Revision #224 of the Highway Standards, effective January 1, 2021, is now available on the department’s website.

The revisions are as follows:

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<td>000001-08</td>
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<td>424006-04</td>
<td>424006-05</td>
<td>Clarified minimum crosswalk width and locations.</td>
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<tr>
<td>424021-05</td>
<td>424021-06</td>
<td>Added crosswalk striping and a “buffer” for wide sidewalks.</td>
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<tr>
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<td>542406-04</td>
<td>Revised THICKNESS values in table.</td>
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<tr>
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<td>602106-03</td>
<td>Revised openings in lid to fit the 36 (915) width of the revised concrete median barrier.</td>
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<td>604071-05</td>
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<td>604076-05</td>
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<td>Removed “safety bar” from frame.</td>
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<tr>
<td>604091-03</td>
<td>604091-04</td>
<td>Removed “safety bar” from frame.</td>
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<tr>
<td>610001-08</td>
<td>610001-09</td>
<td>Revised Section B-B, precast box outlet, anchor bolts, rebar and curb details. Added pipe elbows and WWR note.</td>
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Removed | Inserted | Remarks
---|---|---
631031-16 | 631031-17 | Added Detail A and revised plate dimensions on sheet 4.
637006-04 | 637006-05 | Revised Typical and Variable Cross-Sections. Added keyway anchor method and hook bars.
642006 | 642006-01 | Added minimum width of paved shoulder for bicycle accommodations.

Division 700 Index
January 1, 2020 | Division 700 Index
January 1, 2021 | Updated.

701400-09 | 701400-10 | Removed Work Zone Public Information sign and its note. Revised stationary sign gen. note.
701446-10 | 701446-11 | Corrected symbol for type II barricade with steady burn monodirectional light and altered device spacing callout.

Division 800 Index
January 1, 2020 | Division 800 Index
January 1, 2021 | Updated.
814006-02 | 814006-03 | Corrected dimension in Portland Cement Concrete Plan view.
878001-10 | 878001-11 | Revised anchor rod end in Type E detail.

Standards by Subject/Title
January 1, 2020 | Standards by Subject/Title
January 1, 2021 | Updated.

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.
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**EROSION CONTROL**

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# Standards by Division

## DIVISION 400  SURFACE COURSES, PAVEMENTS, REHABILITATION, AND SHOULDERS

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665001-02  Woven Wire Fence
666001-01  Right-of-Way Markers
667001-01  Drainage Markers
667101-02  Permanent Survey Markers
668001-01  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**

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**January 1, 2021**

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**APPROVED**

**January 1, 2021**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED**

**PASSED**

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**STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS**

**STANDARD 000001-08**

---

**Sheet 2 of 9**
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### EROSION & SEDIMENT CONTROL ITEMS

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### ABBREVIATIONS

- ITS Camera
- Wind Turbine
- Intelligent Transportation Systems
- Evergreen Tree
- Shade Tree

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**January 1, 2021**

**Engineer of Design and Environment**

**1-1-97 PASSED AND PATTERNS**

**STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS**

(Worksheet 3 of 9)
**PAVEMENT MARKINGS (contd.)**

- **CL 2L, 2Way**
  - RRPM 12.2 m (40') o.c.

- **CL 2L, 2Way**
  - RRPM 24.4 m (80') o.c.

- **CL, Multilane Div.**
  - RRPM 12.2 m (40') o.c.

- **CL, Multilane Div.**
  - RRPM 24.4 m (80') o.c.

- **CL, Multilane Div., Dbl.**
  - RRPM 24.4 m (80') o.c.

- **CL, Multilane Undiv.**

**EX**

- **Two Way Turn Left Line**

**PR**

- **Urban Combination Left**

- **Urban Combination Right**

- **Urban Left Turn Arrow**

- **Urban Right Turn Arrow**

- **Urban Left Turn Only**

- **Urban Right Turn Only**

- **Urban Thru Only**

**RAILROAD ITEMS**

- **Abandoned Railroad**
  - **EX**
  - **PR**

- **Railroad**
  - **EX**
  - **PR**

- **Railroad Point**
  - **EX**
  - **PR**

- **Control Box**
  - **EX**
  - **PR**

- **Crossing Gate**
  - **EX**
  - **PR**

- **Flashing Signal**
  - **EX**
  - **PR**

- **Railroad Cant. Mast Arm**
  - **EX**
  - **PR**

- **Crossbuck**
  - **EX**
  - **PR**

**REMOVAL ITEMS**

- **Removal Tic**
  - **EX**
  - **PR**

- **Bituminous Removal**

- **Hatch Pattern**

- **Tree Removal Single**

**RIGHT OF WAY ITEMS**

- **Future ROW Corner Monument**
  - **EX**
  - **PR**

- **ROW Marker**
  - **EX**
  - **PR**

- **ROW Line**
  - **EX**
  - **PR**

- **Easement**
  - **EX**
  - **PR**

- **Temporary Easement**
  - **EX**
  - **PR**

**STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS**

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**2021**

**PASSED**

**STANDARD 000001-08**
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**ROADWAY PLAN ITEMS**

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<th>PR</th>
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<tbody>
<tr>
<td>Cable Barrier</td>
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<tr>
<td>Concrete Barrier</td>
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<tr>
<td>Edge of Pavement</td>
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<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>
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</tr>
<tr>
<td>Guardrail</td>
<td>---</td>
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<tr>
<td>Guardrail Post</td>
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<td>Traffic Sign</td>
<td>---</td>
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<tr>
<td>Corrugated Median</td>
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</tr>
<tr>
<td>Impact Attenuator</td>
<td>---</td>
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<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>
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<tr>
<td>Typical Cross-Section Line</td>
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</table>

| STA. 45+00 |

**ROADWAY PROFILES**

<table>
<thead>
<tr>
<th>EX</th>
<th>PR</th>
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</thead>
<tbody>
<tr>
<td>P.I. Indicator</td>
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<tr>
<td>Point Indicator</td>
<td>▲</td>
</tr>
<tr>
<td>Earthworks Balance Point</td>
<td>▲</td>
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<tr>
<td>Begin Point</td>
<td>▲</td>
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<tr>
<td>Vert. Curve Data</td>
<td>VPI = L</td>
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<tr>
<td>Ditch Profile Left Side</td>
<td>---</td>
</tr>
<tr>
<td>Ditch Profile Right Side</td>
<td>---</td>
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<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>
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**SIGNING ITEMS**

<table>
<thead>
<tr>
<th>EX</th>
<th>PR</th>
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<tbody>
<tr>
<td>Cone, Drum or Barricade</td>
<td>▲</td>
</tr>
<tr>
<td>Barricade Type II</td>
<td>▲</td>
</tr>
<tr>
<td>Barricade Type III</td>
<td>▲</td>
</tr>
<tr>
<td>Barricade With Edge Line</td>
<td>▲</td>
</tr>
<tr>
<td>Flashing Light Sign</td>
<td>▲</td>
</tr>
<tr>
<td>Panels I</td>
<td>▲</td>
</tr>
<tr>
<td>Panels II</td>
<td>▲</td>
</tr>
<tr>
<td>Direction of Traffic</td>
<td>▲</td>
</tr>
<tr>
<td>Sign Flag</td>
<td>▲</td>
</tr>
</tbody>
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**STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS**

Illinois Department of Transportation
SIGNING ITEMS

<table>
<thead>
<tr>
<th>EX</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Way Arrow (W2-6-D)</td>
<td>Left Turn Green</td>
</tr>
<tr>
<td>Two Way Arrow Large (W1-7-D)</td>
<td>Left Turn Yellow</td>
</tr>
<tr>
<td>Detour M4-10L (D)</td>
<td>Signal Backplate</td>
</tr>
<tr>
<td>Detour M4-10R (D)</td>
<td>Signal Section 8&quot; (200 mm)</td>
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<tr>
<td>One Way Left (R6-3L)</td>
<td>Signal Section 12&quot; (300 mm)</td>
</tr>
<tr>
<td>One Way Right (R6-3R)</td>
<td>Walk/Don’t Walk Letters</td>
</tr>
<tr>
<td>Left Turn Lane (R3-110-L)</td>
<td>Walk/Don’t Walk Symbols</td>
</tr>
<tr>
<td>Keep Left (R4-7A-L)</td>
<td>Traffic Signal Items</td>
</tr>
<tr>
<td>Keep Left (R4-7A-R)</td>
<td>Galv. Steel Conduit</td>
</tr>
<tr>
<td>Keep Right (R4-7R-L)</td>
<td>Underground Cable</td>
</tr>
<tr>
<td>Keep Right (R4-7R-R)</td>
<td>Detector Loop Line</td>
</tr>
<tr>
<td>Stop Here On Red (R10-6-AL)</td>
<td>Detector Loop Large</td>
</tr>
<tr>
<td>Stop Here On Red (R10-6-AR)</td>
<td>Detector Loop Small</td>
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<tr>
<td>No Left Turn (R3-2)</td>
<td>Detector Loop Quadrapole</td>
</tr>
<tr>
<td>No Right Turn (R3-1)</td>
<td>Traffic Sheet Items</td>
</tr>
<tr>
<td>Road Closed (R11-2)</td>
<td>Cable Number</td>
</tr>
<tr>
<td>Road Closed Thru Traffic (R11-2)</td>
<td>Left Turn Green</td>
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STRUCTURES ITEMS

<table>
<thead>
<tr>
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<tr>
<td>Box Culvert Barrel</td>
<td>Box Culvert Headwall</td>
</tr>
<tr>
<td>Bridge Pier</td>
<td>Bridge</td>
</tr>
<tr>
<td>Retaining Wall</td>
<td>Temporary Sheet Piling</td>
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</table>

TRAFFIC SIGNAL ITEMS

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

STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS

STANDARD 000001-08
| TRAFFIC SIGNAL ITEMS (contd.) | EX | PR | DETECTOR RACEWAY | ALUMINUM MAST ARM | STEEL MAST ARM | VEH. DETECTOR MAGNETIC | CONDUIT SPlice | CONTROLLER | GUlFBOX JUNCTION | WOOD POle | TEMP. SIGNAL HEAD | HANDHOLE | DOUBLE HANDHOLE | HEAVY DUTY HANDHOLE | JUNCTION BOX | Ped. Pushbutton Detector | Ped. SIGNAL HEAD | POWER POle SERVICE | Priority Veh. Detector | Signal Head | Signal Head w/Backplate | Signal Post | Closed Circuit TV | Video Detector System |
|-------------------------------|----|----|-----------------|-------------------|-----------------|------------------------|--------------|-----------|-----------------|------------|-----------------|-----------|----------------|-----------------|----------------|------------------------|--------------|-------------------|----------------|----------------|---------------------|-------------|----------------|----------------|-----------------|----------------------|
| UNDERGROUND UTILITY ITEMS | EX | PR | Cable TV | Electric Cable | Fiber Optic | Gas Pipe | Oil Pipe | Sanitary Sewer | Telephone Cable | Water Pipe | Controller | Double Handhole | Fine Hydrant | GuyWire or Deadman Anchor | Handhole | Heavy Duty Handhole | Junction Box | Light Pole | Manhole | Monitoring Well (Gasoline) | Pipeline Warning Sign | Power Pole | Power Pole with Light | Sanitary Sewer Cleanout | Splice Box Above Ground | Telephone Splice Box Above Ground | Telephone Pipe |
|-------------------------------|----|----|---------|---------------|-----------|-----------|-----------|------------|-------------|-------------|-------------|----------------|----------------|----------------|------------|----------------|---------------|--------------|-----------|-----------------|----------------|----------------|----------------|--------------------|----------------|----------------|----------------|----------------|-------------------|----------------|-------------|
| UTILITY ITEMS | EX | PR | Controller | Double Handhole | Fine Hydrant | GuyWire or Deadman Anchor | Handhole | Heavy Duty Handhole | Junction Box | Light Pole | Manhole | Monitoring Well (Gasoline) | Pipeline Warning Sign | Power Pole | Power Pole with Light | Sanitary Sewer Cleanout | Splice Box Above Ground | Telephone Splice Box Above Ground | Telephone Pipe |
|-------------------------------|----|----|--------|--------------|-----------|----------------|------------|----------------|---------------|-------------|-------------|----------------|----------------|----------------|------------|----------------|----------------|--------------|-----------|-----------------|----------------|----------------|----------------|--------------------|----------------|----------------|----------------|----------------|-------------------|----------------|-------------|
| VEGETATION ITEMS | EX | PR | Deciduous Tree | Bush or Shrub | Evergreen Tree | Shump | Orchard/Nursery Line | Vegetation Line | Woods & Bush Line |
|-------------------------------|----|----|------------|--------------|-------------|---------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------|----------------|----------------|--------------|-----------|-----------------|----------------|----------------|----------------|--------------------|----------------|----------------|----------------|----------------|-------------------|----------------|-------------|
| WATER FEATURE ITEMS | EX | PR | Stream or Drainage Ditch | Waters Edge | Water Surface Indicator | Water Point | Disappearing Ditch | Marsh | Marsh/Swamp Boundary |
|-------------------------------|----|----|----------------|---------------|----------------|-----------|----------------|------------|----------------|----------------|----------------|----------------|----------------|----------------|------------|----------------|----------------|--------------|-----------|-----------------|----------------|----------------|----------------|--------------------|----------------|----------------|----------------|----------------|-------------------|----------------|-------------|

STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS (Sheet 6 of 9) STANDARD 000001-08
<table>
<thead>
<tr>
<th>Diameter (in.)</th>
<th>Area (sq in.)</th>
<th>Weight (lb/ft)</th>
<th>Weight (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8</td>
<td>0.196</td>
<td>1.270</td>
<td>2.044</td>
</tr>
<tr>
<td>1/2</td>
<td>0.358</td>
<td>1.600</td>
<td>2.600</td>
</tr>
<tr>
<td>5/8</td>
<td>0.575</td>
<td>2.400</td>
<td>3.973</td>
</tr>
<tr>
<td>3/4</td>
<td>0.875</td>
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<td>6.404</td>
</tr>
<tr>
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<td>10.680</td>
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**REINFORCEMENT BARS - ENGLISH (METRIC)**

<table>
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<tr>
<th>Bar Size (English)</th>
<th>Dia. in.</th>
<th>Cross-Sectional Area in. sq. in.</th>
<th>Weight/lb. ft.</th>
<th>Weight/kg/m</th>
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<tbody>
<tr>
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<td>0.264</td>
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**REINFORCEMENT BARS - ENGLISH (METRIC)**

<table>
<thead>
<tr>
<th>Bar Size (Metric)</th>
<th>Dia. mm</th>
<th>Cross-Sectional Area in. sq. mm</th>
<th>Weight/lb. ft.</th>
<th>Weight/kg/m</th>
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**AREAS OF STEEL PER FOOT (METER), sq. in. (sq. mm)**

<table>
<thead>
<tr>
<th>Diameter (in.)</th>
<th>Area (sq in.)</th>
<th>Weight (lb/ft)</th>
<th>Weight (kg/m)</th>
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<tbody>
<tr>
<td>3/8</td>
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<tr>
<td>1</td>
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<td>6.875</td>
<td>10.680</td>
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</tbody>
</table>

**DATE**

1-1-97

**AREAS OF REINFORCEMENT BARS**

**STANDARD 001001-02**
<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
<th>A</th>
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</thead>
<tbody>
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<tr>
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<td>0.5250</td>
<td>0.5375</td>
<td>0.5250</td>
<td>0.7175</td>
</tr>
</tbody>
</table>

**A** = Fractions of Inch or Foot

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

DITCH CHECK FOR WIDE MEDIAN

GENERAL NOTES

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

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

VIEW OF NARROW MEDIAN

VIEW OF WIDE MEDIAN

EARTH MEDIAN

DITCH CHECK

STANDARD 202001-01
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.

AGGREGATE DITCH CHECK

When the ditch check is within the clear zone and the road is open to traffic, the traffic approach slope of the aggregate shall be 3:4 (V:H).

SECTION A-A

GENERAL NOTES

The installation details and dimensions shown for perimeter erosion barriers shall also apply for inlet and pipe protection.

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

TEMPORARY EROSION CONTROL SYSTEMS

(Sheet 1 of 2)

STANDARD 280001-07
Flow or rolled excelsior
Straw or hay bales
Spacers
Silt filter
30' (9.0 m)
20' (6.0 m) to 6' (1.8 m)
24 (600) to 12 (300)
will improve if put into a series.

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

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.

INLET AND PIPE PROTECTION

SEDIMENT BASIN

ELEVATION

PLAN

TYPICAL CUT CROSS-SECTION

TYPICAL FILL CROSS-SECTION

TEMPORARY DITCHES FOR CUT & FILL SECTIONS

TEMPORARY EROSION CONTROL SYSTEMS

STANDARD 280001-07
TYPICAL FABRIC FORMED CONCRETE REVETMENT MAT LINED DITCH

INSTALLATION DETAILS

1. In placing inserts through fabric use care to avoid breaking drop stitches.

2. Indicates sequence of pour.

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 stated.

REVETMENT MATS

TYPICAL LAP JOINTS W/ANCHOR WALL

TYPICAL SECTION THRU FILTER POINT MAT

CUT OFF WALL DETAILS
**SECTION A-A**
(TYPICAL 2 LANE WITH SHOULDERS)

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

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

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

**DATE**
1-1-18

**REVISIONS**
1-1-18 Changed tie bar spacing to 36 (900) cts.
1-1-08 Switched units to English (metric)

PCC BASE COURSE WITH HMA BINDER AND SURFACE COURSES

STANDARD 353001-05

Illinois Department of Transportation
January 1, 2018

ENGINEER OF POLICY AND PROCEDURES
APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

PASSED
Provide drainage swale in shaded area.

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

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

When using a radius R1 less than the assumed mainline grade of 0.00%, the indicated "A" and "B" grades for the ramp terminal are based on the 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 (shaped area), provide a drainage swale and flush inlet to enhance drainage.

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

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

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

SECTION B-B

SECTION C-C

SECTION D-D

CROSS SECTIONS WHEN MAINLINE IS CURVED TO THE LEFT

DETAIL A

DETAIL B
to their intersection.

ramp and mainline edge lines of the Project the shoulder

shoulder Edge of bit.

3° 3' 26" (typ.)

(90 m)

(30 m)

pavement

Edge of mainline

Stub (300) Vert.

Stub (300) Vert.

when mainline is curved to the left

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

When mainline is on tangent or curved to the right

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

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

Refer to sheet 3 for vertical offsets using e = 8%

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

See Sheet 3 for GENERAL NOTES
**SECTION B-B**

1.5% and greater
Mainline pvmt.
Ramp pvmt.
Improved subgrade

See DETAIL A

**SECTION CAH - CAH**

1.5% and greater
Mainline pvmt.
Ramp pvmt.
Improved subgrade

**SECTION CBK - CBK**

When Mainline is on tangent or curved to the right

**SECTION CAH - CAH**

When Mainline is curved to the left

**SECTION CBK - CBK**

See Sheet 3 for GENERAL NOTES

**EXIT RAMP TERMINAL**

(Flexible ramp pavement adjacent to flexible mainline pavement)

(Sheet 2 of 3)

STANDARD 406101-05
Details for Drainage in Neutral Area

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

See plans for actual grades.

See Standard 482001 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 R1, construct the ramp as a 140 ft. (43 m) tangent section.

All dimensions are in inches (millimeters) unless otherwise shown.
MAILBOX ON NEAR SIDE OF ENTRANCE

MAILBOX ON FAR SIDE 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 - m (ft)

<table>
<thead>
<tr>
<th>Width of Shoulder</th>
<th>6-8 (1.2-2.4)</th>
<th>10 (3.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width of Turnout (Y)</td>
<td>8 (2.4)</td>
<td>10-15 (2.4-4.9)</td>
</tr>
</tbody>
</table>

L₁ = 32 (9.5) to 32 (9.5)
L₂ = 20 (6.0) to 20 (6.0)
LONGITUDINAL SAWED JOINT

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

Sawed groove \( \frac{1}{6} \) (3) min. x 1/3

Hot poured joint sealer

LONGITUDINAL CONSTRUCTION JOINT

(TIE BAR FORMED IN PLACE OR MECHANICALLY INSERTED)

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

Bar supports (formed in place only)

LONGITUDINAL KEYED JOINT

Type C metal joint or approved equal

SUPPORTING CHAIR ALTERNATE

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

SUPPORTING CHAIR ALTERNATE

GENERAL NOTES

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

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

PAVEMENT JOINTS

STANDARD 420001-09

(Effective January 1, 2018)
**TRANVERSE EXPANSION JOINT**

*FOR PAVEMENTS WITH UNEQUAL THICKNESS*

- **NOTE:** 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.

**TRANVERSE EXPANSION JOINT**

*FOR PAVEMENTS WITH EQUAL THICKNESS*

- **NOTE:** Dowel bars shall be installed in the header once the expansion caps have been removed and the joint filler material has been installed.

---

**SEALING DETAIL**

- **Joint sealer:** Hot poured with edger
- **Finish corners:** Joint sealer Hot poured with edger
- **Joint filler:** Flexible foam Preformed, plastic Preformed, closed cell
- **Base course:** Sand

---

**Dowel Bar Table**

<table>
<thead>
<tr>
<th>Pavement Bar Diameter</th>
<th>Dowel Bar Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 (250) or greater</td>
<td>16 (138)</td>
</tr>
<tr>
<td>8 (200) to 9.99 (249)</td>
<td>16 (132)</td>
</tr>
<tr>
<td>Less than 8 (200)</td>
<td>3 (25)</td>
</tr>
</tbody>
</table>

---

**TRANVERSE CONTRACTION JOINT**

*FOR CAM, CFA AND LFA BASE COURSE MIXTURES*
SECTION A-A
(TYPICAL 2-LANE WITH SHOULDERS)

PAVEMENT PLAN

TRANSVERSE CONSTRUCTION JOINT

DETAIL OF ADDED REINFORCEMENT
FOR PAVEMENT BLOCKS-OUTS

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

DATE                REVISIONS
1-1-18                Changed spacing of tie bars to 36 (900) cts.
1-1-15                Added dimension of tie bar to transverse contraction joints.

STANDARD 420101-06

24' (7.2 m) JOINTED
PCC PAVEMENT

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                Changed spacing of tie bars to 36 (900) cts.
1-1-15                Added dimension of tie bar to transverse contraction joints.

STANDARD 420101-06

24' (7.2 m) JOINTED
PCC PAVEMENT

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                Changed spacing of tie bars to 36 (900) cts.
1-1-15                Added dimension of tie bar to transverse contraction joints.
**MID PANEL DETAIL**

- 8 No. 6 (19) Tie bars equally spaced drilled and grouted in place.
- Circular form 4'-0" (1.22 m) dia. to be removed before concrete added.
- 6 No. 6 (19) inner hoop bar at mid depth 3'-6" (1.1 m) dia. (typ.)
- Semi-circular No. 6 (19) outer hoop bar 4'-0" (1.22 m) Semi-circular form with tangent extended to longitudinal joint.
- 6 No. 6 (19) Tie bars equally spaced 18 (450) long (typ.)
- 6 No. 6 (19) Tie bars equally spaced and symmetrical about longitudinal joint drilled and grouted in place.

**DETAIL AT TRANSVERSE JOINT**

- Sawcut stops at suitable circular form.
- Continuous No. 6 (19) inner hoop bar 18 (450) long.
- Circular form.
- Transverse contraction joint.
- Continuous No. 6 (19) outer hoop bar 18 (450) long.

**DETAIL AT LONGITUDINAL JOINT**

- 4'-0" (1.22 m) Semi-circular form with tangent extended to transverse joint.
- 6 No. 6 (19) Tie bars equally spaced 18 (450) long (typ.).

**DETAIL NEAR TRANSVERSE JOINT**

- Circular form.
- 6 No. 6 (19) Tie bars equally spaced 18 (450) long (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.

- Drill and grout is preferred, however tie bars can be poured in place if clearance is provided to outer edge of frame. Minimum 2 (50) clearance.

- Shims shall be used to adjust all frames. After adjusting mortar has cured, the shims shall be removed and the voids under the frames filled with nonshrink grout.

- Hoop reinforcement shall be one piece construction having a minimum lap length of 24 (600).

- All situations not shown and may require combination of details.

- WHEN USING CAST IN PLACE:

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

- All dimensions are in inches (millimeters) unless otherwise shown.
This distance shall be adjusted to place the transverse expansion joint in prolongation with the existing joint in the mainline pavement.

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

Pavement 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.

GENERAL NOTES

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

See plans for actual grades.

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

See Standard 483001 for ramp shoulder details.

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

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

When using radius R1 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 tying Section C-C.

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

Left edge of ramp when mainline is on tangent or curved to the right;

Left edge of ramp when mainline is on tangent or curved to the right;

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

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

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

See plans for actual grades.

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

See Standard 483001 for ramp shoulder details.

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

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

When using a radius R1 less than the 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 bying Section C-C.

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

GENERAL NOTES

DATE
REVISIONS
1-1-18
Changed tie bar spacing
24 (600) cts.
1-1-17
Added longitudinal sawed joint to middle of ramp pavement.

STANDARD 420206-12

ENTRANCE RAMP TERMINAL
JOINTED PCC RAMP PAVEMENT
ADJACENT TO CRC MAINLINE PAVEMENTS

ISSUED
1-1-97
PASSED

APPROVED
January 1, 2018
ENGINEER OF POLICY AND PROCEDURES

PROJECT
DATE
SHEET
REVISIONS
1-1-97

ADJACENT TO CRC MAINLINE PAVEMENT

(1) Illinois Department of Transportation

ENGINEER OF DESIGN AND ENVIRONMENT

January 1, 2018

TEXT ONLY
ADJACENT TO CRC MAINLINE PAVEMENT

JOINTED PCC RAMP PAVEMENT

SECTION B-B

SECTION C-C

SECTION D-D

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

ADJACENT TO CRC MAINLINE PAVEMENTS

STANDARD 420206-12
**Exit Ramp Terminal**

**Jointed PCC Ramp Pavement**

**Adjacent to Jointed PCC Mainline Pavement**

- **DATE**: January 1, 2018
- **REVISIONS**:
  - 1-1-17: Added longitudinal sawed joint to middle of ramp.
  - 1-1-97: Added longitudinal sawed joint with No. 6 (No. 19) tie bars spaced 36 (900) cts. for a distance of 100 (30 m) beginning at the 12 (300) stub. Joint line is parallel to ramp baseline.

**Standard 420301-08**

**Plan**
- Longitudinal construction joint with No. 6 (No. 19) tie bars spaced at 36 (900) cts.
- Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced 36 (900) cts. for a distance of 100 (30 m) in prolongation with the existing joint in the mainline pavement.

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

**Notes**
- When mainline is on tangent or curved to the right.
- When mainline is curved to the left.
- Vertical offset to ramp edge = 192 (4900) x (S.E.% or cross slope%)

**General Notes**
- See Sheet 3 for additional information.

**Approval**
- Illinois Department of Transportation
- January 1, 2018
- Engineer of Policy and Procedures
- January 1, 2018
- Engineer of Design and Environment
- Issued: 1-1-97
- Passed: 1-1-17
- Revisions: 1-1-18

**References**
- Standard 420301-08

---

- **Stub vertical offset based on 112 (300) x (S.E.% or cross slope%) of mainline**
- **Max. cross slope allowed is 4%**
- **Min. cross slope allowed is 1.5%**
- **G% = (G -.98%)**
- **Range of initial ramp grades when mainline is curved to the left and 
  e = 8%**

---

**Exit Ramp Terminal**

**Jointed PCC Ramp Pavement**

**Adjacent to Jointed PCC Mainline Pavement**

**Standard 420301-08**

---

**Plan**
- Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced 36 (900) cts. for a distance of 100 (30 m) in prolongation with the existing joint in the mainline pavement.

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

**Notes**
- When mainline is on tangent or curved to the right.
- When mainline is curved to the left.
- Vertical offset to ramp edge = 192 (4900) x (S.E.% or cross slope%)

**General Notes**
- See Sheet 3 for additional information.

**Approval**
- Illinois Department of Transportation
- January 1, 2018
- Engineer of Policy and Procedures
- January 1, 2018
- Engineer of Design and Environment
- Issued: 1-1-97
- Passed: 1-1-17
- Revisions: 1-1-18

**References**
- Standard 420301-08

---

**Plan**
- Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced 36 (900) cts. for a distance of 100 (30 m) in prolongation with the existing joint in the mainline pavement.

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

**Notes**
- When mainline is on tangent or curved to the right.
- When mainline is curved to the left.
- Vertical offset to ramp edge = 192 (4900) x (S.E.% or cross slope%)

**General Notes**
- See Sheet 3 for additional information.

**Approval**
- Illinois Department of Transportation
- January 1, 2018
- Engineer of Policy and Procedures
- January 1, 2018
- Engineer of Design and Environment
- Issued: 1-1-97
- Passed: 1-1-17
- Revisions: 1-1-18

**References**
- Standard 420301-08
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>S.E. % ML x 32</td>
<td>S.E. % ML x 32</td>
</tr>
<tr>
<td>B</td>
<td>3.0</td>
<td>S.E. % ML x 192</td>
<td>S.E. % ML x 192</td>
</tr>
<tr>
<td>C</td>
<td>-3.0</td>
<td>S.E. % ML x 192</td>
<td>-3.0</td>
</tr>
<tr>
<td>D</td>
<td>-15.4</td>
<td>-15.4</td>
<td>-15.4</td>
</tr>
</tbody>
</table>

### 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>S.E. % ML x 200</td>
<td>S.E. % ML x 200</td>
</tr>
<tr>
<td>B</td>
<td>-74</td>
<td>S.E. % ML x 4900</td>
<td>S.E. % ML x 4900</td>
</tr>
<tr>
<td>C</td>
<td>-74</td>
<td>S.E. % ML x 4900</td>
<td>-74</td>
</tr>
<tr>
<td>D</td>
<td>392</td>
<td>392</td>
<td>392</td>
</tr>
</tbody>
</table>

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

---

**GENERAL NOTES**

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

See plans for actual grades.

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

See Standard 483001 for ramp shoulder details.

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

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

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

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

---

**EXIT RAMP TERMINAL**

CONTINUED PCC RAMP PAVEMENT ADJACENT TO JOINTED PCC MAINLINE PAVEMENT

STANDARD 420301-08

Illinois Department of Transportation

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED: 1-1-97

APPROVED: January 1, 2018

APPROVED: January 1, 2018

ENGINEER OF POLICY AND PROCEDURES

PASSED
Joint line is parallel to ramp baseline.

Longitudinal sawed joint or a longitudinal construction joint with No. 6 (No. 19) tie bars spaced at 36 (900) cts. for a distance of 100' (30 m) beginning at the 12 (300) stub.

Joint line is parallel to ramp baseline.

Edge of pcc shoulder

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

Reinforcement placed parallel and perpendicular to the mainline pavement.

Reinforcement shall be placed parallel and perpendicular to the mainline. Reinforcement shall be placed parallel and perpendicular to the mainline.

Neutral area (1.94 m) 6'-4" (without tie bars) Longitudinal keyed joint (6.30 m)"

Ramp baseline (90 m) 300'-0" (30 m) 100'-0" (30 m)

Edge of mainline pavement

Edge of pcc shoulder

Transverse expansion joint in ramp mainline and outside shoulder

Longitudinal sawed joint

Longitudinal sawed joint

L.V.C. (variable length)

P.I.

P.I.

Plan

Transverse expansion joint in ramp

Transverse expansion joint in mainline

Joint line is parallel to ramp baseline.

Joint line is parallel to ramp baseline.

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Joint line is parallel to ramp baseline.

Joint line is parallel to ramp baseline.

Joint line is parallel to ramp baseline.

Joint line is parallel to ramp baseline.

Joint line is parallel to ramp baseline.

Joint line is parallel to ramp baseline.

Joint line is parallel to ramp baseline.
1.5% and greater
0.0% Slope
Mainline pvmt.
Subbase (HMA required)
4 (100) Stabilized
Improved subgrade

See DETAIL A

5% max.
1.5% min.
(300)
12
16'-0"
(1.8 m)
6'-0"

4% max.
4% min.
Var. pcc shld.
Agg.
24 (600)
(150)
6

4% min.
pcc shld.

Var.
(450)
18
6

0.00% Slope
Mainline pvmt.
Ramp
Improved subgrade

AH = Ahead
BK = Back

SECTION B-B

WHEN MAINLINE IS ON TANGENT OR CURVED TO THE RIGHT

SECTION CAH - CAH

WHEN MAINLINE IS CURVED TO THE LEFT

SECTION Cbk - Cbk

See Sheet 3 for GENERAL NOTES

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

STANDARD 420306-10

(1-1-97)

PASSED
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>S.E. % ML</th>
<th>x 200</th>
<th>S.E. % ML</th>
<th>x 192</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-0.18</td>
<td>0.16</td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>3.0</td>
<td>0.30</td>
<td>0.30 x 192</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>-3.0</td>
<td>-0.16</td>
<td>-0.16 x 192</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>-15.4</td>
<td>-15.4</td>
<td>-15.4 x 192</td>
<td></td>
</tr>
</tbody>
</table>

### Vertical offsets in mm for right edge of ramp, when \( e = 8\% \)

<table>
<thead>
<tr>
<th>Sections</th>
<th>S.E. % ML</th>
<th>x 500</th>
<th>S.E. % ML</th>
<th>x 490</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-0.18</td>
<td>0.39</td>
<td>0.39 x 192</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>3.0</td>
<td>0.74</td>
<td>0.74 x 490</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>-3.0</td>
<td>-0.74</td>
<td>-0.74 x 490</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>-15.4</td>
<td>-15.4</td>
<td>-15.4 x 490</td>
<td></td>
</tr>
</tbody>
</table>

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

GENERAL NOTES
The initial ramp grade (G) is based on the line generated through the PI that is 205' (62 m) tangent section. For the terminal segment downstream from Section C-C to R, construct the ramp as a 141' (43 m) tangent section.

Vertical offsets in inches for right edge of ramp, when \( e = 8\% \), unless otherwise shown.

The neutral area, provide a swale and flush inlet to enhance drainage. When using grades expressed as %, the grade values shall be divided by 100 to obtain vertical offsets. Where an exit ramp terminal is proposed adjacent to a mainline horizontal curve construct the edge of the terminal by using offset widths, and for the terminal segment downstream from Section C-C to R, construct the ramp as a 141' (43 m) tangent section.

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

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

STANDARD 420306-10
for bridge approach slab

Limit of pavement connector
for bridge approach slab

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

Shoulder

Approach Footing

NEW STANDARD

See DETAIL A

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

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

GENERAL NOTES

THICKNESS: "t" = Thickness of Pavement.

See Standard 610001 for shoulder inlet with curb when required.

See DETAIL A for bridge approach slab and approach footing.

NEW or EXISTING (HMA) or composite pavement

Improved subgrade, see roadway plans.

New standard.

© Illinois Department of Transportation

DATE

REVISIONS

APPROVED

PASSED

ENGINEER OF POLICY AND PROCEDURES

ISSUED
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.

### TYPE B
- **Welded wire reinforcement when required to end approximately 6 (150) from joints.**
- Place casting to grade and fill with full depth concrete after pavement has cured.

### TYPE A
- Position welded wire reinforcement which is lapped longitudinally a minimum lap of 6 (150).
- Welded wire reinforcement may be positioned with the transverse wires on top or bottom of the longitudinal wires.

### GENERAL NOTES
- Pavement Block-outs shall be at least 24 (600) from contraction joints.
- All dimensions are in inches (millimeters) unless otherwise shown.

### DETAIL OF ADDED REINFORCEMENT
**FOR PAVEMENT BLOCKS-OUTS**

- Edge of pavement
- Longitudinal joint or edge of pavement
- Transverse contraction joint
- No. 3 (No. 10) bars
- Approximate 63 lbs./100 sq. ft. (3.07 kg/m²)

### Switched Units
- Changed terminology to 'welded wire reinforcement'.
- Renamed standard.
- Switched units to English (metric).

---

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**APPROVED APRIL 1, 2016**

**ENGINEER OF POLICY AND PROCEDURES**

**PASSED APRIL 1, 2016**

**DATE**

**REVISIONS**

**STANDARD 420701-03**

---

**PAVEMENT WELDED WIRE REINFORCEMENT**

**TYPE B**

- **Lane edge**
- **Longitudinal keyed joint**
- **Casting outside limits**
- **1 (25) Preformed expansion joint full-depth (typ.)**
- **2 No. 3 x 4 (No. 16 x 1.2 m) Reinforcement bars (8 total) placed at pav't. mid-depth**

**TYPE A**

- **Edge of pavement**
Bar Size | Pavement Thickness | ENGLISH (inches) | METRIC (mm) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>#6</td>
<td>7% thru 8%</td>
<td>18 spaces (19 bars) @ 7%</td>
<td>360 thru 420</td>
</tr>
<tr>
<td>#6</td>
<td>8% thru 9%</td>
<td>20 spaces (21 bars) @ 6%</td>
<td>360 thru 430</td>
</tr>
<tr>
<td>#6</td>
<td>9% thru 10%</td>
<td>22 spaces (23 bars) @ 6%</td>
<td>360 thru 430</td>
</tr>
<tr>
<td>#6</td>
<td>10% thru 11%</td>
<td>24 spaces (25 bars) @ 5%</td>
<td>360 thru 430</td>
</tr>
<tr>
<td>#7</td>
<td>9% thru 10%</td>
<td>16 spaces (17 bars) @ 6%</td>
<td>360 thru 430</td>
</tr>
<tr>
<td>#7</td>
<td>10% thru 11%</td>
<td>18 spaces (19 bars) @ 5%</td>
<td>360 thru 430</td>
</tr>
<tr>
<td>#7</td>
<td>11% thru 12%</td>
<td>19 spaces (20 bars) @ 5%</td>
<td>360 thru 430</td>
</tr>
<tr>
<td>#7</td>
<td>12% thru 13%</td>
<td>21 spaces (22 bars) @ 5%</td>
<td>360 thru 430</td>
</tr>
<tr>
<td>#7</td>
<td>13% thru 14%</td>
<td>23 spaces (24 bars) @ 6%</td>
<td>360 thru 430</td>
</tr>
<tr>
<td>#7</td>
<td>14% thru 15%</td>
<td>24 spaces (25 bars) @ 5%</td>
<td>360 thru 430</td>
</tr>
<tr>
<td>#7</td>
<td>15% thru 16%</td>
<td>25 spaces (26 bars) @ 5%</td>
<td>360 thru 430</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 dimension and the distance from the edge of the transverse bar to the edge of pavement may be increased by 3 (75 mm) for slip form paving.

The minimum length of longitudinal bars shall be 30 (0.9 m) except as required to establish the lap arrangement selected.

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

DATE | REVISIONS
--- | ---
4-1-16 | Revised general notes with respect to 30° bar length.
1-1-08 | Switched units to English (metric).

BAR REINFORCEMENT FOR CRC PAVEMENT

STANDARD 421.001-03
PLAN

GENERAL NOTES
See Standard 421001 for details of pavement reinforcement.
See Standards 420001 and 420401 for joint details not shown.
All dimensions are in inches (millimeters) unless otherwise shown.

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

TRANVERSE TERMINAL JOINT
SECTION B-B

TRANVERSE CONSTRUCTION JOINT

24' (7.2 m) CRC PAVEMENT
(WITH LUG SYSTEM)
4 (100) Stabilized subbase (HMA required)

18 (150) Improved subgrade

10 mil (0.25) Polyethylene bond breaker

12 (300) Improved subgrade

No. 5 (No. 16) 24'-9'' (7.43 m) No. 5 (No. 16) 20'-0'' (6.10 m) No. 4 (No. 13) 15'-0'' (4.57 m)

Concrete, cu. yds. (m³) 64.0 (48.9)
Reinforcing Bars, lbs. (kg) 837.7 (380.0)
Concrete Pad, sq. yds. (m²) 144 (120)
Improved Subgrade, sq. yds. (m²) 162 (135)

MATERIALS REQUIRED FOR (1) CRC PAVEMENT SYSTEM
(Excluding Pavement Concrete and Pavement Reinforcement)
Plan

**General Notes**

See Standard 421206-07 for details of pavement reinforcement.

See Standards 420001 and 420401 for joint details not shown.

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

**Section A-A**

( Typical 3-Lane, 1-Way with Shoulders)

- 36'-0" (10.8 m) Longitudinal bars
  - 3'-6" (1.1 m) long at 12 (300) cts.
- 12-Dowel bars at 12 (300) cts.
- 4 (100) Preformed joint seal

**Section B-B**

- 36'-0" (10.8 m) Longitudinal sawed joint
- 36'-0" (10.8 m) Longitudinal construction joint
- 36'-0" (10.8 m) Longitudinal sawed joint
- Concrete pad

**Transverse Construction Joint**

- 36'-0" (10.8 m) Concrete pad
- 36'-0" (10.8 m) Longitudinal sawed joint
- 36'-0" (10.8 m) Longitudinal construction joint
- 36'-0" (10.8 m) Longitudinal sawed joint
- 36'-0" (10.8 m) Longitudinal construction joint
- 36'-0" (10.8 m) Longitudinal sawed joint
- 36'-0" (10.8 m) Longitudinal construction joint
- 36'-0" (10.8 m) Longitudinal sawed joint
- Concrete pad

**Transverse Terminal Joint**

- 4 (100) Stabilized subbase (HMA required)
- 4 (100) Stabilized subbase (HMA required)
- 4 (100) Stabilized subbase (HMA required)
- 4 (100) Stabilized subbase (HMA required)

**Plan Details**

- 45'-0" (13.7 m) Longitudinal sawed joint
- 45'-0" (13.7 m) Longitudinal construction joint
- 45'-0" (13.7 m) Longitudinal sawed joint
- 45'-0" (13.7 m) Longitudinal construction joint
- 45'-0" (13.7 m) Longitudinal sawed joint
- 45'-0" (13.7 m) Longitudinal construction joint
- 45'-0" (13.7 m) Longitudinal sawed joint
- Concrete pad

**Plan Dimensions**

- 36'-0" (10.8 m) Longitudinal sawed joint
- 36'-0" (10.8 m) Longitudinal construction joint
- 36'-0" (10.8 m) Longitudinal sawed joint
- Concrete pad

**Concre Paveement**

- Continuous reinforced pcc pavement
- End of shoulder
- End of stabilized subbase
- Joint seal

**Notes**

- See Standards 421206-07 for details of pavement reinforcement.
- See Standards 420001 and 420401 for joint details not shown.
- All dimensions are in inches (millimeters) unless otherwise shown.
### Materials Required for (1) One Section at LUG W

<table>
<thead>
<tr>
<th>Bar</th>
<th>No.</th>
<th>Size</th>
<th>Length</th>
<th>Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>100</td>
<td>No. 8 (16d)</td>
<td>14'-0&quot; (4.25 m)</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>18</td>
<td>No. 9 (18d)</td>
<td>36'-9&quot; (11.30 m)</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>18</td>
<td>No. 9 (18d)</td>
<td>20'-0&quot; (6.10 m)</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>10</td>
<td>No. 4 (13d)</td>
<td>11'-9&quot; (3.52 m)</td>
<td></td>
</tr>
</tbody>
</table>

- Concrete, cu. yds. (m³): 96.0 (73.4 m³)
- Reinforcing Bars, lbs. (kg): 12,550 (5695 kg)
- Concrete Pad, sq. yds. (m²): 208 (174 m²)

**Improved Subgrade, sq. yds. (m²)**
- 208 (174 m²)

**Concrete Pad, sq. yds. (m²)**
- 216 (181 m²)

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

**Concrete, cu. yds. (m³)**
- 96.0 (73.4 m³)

### 36' (10.8 m) CRC Pavement

*WITH LUG SYSTEM* (Sheet 2 of 2)

**Standard 421206-07**
RAMP IN LANDSCAPED AREA
SETBACK > 5'

RAMP IN PAVED AREA
SETBACK > 5'

SECTION C-C

1. This 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 3' (1.52 m).

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

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

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

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

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

All dimensions are in inches (millimeters) unless otherwise shown.
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 turning space is constrained on a side of 20 ft. (6.1 m) or greater.

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 mm) in width is allowed.

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

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

See Standard 606001 for details of depressed curb and gutter.

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

DIAGONAL CURB RAMPS FOR SIDEWALKS

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.

DETAILED A

Expansion Joint

RAMP IN LANDSCAPED AREA

RAMP IN PAVED AREA

SIDE CURB DETAIL

DIAGRAM 424006-05
CORNER PARALLEL CURB RAMP

SECTION A-A

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

SECTION B-B

GENERAL NOTES

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

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

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

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

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

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

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

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

- Sidewalks ≥ 6 ft. (1.8 m) in width should have a buffer which is not part of the P.A.R. The buffer keeps pedestrians further from traffic and provides a place to install signs.

- Sidewalks ≤ 6 ft. (1.8 m) in width should be limited to 5' (1.52 m) min. for sidewalks typical, 4' (1.22 m) min.

**SECTION A-A**

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

**SECTION B-B**

- Expansion joint required
- Detectable warning
- Depressed corner
- Depressed curb and gutter
- See DETAIL A

**SIDE CURB DETAIL**

- Flashed with top of roadway curb and top of sidewalk
- Variable width
- Ring thickness
- 2 in. (50 mm) min.
- Buffer

**DETAIL A**

- Depressed corner and gutter
- Edges of curb
- Face of roadway curb
- Detectable warning
- Depressed curb and gutter
- Buffer

**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.
  - **Sidewalks:** All dimensions are in inches (millimeters) unless otherwise shown.
  - **Buffer:** A “buffer” is defined as a “buffer” for wide sidewalks.
  - **Added crosswalk striping and a “buffer” for wide sidewalks:** Added crosswalk striping and a “buffer” for wide sidewalks.
  - **Removed upper landings, added blended transition and detectable warning tolerances:** Removed upper landings, added blended transition and detectable warning tolerances.

**DEPRESSED CORNER FOR SIDEWALKS**

**STANDARD 424021-06**
Detectable warning shall only be installed at entrances/alleys with permanent traffic control devices (i.e. stop signs, signals).

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

**Section A-A**

1. 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.

**Section B-B**

1. Curb ramp or blended transition.
2. See DETAIL A.
3. Sidewalk width 5' (1.52 m) typical, 4' (1.22 m) min.

**General Notes**

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

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

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

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

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

---

** Illinois Department of Transportation 2019 ENGINEER OF DESIGN AND ENVIRONMENT date 1-1-12 January 1, 2019 ENGINEER OF POLICY AND PROCEDURES date 1-1-18 January 1, 2018**

**Entrance / Alley Pedestrian Crossing**

**Standard 424026-03**

**DATE**

1-1-19

**Revisions**

Added blended transitions and placement tolerances for detectable warnings.

1-1-18

Omitted diagonal slope at upper landings.
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.

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

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

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

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

When patching two adjacent lanes in one operation, the longitudinal joint shall be a longitudinal sawed joint as detailed on Standard 420001; however, the groove may be either preformed or sawed.

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

**Saw Cut Detail**

**Class A Patches**

**Reinforcement Bars**

<table>
<thead>
<tr>
<th>Bar No.</th>
<th>Diameter (mm)</th>
<th>B (lbs.)</th>
<th>C (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 5</td>
<td>9.5</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>(No. 16)</td>
<td>12.7</td>
<td>30</td>
<td>24</td>
</tr>
<tr>
<td>No. 6</td>
<td>12.7</td>
<td>21</td>
<td>19</td>
</tr>
<tr>
<td>(No. 19)</td>
<td>15.9</td>
<td>42</td>
<td>34</td>
</tr>
<tr>
<td>No. 7</td>
<td>15.9</td>
<td>31</td>
<td>27</td>
</tr>
<tr>
<td>(No. 22)</td>
<td>19.1</td>
<td>60</td>
<td>52</td>
</tr>
</tbody>
</table>

**Fabric**

<table>
<thead>
<tr>
<th>Fabric</th>
<th>Width (m)</th>
<th>Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4 m</td>
<td>4'-6''</td>
<td>14'-0&quot;</td>
</tr>
<tr>
<td>1.5 m</td>
<td>5'-0''</td>
<td>15'-0&quot;</td>
</tr>
<tr>
<td>1.7 m</td>
<td>5'-6''</td>
<td>15'-0&quot;</td>
</tr>
</tbody>
</table>

**Switched Units to English (Metric).**

**Revised General Notes.**
**PAVEMENT REINFORCEMENT DETAIL**

No. 6 (No. 19) rebar

Transverse rebar will be tied to longitudinal rebar.

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

**PATCHING DETAIL**

* Every 3rd intersection must be tied.

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

*** Variables: $S_x$ and $S_y$ are 2 (50) min. and 12 (300) max. $D_x = 2(S_x)$ and $D_y = 2(S_y)$. 

---

**CLASS A PATCHES**

*STANDARD 442001-04*

Illinois Department of Transportation

ENGINEER OF POLICY AND PROCEDURES

APPROVED

January 1, 2008

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

PASSED
### 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>Patch Thickness</th>
<th>Dowel Bar Diameter</th>
<th>Hole Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 (250) or greater</td>
<td>1/8 (3.2)</td>
<td>1/16 (1.6)</td>
</tr>
<tr>
<td>8 (200) to 9.99 (249)</td>
<td>1/8 (3.2)</td>
<td>1/16 (1.6)</td>
</tr>
<tr>
<td>Less than 8 (200)</td>
<td>3/32 (2.4)</td>
<td>1/16 (1.6)</td>
</tr>
</tbody>
</table>

### Class B Patches

**Standard 442101-09**
See sealing details

- Existing pcc pavement
- Full depth saw cut
- Expansion Cap
- 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.

METHOD I
(Without Resurfacing)

6'-0" (1.8 m) min.

METHOD II
(With Resurfacing)

6'-0" (1.8 m) min.

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

CLASS B PATCHES
STANDARD 442101-09
CLASS C

Angles not less than 60°

SECTION A-A
(Built in two operations)

SECTION B-B

SECTION C-C

SECTION D-D

SECTION E-E

CLASS D

Angles not less than 60°

EXISTING LONGITUDINAL JOINT

SECTION F-F
(Built in two operations)

SECTION G-G

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
1-1-08

REVISIONS

1-1-08

Switched units to English (metric).

Illinois Department of Transportation

ENGINEER OF POLICY AND PROCEDURES
APPROVED
January 1, 2008

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
1-1-97

PASSED

REVISIONS

CLASS C and D PATCHES

STANDARD 442201-03
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 Hot-Mix Asphalt (HMA) terminology.
When the plans specify the shoulder to be stabilized full width, the HMA shall be extended to this line.

Slope 1.5%

Variable thickness

PCC pavement
variable thickness

Stabilized subbase
4 (200) min.

HMA shoulder
Slope 4%

Aggregate shoulder
Type B

Variable slope

SHOULDER FOR TANGENT PAVEMENT

SHOULDER FOR SUPERELEVATED PAVEMENT

SHOULDER FOR SUPERELEVATED PAVEMENT

(SIDE OF CURVE)

Slope 1:1 max.

Wedge portion

GENERAL NOTES

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

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

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

HMA SHOULDER ADJACENT
TO RIGID PAVEMENT

STANDARD 482006-03

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

Illinois Department of Transportation
January 1, 2008
ENGINEER OF POLICY AND PROCEDURES
APPROVED
January 1, 2008
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

Asphalt (HMA)

Vocabulary

Variable slope

Shoulder width

Stabilized width

PCC pavement variable thickness

Stabilized subbase 4 (200) min.

HMA shoulder
Slope 4%

Aggregate shoulder Type B

Variable slope

SHOULDER FOR TANGENT PAVEMENT

SHOULDER FOR SUPERELEVATED PAVEMENT

(SIDE OF CURVE)

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

SHOULDER FOR SUPERELEVATED PAVEMENT

(INSIDE OF CURVE)
HMA SHOULDER STRIP AND AGGREGATE WEDGE WITH WIDENING
(Cross-section A)

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

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

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

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

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

The Illinois Department of Transportation

January 1, 2008
ENGINEER OF POLICY AND PROCEDURES
APPROVED

January 1, 2008
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

PASSED DATE
REVISIONS

STANDARD 482011-03
SHOULDER FOR TANGENT PAVEMENT

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

SHOULDER FOR SUPERELEVATED PAVEMENT

(Side of curve)

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

SHOULDER FOR SUPERELEVATED PAVEMENT

(Outside of curve)

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

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.

Note 3: When the superelevation rate of the pavement is between 0% and 4%, the shoulder shall be sloped at 4%.

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

GENERAL NOTES

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

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

See Standard 420001 for details not shown.

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

DATE
1-1-18
1-1-08
1-1-97

REVISIONS
Modified P/L/A view
Switched units to English (metric)

PCC SHOULDER

STANDARD 483001-05
MULTI-SPAN CULVERTS

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

(1) Place on back side of 12" (300) rail.
(2) 9 (225) min. to 36 (900) max. Space to miss rail post.

STEEL RAILS

PARAPET

(Typical)

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

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

4'-0" ± above crown of roadway elevation.

PIERS ON FAI ROUTES

GENERAL NOTES

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

All dimensions are in inches (millimeters) unless otherwise shown.
Center of $\frac{3}{4}$ (12) dia. holes for bolts when required

NOTE:
Border and lettering.
Raised $\frac{3}{4}$ (13), square cut and not tapered.

SEE DESIGN PLANS FOR LETTERING

SECTIONS A-A
PIPE CULVERT END SECTION DIMENSIONS

<table>
<thead>
<tr>
<th>Plane No.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<td>10 (100)</td>
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<td>125</td>
<td>10 (100)</td>
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</tbody>
</table>

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 wide and fill the space with Class 31 concrete.
CONCRETE END SECTIONS FOR PIPE CULVERTS
15" (375 mm) THRU 84" (2100 mm) DIA.

SECTION B-B
(Showing bottom slab and backwall reinforcement)

SECTION C-C
(Showing backwall reinforcement only)

Pipe omitted for clarity.

SECTION D-D
(Showing top and side view of culvert)

REINFORCEMENT SCHEDULE

<table>
<thead>
<tr>
<th>Pipe Dia (inch)</th>
<th>Bar Size</th>
<th>Bar Spacing</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>#4 (13)</td>
<td>3 (75)</td>
</tr>
<tr>
<td>3</td>
<td>#4 (13)</td>
<td>3 (75)</td>
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<td>3 (75)</td>
</tr>
<tr>
<td>5</td>
<td>#4 (13)</td>
<td>3 (75)</td>
</tr>
<tr>
<td>6</td>
<td>#4 (13)</td>
<td>3 (75)</td>
</tr>
<tr>
<td>7</td>
<td>#4 (13)</td>
<td>3 (75)</td>
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<td>#4 (13)</td>
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<td>9</td>
<td>#4 (13)</td>
<td>3 (75)</td>
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<tr>
<td>10</td>
<td>#4 (13)</td>
<td>3 (75)</td>
</tr>
<tr>
<td>11</td>
<td>#4 (13)</td>
<td>3 (75)</td>
</tr>
</tbody>
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grouted with approved chemical adhesive into toewall

deep holes at 18 (450) cts. max.

#4 (13) stirrup bars at 12 (300) cts. max.
### Pipe I.D.

<table>
<thead>
<tr>
<th>Pipe I.D.</th>
<th>15&quot;</th>
<th>21&quot;</th>
<th>24&quot;</th>
<th>30&quot;</th>
<th>36&quot;</th>
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</thead>
<tbody>
<tr>
<td>18&quot;</td>
<td>2100</td>
<td>1800</td>
<td>1500</td>
<td>1650</td>
<td>1600</td>
</tr>
<tr>
<td>24&quot;</td>
<td>900</td>
<td>900</td>
<td>750</td>
<td>825</td>
<td>800</td>
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<tr>
<td>30&quot;</td>
<td>525</td>
<td>575</td>
<td>425</td>
<td>475</td>
<td>450</td>
</tr>
<tr>
<td>36&quot;</td>
<td>375</td>
<td>375</td>
<td>275</td>
<td>325</td>
<td>300</td>
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</table>

### Slope of End Section

<table>
<thead>
<tr>
<th>Concrete yd (m)</th>
<th>600</th>
<th>1200</th>
<th>1800</th>
<th>2400</th>
<th>3000</th>
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</thead>
<tbody>
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<td>600</td>
<td>66</td>
<td>132</td>
<td>198</td>
<td>264</td>
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<tr>
<td>1200</td>
<td>36</td>
<td>72</td>
<td>108</td>
<td>144</td>
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</tr>
<tr>
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<td>72</td>
<td>96</td>
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<td>90</td>
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<tr>
<td>3000</td>
<td>12</td>
<td>24</td>
<td>36</td>
<td>48</td>
<td>60</td>
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### Reinforcement With Lap lbs (kg)

<table>
<thead>
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<th>Concrete yd (m)</th>
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<th>1200</th>
<th>1800</th>
<th>2400</th>
<th>3000</th>
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</thead>
<tbody>
<tr>
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<td>1200</td>
<td>1200</td>
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<tr>
<td>1200</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
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<tr>
<td>1800</td>
<td>1200</td>
<td>1200</td>
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<td>1200</td>
<td>1200</td>
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<td>3000</td>
<td>1200</td>
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</table>

For cast-in-place construction, increase concrete volumes by approximately 12%.
PIPE CULVERT END SECTION DIMENSIONS

<table>
<thead>
<tr>
<th>Equivalent Pipe I.D.</th>
<th>Pipe Size</th>
<th>Pipe Span</th>
<th>H</th>
<th>V</th>
<th>A</th>
<th>D</th>
<th>L</th>
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<tbody>
<tr>
<td>(750)</td>
<td>12</td>
<td>10</td>
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<td>(1075)</td>
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<td>10</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1300)</td>
<td>18</td>
<td>10</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1650)</td>
<td>21</td>
<td>10</td>
<td>24</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

ELEVATION

This dimension shall be increased by 1/8 (38) for 12" pipe outside diameter for field construction.

Restraint angle with tie plate (typ.), joint between multiple end sections.

See Sheet 3 for GENERAL NOTES.

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

DATE
4-15-16

REVISIONS
4-15-16

See Sheet 3 for GENERAL NOTES.
LONGITUDINAL SECTION
(Showing bottom slab and backwall reinforcement.)

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

SECTION C-C
(Showing bottom slab and backwall reinforcement.)

SECTION D-D
(Showing end section tie details)

RESTRAINT ANGLE DETAIL

TIE PLATE DETAIL

REINFORCEMENT SCHEDULE

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

STANDARD 542011-02

SHEET 2 OF 3
For cost-in-place construction, increase concrete volumes by approximately 13%.

<table>
<thead>
<tr>
<th>Round Size</th>
<th>Equivalent</th>
<th>Concrete yd^3/ft^3</th>
<th>Reinforcement Without Lap lbs (kg)</th>
<th>Reinforcement With Lap lbs (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.D.</td>
<td></td>
<td></td>
<td>Slope of End Section</td>
<td></td>
</tr>
<tr>
<td>(mm)</td>
<td>(in)</td>
<td>(m)</td>
<td>Concrete yd^3/m^3</td>
<td></td>
</tr>
<tr>
<td>2400</td>
<td>94.5</td>
<td>1190</td>
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<td>1200</td>
<td>47.2</td>
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<td>1000</td>
<td>39.3</td>
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<td>31.4</td>
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Slope of End Section

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<th>Concrete yd^3/m^3</th>
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</thead>
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<tr>
<td>V:H</td>
<td>V:H</td>
</tr>
<tr>
<td>1:4</td>
<td>1:4</td>
</tr>
<tr>
<td>1:3</td>
<td>1:3</td>
</tr>
<tr>
<td>1:2</td>
<td>1:2</td>
</tr>
</tbody>
</table>

General Notes

This Standard is used with single pipe culverts and multi-pipe culvert installations. For multi-pipe culvert installations, assemble the end sections pipe-way-side leaving a 3 in. (75 mm) space between adjacent end section walls and fill the space(s) with Class III concrete.

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

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

Holes in the walls for the culvert tie assembly may be drilled using core bits in lieu of rods. Holes in the webs for the culvert tie assembly may be drilled using core bits in lieu of formed holes.

General notes are expressed as units of vertical displacement to units of horizontal displacement.

All dimensions are in inches (millimeters) unless otherwise shown.
If the embankment slope above the headwall is flatter than 1:2, provide wings for a 1:2 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.
**WINGS FOR 1.15% SLOPE**

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**REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS**

15° (375 mm) THRU 36° (900 mm) DIA.

SKEWED WITH ROADWAY

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**WINGS FOR 1½ SLOPE**

**REINFORCED CONCRETE END SECTIONS**

**FOR PIPE CULVERTS**

15° (375 mm) THRU 36° (900 mm) DIA.

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**REINFORCED CONCRETE END SECTIONS**

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

(Reinforced Concrete End Sections)

**Bars for 2 End Sections**

- **Rein. Bars**
- **2 End Sections**
- **Bars for End Sections**

---

**WINGS FOR 1:2 SLOPE**

- **Concrete**
- **2 End**
- **Bars**

---

**DIMENSIONS FOR CONCRETE**

- **Concrete Sections by End**
- **Rein. Bars**
- **2 End Sections**

---

**CONCRETE SECTIONS (IN.)**

- **Concrete Sections by End**
- **Rein. Bars**
- **2 End Sections**

---

**SKEWED WITH ROADWAY**

(1.32 m) THRU 3.08 m (375 mm) THRU 775 mm DIA.
### Dimensions for Concrete

#### 60°

<table>
<thead>
<tr>
<th>Nominal Dia.</th>
<th>DS 600-2</th>
<th>DS 750-2</th>
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</thead>
<tbody>
<tr>
<td>Dia.</td>
<td>(750)</td>
<td>(1000)</td>
</tr>
<tr>
<td>Dia.</td>
<td>(1.32 m)</td>
<td>(2.19 m)</td>
</tr>
<tr>
<td>Dia.</td>
<td>36</td>
<td>30</td>
</tr>
<tr>
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<td>3'-10&quot;</td>
<td>4'-4&quot;</td>
</tr>
<tr>
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<td>4'-7&quot;</td>
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<tr>
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<td>4'-8&quot;</td>
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<tr>
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#### 50°

<table>
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<tr>
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<th>DS 500-2</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>Dia.</td>
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<td>(2.19 m)</td>
</tr>
<tr>
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<tr>
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<td>3'-5&quot;</td>
</tr>
<tr>
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<td>5'-2&quot;</td>
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<tr>
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<td>(2.19 m)</td>
</tr>
<tr>
<td>Dia.</td>
<td>36</td>
<td>30</td>
</tr>
<tr>
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<td>3'-1&quot;</td>
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<td>4'-7&quot;</td>
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</tr>
<tr>
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<td>(1.32 m)</td>
<td>(2.19 m)</td>
</tr>
<tr>
<td>Dia.</td>
<td>36</td>
<td>30</td>
</tr>
<tr>
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<td>3'-8&quot;</td>
<td>3'-7&quot;</td>
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<tr>
<td>Dia.</td>
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#### 20°

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</tr>
<tr>
<td>Dia.</td>
<td>(1.32 m)</td>
<td>(2.19 m)</td>
</tr>
<tr>
<td>Dia.</td>
<td>36</td>
<td>30</td>
</tr>
<tr>
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<td>3'-8&quot;</td>
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### Reinforced Concrete End Sections

#### 45°

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<tr>
<th>Concrete Bars</th>
<th>2 End Sections</th>
<th>Rein'd Bars</th>
<th>2 End Sections</th>
<th>Concrete Bar Sections</th>
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</thead>
<tbody>
<tr>
<td>Dia.</td>
<td>(279)</td>
<td>(167)</td>
<td>(153)</td>
<td>(189)</td>
</tr>
<tr>
<td>Dia.</td>
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<td>7'-7&quot;</td>
<td>6'-6&quot;</td>
<td>6'-1&quot;</td>
</tr>
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<td>2'-8&quot;</td>
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<td>3'-9&quot;</td>
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<tr>
<td>Dia.</td>
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<td>5'-3&quot;</td>
<td>5'-6&quot;</td>
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### Reinforced Concrete End Sections for Pipe Culverts

#### 15° (375 mm) Thru 36° (900 mm) Dia.

<table>
<thead>
<tr>
<th>Concrete Bar Sections</th>
<th>2 End Sections</th>
<th>Rein'd Bars</th>
<th>2 End Sections</th>
<th>Concrete Bar Sections</th>
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</thead>
<tbody>
<tr>
<td>Dia.</td>
<td>(279)</td>
<td>(167)</td>
<td>(153)</td>
<td>(189)</td>
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<tr>
<td>Dia.</td>
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<td>3'-6&quot;</td>
<td>3'-9&quot;</td>
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</tbody>
</table>

---

**Sheet 5 of 5**

**Standard 542201-02**

**Reinforced Concrete End Sections**

For Pipe Culverts

15° (375 mm) Thru 36° (900 mm) Dia.

Skewed With Roadway
Provide wings for 1:2 slope. If the embankment slope above the headwall is flatter than 1:2, provide wings for 1:3 slope.

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

If the embankment slope above the headwall is flatter than 1:2, provide wings for 1:3 slope.

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

### Dimensions for Concrete

<table>
<thead>
<tr>
<th>Concrete 2 End Secs.</th>
<th>Welded Wire</th>
<th>Reinforcement</th>
<th>cu. yd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>cc. yd. (m³)</td>
<td>sq. yd. (m²)</td>
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</table>

### Concrete Lengths

<table>
<thead>
<tr>
<th>Length</th>
<th>Cu. Yd.</th>
<th>M³</th>
</tr>
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<tbody>
<tr>
<td>42' 10&quot;</td>
<td>10.0</td>
<td>7.0</td>
</tr>
<tr>
<td>42' 0&quot;</td>
<td>9.8</td>
<td>6.4</td>
</tr>
<tr>
<td>41' 11&quot;</td>
<td>10.8</td>
<td>7.5</td>
</tr>
<tr>
<td>41' 0&quot;</td>
<td>10.3</td>
<td>7.0</td>
</tr>
<tr>
<td>40' 11&quot;</td>
<td>11.8</td>
<td>8.4</td>
</tr>
<tr>
<td>40' 0&quot;</td>
<td>11.3</td>
<td>8.0</td>
</tr>
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</table>

### Welded Wire

<table>
<thead>
<tr>
<th>Length</th>
<th>Cu. Yd.</th>
<th>M³</th>
</tr>
</thead>
<tbody>
<tr>
<td>42' 10&quot;</td>
<td>10.0</td>
<td>7.0</td>
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<tr>
<td>42' 0&quot;</td>
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<td>41' 11&quot;</td>
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<td>7.0</td>
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<td>40' 11&quot;</td>
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<td>8.4</td>
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<td>8.0</td>
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### Nominal Pipe Dia.

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<th>10°</th>
<th>15°</th>
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<td>1</td>
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### Concrete Trenches

<table>
<thead>
<tr>
<th>Trench Length</th>
<th>Cu. Yd.</th>
<th>M³</th>
</tr>
</thead>
<tbody>
<tr>
<td>42' 10&quot;</td>
<td>10.0</td>
<td>7.0</td>
</tr>
<tr>
<td>42' 0&quot;</td>
<td>9.8</td>
<td>6.4</td>
</tr>
<tr>
<td>41' 11&quot;</td>
<td>10.8</td>
<td>7.5</td>
</tr>
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<td>41' 0&quot;</td>
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<td>8.4</td>
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### Reinforced Concrete End Sections

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<tr>
<th>Section</th>
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### Reinforced Concrete Trenches

<table>
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<tr>
<th>Trench Length</th>
<th>Cu. Yd.</th>
<th>M³</th>
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<td>8.0</td>
</tr>
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</table>
### WINGS FOR 1:1 1/2 SLOPE

<table>
<thead>
<tr>
<th>Skew Angle</th>
<th>Nominal Pipe Dia.</th>
<th>Dimensions for Concrete</th>
<th>Concrete End Secs. 2 cu. yd. (m³)</th>
<th>Welded Wire Reinforcement 2 sq. yd. (m²)</th>
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</thead>
<tbody>
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WINGS FOR 1\:1\:2 SLOPE

19'-11"

Dimensions for Concrete

Reinforcement

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

(Sheet 5 of 5)

STANDARD 542206-04
**PLAN**

End connection to fit pipe used.

**SECTION A-A**

Same reinforcement as *inner cage, class HE-II*

Same reinforcement as *outer cage, class HE-II*

**END VIEW**

Optional welded wire reinforcement lap

(See detail)

**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.

**OPTIONAL WELDED WIRE REINFORCEMENT LAP**

**END VIEW**

Optional welded wire reinforcement lap

(See detail)

**SECTION A-A**

Same reinforcement as *inner cage, class HE-II*

Same reinforcement as *outer cage, class HE-II*

* Refers to the equivalent pipe diameter.

**END VIEW**

Optional welded wire reinforcement lap

(See detail)
**LONGITUDINAL SECTION**

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

**PLAN VIEW**

- Q intermediate support

**SECTION B-B**

- Steel anchor pipe

**SECTION D-D**

- Measured perpendicular to top of culvert wall. In addition, formed hole shall be located a minimum of 6 (150) measured horizontally from any vertical joints necessary for construction of the culvert end section.

**VIEW A-A**

- Ø hole (19) Ø bolt in % (22) Ø hole

**VIEW C-C**

- Ø hole (19) Ø bolt in % (22) Ø hole (provide 2 hardened washers)

**VIEW D-D**

- Ø hole

**DETAIL A**

- Ø (Nom.) steel pipe

**DETAIL B**

- Ø (Nom.) steel pipe

**GENERAL NOTES**

This standard shall only be used on concrete end sections not skewed more than ±15 degrees with roadway.

The minimum distance from the center of a hole to the free edge of a structural shape or plate shall be 2½ (38) unless noted otherwise.

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

**TRAVERSABLE PIPE GRATE FOR CONCRETE END SECTIONS**

- For grate pipe lengths > 20'-0" (6.00 m)

**REVISIONS**

- Corrected typo.
- Renamed standard.
- Corrected value in elliptical pipe table.
### PIPE-GRATE SCHEDULE FOR PIPE CULVERT END SECTIONS

<table>
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<tr>
<th>No. / Length</th>
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<th>Int. Support</th>
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<td>2 @ 23'-9&quot;</td>
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### PIPE-GRATE SCHEDULE FOR ELLIPTICAL PIPE CULVERT END SECTIONS

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<td>1 @ 23'-11&quot;</td>
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<tr>
<td>1 @ 26'-3&quot;</td>
<td>(7.92 m)</td>
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**STANDARD 542311-07**

**Sheet 2 of 2**
For 60 (1500) thru 84 (2250) sizes, reinforced metal pipes having helical ends, only the dimple or annular band may be used with corrugated Type 4 connection can be used for all pipe sizes. Coupler shall be 2\(\frac{1}{2}\) x \(\frac{1}{4}\) (63x16) dimple, hugger, or annular band of 3\(\frac{1}{2}\) (70x25). The simple, hugger, or annular band may be used with corrugated metal pipes having annular ends. For corrugated metal pipes having helical ends, only the dimple band will be allowed.

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

**NOTES**

1. Types 1 and 2 for pipes with annular ends only.
2. Type 3 connection may be used for all pipe sizes and includes 12 (300) of the pipe length. The connector section shall be attached to the end section by rivets or bolts and shall be the same metal thickness as the end section. Stub shall be either 2\(\frac{1}{4}\) (64) pitch x \(\frac{1}{4}\) (13) depth or 3\(\frac{1}{2}\) (75) pitch x 1 (25) depth annular corrugated pipe.
3. Type 4 connection can be used for all pipe sizes. Coupler shall be 2\(\frac{1}{2}\) x \(\frac{1}{4}\) (63x16) dimple, hugger, or annular band of 3\(\frac{1}{2}\) (70x25). The simple, hugger, or annular band may be used with corrugated metal pipes having annular ends. For corrugated metal pipes having helical ends, only the dimple band will be allowed.

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

**NOTES**

1. Types 1 and 2 for pipes with annular ends only.
2. Type 3 connection may be used for all pipe sizes and includes 12 (300) of the pipe length. The connector section shall be attached to the end section by rivets or bolts and shall be the same metal thickness as the end section. Stub shall be either 2\(\frac{1}{4}\) (64) pitch x \(\frac{1}{4}\) (13) depth or 3\(\frac{1}{2}\) (75) pitch x 1 (25) depth annular corrugated pipe.
3. Type 4 connection can be used for all pipe sizes. Coupler shall be 2\(\frac{1}{2}\) x \(\frac{1}{4}\) (63x16) dimple, hugger, or annular band of 3\(\frac{1}{2}\) (70x25). The simple, hugger, or annular band may be used with corrugated metal pipes having annular ends. For corrugated metal pipes having helical ends, only the dimple band will be allowed.

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

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

**Type 2**

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

**Type 3**

- See Note 2

**Type 4**

- See Note 3

---

**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 means of screws and bolts and shall be the same metal thickness as the end section. When coupling the type 3 end section to a pipe with helical ends, only the dimple type coupling band shall be used.

3. Type 4 connection can be used with all pipe arch sizes. The end section band shall be either a dimple, hugger, or annular band and can be used with pipes having annular ends. For pipes having helical ends, only the dimple end section band will be allowed.

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

---

**Dimensions**

- **SPAN**
  - 17 (432)
  - 21 (533)
  - 26 (610)
  - 30 (730)

- **THICKNESS**
  - 0.064 (1.63)
  - 0.064 (1.63)
  - 0.064 (1.63)
  - 0.064 (1.63)

- **DIMENSIONS**
  - A
    - 17 (432): 10 (250) max.
    - 21 (533): 16 (400)
    - 26 (610): 20 (500)
    - 30 (730): 26 (660)

  - B
    - 17 (432): 17 (430)
    - 21 (533): 23 (580)
    - 26 (610): 30 (760)
    - 30 (730): 35 (890)

  - C
    - 17 (432): 24 (600)
    - 21 (533): 30 (760)
    - 26 (610): 35 (890)
    - 30 (730): 40 (1020)

  - D
    - 17 (432): 8 (200)
    - 21 (533): 10 (250)
    - 26 (610): 13 (330)
    - 30 (730): 15 (380)

  - E
    - 17 (432): 13 (330)
    - 21 (533): 18 (450)
    - 26 (610): 21 (530)
    - 30 (730): 25 (630)

  - E
    - 17 (432): 16 (400)
    - 21 (533): 20 (500)
    - 26 (610): 25 (630)
    - 30 (730): 30 (760)

  - F
    - 17 (432): 12 (300)
    - 21 (533): 17 (430)
    - 26 (610): 22 (550)
    - 30 (730): 27 (680)

  - G
    - 17 (432): 8 (200)
    - 21 (533): 10 (250)
    - 26 (610): 13 (330)
    - 30 (730): 15 (380)

**Angles**

- The angles shall be attached by 6 (150) rivets or bolts.

---

**Attachment**

- **Threaded rod**
- **Connector lug**
- **Reinforced edge**
- **Metal flared end section for pipe arches**

**Connections of End Sections**

**Notes**

- All pipe arch sizes, reinforced edges shall be supplemented with 2x2x (51x51x51) flaper angles. The angles shall be by means of screws and bolts.

- All slope ratios are expressed as a ratio of vertical displacement to units of horizontal displacement (V:H).
**METAL END SECTIONS FOR ROUND PIPE CULVERT**

| PIPE DIA. (mm) | METAL THICK. | A | B | C | D | E | F | G | H | I | J | K | L | SLOPE 1:4 | SLOPE 1:6 |
|---------------|--------------|---|---|---|---|---|---|---|---|---|---|---|---|---|----------|----------|
| 15 (375)      | 0.044 (1.08) | 8 | 6 | 21 | 37 | 89 | 69 | 52 | 48 | 52 | 48 | 52 | 48 | 15       | 16       |
| 16 (400)      | 0.064 (1.63) | 8 | 6 | 24 | 40 | 92 | 64 | 70 | 60 | 64 | 70 | 60 | 70 | 60       | 64       |
| 21 (530)      | 0.068 (1.67) | 8 | 6 | 27 | 43 | 94 | 66 | 73 | 63 | 66 | 73 | 63 | 73 | 63       | 66       |
| 24 (600)      | 0.064 (1.63) | 8 | 6 | 30 | 46 | 55 | 83 | 65 | 55 | 83 | 65 | 55 | 83 | 65       | 83       |
| 30 (750)      | 0.109 (2.77) | 12 | 9 | 36 | 60 | 79 | 118 | 92 | 79 | 118 | 92 | 79 | 118 | 92       | 118      |
| 36 (900)      | 0.109 (2.77) | 12 | 9 | 42 | 66 | 102 | 154 | 102 | 154 | 102 | 154 | 102 | 154 | 102      | 154      |
| 42 (1050)     | 0.109 (2.77) | 16 | 12 | 48 | 80 | 126 | 189 | 126 | 189 | 126 | 189 | 126 | 189 | 126      | 189      |
| 48 (1200)     | 0.109 (2.77) | 16 | 12 | 54 | 84 | 132 | 214 | 132 | 214 | 132 | 214 | 132 | 214 | 132      | 214      |
| 54 (1350)     | 0.109 (2.77) | 16 | 12 | 60 | 88 | 138 | 224 | 138 | 224 | 138 | 224 | 138 | 224 | 138      | 224      |
| 60 (1500)     | 0.109 (2.77) | 16 | 12 | 66 | 92 | 144 | 266 | 144 | 266 | 144 | 266 | 144 | 266 | 144      | 266      |
| 66 (1650)     | 0.109 (2.77) | 16 | 12 | 72 | 96 | 150 | 279 | 150 | 279 | 150 | 279 | 150 | 279 | 150      | 279      |
| 72 (1800)     | 0.109 (2.77) | 16 | 12 | 78 | 100 | 156 | 315 | 156 | 315 | 156 | 315 | 156 | 315 | 156      | 315      |
| 78 (1950)     | 0.109 (2.77) | 16 | 12 | 84 | 104 | 162 | 340 | 162 | 340 | 162 | 340 | 162 | 340 | 162      | 340      |
| 84 (2100)     | 0.109 (2.77) | 16 | 12 | 90 | 108 | 168 | 365 | 168 | 365 | 168 | 365 | 168 | 365 | 168      | 365      |
| 90 (2250)     | 0.109 (2.77) | 16 | 12 | 96 | 112 | 174 | 390 | 174 | 390 | 174 | 390 | 174 | 390 | 174      | 390      |
| 96 (2400)     | 0.109 (2.77) | 16 | 12 | 102 | 116 | 180 | 415 | 180 | 415 | 180 | 415 | 180 | 415 | 180      | 415      |
| 102 (2550)    | 0.109 (2.77) | 16 | 12 | 108 | 120 | 186 | 440 | 186 | 440 | 186 | 440 | 186 | 440 | 186      | 440      |
| 108 (2700)    | 0.109 (2.77) | 16 | 12 | 114 | 124 | 192 | 465 | 192 | 465 | 192 | 465 | 192 | 465 | 192      | 465      |
| 114 (2850)    | 0.109 (2.77) | 16 | 12 | 120 | 128 | 198 | 490 | 198 | 490 | 198 | 490 | 198 | 490 | 198      | 490      |
| 120 (3000)    | 0.109 (2.77) | 16 | 12 | 126 | 132 | 204 | 515 | 204 | 515 | 204 | 515 | 204 | 515 | 204      | 515      |

**GENERAL NOTES**

- 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).
- Provide traversable pipe grate when specified.
- See roadway plans for slope (V:H) and pipe diameter.

**DATE:** January 1, 2018  
**REVISIONS:** 

<table>
<thead>
<tr>
<th>STANDARD 542411</th>
</tr>
</thead>
</table>
CROSS DRAINAGE END SECTION - ELEVATION

PARALLEL DRAINAGE END SECTION - ELEVATION

PARALLEL BARS

SAFETY BAR DETAILS

Typical Installation

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

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.

LONGITUDINAL DRAINAGE BAR

THRU 60" (1500 mm) DIA.

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

STANDARD 542411

© Illinois Department of Transportation

ISSUED 1-1-18

APPROVED January 1, 2018

ENGINEER OF DESIGN AND ENVIRONMENT

PASSED ENGINEER OF POLICY AND PROCEDURES
### METAL END SECTIONS FOR PIPE ARCH CULVERT

#### DIMENSIONS

<table>
<thead>
<tr>
<th>PIPE EQUIV.</th>
<th>METAL THICK.</th>
<th>A</th>
<th>H</th>
<th>W</th>
<th>OVERALL WIDTH</th>
<th>CORRIGATION 25 x 9</th>
<th>CORRIGATION 3 x 1 OR 5 x 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 (275)</td>
<td>0.084</td>
<td>8</td>
<td>6</td>
<td>23</td>
<td>5000</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>16 (305)</td>
<td>0.064</td>
<td>8</td>
<td>6</td>
<td>27</td>
<td>5500</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>18 (365)</td>
<td>0.064</td>
<td>8</td>
<td>6</td>
<td>35</td>
<td>6600</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>20 (406)</td>
<td>0.064</td>
<td>8</td>
<td>6</td>
<td>46</td>
<td>7500</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>24 (508)</td>
<td>0.109</td>
<td>12</td>
<td>9</td>
<td>64</td>
<td>9000</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>30 (762)</td>
<td>0.109</td>
<td>12</td>
<td>9</td>
<td>64</td>
<td>9000</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>36 (914)</td>
<td>0.109</td>
<td>12</td>
<td>9</td>
<td>64</td>
<td>9000</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>42 (1067)</td>
<td>0.109</td>
<td>16</td>
<td>12</td>
<td>86</td>
<td>12000</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>48 (1219)</td>
<td>0.109</td>
<td>16</td>
<td>12</td>
<td>86</td>
<td>12000</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>54 (1352)</td>
<td>0.109</td>
<td>16</td>
<td>12</td>
<td>86</td>
<td>12000</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>60 (1524)</td>
<td>0.109</td>
<td>16</td>
<td>12</td>
<td>86</td>
<td>12000</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>66 (1676)</td>
<td>0.109</td>
<td>16</td>
<td>12</td>
<td>86</td>
<td>12000</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>72 (1829)</td>
<td>0.109</td>
<td>16</td>
<td>12</td>
<td>86</td>
<td>12000</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>78 (2042)</td>
<td>0.109</td>
<td>16</td>
<td>12</td>
<td>86</td>
<td>12000</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>84 (2254)</td>
<td>0.109</td>
<td>16</td>
<td>12</td>
<td>86</td>
<td>12000</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>90 (2466)</td>
<td>0.109</td>
<td>16</td>
<td>12</td>
<td>86</td>
<td>12000</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>96 (2678)</td>
<td>0.109</td>
<td>16</td>
<td>12</td>
<td>86</td>
<td>12000</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>102 (2890)</td>
<td>0.109</td>
<td>16</td>
<td>12</td>
<td>86</td>
<td>12000</td>
<td>18</td>
<td>24</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:H).
- All dimensions are in inches (millimeters) unless otherwise shown.

---

**DATE** | **REVISIONS**
---|---
1-1-18 | New standard

**STANDARD 542416**

[Sheet 1 of 2]

---

**SIGNATURES**

[Signature area]
Longitudinal bars

Parallel bars

Cross drainage end section

Typical installation

Provide longitudinal bars when the span exceeds 30' (750).

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

Safety bars

Parallel drainage end section

Safety bar details

Longitudinal drainage bar

Parallel drainage end section - elevation

Cross drainage end section - elevation

Sloped metal end sections for pipe

Arch culverts 15" (375 mm) thru 72" (1800 mm) equivalent dia.

Illinois Department of Transportation

January 1, 2018

APPROVED

Engineer of design and environment

January 1, 2018

Engineer of policy and procedures

1-1-18

Passed

SLOPED METAL END SECTIONS FOR PIPE

ARCH CULVERTS 15" (375 mm) THRU 72" (1800 mm) EQUIVALENT DIA.

STANDARD 542416
Traffic Slope

Sketch showing location and direction of box in relation to median. Material required for one inlet box

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>10</td>
<td>No. 6 (No. 13)</td>
<td>7'-9&quot; (2.35 m)</td>
</tr>
<tr>
<td>w</td>
<td>10</td>
<td>No. 6 (No. 13)</td>
<td>6'-3&quot; (1.90 m)</td>
</tr>
<tr>
<td>u1</td>
<td>1</td>
<td>No. 6 (No. 13)</td>
<td>5'-8&quot; (1.70 m)</td>
</tr>
<tr>
<td>v</td>
<td>6</td>
<td>No. 6 (No. 13)</td>
<td>4'-0&quot; (1.20 m)</td>
</tr>
<tr>
<td>v1</td>
<td>4</td>
<td>No. 6 (No. 13)</td>
<td>3'-6&quot; (1.05 m)</td>
</tr>
<tr>
<td>v2</td>
<td>2</td>
<td>No. 6 (No. 13)</td>
<td>2'-6&quot; (0.75 m)</td>
</tr>
<tr>
<td>Galv. Steel Pipe</td>
<td>1</td>
<td>O.D.</td>
<td>8'-0&quot; (2.435 m)</td>
</tr>
</tbody>
</table>

Concrete

Bars & u1

Plan of Reinforcement

Inlet Box

Type 24 (600) A

GENERAL NOTES

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

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

DATE REVISIONS

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

1-1-07 Soft converted metric reinforcement bars.
SECTION A-A

交通流量

1 : 4 斜率

交通流量

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

GENERAL NOTES

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

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

INLET BOX

TYPE 24 (600) B

INLET BOX

TYPE 24 (600) B

DATE

DATE

REVISIONS

REVISIONS

4-1-16

4-1-16

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

1-1-09

1-1-09

Switched units to English (metric).

STANDARD 542506-03

STANDARD 542506-03
SECTION A-A

PLAN

Bars u, u1 & u2

PLAN OF REINFORCEMENT

INLET BOX

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.

Materials 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>3' 6&quot; (1.09 m)</td>
</tr>
<tr>
<td>v</td>
<td>13</td>
<td>No. 4 (No. 13)</td>
<td>6' 5&quot; (1.96 m)</td>
</tr>
<tr>
<td>u1</td>
<td>8</td>
<td>No. 4 (No. 13)</td>
<td>60&quot; (1.52 m)</td>
</tr>
<tr>
<td>u2</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>40&quot; (1.02 m)</td>
</tr>
<tr>
<td>v1</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>24&quot; (0.61 m)</td>
</tr>
<tr>
<td>v2</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>18&quot; (0.46 m)</td>
</tr>
<tr>
<td>Concrete</td>
<td>150 cu. yds.</td>
<td>(125 cu. m)</td>
<td></td>
</tr>
<tr>
<td>Galv. Steel Pipe</td>
<td>⅜ (89) O.D.</td>
<td>0.02 (0.17 cm)</td>
<td></td>
</tr>
</tbody>
</table>

Traffic

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

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

**INLET BOX**

**TYPE 24 (600) D**

**PLAN OF REINFORCEMENT**

**SECTION A-A**

**TABLE**

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>v1</td>
<td>8</td>
<td>No. 4 (13)</td>
<td>45° (1.11 m)</td>
</tr>
<tr>
<td>v</td>
<td>16</td>
<td>No. 4 (13)</td>
<td>5'-9&quot; (1.76 m)</td>
</tr>
<tr>
<td>v</td>
<td>14</td>
<td>No. 4 (13)</td>
<td>6'-5&quot; (1.96 m)</td>
</tr>
<tr>
<td>w</td>
<td>3</td>
<td>No. 4 (13)</td>
<td>22 (550)</td>
</tr>
<tr>
<td>u</td>
<td>2</td>
<td>No. 4 (13)</td>
<td>3'-8&quot; (1.15 m)</td>
</tr>
<tr>
<td>h</td>
<td>10</td>
<td>No. 4 (13)</td>
<td>12'-0&quot; (3.66 m)</td>
</tr>
<tr>
<td>h1</td>
<td>8</td>
<td>No. 4 (13)</td>
<td>4'-5&quot; (1.35 m)</td>
</tr>
</tbody>
</table>

**Note:** Galv. Steel Pipe

**Material required for one inlet box**

- Concrete: 2,2 cu. yds. (1.8 m³)
- Rein. Bars: 120 lbs. (54.4 kg)
- Galv. Steel: 1.1-7/8" (4.5 m)

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

**Illinois Department of Transportation**

**ENGINEER OF POLICY AND PROCEDURES**

**APPROVED**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED**

**PASSED**

**DATE**

1-1-97

**REVISIONS**

1-1-11: Corrected two bars in web to v2

1-1-09: Switched units to English (metric)
Traffic 1:6 Slope

Sketch showing location and direction of box in relation to 1/8 median.

TOP ANCHOR PLATE

SECTION D-D

SECTION C-C

DETAIL AT BLOCKOUTS

1/2 (M12) U BOLT

INLET BOX
TYPE 24 (600) E

STANDARD 542521-02
Traffic

SECTION A-A

PLAN

DETAIL A

GENERAL NOTES

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

All close tolerances 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) F

DATE

REVISIONS

1-1-11 Corrected weld symbols on Sheet 2.

1-1-09 Switched units to English (inches). Revised General Notes.

PASSED

STANDARD 542526-03

1-1-97
NOTE:
Culvert pipe may exit from the side (or sides) by changing
reinforcement bars in that area and in the headwall end of box.

SECTION A-A

Sketch showing location and direction of main
bearing bars in relation to q median
(showing exit from end)

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.
**GENERAL NOTES**

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

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

---

**INLET BOX**

**TYPE 48 (1200) A**

(Sheet 1 of 2)

**DATE**

1-1-09

**REVISIONS**

ENGLISH (METRIC)

Switched units to

Soft converted metric

Inlet Box

---

**SECTION A-A**

**PLAN**

**PLAN OF REINFORCEMENT**

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>21</td>
<td>No. 4 (No. 13)</td>
<td>18'-5&quot; (4.40 m)</td>
</tr>
<tr>
<td>h2</td>
<td>8</td>
<td>No. 4 (No. 13)</td>
<td>6'-8&quot; (1.64 m)</td>
</tr>
<tr>
<td>h3</td>
<td>2</td>
<td>No. 4 (No. 13)</td>
<td>5'-6&quot; (1.67 m)</td>
</tr>
<tr>
<td>u</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>8'-0&quot; (2.44 m)</td>
</tr>
<tr>
<td>u1</td>
<td>2</td>
<td>No. 4 (No. 13)</td>
<td>4'-9&quot; (1.46 m)</td>
</tr>
<tr>
<td>v</td>
<td>8</td>
<td>No. 4 (No. 13)</td>
<td>1'-9&quot; (0.47 m)</td>
</tr>
<tr>
<td>v1</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>1'-9&quot; (0.47 m)</td>
</tr>
<tr>
<td>v2</td>
<td>13</td>
<td>No. 4 (No. 13)</td>
<td>3'-3&quot; (1.00 m)</td>
</tr>
<tr>
<td>v3</td>
<td>10</td>
<td>No. 4 (No. 13)</td>
<td>3'-3&quot; (1.00 m)</td>
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Concrete

<table>
<thead>
<tr>
<th>reinforcement</th>
<th>lbs</th>
<th>kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 at 14'-1½&quot;</td>
<td>2</td>
<td>147</td>
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</tbody>
</table>

Galv. Steel Pipe

<table>
<thead>
<tr>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>3½ (89)</td>
<td>0.06 (1.75 m)</td>
</tr>
</tbody>
</table>

---

**Traffic**

1:4 Slope

---

Sketch showing location and direction of box in relation to Q of ditch.
Remove concrete along these lines. Clean reinforcement for either tied or welded laps of longitudinal and circumferential reinforcement.

For wire dia. W14 - W6 (10.72 - 7.01), length of weld shall be $\frac{3}{8}$ (20) min.

For wire dia. W5.5 - W2.9 (6.73 - 4.88), length of weld shall be $\frac{3}{8}$ (10) min.

Other wire dia. shall be tied per detail.

For laps.

Mortar shall be flush with pipe.

Mortar shall be:

- 8 (200) min. (Tied lap)
- 10 (400) min. (Welded lap)
- 14 (530) min. (Tied lap)
- 16 (600) min. (Welded lap)
- 21 (530) min. (Tied lap)
- 24 (600), 30 (750) min. (Welded lap)

Degree of elbow $\div 2$

For wire dia. W14 - W6 (10.72 - 7.01), length of weld shall be $\frac{3}{8}$ (20) min.

For wire dia. W5.5 - W2.9 (6.73 - 4.88), length of weld shall be $\frac{3}{8}$ (10) min.

Other wire dia. shall be tied per detail.

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- 8 (200) min. (Tied lap)
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- 16 (600) min. (Welded lap)
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- 24 (600), 30 (750) min. (Welded lap)

Degree of elbow $\div 2$

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Other wire dia. shall be tied per detail.

Mortar shall be flush with pipe.

Mortar shall be:

- 8 (200) min. (Tied lap)
- 10 (400) min. (Welded lap)
- 14 (530) min. (Tied lap)
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Degree of elbow $\div 2$

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For wire dia. W5.5 - W2.9 (6.73 - 4.88), length of weld shall be $\frac{3}{8}$ (10) min.

Other wire dia. shall be tied per detail.

Mortar shall be flush with pipe.

Mortar shall be:

- 8 (200) min. (Tied lap)
- 10 (400) min. (Welded lap)
- 14 (530) min. (Tied lap)
- 16 (600) min. (Welded lap)
- 21 (530) min. (Tied lap)
- 24 (600), 30 (750) min. (Welded lap)

Degree of elbow $\div 2$
Inner cage circumferential reinforcement = 0.01 sq. in./ft. (212 mm²/m) (min.) longitudinal reinforcemnt is same as for 36 (900) riser.

End connection to fit pipe used.

Grout with mortar.

For wire W12 thru W2 (10.008 thru 7.188), length of weld shall be 3 (80) min.
For wire W9.5 thru W2.5 (6.655 thru 4.496), length of weld shall be 3 (80) 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.

ENGINEER OF POLICY AND PROCEDURES
APPROVED
January 1, 2011

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
January 1, 2011

PASSED

DATE

REVISIONS
1-1-11 Corrected weld symbol on Welded Lap detail.
1-1-09 Switched units to English (metric)
Width min. = O.D. + 4 (100)
Width max. = 12 (300)

Width min. = 12xO.D. + 6 (150)
Width max. = 28 (600)

Width min. = O.D. + 4 (100)
Width max. = 22 (550)

Width max. = 18 (450)
Width min. = (2xO.D.) + 6 (150)

180° bedding groove

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

Concrete headwall

Underdrain (special)

PCC or flexible pavement

Remove wedge when flexible pavement.

PCC or variable width

PCC shoulder

Improved subgrade (when required)

Subbasegranular material Type C

Edge of pcc shoulder

Backfill

Cornered subbase

Trench for corrugated polyethylene tubing alternate

PCC shoulder (variable width)

Concrete headwall

Edge of Pav't.

Flexible wedge

Existing shoulder

Existing shoulder

HMA shoulder

Material (plug)

Proposed pavement

SECTION A-A

PCC shoulder

Subbase granular material Type C

Improved subgrade (when required)

Concrete headwall

Edge of pcc shoulder

Backfill

SECTION A-A

(HMA SHOULDER)

Existing Pav't.

SECTION B-B

TUNNEL ALTERNATE

TRENCH FOR CORRUGATED POLYETHYLENE TUBING ALTERNATE

SECTION B-B

NEW CONSTRUCTION

SECTION D-D

SECTION D-D

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 601001 for details of concrete headwall.

See Standards 482001, 482006 and 483001 for details of shoulders not shown.

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

**RODENT SHIELD PLACEMENT**

- Rodent shield inserted 4 - 6 (100-150) into pipe.
- Back of headwall.
- Group (typ.)

**SIDE VIEW**

- Optional handling hole and 24 (600) long No. 4 (No. 13) reinf. bar.
- End of pipe.

**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.

---

**SECTION A-A**

- Detail of rodent shield.
- Bar h.

**DETAIL OF RODENT SHIELD**

- 0.063 (1.6) Dia. after galvanizing.

---

**CONCRETE HEADWALL FOR PIPE UNDERDRAINS**

**STANDARD 601101-02**

**REVISIONS**

- 4-1-16: Renamed standard to be consistent with specs and other standards.
- 1-1-99: Switched units to English (metric).
Materials for Walls

- Concrete Masonry Unit
- Brick Masonry
- Concrete Section
- Precast Reinforced
- Cast-in-place Concrete

<table>
<thead>
<tr>
<th>ALTERNATE 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;</td>
<td>30'10'</td>
<td>5</td>
</tr>
<tr>
<td>5'-0&quot;</td>
<td>36'5&quot;</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6'-0&quot;</td>
<td>42'10&quot;</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>7'-0&quot;</td>
<td>48'10&quot;</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>8'-0&quot;</td>
<td>54'10&quot;</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Brick Masonry</td>
<td>4'-0&quot;</td>
<td>30'10'</td>
<td>8</td>
</tr>
<tr>
<td>5'-0&quot;</td>
<td>36'5&quot;</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>6'-0&quot;</td>
<td>42'10&quot;</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>7'-0&quot;</td>
<td>48'10&quot;</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>8'-0&quot;</td>
<td>54'10&quot;</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Precast Reinforced Concrete Section</td>
<td>4'-0&quot;</td>
<td>30'10&quot;</td>
<td>4</td>
</tr>
<tr>
<td>5'-0&quot;</td>
<td>36'5&quot;</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>6'-0&quot;</td>
<td>42'10&quot;</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>7'-0&quot;</td>
<td>48'10&quot;</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>8'-0&quot;</td>
<td>54'10&quot;</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Cast-in-place Concrete</td>
<td>4'-0&quot;</td>
<td>30'10&quot;</td>
<td>6</td>
</tr>
<tr>
<td>5'-0&quot;</td>
<td>36'5&quot;</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>6'-0&quot;</td>
<td>42'10&quot;</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7'-0&quot;</td>
<td>48'10&quot;</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>8'-0&quot;</td>
<td>54'10&quot;</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

* For precast reinforced concrete sections, dimension "C" may vary from the dimension given to plus 2 (50).

ELEVATION

- Standard Outlet
- Half Trap

General Notes

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

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

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

See Standard 602701 for details of steps.

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

MATERIALS REQUIRED FOR ONE (1)

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>1</td>
<td>No. 4 (No. 13)</td>
<td>3'-5'' (1.02 m)</td>
</tr>
<tr>
<td>u1</td>
<td>3</td>
<td>No. 4 (No. 13)</td>
<td>5'-9'' (1.72 m)</td>
</tr>
<tr>
<td>v</td>
<td>14</td>
<td>No. 4 (No. 13)</td>
<td>7'-0'' (2.10 m)</td>
</tr>
<tr>
<td>u1</td>
<td>14</td>
<td>No. 4 (No. 13)</td>
<td>6'-6'' (1.98 m)</td>
</tr>
<tr>
<td>v</td>
<td>16</td>
<td>No. 4 (No. 13)</td>
<td>6'-9'' (2.05 m)</td>
</tr>
<tr>
<td>x</td>
<td>3</td>
<td>No. 4 (No. 13)</td>
<td>1'-11'' (0.58 m)</td>
</tr>
<tr>
<td>Concrete</td>
<td></td>
<td>2.5 (1.90 m)</td>
<td></td>
</tr>
<tr>
<td>Reinforcement bars</td>
<td></td>
<td>200 (900)</td>
<td></td>
</tr>
</tbody>
</table>

All bars shall be at 12 (300) centers unless otherwise shown. Reinforcement bar clearance shall be 1/4 (640).
ALTERNATE MATERIALS FOR WALLS

<table>
<thead>
<tr>
<th>Material</th>
<th>T (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precast Reinforced Concrete Section</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

- Precast reinforced concrete slab
- Prefabricated concrete slab, when the precast reinforced concrete sections alternate is used.
- Sand cushion sections alternate is used.
- Reinforcing bars shall be 2 (50) mm.
- Bottom slabs shall be reinforced with a minimum of 0.27 sq. in./ft. (570 sq. mm/m) in both directions with a maximum spacing of 9 (230).
- Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

GENERAL NOTES

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

CATCH BASIN TYPE C

STANDARD 602011-02

DATE  REVISIONS
1-1-11  Detailed min. in slabs
        Added max. limit to height
        Added general notes
1-1-09  Switched units to
        English (metric)
### MATERIALS FOR WALLS

<table>
<thead>
<tr>
<th>ALTERNATE MATERIALS FOR WALLS</th>
<th>D</th>
<th>C</th>
<th>T (mm)</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>8 (200)</td>
</tr>
<tr>
<td>Precast Reinforced Concrete Section</td>
<td>36 (900)</td>
<td>15 (380)</td>
<td>3 (75)</td>
</tr>
<tr>
<td>Cast-in-Place Concrete</td>
<td>36 (900)</td>
<td>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 602016-02 for details of steps.

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

**DATE**  
1-1-11

**REVISIONS**  
1-1-09

**CATCH BASIN**  
**TYPE D**

**STANDARD 602016-02**
Flow 10'0" (3.05 m) max.
Flow 4'-0" (1.22 m) min.

(915) 36

No. 5 (No. 16) bars at 7 (175) cts. (all sides).
Over 8'-0" (2.44 m) to 10'-0" use No. 5 (No. 16) bars at 8 (200) cts. (all sides).
For 4'-0" (1.22 m) to 8'-0" (2.44 m) use No. 5 (No. 16) bars at 6 (150) cts. (all sides)

12 (300) cts. (all sides)

1-1-21
(40)

Concrete barrier

For locations & elevations see plans.

Optional constr.jt.

Steps at 12-16
(300-400) cts.

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

1-1-19
Revised Type 4 and revised types 4 and 5 to fit with 44 (1120) height, constant slope barrier.
1-1-17
Revised openings to fit to fit.
One 36 (915) width of the revised concrete median barrier.

(40)
REINFORCED LID - TYPE 4 & 5

DRAINAGE STRUCTURES
TYPES 4 & 5

ILLINOIS DEPARTMENT OF TRANSPORTATION

ENGINEER OF POLICY AND PROCEDURES
APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

PASSED

STANDARD 602106-03

REINFORCED LID - TYPE 4 & 5

No. 4 (No. 13) Bar h
No. 3 (No. 10) Bar s
No. 5 (No. 16) Bar t
No. 6 (No. 19) Bar t
**Plan**

- Top of masonry
- Diameter 24 (600)
- Concrete fill, 4%
- Pipe size. See plans for minimum grade of 1%
- Sand cushion 2 (50) min.
- Precast reinforced concrete slab

**Elevation**

- Pipe to be laid on a minimum grade of 1%
- Reinforced cast-in-place concrete

**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>6 (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>

**General Notes**

Bottom slabs shall be reinforced with a minimum of 0.24 sq. in./ft. (0.10 sq. mm) 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.

**Alternate Methods**

- Bottom slabs may be reinforced with a minimum of 0.24 sq. in./ft. (0.10 sq. mm) in both directions with a maximum spacing of 10 (250).

**Inlet - Type A**

1-1-97

**Revisions**

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>1-1-14</td>
<td>Increased height to 72 (1800) maximum</td>
</tr>
<tr>
<td>1-1-11</td>
<td>Added max. limit to height</td>
</tr>
<tr>
<td>1-1-14</td>
<td>Added general notes</td>
</tr>
</tbody>
</table>

**Illinois Department of Transportation**

**January 1, 2014**

**Engineer of Policy and Procedures**

**January 1, 2014**

**Engineer of Design and Environment**

**Issued**

**Passed**

**Standard 602301-04**
For precast reinforced concrete sections, this dimension may vary from the dimension given to plus 6 (150).
FLAT SLAB TOP JOINT CONFIGURATIONS

SECTION PARALLEL TO PIPE

SECTION PERPENDICULAR TO PIPE

BASE SLAB JOINT CONFIGURATIONS

GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES

Note 1: A minimum of 9 (220) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 24 (600).

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

Note 3: A minimum of 6 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 space 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.

SHEAR KEY GEOMETRY

Optional Joint

Cut bars to fit.

SECTION PARALLEL TO PIPE (Without conical top riser)

SECTION PERPENDICULAR TO PIPE (With conical top riser)

Notes:

1. See flat slab top joint configurations

2. Flat slab top

3. 4'-0" (1.22 m) DIAMETER

4. (Shown at access hole)

5. Optional Joint

6. Concrete fill, 2% max.

7. Base slab

8. Sand cushion

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.

DATE
REVISIONS
1/1/21 Revised Note 1 and lifting hole
1/1/21 Moved wall reinforcement from inside face to middle

(Please note: The image contains diagrams and text that illustrate joint configurations, geometric limits for pipe penetration holes, and shear key geometry. The text provides notes and specifications for the installation of precast manhole Type A, including details on joint configurations and reinforcement requirements.)
Concrete fill, 2% max.

Steps spaced at 12 (300) to 24 (600) cts.

Barrel c.

Concrete fill, 2% max.

BARREL WALL JOINT CONFIGURATIONS

*(Reinforcement not shown for clarity)*

Cut bars to fit.

Optional joint

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 (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.

SHELL KEY GEOMETRY

(Reinforcement not shown for clarity)

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.

DATE
1-1-21

REVISIONS
2-1 Note 1 and lifting hole

Note 1:

Note 2:

Note 3:

Note 4:

Note 5:

Note 6:

STANDARD 602402-03

PRECAST MANHOLE TYPE A

5' (1.52 m) DIAMETER

(Sheet 1 of 2)
**PLAN - FLAT SLAB TOP**

(Showing layout of bottom reinforcement bars and c bars)

- **Bar c #5 (#16)**, 7’-7” (2.3 m) length, 32 (815) radius top and bottom
- #4 (#13) bars bottom. Bundle first bar with closest WWR bar to the opening and place second bar ±3 (75) away.

**WALL REINFORCEMENT**

- **Location**
  - **Orientation**
  - **WWR or Rebar**
<table>
<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>WWR or Rebar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riser</td>
<td>Circumferential</td>
<td>0.15 sq. in./ft. (380 sq. mm/m)</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.16 sq. in./ft. (393 sq. mm/m)</td>
</tr>
<tr>
<td>Barrel</td>
<td>Circumferential</td>
<td>0.16 sq. in./ft. (393 sq. mm/m)</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.16 sq. in./ft. (393 sq. mm/m)</td>
</tr>
</tbody>
</table>

**BASE SLAB REINFORCEMENT**

- **Location**
<table>
<thead>
<tr>
<th>Location</th>
<th>Toler. Height</th>
<th>WWR or Rebar each direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>≤ 20 ft. (6.10 m)</td>
<td>0.24 sq. in./ft. (608 sq. mm/m)</td>
</tr>
<tr>
<td></td>
<td>&gt; 20 ft. (6.10 m)</td>
<td>0.18 sq. in./ft. (450 sq. mm/m)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>A1</td>
<td>0.11 sq. in./ft. (260 sq. mm/m)</td>
</tr>
</tbody>
</table>

**FLAT SLAB TOP REINFORCEMENT**

- **Location**
<table>
<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>WWR or Rebar each direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>Circumferential</td>
<td>0.15 sq. in./ft. (380 sq. mm/m)</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.17 sq. in./ft. (420 sq. mm/m)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>A1</td>
<td>0.17 sq. in./ft. (420 sq. mm/m)</td>
</tr>
</tbody>
</table>

**STANDARD 602402-03**

January 1, 2021

Illinois Department of Transportation

[Sheet 2 of 2]
GEOMETRIC LIMITS FOR PIPE PENETRATION Holes

Note 1: A minimum of 9 (225) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 15 (380).

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 be intersected such that the vertical spacing between the horizontal joints 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.

BASE SLAB JOINT CONFIGURATIONS

FLAT SLAB TOP JOINT CONFIGURATIONS

SECTION PERPENDICULAR TO PIPE

SECTION PARALLEL TO PIPE
2021

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)

* #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.

ILLINOIS DEPARTMENT OF TRANSPORTATION
APPROVED ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
PASSED ENGINEER OF POLICY AND PROCEDURES

DIA. 24 (600)
DIA. 4' 0" (1.22 m)
6' (1.83 m) DIAMETER

PRECAST MANHOLE TYPE A
6' (1.83 m) DIAMETER

[Sheet 2 of 3]
SHEAR KEY GEOMETRY

Illinois Department of Transportation
2021 APPROVED
2021 ENGINEER OF DESIGN AND ENVIRONMENT ISSUED 4-1-06

ENGINEER OF POLICY AND PROCEDURES PASSED DATE

REVISIONS

Sand cushion Bar c

Flat slab top

Steps spaced at 12 (300) to 16 (400) cts.

(600)

24

(300) to 16 (400) cts.

(600)

24

(1.22 m)

4'-0"

Sand cushion

Flat slab top

See flat slab top joint configurations

13-#5 (#18) bars or equivalent, evenly spaced around perimeter. Cut bars to fit. Optional joint

17-#3 (#10) bars in every spaced around perimeter. Cut bars to fit. Optional joint

See geometric limits for pipe penetration holes.

2-#3 (#10) vertical bars each side of holes greater than 15 (380) placed at 16 (400) cover from inside face. Length shall be sufficient to intersect the horizontal #3 (#10) bars as shown.

2-#3 (#10) radius bars above holes greater than 36 (900). Length shall be sufficient to intersect the vertical #3 (#10) bars as shown.

Concrete fill, 1.5 % max.

Single-element shear key at center of slab

Optional Joint

Concrete fill, 1.5 % max.

Base slab

Base slab

Concrete fill, 1.5 % max.

Base slab

Base slab

Concrete fill, 1.5 % max.

Base slab

Base slab

Concrete fill, 1.5 % max.

Base slab

Base slab

Concrete fill, 1.5 % max.

Base slab

Base slab

Concrete fill, 1.5 % max.

Base slab

Base slab

Concrete fill, 1.5 % max.

Base slab

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Concrete fill, 1.5 % max.

Base slab

Base slab

Concrete fill, 1.5 % max.

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Concrete fill, 1.5 % max.

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Concrete fill, 1.5 % max.

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Concrete fill, 1.5 % max.

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Base slab

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Base slab

Concrete fill, 1.5 % max.

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Base slab

Base slab

Concrete fill, 1.5 % max.

Base slab

Base slab

Concrete fill, 1.5 % max.

Base slab

Base slab

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Base slab

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Concrete fill, 1.5 % max.

Base slab

Base slab

Concrete fill, 1.5 % max.

Base slab

Base slab

Concrete fill, 1.5 % max.
PLAN - FLAT SLAB TOP
(Showing layout of bottom reinforcement bars and c bars)

Bar c #5 (#16),
3'-8'' (1.12 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
**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>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(254 sq. mm/m)</td>
<td>(150)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>0.045 sq. in./ft.</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(95 sq. mm/m)</td>
<td>(200)</td>
</tr>
</tbody>
</table>

**WALL REINFORCEMENT**

- **Location**: 4 ft. (1.22 m) Ø Riser
  - **Orientation**: Circumferential
  - **WWR or Rebar**: 0.04 sq. in./ft. (95 sq. mm/m)

- **Location**: 7 ft. (2.13 m) Ø Barrel
  - **Orientation**: Vertical
  - **WWR or Rebar**: 0.045 sq. in./ft. (95 sq. mm/m)

**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>Top Mat</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>0.32 sq. in./ft. (8.7 sq. mm/m)</td>
</tr>
<tr>
<td></td>
<td>or TH ≤ 20 ft. (6.10 m)</td>
<td>0.32 sq. in./ft. (8.7 sq. mm/m)</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>0.32 sq. in./ft. (8.7 sq. mm/m)</td>
</tr>
</tbody>
</table>

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

---

**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 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.

**BASE SLAB JOINT CONFIGURATIONS**

**SECTION PARALLEL TO PIPE**

**SECTION PERPENDICULAR TO PIPE**

**FLAT SLAB TOP JOINT CONFIGURATIONS**

(Shown at access hole)

**SHEAR KEY GEOMETRY**

(Relief not shown for clarity)

**GENERAL NOTES**

Pipe holes shall be formed to facilitate proper placement of pipe 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.
PLAN - FLAT SLAB TOP

(Showing layout of bottom reinforcement bars and c bars)

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

PLAN - FLAT SLAB TOP

(Showing layout of Welded Wire Reinforcement and c bars)

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

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

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

PRECAST MANHOLE TYPE A

8' (2.44 m) DIAMETER

STANDARD 602416-09
**FLAT SLAB TOP REINFORCEMENT**

| Location  | Orientation   | WWR or Rebar
|-----------|---------------|-------------
|           |               | A_s (min.)  | Spacing (max.) |
| Top       | Circumferential | 0.12 sq. in./ft. | 4 (450) |
|           | Vertical      | 0.045 sq. in./ft. | 6 |
| Bottom    | Circumferential | 0.24 sq. in./ft. | 6 |
|           | Vertical      | 0.045 sq. in./ft. | 6 |

**WALL REINFORCEMENT**

| Location  | Orientation       | WWR or Rebar
|-----------|-------------------|-------------
|           |                   | A_s (min.)  | Spacing (max.) |
| Top       | Circumferential   | 0.12 sq. in./ft. | 4 (450) |
|           | Vertical          | 0.045 sq. in./ft. | 6 |
| Bottom    | Circumferential   | 0.24 sq. in./ft. | 6 |
|           | Vertical          | 0.045 sq. in./ft. | 6 |

**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_s (min.)</td>
</tr>
<tr>
<td>Top</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>0.15 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>or TH ≤ 20 ft. (6.10 m)</td>
<td>0.25 sq. in./ft.</td>
</tr>
<tr>
<td>Bottom</td>
<td>All</td>
<td>0.15 sq. in./ft.</td>
</tr>
</tbody>
</table>

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

---

**Holes in the walls may be drilled using core bits in lieu of formed holes.**

All nuts shall be brought to a snug tight condition.

**All nuts shall be brought to a snug tight condition.**

**With 2¼x2¼xƉ (55x55x8) ¢ washers under each nut.**

**With 2¼x2¼xƉ (55x55x8) ¢ washers under each nut.**

**Threaded rods threaded into the holes.**

**#10 #13 #6 #9 **

**#10 #13 #6 #9**
**ILLINOIS DEPARTMENT OF TRANSPORTATION**

---

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED**

**PASSED**

**ENGINEER OF POLICY AND PROCEDURES**

---

**STANDARD 602421-09**

**9' (2.74 m) DIAMETER**

**PRECAST MANHOLE TYPE A**

---

**SEGMENT PARALLEL TO PIPE**

*Without conical top riser*

**FLAT SLAB TOP JOINT CONFIGURATIONS**

*(Shown at access hole)*

**SECTION PARALLEL TO PIPE**

**SECTION PERPENDICULAR TO PIPE**

**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'-6" (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 space 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 > 3'-8" (1.12 m) are allowed in riser sections.

**BASE SLAB JOINT CONFIGURATIONS**

**SHEAR KEY GEOMETRY**

*Center of slab shear key at
Single-element shear key at center of slab*

**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.

Note 1: See Standard 602701 for details of manhole steps.

Note 2: General note.

Note 3: Revised Note 1 and lifting hole.

Note 4: 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 602421-09**
**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)

* #6 (4-19) bars bottom. Bundle first bar with closest WWR bar to the opening and place second bar ±3 (75) away.

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

**PRECAST MANHOLE TYPE A**

9' (2.74 m) DIAMETER

(Sheet 2 of 3)
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>
<th>A₀ (min.)</th>
<th>Spacing (max.)</th>
<th>A₀ (min.)</th>
<th>Spacing (max.)</th>
<th>Bar Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>All</td>
<td>0.11 sq. in./ft.</td>
<td>18 (450)</td>
<td>0.11 sq. in./ft.</td>
<td>18 (450)</td>
<td>#3 or #4 (4/10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>0.08 sq. in./ft.</td>
<td>6 (150)</td>
<td>See slab view for rebar orientation and spacing and this table for bar size</td>
<td>#6 (4/25)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RH &gt; 10 ft. (3.05 m)</td>
<td>WWR not permitted</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

WALL REINFORCEMENT

<table>
<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>WWR or Rebar</th>
<th>A₀ (min.)</th>
<th>Spacing (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 ft. (2.74 m) Ø Barrel</td>
<td>Circumferential</td>
<td>0.12 sq. in./ft. (233 sq. mm/m)</td>
<td>6 (150)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.025 sq. in./ft. (65 sq. mm/m)</td>
<td>6 (200)</td>
<td></td>
</tr>
<tr>
<td>9 ft. (2.74 m) Ø Riser</td>
<td>Circumferential</td>
<td>0.025 sq. in./ft. (65 sq. mm/m)</td>
<td>6 (200)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.005 sq. in./ft. (13 sq. mm/m)</td>
<td>8 (200)</td>
<td></td>
</tr>
</tbody>
</table>

BASE SLAB REINFORCEMENT

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (RH)</th>
<th>Total Height (TH)</th>
<th>WWR (each direction)</th>
<th>Rebar (each direction)</th>
<th>A₀ (min.)</th>
<th>Spacing (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>RH ≤ 10 ft. (3.05 m) &amp; TH ≤ 20 ft. (6.10 m)</td>
<td>0.64 sq. in./ft. (1524 sq. mm/m)</td>
<td>6 (150)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RH &gt; 10 ft. (3.05 m) or TH &gt; 20 ft. (6.10 m)</td>
<td>0.52 sq. in./ft. (1334 sq. mm/m)</td>
<td>6 (150)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>All</td>
<td>0.11 sq. in./ft. (233 sq. mm/m)</td>
<td>18 (450)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: All locations shall be 0.25 sq. in./ft. (6.45 sq. mm/m) and 0.44 sq. in./ft. (1009 sq. mm/m) vertically and circumferentially. **Only one layer of WWR permitted to avoid congestion.**
**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).

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

**BASE SLAB JOINT CONFIGURATIONS**

**SECTION PARALLEL TO PIPE**

(Without conical top riser)

**SECTION PERPENDICULAR TO PIPE**

(With conical top riser)

**FLAT SLAB TOP JOINT CONFIGURATIONS**

(Shown at access hole)

**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**

1-1-21

**REVISIONS**

1-1-21 Revised Note 1.

3-1-19 Moved wall reinforcement of 4'-0" (1.22 m) riser from inside face to middle.

**PRECAST MANHOLE TYPE A**

10' (3.05 m) DIAMETER

**STANDARD 602426-03**

(Sheet 1 of 3)
PLAN - FLAT SLAB TOP

(Showing layout of bottom reinforcement bars and c bars)

Bar c #5 ( #18),
14'-0" (4.22 m)
length, 5'-2" (1.57 m)
radius top and bottom

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

PLAN - FLAT SLAB TOP

(Showing layout of welded wire reinforcement and c bars)

Bar c #5 ( #18),
14'-0" (4.22 m)
length, 5'-2" (1.57 m)
radius top and bottom

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

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

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

PRECAST MANHOLE TYPE A
10' (3.05 m) DIAMETER

STANDARD 602426-03

(Sheet 2 of 3)
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 middle face to middle.

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

(Sheet 1 of 2)

STANDARD 602501-06
**FLAT SLAB TOP REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>Rebar</th>
<th>A_s (min.)</th>
<th>Spacing (max.)</th>
<th>A_s (min.)</th>
<th>Spacing (max.)</th>
<th>Bar Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom</td>
<td>* 0.62 sq. in./ft.</td>
<td>6</td>
<td>See plan view for rebar orientation and spacing and this table for bar size</td>
<td>* 0.62 sq. in./ft.</td>
<td>6</td>
<td>See plan view for rebar orientation and spacing and this table for bar size</td>
<td>#5 (#16)</td>
</tr>
<tr>
<td>Mat</td>
<td>(3912 sq. mm²)</td>
<td></td>
<td>(150)</td>
<td></td>
<td>(150)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Only one layer of WWR permitted to avoid congestion.

**WALL REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR or Rebar</th>
<th>A_s (min.)</th>
<th>Spacing (max.)</th>
<th>Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circumferential</td>
<td>0.12 sq. in./ft.</td>
<td>6</td>
<td>(250)</td>
<td>(508 sq. mm²)</td>
</tr>
<tr>
<td>Vertical</td>
<td>0.065 sq. in./ft.</td>
<td>8</td>
<td>(220)</td>
<td>(93 sq. mm²)</td>
</tr>
</tbody>
</table>

**BASE SLAB REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Height</th>
<th>WWR or Rebar (each direction)</th>
<th>A_s (min.)</th>
<th>Spacing (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>≥ 29 ft. (8.84 m)</td>
<td>0.04 sq. in./ft.</td>
<td>(1008 sq. mm²)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>&gt; 29 ft. (8.84 m)</td>
<td>0.04 sq. in./ft.</td>
<td>(1008 sq. mm²)</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Height</th>
<th>WWR or Rebar (each direction)</th>
<th>A_s (min.)</th>
<th>Spacing (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>≥ 29 ft. (8.84 m)</td>
<td>0.04 sq. in./ft.</td>
<td>(1008 sq. mm²)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>&gt; 29 ft. (8.84 m)</td>
<td>0.04 sq. in./ft.</td>
<td>(1008 sq. mm²)</td>
<td>10</td>
</tr>
</tbody>
</table>

**BASE SLAB JOINT CONFIGURATIONS**

- **Optional Joint**
  - Cut bars to fit.
  - Spaced around perimeter.
  - Equivalent, evenly spaced around perimeter.
  - 10-#4 (13) bars or equivalent, evenly spaced around perimeter.
  - Cut bars to fit.

**SHEAR KEY GEOMETRY**

- Single-element shear key at center of slab.
- Shear key at center of slab.

**PLAN - FLAT SLAB TOP**

- (Showing layout of reinforcement and c bars)
- **Bar c #5 (#16), 6'-10" (2.08 m) length, 36 (660) radius bottom**
- **#5 (#16) bars bottom. Bundle first bar with closest WWR bar to the opening and place second bar #3 (75) away.**

**BASE DEPARTMENT OF TRANSPORTATION**

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**APPROVED ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED PASSED ENGINEER OF POLICY AND PROCEDURES**

**STANDARD 602501-06**

**4' (1.22 m) DIAMETER**

**PRECAST VALVE VAULT TYPE A**

(Sheet 2 of 2)
5' (1.52 m) DIAMETER

**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.

**SECTION THRU VALVE VAULT**

See flat slab top joint configurations.

**FLAT SLAB TOP**

**JOINT CONFIGURATIONS**

See Standard 602701 for details of manhole steps.

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

<table>
<thead>
<tr>
<th>Location</th>
<th>WW or Rebar (each direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat.</td>
<td></td>
</tr>
<tr>
<td>Top</td>
<td>0.11 sq. in./ft. (233 sq. mm²/m²)</td>
</tr>
<tr>
<td>Bottom</td>
<td>0.40 sq. in./ft. (647 sq. mm²/m²)</td>
</tr>
</tbody>
</table>

**WALL REINFORCEMENT**

<table>
<thead>
<tr>
<th>Orientation</th>
<th>WW or Rebar (each direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circumferential</td>
<td></td>
</tr>
<tr>
<td>Vertical</td>
<td></td>
</tr>
</tbody>
</table>

**BASE SLAB REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Height</th>
<th>WW or Rebar (each direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat.</td>
<td>≥ 20 ft. (6.10 m)</td>
<td>0.24 sq. in./ft. (588 sq. mm²/m²)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>&lt; 20 ft. (6.10 m)</td>
<td>0.13 sq. in./ft. (273 sq. mm²/m²)</td>
</tr>
</tbody>
</table>

**SHEAR KEY GEOMETRY**

* Only one layer of WW permitted to avoid congestion.

**BASE SLAB JOINT CONFIGURATIONS**

- **Single-element shear key at center of slab**
- **Optional Joint**

**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)
**FLAT SLAB TOP JOINT CONFIGURATIONS**

**FOR D = 36 (900) AND D = 4'-0" (1.22 m)**

(Shown at access hole)

**SECTION THRU FLAT SLAB TOP**

**FOR D = 36 (900) AND D = 4'-0" (1.22 m)**

(Showing layout of reinforcement bars and c bars)

**FLAT SLAB TOP JOINT CONFIGURATIONS**

**D = 5'-0" (1.52 m)**

(Shown at access hole)

**SECTION THRU FLAT SLAB TOP**

**FOR D = 5'-0" (1.52 m)**

(Showing layout of welded wire reinforcement and c bars)

---

**TABLE**

<table>
<thead>
<tr>
<th>D</th>
<th>T</th>
<th>D_L</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>36 (900)</td>
<td>4'-0&quot; (1.22 m)</td>
<td>6 (150)</td>
<td>8 (200)</td>
</tr>
<tr>
<td>4'-0&quot; (1.22 m)</td>
<td>5'-0&quot; (1.52 m)</td>
<td>6 (150)</td>
<td>8 (200)</td>
</tr>
</tbody>
</table>

**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.

**DATE**

**REVISIONS**

1-1-19  Expanded / refined reinforcement options

1-1-18  Revised for compliance with LRFD

**PRECAST REINFORCED CONCRETE FLAT SLAB TOP**

(Shew 1 of 2)

**STANDARD 602601-06**
PLAN - FLAT SLAB TOP FOR D = 4'-0" (1.22 m)

- Bar c #5 (#16), 0'-10" (3.05 m) length, 26 (660) radius bottom
- Bar c #5 (#16), 7'-3" (2.21 m) length, 32 (815) radius top and bottom

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

- Bar c #5 (#16), 0'-10" (3.05 m) length, 26 (660) radius bottom
- Bar c #5 (#16), 7'-3" (2.21 m) length, 32 (815) radius top and bottom

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

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

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

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

FLAT SLAB TOP REINFORCEMENT FOR D = 36 (900)

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>Spacing (max.)</th>
<th>A₃ (min.)</th>
<th>Spacing (max.)</th>
<th>Bar Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom</td>
<td>0.62 sq. in./ft.</td>
<td>6</td>
<td></td>
<td>1150</td>
<td>#6</td>
</tr>
<tr>
<td>Mat</td>
<td>1332 sq. mm/m</td>
<td>(450)</td>
<td></td>
<td>(450)</td>
<td>#3 or #4</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>Spacing (max.)</th>
<th>A₃ (min.)</th>
<th>Spacing (max.)</th>
<th>Bar Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom</td>
<td>0.62 sq. in./ft.</td>
<td>6</td>
<td></td>
<td>1150</td>
<td>#5</td>
</tr>
<tr>
<td>Mat</td>
<td>1332 sq. mm/m</td>
<td>(450)</td>
<td></td>
<td>(450)</td>
<td>#3 or #4</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>Spacing (max.)</th>
<th>A₃ (min.)</th>
<th>Spacing (max.)</th>
<th>Bar Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>0.11 sq. in./ft.</td>
<td>18</td>
<td>0.11 sq. in./ft.</td>
<td>18</td>
<td>#3 or #4</td>
</tr>
<tr>
<td>Mat</td>
<td>233 sq. mm/m</td>
<td>(450)</td>
<td>233 sq. mm/m</td>
<td>(450)</td>
<td>#3 or #4</td>
</tr>
<tr>
<td>Bottom</td>
<td>0.60 sq. in./ft.</td>
<td>6</td>
<td></td>
<td>1150</td>
<td>#4</td>
</tr>
<tr>
<td>Mat</td>
<td>887 sq. mm/m</td>
<td>(450)</td>
<td></td>
<td>(450)</td>
<td>#3 or #4</td>
</tr>
</tbody>
</table>

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

SECTION A-A

ELEVATION VIEW

19 (250) mm

3 (75) mm extension

10 (250) mm

Inside face of structure

9 (13) Reinforcement bar

MANHOLE STEPS

(Sheet 2 of 2)
CAST FRAME

6 Gussets shown
10 permitted

CAST OPEN LID

CAST CLOSED LID

ADA COMPLIANT CAST OPEN LID

1-1-15
Revised dimensioning of
Frame: Added ADA compliant
open lid.

1-1-20
Revised dimension in Section D-B
of cast open lid.

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

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

FRAMES AND LIDS

TYPE 1

STANDARD 604001-05
CAST FRAME

SECTION B-B

CAST GRATE

ALTERNATE CURB BOX

SECTION E-E

STANDARD 604006-05

FRAME AND GRATE

TYPE 3

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

SECTION B-B

ALTERNATE CURB BOX

SECTION E-E

CAST GRATE

VANE DETAIL

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

FRAME AND GRATE
TYPE 3V

STANDARD 604011-05
SECTION A-A

CAST FRAME

SECTION B-B

SECTION C-C

SECTION D-D

CAST GRATE

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

DATE
REVISIONS
4-1-16 Corrected dimension on SECTION A-A
1-1-15 Revised dimensions of frame and grate

FRAME AND GRATE
TYPE 4

STANDARD 604016-04
4 holes
\( \frac{3}{16} \) Dia.

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

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

BASE, FRAME AND LIDS TYPE 5

GENERAL NOTES

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

DETAIL OF BOLTING

FRAME TO BASE

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

SECTION B-B

CAST FRAME
Gray Iron

SECTION A-A
CAST BASE
Gray Iron

SECTION C-C
CAST OPEN LID

SECTION D-D
CAST CLOSED LID
Gray Iron

SECTION E-E

SECTION G-G

SECTION F-F

ADA COMPLIANT
CAST OPEN LID

REVISIONS

1-1-20
Switched units to English (metric).

1-1-15
Added ADA compliant open lid.

1-1-09

SECTION A-A

CAST GRATE

SECTION B-B

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

PASSED

DATE

REVISIONS

1-1-15 Revised grate thickness.

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

STANDARD 604031-03

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

6 lugs shown, 3 permitted.

SECTION A-A

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

STANDARD 604036-03

REVISED

DATE
REVISIONS
1-1-15
1-1-15
1-1-09
1-1-09

ENGINEER OF POLICY AND PROCEDURES
APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
PASSED
All dimensions are in inches (millimeters) unless otherwise stated.

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

CAST FRAME

CAST GRATE

DATE
1-1-15

REVISIONS
1-1-15 Revised dimensions of frame
1-1-99 Switched units to English (metric)

FRAME AND GRATE
TYPE 9

STANDARD 604041-03

Illinois Department of Transportation
ENGINEER OF POLICY AND PROCEDURES
APPROVED
January 1, 2015

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
1-1-97

PASSED DATE

REVISED DIMENSIONS OF FRAME

1-1-15

ENGLISH (METRIC) UNITS

1-1-99
All dimensions are in inches (millimeters) unless otherwise shown.
CAST FRAME

SECTION A-A

ALTERNATE CURB BOX

SECTION B-B

SECTION C-C

SECTION D-D

CAST GRATE

SECTION E-E

All dimensions are in inches (millimeters) unless otherwise shown.
Curb box adjustable from 4½ (115) to 9 (225).

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

CAST FRAME

SECTION B-B

SECTION C-C

SECTION D-D

CAST GRATE

FRAME AND GRATE
TYPE 12

STANDARD 604061-03

Illinois Department of Transportation

DATE
REVISIONS
1-1-15
Revised dimensions of frame and grate
1-1-09
Switched units to English (American)

ENGINEER OF POLICY AND PROCEDURES
APPROVED
January 1, 2015

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
1-1-97

PASSED
DATE

All dimensions are in inches (millimeters) unless otherwise shown.
NOTE:
Warp sloping face of curbs in a distance of 5 (1.5 m)
in the cross section shown at the frame.

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

Slope pavement or gutter flag
12% at inlet.

Curb

SECTION B-B

SECTION Z-Z (WITH FRAME)

CASE II

SECTION D-D

CASE I

SECTION C-C

CAST LID

CAST FRAME (GRAY IRON)

SECTION A-A

DETAIL E

Illinois Department of Transportation

DATE

REVISIONS

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

1-1-04
Removed weights.

1-1-97

PASSED

FRAME AND LID

TYPE 15

STANDARD 604066-02

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

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

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

\( \frac{3}{4} \) (14) Dia. holes for grate alignment, two places.

One gusset shown each side, two permitted.

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

All dimensions are in inches (millimeters) unless otherwise shown.
\( \frac{3}{8} \) (M16) Galv. bolt, nut & washer.

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

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

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

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

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

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

\( \frac{1}{2} (19) \) Dia. holes, three places each frame.

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

Three \( \frac{3}{8} x 2\frac{1}{2} \) (M16 x 64) galv. hex. head bolt & nut with galv. washers.

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

FRAME AND GRATES
TYPE 22

STANDARD 604081-05
This image contains a detailed drawing of a frame and grate, labeled as FRAME AND GRATE TYPE 23. The drawing includes multiple sections such as PLAN - FRAME, SECTION B-B, SECTION D-D, SECTION C-C, and SECTION A-A. The drawing provides various dimensions, angles, and annotations, all of which are in inches or millimeters, unless otherwise stated. The Illinois Department of Transportation approved the design on January 1, 2021. The drawing includes revisions dated 1-1-15 and 1-1-21, indicating changes to the frame and grate design. All dimensions are in inches (millimeters) unless otherwise shown.
Frame

1:4 or 1:6

Grate

45°

4% Slope

Welded wire fabric

1/2 (13) PJF (circumference of pipe)

Concrete apron, 4 (100) thick

Traffic

SECTION B-B

LOCATION SKETCH - PLAN

GENERAL NOTES

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

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

DATE REVISIONS
1-1-99 Switched units to English (metric).

REINFORCED CONCRETE PIPE

STANDARD 604106-01

MEDIAN INLET for 36" (900 mm)

Illinois Department of Transportation
ENGINEER OF POLICY AND PROCEDURES
APPROVED January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED 1-1-97
PASSED DATE
REVISIONS
Undoweled contraction joint (typ.)

1. Form with ½ (13) thick steel template
   2. (50) deep, and seal.
2. Saw 2 (50) deep at 4 to 24 hours, and seal.
3. Insert ½ (20) thick preformed joint filler full depth and width.

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

Drainage casting
with curb box
Back of curb

Pavement

Edge of pavement

HMA surfacing

Base course

ON DISTURBED SUBGRADE

ON UNDISTURBED SUBGRADE

Concrete Curb Type B

Adjacent to flexible pavement

Adjacent to PCC pavement or PCC base course

Concrete Curb and Gutter

STANDARD 606001-07
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) pav't.
2.41 cu. yds. (1.84 m³) concrete for 9 (225) pav't.

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)

STANDARD OUTLET

DATE REVISIONS

1-1-16 Revised General Notes for tie bar spacing to 36 (900) cts.
3-15-16 Changed terminology to welded wire reinforcement.
1.98 cu. yds. (1.51 m³) concrete for 9 (225) pav't.
2.01 cu. yds. (1.60 m³) concrete for 10 (250) pav't.

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

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
Flow line
placed at mid-depth
with HMA shoulders
or at 25' (7.6 m) cts.
with pcc shoulder joints
Placed in prolongation
No. 4 (No. 13) rebar dowel bars
1x18 (25x450) min.
3' (1 m) min.
(300)
12
No. 4 (No. 13) rebar
placed at mid-depth
(one each side of casting)

SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D

ROLL OFF

PLAN

TYPE A GUTTER

EXPANSION JOINT

INLET

Type A Gutter

Flow line

Edge of paved shoulder

3'-13 mil

3' (1 m) min.

9'-6" (2.9 m)

6'-0" (1.8 m)

4'-9" (1.45 m)

18 (450)

Shld.

18 (450)

27½

18 (450)

18 (450)

18 (450)

18 (450)

6' (1.8 m)

6' (1.8 m)

6' (1.8 m)

450

18

Shld.

Inlet

Flow line

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.

DATE

REVISIONS

4-1-16

Changed terminology to "welded wire reinforcement.

1-1-97

Switched units to English (metric). Changed radii, adjusted gys.

1-1-09

All units metricized.

APPROVED

1-1-97

PASSED

April 1,

DATE

REVISIONS

1-1-09

Switched units to English (metric). Changed radii, adjusted gys.

1-1-97

IIlinois Department of Transportation

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

ENGINEER OF POLICY AND PROCEDURES

APPROVED

1-1-97

PASSED

April 1,

DATE

REVISIONS

1-1-16

Changed terminology to "welded wire reinforcement.

1-1-09

Switched units to English (metric). Changed radii, adjusted gys.
**QUANTITIES OF CONCRETE**

Commercial Entrances:
Section B-B to C-C = 0.25 cu. yd./ft. (0.50 m³/m).
Section (A-A to B-B) + (C-C to D-D) = 2.26 cu. yd. (1.73 m³).

All Other Entrances:
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))
The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001. Tie bars shall be No. 6 (No. 19) at 36 (900) centers in accordance with details for longitudinal joint shown on Standard 420001.

The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001. Tie bars shall be No. 6 (No. 19) at 36 (900) centers in accordance with details for longitudinal joint shown on Standard 420001.

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

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

**QUANTITIES**

<table>
<thead>
<tr>
<th>Material</th>
<th>Single</th>
<th>Double</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete - cu. yd (m³)</td>
<td>2 (2.5)</td>
<td>3 (3.5)</td>
</tr>
<tr>
<td>Cast Iron Grate - Ea.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Pipe Drain - Dia. in. (mm)</td>
<td>15</td>
<td>18</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

Concrete, reinforced with No. 6 (No. 19) tie bars placed at 36 (900) centers, shall be placed parallel to the face of the pavement to a depth shall be not less than 2' (610 mm) and not more than 3' (914 mm) at a maximum distance of 20' (6096 mm) from the gutter.

Concrete shall be placed in lifts not exceeding 3' (914 mm) in thickness, compacted to a degree of compaction of 95% of standard Proctor design, using standard methods of compaction. Compaction shall be made to a degree of compaction of 95% of standard Proctor design, using standard methods of compaction. Compaction shall be made using a vibratory roller.
QUANTITY OF CONCRETE
Section A-A to C-C
0.64 cu. yd. (0.49 m³)

SECTION A-A

SECTION B-B

SECTION C-C

PLAN

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.

DATE
REVISIONS
1-1-18 Deleted first General Note to avoid conflict with second General Note.
4-1-16 Changed terminology to 'welded wire reinforcement'.

INLET

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

SECTION B-B & B'-B'

TYPE B GUTTER

(PLAN)

ENTRANCE

QUANTITY OF CONCRETE
Section B'-B to B-B = 0.076 cu. yd./ft. (0.19 m³/m)
Section (C-C to B'-B') + (B-B to A-A) = 0.44 cu. yd. (0.34 m³)

SEE PLANS

TIE BARS

EDGE ROLLED

FLOW LINE
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. (0.017 m³/m).

REINFORCEMENT
Welded wire reinforcement (not less than 58 lbs./100 sq. ft. (2.83 kg/m²)) to begin here.

ILLINOIS DEPARTMENT OF TRANSPORTATION
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED 1-1-97
PASSED

INLET, OUTLET & ENTRANCE
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
SECTIONS AT END OF OUTLET

TYPE B GUTTER
(STANDARD 606201-04)
1/2 (20) PEJF between rigid pavement and median end. Align with joint in adjacent pavement.

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.

PEJF = Preformed expansion joint filler.
Type G requires 3 grates
Type E requires 2 grates
Type F requires 1 grate

NOTE:
Welded wire reinforcement (WWR) may be used in lieu of reinforcement bars. Only one layer of WWR is permitted to avoid congestion.
**SECTION A-A**

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

STEEL POST DETAILS

WOOD POST CONSTRUCTION

WOOD BLOCK-OUT AND STEEL POST DETAILS

TWO-PIECE WOOD BLOCKOUT OPTION

POST OR SPLICE BOLT & NUT

Illinois Department of Transportation
APPROVED 2018
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED 1-1-97

STEEL PLATE BEAM GUARDRAIL
(Sheet 2 of 4)

STANDARD 630001-12

Note: All holes $\frac{3}{8}$ (20) dia.
CABLE ASSEMBLY

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

ANCHOR PLATE T DETAILS

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

RAIL ELEMENT SPLICE

NOTE
When end shoe is attached to a bridge parapet which has an expansion joint, the bolts shall be provided with a locknut or double nut and shall be tightened only to a point that will allow guardrail movement.

The standard end shoe shall be attached to the concrete with pre-drilled or self-drilling anchor bolts. The anchor cone shall be set flush with the surface of the concrete.

Externally threaded studs protruding from the surface of the concrete will not be permitted.
**GUARDRAIL PLACED BEHIND CURB**

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

### MATERIAL IS ENCOUNTERED

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

#### TABLE:

<table>
<thead>
<tr>
<th>V</th>
<th>W</th>
<th>( D )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 6</td>
<td>24</td>
<td>( 16 (40) )</td>
</tr>
<tr>
<td>( &gt; 6 - 18 )</td>
<td>16</td>
<td>( 8 (20) )</td>
</tr>
<tr>
<td>( \geq 18 - 31 )</td>
<td>12</td>
<td>( 8 (20) )</td>
</tr>
<tr>
<td>( \geq 31 - 40 )</td>
<td>12</td>
<td>( 8 (20) )</td>
</tr>
<tr>
<td>( \geq 40 - 63 )</td>
<td>12</td>
<td>( 8 (20) )</td>
</tr>
</tbody>
</table>

**PLAN**

- **Steel or wood post: (steel shown)**
- **Aggregate backfill (CA 11)**
- **Finished ground line**
- **Drilled hole**
- **Ledge**

**ELEVATION**

- **Steel or wood post: (steel shown)**
- **Finished ground line**
- **Aggregate backfill (CA 11)**
- **Drilled hole**
- **Ledge**

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

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

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

**STANDARD 630001-12**

**STEEL PLATE BEAM GUARDRAIL**

*Sheets 4 of 4*

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**APPROVED 2018 ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED 1-1-97**

**APPROVED 2018 ENGINEER OF POLICY AND PROCEDURES**
ELEVATION

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

SECTION A-A

When \( S < 3 \) and the distance from the back of post is less than 24 (610), the post embedment shall be 76 (1.93 m) and the minimum top of rail height shall be 31 (787).

BACK-UP PLATE

Steel post

Back-up plate

Steel plate beam guardrail with bolt slots at 37/6 (953) centers

Hinge point

Slope 1:10 or flatter

Steel post (See Standard 630106)
FOOTING FOR POST WHEN IMPERVIOUS MATERIAL IS ENCOUNTERED

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

LEAVE-OUT FOR POST WHEN PAVED MATERIAL IS ENCOUNTERED

- HMA or PCC pavement
- Steel post
- Aggregate backfill (CA 11)
- HMA or Controlled Low-Strength Material (CLSM)

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

<table>
<thead>
<tr>
<th>V</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 6</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>(0 - 152)</td>
<td>810</td>
<td>510</td>
</tr>
<tr>
<td>&gt; 6 - 18</td>
<td>18</td>
<td>146</td>
</tr>
<tr>
<td>(&gt; 152 - 458)</td>
<td>458</td>
<td>360</td>
</tr>
<tr>
<td>&gt; 18 - 31</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>(&gt; 458 - 787)</td>
<td>305</td>
<td>220</td>
</tr>
<tr>
<td>&gt; 31 - 40</td>
<td>12 - 6</td>
<td>8</td>
</tr>
<tr>
<td>(&gt; 787 - 1,024)</td>
<td>1035</td>
<td>200</td>
</tr>
</tbody>
</table>

2 (50) max.

8 (200) min.

18 (460) min.
For details of guardran elements not shown, see Standard 630001.

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

All dimensions are in inches (millimeters) unless otherwise shown.
Pay limits of other type of guardrail

Plan

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

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

6'-3" (1.905 m)

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

6'-3" (1.905 m)

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

6'-3" (1.905 m)

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

6'-3" (1.905 m)

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

Steel posts

CRT wood posts

Top of culvert

Steel posts

CRT wood posts

Elevation

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.

Revised general notes for non-blocked guardrail option.

Revised pay limits.

1-1-11:

1-1-13:

Added min. dim. from guardrail to headwall Added dim. to section A-A

Standard 630106-02

 Illinois Department of Transportation

January 1, 2017

PASSED

January 1, 2017

ISSUED

1-1-11

ENGINEER OF DESIGN AND ENVIRONMENT

PASSED

APPROVED

ENGINEER OF POLICY AND PROCEDURES

1-1-17
Pay limits of Guardrail Attached to Culvert

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

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

Steel post
Steel backup plate
Steel plate beam guardrail

Steel post at culvert

SQUARE WASHER A

STEEL POST

POST STANDOFF

SQUARE WASHER A

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

STEEL POST

SQUARE WASHER A

GENERAL NOTES
See Standard 630001 for details of guardrail not shown.
See Standard 630006 for details of non-blocked guardrail not shown.

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

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

WEAK POST GUARDRAIL ATTACHED TO CULVERT

STANDARD 630111-01
Two 7/8 x 7 (M19 x 178) threaded rods secured with chemical adhesive.

One 3/8 (19) expansion bolt.

Steel post

3/4 x 5
(M16 x 127)

hex bolt
and nut

Socket assembly

Two 3/8 x 2
(M13 x 50)
hex bolts and nuts

Greater of 3/8 (14) or 3/4 x 2 (R=64)

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

ELEVATION

TOP VIEW

SIDE VIEW

FRONT VIEW

SOCKET ASSEMBLY

FOR CASE I

WEAK POST GUARDRAIL
ATTACHED TO CULVERT

(Sheet 2 of 6)

STANDARD 630111-01
**CASE II, (H+T-R) < 18 (457), SIDE-MOUNT THROUGH-BOLT**

Steel post:

\[ \frac{1}{2} \times 5 \] (M16 x 127) hex bolt and nut

Socket assembly:

Two \( \frac{1}{2} \times 2 \) (M13 x 50) hex bolts

Greater of 5\( \frac{1}{2} \) (140) or R+2\( \frac{1}{2} \) (84)

One \( \frac{1}{2} \) (19) expansion bolt

Two \( \frac{1}{2} \) (19) threaded rods. Length shall be W + 4 (102)

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

Steel post:

\[ \frac{1}{2} \times 5 \] (M16 x 127) hex bolt and nut

Socket assembly:

Two \( \frac{1}{2} \times 2 \) (M13 x 50) hex bolts

Greater of 5\( \frac{1}{2} \) (140) or R+2\( \frac{1}{2} \) (84)

One \( \frac{1}{2} \) (19) expansion bolt

Two \( \frac{1}{2} \times 11 \) (M19 x 279) threaded rods secured with chemical adhesive

Two \( \frac{1}{2} \) (19) expansion bolts

FOR CASES II & III

**SOCKET ASSEMBLY**

- 12 (305) mm.
- W
- H
- T
- A

**TOP VIEW**

**FRONT VIEW**

**SIDE VIEW**

**BOTTOM VIEW**

- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx

**PLATE C**

- 10
- 3
- 3
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx

**PLATE D**

- 10
- 3
- 3
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx

**VARIABLE**

- 10
- 8
- 3
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx
- 70 xx

**CROSS SECTION**

**ELEVATION**

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**PASSED**

**APPROVED**

**ISSUED**

1-1-17

1-1-20

ENGINEER OF POLICY AND PROCEDURES

ENGINEER OF DESIGN AND ENVIRONMENT

WEAK POST GUARDRAIL
ATTACHED TO CULVERT

STANDARD 630111-01
CROSS SECTION
CASE IV, (H+T-R) > 18 (457), TOP MOUNT

ELEVATION

SIDES VIEW

TOP VIEW

FRONT VIEW

SOCKET ASSEMBLY
FOR CASE IV

Steel post

HSS 4 x 4 x \( \frac{\pi}{4} \)

Two \( \frac{3}{4} \times 7 \) (M19 x 178) threaded rods secured with chemical adhesive

Two \( \frac{1}{2} \times 7 \) (M13 x 178) threaded rods secured with chemical adhesive

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

Steel post

HSS 4 x 4 x \( \frac{\pi}{4} \)

Two \( \frac{3}{4} \times 7 \) (M19 x 178) threaded rods secured with chemical adhesive

Two \( \frac{1}{2} \times 7 \) (M13 x 178) threaded rods secured with chemical adhesive

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

Steel post

HSS 4 x 4 x \( \frac{\pi}{4} \)

Two \( \frac{3}{4} \times 7 \) (M19 x 178) threaded rods secured with chemical adhesive

Two \( \frac{1}{2} \times 7 \) (M13 x 178) threaded rods secured with chemical adhesive

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

Steel post

HSS 4 x 4 x \( \frac{\pi}{4} \)

Two \( \frac{3}{4} \times 7 \) (M19 x 178) threaded rods secured with chemical adhesive

Two \( \frac{1}{2} \times 7 \) (M13 x 178) threaded rods secured with chemical adhesive

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

$\frac{1}{2} \times 5$ (M16 x 127) hex bolt and nut

Socket assembly

Two $\frac{1}{2} \times 7$ (M13 x 178) threaded rods secured with chemical adhesive

* R varies between 0 to 6 (152)

** CROSS SECTION **

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

CASE VI, $(H+T-R) \geq 18$ (457), SIDE-MOUNT ANCHORED

ENGINEER OF POLICY AND PROCEDURES
APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

PASSED

ATTACHED TO CULVERT

WEAK POST GUARDRAIL

STANDARD 630111-01

(Sheet 5 of 6)

W-BEAM GUARDRAIL

VIEW A-A

THRIE-BEAM GUARDRAIL

VIEW B-B

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

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

GENERAL NOTES

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
Slope 1:1 max. Variable slope

Variable width beam guardrail

Steel plate

Shoulder stabilization

End treatment

Appropriate guardrail end treatment

Variable depending on normal shoulder slope

Transition to normal shoulder slope

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

24 (610) min.

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

24 (610) min.

Proposed PCC/HMA shoulder paved width

Variable width

Resurfacing

New construction

GENERAL NOTES

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

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

DATE | REVISIONS
--- | ---
1-1-17 | Revised leave-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
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.

SHOULDER WIDENING FOR TYPE 1 (SPECIAL) GUARDRAIL TERMINALS

1-1-19
1-1-19
1-1-19
1-1-18
1-1-19
1-1-19

STANDARD 630301-09
SHOULDER WIDENING FOR
TYPE 1 (SPECIAL)
GUARDRAIL TERMINALS

Illinois Department of Transportation

January 1, 2019

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

ENGINEER OF POLICY AND PROCEDURES

SHOULDER WIDENING TRANSITION
FOR FLARED TERMINAL

SECTION B-B
(Impact Head omitted for clarity)

SHOULDER WIDENING FOR
TYPE 1 (SPECIAL)
GUARDRAIL TERMINALS

(Sheet 2 of 2)

STANDARD 630301-09
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 (1 each)

Pay limits of STEEL PLATE BEAM
GUARDRAIL, TYPE A or TYPE B

This post required for all types
6'-3" (1.905 m)
6'-3" (1.905 m)
336
(952)

Rectangular

Bearing plate K

Face of guardrail

TRAFFIC FLOW

End section

Anchor plate T

Wood post inserted

in steel tube.

PLAN

Elevation

Lap rail over

end section

To center of first

bolthole in anchor plate

Bearing plate K

Cable

Strut

assembly

Wood post inserted

in steel tube.

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.
Pay limits of
other type

TRAFFIC BARRIER TERMINAL TYPE 5 (one each)

Plate E and rail element.
Place plate washer D under nut.

Finished ground line

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

* Post bolt with plate washer F placed under head and nut.

Post bolt with plate washer F*

1 (25) Dia. anchor bolt with locknut
furnished in place by the Contractor of the concrete structure. Place plate washer D under nut.

Plate washer D

Plate G placed between plate E and rail element.

1\(\frac{1}{4}\)x1 (17x25) Slotted hole

3\(\frac{1}{2}\)x2\(\frac{1}{2}\) (19x64) Slotted holes

3\(\frac{1}{2}\)x2\(\frac{1}{2}\) (19x64) Slotted holes

\(\frac{3}{16}\)x1 (17x25) Slotted hole

\(\frac{3}{16}\) (5) Steel plate

\(\frac{3}{8}\) (22) Dia. steel rod

\(\frac{1}{8}\) (22) Dia. hole

\(\frac{3}{16}\)x1 (17x25) Slotted hole

\(\frac{3}{4}\) (19) Steel plate

\(\frac{1}{2}\) (38) Dia. holes

GENERAL NOTES

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.

See Standard 630001 for details of guardrail not shown.

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

Revised post spacing dimensions on elevation.

Switched units to English (metric).

ENGINEER OF POLICY AND PROCEDURES
APPROVED

1-1-97

DATE
REVISIONS
1-1-15
1-1-09

TRAFFIC BARRIER TERMINAL, TYPE 5

STANDARD 631026-06
**GENERAL NOTES**

See Standard 630001 for details of guardrail not shown.

Thrie beam rail shall be bolted to block-out at all posts.

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

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

---

**TRAFFIC BARRIER TERMINAL, TYPE 6**

---

**STANDARD 631031-17**

---

**ENGINEER OF POLICY AND PROCEDURES APPROVED January 1, 2021**

**ENGINEER OF DESIGN AND ENVIRONMENT ISSUED 1-1-97 PASSED DATE REVISIONS**

---

**PLAN**

- 12'-6" (3.81 m) Single section of Thrie beam
- 6'-3" (1.91 m) Single section of Thrie beam
- 6'-2" (1.88 m) Single section of Thrie beam
- 12'-6" (3.81 m) Single section of W-beam

**ELEVATION**

- 13 - 6'-0" (1.83 m) W6x9.0 (W150x13.5) Steel posts
- 6 - 7'-0" (2.13 m) W6x9.0 (W150x13.5) Steel posts

**SECTION A-A**

- Wood Blockout
- Bridge approach slab

**PARAPET OR WINGWALL**

- Steel bearing plate
- Steel connector plate for constant-slope
- Steel post, typ. (W150x13.5)
- Bridge approach curb, see plans for details.

---

**DATE REVISIONS**

- 1-1-21 Added Detail A and revised plate dimensions on sheet 4.
- 1-1-20 Revised F-Shape to constant slope parapet and added steel connector plates. Added two posts and revised post length.
Please provide the raw textual content to be included in the image representation as natural text.
THREE BEAM END SHOE DETAIL

POSTS 1-11 WOOD BLOCKOUT DETAIL

PARAPET STEEL BEARING PLATE DETAIL

TRANSITION SECTION

TRAFFIC BARRIER

TERMINAL, TYPE 6

STANDARD 631031-17
WELDING INSTRUCTION
(Back side of plate shown)

PLATE AND STIFFENER IDENTIFICATION
(Back side of plate shown)

CONNECTOR PLATE DIMENSION
(PER ASSEMBLY)

<table>
<thead>
<tr>
<th>PLATE</th>
<th>QUANTITY</th>
<th>SHAPE</th>
<th>SIZE A x B x C x D x E</th>
<th>THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>1</td>
<td></td>
<td>20 x 20 (508 x 508)</td>
<td>% (10)</td>
</tr>
<tr>
<td>P2</td>
<td>1</td>
<td></td>
<td>19 1/2 x 20 x 27 3/8 (492 x 508 x 700)</td>
<td>% (10)</td>
</tr>
<tr>
<td>P3</td>
<td>2</td>
<td></td>
<td>20 x 3 1/2 x 27 3/8 x 3 1/4 (508 x 95 x 956 x 6 x 456)</td>
<td>% (10)</td>
</tr>
<tr>
<td>S1</td>
<td>4</td>
<td></td>
<td>18 1/2 x 1 1/2 x 26 5/8 x 3 1/4 (466 x 6 x 673 x 95)</td>
<td>% (10)</td>
</tr>
<tr>
<td>S2</td>
<td>1</td>
<td></td>
<td>19 1/4 x 1 1/4 x 8.3 x 9 1/2 x 6 1/6 (492 x 3.1 x 205 x 10 x 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 111.
All dimensions are in inches (millimeters) unless otherwise shown.

STEEL CONNECTOR PLATE FOR CONSTANT SLOPE

Traffic Barrier
Terminal, Type 6
(Sheet 4 of 4)

Standard 631031-17
Pay limits of TRAFFIC BARRIER TERMINAL TYPE 6A (1 each)

Bridge approach curb, see plans for details.

Bridge rail

Transition section (see detail) included in TRAFFIC BARRIER TERMINAL TYPE 6

Plan

Elevation

GENERAL NOTES

This standard shows attachment to curb mounted bridge rail. Attachment to side mounted bridge rail is similar.

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 6A

ILLINOIS DEPARTMENT OF TRANSPORTATION

ENGINEER OF POLICY AND PROCEDURES

APPROVED

JANUARY 1, 2017

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

JANUARY 1, 2017

STANDARD 631032-09

DATE

REVISIONS

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

1-1-13 Added note to see plans for bridge approach curb

TRAFFIC BARRIER TERMINAL, TYPE 6A

(Sheet 1 of 3)
Bolts (A307) with washers and self-locking nut, or nut and jam nut. Top bolt 3\x23 (22x127) for curb mount or 3\x7 (22x179) for side mount.

Note:
Side mounted rail similar as to connection details.

Finished surface

SECTION C-C

MODIFIED THRIE BEAM END SHOE DETAIL

POSTS 1-9 WOOD BLOCKOUT DETAIL

POST 10 WOOD BLOCKOUT DETAIL

(See Standard 630001 for post 11-15 blockouts.)
GUARDRAIL CONNECTION PLATE ASSEMBLY DETAILS (Mirror for opposite end)

VIEW D-D

SECTION E-E

LEGEND

- 2-1 (25) holes
- 3x1½ (39x38) slotted holes
- 3x⅞ (19x38) slotted holes
- 3x⅞ (19x38) slotted holes
- 4x1½ (22x31) slotted holes
- 32⅛ (824)
- 10⅛ (260)

DEPARTURE END VIEW

CONNECTION ANGLES:

(Install angles to rail caps using N (19)
washers and self-locking nuts or nuts
and jam nuts, to be provided by others)

APPRAOH END VIEW

TRAFFIC BARRIER
TERMINAL, TYPE 6A

STANDARD 631032-09

Illinois Department of Transportation

January 1, 2017

ENGINEER OF POLICY AND PROCEDURES

APPROVED

January 1, 2017

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

1-1-2003
Five % (M20) anchor bolts secured with chemical adhesive *(two @ each blockout) *

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

3'-1½" (938) c-c 12'-6" (3.81 m) Single section of thrie beam

15'-7½" (4.76 m) 10 spaces at 1'-6½" (476) 21'-10½" (6.67 m) 7 spaces at 3'-1½" (938)

No starting or ending of curb within this limit.

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

(Sheet 1 of 2)

ENGINEER OF POLICY AND PROCEDURES 1-1-2003

ENGINEER OF DESIGN AND ENVIRONMENT 1-1-2020
POSTS 1-11 WOOD BLOCKOUT DETAIL

POST 12 WOOD BLOCKOUT DETAIL
(See Standard 630001 for post 13-17 blockouts.)

THRIE BEAM END SHOE DETAIL

WOOD BLOCKOUT DETAIL

WOOD BLOCKOUT D

WOOD BLOCKOUT A & B

WOOD BLOCKOUT C

TRAFFIC BARRIER
TERMINAL, TYPE 6B

STANDARD 631033-08
GUARDRAIL (typ.)
pay limits of
Splice ¢ &
end shoe
Standard
Spacing per
(outside)
Splice ¢
P.T.
bolts with standard washers. ***
(M22) anchor
7
Epoxy grouted
end shoe
Standard
Spacing per
(outside)
Splice ¢
6
4 Epoxy grouted ½ (M22) anchor
bolts with standard washers. ***
(M22) anchor
8
4 Epoxy grouted ½ (M22) anchor
bolts with standard washers. ***
(M22) anchor
8
4 Epoxy grouted ½ (M22) anchor
bolts with standard washers. ***
(M22) anchor
8
4 Epoxy grouted ½ (M22) anchor
bolts with standard washers. ***
(M22) anchor
8
4 Epoxy grouted ½ (M22) anchor
bolts with standard washers. ***
TRAFFIC BARRIER TERMINAL TYPE 11

TEMPORARY CONCRETE BARRIER

% (M16) Button head bolt with hex nut and washer recessed in wood block.

*Post bolt with plate washer F placed under head and nut.

ELEVATION

PLATE G

(Place between the rail element and Plate E)

PLATE E

PLATE WASHER D

GENERAL NOTES

For details of guardrail not shown, see Standard 630001.

Install the face of the guardrail flush with the face of the temporary bridge rail. Insert plate washer D so that the 1 (25) projection fills the remainder of the slotted holes in the 1 (25) end plate of plate G after the % (M24) diameter bolts are in place.

* Bolts shall be provided with a lock nut or double nut and shall be tightened only to a point that will allow plate G to be free to move.

** After tightening, cut the anchor bolts flush with nuts, and damage the bolt head to prevent them from loosening.

All dimensions are in inches (millimeters) unless otherwise shown.
Delineators shall be placed 24 (600) from break point on all interchange ramps and wherever pavement superelevation exceeds 6% and wherever pavement on all interchange ramps 24 (600) from break point. Delineators shall be placed Type C metal post (1.2 m) 4' (900) 36 and on curves.

Single reflector units on tangent sections of main line ramps. Delineators on ramps and acceleration and deceleration lanes shall be placed at a maximum of 200' (60 m) spacing. Delineators on tangent sections of main line roadways shall be placed at 400' (120 m) spacing. Delineators shall be used on outside of all acceleration and deceleration lanes.

Provide when double reflector unit is required.

Plan - Two-Way Roadways

Plan - Dual Highways

Sectional View

Elevation

Revisions

English (metric)

Switched units to English (metric).

Revised notes.

DATE

REVISIONS

4-1-16

Added detail of reflector attached to post. Revised signature block.

1-1-09

Revised notes.

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.
NOTES

V + W shall not exceed 39 (990). When V
is 15 (380), W = 24 (610), and posts
shall be shortened as required. When V
exceeds 15 (380), W shall be shortened
correspondingly.

T = 15 (380) when U is 33 (840) or less. When
U exceeds 33 (840), the impervious material
shall be removed and the standard anchor
shall be used.

Timber blocks shall be nailed to each wood
post on the concave side of curve for
curves having a radius of less than 600'
(180 m).

V = 15 (380)
U = 3 (76)
T = 15 (380)
W = 24 (610)

GENERAL NOTES

The Engineer will determine the stability of the
im pervious material for anchoring.

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

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

PASSED

DATE

REVISIONS

1-1-09
Switched units to Eng
(units omitted previously)
deadman and gen. note

1-1-05
Corrected note on Post
Anchor detail on sheet

1-1-05

ISSUED

1-1-97

APPROVED

January 1,
2009

ENGINEER OF POLICY AND PROCEDURES

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

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ISSUED

1-1-97

REVISIONS

1-1-09
Switched units to Eng
(units omitted previously)
deadman and gen. note

1-1-05
Corrected note on Post
Anchor detail on sheet

1-1-05

ISSUED

1-1-97

PASSED

January 1,
2009

ENGINEER OF POLICY AND PROCEDURES

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

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ISSUED

1-1-97

PASSED

January 1,
2009

ENGINEER OF POLICY AND PROCEDURES

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

PASSED

January 1,
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.

**GENERAL NOTES**

- **NEW MONOLITHIC PCC BASE**
  - when the barrier is confined by earth
  - This dimension shall be 20 (250) min.

- **NEW OR EXISTING HMA / PCC BASE**
  - with HMA OVERLAY CONFINEMENT
  - No. 6 (No. 19) Hook bars at 30 (760) cts.
  - staggered side to side

- **NEW OR EXISTING PCC BASE**
  - with HOOK BARS
  - New or exist. PCC base

- **EXISTING PCC BASE**
  - with LONGITUDINAL JOINT
  - No. 6 (No. 19) Hook bars at 30 (760) cts.

**FIVE ANCHORING METHODS**

**TYPICAL CROSS-SECTION**

**VARIABLE CROSS-SECTION**

**NEW PCC BASE w/ KEYWAY**

**NEW OR EXISTING HMA / PCC BASE w/ HOOK BARS**

**NEW OR EXISTING HMA / PCC BASE w/ HOOK BARS**

**EXISTING PCC BASE w/ HOOK BARS**

See standard 836011 for additional light pole foundation details where required in concrete barrier. All dimensions are in inches (millimeters) unless otherwise shown.
CONCRETE BARRIER, DOUBLE FACE, 44 in. (1120 mm) HEIGHT

EXPANSION JOINT

PLAN AT LIGHTING FOUNDATION

CONSTRUCTION JOINT

ELEVATION AT LIGHTING FOUNDATION

CONDUIT

ANCHOR ROD

GROUNDING ELECTRODE

PVC SLEEVE FOR PVC SLEEVE FOR GROUNDING ELECTRODE

BARRIER BASE

SHEET 2 OF 2

STANDARD 637006-05
Expansion Joint

No. 4 (No. 13) Bar 18 (450) long (typ.)

Bend in field

Concrete glare barrier

Concrete (750)

30 (2.1 m)

7'-0" (2.1 m) ± cts.

No. 4 (No. 13) Bar

(90)

2

3

6 (150)

8

10

19

300

13

200

8

150

6 (350)

SECTION A-A

ELEVATION

TYPICAL APPLICATION AT MEDIAN OBSTRUCTIONS

Glare Screen

Necessity for glare screen is dependent upon geometrics

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

DATE

1-1-09

REVISIONS

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

CONCRETE GLARE SCREEN

STANDARD 638101-02

Illinois Department of Transportation

January 1, 2009
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**

**SECTION A-A**

**SECTION B-B**

**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)
- Prestressing Steel: $f_{ps} = 2,000$ psi (1380 MPa)
- Reinforcing Steel: $f_y = 40,000$ psi (270 MPa)
- Structural Steel: $f_s = 20,000$ psi (138 MPa)
- Minimum allowable soil bearing pressure: $= 1.25$ tsf (120 kPa)

All dimensions are in inches (millimeters) unless otherwise shown.
**SECTION E-E**
(For panels with smooth surface finish)

No. 4 (No. 13) bars shall be alternated above and below prestressing strands.

**NOTE**
Each prestressing strand shall be stressed to 16,000 lbs. (71.2 kN)

---

**SECTION C-C**

Ribs shall be irregular, fractured or chipped appearance.

Smooth vertical border each side

Pitch may vary from 19 (58) to 25 (65), but shall be constant for entire width of panel.

**TEXTURED SURFACE FINISH DETAIL**

**Nominal Panel Size**

<table>
<thead>
<tr>
<th>Panel Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>M</th>
</tr>
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<tbody>
<tr>
<td>8'-0&quot; x 8'-0&quot;</td>
<td>6</td>
<td>9</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>(2.4 m x 2.4 m)</td>
<td>(150)</td>
<td>(190)</td>
<td>(220)</td>
<td>6</td>
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<tr>
<td>8'-0&quot; x 10'-0&quot;</td>
<td>3</td>
<td>10</td>
<td>9</td>
<td>1</td>
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<tr>
<td>(2.4 m x 3.0 m)</td>
<td>(75)</td>
<td>(125)</td>
<td>(225)</td>
<td>(75)</td>
</tr>
<tr>
<td>8'-0&quot; x 12'-0&quot;</td>
<td>3</td>
<td>16</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>(2.4 m x 3.6 m)</td>
<td>(75)</td>
<td>(150)</td>
<td>(190)</td>
<td>9</td>
</tr>
</tbody>
</table>
Terminal pull post on pull posts
Dome type caps on line posts
Loop type caps on line posts

Tops of all footings shall be rounded.

DETAIL A

Line post
Truss rod
cable
Tension buckle

DETAIL B

Intermediate pull post
Truss rod
Turnbuckle

DETAIL C

Line post
Truss rod
Turnbuckle

Tension cable

Wire ties at 12 (300) cts.

8'-0" (2.43 m) (max.) post spacing

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.

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.

* Post sizes other than those shown may be used subject to approval by the Engineer.

GENERAL NOTES
Loading for wind 80 mph (130 km/h) with 20% gust factor. Minimum allowable soil pressure = 3.25 ksf (150 kPa).

Tension cable shall be provided with one turn buckle between each pair of pull posts.

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

ELEVATION - 6' (1.83 m) FENCE
(Looking toward Highway)

ELEVATION - 8' (2.43 m) & 10' (3.05 m) FENCES
(looking toward highway)

HEIGHT
POST
SECTION (O.D.)
lbs/ft.
(kg/m)

6' (1.83 m)
4
9.11
(13.6)

8' (2.43 m)
4
12.51
(18.6)

10' (3.05 m)
4
22.85
(34)

FENCE
WEIGHT
POST
SECTION (O.D.)
lbs/ft.
(kg/m)

6'
4
9.11
(13.6)

8'
4
12.51
(18.6)

10'
4
22.85
(34)

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

DATE
1-1-97

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

ISSUED
1-1-97

APPROVED
January 1,
2009

ENGINEER OF BRIDGES AND STRUCTURES
APPROVED
January 1,
2009

ENGINEER OF DESIGN AND ENVIRONMENT

REVISIONS

SIGHT SCREEN
CHAIN LINK FENCE
(System 1 of 2)

STANDARD 640001-01

Illinois Department of Transportation
RENUM. STANDARD 2365-6

Sheet 1 of 2

08/23/06
01/05/03

215-09-01
215-09-30
SECTION A-A

(Showing method of fastening bottom tension cable and fence fabric to pull posts.)

DETAIL B

(Showing typical method of attaching middle brace rails to posts.)

DETAIL A

(Looking from highway)

DETAIL C

(Looking forward highway)

DETAIL OF FABRIC

THICK WOOD SLAT (TYP.)

SIGHT SCREEN

CHAIN LINK FENCE

SHEET 2 OF 2

STANDARD 640001-01

ILLINOIS DEPARTMENT OF TRANSPORTATION

ENGINEER OF BRIDGES AND STRUCTURES

APPROVED JANUARY 1, 2009

ENGINEER OF DESIGN AND ENVIRONMENT

APPROVED JANUARY 1, 2009

ISSUED 1-1-97
**DETAIL A**

- 3x4 (75x100) Rails (nominal dim.)
- Cedar pickets
- Spacing (typ.) 7'-4" (2.2 m)

**PLAN**
(Facing highway)

**DETAIL B**

- Fence height
  - (75 ± 50)
  - 3 ± 2
  - A
  - B
  - C
  - D
  - 30° min.

- Galvanized common wire nails.
- To rail attachment
- (Showing typical picket connection at each rail.)
- Aggregate
- 15 (380) Dia. holes in timbers.
- 32x3 plate washers
- (M12) bolt with std. nut and
  - (190)
  - 8
  - 1
  - 2
- Vertical posts (typ.)

- Vertical posts parallel to grade
- Slight rails parallel to grade

**ELEVATION**
(Showing treatment with sloping ground)

**SEC. A-A**

- 2½ (63) (typ.)

- (Notch pickets when required to clear washer and bolt head.)

**GENERAL NOTES**

- Loading is based on 80 mph (130 km/h) with 30% gust factor. Minimum allowable soil pressure = 1.25 ksf (120 kPa).
- All dimensions are in inches (millimeters) unless otherwise shown.

---

**SIGHT SCREEN**

**CEDAR STOCKADE FENCE**

**TYPE S**

**STANDARD 641001-01**

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**REVISIONS**

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<td>Switched units to English (metric). Changed Sec. B-B to Detail B. STANDARD 2267-3. Deleted DN Symbol.</td>
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<td>Approved Standard 2267-3.</td>
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**APPROVED**

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<td>ENGINEER OF BRIDGES AND STRUCTURES</td>
</tr>
<tr>
<td>January 1, 2009</td>
<td>ENGINEER OF DESIGN AND ENVIRONMENT</td>
</tr>
</tbody>
</table>
SHOULDER RUMBLE STRIPS, 16 in.

STANDARD 642001-02

GENERAL NOTES

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.

1-1-03 PASSED

1-1-12 ENGINEER OF POLICY AND PROCEDURES

APPROVED

January 1, 2012

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

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

1-1-12 Changed formed rumble strip to 16 (400) wide. Renamed standard.

Rumble strip

Edge of pavement

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

TYPICAL APPLICATION AT AN INTERCHANGE

TYPICAL APPLICATION AT AN INTERSECTION OR ENTRANCE

HALF PLAN

HALF PLAN
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

1. See Section A-A.
2. 6 (1.2 m) preferred, 3 (0.90 m) minimum where the paved shoulder is considered a bicycle accommodation.

SHOULDER RUMBLE STRIPS, 8 in.

STANDARD 642006-01
0.0747 (2) Thick

0.1345 (3.5) Thick

Lock loops

Barbed or knuckled selvage

Top tension wire

Bottom tension wire

Wire fabric to be woven into the lock loops for the entire length of post.

Stretcher bar band spaced 14 (358) c-c max.

Fabric tie spaced

Knuckled selvage

Fabric

Post

Stretcher bar

METHOD OF FASTENING STRETCHER BAR TO POST

METHOD OF TYING FABRIC TO TENSION WIRES

ROLL FORMED SECTION OF TERMINAL & GATE POST

ROLL FORMED SECTION OF BRACE

LINE POST

GATE POSTS *

GATE FRAMES

TERMINAL POST

HORIZONTAL BRACES

PIPE TYPE A 1.90 (48.3) O.D.

Pipe Type B 1.90 (48.3) O.D.

Pipe Type C 1.90 (48.3) O.D.

H 1.875x1.625 (47.6x41.3)

C

J

Pipe Type A 2.375 (60.3) O.D.

Pipe Type B 2.375 (60.3) O.D.

Pipe Type C 2.375 (60.3) O.D.

Roll Formed 35x35 (89.0x89.0)

5/8 Tubing 2(8x2); (63.5x63.5)

Pipe Type A 1.66 (42.2) O.D.

Pipe Type B 1.66 (42.2) O.D.

Pipe Type C 1.66 (42.2) O.D.

H 1.31x1.5 (33.3x38.1)

Roll Formed 35x35 (63.5x63.5)

See detail

See detail

See detail

GATE FRAMES

Section

Pipe Type A 1.90 (48.3) O.D.

Pipe Type B 1.90 (48.3) O.D.

Pipe Type C 1.90 (48.3) O.D.

Section

Pipe Type A 1.66 (42.2) O.D.

Pipe Type B 1.66 (42.2) O.D.

Pipe Type C 1.66 (42.2) O.D.

Section

Pipe Type A 1.66 (42.2) O.D.

Pipe Type B 1.66 (42.2) O.D.

Pipe Type C 1.66 (42.2) O.D.

Section

Pipe Type A 2.375 (60.3) O.D.

Pipe Type B 2.375 (60.3) O.D.

Pipe Type C 2.375 (60.3) O.D.

Section

Pipe Type A 2.375 (60.3) O.D.

Pipe Type B 2.375 (60.3) O.D.

Pipe Type C 2.375 (60.3) O.D.

Section

Pipe Type A 2.375 (60.3) O.D.

Pipe Type B 2.375 (60.3) O.D.

Pipe Type C 2.375 (60.3) O.D.

Section

Pipe Type A 1.66 (42.2) O.D.

Pipe Type B 1.66 (42.2) O.D.

Pipe Type C 1.66 (42.2) O.D.

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Pipe Type C 1.66 (42.2) O.D.

Section

Pipe Type A 1.66 (42.2) O.D.

Pipe Type B 1.66 (42.2) O.D.

Pipe Type C 1.66 (42.2) O.D.
Post

Tension wire

Ground line

#6 Solid, bare, copper wire

# (18) min. dia. copper clad steel rod.

Approx 22'-0" (6.7 m)

Ledge of impervious material

Approx 8'-0" (2.4 m)

A= 18 (450)

Post

Tension wire

Culvert

Toe of slope

Culvert

Corner post assembly

Toe of slope

Corner post assembly

See DETAIL A

Fence

R.O.W.

Fence

R.O.W.

Toe of slope

Corner post assembly

Top of slope

Corner post assembly

Top of slope

Fence

R.O.W.

Extra length posts

where necessary

The chain link fabric shall be replaced by barbed wire strands at 12 (300) maximum centers between the double posts shown on DETAIL A when shown on the plans.

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.

Terminal post assembly

End post assembly

4 (100)

Post not centered in concrete.

36 (900) for 4' (1.2 m) fence.

3'-6" (1.0 m) for over 4' (1.2 m) fence.

INSTALLATION ON SLOPES

Highway

Fence

R.O.W.

Post

INSTALLATION AROUND HEADWALL

INSTALLATION OVER STREAM

ELEVATION

DETAIL A

INSTALLATION AT CORNERS

INSTALLATION AT CORNERS

INSTALLATION AT CORNERS
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 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.

The clearance between the bottom fence wire and the ground may be up to 3 (75) for a maximum distance of 8' (2.4 m) when uneven ground is encountered.

All dimensions are in inches (millimeters) unless otherwise shown.
## 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>1.93 (2.72)</td>
</tr>
<tr>
<td>Type C: Pipe 1.66 (42.2) O.D.</td>
<td>1.66 (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>3.67 (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>H, I, U, structural shapes</td>
<td>4.1 (6.0) min.</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 1.315 (33.4) O.D.</td>
<td>1.66 (2.50)</td>
</tr>
<tr>
<td>Type B: Pipe 1.315 (33.4) O.D.</td>
<td>1.34 (1.99)</td>
</tr>
<tr>
<td>Type C: Pipe 1.315 (33.4) O.D.</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>Type A: Pipe 2.375 (60.3) O.D.</td>
<td>4.1 (6.1) min.</td>
</tr>
<tr>
<td>Type B: Pipe 2.375 (60.3) O.D.</td>
<td>4.1 (6.1) min.</td>
</tr>
<tr>
<td>Type C: Pipe 2.375 (60.3) O.D.</td>
<td>4.1 (6.1) min.</td>
</tr>
</tbody>
</table>

## Structural Shapes

- H, I, U, structural shapes
- L, C, T, Y, or other approved structural shapes
- (64x64x6.4) 4
- (76x76x7.9) 8
- (76x76x9.5) 8

## Wood Items

### Gate, Corner, End or Pull Posts

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A: Pipe 2.375 (60.3) O.D.</td>
<td>3.85 (5.84)</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>4.32 (6.43)</td>
</tr>
<tr>
<td>Angle 2(x)2(x)6 (64x64x6.4)</td>
<td>4.1 (6.0) min.</td>
</tr>
<tr>
<td>H, I, U, structural shapes</td>
<td>4.1 (6.0) min.</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>Type A: Pipe 2.375 (60.3) O.D.</td>
<td>5.79 (8.62)</td>
</tr>
<tr>
<td>Type B: Pipe 2.375 (60.3) O.D.</td>
<td>4.64 (6.91)</td>
</tr>
<tr>
<td>Type C: Pipe 2.375 (60.3) O.D.</td>
<td>3.78 (5.63)</td>
</tr>
<tr>
<td>Tubing 1 (25.4) Sq.</td>
<td>5.76 (8.60)</td>
</tr>
<tr>
<td>H, I, U, structural shapes</td>
<td>6.1 (9.08) min.</td>
</tr>
</tbody>
</table>

### Blocks

- 2x8 (50x200x450) 8.5 (12.70) min.
- 3 (76.2) Sq.

## Woven Wire Fence

- Illinois Department of Transportation
- January 1, 2009

- Wood Items
- Metal Items
- Standard 665001-02
**DRAINAGE MARKERS**

**FRONT ELEVATION**

**SECTION A-A**

- **No. 3 (No. 10) bars**
- **4'-0" (1.2 m) long**
- **4% (20) Bevel**

**SECTION B-B**

- **18" (457 mm)**
- **36" (914 mm)**
- **24" (609 mm)**
- **24" (609 mm)**

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

---

**DATE**

1-1-97

**REVISIONS**

Switched units to English (metric).

**STANDARD 667001-01**
Magnet when required
\( \frac{3}{4} \) (19) dia.
\( \frac{3}{4} \) (6) thick

Use cement and water or product from approved list of chemical adhesives to seal marker table in rock ledge, concrete pavement or structure. Hole shall be \( \frac{3}{4} \) (40) in diameter.

Tablet constructed in rock ledge or concrete.
Ground surface

Concrete

DETAIL A

Dia. 10 (250)

Dia. 14 (350)

ELEVATION

To be 6'-0" (1.8 m) min. in dist. 1, 2, 3, & 4.

To be 36" (900) min. in dist. 5, 6, 7, 8, & 9.

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

January 1, 2009

ENGINEER OF POLICY AND PROCEDURES

APPROVED

January 1, 2009

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

DATE

REVISIONS

3-1-97

Switched units to English (metric)

3-1-99

Asums. Standard 2448

Revised depth

U.S. GEOLOGICAL SURVEY AND NATIONAL GEODETIC SURVEY

BENCHMARKS RESETTING METHOD

STANDARD 668001-01
**TYPICAL APPLICATIONS**
- Landscaping work
- Utility work
- Fencing contracts and maintenance
- Clearing culverts

**GENERAL NOTES**

This Standard is used where at all times all vehicles, equipment, workers or their activities are more than 15' (4.5 m) from the edge of pavement.

When the work operation requires that two or more work vehicles cross the 15' (4.5 m) clear zone in any one hour, traffic control shall be according to Standard 701006.

All dimensions are in inches (millimeters) unless otherwise shown.
TYPICAL APPLICATIONS
Utility operations
Culvert extensions
Side slope changes
Guardsrail installation and maintenance
Delineator installation
Landscaping operations
Shoulder repair
Sign installation and maintenance

SYMBOLS
- Work area
- Sign
- Cone, drum or barricade

When the work operation exceeds one hour, cones, drums or barricades shall be placed at 35' (10.5 m) centers for L/3 distance, and at 50' (15 m) centers through the remainder of the work area.

FORMULAS

\[
L = \begin{cases} 
\frac{W}{60} & \text{if} \quad 40 \text{ mph (60 km/h) or less:} \\
\frac{W}{110} & \text{if} \quad 45 \text{ mph (80 km/h) or greater:} 
\end{cases}
\]

\[L = 0.65(W)(S)\]

\[L = 1.5(S)\]

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

GENERAL NOTES
This Standard is used where any vehicles, equipment, workers or their activities will encroach in the area 15' (4.5 m) to 24" (600 mm) from the edge of pavement.

Calculate L as follows:

\[L = \sqrt{\frac{W}{S}}\]

\[L = \frac{W}{S}\]
For contract projects and utility maintenance for work areas:

- W20-I103(0)-48
- W21-I101(0)-48

1-1-14
APPROVED

DATE
REVISIONS
1-1-14 Revised workers sign
1-1-13 Updated text WORKERS

SYMBOLS
- Work area
- Sign
- Flagger with traffic control sign when required

TYPICAL APPLICATIONS
- Shoulder work
- Utility operations

GENERAL NOTES
This Standard is used where at any time any vehicle, equipment, workers or their activities require an intermittent or continuous moving operation on the shoulder where the average speed is 1 mph (2 km/h) or less.

When the work operation does not exceed 60 minutes, traffic control may be according to Standard 70101.

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

STANDARD 701011-04

OFF-RD MOVING OPERATIONS, 2L, 2W, DAY ONLY

Illinois Department of Transportation
January 1, 2014
ISSUED

ENGINEER OF DESIGN AND ENVIRONMENT

ENGINEER OF SAFETY ENGINEERING

PASSED
The text details the standard for off-road operations in multilane roadways, specifically addressing the setup and requirements for work areas, including the placement of signs, cones, drums, or barricades. The standard outlines the calculation of work zone lengths based on posted speeds and width of offset. It also covers typical applications and symbols used in construction and maintenance projects. The document includes a series of figures and diagrams illustrating the setup of work zones and the placement of equipment.
TYPICAL APPLICATIONS
- Landscaping work
- Utility work
- Fencing contracts

GENERAL NOTES
This Standard is used where at all times all vehicles, equipment, workers or their activities are more than 15' (4.5 m) from the edge of pavement.

When the work operation requires that two or more work vehicles cross the 15' (4.5 m) clear zone in any one hour, traffic control shall be according to Standard 701101.

This Standard also applies to work performed in the median more than 15' (4.5 m) from either pavement.

All dimensions are in inches (millimeters) unless otherwise shown.
Devices at 20' (6 m) centers in the taper.

Cones at 25' (8 m) centers for the first 150' (45 m). Additional cones may be placed at 50' (15 m) centers. When drums or barricades are used, these intervals between devices may be doubled.

**TYPICAL APPLICATIONS**
- Isolated patching
- Utility operations
- Storm sewers
- 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**
- 1-1-19 Revised device spacing in taper.
- 1-1-11 Revised flagger sign.

**REVISIONS**
Barricades or drums at 20' (6 m) centers in the taper.

Cones at 25' (8 m) centers for the first 150' (45 m). Additional cones may be placed at 50' (15 m) centers. When barricades or drums are used, these intervals between devices may be doubled.

For contract construction projects

For maintenance and utility projects

TYPICAL APPLICATIONS
Isolated patch
Installation of drainage structure
Utility operations

SYMBOLS
- Work area
- Sign
- Flagger with traffic control sign
- Cone, drum or barricade
- Barricade or drum with flashing light
- Barricade or drum with steady burning light

GENERAL NOTES
This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach in the area between the center line and a line 24 (600) from the edge of pavement for nighttime operation.

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

LANE CLOSURE, 2L, 2W, NIGHT ONLY, FOR SPEEDS ≥ 45 MPH

STANDARD 701206-05
For any operation that encroaches in the area between the centerline and a line 24 (600) outside the edge of the pavement for a period of less than 15 minutes.

- Vehicle with dual flashers or flashing amber dome light operating.

For any operation that encroaches in the area between the centerline and a line 24 (600) outside the edge of the pavement for a period of less than 60 minutes.

- Vehicle with dual flashers or flashing amber dome light operating.

For any operation that encroaches in the area between the centerline and a line 24 (600) outside the edge of the pavement for a period in excess of 15 minutes but less than 60 minutes.

- Vehicle with dual flashers or flashing amber dome light operating.

TYPICAL APPLICATIONS
- Marking patches
- Field survey
- String line
- Utility operations
- Cleaning up debris on pavement

SYMBOLS
- Work area
- Sign on portable or permanent support
- Flagger with traffic control sign

SIGN SPACING

<table>
<thead>
<tr>
<th>Speed Limit</th>
<th>Sign Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>450 (150 m)</td>
</tr>
<tr>
<td>45</td>
<td>50-45</td>
</tr>
<tr>
<td>65</td>
<td>240 (60 m)</td>
</tr>
</tbody>
</table>

1 = Refer to SIGN SPACING table for distances.

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

ILLINOIS DEPARTMENT OF TRANSPORTATION

DATE

REVISIONS

1-1-11 Revised flagger sign

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

1-1-09 English (metric)

STANDARD 701301-04
TYPICAL APPLICATIONS

- Bituminous resurfacing
- Milling operations
- Utility operations
- Shoulder operations

SYMBOLS

- Work area
- Sign on portable or permanent support
- Flagger with traffic control sign

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 15 mph (3 km/h) and less than 4 mph (6 km/h).

When the operation does not exceed 60 minutes, traffic control may be according to Standard 701301.

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

Lane closure, 2L, 2W, slow moving operations day only, for speeds ≥ 45 MPH

STANDARD 701306-04

DATE

REVISED

2-1-18

Revised lower speed limit

for operation to 15 mph.

3-1-11

Revised flagger sign.
TYPICAL APPLICATIONS
- Landscaping work
- Utility work
- Pavement marking
- Weed spraying
- Roadometer measurements
- Debris cleanup
- Crack pouring

SYMBOLS
- Arrow board (Hazard Mode only)
- Truck with headlights, emergency flashers and flashing amber light.
  (visible from all directions)
- 18x18 (450x450) mm orange flag
  (use when guide wheel is used)
- Truck mounted attenuator

GENERAL NOTES
This Standard is used where any vehicle, equipment, workers or their activities will require a continuous moving operation where the average speed is greater than 3 mph (5 km/h).

For shoulder operations not encroaching on the pavement, use DETAIL A, Standard 701426.

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

DATE REVISIONS
1-1-09 Switched units to English (metric). Omitted
1-1-97 Elim. speed restrictions
1-1-00 Pass With Care sign
1-1-00 In Standard title

LANE CLOSURE 2L, 2W MOVING OPERATIONS - DAY ONLY
STANDARD 701311-03
**TRAFFIC SIGNAL SEQUENCE**

<table>
<thead>
<tr>
<th>PHASE</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERVAL</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>NORTHBOUND OR EASTBOUND</td>
<td>G</td>
<td>Y</td>
</tr>
<tr>
<td>SOUTHBOUND OR WESTBOUND</td>
<td>R</td>
<td>R</td>
</tr>
</tbody>
</table>

**ADVISORY SPEED LIMIT**

<table>
<thead>
<tr>
<th>NORMAL</th>
<th>POSTED SPEED</th>
<th>ADVISORY SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 - 45 mph</td>
<td>40 mph</td>
<td>40 mph</td>
</tr>
<tr>
<td>40 mph</td>
<td></td>
<td>35 mph</td>
</tr>
<tr>
<td>35 - 30 mph</td>
<td>30 mph</td>
<td></td>
</tr>
</tbody>
</table>

**ADVISORY SPEED LIMIT**

- For speeds ≥ 45 MPH
  - 40 mph
  - 35 mph
  - 30 mph

**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 701010 or 701006.

- 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**
For contract construction projects:

- **W20 (103)|-48**
- **W12 (102)|-48**
- **W20 (40)|-48**
- **W3-3|-48**
- **R10-6A-2430**

For maintenance projects:

- **W12 (102)|-48**
- **W20 (40)|-48**
- **W3-3|-48**

**SYMBOLS**

- **Drum**
  - With steady burning bi-directional light
- **Sign**
- **Temporary concrete barrier**
- **Temporary rumble strip (when specified)**
- **Double vertical panel (see detail)**
- **Crystal, bidirectional guardrail/barrier wall reflector**
- **Impact attenuator**
- **Drum with flashing lights**
- **Type III barricade**
- **Detector loops**

**LANE CLOSURE, 2L, 2W, BRIDGE REPAIR WITH BARRIER**

**STANDARD 701321-18**

See Sheet 2 for GENERAL NOTES.
**TRAFFIC SIGNAL SEQUENCE**

<table>
<thead>
<tr>
<th>INTERVAL</th>
<th>EASTBOUND</th>
<th>NORTHBOUND OR SOUTHBOUND</th>
<th>WESTBOUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>B</td>
<td>G</td>
<td>R</td>
</tr>
<tr>
<td>2</td>
<td>R</td>
<td>Y</td>
<td>G</td>
</tr>
<tr>
<td>3</td>
<td>G</td>
<td>B</td>
<td>R</td>
</tr>
<tr>
<td>4</td>
<td>B</td>
<td>G</td>
<td>R</td>
</tr>
<tr>
<td>5</td>
<td>R</td>
<td>Y</td>
<td>G</td>
</tr>
<tr>
<td>6</td>
<td>G</td>
<td>B</td>
<td>R</td>
</tr>
</tbody>
</table>

**TEMPORARY CONCRETE BARRIER**

<table>
<thead>
<tr>
<th>POSTED SPEED</th>
<th>RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mph AND ABOVE</td>
<td>12:1</td>
</tr>
<tr>
<td>ABOVE 40 mph</td>
<td>8:1</td>
</tr>
</tbody>
</table>

**ADVISORY SPEED LIMIT**

<table>
<thead>
<tr>
<th>POSTED SPEED</th>
<th>NORMAL SPEED</th>
<th>ADVISORY SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 - 45 mph</td>
<td>40 mph</td>
<td>35 mph</td>
</tr>
<tr>
<td>40 mph</td>
<td></td>
<td>35 mph</td>
</tr>
<tr>
<td>35 - 30 mph</td>
<td></td>
<td>30 mph</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

This Standard is used where, at any time, any vehicle, equipment, workers, or their activities will encroach on one lane of a bridge. Traffic signals shall be operational only when all traffic controls are in place. When traffic signals are not in operation, flaggers shall be used and traffic control shall conform to Standard 701201 or 701206.

Temporary concrete barrier shall be according to Standard 704001.

Existing or temporary pavement markings shall be on both sides of open lane from stop bar to stop bar.

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

- Work area
- Active Work area
- Sign
- Barricade, drum, or vertical panels
- Flagger with traffic control sign

**GENERAL NOTES**

This Standard is used where at any time, any vehicles, 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**

**DATE**

1-1-11  Revised flagger sign

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

Corrected sign No.'s
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 30' (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.

LANCE CLOSURE, 2L, 2W, WITH RUN-AROUND, FOR SPEEDS ≥ 45 MPH

STANDARD 701331-05
This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach in the area between the center line and a line 24 (600) outside the edge of the pavement.

Two flaggers shall be required for each separate lane closure. The flagger shall be a minimum of 200' (60 m) and a maximum of 1/2 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 open holes is greater than 50' (15 m), two barricades/drums shall be placed in front of each open hole and one on the backside close to the centerline. When the open hole is greater than 10' (3 m) parallel to the centerline, one barricade/drum shall be placed at intervals not greater than 2000' (600 m), additional flaggers, warning signs, and tapers shall be placed as shown.

Barricades/drums shall be placed at intervals not greater than 200' (60 m) and a maximum of 1/2 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.

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

SYMBOLS

- Patch
- Sign
- Flagger with traffic control sign
- Barricade or drum
- Cone, barricade or drum

TYPICAL APPLICATIONS

Patching

GENERAL NOTES

Lane closure, 2L, 2W, work areas in series, for speeds ≥ 45 MPH

STANDARD 701336-07
The Road Construction Ahead sign shall be located 3 to 5 miles in advance of the project limits.

The message board shall be used to display status of lanes within the project. The primary messages shall be:
- "Right Lane Closed" / "x Miles Ahead"
- "Left Lane Closed" / "x Miles Ahead"
- "All Lanes Open".

Three, Type II barricades, drums, or vertical barricades at 25' (8 m) centers.

This sign shall be used when 2 lanes are closed.

This sign shall be omitted when median width is less than 10' (3 m).

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 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.
I

MINIMUM $XXX FINE

LIMIT
SPEED
ZONE
WORK
ENFORCED
PHOTO
LIMIT
SPEED
ZONE
WORK
ENFORCED
PHOTO
MINIMUM $XXX FINE

END
WORK
ZONE
SPEED
LIMIT

Median
1
(90 m)
300’
(300 m)
1000’
(300 m to 1050 m)
1000’ to 3500’
min.
300’ (90 m)
(150 m)
500’
max.
2000’ (600 m)

barricades at 100’ (30 m) centers

Type II barricades, drums, or vertical
barricades at 100’ (30 m) centers

Direction indicator barricades at 50’ (15 m) centers

SYMBOLES

1. Arrow board
2. Worker
3. Sign
4. Direction indicator barricade with steady burn monodirectional light
5. Type II barricade, drum, or vertical barricade
6. Spotter
7. Reflectorized temporary pavement marking tape shall be placed throughout the taper and for 300’ (90 m) alongside the work area when the closure time is greater than fourteen days. The edge line shall be white for right lane closures and yellow for left lane closures.
8. Work Zone speed limit signs shall be moved as necessary to maintain the required spacing between the signs and the workers in each separate work activity. Work Zone Speed Limit 55 Photo Enforced sign shall be omitted when the work area dictates placement of the sign array within 500’ (150 m) of the End Work Zone Speed Limit Sign.

GENERAL NOTES

This Standard is used where at any time any vehicle, equipment, workers or their activities will encroach on the lane adjacent to the shoulder, or on the shoulder within 24’ (600) of the edge of pavement.

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.

LANE CLOSURE,
FREEWAY/EXPRESSWAY

STANDARD 701401-12

DATE
REVISIONS
1-1-19
1-1-18
Replaced flagger with spotter.
Omitted lights in tangent.
END WORK ZONE
SPEED LIMIT

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 (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:

NORMAL POSTED SPEED

FORMULAS

45 mph (80 km/h) or more

L = (W)(S)

or less

W = Width of offset in feet (meters).

S = Normal posted speed in mph (km/h).

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

L = 0.65(W)(S)

S = Normal posted speed in km/h.

S = Normal posted speed in feet (meters).

S = Normal posted speed in mph (km/h).

S = Normal posted speed in mph (km/h).

FORMULAS

45 mph (80 km/h) or more

L = (W)(S)

or less

W = Width of offset in feet (meters).

S = Normal posted speed in mph (km/h).

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This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach on the lane adjacent to the shoulder, or on the shoulder within 24 (600) of the edge of pavement for daylight operation.

This Standard must always be used in combination with Standard 701400.

This Standard also applies when work is being performed in the left lane. Under these conditions, the set up would be a mirror image to what is shown.

All dimensions are in inches (millimeters) unless otherwise shown.
APPLICATION NO. 1

Application No. 1 depicts a modified entrance ramp. This method shall be utilized whenever existing entrance tapers cannot be retained due to the close proximity of the work zone. The entrance location may be shifted, with the approval of the Engineer, to perform work in the entrance area. Application No. 2 shall be put into effect as soon as possible.

APPLICATION NO. 2

Application No. 2 depicts a shortening of the normal entrance ramp. This method shall be used whenever the existing geometrics can be retained. Consideration should be given to the entering motorists’ line of sight, through, between, or over the delineation devices.

GENERAL NOTES

This Standard is used where, at any time any vehicle, 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.

Drums 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.
**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.
**SYMBOLS**

- **Arrow board**
- **Work area**
- **Sign**
- **Direction indicator barricade with steady burn monodirectional light**
- **Type II barricade with steady burn monodirectional light**
- **Drum with steady burn monodirectional light**
- **Vertical Panel**
- **Type III barricade with flashing lights**
- **Temporary concrete barrier**
- **Drum**

**GENERAL NOTES**

This Standard is used where at any time, any vehicle, equipment, workers or their activities require the closure of two adjacent lanes and a temporary crossover is provided by making use of one lane of pavement normally used by opposing flow of traffic and concrete barrier is used to separate the opposing traffic.

This Standard must always be used in combination with Standard 701400.

All barricades, drums, and vertical panels shall be at 50 ft. (15 m) centers.

Temporary concrete barrier shall be according to Standard 704001.

All dimensions are in inches (millimeters) unless otherwise shown.
This Standard is used where at any time, any vehicle, equipment, workers or their activities encroach on the lane adjacent to the shoulder, or on the shoulder within 24 (600) of the edge of pavement.

This Standard also applies when work is being performed in the left lane. Under these conditions, LEFT LANE CLOSED signs shall be substituted for RIGHT LANE CLOSED signs. On undivided highways, LEFT LANE CLOSED signs shall be substituted for LEFT LANE CLOSED signs. On undivided highways, LEFT LANE CLOSED signs shall be substituted for LEFT LANE CLOSED signs.

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

L = lane width X taper ratio

Normal Posted Speed | Taper Ratio
---------------------|----------
55 | 55/1
45 | 45/1

Undivided roadway only with left lane closure in opposite direction.

Omitted when median is less than 10' (3 m).

FLASHER signs shall be moved as necessary to maintain the required spacing between the sign and each separate work activity.

Three Type II barricades, drums, or vertical barricades at 25' (75 m) centers.
**NOTE**
When a shoulder does not exist or is narrow, use Detail B.

**DETAIL A**

- KEEP LEFT
- Arrow board
- Work area
- Truck with flashing amber light

**SYMBOLS**

- Arrow board
- Truck with flashing amber light
- Truck/Trailer mounted attenuator
- Flagger with traffic control sign
- Sign

**TYPICAL APPLICATIONS**

- Crack pouring
- Debris cleanup
- Roadometer measurements
- Weed spraying
- Pavement marking
- Utility work
- Landscaping work

**GENERAL NOTES**

This Standard is used where any vehicle, equipment, workers or their activities will require:

1) stationary operations up to 1 hour, or
2) a continuous or intermittent moving operation where the average speed of movement is greater than 1 mph (2 km/h).

This Standard is also applicable when work is being performed in the left lane(s) or on the median shoulder. Under these conditions, KEEP RIGHT signs shall be substituted for KEEP LEFT signs and arrow board indications shall be directed to the right.

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

**DATE**

| 2-3-17 | Revised "NOTE" on DETAIL A; to use DETAIL B in lieu |
| 4-1-16 | Added trailer option for attenuator symbol; Added note (8) Revised gen. notes |
NOTE
When a shoulder does not exist or is narrow, use Detail B.

DETAIL A

1. Flaggers are required when workers are on the pavement.
2. For striping operations only:
   See sign arrow detail on this standard.
3. 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.
4. 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
- Sign

DETAIL B

- For stationary operations which are on the pavement:
- See sign arrow detail on this standard.
- For striping operations only:
- Flaggers are required when workers are on the pavement.

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 (millimeter) unless otherwise shown.

DATE

REVISIONS

2-1-17 Revised NOTE on DETAIL A to use DETAIL B in lieu of DETAIL C
4-1-16 Rev. gen. notes. Added note 5. Rev. dist. between work and lead truck.

STANDARD 701427-05
CASE I
CASE I depicts the setup of delineating devices for a single outside lane closure. The single lane closure device setup as depicted in CASE I shall be performed prior to the setup for the second lane closure.

CASE II
CASE II depicts the setup of delineating devices for a two lane closure. The single lane closure 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
- Devices in lane closure taper
- Devices in tangent

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 (millimeter) unless otherwise shown.

DATE  REVISIONS
4-1-16  Added trailer option for attenuator symbol
2-1-14  New Standard

FREEWAY/EXPRESSWAY
TRAFFIC CONTROL SETUP AND REMOVAL
STANDARD 701428-01
The length of the tangent section shall be:

<table>
<thead>
<tr>
<th>Duration of Closure</th>
<th>Length of Tangent Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 14 Days</td>
<td>1000' (300 m)</td>
</tr>
<tr>
<td>≥ 14 Days</td>
<td>2000' (600 m)</td>
</tr>
</tbody>
</table>

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.
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

Drums at 25' (7.6 m) cts.
1:20 taper from edge of ramp to edge of work zone
500' (150 m)
500' (150 m)
1000' (460 m)

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

PASSED
ENGINEER OF SAFETY PROG. AND ENGINEERING

APPROVED
ENGINEER OF DESIGN AND ENVIRONMENT

DATE
1-1-18
1-1-17

REVISIONS
- Added flashing lights to Type III barricade
- Omitted lights on drums in tangent
- Added flashing lights to Type III barricade

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' (152 m) or 1 block.
4. Cones at 25' (8 m) centers for 250' (75 m) on approach. Additional cones may be placed at 30' (9 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

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:

SPEED LIMIT FORMULAS

<table>
<thead>
<tr>
<th>English (Metric)</th>
<th>L=WS²/60</th>
<th>L=(W)(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mph (70 km/h)</td>
<td>L=W²/60</td>
<td>L=0.45(W)(S)</td>
</tr>
<tr>
<td>45 mph (80 km/h)</td>
<td>or greater</td>
<td>or greater</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.

URBAN LANE CLOSURE, 2L, 2W, WITH BIDIRECTIONAL LEFT TURN LANE

STANDARD 701502-09

January 1, 2019

APPROVED

ENGINEER OF SAFETY PROG. AND ENGINEERING

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

(L)
**GENERAL NOTES**

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement during shoulder operations or where construction requires lane closures in urban areas.

Calculate $L$ as follows:

**FORMULAS**

\[
L = \frac{W S^2}{20} \quad \text{(Meters)}
\]

\[
L = \frac{W S^2}{120} \quad \text{(Feet)}
\]

\[
L = 0.65(W)(S)
\]

\[
L = 0.65(W)(S)
\]

where:

- $W$ = Width of offset in feet (meters).
- $S$ = Normal posted speed in mph (km/h).

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

**SIGN SPACING**

- **Table:*** Speed | Sign Spacing |
  | 40-45 | 500' (150 m) |
  | 50-45 | 350' (100 m) |
  | 60-65 | 200' (60 m) |

**REVISIONS**

1-1-14 Revised workers sign number to agree with current MUTCD.

1-1-13 Deleted text WORKERS & NS luxury project.

**STANDARD 701601-09**
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) or 1 block, repeat every 1 mile (1.6 km).
4. Cones at 25' (7.5 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.

SPEED LIMIT FORMULAS

FOR English

\[
L = \frac{W}{S^2} \\
L = \frac{W}{S^2}
\]

FOR Metric

\[
L = \frac{W}{S^2} \\
L = \frac{W}{S^2}
\]

where:
- \(W\) = Width of offset in feet (meters)
- \(S\) = Normal posted speed in mph (km/h)

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

GENERAL NOTES

This Standard is used where 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:

\[
L = 0.65(W)(S)
\]

where:
- \(W\) = Width of offset in feet (meters)
- \(S\) = Normal posted speed in mph (km/h)

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

STANDARD 701602-10
I
I
ROAD AHEAD
CONSTRUCTION
ROAD AHEAD
WORK
RIGHT LANE CLOSED
AHEAD
SIGN SPACING

Posted Speed

<table>
<thead>
<tr>
<th>english</th>
<th>(Metric)</th>
</tr>
</thead>
</table>

Formulas

\[ L = \frac{60}{W^2} \]  \[ L = \frac{150}{W^2} \]  \[ L = 0.65(W)(S) \]

Width of offset

Normal posted speed

\[ S = \text{Normal posted speed} \]

\[ W = \text{Width of offset} \]

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

**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:

\[ \text{SPEED LIMIT} \quad \text{FORMULAS} \quad \text{English} \quad \text{(Metric)} \]

40 mph (64 km/h)

\[ L = \frac{60}{W^2} \]

\[ L = \frac{150}{W^2} \]

45 mph (80 km/h) or greater:

\[ L = 0.65(W)(S) \]

\[ L = 0.655W(S) \]

\[ W = \text{Width of offset} \]

\[ S = \text{Normal posted speed} \]

\[ \text{mph (km/h)} \]

55

50-45

Arrows

| Cone, drum or barricade |
| Sign on portable or permanent support |
| Work area |
| Barricade or drum with flashing light |
| Flagger with traffic control sign |

\[ \text{Refer to SIGN SPACING TABLE for distances.} \]

\[ \text{Required for speeds} > 40 \text{ mph.} \]

\[ \text{Use flagger sign only when flagger is present.} \]

\[ \text{Cones at 25'} (8 \text{ m}) \text{ centers for} 250' (75 \text{ m}). \text{ Additional cones may be placed at} 50' (15 \text{ m}) \text{ centers. When drums or Type I or Type II barricades are used, the interval between devices may be doubled.} \]

\[ \text{Cones, drums or barricades at} 20' (6 \text{ m}) \text{ centers in taper.} \]


dates and revisions:

- 1-2-97: First printed version
- 1-1-15: Current version
### 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 more than one traffic lane in an Urban area.

Calculate $L$ as follows:

**FORMULAS**

<table>
<thead>
<tr>
<th>English (Metric)</th>
<th>Metric (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$40$ mph ($60$ km/h) or less:</td>
<td></td>
</tr>
<tr>
<td>$L = \frac{W(S)}{60}$</td>
<td></td>
</tr>
<tr>
<td>$L = \frac{W(S)}{100}$</td>
<td></td>
</tr>
<tr>
<td>$45$ mph ($70$ km/h) or greater:</td>
<td></td>
</tr>
<tr>
<td>$L = \frac{W(S)}{105}$</td>
<td></td>
</tr>
<tr>
<td>$L = \frac{W(S)}{150}$</td>
<td></td>
</tr>
</tbody>
</table>

where:
- $W$ = Width of offset (feet or meters)
- $S$ = Normal posted speed (mph or km/h)

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

### SIGN SPACING

<table>
<thead>
<tr>
<th>Posted Speed</th>
<th>Sign Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>$&lt;45$</td>
<td>$500'$ (150 m)</td>
</tr>
<tr>
<td>$45-55$</td>
<td>$350'$ (100 m)</td>
</tr>
<tr>
<td>$55-65$</td>
<td>$200'$ (60 m)</td>
</tr>
</tbody>
</table>

### SYMBOLS

- **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 lights**
- **Flagger with traffic control sign**

### TABLE for distances

<table>
<thead>
<tr>
<th>SPEED LIMIT</th>
<th>SIGN SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>$40$ mph ($60$ km/h)</td>
<td>$500'$ (150 m)</td>
</tr>
<tr>
<td>$45$ mph ($70$ km/h)</td>
<td>$350'$ (100 m)</td>
</tr>
<tr>
<td>$55$ mph ($80$ km/h)</td>
<td>$200'$ (60 m)</td>
</tr>
</tbody>
</table>

when:
- drums or 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).
GENERAL NOTES

This Standard is used wherever, 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.

This Standard must be used in conjunction with other Traffic Control & Protection Standards when roadway traffic is affected.

Type II barricades and R11-2-4830 signs shall be positioned as shown in "ROAD CLOSED TO ALL TRAFFIC" detail on Standard 701901.

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

DATE: 4-1-16

REVISIONS

- 4-1-16: Omited orange safety fence. Front Standard as this is.
- 1-1-12: Added SIDEWALK DIVERSION.
- Modified appearance of plan views. Renamed Std.

STANDARD 701801-06

SIDEWALK, CORNER OR CROSSWALK CLOSURE

(Sheet 1 of 2)
### 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.

### Warning Light (if required)

- Edge of pavement
- Metal or wood post
- Embedment

** 5' (1.5 m) min. embedment

### Signs on Temporary Supports

** When work operations exceed four days, this dimension shall be 5' (1.5 m). If located behind other devices, the height shall be sufficient to be seen completely above the devices.

### High Level Warning Device

- Elevation of edge of pavement
- Elevation of edge of pavement

### Work Limit Signing

- SPEED LIMIT
- END WORK ZONE
- PHOTO ENFORCED
- XXXX FINE MINIMUM

This sign shall be used when the above sign assembly is used.

### Highway Construction Speed Zone Signs

- END WORK ZONE
- SPEED LIMIT

This sign shall only be used along roadways under the jurisdiction of the State.

### Traffic Control Devices

- STANDARD 701901-08

---

** Illinois Department of Transportation

January 1, 2019

APPROVED

January 1, 2019

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-13

ENGINEER OF SAFETY PROGRAM AND ENGINEERING

APPROVED
**ROAD CLOSED**

**SECTION A A**

**TEMPORARY RUMBLE STRIPS**

**TYPICAL APPLICATIONS OF TYPE III BARRICADES CLOSING A ROAD**

Reflectors and striping may be omitted on the back side of the barricades.

If a Type III barricade with an attached sign panel which meets NCHRP 350 is not available, the signs may be mounted on an NCHRP 350 temporary sign supports directly in front of the barricade.

Reflectors and 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 signs may be mounted on NCHRP 350 temporary sign supports directly in front of the barricade.

**TYPICAL INSTALLATION**

**TRAFFIC CONTROL DEVICES**

IN THE LEASE

ILLINOIS DEPARTMENT OF TRANSPORTATION

APPROVED

JANUARY 1, 2019

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

JANUARY 1, 2019

ENGINEER OF SAFETY PROG. AND ENGINEERING

APPROVED 1-1-13

STANDARD 701901-08
**MOUNTING DETAILS**

**SECTION MODULI (minimum)**

<table>
<thead>
<tr>
<th>Material</th>
<th>Axis A (in.³)</th>
<th>Axis B (mm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>0.050 in.³ (819 mm³)</td>
<td>0.105 in.³ (1720 mm³)</td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.150 in.³ (2456 mm³)</td>
<td>0.315 in.³ (5162 mm³)</td>
</tr>
</tbody>
</table>

**WOOD OR TELESCOPING STEEL POSTS**

**LIGHT OR SIGNAL STANDARDS**

**BREAKAWAY STEEL TUBING POSTS**

(All sign panel sizes)

**SUPPORTING CHANNEL DETAILS**

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

**DATE**

**REVISIONS**

1-1-09 Switched units to English metrics.

1-1-97 Renumbered Standard 2319-B.
TYPICAL INSTALLATIONS

Signs in any area shall be erected to a uniform height above the edge of the pavement.

* In any area where parking is likely to occur or where there are obstructions to view or where signs are located over sidewalks, the height shall be at least 7' (2.1 m).

URBAN LOCATIONS

POST SPACING FOR NON-FREEWAY SIGN PANELS

GROUND MOUNT SIGN POSITIONING

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

Dimensions shown for cross sections are minimum.

- All holes are $\frac{5}{32}$ in. ($0.16$ mm).
- $S_{x-x}$ is the minimum section modulus about the $x-x$ axis of the post as shown. For posts in which holes are punched or drilled for more than half their length, $S_{x-x}$ shall be computed for the net section.
- All dimensions are in inches (millimeters) unless otherwise shown.

<table>
<thead>
<tr>
<th></th>
<th>a (in)</th>
<th>b (in)</th>
<th>c (in)</th>
<th>$S_{x-x}$ (in.³)</th>
<th>$S_{x-x}$ (mm³)</th>
<th>Steel (lbs./ft.)</th>
<th>Steel (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td>$\frac{3}{32}$</td>
<td>$\frac{3}{32}$</td>
<td>$\frac{1}{4}$</td>
<td>3.405</td>
<td>10.99</td>
<td>3.08</td>
<td>0.88</td>
</tr>
<tr>
<td>Aluminum</td>
<td>$\frac{3}{32}$</td>
<td>$\frac{3}{32}$</td>
<td>$\frac{1}{4}$</td>
<td>3.405</td>
<td>10.99</td>
<td>3.08</td>
<td>0.88</td>
</tr>
<tr>
<td>Type B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td>$\frac{1}{4}$</td>
<td>$\frac{1}{4}$</td>
<td>$\frac{3}{4}$</td>
<td>6.381</td>
<td>168.1</td>
<td>3.08</td>
<td>0.88</td>
</tr>
<tr>
<td>Aluminum</td>
<td>$\frac{1}{4}$</td>
<td>$\frac{1}{4}$</td>
<td>$\frac{3}{4}$</td>
<td>6.381</td>
<td>168.1</td>
<td>3.08</td>
<td>0.88</td>
</tr>
</tbody>
</table>

**METAL POSTS FOR SIGNS, MARKERS & DELINEATORS**

**STANDARD 720011-01**

**ENGINEER OF POLICY AND PROCEDURES**

**APPROVED**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED**

**REVISIONS**


1-1-99 Switched units to English (metric).

Illinois Department of Transportation

[Diagram of TYPE A, TYPE B, and TYPE C posts with dimensions and notes]
TYPICAL SIGN STYLES

<table>
<thead>
<tr>
<th>SIGN STYLE</th>
<th>DIMENSIONS</th>
<th>LETTER SIZE UC/LC PRIMARY</th>
<th>BORDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>a,b,c</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 (300)</td>
<td>16 (40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 (400)</td>
<td>16 (40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 (400)</td>
<td>16 (40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 (500)</td>
<td>16 (40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c,e</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 (400)</td>
<td>16 (40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 (550)</td>
<td>16 (40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38 (600)</td>
<td>16 (40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42 (700)</td>
<td>16 (40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>r</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Var</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 (400)</td>
<td>16 (40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 (550)</td>
<td>16 (40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42 (700)</td>
<td>16 (40)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Supplemental Messages

GENERAL NOTES

All signs shall have a white reflectorized legend and border on a green reflectorized background. The sign panels shall be mounted as shown on Standard 720016-04 as specified in the plans. All dimensions are in inches (millimeters) unless otherwise shown.

MAST ARM MOUNTED STREET NAME SIGNS

STANDARD 720016-04
(Provide two post clips top and bottom. Alternate at interior panel joints on ground-mounted signs, and provide two clips at all panel joints on overhead mounted signs.)

SIGN MOLDING

Color shall match sign facematerial. To be riveted to sign panel at 24 (600) O.C.)

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

STANDARD 720021-02
EXTRUDED ALUMINUM TYPE

DATE
1-1-09
REVISIONS
Adlets aluminum clip
Switched units to English (metric)
Revised stainless steel clip design, and minor changes.

Sheet 1 of 2

ILLINOIS DEPARTMENT OF TRANSPORTATION

APPROVED
January 1, 2009

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
1-1-00

ENGINEER OF OPERATIONS
PASSED
DATE
REVISIONS
1-1-09
1-1-03

MINOR CHANGES
**Case I**

- Parallel to road
- Alternating black and yellow stripes.

**Case II**

- Alternating black and yellow stripes.

**Sheeting Position: 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>

**Terminal Marker Details**

- Color: Black / Yellow reflectorized
- Object marker details
  - The width and height (a, b) of the terminal marker shall be within approximately 1/2 (25) of the outer edge of the terminal end.

**General Notes**

See detail on Standard 729001 for mounting markers to posts.

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

**Approved and Issued**

January 1, 2017

**Engineer of Design and Environment**

1-1-2016

**Engineer of Operations**

1-1-2016

**Revisions**

1-1-17: Revised minimum reflective area requirement for terminal marker.

4-1-16: Reclassified standard from 635006.

**Object and Terminal Markers**

**Standard 725001-01**
All bolts 1/4 (M10) hex head zinc or cadmium plated.

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

GENERAL NOTES
For diamond shaped sign with side S as shown, use required post size for a sign with W = 0.7S and D = 1.4S.

For a sign with W = 0.7S and D = 1.4S, required post size for a sign with W = 0.7S and D = 1.4S.

NOTE: Minimum of 2 bolts per post required.

GEOGRAPHICAL NOTES

LOADING: For 60 mph (95 km/h) wind velocity with 30% gust factor, normal to sign.

SOIL PRESSURE: Minimum allowable soil pressure 2.25 tsf (120 kPa).

See Standard 720011 for details of Types A and B posts.

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

APPLICATIONS OF TYPES A & B METAL POSTS
(FOR SIGNS & MARKERS)

STANDARD 729001-01
Washers shall be used to level the base when necessary.

### POST ASSEMBLY DETAIL

- 3/8" (M10) Galvanized carriage bolt
- Lock washer

### ANCHOR BOLT DETAIL

- 1/2 (18) Hole, 3 places

### PLAN

- Letters I, D, and H are 2 (50) series D raised

### SECTION A-A

- Letters I, D, and H are 2 (50) series D raised

All dimensions are in inches (millimeters) unless otherwise shown.
LAKES DEPARTMENT OF TRANSPORTATION

APPROVED: January 1, 2015

DATE

REVISIONS

TYPICAL PAVEMENT MARKINGS

STANDARD 780001-05

(Sheet 1 of 3)
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.

LETER AND ARROW GRID SCALE

<table>
<thead>
<tr>
<th>Legend Height</th>
<th>Arrow Size</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>6’ (1.8 m)</td>
<td>Small</td>
<td>2.9 (74)</td>
</tr>
<tr>
<td>8’ (2.4 m)</td>
<td>Large</td>
<td>3.8 (96)</td>
</tr>
</tbody>
</table>
TYPICAL PAVEMENT MARKINGS

(1.2 m)
4 -
10
(3 m)

(1.75 m)
8
6'

(6 m)
20'
50'
(15 m)

Large size: rural
Small size: urban

(2.7 m)
24
(2.4 m)
9'

(914)
36

(1.0 m)
3'-4"
6'-0"

20°

(1.8 m)
6'-0"
3'-4"

30

(1.8 m)
6'-0"
3'-4"
10'-0"

8'-0"

18'-0"

3'-5"

5'-9"

8'-0"

15'-6"

15'-6"

30

10'-0"

10'-0"

8'

6'

(3 m)

(2.4 m)

(0.8 m)

(0.8 m)

(1.8 m)

(1.0 m)

RIGHT LANE-REDUCTION ARROW
Right lane-reduction arrow shown.
Use mirror image for left lane.

WORD AND ARROW LAYOUT

Wrong Way Arrow

International Symbol of Accessibility

Shared Lane Symbol

Bike Symbol

(Arrow is optional)

Illinois Department of Transportation
January 1, 2015
PASSED

ENGINEER OF OPERATIONS

Sheet 3 of 3
TWO-LANE / TWO-WAY

Reduce to 40’ (12.2 m) o.c. on curves with posted or advisory speeds of 45 mph (70 km/h) or less.

MULTI-LANE UNDIVIDED

** See MULTI LANE DIVIDED detail for lane marker notes.

MULTI-LANE DIVIDED

* Reduce to 40’ (12.2 m) o.c. on curves where advisory speeds are 30 mph (48 km/h) lower than posted speeds.

** Where double lane line markers are specified, they shall be spaced as shown.

LANE REDUCTION TRANSITION

FREEWAY EXIT RAMP

SYMBOLES

- Yellow stripe
- White stripe
- One-way amber marker
- One-way crystal marker
- Two-way amber marker

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

TYPICAL APPLICATIONS

RAISED REFLECTIVE

PAVEMENT MARKERS

STANDARD 781001-04
Reflectors at 20' (6.1 m) centers

Reflectors at 10' (3.0 m) centers

Reflectors at 40' (12.2 m) centers

MEDIAN ISLAND

Face of curb

Direction of traffic flow

Curb reflector, typical for median islands.

Amber curb reflector, typical for median islands.

Curb reflector, typical for corner islands.

CRYSTAL CURB REFLECTOR

SECTION A-A

(Similar for corner islands.)

Curb reflector

Face of curb

Curb

MEDIAN ISLAND

GENERAL NOTES

Curb reflectors shall be monodirectional and oriented with the reflective face toward approaching traffic.

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

DATE
REVISIONS
6-1-16 Revised title and removed work sampling
1-1-12 New standard

CURB REFLECTORS

STANDARD 782001-01
REFLECTOR TYPE A
(mono-directional shown)

Metal rivet

REFLECTOR TYPE B
(bi-directional shown)

Adhesive weep slots or holes equally spaced on both sides

Brass or plastic rivet

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

DATE REVISIONS
1-1-20 Revised from F-shape to constant slope parapet, revised note 3 on sh. 3, and fixed typo.
4-1-16 Added reflector spacing
detail: Moved TERMINAL
MARKER to std. 725001.

GUARDRAIL AND BARRIER WALL REFLECTOR MOUNTING DETAILS

STANDARD 782006-01

Illinois Department of Transportation
2020
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
2020
PASSED
January 1, 2020

REFLECTOR TYPE A
(mono-directional shown)

Metal rivet

REFLECTOR TYPE B
(bi-directional shown)

Adhesive weep slots or holes equally spaced on both sides

Brass or plastic rivet

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

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GUARDRAIL AND BARRIER WALL REFLECTOR MOUNTING DETAILS

STANDARD 782006-01

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

REFLECTOR TYPE A
(mono-directional shown)

Metal rivet

REFLECTOR TYPE B
(bi-directional shown)

Adhesive weep slots or holes equally spaced on both sides

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GUARDRAIL AND BARRIER WALL REFLECTOR MOUNTING DETAILS

STANDARD 782006-01

Illinois Department of Transportation
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ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
2020
PASSED
January 1, 2020

REFLECTOR TYPE A
(mono-directional shown)

Metal rivet

REFLECTOR TYPE B
(bi-directional shown)

Adhesive weep slots or holes equally spaced on both sides

Brass or plastic rivet

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

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detail: Moved TERMINAL
MARKER to std. 725001.

GUARDRAIL AND BARRIER WALL REFLECTOR MOUNTING DETAILS

STANDARD 782006-01

Illinois Department of Transportation
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ENGINEER OF DESIGN AND ENVIRONMENT
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2020
PASSED
January 1, 2020

REFLECTOR TYPE A
(mono-directional shown)

Metal rivet

REFLECTOR TYPE B
(bi-directional shown)

Adhesive weep slots or holes equally spaced on both sides

Brass or plastic rivet

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

DATE REVISIONS
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detail: Moved TERMINAL
MARKER to std. 725001.

GUARDRAIL AND BARRIER WALL REFLECTOR MOUNTING DETAILS

STANDARD 782006-01

Illinois Department of Transportation
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ENGINEER OF DESIGN AND ENVIRONMENT
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2020
PASSED
January 1, 2020

REFLECTOR TYPE A
(mono-directional shown)

Metal rivet

REFLECTOR TYPE B
(bi-directional shown)

Adhesive weep slots or holes equally spaced on both sides

Brass or plastic rivet

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

DATE REVISIONS
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detail: Moved TERMINAL
MARKER to std. 725001.

GUARDRAIL AND BARRIER WALL REFLECTOR MOUNTING DETAILS

STANDARD 782006-01

Illinois Department of Transportation
2020
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
2020
PASSED
January 1, 2020

REFLECTOR TYPE A
(mono-directional shown)

Metal rivet

REFLECTOR TYPE B
(bi-directional shown)

Adhesive weep slots or holes equally spaced on both sides

Brass or plastic rivet

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

DATE REVISIONS
1-1-20 Revised from F-shape to constant slope parapet, revised note 3 on sh. 3, and fixed typo.
4-1-16 Added reflector spacing
detail: Moved TERMINAL
MARKER to std. 725001.

GUARDRAIL AND BARRIER WALL REFLECTOR MOUNTING DETAILS

STANDARD 782006-01

Illinois Department of Transportation
2020
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
2020
PASSED
January 1, 2020

REFLECTOR TYPE A
(mono-directional shown)

Metal rivet

REFLECTOR TYPE B
(bi-directional shown)

Adhesive weep slots or holes equally spaced on both sides

Brass or plastic rivet

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

DATE REVISIONS
1-1-20 Revised from F-shape to constant slope parapet, revised note 3 on sh. 3, and fixed typo.
4-1-16 Added reflector spacing
detail: Moved TERMINAL
MARKER to std. 725001.

GUARDRAIL AND BARRIER WALL REFLECTOR MOUNTING DETAILS

STANDARD 782006-01

Illinois Department of Transportation
2020
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
2020
PASSED
January 1, 2020

REFLECTOR TYPE A
(mono-directional shown)

Metal rivet

REFLECTOR TYPE B
(bi-directional shown)

Adhesive weep slots or holes equally spaced on both sides

Brass or plastic rivet

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

DATE REVISIONS
1-1-20 Revised from F-shape to constant slope parapet, revised note 3 on sh. 3, and fixed typo.
4-1-16 Added reflector spacing
detail: Moved TERMINAL
MARKER to std. 725001.

GUARDRAIL AND BARRIER WALL REFLECTOR MOUNTING DETAILS

STANDARD 782006-01

Illinois Department of Transportation
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REFLECTOR TYPE A
(mono-directional shown)

Metal rivet

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1-1-20 Revised from F-shape to constant slope parapet, revised note 3 on sh. 3, and fixed typo.
4-1-16 Added reflector spacing
detail: Moved TERMINAL
MARKER to std. 725001.
REFLECTOR TYPE C

Reflective area. May be rectangular or slight trapezoidal.

3 min. at base

Minimum total area of base 7.0 sq. in. (45,36 mm²)

2 min. adhesive weep holes or slots each side, variable spacing.

Variable spacing.

Cross section may be "T" or "L" 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

GUARDRAIL AND BARRIER WALL REFLECTOR MOUNTING DETAILS

STANDARD 782006-01
Spacing 80 ft. (24 m) max. for first 400 ft. (122 m) or curve spacing shown in Standard 635001, whichever is less (min. 4 reflectors regardless of length).

After 400 ft. (122 m), transition to normal delineator spacing shown in Standard 635001, and continue as required.

Where the shoulder width is reduced to less than 24 (610), use bidirectional crystal/crystal in lieu of monodirectional crystal.
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 1/2 (13) 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.

ALTERNATE INSTALLATION
(Installation when weatherproof box cannot be installed facing the adjacent property line.)

All dimensions are in inches (millimeters) unless otherwise shown.
**INTEGRAL/SEMI-INTEGRAL ABUTMENT WITH PARAPET ON APPROACH PAVEMENT**

Conduit: steel conduit.

- 2 (50) stainless steel conduit.

Stainless steel junction box

12 x 12 x 6 (300 x 300 x 150) min.

Parapet on approach pavement

Parapet on bridge

Wingwall

**JOINTED ABUTMENT WITH PARAPET ON APPROACH PAVEMENT**

Stainless steel junction box

12 x 12 x 6 (300 x 300 x 150) min.

Parapet on approach pavement

Parapet on bridge

Wingwall

**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.
ILINOIS DEPARTMENT OF TRANSPORTATION

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-15

STANDARD 812001-01

2020

ELECTRICAL AND MECHANICAL UNIT CHIEF

INTEGRAL/SEMI-INTEGRAL ABUTMENT WITH
PARAPET ENDING ON BRIDGE DECK

RACEWAYS EMBEDDED IN STRUCTURE
**Jointed Abutment with Parapet Ending on Bridge Deck**

**Raceways Embedded in Structure**

**Plan**
- Jointed expansion joint
- 2 (50) PVC conduit embedded in structure
- Stainless steel conduit junction box 12 x 12 x 6 (300 x 300 x 150) min.
- 2 (50) liquidtight flexible nonmetallic conduit, 6' (1.83 m) max. length

**Elevation**
- Stainless steel conduit with bushing
- 10' x 2 (3 m x 50)
- Parapet wall on bridge deck
- 2 (50) PVC conduit embedded in structure
- Expansion joint
- Stainless steel conduit junction box 12 x 12 x 6 (300 x 300 x 150) min.
- 2 (50) liquidtight flexible nonmetallic conduit, 6' (1.83 m) max. length

**View B-B**
- Stainless steel conduit
- 10' x 2 (3 m x 50) stainless steel conduit with bushing
- Parapet wall on bridge deck
- 2 (50) PVC conduit embedded in structure
Bridge deck

Beam (steel shown)

Underpass luminaire mounted to pier or abutment wall.

Luminaire numbering decal bracket.

Concrete abutment.

Edge of roadway.

Shoulder.

SECTION A-A

CENTER PIER DETAIL

ELEVATION

TOP VIEW

LUMINARE NUMBERING DECAL
BRACKET MOUNTING DETAIL

PIER / ABUTMENT WALL ELEVATION

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

2016

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

DATE

REVISIONS

STANDARD 821001
Underpass luminaires shall be centered between beams unless otherwise directed by the Engineer.

Optics of underpass luminaires shall be installed 1 (25) above the bottom of the beams with no parts of the luminaire or attached conduit below the beams.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaires shown routed from underguard. Branch circuits may also be routed from bridge parapet above.

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

Any voids in the foundation shall be filled with fire aggregate.

See Standard 836001 for Light Pole Foundation and ground rod.

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

**ELEVATION AT POLE BASE WITH METAL FOUNDATION**

(Rodent screen not shown)

**LUMINAIRE WIRING IN POLE**

STANDARD 821101-02
**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.

- **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 clamps at 5' (1.5 m) intervals.**
- **Meter (when required).**
- **Conduit hub.**
- **Service disconnect switch.**
- **Rigid steel conduit elbow.**
- **No. 6 bare copper wire.**
- **Neutral bar.**
- **Branch lighting circuits.**

**Control Schematic**

- **Controller enclosure; minimum dimensions: 18H x 12W x 8D (450 x 300 x 200).**
- **Service conductors.**
- **Insulated mounting board.**
- **Branch lighting circuits.**

**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.

**Lighting Controller**

**Pole Mounted, 240V**

**STANDARD 825001-04**

**DATE**  | **REVISIONS**
---|---
1-1-19 | Replace **note with new note regarding consulting utility company standards for installation.**
4-1-16 | Corrected connection at terminal block.
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.

Controller enclosure.

- Malleable iron conduit cans, at 5' (1.5 m) intervals.
- 2v (7.5 ml Wood service pole.
- 3 No. 6 XLP cables in 1 (25) rigid steel conduit.
- Insulating mounting board.
- Service conductors.
- #6 Wire.
- Equipment grounding bar.
- Neutral bar.
- Branch lighting circuits in unit duct(s).

Ground line.

- No. 6 bare copper wire.
- Ground rod.
- Controller enclosure.
- Ventilator
- Conduit hub.
- Motor (when required). **
- Service disconnect switch.
- Rigid steel conduit elbow.
- Rigid steel conduit.
- Unchannel or mounting bracket, two required.

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.

Lighting Controller

Pole Mounted, 480V

Date

1-1-19

Revisions

1-1-19

1-1-15 Added note 2

1-1-19 Replaced ** note with new note regarding utility company standards. Made *** the ** note.

Electric Service Installation

Front

Side

Control Schematic
**ELECTRIC SERVICE INSTALLATION**

- **Typical overhead service shown.** Cut pole off for underground service and treat cut surface with preservative. Conduit 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.

**SERVICE POLE**
- 3-wire, overhead, 240/480 V, 1-phase, Weatherhead.
- Malleable iron conduit clamps at 5' (1.5 m) intervals.
- Meter (when required).
- Conduit hub.
- Service disconnect switch.

**FEEDER CONDUCTORS**
- Service conductors in rigid steel conduit, sized as required.
- Service conductors in rigid steel conduit, sized as required.
- Malleable iron conduit clamps at 5' (1.5 m) intervals.
- Conduit hub.
- Service disconnect switch.

**GROUND LINE**
- Ground rod in ground bar.
- Equipment grounding circuits.
- Ground line.

**LIGHTING CONTROLLER**
- Photocell with integral surge arrester.
- HAND-OFF-AUTO selector switch.
- 100 amp, electrically held contactor.
- 35 amp, 1-pole circuit breaker.
- 20 amp, 2-pole circuit breaker (two spares required but not shown).
- Surge arrester.
- GFCI duplex receptacle.
- Single-pole, single-throw switch.

**LIGHTING CONTROLLER ENCLOSURE**
- Controller enclosure, minimum dimensions: 30" x 22" x 4' (760 x 558 x 122).
- Insulated mounting board.

**FOUNDATION (PLAN)**

**ANCHOR ROD DETAIL**
- Pedestal base.
- 5' (1.5 m) Chamber.
- Ground line.

**CONTROL SCHEMATIC**
- 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.
- Transformer - 1KVA*, 480V primary, 120/240V secondary, single-phase, 60Hz.
- 15 amp, 2-pole circuit breaker.
- 60 amp*, 2-pole circuit breaker.
- Terminal block sized for conductors as shown on plans.

**DIMENSIONS**
- All dimensions in inches (millimeters) unless otherwise shown.
LIGHTING SERVICE.

3-wire, overhead 120/240 V, 1-phase, Weatherhead anchor, as needed.

Downguy and cover overhang in underside of Slotted ventilator service pole.

25' (7.5 m) Wood as required.

Conduit, sized in rigid steel Service conductors

Switch.

Feeder conductors, sized as required.

Ground line.

Neutral bar.

Equipment ground bar.

Branch lighting circuits.

Foundation:

Minimum dimensions: 1270 x 915 x 430

Controller enclosure, maximum dimensions: 504 x 360 x 170 - (1270 x 915 x 430)

Neutral bar.

Equipment ground bar.

Branch lighting circuits.

Controller enclosure, maximum dimensions: 504 x 360 x 170 - (1270 x 915 x 430)

Neutral bar.

Equipment ground bar.

Branch lighting circuits.
**Lighting Service**

3-wire, overhead 240/480 V, 1-phase, Weatherhead.

As needed.

Anchor, as Downguy and cover overhang.

In underside of Slotted ventilator service pole. *

25' (7.5 m) Wood conduit, sized as required.

In rigid steel Malleable iron conduit required. **

Meter (when needed). *

Conduit hub.

To service pole.

Ground line.

Feeder conductors sized as required.

In rigid conduit to Feeder conductors, sized as required.

Neutral line.

Cable (125) Sch. 40 PVC conduit.

Concrete foundation.

No. 6 bare copper wire.

Ground rod.

Service disconnect switch.

Controller enclosure, minimum dimensions. 50H x 26W x 17D (1270 x 635 x 430). *

Additional wiring window as needed.

Service conductors.

Ground line.

Additional wiring window as needed.

Controller enclosure, Engraved name plate.

12 x 9 x 1 (305 x 229 x 25) watertight sleeve mounted inside door with as built drawings and schematics.

Engraved name plate.

Photocell with integral surge arrester.

Hang OFF-AUTO selector switch.

100 amp*, 3-wire, 100 amp*, fused at 100 amp*.

15 amp, 1-pole circuit breaker.

20 amp*, 2-pole circuit breaker (two spares required but not shown).

Surge arrester.

GFCI duplex receptacle.

Single-pole, single-throw switch.

Incandescent luminaire, enclosed and gasketted with 100 watt lamp.

Service disconnect switch - 2-pole, 3-wire, 100 amp*, fused at 100 amp*, solid neutral in NEMA 4X enclosure having lockable external handle.

Transformer - 1KVA*, 480V primary, 120/240V secondary, single-phase, 60Hz.

15 amp, 2-pole circuit breaker.

100 amp*, 2-pole circuit breaker.

Terminal block sized for conductors as shown on plans.

* Size larger as needed.

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

- **Size larger as needed.
- Overall meeting company standards for exact requirements.
- Size larger as needed.
- When cold sequencing is required, provide a meter disconnect switch as directed by Utility Company.
- Made *** the ** note.
- Replaced ** note with new note **.
- Directed by Utility Company.
Lighting

Service.

3-wire, overhead 120/240 V, 1-phase, Weatherhead needed. Anchor, as Downguy and needed.

Slotted ventilator in underside of cover overhang.

In underside of Slotted ventilator.

Concrete foundation.

To service pole.

To service pole.

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.

\( \frac{3}{8} \) (13) Sch. 40 PVC conduit.

Ground line.

Ground rod.

No. 6 bare copper wire.

Feeder conductors in rigid conduit to lighting controller.

**Size larger as needed.**

*Size larger as needed.*

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

Engraved name plate.

Controller enclosure.

\( \frac{3}{8} \) (18) dia anchor rod.

1 (15) 45° Chamfer.

Ground line.

Additional wiring window as needed.

5 (125) Sch. 40 PVC wiring window.

LIGHTING CONTROLLER

FOUNDATION (PLAN)

(Work pad not shown.)

* Size larger as needed.

NAVIGATION OBSTRUCTION

LIGHTING CONTROLLER, 240V

DRAWN: 1-1-15

ISSUED: 1-1-16

DATE

REVISIONS

1-1-19 Replaced ** note with new note regarding consulting utility company standards for installation.

1-1-15 Added note **.
240/480 V, 3-phase, 3-wire, overhead service.

Service conductors in rigid steel conduit, sized as required.

Steel conduit, sized in rigid steel conduit, sized as required.

Service disconnect switch.

Concrete foundation.

Controller anchor rod.

Controller enclosure.

Additional wiring window as needed.

5 (125) Sch. 40 PVC conduit.

Concrete pole. To service pole.

Additional note 18.


directly by Utility Company.

Table 1 of 2)
Controller enclosure, minimum dimensions: 59H x 44W x 26D (1500 x 1120 x 660)

Printed on 100% recycled paper.

NAVIGATION OBSTRUCTION
LIGHTING CONTROLLER, 480V

STANDARD 826006-02

ILLINOIS DEPARTMENT OF TRANSPORTATION

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-12

PASSED ELECTRICAL AND MECHANICAL UNIT CHIEF

January 1, 2019
APPROVED
**MOUNTING HEIGHT** | **MINIMUM SHAFT DIAMETER** | **MINIMUM WALL THICKNESS**
--- | --- | ---
35" (1077 mm) or less | 8 tapered to 4½" (200 to 114) | 0.25 (6)
Greater than 35" (900 mm) to 4½" (114 mm) | 10 tapered to 6" (250 to 150) | 0.25 (6)
Greater than 4½" (114 mm) to 5½" (140 mm) | 12 tapered to 6" (250 to 150) | 0.312 (8)

**POLE BASE**

<table>
<thead>
<tr>
<th>MOUNTING HEIGHT</th>
<th>BOLT CIRCLE DIAMETER</th>
</tr>
</thead>
</table>
35" (900 mm) or less | 1½" (38)
Greater than 35" (900 mm) to 5½" (140 mm) | 2½" (64)

**GENERAL NOTES**

See Standard 830001-03 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole identification banding to pole.

Voids in light pole base shall be sealed to prevent rodent entry.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with 6 stainless steel washers.

All dimensions are in inches (millimeters) unless otherwise stated.
Handhole and cover. See orientation detail.

SECTION A-A

Handhole detail.

Handhole and cover. See orientation detail.

ELEVATION AT CONCRETE FOUNDATION, METAL FOUNDATION OR RETAINING WALL

ELEVATION AT BRIDGE PARAPET

POLE BASE DETAILS

HANDHOLE / IDENTIFICATION ORIENTATION DETAIL

HANDHOLE DETAIL

STANDARD 830001-03

LIGHT POLE ALUMINUM MAST ARM

Illinois Department of Transportation
APPROVED
2015
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED 1-1-12

January 1, 2015

January 1, 2015

ENGINEER OF PRELIMINARY ENGINEERING
**DAVIT LIGHT POLE**

(Single or twin mount)

- Unless directed otherwise by the Engineer.

**TENON DETAIL**

- Slip joint.
- Flat washer and lock washer.
- Light pole shaft.
- Pole identification banded to pole. See orientation detail.
- See pole base and handrail detail.

**SECTION A-A**

- Davit arm length
- 15'-0" (4.57 m) max. for single
- 12'-0" (3.66 m) max. for double.
- Davit arm. Minimum wall thickness 0.188 (4.8).

**SECTION B-B**

- Davit arm. Minimum wall thickness 0.188 (4.8).
- See tenon detail.

**Pole Base**

<table>
<thead>
<tr>
<th>Mounting Height</th>
<th>Bolt Circle Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>35' (10.7 m) or less</td>
<td>115 (290)</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>15 (380)</td>
</tr>
</tbody>
</table>

**Pole Lower Shaft**

<table>
<thead>
<tr>
<th>Mounting Height</th>
<th>Lower Shaft Length</th>
<th>Minimum Shaft Diameter</th>
<th>Minimum Wall Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>30' (9.1 m)</td>
<td>24'-0&quot; (7.2 m)</td>
<td>8 tapered to 6 (206 to 150)</td>
<td>0.25 (6)</td>
</tr>
<tr>
<td>35' (10.7 m)</td>
<td>28'-0&quot; (8.53 m)</td>
<td>8 tapered to 6 (206 to 150)</td>
<td>0.25 (6)</td>
</tr>
<tr>
<td>40' (12.2 m)</td>
<td>32'-0&quot; (9.75 m)</td>
<td>10 tapered to 6 (250 to 150)</td>
<td>0.25 (6)</td>
</tr>
<tr>
<td>45' (13.7 m)</td>
<td>36'-0&quot; (10.97 m)</td>
<td>10 tapered to 6 (250 to 150)</td>
<td>0.25 (6)</td>
</tr>
<tr>
<td>50' (15.2 m)</td>
<td>40'-0&quot; (12.19 m)</td>
<td>10 tapered to 6 (250 to 150)</td>
<td>0.312 (8)</td>
</tr>
</tbody>
</table>

**General Notes**

- Lower shaft length shall be from the bottom of the pole base to the bottom of the slip joint.
- 5" max. for unloaded pole, 1.5" max. for loaded pole.

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

- See Standard 720001 for pole identification banding to pole.

- 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.

- Provide breakaway devices where required.

- Voids in light pole base shall be sealed to prevent rodent entry.

- Illawara Department of Transportation

- DATE: 1-1-12
- REVISIONS: Added notes 3 and 4.
MAST ARM
LIGHT POLE
(Single or twin mount)
* Unless directed otherwise by the Engineer.

Pole cap secured to pole with three 5/8 (6) set screws.

Clamp type bracket with hex head bolts and hardware (typ.).

Pole identification banded to pole. See orientation detail.

See pole base and handhole detail.

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.

DATE
1-1-19
REVISIONS
1-1-19 Revised POLE and BASE POLE tables
1-1-34 Added pole mounted on bridge parapet. Modified attachment of screen.

STANDARD 830011-03
**Davit Arm Length**

- 15'-0" (4.57 m) max. for single
- 12'-0" (3.66 m) max. for double.

**Slip Joint**

- 3'-9" (1.14 m) R.
- 8 Taper to 2 thickness 0.149 (3.8).

**Davit Arm**

- Minimum wall thickness 0.149 (3.8).

**General Notes**

- Lower shaft length shall be from the bottom of the pole base to the bottom of the slip joint.
- 3° max. for unloaded pole, 1.5° max. for loaded pole.

*Unless directed otherwise by the Engineer.*

---

**TABLE 1**

<table>
<thead>
<tr>
<th>MOUNTING HEIGHT</th>
<th>BOLT CIRCLE DIAMETER</th>
<th>BASE PLATE THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-9&quot; (1.14 m)</td>
<td>115&quot; (290)</td>
<td>5&quot; (25)</td>
</tr>
<tr>
<td>Greater than 3'-9&quot; (1.14 m)</td>
<td>15&quot; (380)</td>
<td>10&quot; (32)</td>
</tr>
</tbody>
</table>

**Table 2**

<table>
<thead>
<tr>
<th>MOUNTING HEIGHT</th>
<th>LOWER SHAFT DIAMETER</th>
<th>MINIMUM SHAFT DIAMETER</th>
<th>MINIMUM WALL THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-9&quot; (1.14 m)</td>
<td>21'-1&quot; (6.4 m)</td>
<td>8 tapered to 6</td>
<td>10 gauge</td>
</tr>
<tr>
<td>Greater than 3'-9&quot; (1.14 m)</td>
<td>26'-1&quot; (7.9 m)</td>
<td>6 tapered to 8</td>
<td>10 gauge</td>
</tr>
<tr>
<td>4'-0&quot; (1.22 m)</td>
<td>31'-1&quot; (9.5 m)</td>
<td>10 tapered to 8</td>
<td>7 gauge</td>
</tr>
<tr>
<td>4'-5&quot; (1.37 m)</td>
<td>36'-1&quot; (11.0 m)</td>
<td>10 tapered to 8</td>
<td>7 gauge</td>
</tr>
<tr>
<td>5'-0&quot; (1.52 m)</td>
<td>41'-1&quot; (12.5 m)</td>
<td>10 tapered to 8</td>
<td>7 gauge</td>
</tr>
</tbody>
</table>

*Except where otherwise shown.*

**Light Pole**

- Single or twin mount.
- Top of pole shall be banding to pole.
- See orientation detail.
- Pole identification banding to pole.
- See orientation detail.
- See pole base and handhole detail.
- See pole base and handhole detail.

**Steel Davit Arm**

- Flat washer and lock washer.
- Nut.
- 16 (16) bolt threaded at end only (typ.).

**Light Pole Foundation and Grounding Electrode**

- See Standard 836001 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.

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**Illinois Department of Transportation**

**Light Pole **

- **(Single or twin mount)**
  - Unless directed otherwise by the Engineer.

---

**Date: 1-1-12**

**Revisions:**

- 1-1-19 - Revised Board PLATE table.
- 1-1-14 - Added pole mounted on bridge parapet. Modified attachment of screen.

---

**Standard 830016-03**

---

**Standard 830016-03**

- **Steel Davit Arm**
- **Light Pole**

---

**Engineer of Design and Environment**

---
### BASE PLATE

<table>
<thead>
<tr>
<th>MOUNTING HEIGHT</th>
<th>BOLT CIRCLE DIAMETER</th>
<th>BASE PLATE MINIMUM THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>35’ (10.7 m) or less</td>
<td>15/8 (290)</td>
<td>1 (25)</td>
</tr>
<tr>
<td>Greater than 35’ (10.7 m) to</td>
<td>15/8 (380)</td>
<td>1 (32)</td>
</tr>
<tr>
<td>50’ (15.2 m)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### LIGHT POLE

<table>
<thead>
<tr>
<th>MOUNTING HEIGHT</th>
<th>MINIMUM S-HAFT 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 gauge</td>
</tr>
<tr>
<td>Greater than 35’ (10.7 m) to</td>
<td>10 tapered to 4</td>
<td>7 gauge</td>
</tr>
<tr>
<td>50’ (15.2 m)</td>
<td>(250 to 100)</td>
<td>(250 to 100)</td>
</tr>
</tbody>
</table>

### GENERAL NOTES

See Standard 830001 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole identification banding to pole.

Provide breakaway devices where required.

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**

- Three 5/8 x 1-1/2 (6 x 38) self tapping screws at 120°.
- Light pole with cap at top.
- 2\(\frac{1}{8}\) (6) I.D. schedule 40 pipe.

**Twin Tenon Detail**

- Pole identification banded to pole. See orientation detail.
- Twin tenon, see detail.

**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.*
**Traffic flow**

**Pole.**

**Handhole.**

**Identification.**

**Pole foundation.**

**Pole on ground mounted**

**Retaining wall.**

**Parapet.**

**Bolt cover.**

**Handhole cover.**

**Handhole gasket.**

**SECTION A-A**

1% x 2 (13 x 50) slot (typ.).

**Tapped** 1/8 (3) hole for grounding connector.

**SETION A-A**

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.**

**Bolt (Bolts not shown)**

1 (25) leveling nut.

**See DETAIL A.**

**POLE BASE DETAILS**

**ELEVATION AT CONCRETE FOUNDATION, METAL FOUNDATION OR RETAINING WALL**

**Hex nut and lock washer on fully threaded rod for metal foundation.**

**ELEVATION AT BRIDGE PARAPET**

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.**

2 1/2 D.D. x 5/8 (64 x 16) washers both sides of 2 1/2 D.D. x 5/8 (64 x 16) min. isolation washer.

**Pole base.**

5/16 (13) min. isolation pad sized to match pole base.

1 1/2 (25) min. leveling plate sized to match pole base.

1 (25) leveling nut.

**See DETAIL A.**

**HANDHOLE DETAIL**

**HANDHOLE IDENTIFICATION ORIENTATION DETAIL**

1 1/8 (28) hole for grounding connector.

4 x 8 (100 x 200) min. handhole and cover. See orientation detail.
Luminaire.

Wood light pole, 50' (15.2 m), class 3 (typ.). *

Luminaire mounting bracket.

Cable clamps on 24 (600) centers.

Three #10 XLP-USE cable.

Waterproof, two-pole fuse holder with fuses.

Waterproof insulation piercing tap connector.

Heavy duty insulated pulley clevis with mounting bolt and hardware.

Ground clamp.

1 (3) rigid steel conduit. *

Malleable iron conduit clamps, 5' (1.5 m) intervals.

Threaded conduit reducer.

"C" conduit, threaded.

1½ (40) rigid steel conduit. *

Conduit bushing.

#6 bare copper ground wire to 10 ft. ground rod, every third light pole.

Unit duct.

Wire tie.

Malleable iron conduit clamp below "C" conduit. *

Size larger as needed.

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.

DATE
1-1-19 Revised luminaire to be horizontal.
1-1-13 New standard

REVISIONS

STANDARD 830026-01
Enclosed, dry-type transformer.

Motor circuit enclosure.

Circuit breaker.

Momentary reversing drum switch.

Motor with thermal overload switch visible from handhole.

Main disconnect and motor disconnect in one enclosure. See schedule for labeling.

Motor circuit breaker actuator.

Motor circuit breaker actuator.

Momentary reversing drum switch.

25' (8 m) control cord.

Luminaire ring power cord to receptacle connector.

POWER CORD (typ.)

Two-pole fuse holder (not shown).

Plug connector with cap.

Receptacle connector with cap.

Ground pad with grounding electrode conductor to ground rod.

Surge protector.

Gear reducer and clutch.

Winch drum with cable guide.

Transition plate visible in handhole when luminaires at full mounting height.

Safety Chain and hook assembly (typ.).

Luminaire ring power cord up to luminaire ring terminal box.

Plug connector with cap.

Ground pad with grounding electrode conductor to ground rod.

Surge protector.

Gear reducer and clutch.

Winch drum with cable guide.

Transition plate visible in handhole when luminaires at full mounting height.

Safety Chain and hook assembly (typ.).

Luminaire ring power cord up to luminaire ring terminal box.

Plug connector with cap.

Receptacle connector with cap.

Ground pad with grounding electrode conductor to ground rod.

Surge protector.

Gear reducer and clutch.

Winch drum with cable guide.

Transition plate visible in handhole when luminaires at full mounting height.

Safety Chain and hook assembly (typ.).

Luminaire ring power cord up to luminaire ring terminal box.

Plug connector with cap.

Receptacle connector with cap.

Ground pad with grounding electrode conductor to ground rod.

Surge protector.
## Concrete Foundation

**Revisions 2019**

### Foundation Requirements

**Engineer of Design and Environment**

**Approved**

**Passed**

**Electrical and Mechanical Unit Chief**

<table>
<thead>
<tr>
<th>Mounting Height</th>
<th>Light Pole with Bottom of Top Plate</th>
<th>Top of Foundation</th>
<th>Plate to be Installed when Required (See Ring Plate Detail)</th>
<th>Anchor Rod 1.25 Diameter with 9 (230) Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>46'-50'</td>
<td>9.1 m</td>
<td>5' (1.52 m)</td>
<td>1.5 (381) Min. concrete cover on all steel</td>
<td>1.25 (320) I.D. with 11 (292) Bolt Circle</td>
</tr>
<tr>
<td>41'-45'</td>
<td>8.8 m</td>
<td>4.6 (117)</td>
<td>2.0 (508) I.D. with 15 (381) Bolt Circle</td>
<td>12 (105) D. with 15 (381) Bolt Circle</td>
</tr>
<tr>
<td>31'-35'</td>
<td>7.5 m</td>
<td>3.9 (99)</td>
<td>1.25 (320) I.D. with 23 (603) Bolt Circle</td>
<td>14 (254) D. with 17 (432) Bolt Circle</td>
</tr>
<tr>
<td>24'-28'</td>
<td>6.3 m</td>
<td>3.0 (76)</td>
<td>1.25 (320) I.D. with 23 (603) Bolt Circle</td>
<td>Thread Bottom of Anchor Rod 2 (506)</td>
</tr>
</tbody>
</table>

### Cutting Teeth

1. 1 (25) hex head nut (typ.)
2. Cut and Thread Anchor Rods (typ.)

### Bolt Circle Diameter

- 15 (381) O.D. - 20 (508) O.D.
- 9 (230) I.D. with 11 (292) Bolt Circle
- 12 (105) D. with 15 (381) Bolt Circle
- 14 (254) D. with 17 (432) Bolt Circle

### 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 TFS. The Contractor shall verify the soil strength during boring for concrete foundations or by monitoring installation resistance of metal foundations and notify the Engineer if other conditions are encountered.

- When rock is encountered the foundation depth may be reduced 6 (150) for every 12 (300) of embedment in rock. The minimum foundation depth shall be 4.6 (117) m with cut anchor rods 6 (150) above excavated hole. See ring plate detail.

- Anchor rods shall be increased in diameter as needed for 60 (152) 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 rod sizes.

- Transformer bases shall not be used on metal foundations.

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

### Table: Light Pole Foundation

**Ring Plate Detail**

- 1 (25) hex head nut (typ.)

**Concrete Foundation**

- Thread Bottom of Anchor Rod 2 (506) and provide matching hex head nut fully sealed (typ.)

### Diagram Notes

- Cut and thread anchor rods (typ.)

---

**Top View**

- Use dirt removed from foundation to meet 9" (229) m chord fill around foundation top. Grade dirt level with bottom of concrete chamber.

- Use dirt removed from foundation to meet 9" (229) m chord fill around foundation top. Grade dirt level with bottom of concrete chamfer.

- Top of wiring window shall be flush with top of foundation.

- Plate to be installed when required (See ring plate detail).

- Anchor rod shall extend through nut 1 (220). For foundation behind barrier or guardrail, use self-locking nut and flat washer. Do not use lock washer.

- Use dirt removed from foundation to meet 9" (229) m chord fill around foundation top. Grade dirt level with bottom of concrete chamfer.

- 1 (25) dia. tapped hole for 125 dia. fully threaded stud or rod. 7 (178) min. length (typ.).

- No. 6 bare copper grounding electrode conductor.

- Length above foundation shall be adjusted to accommodate breakaway devices furnished by the contractor for a specific installation.
**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.

---

**LIGHT POLE FOUNDATION**

44 IN. (1120 mm)

**CONCRETE BARRIER**

44 (1120) high barrier wall.

---

**ELEVATION**

- Anchor rod.
- 1 (25) hex head nut (typ.)
- 1/4 (6) thick ring plate.
- Two piece PVC expansion deflection coupling at expansion joint (typ.).
- 2 (50) PVC conduit one or two required (See lighting plans).

---

**PLAN**

- Top of grounding electrode 1 (25) below tops of anchor rods.
- Top of anchor red even with top of barrier.
- Top of expansion joint 36 x 3 (914) min. bend radius.
- Two (min.) 1 1/2 x 10' (36 x 3 m) connected (threaded) grounding electrodes in 1 (25) sch. 40 PVC sleeve.
- Thread bottom of anchor rod 2 (50) and provide 1 (25) hex head nut fully seated, typ.

---

**FOUNDATION TABLE**

<table>
<thead>
<tr>
<th>LIGHT POLE MOUNTING HEIGHT</th>
<th>SHAFT DIAMETER</th>
<th>SHAFT DEPTH</th>
<th>ANCHOR ROD LENGTH</th>
<th>ANCHOR ROD CIRCLE DIA.</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 (10.2 m)</td>
<td>6 (150)</td>
<td>3 (76)</td>
<td>11 (282)</td>
<td>11 (282)</td>
</tr>
<tr>
<td>32 (10.2 m)</td>
<td>6 (150)</td>
<td>3.8 (100)</td>
<td>11.6 (292)</td>
<td>11.6 (292)</td>
</tr>
<tr>
<td>36 (10.8 m)</td>
<td>6 (150)</td>
<td>4 (100)</td>
<td>12 (282)</td>
<td>12 (282)</td>
</tr>
<tr>
<td>36 (10.8 m)</td>
<td>6 (150)</td>
<td>4.8 (122)</td>
<td>12 (282)</td>
<td>12 (282)</td>
</tr>
<tr>
<td>44 (11.2 m)</td>
<td>6.5 (160)</td>
<td>5 (137)</td>
<td>13 (340)</td>
<td>13 (340)</td>
</tr>
<tr>
<td>44 (11.2 m)</td>
<td>6.5 (160)</td>
<td>6 (150)</td>
<td>13 (340)</td>
<td>13 (340)</td>
</tr>
<tr>
<td>44 (11.2 m)</td>
<td>6.5 (160)</td>
<td>6.8 (172)</td>
<td>13 (340)</td>
<td>13 (340)</td>
</tr>
<tr>
<td>44 (11.2 m)</td>
<td>6.5 (160)</td>
<td>15 (381)</td>
<td>13 (340)</td>
<td>13 (340)</td>
</tr>
</tbody>
</table>

---

**JUNCTION BOX ELEVATION**

- 2 (50) PVC conduit unless otherwise noted on lighting plans.
- 8x2x10 (200x51x250) min. Stainless steel junction box.

---

**RING PLATE DETAIL**

- Anchor rod circle.
**SOIL CONSISTENCY**

- **Very Soft**
  - Qu in ft
    - ≤ 0.5
  - Qu in BLOWS/0.3m
    - 5 to 10
  - Qu in BLOWS/FT
    - ≤ 5
  - Qu in qtsf
    - 5 to 10

- **Soft**
  - Qu in ft
    - 0.5 to 1
  - Qu in BLOWS/0.3m
    - 10 to 20
  - Qu in BLOWS/FT
    - 10 to 25
  - Qu in qtsf
    - 10 to 25

- **Medium**
  - Qu in ft
    - 1 to 2
  - Qu in BLOWS/0.3m
    - 20 to 50
  - Qu in BLOWS/FT
    - 25 to 50
  - Qu in qtsf
    - 25 to 50

- **Hard**
  - Qu in ft
    - ≥ 2
  - Qu in BLOWS/0.3m
    - > 50
  - Qu in BLOWS/FT
    - > 75
  - Qu in qtsf
    - > 75

**SHAFT LENGTH TABLE**

<table>
<thead>
<tr>
<th>Shaft Length</th>
<th>Soft</th>
<th>Medium</th>
<th>Hard</th>
</tr>
</thead>
<tbody>
<tr>
<td>120'</td>
<td>13'</td>
<td>13'</td>
<td>13'</td>
</tr>
<tr>
<td>140'</td>
<td>14'</td>
<td>14'</td>
<td>14'</td>
</tr>
<tr>
<td>150'</td>
<td>15'</td>
<td>15'</td>
<td>15'</td>
</tr>
<tr>
<td>160'</td>
<td>16'</td>
<td>16'</td>
<td>16'</td>
</tr>
</tbody>
</table>

**SECTION A-A**

- No. 4 bare copper grounding electrode conductor.
- 1 (25) chamfer.
- Anchor rod cage.
- Work pad.
- No. 4 (No. 13) spiral, 6 (150) pitch, (typ.)
- V-bars. See Section A-A.

**FOUNDATION ELEVATION**

- Shaft diameter.

**SHAFT LENGTH HEIGHT**

<table>
<thead>
<tr>
<th>Date</th>
<th>Revisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-20</td>
<td>Revised min. anchor rod diameters.</td>
</tr>
<tr>
<td>1-1-15</td>
<td>Added 6'-8&quot; min. anchor rod</td>
</tr>
<tr>
<td>1-1-16</td>
<td>Increased in foundation</td>
</tr>
<tr>
<td>1-3-14</td>
<td>Revised min. diameter of grounding electrode sleeve</td>
</tr>
</tbody>
</table>

**LIGHT TOWER FOUNDATION**

**STANDARD 837001-05**
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.

GENERAL NOTES:

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 rock shall be required.

Anchor rods evenly spaced.

Steel bar, length as required (typ.).

60 x 80 (150 x 6) steel template.

Self-locking hex head nut with steel insert.

Flat washer (typ.)
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.)
Washers on top of pole base shall cover the entire bolt slot.

Concrete or metal foundation (concrete shown).

When encountered, cut wire cloth to conform to depressions in bottom of pole base.

GENERAL NOTES:

See View A-A.

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 6/15 (0.4), and have a minimum wire size of AWG No. 14 (1.6).

All dimensions are in inches (millimeters) unless otherwise shown.
STANDARD PHASE DESIGNATION DIAGRAM (NEMA)

LEGEND

- Vehicular phase no. x
- Pedestrian phase no. x
- Right turn overlaps when:
  \[ A = 2 + 3 \]
  \[ B = 4 + 5 \]
  \[ C = 6 + 7 \]
  \[ D = 8 + 1 \]

NEMA = National Electrical Manufacturers Association

NEMA EIGHT PHASE DUAL RING
ACTUATED CONFIGURATION

Barriers

Ring 1

Ring 2

1-1-09

1-1-97

STANDARD 857001-01

STANDARD PHASE DESIGNATION DIAGRAMS
AND PHASE SEQUENCES

Illinois Department of Transportation

January 1, 2009

APPROVED

January 1, 2009

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

ENGINEER OF OPERATIONS

DATE

REVISIONS

1-1-09

Units of length.

1-1-97

Retum Standard 2393-2.
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.

CR1 and CR2 are 120VAC 3PDT Relays.

**GENERAL NOTES**

Preemptions are labeled Preempt No. 1 and Preempt No. 2.

The associated vehicle yellow change interval is set to 1 second delay.

Preemptions are labeled Preempt No. 1 and 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.
Charger
Inverter/
Relay
Transfer
Power
Batteries inverter/charger.
be internal to the transfer relay may Note: The power transfer relay may be internal to the inverter/charger.

SINGLE LINE BLOCK DIAGRAM
BONDING A HANDHOLE COVER & FRAME

Handhole Frame and cover

Heavy-duty compression terminal (typical)

No. 6 AWG equipment grounding conductor (green)

To pole or post

BONDING AN EXISTING HANDHOLE COVER & FRAME

Heavy-duty compression terminal (typical)

1/2 x 1/2 (13 x 31) stainless steel bolt with split lock washer and nylon insert locknut welded to frame and to cover (typical). Anti-corrosion compound shall be applied to each assembly.

GROUNDING A MAST ARM POLE/POST

Grounding electrode conductor

Access cover

1/4 x 10' (19 x 3.0 m) copper clad grounding electrode

HEAVY-DUTY COMPRESSION TERMINAL

HEAVY-DUTY GROUND ROD CLAMP

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

TRAFFIC SIGNAL GROUNDING & BONDING

STANDARD 873001-02

DATE

REVISIONS

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

1-1-07 Revised terminology

EPA - 9-6-99

APPROVED

PASSED

ISSUED

ENGINEER OF OPERATIONS

ENGINEER OF DESIGN AND ENVIRONMENT

January 1, 2009

January 1, 2009

Revised by:  4-1-06

Illinois Department of Transportation
PEDESTRIAN PUSH BUTTON POST

STANDARD 876001-04
Mast arm length as specified on the plans

**Typ.**

12' (3.6 m)
8' (2.4 m)

**Min.**

8' (2.4 m)
6' (1.8 m)

36x36 (900x900)

- Sign panel or blankout sign
- 100 lb (45 kg) max.

This signal head only for arms 36' 110.97 m) and longer.

- Steel mast arm
- Assembly and pole
- Pole height
- Ground lug
- Mesh
- Stainless steel

- Blankout sign
- Sign panel or blankout sign
- 100 lb (45 kg) max.
- 20 sq. ft. (1.86 sq. m) max.
- 20 sq. ft. (1.86 sq. m) max.
- 20 sq. ft. (1.86 sq. m) max.
- 20 sq. ft. (1.86 sq. m) max.

- Bolt covers for each anchor rod
- Stainless steel mesh

**GENERAL NOTES**

Signal heads, sign panels, and other attachments are shown for minimum design loading purposes only. Each signal head shall weigh 80 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.

**MAST ARM LENGTH**

<table>
<thead>
<tr>
<th>MAST ARM LENGTH</th>
<th>ANCHOR ROD CIRCLE</th>
<th>ANCHOR ROD SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 thru 40</td>
<td>18</td>
<td>1½ x 7</td>
</tr>
<tr>
<td>(4.87 m thru 12.20 m)</td>
<td>(440)</td>
<td>(44 x 2.10 m)</td>
</tr>
<tr>
<td>42 thru 55</td>
<td>21</td>
<td>1½ x 7</td>
</tr>
<tr>
<td>(12.80 m thru 36.80 m)</td>
<td>(535)</td>
<td>(44 x 2.10 m)</td>
</tr>
</tbody>
</table>

- Steel mast arm
- Assembly and pole
- Pole height
- Ground lug
- Mesh
- Stainless steel

- Blankout sign
- Sign panel or blankout sign
- 100 lb (45 kg) max.
- 20 sq. ft. (1.86 sq. m) max.

- Bolt covers for each anchor rod
- Stainless steel mesh

**DATE**

- 1-1-20
- Revised mast arm length

**REVISIONS**

- 1-1-18
- Revised GEN. NOTES for sigs
- Location: Replaced nest hooks with nuts

**STEEL MAST ARM ASSEMBLY AND POLE 16' THROUGH 55'**

**STANDARD 877001-08**
Mast arm length as specified on the plans

Four spaces at 12' (3.6 m) typ., 8' (2.4 m) (min.)

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.

Removable cap

36' thru 64' (17.07 m thru 19.51 m)
24 (610)
1 1/4" x 7' (44 x 2.10 m)

65' thru 75' (19.81 m thru 22.86 m)
27 (683)
2 1/4" x 7'6" (51 x 2.29 m)

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).

See Standard 72016 for location of sign panel or blackout sign closest to pole.

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

STANDARD 877002-04
**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 panels or blankout signs closest to pole.

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

---

**STEEL MAST ARM ASSEMBLY AND POLE WITH DUAL MAST ARMS**

**STANDARD 877006-06**

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-18</td>
<td>Revised for RLFD reqs. Revised GEN. NOTES for sign location. Revised ANCHOR ROD DETAIL.</td>
</tr>
<tr>
<td>4-1-16</td>
<td>Changed sign panel to 36x36. Added max weight of 100 lb. Modified dim. to outer signal.</td>
</tr>
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</table>

---

**ANCHOR ROD DETAIL**

---

**MAST ARM LENGTH**

<table>
<thead>
<tr>
<th>MAST ARM LENGTH</th>
<th>ANCHOR ROD CIRCLE</th>
<th>ANCHOR ROD SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10' thru 30'</td>
<td>18</td>
<td>3/8 x 7'</td>
</tr>
<tr>
<td>(3.05 m thru 9.14 m)</td>
<td></td>
<td>(44 x 2.10 m)</td>
</tr>
<tr>
<td>12' thru 50'</td>
<td>21</td>
<td>2 x 7'-6&quot;</td>
</tr>
<tr>
<td>(3.66 m thru 15.24 m)</td>
<td></td>
<td>(51 x 2.29 m)</td>
</tr>
</tbody>
</table>

---

**Pole height**

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.
**Camera or detector**

9.9 lb (4.5 kg), 1 sq. ft. (0.09 sq. m)

**Mast arm length as specified on the plans**

Typ.:

- 12' (3.6 m)
- 8' (2.4 m)

Min.:

- 8' (2.4 m)
- 5' (1.5 m)

**Stainless steel**

- 3x5 (75x125) Handhole
- 4x8 (100x200) Handhole

**Anchor Rod Detail**

- Rod circle (see table)
- Rod covers (6 required)
- Thread bottom of anchor rod 2 (50) and provide matching hex head nut fully seated, typ
- Ground lug opposite handhole

**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.

See standard S2100 for luminaire wiring diagram.

**Dimensions**

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

**Anchor Rod Circle**

- 12' (3.6 m)
- 8' (2.4 m)
- 4' (1.2 m)

**Anchor Rod Size**

- 1/8 x 7' (44 x 2.15 m)
- 1/8 x 7' (44 x 2.10 m)
- 1/8 x 7' (44 x 2.10 m)

---

**Table: Mast Arm Length, Anchor Rod Circle, Anchor Rod Size**

<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 35'</td>
<td>38</td>
<td>1/8 x 7' (44 x 2.10 m)</td>
</tr>
<tr>
<td>36' thru 55'</td>
<td>21</td>
<td>1/8 x 7' (44 x 2.10 m)</td>
</tr>
<tr>
<td>(4.87 m thru 10.67 m)</td>
<td>(533)</td>
<td></td>
</tr>
<tr>
<td>(10.97 m thru 16.80 m)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Steel Comb. Mast Arm Assembly and Pole**

**16' Through 55'**

**Standard 877011-10**

---

**Date**

- 1-1-19: Revised anchor rod info.
- 1-1-18: Revised luminaire arm info.
- 1-1-19: Revised for LRFD reqs. Revised GEN. NOTES for sign location.
Camera or detector
9.9 lb (4.5 kg), 1 sq. ft. (0.09 sq. m)

Mast arm length as specified on the plans

This signal head only for arms 55' (16.8 m) and longer.

4 bolts (100x200) Handhole with frame and cover

6 bolts

This signal head only for arms 65' (19.8 m) and longer.

3x5 (75x125) Handhole with frame and cover

6 bolts

Removable pole cap

Where required provide second luminaire, arm and bracket at 90° or as noted on plans. Second luminaire and arm not shown for clarity.

Removable cap

36x36 (900x900)
Sign panel or blankout sign 100 lb (45 kg) max.

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' (4.6 m).
Tapered one-piece arm required for arms longer than 35' (4.6 m).
One-piece shown. See plans for length to be provided.

Mast arm length as specified on the plans

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.

See standard 821001 for luminaire wiring diagram.

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

General Notes for sign location.

Rev. second luminaire info.

Replace second luminaire info.

Located opposite of pole at the midpoint of pavement.

Distance from top of pole to bottom of hand hole shall match the inside diameter of the pole at the midspan of the hand hole.

Mast arm length as specified on the plans

<table>
<thead>
<tr>
<th>Mast Arm Length</th>
<th>Anchor Rod Circle</th>
<th>Anchor Rod Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>56 thru 64'</td>
<td>24 (610)</td>
<td>3/8 x 7' (64 x 2.10 m)</td>
</tr>
<tr>
<td>65 thru 78'</td>
<td>22 (665)</td>
<td>5 x 7-6' (53 x 2.99 m)</td>
</tr>
</tbody>
</table>

Steel Comb. Mast Arm Assembly and Pole
56' Through 75'

STANDARD 877012-07

For a revised design if other conditions are encountered.

The Bureau of Bridges & Structures should be contacted 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.

**FOUNDATION DETAILS**

**CONCRETE**

**TOP VIEW**

**CONCRETE FOUNDATION DETAILS**

<table>
<thead>
<tr>
<th>Mast Arm Length</th>
<th>Foundation Depth *</th>
<th>Foundation Diameter</th>
<th>Spiral Diameter</th>
<th>Quantity of Rebars</th>
<th>Size of Rebars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 30' (9.1 m)</td>
<td>20' 0&quot; (6.0 m)</td>
<td>30 (750)</td>
<td>24 (600)</td>
<td>8</td>
<td>8 (19)</td>
</tr>
<tr>
<td>Greater than or equal to 30' (9.3 m) and less than 40' (12.2 m)</td>
<td>23' 6&quot; (7.2 m)</td>
<td>30 (750)</td>
<td>24 (600)</td>
<td>8</td>
<td>8 (19)</td>
</tr>
<tr>
<td>Greater than or equal to 40' (12.2 m) and less than 50' (15.2 m)</td>
<td>23' 6&quot; (7.2 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>25' 0&quot; (7.6 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 55' (16.8 m) and less than 65' (19.8 m)</td>
<td>25' 0&quot; (7.6 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>25' 0&quot; (7.6 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 length up to and including 55' (16.8 m) shall be increased by 1' (0.3 m) of that shown in the table, based on the longer of the two arms.

These foundation depths are for sites which have cohesive soils (clayey silt, sandy clay, etc.) along the length of the shaft, with an average Unconfined Compressive Strength (Qu) > 1.0 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.
**INSTALLATIONS**

**DETECTOR LOOP INSTALLATIONS**

**DETECTOR LOOP AT PAVEMENT OR PAVEMENT CRACK**

**NOTE**

Loop wire shall follow saw cut to bottom, forming slack section at joint.

**DETECTOR LOOP INSTALLATION**

**SECTION A-A**

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

- Lead-in cable (single pair or multipair)
- Lead-in cable shield
- Lead-in cable shield drain-wire
- Lead-in cable insulated conductor
- Bare conductor
- Loop wire in tube
- Loop wire insulated conductor
- Twisted and resin soldered conductor
- Electrical tape insulated splice
- Rigid mold
- Waterproof and dielectric resin

** DETECTOR LOOP AT PAVEMENT OR PAVEMENT CRACK **

**NOTE**

Loop wire shall follow saw cut to bottom, forming slack section at joint.
**Dowel Bar Table**

<table>
<thead>
<tr>
<th>PAVEMENT THICKNESS</th>
<th>DOWEL BAR DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 (250) or greater</td>
<td>7⁄8 (22)</td>
</tr>
<tr>
<td>8 (200) thru 9.99 (249)</td>
<td>7⁄8 (22)</td>
</tr>
<tr>
<td>Less than 8 (200)</td>
<td>3⁄4 (19)</td>
</tr>
</tbody>
</table>

**General Notes**

- Dowel bars are only required for Class I, II, or III Roads and Streets having pavement thickness of 7 (175) or greater.
- Dowel bars are not required when base course and surface are cut separately.
- Bituminous surface treatment follows Standard 420001 for each type of joint.
- All dimensions are in inches (millimeters) unless otherwise shown.

**Plan of Pavement**

- 15' (4.6 m) max.
- 12' (3.6 m) max.
- 6' (1.8 m) max.

**Cross Section of Pavement**

- 22'-0'' (6.6 m) or 24'-0'' (7.2 m)
- 13'-0'' (3.3 m) or 12'-0'' (3.6 m)

**Transverse Construction Joint**

- Hot poured joint sealer
- Bituminous surface treatment
- Stabilized base course
- Dowel bar assembly

**Transverse Contraction Joint**

- Sawed groove
- Dowel bar assembly
- Hot poured joint sealer

**General Notes**

- Dowel bars are only required for Class I, II, or III Roads and Streets having pavement thickness of 7 (175) or greater.
- Dowel bars are not required when base course and surface are cut separately.
- Bituminous surface treatment follows Standard 420001 for each type of joint.
- All dimensions are in inches (millimeters) unless otherwise shown.

**Portland Cement Concrete Pavement (Nonreinforced)**

**Standard B.L.R. 14-12**

**Illinois Department of Transportation**

**January 1, 2018**

**Approved**

**January 1, 2018**

**Engineer of Design and Environment**

**Issued**

**1-1-97**

**Passed**

**Engineer of Local Roads and Streets**

**Date**

**Revisions**

- 1-1-15: Added general notes regarding dowel bars.
- 1-1-18: Revised dowel and tie bar sizes. Increased tie bar spacing. Eliminated skewed joint.
Type III barricades with standard sign R11-2 or R11-4 mounted as shown.

Type III barricades to be width of pavement only.

Reflectorized 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 reflectorized backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

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

TWO-LANE, TWO-WAY TRAFFIC, RURAL OPERATIONS EXCEEDING ONE DAYLIGHT PERIOD

GENERAL NOTES

DATE REVISIONS
1-1-98 Rev. "R11-2" to "R11-4"
1-1-99 Rev. 4th General Note

TRAFFIC CONTROL DEVICES - DAY LABOR CONSTRUCTION

STANDARD B.L.R. 17-4
GENERAL NOTES

Maintenance operations shall be confined to one traffic lane, leaving the opposite lane open to traffic. At least 500 (1500 m) of both traffic lanes shall be available for traffic movement between work areas at intervals not greater than 1000 (3000 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 adjusted slightly to fit field conditions.

All traffic signs shall be protected by Type I or Type II barricades with flashing lights. Longitudinal dimensions may be adjusted slightly to fit field conditions.

All vehicles, equipment, men, and their activities are restricted at all times to one side of the pavement.

Flashing lights or rotating beacons are required for all maintenance vehicles while in operation.

Applicable operations illustrated in Standard 701301 may be used when operations do not exceed 15 minutes on the pavement or 30 minutes on the shoulder respectively.

All warning signs shall have minimum dimensions of 36x36 (900x900) and have black legend on an orange reflectorized background.

When fluorescent signs are used, orange flags are required.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

All dimensions are in inches (millimeters) unless otherwise shown.
When rail element is placed adjacent to a tapered surface use timber wedge 'M' between the concrete and plate 'G'.

1 (M25) Dia. anchor bolt with locknut furnished in place by the Contractor of the Concrete Structure. Place plate washer 'D' under nut.

When an expansion joint exists below the connector, "G" after the 1 (25) bolts are in place.

Plate 'C' placed between plate 'E' and rail element.

Splice bolts with washer under nut.

Splice bolts

* Post bolt with plate washer 'F' placed under head and nut.

ELEVATION TRAFFIC BARRIER TERMINAL TYPE 5R

GENERAL NOTES

Install the face of the guardrail flush with the face of the parapet. Install plate washer 'D' so that the 1 (25) projection fills the remainder of the slotted holes in the 1 (25) end plate on plate 'G' after the 1 (25) bolts are in place.

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

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

TRAFFIC BARRIER TERMINAL-TYPE 5R

Scales: 1" = 1'-0" (sheet 1 of 3)

STANDARD B.L.R. 20-7

APPREOVED

January 1, 2012

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

January 1, 2012

ENGINEER OF LOCAL ROADS AND STREETS

DATE

REVISIONS

1-1-12

Revised barrier terminal

1-1-09

Translated units to English (metric)

1-1-97

PASSED

1-1-12

ilio Department of Transportation
**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 70/701.

Two Type A Low Intensity Flashing Lights shall be used on each approach in advance of the work area during hours of darkness. One light shall be installed above the barricades and the other above the first advance warning sign.

All warning signs shall have minimum dimensions of 36 x 36 (900 x 900) and have a black legend on an orange reflectorized background.

When fluorescent signs are used, orange flags are not required.

Longitudinal dimensions may be adjusted to fit field conditions.

When the distance between the barricade and the intersection is between 1500' (450 m) and 2000' (600 m), the advance sign shall be placed at the intersection. When the distance between the barricade and the intersection is over 2000' (600 m), an additional sign shall be placed at the intersection. The additional sign shall give the distance to the barricade in miles or fractions of a mile.

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

---

**CONDITION I**

When distance from closure to crossroad is less than 1500' (450 m)

- Variable
- 500' (150 m)
- 1000' (300 m) max.

**CONDITION II**

When distance from closure to crossroad is greater than 1500' (450 m)

- Variable
- 500' (150 m)
- 1000' (300 m) and variable

**SYMBOLS**

- Work area
- Type III Barricade
- Sign with 18x18 (450x450) min. orange flag attached

---

**TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES FOR CONSTRUCTION ON RURAL LOCAL HIGHWAYS**

STANDARD B.L.R. 21-9
CONDITION I
APPROACH TRAFFIC STOPPED

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.

DATE  REVISIONS
1-1-12  Added two notes from
        GENERAL NOTES
1-1-09  Revised General Notes
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
**SHOULDER WIDENING TRANSITION**

**WOOD BREAKAWAY POSTS**

**TUBULAR STEEL FOUNDATIONS**

**GENERAL NOTES**

See Standard B.L.R. 26 for details of guardrail not shown.

Posts at location 1 & 2 shall be wood breakaway posts. Posts other than 1 & 2 may be either standard wood posts or steel posts, as the option of the Contractor. If standard wood posts are used, one post shall be located midway between and in lieu of posts 4 & 5. The offset (Y) for this post shall be 12 (300).

A two-piece assembly may be substituted for the one piece nose shown above.

The bearing plate K shall be held in position by (2) 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. 26, the guardrail shall transition down to the height of the terminal prior to post 8.

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

**OFFSET 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>14.20</td>
<td>4.0</td>
</tr>
<tr>
<td>2</td>
<td>22.00</td>
<td>2.79</td>
</tr>
<tr>
<td>3</td>
<td>24.92</td>
<td>1.79</td>
</tr>
<tr>
<td>4</td>
<td>20.79</td>
<td>0.85</td>
</tr>
<tr>
<td>5</td>
<td>16.94</td>
<td>0.58</td>
</tr>
<tr>
<td>6</td>
<td>12.49</td>
<td>0.35</td>
</tr>
<tr>
<td>7</td>
<td>6.25</td>
<td>0.11</td>
</tr>
<tr>
<td>8</td>
<td>0.69</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**SECTION A-A**

* If fill height exceeds 2'-0" (0.6 m) use 1:3 max.
WOOD BREAKAWAY POST
(2 ea.)

SOIL PLATE H
(2 ea.)

STEEL TUBE
(2 ea.)

PLATE WASHER F
(1 ea.)

ALTERNATE SOIL PLATE CONNECTION

BEARING PLATE K
(1 ea.)

DIAPHRAGM
(2 ea.)

Nose
(1 ea.)

WOOD BREAKAWAY POST

PLATE WASHER F

ALTERNATE SOIL PLATE CONNECTION

BEARING PLATE K

WOOD BREAKAWAY POST

PLATE WASHER F

ALTERNATE SOIL PLATE CONNECTION

BEARING PLATE K

WOOD BREAKAWAY POST

PLATE WASHER F

ALTERNATE SOIL PLATE CONNECTION

BEARING PLATE K

ILLINOIS DEPARTMENT OF TRANSPORTATION

ENGINEER OF LOCAL ROADS AND STREETS

ENGINEER OF DESIGN AND ENVIRONMENT

JANUARY 1, 2012

APPROVED

JANUARY 1, 2012

PASSED

JANUARY 1, 2012

TRAFFIC BARRIER
TERMINAL TYPE 1

STANDARD B.L.R. 23-4
**GENERAL NOTES**

Mailbox turnouts 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>5</th>
<th>4</th>
</tr>
</thead>
<tbody>
<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>L₁</td>
<td>30</td>
<td>30</td>
<td>23</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>L₂</td>
<td>20</td>
<td>20</td>
<td>15</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Note: Dimensions for Township and District Roads may vary from the above dimensions.
TYPE 1A BARRICADE
FOR NON-NHS ROUTES

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

STEEL BLOCK-OUT DETAIL

PLATE A

NOTE

Plate A shall be placed between rail element and block-out at non-splice mounting points only when steel block-outs are used.

WOOD POST CONSTRUCTION

POST OR SPlice BOLT & NUT

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.

STANDARD B.L.R. 26-3
STEEL PLATE BEAM GUARDRAIL
29" (731mm) HEIGHT
(Sheet 3 of 4)
Illinois Department of Transportation
January 1, 2012
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED January 1, 2012
ISSUED 1-1-08
PASSED ENGINEER OF LOCAL ROADS AND STREETS
Optional round hole

10 (250) min. (Wood post)
8 (203) min. (Steel post)

Finished backfill (CA 11)

Aggregate Ledge
or hard slag fill.

Note: Ledge line is Drilled Hole
of the guardrail.

(Optional) shall be used in front of and in advance of the guardrail.

(D = 0 desirable to 12 (300) maximum)

WOOD BLOCK-OUT AND STEEL POST DETAILS

1 (M24) double nuts or locknuts and washer

STANDARD B.L.R. 26-3
29" (731mm) HEIGHT

TIGHTEN TO TIGHT TENSION.
(40,000 lbs. (18,100 kg) min. breaking strength)
Other types

Pay limits of structure. Use plate washer D furnished by the Contractor of the 1x4 (M24x200) machine bolt with locknut.

TRAFFIC BARRIER TERMINAL TYPE 5A

TRAFFIC BARRIER TERMINAL TYPE 5A (one each)

PLATE G

PLACEMENT OF PLATE WASHER D

PLATE WASHER D

PLATE E

PLATE WASHER F

GENERAL NOTES

See Standard B.L.R. 26 for details of guardrail not shown.

Install plate washer D so the 1 (25) projection 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 630001, the guardrail shall transition down to the height of the terminal.

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

DATE

REVISIONS

1-1-09

Switched units to English measure.

1-1-09

New Standard. Was part of Std. 631026 prior to January 1, 2007.

Illinois Department of Transportation

ENGINEER OF LOCAL ROADS AND STREETS

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

STANDARD B.L.R. 27-1

TRAFFIC BARRIER TERMINAL TYPE 5A
Short radius curve

A

Contraction joints
at 25'-0" (7.6 m)
max. cts. (typ.)

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

Drainage casting
with curb box

Back of curb

5'-0" (1.5 m)

Edge of pavement

Construction joint

Undoweled contraction joint (typ.)

Construction options:
1. Form with 1/8 (3) thick steel template
2. Saw 2 (50) deep, and seal.
3. Insert 1/8 (20) thick preformed joint filler
   full depth and width.

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

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

Pavement

12 (300)

(5.5 m)

12 (300)

(5.5 m)

5'-0"

(1.5 m)

Plan

Mountable curb shown
(other types permitted)

HMA surfacing

Base course

HMA surfacing

Base course

ON DISTURBED SUBGRADE

ON UNDISTURBED SUBGRADE

ADJACENT TO FLEXIBLE PAVEMENT

CONCRETE CURB AND GUTTER

CONCRETE CURB TYPE B

AND COMBINATION

CONCRETE CURB AND GUTTER

B.L.R. 28