burn bi-directional light
- Temporary rumble strip (when specified)
- Crystal, bidirectional guardrail/barrier wall reflector
- Double vertical panel (see detail)
- Drum

See Sheet 2 for GENERAL NOTES.

**DATE**
- 1-1-20: Revised from F-shape to constant slope parapet.
- 1-1-18: Omitted lights in tangents.
- 1-1-17: Revised note (3).

**REVISIONS**
- 1-1-20:
- 1-1-18:
- 1-1-17: Revised note (3).
**TRAFFIC SIGNAL SEQUENCE**

<table>
<thead>
<tr>
<th>PHASE</th>
<th>INTERVAL</th>
<th>EASTBOUND</th>
<th>NORTHBOUND OR WESTBOUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5</td>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>

**ADVISORY SPEED LIMIT**

<table>
<thead>
<tr>
<th>INTERVAL</th>
<th>EASTBOUND</th>
<th>NORTHBOUND</th>
<th>WESTBOUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2-3-4-5</td>
<td>35 - 45 mph</td>
<td>40 mph</td>
<td>35 mph</td>
</tr>
<tr>
<td>6</td>
<td>35 - 30 mph</td>
<td>40 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 and traffic signals are required.

When traffic signals are not in operation, flaggers shall be used and traffic control devices shall conform to Standard 701201 or 701206.

Existing or temporary pavement markings shall be on both sides of open lane from stop bar to stop bar.

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

**LANE CLOSURE, 2L, 2W, BRIDGE REPAIR, FOR SPEEDS ≥ 45 MPH**

**STANDARD 701316-13**
ROAD AHEAD CONSTRUCTION

ROAD AHEAD WORK

XX'-X” ONE LANE ROAD AHEAD MPH X X

STOP HERE ON RED

STOP HERE ON RED

ROAD AHEAD CONSTRUCTION

Proceed with caution.

W20(103)48
Dr
For maintenance projects

W20(101)48
Dr
For contract construction projects

W212(102)(0)-48
W20(40)-48
W3(3)48
R10-6A-2430

Drums at 50' (15 m) cts.

Drums at 25' (7.6 m) cts.

White temporary pavement marking (see detail).

1:12 Taper

See detail for placement of detector loops.

Drum with steady burning bi-directional light

Temporary concrete barrier

Type II barricade with flashing lights

Traffic signal

Double vertical panels (see detail)

Crystal, bidirectional guardrail/barrier wall reflector

Detector loops

Impact attenuator

Drum

SYMBOLS

DATE

1-1-19

REVISIONS

See Sheet 2 for GENERAL NOTES

ILLINOIS DEPARTMENT OF TRANSPORTATION

January 1, 2020

APPROVED

January 1, 2020

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

PASSED

ENGINEER OF SAFETY PROG. AND ENGINEERING

LANE CLOSURE, 2L, 2W,
BRIDGE REPAIR WITH BARRIER

STANDARD 701321-18

(1) Type II barricade to be placed when no work is being performed.

(2) Guardrail/barrier wall reflectors at 25' (7.6 m) cts. See Standards 704001 & 782006.

(3) When temp. bridge rail is specified, it shall be connected to the temp. conc. barrier using a traffic barrier terminal Type 11.

(4) Vertical panels at 25' (7.6 m) cts. throughout lane visit. These devices may be omitted when the guardrail, rail system, extends to at least this point on the taper.

(5) The edge of the post mounted signal head shall be between 24’ (610) and 6’ (1.8 m) from edge of shoulder.
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>A</td>
<td>1.5 m</td>
<td>5'</td>
<td>45°</td>
<td>10'</td>
</tr>
<tr>
<td>B</td>
<td>1.5 m</td>
<td>5'</td>
<td>45°</td>
<td>10'</td>
</tr>
</tbody>
</table>

Stage lane width

TEMPORARY PAVEMENT MARKING

White temporary pavement marking

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 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.

STANDARD 701321-18

LANE CLOSURE, 2L, 2W,
BRIDGE REPAIR WITH BARRIER

(Sheet 2 of 2)
ROAD AHEAD
CONSTRUCTION

ROAD AHEAD
WORK

ONE LANE ROAD AHEAD

ONE LANE ROAD AHEAD

ONE LANE ROAD AHEAD

ONE LANE ROAD AHEAD

ROAD AHEAD

ROAD AHEAD

projects

W20-I103(0)-48

W20-1(0)-48

W20-4(0)-48

1000' (300 m) max.

1000' (300 m)

500' (150 m)

1000' (300 m)

500' (150 m)

500' (150 m)

500' (150 m)

W20-7(0)-48

W20-7(1)-48

W20-7(0)-48

W20-7(1)-48

W20-7(0)-48

W20-7(1)-48

W20-7(0)-48

W20-7(1)-48

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.

GENERAL NOTES

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.

LANE CLOSURE, 2L, 2W,
PAVEMENT WIDENING,
FOR SPEEDS ≥ 45 MPH

STANDARD 701326-04
For projects and utility maintenance, speeds 30 mph or less.

For MVC or less.

Bridge construction
Culvert construction

Traffic signs shall be shown below the reverse curve (turn) signs shall be determined at the site and approved by the Engineer.

These signs are not required when T is less than 500' (150 m).

The advisory speed to be shown below the reverse curve (turn) signs shall be determined at the site and approved by the Engineer.

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.

TYPICAL APPLICATIONS
Bridge construction
Culvert construction

SYMBOLS

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
ROAD AHEAD
CONSTRUCTION
ONE LANE ROAD AHEAD
1000' (300 m) max.
500' (150 m) min.

W20-4(0)-48
Or
W20-I103(0)-48

W20-1(0)-48

W20-7(0)-48

SYMBOLS

Patches
Sign
Flagger with traffic control sign
Barricade or drum
Cone, barricade or drum

TYPICAL APPLICATIONS

Patching

LARGE OF WORK
ALONG RURAL RURAL

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach in the area between the centerline 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 patches 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 succes- sive patches 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 succes- sive patches exceeds 2000' (600 m), additional flaggers, warning signs, and tapers shall be placed as shown.

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

LANE CLOSURE, 2L, 2W, WORK AREAS IN SERIES, FOR SPEEDS ≥ 45 MPH
STANDARD 701336-07
**GENERAL NOTES**

This standard is used where at any time a lane is closed on a freeway/expressway. When the left lane is closed, LEFT LANE CLOSED signs shall be substituted for the RIGHT LANE CLOSED signs. The first sign and the message board are stationary.

The last four signs and arrow board shall be moved as necessary to maintain the required distance from the start of the lane closure taper(s).

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

---

**SYMBOLS**

1. Arrow board
2. Trailer mounted sign
3. Sign
4. Type II barricade, drum, or vertical barricade with monodirectional flashing light

---

1. The Road Construction Ahead sign shall be located 3 to 5 miles in advance of the project limits.
2. The message board shall be used to display status of lanes within the project. The primary messages shall be:
   - "Left Lane Closed" / "x Miles Ahead"
   - "Right Lane Closed" / "x Miles Ahead"
   - "All Lanes Open"
3. Three, Type II barricades, drums, or vertical barricades at 25' (8 m) centers.
4. This sign shall be used when 2 lanes are closed.
5. This sign shall be omitted when median width is less than 10' (3 m).
6. This sign shall only be used if the existing speed limit is greater than 65 mph.
**GENERAL NOTES**

This Standard is used where at any time any vehicular, equipment, workers, or their activities will encroach on the lane adjacent to the shoulder, or on the shoulder within 24 (600) of the edge of pavement.

This Standard 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 setup would be a mirror image to what is shown.

A check barricade shall be placed in the middle of the closed lane and at the shoulder at 1000 (300 m) centers.

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

**STANDARD 701401-13**

**LANE CLOSURE, FREEWAY/EXPRESSWAY**

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-22</td>
<td>Corrected work zone speed limit sign numbers.</td>
</tr>
<tr>
<td>1-1-19</td>
<td>Replaced flagger with spotter.</td>
</tr>
<tr>
<td>1-1-18</td>
<td>Omitted lights in tangent.</td>
</tr>
</tbody>
</table>
**SYMBOLS**

- **Arrow board**
- **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**

**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 ft (600) of the edge of pavement for daylight operation exceeding one day and where temporary concrete barrier is utilized.

This Standard must always be used in combination with Standard 701400.

When work is being performed in the left lane, 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:

\[
L = 0.65 (W) (S)
\]

<table>
<thead>
<tr>
<th>English (mph)</th>
<th>Metric (km/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( S = )</td>
<td>( L = 0.65 (W) (S) )</td>
</tr>
</tbody>
</table>

**FORMULAS**

\( W = \) Width of offset in feet (meters).
\( S = \) Normal posted speed in mph (km/h).

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

**LANE CLOSURE, FREEWAY/EXPRESSWAY, WITH BARRIER**

**STANDARD 701402-12**

Date: 3-1-17

Revised END WORK ZONE SPEED LIMIT sign from orange to white background.

4-1-16

Added reference to Standards 704001 and 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 2400' (600 m) 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
- Spotter

**TYPICAL APPLICATIONS**

- Pavement patch
- Utility operations
- Bituminous resurfacing

**LANE CLOSURE, FREEWAY/EXPRESSWAY, DAY OPERATIONS ONLY**

**STANDARD 701406-13**

**DATE**

- 1-1-22: Corrected work zone speed limit sign numbers.
- 1-1-19: Replaced flagger with spotter.
- 1-1-17: Revised END WORK ZONE SPEED LIMIT sign from orange to white background.

**REVISIONS**

- 1-1-97: General notes.
- 1-1-17: Revised END WORK ZONE SPEED LIMIT sign from orange to white background.
- 1-1-22: Corrected work zone speed limit sign numbers.
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.

SYMBOLS

- Work area
- Sign
- Type II barricades or drums with steady burning monodirectional light
- Drums with steady burning monodirectional light

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 \n1-1-15
1-1-12

REVISIONS
-

APPROVED

January 1, 2015

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

PASSED

January 1, 2015

ENGINEER OF SAFETY ENGINEERING

STANDARD 701411-09

LANE CLOSURE, MULTILANE, AT ENTRANCE OR EXIT RAMP, FOR SPEEDS ≥ 45 MPH

(Sheet 1 of 2)
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' line of sight through, between or over the delineation devices.
This Standard is used where at any time, any vehicle, equipment, workers or their activities require the closure of two adjacent lanes and a temporary crossover is provided by making use of one lane of pavement normally used by opposing flow of traffic. 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.
**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 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 (centimeters) unless otherwise shown.

---

**LANE CLOSURE, MULTILANE, FOR SPEEDS ≥ 45 MPH TO 55 MPH**

---

**SPEED LIMITS**

- **45** MPH
- **55** MPH

---

**SYMBOLS**

- **Arrow board**
- **Work area**
- **Sign**
- **Direction indicator barrier with steady burn monodirectional light**
- **Type II barricade, drum, or vertical barricade**
- **Flagger with traffic control sign**
- **Worker**
- **Type II barricade, drum, or vertical barricade with monodirectional flashing light**

---

**TABLE**

<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>

---

**REVISIONS**

- 1-1-19: Changed sign in tangent
- 1-1-18: New END WORK ZONE SPEED LIMIT sign: Changed device location at first work line.
MINIMUM FINE LIMIT
SPEED ZONE WORK ENFORCED PHOTO
ROAD 1 MILE CONSTRUCTION ROAD 1 MILE WORK RIGHT LANE CLOSED 1 MILE ROAD AHEAD CONSTRUCTION ROAD AHEAD WORK

END WORK ZONE SPEED LIMIT

For maintenance projects

For contract construction projects

Post-Lane Change Sign

Direction indicator barricade with monodirectional light

Type II barricade, drum, or vertical barricade with steady burn monodirectional light

Temporary concrete barrier

Impact attenuator

Type II barricade, drum, or vertical barricade with monodirectional flashing light

General Notes:

This standard is used where at any time any vehicular equipment, workers, or their activities will encroach on the pavement or on the shoulder within 24 (600) of the edge of pavement for daily operation exceeding one day and where temporary concrete barrier is utilized.

When work is being performed in the left lane, the set up would be a mirror image to what is shown.

Calculate L as follows:

\[ L = \frac{0.65(W)(S)}{} \]

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

W = Width of offset

L = (W)(S) or more

FORMULAS

\[ \text{POSTED SPEED NORMAL} \]

\[ \text{SYMBOLS} \]

\[ \text{UNDIVIDED ROADWAY WITH LEFT LANE CLOSURE IN OPPOSITE DIRECTION.} \]

\[ \text{SIGN IN MEDIAN MAY BE OMITTED WHEN MEDIAN IS LESS THAN 30' (3 m).} \]

\[ \text{TEMPORARY PAVEMENT MARKING TAPE SHALL BE PLACED THROUGHOUT THE TAPER AND ALONGSIDE THE WORK AREA. THE RIGHT EDGE LINE SHALL BE WHITE AND THE LEFT EDGE LINE SHALL BE YELLOW.} \]

\[ \text{GUARDRAIL/Barrier wall reflectors at 25' (7.6 m). Markers on right shall be crystal and markers on left shall be amber. See Standards 704001 and 782006.} \]

\[ \text{VERTICAL BARRIERS SHALL NOT BE USED IN LANE SHIFT TAPER.} \]

\[ \text{THREE TYPE II BARRIACDES, DRUMS, OR VERTICAL BARRIACDES AT 25' (8 M) CENTERS.} \]

\[ \text{UNDIVIDED ROADWAY WITH LEFT LANE CLOSURE IN OPPOSITE DIRECTION.} \]

\[ \text{SIGN IN MEDIAN MAY BE OMITTED WHEN MEDIAN IS LESS THAN 30' (3 m).} \]

\[ \text{TEMPORARY PAVEMENT MARKING TAPE SHALL BE PLACED THROUGHOUT THE TAPER AND ALONGSIDE THE WORK AREA. THE RIGHT EDGE LINE SHALL BE WHITE AND THE LEFT EDGE LINE SHALL BE YELLOW.} \]

\[ \text{GUARDRAIL/Barrier wall reflectors at 25' (7.6 m). Markers on right shall be crystal and markers on left shall be amber. See Standards 704001 and 782006.} \]

\[ \text{VERTICAL BARRIERS SHALL NOT BE USED IN LANE SHIFT TAPER.} \]

\[ \text{THREE TYPE II BARRIACDES, DRUMS, OR VERTICAL BARRIACDES AT 25' (8 M) CENTERS.} \]

\[ \text{FORMULAS} \]

\[ \text{POSTED SPEED NORMAL} \]
When a shoulder does not exist or is narrow, use Detail B.

**NOTE**

Flagger(s) are required when workers are on the pavement.

1) For stationary operations only. See sign arrow detail on this standard.
2) For stationary operations which are on the roadway or shoulder greater than 15 minutes and up to 1 hour.
3) The distance between the work and the lead truck may vary according to terrain or paint/crack sealing drying time.

**SYMBOLS**

- Arrow board
- Work area
- Truck with flashing amber light
- Truck/Trailer mounted attenuator
- Flagger with traffic control sign
- Sign

**TYPICAL APPLICATIONS**

- Pavement marking
- Weed spraying
- Roadometer measurements
- Detox cleanup
- Crack pouring

**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).
PAINT WET ROAD AHEAD CONSTRUCTION
RIGHT LANE CLOSED AHEAD

NOTE
When a shoulder does not exist or is narrow, use Detail B.

DETAIL A

Flagger are required when workers are on the pavement.

For striping operations only:
See sign arrow detail on this standard.

For stationary operations which are on the roadway or shoulder, greater than 15 minutes and up to 1 hour:
Omit truck, attenuator and arrow board when no shoulder exists due to curb and gutter.

The distance between the work and the lead truck may vary according to terrain or paint/crack sealing time.

SYMBOLS

Arrow board
Work area

Truck with flashing amber light

Truck/Trailer mounted attenuator
Flagger with traffic control sign

DETAIL B

DETAIL C

Required when workers are on the pavement.

TYPICAL APPLICATIONS

- Maintaining work
- Utility work
- Pavement marking
- Weed spraying
- Roadometer measurements
- Detrit cleanup
- Crack pouring

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 performed in the left lane(s) or on the median shoulder shall be substituted for KEEP LEFT signs and arrow board indications shall be directed to the right.

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

LANE CLOSURE, MULTILANE, INTERMITTENT OR MOVING OPER., FOR SPEEDS ≤ 40 MPH

STANDARD 701427-05
CASE I
CASE I depicts the setup of delineating devices for a single outside lane closure.

CASE II
CASE II depicts the setup of delineating devices for a two 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.

SYMBOLS

Arrow board
Truck with flashing amber light
Truck/Trailer mounted attenuator

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 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).

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.

DATE       REVISIONS
4-1-16      Added trailer option for attenuator symbol
2-1-14      New Standard

STANDARD 701428-01
MINIMUM $XXX FINE LIMIT SPEED 45 ZONE WORK ENFORCED PHOTO LIMIT SPEED 55 ZONE WORK ENFORCED PHOTO MINIMUM $XXX FINE END WORK ZONE SPEED LIMIT

Symbols:
- Arrow boards
- Work area
- Worker
- Sign
- Direction indicator barricade with steady burn monodirectional light
- Type II barricade, drum, or vertical barricade with steady burn monodirectional light
- Spotter
- Type II barricade, drum, or vertical barricade

Symbols:
- Arrow boards
- Work area
- Worker
- Sign
- Direction indicator barricade with steady burn monodirectional light
- Type II barricade, drum, or vertical barricade with steady burn monodirectional light
- Spotter
- Type II barricade, drum, or vertical barricade

GENERAL NOTES
This Standard is used where at any time any vehicle, equipment, workers or their activities will encroach on two lanes of a freeway/expressway.
This Standard must always be used in combination with Standard 701400.
This Standard also applies when work is being performed in the left lanes. Under these conditions, the set up would be a mirror image to what is shown.
Check barricades shall be placed in the middle of the closed lanes at 1000' (300 m) centers.
All dimensions are in inches (millimeters) unless otherwise shown.

TWO LANE CLOSURE, FREEWAY/EXPRESSWAY

DATE
1-1-21
1-1-20
1-1-20

REVISIONS
Corrected symbol for type II barricade with steady burn monodirectional light and altered device spacing callout.
Replaced flagger with spotter.
PARTIAL EXIT RAMP CLOSURE

SYMBOLS

- Sign
- Type III barricade with flashing lights
- Drum with steady burning light
- Work area
- Flagger with traffic control sign
- Drum

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)

Ramp to edge of work zone

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

DATE REVISIONS
1-1-18 Dimmed lights on drums
1-1-17 Added flashing lights to
Type III barricade

Illinois Department of Transportation
APPROVED January 1, 2018
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED 1-1-09
PASSED ENGINEER OF SAFETY PROG. AND ENGINEERING
FREEWAY/EXPRESSWAY
PARTIAL EXIT RAMP CLOSURE
STANDARD 701456-05
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 light
- 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>&lt;45</td>
<td>200' (60 m)</td>
</tr>
<tr>
<td>50-45</td>
<td>300' (90 m)</td>
</tr>
<tr>
<td>55-65</td>
<td>400' (120 m)</td>
</tr>
<tr>
<td>&gt;65</td>
<td>500' (150 m)</td>
</tr>
</tbody>
</table>

FORMULAS

- For speeds > 40 mph (70 km/h) or less:
  
- W = Width of offset in feet (meters)
  
- S = Normal posted speed in mph (km/h)

SPEED LIMIT

- 40 mph (70 km/h) or less:
  
- L = W/S²
  
- W = (L/0.65)²

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

- L = W/S²

U.S. Units

- English (Metric)

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

DATE
1-1-18

REVISIONS
- Revised to allow cones at night.

APPROVED
January 1, 2019

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-01

ENGINEER OF SAFETY PROG. AND ENGINEERING
**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**

<table>
<thead>
<tr>
<th>Speed Limit</th>
<th>L=</th>
<th>Ws²</th>
<th>L=</th>
<th>Ws²</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mph (64 km/h)</td>
<td>60</td>
<td>0.65</td>
<td>150</td>
<td>1.05</td>
</tr>
<tr>
<td>45 mph (72 km/h)</td>
<td>60</td>
<td>0.65</td>
<td>150</td>
<td>1.05</td>
</tr>
</tbody>
</table>

W = Width of Offset (feet or meters).
S = Normal posted speed (mph or km/h).

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

**STANDARD 701601-09**

**URBAN LANE CLOSURE, MULTILANE, 1W OR 2W WITH NONTRAVERSABLE MEDIAN**

(Sheet 1 of 2)
ROAD CLOSED
ROAD AHEAD
CONSTRUCTION
ROAD CLOSED
AHEAD
WORK CLOSED
LEFT LANES
CLOSED
RIGHT LANES
CLOSED

Or
W20-I103(0)-48
Or
W21-I106L(0)-48
Or
4
6
W20-1(0)-48
W21-I106R(0)-48
W21-1(0)-48

barricades
Type I or Type II
barricades
Type III
**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**
  - **FOR FORMULAS**
    - **English**
      - \( W = \text{Width of offset} \) in feet (meters).
      - \( S = \text{Normal posted speed} \) in mph (km/h).
    - **Metric**
      - \( W = \text{Width of offset} \) in feet (meters).
      - \( S = \text{Normal posted speed} \) in mph (km/h).

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

**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' (164 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.
4. For approved sideroad closures.
5. Cones, drums or barricades at 20' (6 m) centers in taper.
6. Use flagger sign only when flagger is present.

**SIGN SPACING**

<table>
<thead>
<tr>
<th>Category</th>
<th>Units</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrow board</td>
<td>Width</td>
<td>600' (180 m)</td>
</tr>
<tr>
<td>Work area</td>
<td>Length</td>
<td>1000' (300 m)</td>
</tr>
<tr>
<td>Barricade or drum with steady burning monodirectional light</td>
<td>Width</td>
<td>600' (180 m)</td>
</tr>
<tr>
<td>Flagger with traffic control sign</td>
<td>Width</td>
<td>600' (180 m)</td>
</tr>
<tr>
<td>Cone, drum or barricade</td>
<td>Length</td>
<td>1000' (300 m)</td>
</tr>
<tr>
<td>Sign on portable or permanent support</td>
<td>Width</td>
<td>600' (180 m)</td>
</tr>
<tr>
<td>Type III barricade with flashing lights</td>
<td>Width</td>
<td>600' (180 m)</td>
</tr>
</tbody>
</table>

**SYMBOLS**

- Arrow board
- Work area
- Barricade or drum with steady burning monodirectional light
- Flagger with traffic control sign
- Cone, drum or barricade
- Sign on portable or permanent support
- Type III barricade with flashing lights
ROAD AHEAD
CONSTRUCTION
ROAD AHEAD
WORK
ROAD CLOSED
AHEAD
ROAD CLOSED
W21-1(0)-48
Or
6 0 m
W20-7(0)-48
W20-1(0)-48
W20-1(0)-48
W20-3(0)-48
Barricade
Type III
5
5
W20-7(0)-48
W20-1(0)-48
W20-3(0)-48
W20-1(0)-48
CASE IV
URBAN LANE CLOSURE,
MULTILANE, 2W WITH
BIDIRECTIONAL LEFT TURN LANE
(Sheet 4 of 4)
STANDARD 701602-10
Illinois Department of Transportation
January 1, 2019
APPROVED
January 1, 2019
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
ENGINEER OF SAFETY PROG. AND ENGINEERING
APPROVED
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.

Calculate L as follows:

\[
L = \frac{W^2 S}{60^2}
\]

FORMULAS

\[
W = \text{Width of offset (feet)}
\]

\[
S = \text{Normal posted speed (mph in feet or km/h in kilometers)}
\]

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

SYMBOLS

\[
\begin{array}{l}
\text{Arrow board} \\
\text{Cone, drum or barricade} \\
\text{Sign on portable or permanent support} \\
\text{Work area} \\
\text{Barricade or drum with flashing light} \\
\text{Flagger with traffic control sign}
\end{array}
\]

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 50' (15 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.

URBAN SINGLE LANE CLOSURE, MULTILANE, 2W WITH MOUNTABLE MEDIAN

STANDARD 701606-10

DATE
REVISIONS
1-1-15
Returned standard. Moved case on Sheet 2 to new Highway Standard.
1-1-14
Returned workers sign.

APPROVED
January 1, 2015
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. Calculate L as follows:

**FORMULAS**

\[ L = \frac{WS^2}{150} \]

\[ L = \frac{W(S)}{0.65} \]

English (Metric)

40 mph (60 km/h) or less:

\[ L = \frac{WS^2}{150} \]

45 mph (80 km/h) or greater:

\[ L = \frac{W(S)}{0.65} \]

W = Width of offset (in feet (meters)).

S = Normal posted speed (mph (km/h)).

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

**SYMBOLES**

- **Arrow board**
- **Cone, drum or barricade**
- **Sign on portable or permanent support**
- **Work area**
- **Barricade or drum with flashing light**
- **Type II barricade with flashing light**
- **Flagger with traffic control sign**

**GENERAL NOTES**

The closure of more than one traffic lane in an Urban area.

Refer to SIGN SPACING TABLE for distances.

Required for speeds > 40 mph.

Use flagger sign only when flagger is present.

For approved roadside closures.

Cone at 25' (8 m) centers for 250' (75 m). Additional cones may be placed at 50' (15 m) centers. When drums of Type I or Type II barricades are used, the interval between devices may be doubled.

Cones, drums or barricades at 20' (6 m) centers in taper.

Repeat every 1 mile (1.6 km).
LEFT TURN LANE OR CENTER MEDIAN OPERATIONS

1. Refer to SIGN SPACING TABLE for distance.
2. Required for speed > 40 mph.
3. 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.
4. Use flagger sign only when flagger is present.
5. Omit this sign when median is less than 10' (3 m) or for bi-directional turn lanes.
6. Cones, drums or barricades at 20' (6 m) centers in taper.
7. Advanced arrow board required for speeds > 45 mph.
8. Three Type II barricades, drums or vertical barricades at 50' (15 m) centers.

CORNER ISLAND OPERATIONS

General Notes

This Standard is used whenever 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:

\[
L = \begin{cases} 
0.50(W)(S) & \text{S = Normal posted speed in mph (km/h)} \\
0.65(W)(S) & \text{S = Normal posted speed in mph (km/h)} 
\end{cases}
\]

FORMULAS

\[
L = \begin{cases} 
0.50(W)(S) & \text{S = Normal posted speed in mph (km/h)} \\
0.65(W)(S) & \text{S = Normal posted speed in mph (km/h)} 
\end{cases}
\]

\[
L = \begin{cases} 
0.50(W)(S) & \text{S = Normal posted speed in mph (km/h)} \\
0.65(W)(S) & \text{S = Normal posted speed in mph (km/h)} 
\end{cases}
\]

SYMBOLS

- Work area
- Cone, drum or barricade
- Sign on portable or permanent support
- Arrow board
- Barricade or drum with flashing light
- Flagger with traffic control sign
This Standard is used where, at any time, pedestrian traffic must be rerouted due to work being performed.

This Standard must be used in conjunction with other Traffic Control & Protection Standards when roadway traffic is affected.

Temporary facilities shall be detectable and accessible.

The temporary pedestrian facilities shall be provided on the same side of the closed facilities whenever possible.

The SIDEWALK CLOSED / USE OTHER SIDE sign shall be placed at the nearest crosswalk or intersection to each end of the closure. Where the closure occurs at a corner, the signs shall be erected on the corners across the street from the closure. The SIDEWALK CLOSED signs shall be used at the ends of the actual closures.

Type III barricades and R11-2-4830 signs shall be provided on the same side of the closed facilities whenever possible.

The SIDEWALK CLOSED to ALL TRAFFIC detail on Standard 701901. All dimensions are in inches (millimeters) unless otherwise shown.
**POST MOUNTED SIGNS**

** When curbs or paved shoulders 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.

---

**SIGNS ON TEMPORARY SUPPORTS**

*** When work operations exceed four days, this dimension shall be 5' (1.5 m) min. If located behind other devices, the height shall be sufficient to be seen completely above the devices.

---

**HIGH LEVEL WARNING DEVICE**

---

**WORK LIMIT SIGNING**

---

**HIGHWAY CONSTRUCTION SPEED ZONE SIGNS**

**** R30-108p shall only be used along roadways under the jurisdiction of the State.
Reflectorized striping may be omitted on the back side of the barricade. If a Type III barricade with an attached sign panel which meets NCHRP 350 is not available, the sign may be mounted on an NCHRP 350 temporary sign support directly in front of the barricade.

Reflectorized striping shall appear on both sides of the barricades. If a Type III barricade with an attached sign panel which meets NCHRP 350 is not available, the sign may be mounted on NCHRP 350 temporary sign supports directly in front of the barricade.
### 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.

The insert for the ½ (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.

### Connectors and Anchors

**Connecting Loop Bar**

- ½ (19) Dia. connecting loop bar
- US Std. 1 1/4" (32 mm) O.D. x 2 9/16" (65 mm) thick washer
- 1 (25) pin

**Anchor Pins**

- 1/4 (19) Dia. connecting loop bar
- Lift slot (optional)

**Elevated View**

- Showing connecting loop bars and vertical panel bolt/insert

**Connecting Detail**

- Section A-A
- Lifting Slot

**Plan**

- 2/16 (63) measured from face of barrier to end of loop bar
- 24° (traffic) tilt

**Temporary Concrete Barrier**

- Standard 704001-08
- Dimension: 8 ft (2.4 m) wide
- Height: 5 ft 6 in (1.68 m)
- Weight: 8,900 lb (4,000 kg)
- Approx. 3,000 lb (13 kN) pull-out strength

**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.

- The insert for the ½ (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.
MULTILINE HIGHWAYS

TWO LANE RURAL HIGHWAYS

URBAN LOCATIONS

TYPICAL INSTALLATIONS

Signs in any area shall be erected to a uniform height above the edge of the pavement.

POST SPACING FOR NON-FREEWAY SIGN PANELS

GROUND MOUNT SIGN POSITIONING

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

TANGENT SECTION

CURVE SECTION

1-1-15 W

1-1-14

1-1-12

Added shoulders and slopes
Changed sign distances
from roadway and shoulder
Rev. sign elev. for multilane
Rev. sign elev. for rural loc.

STANDARD 720006-04
Dimensions shown for cross sections are minimum.

Steel - 1.12 lbs./ft. (1.67 kg/m)

Aluminum - 7-0 lbs./ft. (1.67 kg/m)

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

GENERAL NOTES

Steel - 1.22 lbs./ft. (1.67 kg/m)

Aluminum - 7-0 lbs./ft. (1.67 kg/m)

Taper optional

Steel - 1-1/2" holes spaced at 1'-25" cts.

Aluminum - 1-1/2" holes spaced at 1'-25" cts.

Taper optional

Steel - 1-1/2" holes spaced at 1'-25" cts.

Aluminum - 1-1/2" holes spaced at 1'-25" cts.

GENERAL NOTES

Dimensions shown for cross sections are minimum.

All holes are 1/8" (10).

Save 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, Sx-x shall be computed for the net section.

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

- All signs shall have a white reflectorized legend and border on a green reflectorized background.
- The sign panels shall be mounted as shown on Standard 720016-04 as specified in the plans.

**MOUNTING LOCATION**

- The sign panels shall be mounted as shown on Standard 720016-04 as specified in the plans.
- All dimensions are in inches (millimeters) unless otherwise shown.

**Typical Sign Styles**

<table>
<thead>
<tr>
<th>SIGN STYLE</th>
<th>DIMENSIONS</th>
<th>LETTER SIZE ULC/UC PRIMARY</th>
<th>BORDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.b.o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 1</td>
<td>11 (300)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 2</td>
<td>10 (250)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 3</td>
<td>9 (200)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.e</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 1</td>
<td>15 (400)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 2</td>
<td>14 (350)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 3</td>
<td>13 (300)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>r</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 1</td>
<td>15 (400)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 2</td>
<td>14 (350)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var 3</td>
<td>13 (300)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- *Supplemental Messages*
Face of Sign Panel

6 (150) Panel

Type B Sign Panel

Type C Sign Panel

Section A-A

Section B-B

Section C-C

Sign Molding

Sign Panels
Extruded Aluminum Type

Standard 720021-03
Aluminum sign face

4x3x1/8 (1200x75x10) Galv. steel or aluminum angle

4x6 (100x150) Wood post

Wood post

Post clipped as shown in Section B-B

1/4 (M10) bolt with flat washer, lock washer and nut
1/8 (450) O.C. (min. of 3 bolts to be used)

1/2 nylon locking ring.

Nut equipped with

Note:

STANDARD 720021-03
EXTRUDED ALUMINUM TYPE
(Sheet 2 of 2)

SIGN PANELS
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED 1-1-00
PASSED
ENGINEER OF OPERATIONS
**TERMINAL MARKERS**

**OBJECT AND TERMINAL MARKERS**

**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**
1-1-17

**NOTE**

- **Type 1** or **Type 4**
- **Type 2**
- **Type 3**

**POST MOUNTED**

**OBJECT MARKER DETAILS**

**TYPE 1 OR TYPE 4**

**CASE I**

**CASE II**

**SHETING POSITION: CASE II**

- **Parallel to road**
- **Color:** Black / Yellow reflectorized
- **Markers to posts.**

**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.**

**SHEETING POSITION**

- **LEFT**
- **RIGHT**

**DIMENSION**

- **CASE I**
- **CASE II**

<table>
<thead>
<tr>
<th>DIMENSION</th>
<th>CASE I</th>
<th>CASE II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>*</td>
<td>18 (450)</td>
</tr>
<tr>
<td>b</td>
<td>*</td>
<td>16 (406)</td>
</tr>
</tbody>
</table>

**NOTES**

- **Omitted minimum reflective area requirement for terminal marker.**
- **Re-numbered standard from 635006.**

**STANDARD 725001-01**

**APPROVED**
January 1, 2017

**ISSUED**
1-1-2016

**ENGINEER OF OPERATIONS**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ILLINOIS DEPARTMENT OF TRANSPORTATION**
All bolts 5/16 (M10) hex head zinc or cadmium plated.

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

GENERAL NOTES

TELESCOPING STEEL SIGN SUPPORT

STANDARD 728001-01

DATE

REVISIONS

1-1-09

Switched units to English (metric)

1-1-07

New Standard. Used to be part of Standard

728006
For diamond shaped sign with side S as shown, use required post size for a sign with W = 0.7S and D = 1.4S.

NOTE: Minimum of 2 bolts per post required.

GENERAL NOTES


LOADING: For 60 mph (95 km/h) wind velocity with 30% gust factor, normal to sign.

SOIL PRESSURE: Minimum allowable soil pressure 3.25 tsf (150 kPa).

See Standard 720011 for details of Types A and B posts.

All dimensions are in inches (millimeters) unless otherwise shown.
Washer shim. Additional washers shall be used to level the base when necessary.

\[ \frac{3}{8} (10) \text{ Galvanized carriage bolt.} \]
LANE AND EDGE LINES

- Approximately 15' (4.5 m) from nearest 24' or 8' (2.4 m) high black iron 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 RR 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.

- The transverse spread of the "X" may vary according to lane width.

- NOTES

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

PAVEMENT MARKINGS AT RAILROAD-HIGHWAY GRADE CROSSING

- As specified by the Engineer.

- Added bike symbol. Revised.

- Added bike symbol. Revised note.

- For stop line at RR crossing.

- LANE DROP ARROW detail to LANE REDUCTION ARROW.
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**

<table>
<thead>
<tr>
<th>Legend Height</th>
<th>Arrow Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>6' (1.8 m)</td>
<td>Small</td>
</tr>
<tr>
<td>8' (2.4 m)</td>
<td>Large</td>
</tr>
</tbody>
</table>
**LANE-REDUCTION ARROW**
Right lane-reduction arrow shown. Use mirror image for left lane.

**WORD AND ARROW LAYOUT**

**SHARED LANE SYMBOL**
(Arrow is optional.)

**WRONG WAY ARROW**

**INTERNATIONAL SYMBOL OF ACCESSIBILITY**

**TYPICAL PAVEMENT MARKINGS**

**STANDARD 780001-05**
Reduce to 40' (12.2 m) o.c. on curves with posted or advisory speeds of 45 mph (70 km/h) or less.

**See MULTI LANE DIVIDED detail for lane marker notes.

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

**MULTI-LANE UNDIVIDED**

**MULTI-LANE DIVIDED**

**STANDARD 781001-04**

**RAISED REFLECTIVE PAVEMENT MARKERS**

**TYPICAL APPLICATIONS**

**TWO-LANE / TWO-WAY**

**TWO-WAY LEFT TURN**

**FREEWAY EXIT RAMP**
MEDIAN ISLAND

Curb reflectors shall be monodirectional and oriented with the reflective face toward approaching traffic.

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

SECTION A-A
(Similar for corner islands.)

GENERAL NOTES

CURB REFLECTORS

STANDARD 782001-01
REFLECTOR TYPE A
(monodirectional shown)

Adhesive weep slots or holes equally spaced on both sides

REFLECTOR TYPE B
(bidirectional shown)

Brass or plastic rivet

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

3 min. adhesive weep holes or slots each side, variable spacing.

Minimum total area of base 7.0 sq. in. (4536 mm²)

Cross section may be "T" or "I" shaped and may have side supports at ends.

TYPICAL MOUNTING DETAIL FOR GUARDRAIL REFLECTOR

TYPICAL MOUNTING DETAIL FOR BRIDGE RAIL REFLECTOR

TYPICAL MOUNTING DETAIL FOR BARRIER WALL REFLECTOR

Illinois Department of Transportation
2020
APPROVED
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
PASSED
ENGINEER OF OPERATIONS

STANDARD 782006-01

GUARDRAIL AND BARRIER WALL REFLECTOR MOUNTING DETAILS
(Sheet 2 of 3)
ONE-WAY TRAFFIC

1. 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).

2. After 400 ft. (122 m), transition to normal delineator spacing shown in Standard 635001, and continue as required.

TWO-WAY TRAFFIC

3. Where the shoulder width is reduced to less than 24 (610), use bidirectional crystal/crystal in lieu of monodirectional crystal.

GUARDRAIL AND BARRIER WALL

REFLECTOR PLACEMENT DETAIL

Terminal marker
See standard 725001.
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.
4. Aluminum weatherproof box with gasketed cover. Weatherproof box shall be installed facing the adjacent property line. (See diagram for alternate installation.)
5. Ground stud for neutral connection.
7. Offset weatherproof fitting.
8. Circuit breaker.

The following equipment is to be furnished and installed on the TYPE B installation:

2. Galvanized conduit clamps.
3. Aluminum weatherproof box with gasketed cover. Weatherproof box shall be installed facing the adjacent property line. (See diagram for alternate installation.)
5. Service cables.
6. Offset weatherproof fitting.
7. Circuit breaker.

The following equipment is to be furnished and installed on the TYPE A installation:

1. Cable in conduit (electric cable, No. 6, 2/C except where otherwise specified).
2. Galvanized steel conduit 1/4 (32) with bend.
4. Aluminum weatherproof box with gasketed cover. Weatherproof box shall be installed facing the adjacent property line. (See diagram for alternate installation.)
5. Ground stud for neutral connection.
7. Offset weatherproof fitting.
8. Circuit breaker.

All dimensions are in inches (millimeters) unless otherwise shown.
**INTEGRAL/SEMI-INTEGRAL ABUTMENT WITH PARAPET ON APPROACH PAVEMENT**

- Parapet on approach pavement
- Parapet on bridge
- Stainless steel junction box
- Conduit: expansion/deflection fitting
- Expansion bushing
- Expansion joint
- Metallic to nonmetallic conduit coupling
- PVC conduit
- Expansion fitting
- Barrels of expansion fitting flush with concrete
- Stainless steel connecting expansion nipple
- COMBINATION EXPANSION/DEFLECTION FITTING

**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.

**DATE** | **REVISIONS**
--- | ---
1-1-20 | Revised from F-Shape to constant slope parapet, added general note for steel connector plate, revised standard note, and fixed typo.
1-1-15 | New standard
INTEGRAL/SEMI-INTEGRAL ABUTMENT WITH PARAPET ENDING ON BRIDGE DECK

**PLAN**
- Steel conduit 2 (50) stainless embedded in structure
- 2 (50) PVC conductor embedded in structure
- Stainless steel conduit
- Stainless steel junction box 12 x 12 x 6 (300 x 300 x 150) min.
- Stainless steel junction box 12 x 12 x 6 (300 x 300 x 150) min.
- Stainless steel junction box 12 x 12 x 6 (300 x 300 x 150) min.
- Stainless steel junction box 12 x 12 x 6 (300 x 300 x 150) min.

**ELEVATION**
- Steel conduit 2 (50) stainless with bushing
- PVC conduit 2 (50)
- Stainless steel conduit
- Stainless steel junction box 12 x 12 x 6 (300 x 300 x 150) min.
- Stainless steel junction box 12 x 12 x 6 (300 x 300 x 150) min.
- Stainless steel junction box 12 x 12 x 6 (300 x 300 x 150) min.
- Stainless steel junction box 12 x 12 x 6 (300 x 300 x 150) min.

**VIEW A-A**
- Steel conduit 2 (50) stainless
- PVC conduit 2 (50)
- Stainless steel conduit
- Stainless steel junction box 12 x 12 x 6 (300 x 300 x 150) min.
- Stainless steel junction box 12 x 12 x 6 (300 x 300 x 150) min.
- Stainless steel junction box 12 x 12 x 6 (300 x 300 x 150) min.
JOINTED ABUTMENT WITH PARAPET ENDING ON BRIDGE DECK

**RACEWAYS EMBEDDED IN STRUCTURE**

**ELEVATION**

- Stainless steel conduit with bushing
- Expansion joint
- 10 x 2 (3 m x 50)
- 2 (50) PVC conduit embedded in structure

**PLAN**

- Parapet wall on bridge deck
- 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) min.

**VIEW B-B**

- Parapet wall on bridge deck
- 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) min.
All dimensions are in inches (millimeters) unless otherwise shown.

**Quantities**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>PC Concrete (yd³)</th>
<th>Hard</th>
<th>HD Concrete (yd³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>0.84</td>
<td>0.98</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>0.73</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>0.60</td>
<td>0.65</td>
<td></td>
</tr>
</tbody>
</table>

**Handholes**

- **Concrete yd³ (m³)**
- **Depth** (ft)
- **PC Concrete** (yd³)
- **Heavy Duty** (yd³)
- **Nonmetallic conduit bell**
- **Galvanized steel hooks**
- **French drain**

**Elevation**

- **Portland cement concrete**
- **Heavy duty**
- **Composite concrete**

**Plan**

- **Conduit**
- **Min.** (in.)
- **Steel hooks**
- **Galvanized**
- **Nonmetallic**
- **Conduit bell**
- **Concrete yd³ (m³)**
- **Depth** (ft)

**Revisions**

- 1-1-99: Switched units to English (metric).
- 1-1-15: Corrected dimension on heavy duty handhole.

**Handholes**

- **Nonmetallic conduit bell**
- **Galvanized steel hooks**
- **French drain**

**Concrete quantities table.**

**Illinois Department of Transportation**

**January 1, 2015**

**APPROVED**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**Issued**

**Engineer of Operations**

**Date**

**Revisions**

- 1-1-15: Corrected dimension on heavy duty handhole.
- 1-1-09: Added concrete quantities table.
All dimensions are in inches (millimeters) unless otherwise shown.

1-1-21 Corrected dimension in Portland Cement Concrete Plan view.
1-1-09 Switched units to English (metric)

DOUBLE HANDHOLES

STANDARD 814006-03
Bridge deck.

Stainless steel junction box, 6 x 6 x 4 (150 x 150 x 100) min.

Beam (steel shown).

Underpass luminaire mounted to pier or abutment wall.

Concrete abutment.

Edge of roadway.

Shoulder.

STANDARD 821001

A

WALL MOUNT

UNDERPASS LIGHTING

SECTION A-A

WALL ELEVATION

CENTER PIER

DETAI

ELEVATION

LUMINAIRE NUMBERING DECAL

BRACKET MOUNTING DETAIL

GENERAL NOTES

See plans for underpass luminaire locations.

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 luminaire shown routed from underground. Branch circuits may be routed from bridge parapet above.

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

Illinois Department of Transportation

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

ENGINEER OF PRELIMINARY ENGINEERING

DATE

REVISIONS

STANDARD 821001

A 0 16
Luminaire hanger assembly, four per luminaire required. See detail.

STANDARD 821006
Conductor splice (typ.).

Surge arrester (typ.).

Breakaway fuse holder with fuses (typ.).

Light pole handhole with ground lug.

Green equipment grounding conductor. See plans for size.

Breakaway coupling(s), when used. Rodent screen not shown for clarity.

ELEVATION AT POLE BASE WITH CONCRETE FOUNDATION

Conductor splice (typ.).

Surge arrester (typ.).

Breakaway fuse holder with fuses (typ.).

Light pole handhole with ground lug.

Green equipment grounding conductor. See plans for size.

Breakaway coupling(s), when used. Rodent screen not shown for clarity.

ELEVATION AT POLE BASE WITH METAL FOUNDATION

(Green equipment grounding conductor. See plans for size.)

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.
**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.

**3-wire, overhead service.**

- Weatherhead.
- Down guy and anchor, as needed.
- 25' (7.5 m) Wood service pole.
- 3-No. 8 XLP cables in 1 (25) rigid steel conduit.
- Malleable iron conduit clamp at 5 (15.5) intervals.
- Meter (when required).
- Conduit hub.
- Service disconnect switch.
- Rigid steel conduit elbow.
- 16 (13) Sch. 40 PVC conduit.
- Ground line.
- No. 6 bare copper wire.
- Ground rod.
- Controller enclosure, minimum dimensions: 18H x 12W x 8D (450 x 300 x 200).
- Insulated mounting board.
- 1-channel or mounting bracket, two required.
- Photocell.
- Controller enclosure.
- Rigid steel conduit elbow.
- Rigid steel conduit.
- Equipment ground bar.
- Neutral bar.
- Ground bar.
- Photocell with integral surge arrester.
- HAND-OFF-AUTO selector switch.
- Surge arrester.
- Service disconnect switch - 2-pole, 3-wire, 30 amp, fused at 30 amp, solid neutral in NEMA 4X enclosure having lockable external handle.
- Terminal block sized for conductors as shown on plant.

**CONTROL SCHEMATIC**

**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.
Service pole. *

25’ (7.5 m) Wood conduit. *

3-No. 6 XLP cables in 2 (2%) rigid steel conduit. *

Malleable iron conduit clamps at 5’ (1.25 m) intervals.

Meter (when required).

Rigid steel conduit.

Controller enclosure, minimum dimensions: 300 x 200 x 140* (760 x 510 x 355)
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.)

- When cold sequencing is required, provide a meter disconnect switch as directed by utility company.
- Size larger as needed.

240/480 V, 1-phase, 3-wire, overhead service.

Down guy and anchor, as needed.

2½ (7.6 ml) Wood service pole.

3 No. 6 XLP cables in 1 (25) rigid steel conduit.

Malleable iron conduit canopy at 3' (1.5 m) intervals.

Meter (when required).**

Conduit hub.

Service disconnect switch.

Rigid steel conduit elbow.

2½ (13) 5/8 Schedule 40 PVC conduit.

Service conductors.

Controller enclosure.

Controller enclosure, minimum dimensions: 30H x 20W x 24D * (760 x 510 x 355).

Insulating mounting board.

Unchannelled or mounting bracket, two required.

Ventilator

Rigid steel conduit.

Controller enclosure.

Neutral bar.*

Equipment ground bar.

Ground line.

No. 6 bare copper wire.

Ground rod.

Branch lighting circuits in unit duct(s).

20 amp*, 2-pole circuit breaker.

100 amp*, electrically held contactor.

15 amp, 1-pole circuit breaker.

Surge arrester.

Transformer: 360VA*, 480V primary, 120/240V secondary, single-phase, 60Hz.

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.

15 amp, 2-pole circuit breaker.

Terminal block sizes for conductors as shown on plans.

* Size larger as needed.

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.

STANDARD 825006-03

LIGHTING CONTROLLER

POLE MOUNTED, 480V
**LIGHTING SERVICE INSTALLATION**

- **3-wire, overhead service.**
- **120/240 V, 1-phase, Weatherhead needed.**
- **Anchor, as needed.**
- **Downguy and cover overhang.**
- **Slotted ventilator in underside of service pole.**

**Service conductors in rigid steel conduit, sized as required.**

- **Malleable iron conduit required.**
- **Meter (when required).**
- **Conduit hub.**

**Service disconnect switch.**

**Cement foundation.**

**Controller enclosure, minimum dimensions: 504 x 368 x 170.**

**Insulated wiring window.**

**Ground line.**

**Neutral bar.**

**Equipment ground bar.**

**Branch lighting circuits.**

**Additional wiring window as needed.**

**GFCI duplex receptacle.**

**Surge arrester.**

**Photocell with integral surge arrester.**

**Incandescent luminaire, enclosed and gasketted with 100 watt lamp.**

**Single-pole, single-throw switch.**

**HAND-OFF-AUTO selector switch.**

**3-wire, 100 amp*, fused at 100 amp*, solid neutral in NEMA 4X enclosure having lockable external handle.**

**20 amp, 2-pole circuit breaker.**

**20 amp, 2-pole circuit breaker (two spares required but not shown).**

**100 amp*, 2-pole circuit breaker.**

**Terminal block sized for conductors as shown on plans.**

**STANDARD 825021-04**

**BASE MOUNTED, 240V LIGHTING CONTROLLER**

**CONTROL SCHEMATIC**

**DETAIL**

**ANCHOR ROD**

**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.**

**Foundation (Plan)**

(Work pad not shown.)
LIGHTING service.

Service conductors in rigid steel conduit, sized as required.

Conduit hub.

Service disconnect switch.

Concrete foundation.

To service pole.

Ground line.

Weatherhead.

Drawspouts and anchor, as needed.

Slotted ventilator in underside of cover overhang.

240/480 V, 3-phase, 3-wire, overhead service.

25 7.5 m Wood service pole *

Service conductors in rigid steel conduit, sized as required.

Malleable iron conduit clamps at 3' (1.5 m) intervals.

Meter (when required). **

Conduit hub.

Service disconnect switch.

3/13 Sch. 40 PVC conduit.

Frequent intervals.

Clamps at 5' (1.5 m).

No. 6 bare copper wire.

Ground rod.

GROUND LINE.

Lighting controller.

淤 (16) dia. anchor rod.

3 1/2 • 45° Chamfer.

Ground line.

Additional wiring window as needed.

5 11/2 Sch. 40 PVC wiring window.

To service pole.

Feeder conductors sized as required.

Foundation (Plan) (Work pad not shown.)

ILLINOIS DEPARTMENT OF TRANSPORTATION

BASE MOUNTED, 480V

LIGHTING CONTROLLER

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.

GROUND LINE.

Lighting controller.

淤 (16) dia. anchor rod.

3 1/2 • 45° Chamfer.

Ground line.

Additional wiring window as needed.

5 11/2 Sch. 40 PVC wiring window.

To service pole.

Feeder conductors sized as required.

FOUNDATION (PLAN)

(Work pad not shown.)

Anchors for lighting controller.

Additional wiring window as needed.

5 11/2 Sch. 40 PVC wiring window.

GROUND LINE.

Lighting controller.

淤 (16) dia. anchor rod.

3 1/2 • 45° Chamfer.

Ground line.

Additional wiring window as needed.

5 11/2 Sch. 40 PVC wiring window.

To service pole.

Service conductors.

Terminal block sized for conductors having lockable external handle.

Cleaning line.

Incandescent luminaire, enclosed and gasketed with 100 watt lamp.

Photocell with integral surge arrester.

MAN-OFF-AUTO selector switch.

100 amp*, electrically held contactor.

15 amp, 2-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.

Neutral bar.

Equipment ground bar.

Branch lighting circuits.

Pole.

Concrete pole.

To service pole.

Feeder conductors sized as required.

* Size larger as needed.

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

DATE

REVISIONS

1-1-19

Replaced ** note with new note regarding utility company standards. Made *** the ** note.

1-1-15

Added note 14.

STANDARD 825026-04
LIGHTING 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.

ANCHOR ROD DETAIL

120/240 V, 1-phase, 3-wire, overhead service.

25' (7.5 m) Wood service pole. *

Service conductors in rigid steel conduit, sized as required.

Malleable iron conduit clamps at 5' (1.5 m) intervals.

Meter (when required).

Conduit hub.

Service disconnect switch.

½ (13) Sch. 40 PVC conduit.

Ground line.

No. 6 bare copper wire.

Ground rod.

Feeder conductors in rigid conduit to lighting controller.

12 x 9 x 3 (305 x 229 x 76) watertight pouch mounted inside door with as-built drawings and schematics.

Concrete foundation.

Additional wiring window as needed.

5 (125) Sch. 40 PVC wiring window.

Lighting controller.

Engraved name plate.

Chamfer. 

1 (25) 45°

1/8 (16) dia. anchor rod.

Ground line.

Controller enclosure.

Foundation (Plan)

(Light pad not shown.)

* Size larger as needed.

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

OBSTRUCTION WARNING

LIGHTING CONTROLLER, 240V

DATE

REVISIONS

1-1-22 Replaces "Navigation" with "Obstruction Warning" in std title.

1-1-22 Replaces "Navigation" with "Obstruction Warning" in std. title.

1-1-19 Replaces ** note with new note regarding consulting utility company standards for installation.

1-1-12 Replaced ** note with new note regarding consulting utility company standards for exact requirements.

ILLINOIS DEPARTMENT OF TRANSPORTATION

APPROVED January 1, 2022

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-12

PASSED ELECTRICAL AND MECHANICAL UNIT CHIEF NAME

STANDARD 826001-03
Controller enclosure, minimum dimensions: 59H x 44W x 26D (1500 x 1120 x 660) minimum dimensions: 59H x 44W x 26D (1500 x 1120 x 660)

Service conductors.

Feeder conductors, sized as required.

Grounding conductor, sized as required.

Equipment grounding 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.

Terminal block sized for conductors as shown on plans.

* Size larger as needed.
**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.**

**3-wire, overhead service.**

25' (7.5 m) Wood service pole.*

Service conductors in rigid steel conduit, sized as required.

Malleable iron conduit camber at 5' (1.5 m) intervals.

Meter (when required).***

Conduit hub.

Service disconnect switch.

9, (13) Sch. 40 PVC conduit.

PVC conduit to lighting controller.

Feeder conductors in rigid conduit to lighting controller.

No. 6 bare copper wire.

Ground rod.

**GROUND LINE.**

**ANCHO R ROD DETAIL**

**L I G H T I N G C O N T R O L L E R**

**F O U N D AT I O N ( P L A N )**

(Work pad not shown.)

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

**STANDARD 826006-03**

LIGHTING CONTROLLER, 480V

**OBSTRUCTION WARNING**

ILLINOIS DEPARTMENT OF TRANSPORTATION

DATE

REVISIONS

1-1-22

Replaces **Note** 2 with new note regarding utility company standards. Made *** the ** note.

1-1-19

Replaces **Note** 2 with new note regarding utility company standards. Made *** the ** note.

1-1-19

OBSTRUCTION WARNING In std title, note 2 and Control Schematic.

1-1-22

Upon new note.
CONTROL SCHEMATIC

1. Photocell with integral surge arrester for roadway lighting.
2. Photocell with integral surge arrester for obstruction warning 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.
See Bridge Plans for 1 (25) anchor rod by others.

1 (25) self-locking nut. Install with torque wrench to isolation pad min. specifications.

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.

Metal foundation.

Omit leveling nuts when breakaway devices are required.

ELEVATION AT CONCRETE FOUNDATION, METAL FOUNDATION OR RETAINING WALL

ELEVATION AT BRIDGE PARAPET

POLE BASE DETAILS

STANDARD 830001-03
Davit arm length
15'-0" (4.57 m) max. for single
12'-0" (3.66 m) max. for double.

See tenon detail.

Pole identification bonded to pole. See orientation detail.

See pole base and handhole detail.

Illinois Department of Transportation

Revised standard to comply with the 2013 version of AASHTO.

See Standard 830006-05 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.

GENERAL NOTES

LIGHT POLE

ALUMINUM DAVIT ARM

DATE

1-1-19

REVISIONS

1-1-17

Added notes 3 and 4.

1-1-12

PASSED

2019

ISSUED

1-1-19

APPROVED

2019

ENGINEER OF DESIGN AND ENVIRONMENT

1-1-17

STANDARD 830006-05

(Sheet 1 of 2)
### GENERAL NOTES

See Standard 836011 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

**MOUNTING HEIGHT**

<table>
<thead>
<tr>
<th>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>10 guage</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>10 tapered to 4</td>
<td>7 guage</td>
</tr>
</tbody>
</table>

#### 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>1 1/2 (29)</td>
<td>1 (25)</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>1 1/2 (29)</td>
<td>1 (32)</td>
</tr>
</tbody>
</table>
Traffic flow

Pole on ground mounted foundation.

Traffic flow

Pole on barrier wall, retaining wall or parapet.

Traffic flow

Pole on median barrier wall.

Traffic flow

Pole identification.

Handhole.

Pole identification.

Pole on ground mounted foundation.

Traffic flow

Pole on median barrier wall.

Traffic flow

Pole identification.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.

Pole identification.

Pole.

Handhole.
**LIGHT POLE STEEL DAVIT ARM**

**DAVIT LIGHT POLE**

(Single or Twin Mount)

* Unless directed otherwise by the Engineer.

**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 sleeve plate directly on concrete and level with stainless steel washers.

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

**DATE**

1/1/19

1/1/14

PASSED

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

January 1, 2019

January 1, 2014

(Rev. 1) (Rev. 1)

**REVISIONS**

2019

2019

830016-03

1-1-12

1-1-19

ILLINOIS DEPARTMENT OF TRANSPORTATION

1-1-14

STANDARD 830016-03

Sheet 1 of 2

1-1-19

1-1-14

Added pole mounted on bridge parapet. Modified attachment of screen.

1-1-19

1-1-14

Revised BASE PLATE table.

1-1-12

1-1-19

* Unless directed otherwise by the Engineer.
Traffic flow

**Handhole / Identification**

- 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.

**Handhole 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 (13) minimum overlap and wire-tie with matching wire.

**Elevation at Concrete Foundation, Metal Foundation or Retaining Wall**

- Concrete foundation, barrier or retaining wall.
- Pole on median barrier wall.
- Pole on ground mounted foundation.

**Detail A**

- 2½ O.D. x ½ (64 x 7) washers both sides of 2½ O.D. x ½ (64 x 12) min. isolation washer
- ½ (13) min. isolation pad sized to match pole base
- ½ (13) min. leveling plate sized to match pole base
- 1 (25) leveling nut.

**Elevation at Bridge Parapet**

- Screen wrapped around nuts and anchor rods between foundation and bottom of pole base. Provide 6 (13) minimum overlap and wire-tie with matching wire.

**Pole Base Details**

- Light Pole
- Steel Davit Arm

**Handhole and Cover**

- See orientation detail.

**Foundation, Metal Foundation or Retaining Wall**

- Concrete foundation, barrier or retaining wall.
- Hex nut and lock washer on fully threaded rod for metal foundation.

**Elevation at Concrete Foundation, Metal Foundation or Retaining Wall**

- 4 x 8 (100 x 200) min. handlehole and cover. See orientation detail.

**Elevation at Bridge Parapet**

- Bridge parapet.

**See Bridge Plans**

- See Bridge Plans for 1 (25) anchor rod by others.
**TENON DETAIL**

- Pole identification banded to pole. See orientation detail.
- See pole base and handhole detail.

**TENON TOP LIGHT POLE**

(Single or twin mount) *Unless directed otherwise by the engineer*

**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 (29.0)</td>
<td>1 (25)</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>1½ (38.0)</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</td>
<td>4 to 6 (250 to 100)</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>10 tapered to 4</td>
<td>7 guage</td>
</tr>
</tbody>
</table>

**BASE PLATE**

2½ (68) D.D. schedule 40 pipe

Three 3½ x 1½ (9x38) self tapping screws at 120°.

4 to 6 (150 to 150)

**TWIN TENON DETAIL**

2½ (64) I.D. schedule 40 pipe with cap at top.

**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.

**REVISIONS**

1/1/14 - Added pipe mounted on bridge parapet. Modified attachment of screen.

1/1/19 - Revised BASE PLATE and LIGHT POLE tables.
Traffic flow

Pole identification.

Pole on ground mounted foundation.

Handhole.

Traffic flow

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.

ELEVATION AT BRIDGE PARAPET

POLE BASE DETAILS

LIGHT POLE

STEEL TENON TOP

(Sheet 2 of 21)

ILLINOIS DEPARTMENT OF TRANSPORTATION

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

JANUARY 1, 2019

STANDARD 830021-03

PASSED

ELECTRICAL AND MECHANICAL UNIT CHIEF

HANDHOLE DETAIL

SECTION A-A

(Shall not shown)

1½ x 2 (32 x 50) slot (typ.).

Tapped ½ (13) hole for grounding connector.

Bolt force.

Handhole.

Pole.

Pole identification.

Pole on parapet or retaining wall.

HANDHOLE / IDENTIFICATION

ORIENTATION DETAIL

DETAIL A

See Bridge Plans for 1 (25) anchor rod by others.

3 (25) self-locking nut. Install with torque wrench to isolation pad per specifications.

Bridge parapet.

2½ O.D. x ½ (64 x 13)

washes both sides of

2½ O.D. x ½ (64 x 13)

min. isolation washer.

Pole base.

½ (13) min. isolation pad

sized to match pole base.

½ (13) min. leveling plate sized
to match pole base.

1 (25) leveling nut.

HANDHOLE DETAIL

HANDHOLE COVER

HANDHOLE GASKET

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.

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.

LEVELING NUT (TYP.).

Hex nut and lock washer on fully threaded rod for metal foundation.

Metal foundation.

LEVELING PLATE.

4 x 8 (100 x 200) min., handhole and cover.

See orientation detail.

 omitted leveling nuts when breakaway devices are required.

ELEVATION AT CONCRETE FOUNDATION, METAL FOUNDATION OR RETAINING WALL

ELEVATION AT BRIDGE PARAPET
**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.

---

**LIGHT POLE WITH CIRCUIT ROUTED UNDERGROUND**

- **Service pole.**
- **Weather head.**
- **Aerial cable with messenger to luminaires.**
- **Malleable iron conduit clamps below "C" conduit.**
- **に Size larger as needed.**

---

**LIGHTING CIRCUIT AT SERVICE/CONTROLLER**

See standard 835001 for service installation.

---

**TWIN MOUNTING BRACKET DETAILS**

- **Wiring entrance with rubber grommet.**
- **Lag bolt.**
- **Wiring entrance with rubber grommet.**

**SINGLE MOUNTING BRACKET DETAILS**

- **Lag bolt.**

---

**LUMINAIRE MOUNTING DETAILS**

- **45'-46' (13.7 m - 13.9 m) mounting height.**
- **unless noted otherwise on plans.**

---

**FACING VIEW**

---

**SIDE VIEW**

---

**GRADE**

---

**TEMPORARY ROADWAY LIGHTING**

---

**STANDARD 830026-01**

---

**DATE**

- **1-1-19** Revised luminaire to be horizontal.
- **1-1-13** New standard.

---

**REVISIONS**

- New standard.
**METAL FOUNDATION**

<table>
<thead>
<tr>
<th>LIGHT POLE MOUNTING HEIGHT</th>
<th>BOLT CIRCLE DIAMETER</th>
<th>SHAFT DIAMETER</th>
<th>SHAFT DEPTH</th>
<th>TOP PLATE (mm)</th>
<th>SHAFT DIAMETER</th>
<th>SHAFT DEPTH</th>
<th>ANCHOR ROD LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>20'</td>
<td>115</td>
<td>108</td>
<td>1'</td>
<td>12 x 12 x 1</td>
<td>12 x 12 x 1</td>
<td>9'</td>
<td>4'</td>
</tr>
<tr>
<td>(6.1 m)</td>
<td>(292)</td>
<td>(300)</td>
<td>(300 x 300 x 123)</td>
<td>(300 x 300 x 25)</td>
<td>(300 x 300 x 25)</td>
<td>(300 x 300 x 25)</td>
<td>(300 x 300 x 25)</td>
</tr>
<tr>
<td>24'</td>
<td>(610)</td>
<td>(610)</td>
<td>(610)</td>
<td>(610)</td>
<td>(610)</td>
<td>(610)</td>
<td>(610)</td>
</tr>
<tr>
<td>26'</td>
<td>(660)</td>
<td>(660)</td>
<td>(660)</td>
<td>(660)</td>
<td>(660)</td>
<td>(660)</td>
<td>(660)</td>
</tr>
<tr>
<td>28'</td>
<td>(710)</td>
<td>(710)</td>
<td>(710)</td>
<td>(710)</td>
<td>(710)</td>
<td>(710)</td>
<td>(710)</td>
</tr>
<tr>
<td>30'</td>
<td>(760)</td>
<td>(760)</td>
<td>(760)</td>
<td>(760)</td>
<td>(760)</td>
<td>(760)</td>
<td>(760)</td>
</tr>
</tbody>
</table>

**CONCRETE FOUNDATION**

1. Anchor rod shall extend through nut 1 (25).
2. Anchor rod shall be adjusted to accommodate breakaway devices furnished by the contractor for a specific installation.
3. Plate to be installed when required (See ring plate detail).
4. Bolt circle shall be 17 (430) when a transformer base is used.
5. Schedule 40 P.V.C. wiring window. Fill with fine aggregate.
6. Use dirt removed from foundation to meet 9' (2.74 m) chord fill around foundation.
7. Plate back of barrier or guardrail, self-locking nut and flat washer. Do not use lock washer.
8. Anchor rod shall be increased in diameter as needed for 60' (18.29 m) mounting height or above. The Contractor shall match the breakaway device size or slotted hole size in the pole base plate to accommodate larger nut sizes.
9. Transformer bases shall not be used on metal foundations.

**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 staking 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" (1.37 m) with cut anchor rods 6 (150) above bottom of excavated hole. See ring plate detail.

All foundations shall be increased in diameter as needed for 60' (18.92 m) mounting height or above. The Contractor shall verify the installation resistance of metal foundations and notify the Engineer if other conditions are encountered.

Minimum foundation depth shall be 4'6" (1.37 m) with cut anchor rods 6 (150) above bottom of excavated hole. See ring plate detail.

Transformer bases shall not be used on metal foundations.

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

**STANDARD 836001-04**
**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 embankment in rock. The minimum foundation depth shall be 30 (762) with cut anchor rods 6 (150) above bottom of excavated hole. See ring plate detail.

All dimensions are in inches (millimeters) unless otherwise shown.
<table>
<thead>
<tr>
<th>TOWER HEIGHT</th>
<th>ANCHOR ROD DIAM (MIN)</th>
<th>ROD CIRCLE DIAM (MIN)</th>
<th>TOWER BASE DIAM (MIN)</th>
<th>DRILLED SHAFT DIAM (MIN)</th>
<th>V BAR QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 (25 m)</td>
<td>1 5/8 (38)</td>
<td>30 (760)</td>
<td>24 (610)</td>
<td>4 (1.2 m)</td>
<td>14</td>
</tr>
<tr>
<td>90 (27 m)</td>
<td>1 5/8 (38)</td>
<td>30 (760)</td>
<td>24 (610)</td>
<td>4 (1.2 m)</td>
<td>14</td>
</tr>
<tr>
<td>100 (30 m)</td>
<td>1 5/8 (38)</td>
<td>30 (760)</td>
<td>24 (610)</td>
<td>4 (1.2 m)</td>
<td>14</td>
</tr>
<tr>
<td>110 (34 m)</td>
<td>2 (51)</td>
<td>30 (760)</td>
<td>24 (610)</td>
<td>4 (1.2 m)</td>
<td>16</td>
</tr>
<tr>
<td>120 (37 m)</td>
<td>2 (51)</td>
<td>30 (760)</td>
<td>24 (610)</td>
<td>4 (1.2 m)</td>
<td>16</td>
</tr>
<tr>
<td>130 (40 m)</td>
<td>2 (51)</td>
<td>30 (760)</td>
<td>24 (610)</td>
<td>4 (1.2 m)</td>
<td>18</td>
</tr>
<tr>
<td>140 (43 m)</td>
<td>2 (51)</td>
<td>30 (760)</td>
<td>24 (610)</td>
<td>4 (1.2 m)</td>
<td>18</td>
</tr>
<tr>
<td>150 (46 m)</td>
<td>2 (51)</td>
<td>30 (760)</td>
<td>24 (610)</td>
<td>4 (1.2 m)</td>
<td>22</td>
</tr>
<tr>
<td>160 (49 m)</td>
<td>2 (51)</td>
<td>30 (760)</td>
<td>24 (610)</td>
<td>4 (1.2 m)</td>
<td>22</td>
</tr>
</tbody>
</table>

Diameter Based on a 5 (125) conc. cover. The min. cover shall be 3 (75) in dry shaft excavation and 4 (100) in a wet hole. When rock is encountered a 5 (125) cover against soil and a 2 (50) cover against rock shall be required.

GENERAL NOTES:

The shaft length(s) are based on soil borings in the plans. If different soils are encountered, the engineer shall be notified to provide a revised length.

Anchor rod quantity, diameter, and length shall be determined by the tower manufacturer and approved by the Engineer. Each foundation shall have a minimum of 8 anchor rods.

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.)

BREAKAWAY COUPLINGS ON METAL FOUNDATION FOR STEEL POLE

(Provide pole base skirt around wire cloth when required.)

BREAKAWAY TRANSFORMER BASE FOR STEEL OR ALUMINUM POLE

(Steel pole shown)

Seal all gaps between transformer base and concrete foundation.

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.
**GENERAL NOTES**

See light pole standard for details not shown.

Use largest transformer base bolt circle possible.

Transformer bases shall not be installed on metal foundations.

Washers 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 \( \frac{4}{6} \) in., and have a minimum wire size of AWG No. 16 (1.6).

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

---

**BREAKAWAY COUPLINGS FOR ALUMINUM POLES**

(Provide pole base skirt around wire cloth when required.)
Coordinated phase

Ring 1

Ring 2

LEGEND

1. Vehicular phase no. x
2. Pedestrian phase no. x
3. Right turn overlaps where:
   A = 2 + 3
   B = 4 + 5
   C = 6 + 7
   D = 8 + 1

NEMA EIGHT PHASE DUAL RING ACTUATED CONFIGURATION

NEMA

National Electrical Manufacturers Association

STANDARD PHASE DESIGNATION DIAGRAM (NEMA)
PREEMPT RELAY
CR1

Supervisory Relay
CR2

24V DC Monitor
5

Preempt Interlock
(Relay & Controller Harness)
5

Supervision Fail
Preempt No. 1
5

Railroad Preempt
Preempt No. 2
5

#10 AWG to AC-
5

2 Amp
5

In-line fuse
5

AC
5

Logic Common
LC
5

AC+
5

AC-
5

Separately shielded
conductors
5

All three shields shall be isolated at the railroad facility end.
5

RELS IN NON-PREEMPT STATE - RAILROAD AND PREEMPT RELAYS ENERGIZED

GENERAL NOTES

CR1 and CR2 are 120VAC 3PDT Relays.
Supervision Fail is Preempt No. 1, causing traffic signal controller to implement all-red flash following track clearance phase.

Railroad Preempt is Preempt No. 2, causing traffic signal controller to implement railroad preemption routine following 2 second delay.

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.

SUPERVISED 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

No. 6 AWG equipment grounding conductor (green)

See Detail "A"

See Detail "B"

Recessed cover

U.L. listed direct burial splice kit

To pole or post

Equipment grounding conductor to controller double handhole.

HANDHOLE FRAME AND COVER

Heavy-duty compression terminal (typical)

\( \frac{3}{8} \times 3\frac{1}{4} (13 \times 31) \) stainless steel bolt with split lock washer and nylon insert lockout welded to frame and to cover (typical). Anti-corrosion compound shall be applied to each assembly.

BONDING AN EXISTING HANDHOLE COVER & FRAME

GROUNDING A MAST ARM POLE/POST

\( \frac{3}{8} \times 10' (9 \times 3.0 \text{ m}) \) copper clad grounding electrode

HEAVY-DUTY COMPRESSION TERMINAL

HEAVY-DUTY GROUND ROD CLAMP

All dimensions are in inches (millimeters) unless otherwise shown.
Mast arm length as specified on the plans

- 12' (3.6 m) typ.
- 8' (2.4 m) min.

This signal head only for arms 36' 110.97 m) and longer.

36x36 (950x900) Sign panel or blankout sign 100 lb (45 kg) max.

20 sq. ft. (1.86 sq. m) max. sign panel or blankout sign 100 lb (45 kg) max.

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.

- 20 sq. ft. (1.86 sq. m) max. sign panel or blankout sign 100 lb (45 kg) max.
- 20 sq. ft. (1.86 sq. m) max. sign panel or blankout sign 100 lb (45 kg) max.


cap Removable

ground lug

Thread bottom of anchor rod 2 (50) and provide matching hex head nut fully seated, typ.

4x8 (100x200) Handhole with frame and cover located opposite of oncoming traffic

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.

4x8 (100x200) Handhole

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.

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.

<table>
<thead>
<tr>
<th>MAST ARM LENGTH</th>
<th>ANCHOR ROD CIRCLE</th>
<th>ANCHOR ROD SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 thru 40</td>
<td>18</td>
<td>1 1/8 x 7</td>
</tr>
<tr>
<td>(4.87 m thru 12.20 m)</td>
<td>(430)</td>
<td>(44 x 2.10 m)</td>
</tr>
<tr>
<td>42 thru 55</td>
<td>21</td>
<td>1 1/8 x 7</td>
</tr>
<tr>
<td>(12.80 m thru 16.80 m)</td>
<td>(555)</td>
<td>(44 x 2.10 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 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

DATE         
1-1-20         Revised mast arm length
1-1-18         Revised table for LRFD reqs.
1-1-18         Revised GEN. NOTES for sign location. Replaced rail hooks with nuts.
This signal head only for arms 65' (19.8 m) and longer.

20 sq. ft. (1.86 sq. m) max. sign panel or blackout sign 100 lb (45 kg) max.

6 bolts

4x8 (100x200) Handhole with frame and cover located opposite of oncoming traffic

Ground lug opposite handhole

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.

4x8 (100x200) Handhole closest to pole.

Each signal head shall weigh 80 lbs. (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 blackout sign closest to pole.

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

**GENERAL NOTES**

Signal heads, sign panels, and other attachments are shown for minimum design loading purposes only. Each signal head shall weigh 80 lbs. (36 kg) and have a projected area of 14.7 sq. ft. (1.37 sq. m).

**STEEL MAST ARM ASSEMBLY AND POLE**

**56' THROUGH 75'**

**STANDARD 877002-04**
Camera or detector
9.9 lb (4.5 kg), 1 sq. ft. (0.09 sq. m)

Removable pole cap

Mast arm length as specified on the plans

Four spaces at 12' (3.6 m) typ., 8' (2.4 m) (min.)

36x36 (900x900) Sign panel or blankout sign 100 lb (45 kg) max.

3x5 (75x125) Handhole

6 bolts

Ground lug

Bolt covers (6 required)

Steel mesh

GENERAL NOTES

Signal heads, sign panels, and other attachments are shown for minimum design loading purposes only.
Each signal head shall weigh 80 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.

Where required provide second luminaire, arm and bracket at 90° or as noted on plans. Second luminaire and arm not shown for clarity.

This signal head only for arms 35' (10.6 m) or longer.

4 bolt (100x200) Handhole with frame and cover located opposite of oncoming traffic.

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.

Anchorage detail

Steel comb mast arm assembly and pole
56' through 75'

STANDARD 877012-07

DATE
1-1-19
1-1-19
1-1-19

REVISIONS
Remove tenon top info.
Rev. luminaire arm info.
Rev. second luminaire info.
Gen. Notes for sign location

Remove second luminair info.

Con. Notes for sign location
Replaced rod hooks with nuts.

MAST ARM LENGTH ANCHOR ROD CIRCLE ANCHOR ROD SIZE

56 thru 64' 17.07 m thru 19.51 m 24 (600) 1½ x 7 (64 x 2.10 m)

65 thru 76' 19.81 m thru 22.86 m 22 (685) 2 x 7½ (53 x 2.29 m)

Threads bottom of anchor rod 2 (51) and provide matching hex head nut fully seated, typ.

Steel mesh

Mast arm lengths as specified on the plans

Highest point of pavement

EPA Luminaire

Maximum 40 lb (18 kg), 1.6 sq. ft. (0.15 sq. m) EPA Luminaire

Texas type arm required for luminaire mast arm up to 35' (10.6 m). Tapered one-piece arm required for arms longer than 15' (4.6 m). One-piece shown. See plans for length to be provided.

See standard 821:01 for luminaire wiring diagram.

Ends Department of Transportation
APPROVED January 1, 2019

ENGINEER OF DESIGN AND ENVIRONMENT
1-1-08

ENGINEER OF OPERATIONS
1-1-18

1-1-19

Replaced rod hooks with nuts.
Rev. second luminair info.
Remove second luminair info.
Gen. Notes for sign location

Remove tenon top info.
Rev. luminaire arm info.
Rev. second luminaire info.

Con. Notes for sign location
Replaced rod hooks with nuts.

Steel mesh
For a revised design if other conditions are encountered.

The Bureau of Bridges & Structures should be contacted for 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.

<table>
<thead>
<tr>
<th>Mast Arm Length</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>30 (750)</td>
<td>24 (600)</td>
<td>8</td>
<td>6 (19)</td>
</tr>
<tr>
<td>greater than or equal to 30' (9.1 m) and less than 40' (12.2 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
<td>7 (22)</td>
</tr>
<tr>
<td>greater than or equal to 40' (12.2 m) and less than 50' (15.2 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
<td>7 (22)</td>
</tr>
<tr>
<td>greater than or equal to 50' (15.2 m) and up to 55' (16.8 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
<td>7 (22)</td>
</tr>
<tr>
<td>greater than or equal to 56' (16.8 m) and less than 65' (19.8 m)</td>
<td>42 (1060)</td>
<td>36 (900)</td>
<td>16</td>
<td>8 (25)</td>
</tr>
<tr>
<td>greater than or equal to 65' (19.8 m) and up to 75' (22.9 m)</td>
<td>42 (1060)</td>
<td>36 (900)</td>
<td>16</td>
<td>8 (25)</td>
</tr>
</tbody>
</table>

For standard and combination mast arm assemblies. Foundation depths for standard dual mast arms with the longest arm lengths and including 35' (10.7 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 tsf (100 kpa). This strength shall be verified by boring data prior to construction or with testing by the Engineer during foundation drilling. The Bureau of Bridges & Structures should be contacted for a revised design if other conditions are encountered.
SPAN WIRE MOUNTED SIGNALS AND FLASHING BEACON

CONTROL POLE DETAIL

SIDEWALK GUY DETAIL

POST MOUNTED FLASHING BEACON

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

Insert conduit and fill.

Drill hole through pavement.
Insert conduit and fill with approved sealer.

Grade

Insert conduit and fill.

Drill hole through pavement.
Insert conduit and fill with approved sealer.

Curb and gutter

(where installed)

Sealed slit for detector loop

2% min. slope toward handhole

Handhole, junction box, signal base, or controller base

1K (32) Conduit

1K (32) Conduit

Approved sealer

Plastic tube

Grade controller base

box, signal base, or

Handhole, junction

Pavement

Approved

sealer

(8)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)

(100)
SECTION - 28' (8.4 m) OR LESS

SECTION - 28' (8.4 m) TO 36' (10.8 m) WIDTH

SECTION - 26' (10.8 m) TO 48' (14.4 m) WIDTH

PCC PAVEMENT SPECIAL
(NONREINFORCED)

STANDARD B.L.R. 10-8

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

All catch basins shall be separated from the pavement and curb by laying out as shown in the detail. Manhole castings within the pavement limits shall be cast in a like manner except when telescoping type castings are used.

When a joint falls within 5 ft (1.5 m) of or contacts basins, manholes, or other structures, shorten one or more panels either side of opening to permit joint to fall at the corners of the box out.

When specified, roundouts as shown on Standard 420115 shall be in lieu of the manhole detail shown herein except No. 5 (No. 16) bars shall be used in lieu of No. 6 (No. 19) bars.

All transverse joints must extend through curbs and be continuous across pavement, except tied transverse construction joints. Expansion joints will be required as shown on the plans.

When specified, the pavement structure thickness at intersections shall be increased. This requirement generally will occur when the design traffic through the intersection exceeds the typical design of the pavement structure either side of the intersection.

Joints shall be sawed to a depth of t/4 for transverse joints and t/3 for longitudinal joints. Saw joints shall be sealed with material meeting the requirements of Section 1050 of the Standard Specifications.

This alternate construction is at the Contractor's option and shall be constructed in accordance with Section 460 of the Standard Specifications. The combination concrete curb and gutter shall be measured in place and the area computed in sq yd (sq m). This work will be paid for at the contract unit price per sq yd (sq m) for portland cement concrete pavement special with integral curb of the thickness specified.

Transverse joint spacing shall not exceed 12' (3.6 m) for pavements less than 10 (250) thick or 15' (4.5 m) for pavements 10 (250) thick and greater.

Construct TYPE D tied transverse construction joint when construction joint does not fall at a TYPE C sawed transverse joint.

PCC PAVEMENT SPECIAL (NONREINFORCED)

STANDARD B.L.R. 10-8

(Sheet 2 of 2)
Type III Barricades with Standard 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 passage of traffic.

Resident traffic and day labor force's equipment to use road shoulder for passing barricade.

TWO-LANE, TWO-WAY TRAFFIC, RURAL OPERATIONS EXCEEDING ONE DAYLIGHT PERIOD

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.
ROAD WORK AHEAD

MOWING

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 authority.

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, and men, and their activities are restricted at all times to one side of the pavement.

Flashing lights or rotating beacons are required for all maintenance vehicles while in operation.

Applicable operations illustrated in Standard 701301 may be used when operations do not exceed 15 minutes on the pavement or 60 minutes on the shoulder.

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, and men, and their activities are restricted at all times to one side of the pavement.

Flashing lights or rotating beacons are required for all maintenance vehicles while in operation.

Applicable operations illustrated in Standard 701301 may be used when operations do not exceed 15 minutes on the pavement or 60 minutes on the shoulder respectively.

All warning signs shall have minimum dimensions of 36x36 (900x900) and have black legend on an orange reflectorized background.

When fluorescent signs are used, orange flags are 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.

TYPICAL APPLICATIONS
MOWING
SPREADING AGGREGATE
WEED SPRAYING
SURFACE MAINTENANCE
RETUMENDUS RESURFACING
CRACK POURING
SHOULDER REPAIR
CLEANING DITCHES

SYMBOLS
Work area

Sign with 18x18 (450x450) min. orange flag attached.

GENERAL NOTES
Maintenance operations shall be confined to one traffic lane, leaving the opposite lane open to traffic. At least 500' (150 m) of both traffic lanes 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 sign 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, and men, and their activities are restricted at all times to one side of the pavement.

Flashing lights or rotating beacons are required for all maintenance vehicles while in operation.

Applicable operations illustrated in Standard 701301 may be used when operations do not exceed 15 minutes on the pavement or 60 minutes on the shoulder respectively.

All warning signs shall have minimum dimensions of 36x36 (900x900) and have black legend on an orange reflectorized background.

When fluorescent signs are used, orange flags are not required.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

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

TRAFFIC CONTROL DEVICES-
DAY LABOR MAINTENANCE

STANDARD B.L.R. 18-6

DATE
1-1-15

REVISIONS
Corrected RWA sign number.

1-1-09
Switched units to English (metric). Moved
see General Note.
When rail element is placed adjacent to a tapered surface use timber wedge "M" between the concrete and plate "G". Plate washer 'D' under nut.

Finished ground line

Plate washer 'D' under nut.

| M25 Dia. anchor bolt with flat washer and lock nut (screwed drilling or expanding anchors). |

Plate 'G' placed between plate 'E' and rail element.

* Splice bolts with washer under nut.

* Post bolt with plate washer 'F' placed under head and nut.

- Splice bolts

- Post bolt with plate washer

1 (M25) Dia. anchor bolt with locknut

When an expansion joint exists below the connector, "G" after the 1 (25) bolts are in place.

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 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.

Install the face of the guardrail flush with the face of the parapet.

Install plate and rail element.
When distance from closure to crossroad is less than 1500' (450 m)

When distance from closure to crossroad is greater than 1500' (450 m)

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 70/903.

Two Type A Low Intensity Flashing Lights shall be used on each approach in advance of the work area during hours of darkness. One light shall be installed above the barricades and the other above the first advance warning sign.

All warning signs shall have minimum dimensions of 36 x 36 (900 x 900) and have a black legend on an orange reflectorized background.

When fluorescent signs are used, orange flags are not required.

Longitudinal dimensions may be adjusted to fit field conditions.

When the distance between the barricade and the intersection is between 1500' (450 m) and 2000' (600 m), the advance sign shall be placed at the intersection. When the distance between the barricade and the intersection is over 2000' (600 m), an additional sign shall be placed at the intersection. The additional sign shall give the distance to the barricade in miles or fractions of a mile.

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

TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES FOR CONSTRUCTION ON RURAL LOCAL HIGHWAYS

STANDARD B.L.R. 21-9
CONDITION I
APPROACH TRAFFIC STOPPED

SYMBOLS

- Work area
- Type III Barricade
- Sign with 18x18 (450x450) min. orange flag attached

CONDITION II
APPROACH TRAFFIC DOES NOT STOP

SYMBOLS

- Work area
- Type III Barricade
- Sign with 18x18 (450x450) 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 701901. 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.

REVIEWS

DATE

1-1-12

1-1-09

TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES FOR CONSTRUCTION ON RURAL LOCAL HIGHWAYS (TWO LANE TWO WAY RURAL TRAFFIC) (ROAD CLOSED TO THRU TRAFFIC)

STANDARD B.L.R. 22-7
**GENERAL NOTES**

See Standard B.L.R. 26 for details of guardrail not shown.

Posts at location 1 & 2 shall be wood breakaway posts. Posts other than 1 & 2 may be either standard wood posts or steel posts, at the option of the Contractor. If standard wood posts are used, one post shall be located midway between and in 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) two eightpenny nails driven into the post and bent over the top of the plate.

When this terminal is used with Standard B.L.R. 23-4, 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 (mm) unless otherwise shown.

---

**TRAFFIC BARRIER TERMINAL TYPE 1**

**WOOD BREAKAWAY POSTS**

**TUBULAR STEEL FOUNDATIONS**

---

**OFFSETS TO FACE OF RAIL**

<table>
<thead>
<tr>
<th>Post</th>
<th>X ft (m)</th>
<th>Y ft (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>19.20</td>
<td>(5.90)</td>
</tr>
<tr>
<td>2</td>
<td>21.70</td>
<td>(6.64)</td>
</tr>
<tr>
<td>3</td>
<td>24.20</td>
<td>(7.37)</td>
</tr>
<tr>
<td>4</td>
<td>26.70</td>
<td>(8.12)</td>
</tr>
<tr>
<td>5</td>
<td>29.20</td>
<td>(8.90)</td>
</tr>
<tr>
<td>6</td>
<td>31.70</td>
<td>(9.65)</td>
</tr>
<tr>
<td>7</td>
<td>34.20</td>
<td>(10.40)</td>
</tr>
<tr>
<td>8</td>
<td>36.70</td>
<td>(11.21)</td>
</tr>
<tr>
<td>9</td>
<td>39.20</td>
<td>(12.00)</td>
</tr>
<tr>
<td>10</td>
<td>41.70</td>
<td>(12.70)</td>
</tr>
</tbody>
</table>

**SHOULDER WIDENING TRANSITION**

**PLAN**

See table of offsets

3 Spots at 6'-2" (1.88 m)

2 Spots at 6'-3" (1.905 m)

**SECTION A-A**

* If fill height exceeds 3'-0" (1.8 m) use 1:3 max.
TYPICAL APPLICATION

MAILBOX ON FARSIDE OF ENTRANCE

MAILBOX ON NEARSIDE OF ENTRANCE

GENERAL NOTES

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

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

DIMENSIONS - ft. (m)

<table>
<thead>
<tr>
<th>Width of Shoulder (X)</th>
<th>12</th>
<th>10</th>
<th>8</th>
<th>6</th>
<th>4</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width of Turnout (Y)</td>
<td>6</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Width of Turnout (Y)</td>
<td>(2.4)</td>
<td>(2.4)</td>
<td>(1.8)</td>
<td>(1.2)</td>
<td>(1.2)</td>
<td>(1.2)</td>
</tr>
<tr>
<td>L_1</td>
<td>30</td>
<td>30</td>
<td>23</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>L_2</td>
<td>(9.0)</td>
<td>(9.0)</td>
<td>(6.9)</td>
<td>(4.5)</td>
<td>(4.5)</td>
<td>(4.5)</td>
</tr>
<tr>
<td></td>
<td>(2.4)</td>
<td>(2.4)</td>
<td>(1.8)</td>
<td>(1.2)</td>
<td>(1.2)</td>
<td>(1.2)</td>
</tr>
<tr>
<td></td>
<td>(1.8)</td>
<td>(1.8)</td>
<td>(0.6)</td>
<td>(0.3)</td>
<td>(0.3)</td>
<td>(0.3)</td>
</tr>
<tr>
<td></td>
<td>(1.5)</td>
<td>(1.5)</td>
<td>(0.45)</td>
<td>(0.15)</td>
<td>(0.15)</td>
<td>(0.15)</td>
</tr>
<tr>
<td></td>
<td>(1.2)</td>
<td>(1.2)</td>
<td>(0.15)</td>
<td>(0.05)</td>
<td>(0.05)</td>
<td>(0.05)</td>
</tr>
</tbody>
</table>

Note: Dimensions for Township and District Roads may vary from the above dimensions.
All dimensions are in inches (millimeters) unless otherwise shown.

TYPE 1A BARRICADE
FOR NON-NHS ROUTES

STANDARD B.L.R. 25-1
Steel plate beam guardrail

**ELEVATION**

**TYPE A**
6'-3'' (1.905 m) Typical post spacing

**SECTION A-A**

**SECTION B-B**

**SECTION C-C**

**ELEVATION**

**TYPE B**
376 (953) Closed post spacing

**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
29'' (731mm) HEIGHT

STANDARD B.L.R. 26-3

(All revisions and issuances are as of January 1, 2012.)

Illinois Department of Transportation

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

PASSED

ENGINEER OF LOCAL ROADS AND STREETS

DATE

REVISIONS

1-1-12
Modified table on sh. 4.

Renamed standard.

1-1-10

1-1-08

From 6'-9'' to 6'-0''.

Modified table on sh. 4.

REVISIONS
STEEL POST CONSTRUCTION

STEEL BLOCK-OUT DETAIL

NOTE
Plate A shall be placed between rail element and block-out at non-splice mounting points only when steel block-outs are used.

PLATE A

WOOD POST CONSTRUCTION

STEEL PLATE BEAM GUARDRAIL
29" (731mm) HEIGHT

STANDARD B.L.R. 26-3
NOTE

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

NOTE

When end shoe is attached to a bridge parapet which has an expansion joint, the bolts shall be provided with a locknut or double nut and shall be tightened only to a point that will allow guardrail movement.

The standard end shoe shall be attached to the concrete with pre-drilled or self-drilling anchor bolts. The anchor cone shall be set flush with the surface of the concrete. Externally threaded studs protruding from the surface of the concrete will not be permitted.
GUARDRAIL PLACED BEHIND CURB

(D = 0 desirable to 12 (300) maximum)

WOOD BLOCK-OUT AND STEEL POST DETAILS

FOOTING FOR POST WHEN IMPERVIOUS MATERIAL IS ENCOUNTERED

<table>
<thead>
<tr>
<th>V</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 16'6&quot;</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>16'6&quot; - 25'0&quot;</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>&gt;25'0&quot;</td>
<td>23</td>
<td></td>
</tr>
</tbody>
</table>

Steel Post

Wood Post

1 (M24) double nuts or locknuts and washer

Swage connected

% 1/2" dia. (4x19) galvanized cable

Tighten to taut tension.
**TRAFFIC BARRIER TERMINAL TYPE 5A**

**GENERAL NOTES**

See Standard B.L.R. 26 for details of guardrail not shown.

Install plate washer D so 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.

The face of the guardrail shall be installed flush with the face of the bridge rail.

When this terminal is used with Standard 630026, the guardrail shall transition down to the height of the terminal.

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

---

**PLATE WASHER D**

1/4 (25) Dia. hole

3/16 (20) Dia. wood or steel post

**PLATE WASHER F**

3/8 (5) Steel plate

3/8 x 2 1/2 (18 x 65) Slotted hole

**PLATE WASHER E**

1 1/2 (35) Dia. hole

3/8 x 3/16 (19 x 44) Slotted holes

3/8 x 1/2 (25 x 29) Slotted holes

**PLATE G**

1 3/8 (35) Dia. hole

3/8 x 1 1/2 (18 x 37) Slotted hole

**PLATE WASHER D**

2 1/2 (65) Dia. hole

---

**TYPE 5A - STEEL BRIDGE RAIL**

---

**TRAFFIC BARRIER TERMINAL TYPE 5A (one each)**

---

**PLACEMENT OF PLATE WASHER D**

---

**DATE** | **REVISIONS**
---|---
1/1/09 | Switched units to English measure.
1/1/08 | New Standard. Was part of Std. 631026 prior to January 1, 2007.
**GENERAL NOTES**

- For corner islands only.
- Short radius curve (such as entrances, side streets and ramp returns).

**ADJACENT TO PCC PAVEMENT OR PCC BASE COURSE**

**Pavement Expansion Joint**

- Spanning of contraction joints to match adjacent PCC pavement but not to exceed 15' (4.5 m).
- Full depth & width 1.25 (25) - thick (min.), preformed expansion joint filler.
- The dowel bars shown in contraction joints will be placed at mid-depth.
- The bottom slope of combination curb and gutter is omitted.
- See Standard 606301 for details of corner islands except reference to Standard 606001 does not apply.
- All dimensions are in inches (millimeters) unless otherwise shown.

**TABLE OF DIMENSIONS**

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

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

**DEPRESSED CURB ADJACENT TO CURB RAMP ACCESSIBLE TO THE DISABLED**

The bottom slope of combination curb and gutter constructed adjacent to PCC pavement shall be the same slope as the subbase or 6% when subbase is omitted.

- t = Pavement thickness.
- Longitudinal joint tie bars shall be No. 5 (16) at 24 (600) centers in accordance with details for longitudinal construction joint shown on Standard 420001.
- A minimum clearance of 2 (50) between the end of the tie bar and the back of the curb shall be maintained.
- The dowel bars shown in construction joints will only be required for monolithic construction.
- See Standard 608301 for details of corner islands except reference to Standard 606001 does not apply.

**DATE REVISIONS**

1-1-18 New standard.

1-1-17 Revised construction joint spacing adjacent to PCC pavement.

1-1-12 Revised contraction joint spacing adjacent to PCC pavement and dowel bar table.

B.L.R. 28-1
Short radius curve

A

Constriction joints
at 75'-0" (2.3 m)
max. (typ.)

A

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

A

Drainage casting
with curb box
Back of curb

A

12 1300 H

(1.5 m)

A

(1.5 m)

A

5'-0" (1.5 m)

5'-0" (1.5 m)

A

Edge of pavement

A

Undoweded contraction joint
(typ.)

construction options:

1. Form with 1/2 (3) thick steel template
   2. (50) deep, and seal.
2. Saw 2 (50) deep at 4 to 24 hours, and seal.
3. Insert 1/4 (20) thick preformed joint filler
   full depth and width.

Construction joint

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

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

A

12 (300) typ.

A

A

5'-0" (1.5 m)

5'-0" (1.5 m)

A

A

A

A

Edge of pavement

A

Mountable curb shown
(other types permitted)

HMA surfacing

Base course

HMA surfacing

Base course

ON DISTURBED SUBGRADE

ON UNDISTURBED SUBGRADE

ADJACENT TO FLEXIBLE PAVEMENT

DEPRESSED CURB

BARRIER CURB

ADJACENT TO FLEXIBLE PAVEMENT

DEPRESSED CURB

BARRIER CURB

ADJACENT TO PCC PAVEMENT OR PCC BASE COURSE

CONCRETE CURB TYPE B

CONCRETE CURB AND GUTTER

AND COMBINATION

CONCRETE CURB TYPE B