Revision #222 of the Highway Standards, effective March 1, 2019, is now available on the department’s website.

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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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Non-blocked Steel Plate Beam Guardrail
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Long-Span Guardrail Over Culvert
Weak Post Guardrail Attached to Culvert
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PCG/HMA Stabilization at Steel Plate Beam Guardrail
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Concrete Glare Screen
Sight Screen Precast Prestressed Concrete Panel Wall
Sight Screen Chain Link Fence
Sight Screen Cedar Stockade Fence Type S
Sight Screen Wood Plank Fence Type P
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Sand Module Impact Attenuators

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Woven Wire Fence
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Permanent Survey Markers
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Illinois Department of Transportation

January 1, 2019

ENGINEER OF POLICY AND PROCEDURES
APPROVED January 1, 2019

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED 1-1-97

PASSED

STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS

STANDARD 000001-07

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PAVEMENT MARKINGS
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Urban Left Turn Arrow

Urban Right Turn Arrow

Urban Left Turn Only

Urban Right Turn Only

Urban Thru Only

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Railroad

Railroad Point

Control Box

Crossing Gate

Flashing Signal

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Crossbuck

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Hatch Pattern

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ROW Marker

ROW Line

Easement

Temporary Easement

STANDARD SYMBOLS,
ABBREVIATIONS
AND PATTERNS

STANDARD 000001-07
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<tr>
<td>Marsh/Swamp Boundary</td>
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STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS

STANDARD 000001-07
<table>
<thead>
<tr>
<th>Bar Size</th>
<th>Dia. (mm)</th>
<th>Cross-Sectional Area (sq. in.)</th>
<th>Weight lbs/ft.</th>
<th>Spacing, in.</th>
<th>Area of Steel per Foot (Meter), sq. in. (sq. mm)</th>
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<td>1a. (mm)</td>
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<td>0.110 (0.0560)</td>
<td>0.133 (1.067)</td>
<td>0.944 (1.290)</td>
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<td>4 (32)</td>
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<td>0.523 (4.122)</td>
<td>0.670 (7.021)</td>
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<td>1.561 (0.7039)</td>
<td>5.313 (44.376)</td>
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<td>1.500 (1500)</td>
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**ENGINEER OF DESIGN AND ENVIRONMENT**

**APPROVED ENGINEER OF POLICY AND PROCEDURES**

January 1, 1997
<table>
<thead>
<tr>
<th>A (Inches)</th>
<th>B (Fractions of Inch or Foot)</th>
<th>A (Fractions of Inch or Foot)</th>
<th>B (Decimal of an Inch and of a Foot)</th>
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**DECIMAL OF AN INCH AND OF A FOOT**

A = Fractions of Inch or Foot  
B = Inch Equivalents to Foot Fractions
DITCH CHECK FOR NARROW MEDIAN

DITCH CHECK FOR WIDE MEDIAN

GENERAL NOTES

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

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

VIEW OF NARROW MEDIAN

VIEW OF WIDE MEDIAN
**STEP 1**

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

**STEP 2**

**ATTACHING TWO SILT FILTER FENCES**

(Not applicable for J-hooks)

**TRENCH METHOD**

Excavate, backfill, and compact trench to secure fabric.

**SLICE METHOD**

**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.

**ELEVATION**

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 B-B**

**AGGREGATE DITCH CHECK**

**ELEVATION**

**SECTION A-A**

**TRENCH METHOD**

**SLICE METHOD**

**BASIN ELEVATION**

**Flowline (¥) on SEDIMENT HORIZON**

**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.
The performance of the basin will improve if put into a series.
The long dimension should be parallel with the direction of the flow. Accumulated silt shall be removed anytime the basins become 75% filled.

INLET AND PIPE PROTECTION

Outlet type as directed by Engineer.

SEDIMENT BASIN

ELEVATION

PLAN

TYPICAL CUT CROSS-SECTION

TYPICAL FILL CROSS-SECTION

TEMPORARY DITCHES FOR CUT & FILL SECTIONS

TIE DOWN STAKES

SILT FILTER FENCE

SPACERS

MANHOLE WITH OPEN GATE

FINAL EMBANKMENT LIMITS

TEMPORARY EROSION CONTROL SYSTEMS

STANDARD 280001-07

Illinois Department of Transportation

APPROVED

ISSUED

1-1-97

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

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

INSTALLATION DETAILS

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

GENERAL NOTES

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

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

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

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

REVETMENT MATS

FABRIC FORMED CONCRETE

STANDARD 285001-02

DATE REVISIONS
1-1-08 Switched units to
2008
English (metric).

1-1-02 Revised second note.
**SECTION A-A**
(TYPICAL 2 LANE WITH SHOULDERS)

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

**LONGITUDINAL SECTION SHOWING CONSTRUCTION ADJACENT TO EXISTING PAVEMENT**

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

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

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

**TRANSVERSE CONSTRUCTION JOINT**

- No. 6x36 (No. 19x900) Tie bars at 36 (900) cts.
- Drilled for bars

**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.

**PCC BASE COURSE WITH HMA BINDER AND SURFACE COURSES**

STANDARD 353001-05
Provide drainage swale in shaded area.

End aggregate shoulder.

Edge of HMA shoulder.

End full super-elevation.

Plan:

Profile:

General Notes:

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

See plans for actual grades.

See Standard 482001 for ramp shoulder details.

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

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

When using a radius R1 less than the assumed mainline curve, the gore nose dimensions at Sections C-C and D-D as shown. From Section C-C to Section B-B, construct as tangent section, the gore nose dimension at section B-B shall be a variable width dependent on the radius of the mainline curve. Show a special cross-section of the ramps for Section B-B.

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 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 of the ramps 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.

Revised General Notes.
CROSS SECTIONS WHEN MAINLINE IS ON TANGENT OR CURVED TO THE RIGHT

CROSS SECTIONS WHEN MAINLINE IS CURVED TO THE LEFT

ENTRANCE
RAMP TERMINAL
(FLEXIBLE RAMP PAVEMENT ADJACENT TO FLEXIBLE MAINLINE PAVEMENT)

STANDARD 406001-06
to their intersection.

Ramp and mainline edge lines of the Project the shoulder

Stub 12 (300) Stub 24 (600) Stub

shoulder

Edge of bit.

3° 3' 26" (typ.)

300'-0" (30 m)

100'-0"

500'-0"

100'-0"

300'-0"

Edge of mainline

Stub 12 (300) Stub 24 (600) Stub

shoulder

Edge of HMA

Beg in 16' (4.9 m) ramp width

(12 (300) x [cross slope% or S.E.%] of mainline)

Vertical offset based on

(12 (300) x [cross slopes% or S.E.%] of mainline)

When curved
to the left

When on
tangent or
curved to
t the right

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

Max. cross slope allowed is 4%

Min. cross slope allowed is 1.5%

Min. cross slope allowed is 1.5%

Max. cross slope allowed is 5%

When mainline is on tangent or curved to the right:

Right edge of mainline (ML)

Right edge of ramp (in all cases)

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

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

Range of initial ramp grades when mainline is

curved to the right and e = 8% for R

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

Variable grade when mainline is on tangent

Max. cross slope allowed is 4%

Min. cross slope allowed is 1.5%

Max. cross slope allowed is 5%

When mainline is on tangent or curved to the right:

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

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

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

Range of initial ramp grades when mainline is

curved to the right and e = 8% for R_i
DETAILS FOR DRAINAGE IN NEUTRAL AREA

<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 12</td>
<td>S.E. % ML x 12</td>
</tr>
<tr>
<td>B</td>
<td>-3.0</td>
<td>S.E. % ML x 192</td>
<td>S.E. % ML x 192</td>
</tr>
<tr>
<td>C</td>
<td>-15.4</td>
<td>15.6</td>
<td>15.4</td>
</tr>
<tr>
<td>D</td>
<td>-392</td>
<td>-392</td>
<td>-392</td>
</tr>
</tbody>
</table>

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

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 ft. (32 m) past Section C-C and the point created by the vertical offset at Section D-D.

See plans for actual grades.

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

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

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 140 ft. (43 m) tangent section.

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

EXIT RAM TERMINAL

(FLEXIBLE RAMP PAVEMENT ADJACENT TO FLEXIBLE MAINLINE PAVEMENT)

(Sheet 3 of 3)

STANDARD 406101-05
Mailboxes shall be mounted such that the face of the mailbox is 6 (150) to 17 (430) and the post a minimum of 24 (600) from the edge of the turnout surfacing.

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

(for pavements with unequal thickness)

Dowel bar assembly

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

**TRANVERSE CONTRACTION JOINT**

Hot poured joint sealer

1/4 (22) Heat resistant closed cell plastic foam backer rod

This portion of saw cut not required when base course and surface are cut separately.

**SEALING DETAIL**

**PAVEMENT JOINTS**

<table>
<thead>
<tr>
<th>DOWEL BAR TABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAVEMENT BAR</td>
</tr>
<tr>
<td>THICKNESS</td>
</tr>
<tr>
<td>10 (250) or greater</td>
</tr>
<tr>
<td>8 (200) thru 9.99 (249)</td>
</tr>
<tr>
<td>Less than 8 (200)</td>
</tr>
</tbody>
</table>

Illinois Department of Transportation
January 1, 2018

ENGINEER OF POLICY AND PROCEDURES
APPROVED

January 1, 2018

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

PASSED

1-1-97

(Sheet 2 of 2)
**GENERAL NOTES**

See Standard 42001 for details of joints not shown.

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

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

- **A**
- **B**

---

**PAVEMENT PLAN**

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

---

**TRANSVERSE CONSTRUCTION JOINT**

- **A**
- **B**

---

**PCC PAVEMENT**

**24' (7.2 m) JOINTED**

---

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**APPROVED**

**ENGINEER OF POLICY AND PROCEDURES**

**ISSUED**

**REVISIONS**

- 1-1-18: Changed spacing of tie bars to 36 (900) cts.
- 1-1-18: Added dimension of tie bar to 36 (900) cts.

---

**DATE**

**REVISIONS**

- 1-1-18
- 1-1-18

---

**STANDARD 420101-06**
**SECTION A-A**
(TYPICAL 3-LANE, 1-WAY WITH SHOULDERS)

**PAVEMENT PLAN**

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

**GENERAL NOTES**
See Standard 420106-06 for details of joints not shown.
All dimensions are in inches (millimeters) unless otherwise shown.
GENERAL NOTES

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

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

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

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

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.

Circular form shall be removed before concrete added.
CAST IN PLACE DETAIL

ROUNDOUT FOR SQUARE FRAME & GRATE AND MANHOLES

- Drill and Grout No. 6 (19) Tie Bar 24 (600)
- No. 6 (19) Outer loop reinf.
- No. 6 (19) Inner loop reinf.
- Prop. Class SI concrete (higher strength concrete may be used if no detrimental shrinkage cracks occur)

DETAIL OF REINFORCEMENT FOR PAVEMENT ROUNDOUT

- Type 1 or Type 5 Frame and Grate may be used

INNER HOOP REIN.

OUTER HOOP REIN.

CUT HOOP WHEN NECESSARY TO PROVIDE CLEARANCE

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

PCC PAVEMENT ROUNDOUTS

(Standard 420111-04)

ILLINOIS DEPARTMENT OF TRANSPORTATION

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

PASSED

APPROVED 1-1-98

ENGINEER OF POLICY AND PROCEDURES

January 1, 2018

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

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

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.

**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 then 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.

**DATE** | **REVISIONS**
---|---
1-1-18 | Changed tie bar spacing to 36 (900) cts.
1-1-17 | Added longitudinal sawed joint to middle of ramp pavement.
Pavement and reinforcement in the ramp taper shall be the same as the mainline. Reinforcement shall be placed parallel and perpendicular to the mainline pavement.

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

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.

All dimensions are in inches (millimeters) unless otherwise shown.
ADJACENT TO CRC MAINLINE PAVEMENT

JOINTED PCC RAMP PAVEMENT

SECTION B-B

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

SECTION C-C

SECTION D-D

CROSS SECTIONS WHEN MAINLINE IS CURVED TO THE LEFT

DETAIL A

DETAIL B

ENTRANCE RAMP TERMINAL

JOINTED PCC RAMP PAVEMENT

ADJACENT TO CRC MAINLINE PAVEMENTS

STANDARD 420206-12
When curved to the right.

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

Vertical offset to ramp edge = 112 (4900) \( \times \) (cross slope% or S.E.%)

Right edge of mainline (ML)

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

When mainline is on tangent or curved to the right:

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

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

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

Right edge of ramp when mainline is on tangent

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

When mainline is on tangent or curved to the left:

Vertical offset to ramp edge = 112 (4900) \( \times \) (cross slope% or S.E.%)

Right edge of mainline (ML)

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

When mainline is on tangent or curved to the right:

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

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

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

Right edge of ramp when mainline is on tangent

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

When mainline is on tangent or curved to the left:

Vertical offset to ramp edge = 112 (4900) \( \times \) (cross slope% or S.E.%)

Right edge of mainline (ML)

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

When mainline is on tangent or curved to the right:

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

Max. cross slope allowed is 4%
WHEN MAINLINE IS ON TANGENT OR CURVED TO THE RIGHT

WHEN MAINLINE IS CURVED TO THE LEFT
DETAILS FOR DRAINAGE IN NEUTRAL AREA

GENERAL NOTES

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

See plans for actual grades.

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

See Standard 483001 for ramp shoulder details.

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

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

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

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

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

STANDARD 420301-08
DETAILS FOR DRAINAGE IN NEUTRAL AREA

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

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 42000 and 48300.
- See Standard 48300 for ramp shoulder details.
- 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.

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

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

STANDARD 420306-10

Illinois Department of Transportation
ENGINEER OF POLICY AND PROCEDURES
APPROVED
January 1, 2018
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
1-1-97
PASSED

(3) Illinois Department of Transportation
PLAN

(new or existing construction)

SECTION A-A

DETAIL A

GENERAL NOTES

THICKNESS: \( t \) = Thickness of Pavement.

See Standard 610001 for shoulder inlet with curb when required.

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

All dimensions are in inches (millimeters) unless otherwise shown.
Approximately 63 lbs./100 sq. ft. (3.07 kg/m²)

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

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

** Longitudinal joint or
edge of pavement.

** Cast outside limits

2 No. 3 (No. 10) bars

6 (150) from joints.

Lane edge

Welded wire reinforcement when
required to end approximately
6 (150) from joints.

2 No. 5 x 4' (No. 16 x 1.2 m)
Reinforcement bars (8 total)
placed at pav't. mid-depth

Place casting to grade and fill
with full depth concrete after
pavement has cured.

GENERAL NOTES
Pavement Blocks-outs shall be at least
24 (600) from contraction joints.

Welded wire reinforcement which is
lapped longitudinallyshall have a minimum
lap of 6 (150).

Welded wire reinforcement may be
positioned with the transverse wires on
top or bottom of the longitudinal wires.

All dimensions are in inches (millimeters)
unless otherwise shown.
### 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 $b$ dimension and the distance from the end of the transverse bar to the edge of pavement may be increased by 3 (25) for slip form paving.

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

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

---

### BAR REINFORCEMENT FOR CRC PAVEMENT

**ENGLISH (inches)**

<table>
<thead>
<tr>
<th>Bar Size</th>
<th>Pavement Thickness</th>
<th>$a$ (Approx. Spacing)</th>
<th>$b$</th>
<th>$c$</th>
<th>$d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>#6</td>
<td>7% thru #6</td>
<td>18 spaces (19 bars) @ 7%</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#6</td>
<td>8% thru #6</td>
<td>20 spaces (21 bars) @ 6%</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#6</td>
<td>9% thru #10</td>
<td>22 spaces (23 bars) @ 6%</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#6</td>
<td>10% thru #11</td>
<td>24 spaces (25 bars) @ 5%</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#6</td>
<td>11% thru #12</td>
<td>27 spaces (28 bars) @ 5%</td>
<td>35</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>#7</td>
<td>9% thru #10</td>
<td>16 spaces (17 bars) @ 5%</td>
<td>35</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>#7</td>
<td>10% thru #11</td>
<td>18 spaces (19 bars) @ 5%</td>
<td>35</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>#7</td>
<td>11% thru #12</td>
<td>20 spaces (21 bars) @ 4%</td>
<td>35</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>#7</td>
<td>12% thru #13</td>
<td>23 spaces (24 bars) @ 4%</td>
<td>35</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>#7</td>
<td>13% thru #14</td>
<td>23 spaces (24 bars) @ 4%</td>
<td>35</td>
<td>3</td>
<td>26</td>
</tr>
</tbody>
</table>

**METRIC (mm)**

<table>
<thead>
<tr>
<th>Bar Size</th>
<th>Pavement Thickness</th>
<th>$a$ (Approx. Spacing)</th>
<th>$b$</th>
<th>$c$</th>
<th>$d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>#18</td>
<td>200 thru 250</td>
<td>18 spaces (19 bars) @ 191</td>
<td>90</td>
<td>75</td>
<td>560</td>
</tr>
<tr>
<td>#19</td>
<td>230 thru 250</td>
<td>21 spaces (22 bars) @ 163</td>
<td>90</td>
<td>80</td>
<td>560</td>
</tr>
<tr>
<td>#19</td>
<td>280 thru 310</td>
<td>23 spaces (24 bars) @ 149</td>
<td>90</td>
<td>80</td>
<td>560</td>
</tr>
<tr>
<td>#19</td>
<td>320 thru 350</td>
<td>26 spaces (27 bars) @ 132</td>
<td>90</td>
<td>75</td>
<td>560</td>
</tr>
<tr>
<td>#19</td>
<td>390 thru 420</td>
<td>29 spaces (30 bars) @ 118</td>
<td>95</td>
<td>80</td>
<td>560</td>
</tr>
<tr>
<td>#22</td>
<td>230 thru 250</td>
<td>15 spaces (16 bars) @ 229</td>
<td>90</td>
<td>75</td>
<td>460</td>
</tr>
<tr>
<td>#22</td>
<td>280 thru 300</td>
<td>17 spaces (18 bars) @ 292</td>
<td>90</td>
<td>75</td>
<td>660</td>
</tr>
<tr>
<td>#22</td>
<td>300 thru 310</td>
<td>19 spaces (20 bars) @ 181</td>
<td>90</td>
<td>70</td>
<td>660</td>
</tr>
<tr>
<td>#22</td>
<td>320 thru 340</td>
<td>21 spaces (22 bars) @ 163</td>
<td>95</td>
<td>80</td>
<td>660</td>
</tr>
<tr>
<td>#22</td>
<td>350 thru 370</td>
<td>23 spaces (24 bars) @ 149</td>
<td>90</td>
<td>80</td>
<td>660</td>
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<tr>
<td>#22</td>
<td>380 thru 400</td>
<td>25 spaces (26 bars) @ 137</td>
<td>95</td>
<td>80</td>
<td>660</td>
</tr>
<tr>
<td>#22</td>
<td>410 thru 430</td>
<td>27 spaces (28 bars) @ 127</td>
<td>90</td>
<td>80</td>
<td>660</td>
</tr>
</tbody>
</table>

---

### LAP DETAIL I

- $b = 4.0" (100 mm)$
- $c = 10.4" (260 mm)$ min.
- $d = 15.9" (400 mm)$ max.

### LAP DETAIL II

- $b = 36 / (900)$
- $c = 360 / (9000)$ min.

### LAP DETAIL III

- $b = 36 / (900)$
- $c = 360 / (9000)$ min.
TRANVERSE TERMINAL JOINT

SECTION B-B

Concrete pad slope shall match pavement slope.

Pavement reinforcement

Lap reinforcing steel 36 (900) when pavement is extended

3'-6" (1.1 m) min. from the end of the nearest longitudinal bar lap (typ.).

Tie bar

Support

36 (900)

36 (900)

12 Dowel bars at 12 (300) cts.

Split header board

3 (75) Expansion joint in shoulder, both sides

3 (75) cl., when t ≤ 8 (200)

3 (75) cl., when t > 8 (200)

PCC shoulder

3 (75) Expansion joint

Pavement reinforcement

3 (75) Stabilized subbase (HMA required)

4 (100) Preformed睡眠 slp slab.

12 Dowel bars at 12 (300) cts.

Transverse terminal joint

12 Dowel bars at 12 (300) cts.

Wide flange beam joint in mainline pavement only

Continuously reinforced pcc pavement

Sleeper slab

PCC shoulder

12 Dowel bars at 12 (300) cts.

Plan

GENERAL NOTES

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

See Standard 420001 and 420401 for joint details not shown.

See Standard 421001 for details of pavement reinforcement.

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

DATE REVISIONS
1-1-18 Changed tie bar spacing to 36 (900) cts.
1-1-14 Added exp. jnts. in shlds. & omitted bars, cnst. jnt. over wide flange beam slp slab.
36' (10.8 m) CRC PAVEMENT

WITH WIDE FLANGE BEAM TERMINAL JOINT

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

SECTION A-A

TYPICAL TRANSVERSE CONSTRUCTION JOINT

Pavement reinforcement

Transverse construction joint

Concrete pad slope shall match pavement slope.

Extended steel to be blocked up with wood blocking.

Entire top surface shall be steel trowel finished.

Lap reinforcing steel 36 (900) when pavement is extended.

5'-0" (1.5 m) to 6'-0" (1.8 m) min. from 10 (300) cts. shoulder, both sides

4 (100) Stabilized subbase (HMA required)

3 (75) Expansion joint in shoulder, both sides

3'-6" (1.1 m) min. from the end of the nearest longitudinal bar lap (typ).

Pavement reinforcement

Transverse construction joint

Concrete pad slope shall match pavement slope.

Extended steel to be blocked up with wood blocking.

Entire top surface shall be steel trowel finished.

Lap reinforcing steel 36 (900) when pavement is extended.

5'-0" (1.5 m) to 6'-0" (1.8 m) min. from 10 (300) cts. shoulder, both sides

4 (100) Stabilized subbase (HMA required)

3 (75) Expansion joint in shoulder, both sides

3'-6" (1.1 m) min. from the end of the nearest longitudinal bar lap (typ).

Pavement reinforcement

Transverse construction joint

Concrete pad slope shall match pavement slope.

Extended steel to be blocked up with wood blocking.

Entire top surface shall be steel trowel finished.

Lap reinforcing steel 36 (900) when pavement is extended.

5'-0" (1.5 m) to 6'-0" (1.8 m) min. from 10 (300) cts. shoulder, both sides

4 (100) Stabilized subbase (HMA required)

3 (75) Expansion joint in shoulder, both sides

3'-6" (1.1 m) min. from the end of the nearest longitudinal bar lap (typ).

Pavement reinforcement

Transverse construction joint

Concrete pad slope shall match pavement slope.

Extended steel to be blocked up with wood blocking.

Entire top surface shall be steel trowel finished.

Lap reinforcing steel 36 (900) when pavement is extended.

5'-0" (1.5 m) to 6'-0" (1.8 m) min. from 10 (300) cts. shoulder, both sides

4 (100) Stabilized subbase (HMA required)

3 (75) Expansion joint in shoulder, both sides

3'-6" (1.1 m) min. from the end of the nearest longitudinal bar lap (typ).

Pavement reinforcement

Transverse construction joint

Concrete pad slope shall match pavement slope.

Extended steel to be blocked up with wood blocking.

Entire top surface shall be steel trowel finished.

Lap reinforcing steel 36 (900) when pavement is extended.

5'-0" (1.5 m) to 6'-0" (1.8 m) min. from 10 (300) cts. shoulder, both sides

4 (100) Stabilized subbase (HMA required)

3 (75) Expansion joint in shoulder, both sides

3'-6" (1.1 m) min. from the end of the nearest longitudinal bar lap (typ).

Pavement reinforcement

Transverse construction joint

Concrete pad slope shall match pavement slope.

Extended steel to be blocked up with wood blocking.

Entire top surface shall be steel trowel finished.

Lap reinforcing steel 36 (900) when pavement is extended.

5'-0" (1.5 m) to 6'-0" (1.8 m) min. from 10 (300) cts. shoulder, both sides

4 (100) Stabilized subbase (HMA required)

3 (75) Expansion joint in shoulder, both sides

3'-6" (1.1 m) min. from the end of the nearest longitudinal bar lap (typ).

Pavement reinforcement

Transverse construction joint

Concrete pad slope shall match pavement slope.

Extended steel to be blocked up with wood blocking.

Entire top surface shall be steel trowel finished.

Lap reinforcing steel 36 (900) when pavement is extended.

5'-0" (1.5 m) to 6'-0" (1.8 m) min. from 10 (300) cts. shoulder, both sides

4 (100) Stabilized subbase (HMA required)

3 (75) Expansion joint in shoulder, both sides

3'-6" (1.1 m) min. from the end of the nearest longitudinal bar lap (typ).

Pavement reinforcement

Transverse construction joint

Concrete pad slope shall match pavement slope.

Extended steel to be blocked up with wood blocking.

Entire top surface shall be steel trowel finished.

Lap reinforcing steel 36 (900) when pavement is extended.

5'-0" (1.5 m) to 6'-0" (1.8 m) min. from 10 (300) cts. shoulder, both sides

4 (100) Stabilized subbase (HMA required)

3 (75) Expansion joint in shoulder, both sides

3'-6" (1.1 m) min. from the end of the nearest longitudinal bar lap (typ).

Pavement reinforcement

Transverse construction joint

Concrete pad slope shall match pavement slope.

Extended steel to be blocked up with wood blocking.
TRANVERSE TERMINAL JOINT

SECTION B-B

TRANVERSE CONSTRUCTION JOINT

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 AT LUG W

4 bars at 6'-0" (1.8 m) cts.
Bend top portion in field as shown.

Pavement reinforcement

SECTION AT LUG X

a bars at 6'-6" (1.9 m) cts.
Bend top portion in field as shown.

8 (200) Concrete pad

10 mil (0.25) Polyethylene bond breaker

SECTION AT LUG Y

Improved subgrade
(WHEN APPLICABLE)

Bend top portion in field as shown.

MATERIALS REQUIRED FOR (1) ONE LUG SYSTEM
(Excluding Pavement Concrete and Pavement Reinforcement)

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
<th>Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>132</td>
<td>No. 8 (No. 25)</td>
<td>14'-0&quot; (4.25 m)</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>18</td>
<td>No. 5 (No. 16)</td>
<td>24'-9&quot; (7.43 m)</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>132</td>
<td>No. 5 (No. 16)</td>
<td>20'-0&quot; (6.09 m)</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>28</td>
<td>No. 4 (No. 13)</td>
<td>11'-9&quot; (3.58 m)</td>
<td></td>
</tr>
</tbody>
</table>

Concrete, cu. yds. (m³)
64.0 (48.9)

Reinforcing Bars, lbs. (kg)
8372 (3800)

Concrete Pad, sq. yds. (m²)
144 (120)

Improved Subgrade, sq. yds. (m²)
162 (135)

CRC PAVEMENT
(WITH LUG SYSTEM)

STANDARD 421201-07
**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.

**DATE**

1-1-18  Changed tie bar spacing

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

**REVISIONS**

1-1-18  Changed bar spacing

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

**CRC PAVEMENT**

(WITH LUG SYSTEM)

(Sheet 1 of 2)

**STANDARD 421206-07**

**SECTION A-A**

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

**SECTION B-B**

**TRANSVERSE CONSTRUCTION JOINT**

**TRANSVERSE TERMINAL JOINT**

**36' (10.8 m)**

**STABILIZED SUBBASE (HMA required)**

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

**2 (50) Transverse expansion joint**

**12 Dowel bars at 12 (300) cts.**

**1-1-18**  Changed tie bar spacing

**1-1-08**  Switched units to English (metric). Revised

**Lug Sys. Table.**

**1-1-18**  Changed tie bar spacing

**1-1-08**  Switched units to English (metric). Revised

**Lug Sys. Table.**
**MATERIALS REQUIRED FOR (1) ONE LUG SYSTEM**

(Excluding Pavement Concrete and Pavement Reinforcement)

<table>
<thead>
<tr>
<th>Bar</th>
<th>No.</th>
<th>Size</th>
<th>Length (in ft)</th>
<th>Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>10</td>
<td>No. 8</td>
<td>16'-0'' (4.88 m)</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>18</td>
<td>No. 9</td>
<td>6'-0'' (1.83 m)</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>19</td>
<td>No. 9</td>
<td>6'-0'' (1.83 m)</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>22</td>
<td>No. 4</td>
<td>10'-0'' (3.05 m)</td>
<td></td>
</tr>
</tbody>
</table>

- Concrete, cu. yds. (m³): 95.6 (73.6 m³)
- Reinforcing Bars, lbs. (kg): 12,550 (5695 kg)
- Concrete Pad, cu. yds. (m³): 96.0 (73.4 m³)
- Improved Subgrade, sq. yds. (m²): 208 (174 m²)

**CRC PAVEMENT**

(36' (10.8 m))

(With LUG System)

**STANDARD 421206-07**
**PERPENDICULAR CURB RAMPS FOR SIDEWALKS**

RAMP IN LANDSCAPED AREA

**SETBACK ≤ 5'**

- Ramps may be located up to 5' (1.52 m) setback from the edge of the curb.
- 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.

RAMP IN PAVED AREA

**SETBACK ≤ 5'**

- Curb ramps or blended transitions shall be placed as a variable thickness.
- The running slope of a curb ramp shall be 1:20 min. and 1:12 max. The running slope of a blended transition shall be 1:20 max.

**SECTION A-A**

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

**SECTION B-B**

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

**DETAIL A**

- Detector strips shall be placed within 5' (1.52 m) max. of the edge of the curb.
- The running slope of a blended transition shall be 1:20 max. and 1:12 max. The running slope of a blended transition shall be 1:20 max.

**SIDE CURB DETAIL**

- 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**

- Permissible tolerances for detectable warning strips are ± 1 inch (25 mm) from the edges of detectable warning strips.
- The running slope of a blended transition shall be 1:10 max. at the toe of the ramp.
- See Sheet 2 for GENERAL NOTES.
**GENERAL NOTES**

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

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

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

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

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

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

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

**RAMP IN LANDSCAPED AREA**

**SETBACK > 5'**

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

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

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

**PERPENDICULAR CURB RAMPS FOR SIDEWALKS**

**STANDARD 424001-11**

(Sheet 2 of 2)
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 a 1:50 maximum slope is shown, 1:64 is preferred.

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

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

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

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

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

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

DIAGONAL CURB RAMPS FOR SIDEWALKS

STANDARD 424006-04

SECTION A-A

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

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

Where the turning space is constrained to 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.

---

**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.
**PARALLEL MID-BLOCK CURB RAMP**

- Curb ramp or blended transition
- Turning space, 4' (1.22 m) min
- Curb ramp or blended transition
- Sidewalk

**PERPENDICULAR MID-BLOCK CURB RAMP**

- Curb ramp or blended transition
- Turning space
- Curb ramp or blended transition
- Sidewalk

**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:

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

See Standard 604001 for details of depressed curb and blends between curbs.

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

**MID-BLOCK 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.

**SECTION B-B**

- Variable
top of sidewalk
- Ramp
- Expansion joint
- Ramp thickness
- See DETAIL A

**SECTION C-C**

- 1:50 max.
- Turning space
- Curb ramp or blended transition
- Detachable warning
- See DETAIL A

**SIDE CURB DETAIL**

**DETAIL A**

**DATE**

- 1-1-18

**REVISIONS**

- 1-1-19
- Removed upper landing, added blended transitions and detectable warning tolerances.
- 1-1-18
- Removed diagonal slope at turning spaces and upper landings.

**STANDARD 424016-05**
**DEPRESSED CORNER**

Sidewalk width 5' (1.52 m) typical, 4' (1.22 m) min.

**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.

**SIDE CURB DETAIL**

Variable

Expansion joint

Flush with top of roadway curb and gutter

**DETAIL A**

Depressed corner

Detectable warning

**SECTION B-B**

Depressed corner

Detectable warning

**GENERAL NOTES**

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

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

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

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

**Side Border:** Detectable warnings should extend the full width of the walking surface (excluding 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 FOR SIDEWALKS**

STANDARD 424021-05

ENGINEER OF DESIGN AND ENVIRONMENT

APPROVED

ISSUED

PASSED

DATE

REVISIONS

1-1-19

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

1-1-18

Deleted diagonal slope at turning spaces and upper landings.
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 entranceway to avoid the need for ramps and turning spaces.

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

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

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

**DATE**

<table>
<thead>
<tr>
<th>REVIEWS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-19</td>
</tr>
<tr>
<td>1-1-19</td>
</tr>
</tbody>
</table>

**ENTRANCE / ALLEY PEDESTRIAN CROSSINGS**

**SIDE CURB DETAIL**

**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**

- Flank with top of roadway curb and top of sidewalk
- Expanded joint

**DETAIL A**

- Ramp side flare in paved areas
- Pedestrian crossing
- Entrance or alley return
- Side curb in landscaped areas
- Sidewalk width 5' (1.52 m) typical, 4' (1.22 m) min.
**MEDIAN PEDESTRIAN CROSSING**

**SECTION A-A**

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

**GENERAL NOTES**

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

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

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

**Edge of gutter** - Typical

- Depressed curb and gutter
- Edges of gutter, typical
- Face of roadway curb, typical
- Variable expansion joint

**Widthed crosswalk to 6'**

- Added placement tolerances for detectable warnings.
- Revised General Notes.

**DATE**

1-1-19

**REVISIONS**

1-1-19

- Added placement tolerances for detectable warnings.

1-1-12

- Widthed crosswalk to 6'
- Revised General Notes.
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.

**Every 3rd intersection must be tied.

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

*** Variables: Where \( S_1 \) and \( S_2 \) are 2\( 3/4 \) (65) min. and 12 (300) max. \( D_1 = 2(S_1) \) and \( D_2 = 2(S_2) \).
Class B Patches

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.

Date: 1-1-97
Revisions:
1-1-18 Revised reference to Standard 420701 in General Notes.
1-1-19 Revised Dowel Bar Table.

Standard 442101-09

Dowel Bar Table:

<table>
<thead>
<tr>
<th>Pavement Thickness</th>
<th>Dowel Bar Diameter</th>
<th>Hole Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 (250) or greater</td>
<td>1/8 (3/8)</td>
<td>1/8 (3/8)</td>
</tr>
<tr>
<td>Less than 8 (200)</td>
<td>3/32 (25)</td>
<td>1/8 (3/29)</td>
</tr>
</tbody>
</table>

Illinois Department of Transportation

Engineer of Policy and Procedures
Approved

Engineer of Design and Environment
Issued

January 1, 2019

PASSED
DATE
REVISIONS
See sealing details

**METHOD I**
**Without Resurfacing**

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

**METHOD II**
**With Resurfacing**

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

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

Angles not less than 60°

Existing longitudinal joint

Angles not less than 60°

SECTION A-A

(Built in two operations)

SECTION B-B

SECTION C-C

SECTION D-D

SECTION E-E

GENERAL NOTES

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

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

DATE
1-1-08

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

1-1-07 Revised date for Class C patches.

CLASS C and D Patches

STANDARD 442201-03
SHOULDER FOR TANGENT PAVEMENT

Variable slope 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 shoulder of superelevated pavement.

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

HMA SHOULDER ADJACENT TO FLEXIBLE PAVEMENT

STANDARD 482001-02

DATE REVISIONS
1-1-06 Switched units to English (metric)
1-1-07 Switched to HMA Mix
1-1-08 Asphalt Concrete terminology
SHOULDER FOR TANGENT PAVEMENT

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

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

SHOULDER FOR SUPERELEVATED PAVEMENT

SHOULDER FOR SUPERELEVATED PAVEMENT

SHOULDER FOR SUPERELEVATED PAVEMENT

SHOULDER FOR TANGENT PAVEMENT

SHOULDER FOR TANGENT PAVEMENT

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.

HMA SHOULDER ADJACENT TO RIGID PAVEMENT

STANDARD 482006-03
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)

HMA SHLD. STRIPS/SHLDS.
WITH RESURFACING OR WIDENING
AND RESURFACING PROJECTS
(Sheet 1 of 2)

STANDARD 482011-03
SHOULDER FOR TANGENT PAVEMENT

SHOULDER FOR SUPERELEVATED PAVEMENT (Outside of curve)

SHOULDER FOR SUPERELEVATED PAVEMENT (Inside of curve)

NOTES

Note 1: Does not apply when sub-surface drains are installed.

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

Note 3: When the superelevation rate of the pavement is between 0% and 4%, the shoulder shall be sloped at 4%. When the superelevation rate of the pavement exceeds 4%, the shoulder shall be sloped so that the algebraic difference between the pavement and shoulder slopes will not be greater than 8%.

GENERAL NOTES

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

Transverse expansion joints shall be as detailed on Standard 420001 except that 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

REVISIONS
1-1-18

Switched PLA view

1-1-08

Switched units to English (metric)

PCC SHOULDER

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

FOR PARAPET AND END POST MOUNTED

FOR PARAPET
(When Dog Ear Wing is used)

FOR STEEL RAILS

FOR TRUSSES

FOR 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 approach end while looking in the direction of increasing stationing.

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

DATE
REVISIONS
1-1-09
Switched units to English (metric). Added pier detail.
1-1-02
Remove placing note on pier. 2. Added Braze to diag. note on sht. 1.

STANDARD 515001-03

Illinois Department of Transportation
APPROVED
ENGINEER OF BRIDGES AND STRUCTURES
January 1, 2009
APPROVED
ENGINEER OF DESIGN AND ENVIRONMENT
January 1, 2009
ISSUED

NAME PLATE
FOR BRIDGES

(Sheet 1 of 2)
SEE DESIGN PLANS FOR LETTERING

NOTE:
Border and lettering: Raised 3/4 [19], square cut and not tapered.
LONGITUDINAL SECTION

SECTION B-B

SECTION C-C

REINFORCEMENT SCHEDULE

Pipe I.D. | Bar Size | Bar Spacing
---------|----------|--------------
3 (75)  | #6 (13)  | 12 (300) cts.
4 (100) | #5 (16)  | 12 (300) cts.
5 (125) | #4 (13)  | 12 (300) cts.
6 (150) | #4 (13)  | 12 (300) cts.
7 (175) | #4 (13)  | 12 (300) cts.
8 (200) | #4 (13)  | 12 (300) cts.
9 (225) | #4 (13)  | 12 (300) cts.
10 (250) | #4 (13) | 12 (300) cts.
11 (275) | #4 (13)  | 12 (300) cts.
12 (300) | #4 (13)  | 12 (300) cts.
13 (325) | #4 (13)  | 12 (300) cts.
14 (350) | #4 (13)  | 12 (300) cts.
15 (375) | #4 (13)  | 12 (300) cts.
16 (400) | #4 (13)  | 12 (300) cts.
17 (425) | #4 (13)  | 12 (300) cts.
18 (450) | #4 (13)  | 12 (300) cts.
19 (475) | #4 (13)  | 12 (300) cts.
20 (500) | #4 (13)  | 12 (300) cts.
21 (525) | #4 (13)  | 12 (300) cts.
22 (550) | #4 (13)  | 12 (300) cts.
23 (575) | #4 (13)  | 12 (300) cts.
24 (600) | #4 (13)  | 12 (300) cts.
25 (625) | #4 (13)  | 12 (300) cts.
26 (650) | #4 (13)  | 12 (300) cts.
27 (675) | #4 (13)  | 12 (300) cts.
28 (700) | #4 (13)  | 12 (300) cts.
29 (725) | #4 (13)  | 12 (300) cts.
30 (750) | #4 (13)  | 12 (300) cts.
31 (775) | #4 (13)  | 12 (300) cts.
32 (800) | #4 (13)  | 12 (300) cts.
33 (825) | #4 (13)  | 12 (300) cts.
34 (850) | #4 (13)  | 12 (300) cts.
35 (875) | #4 (13)  | 12 (300) cts.
36 (900) | #4 (13)  | 12 (300) cts.
37 (925) | #4 (13)  | 12 (300) cts.
38 (950) | #4 (13)  | 12 (300) cts.
39 (975) | #4 (13)  | 12 (300) cts.
40 (1000)| #4 (13)  | 12 (300) cts.
41 (1025)| #4 (13)  | 12 (300) cts.
42 (1050)| #4 (13)  | 12 (300) cts.
43 (1075)| #4 (13)  | 12 (300) cts.
44 (1100)| #4 (13)  | 12 (300) cts.
45 (1125)| #4 (13)  | 12 (300) cts.
46 (1150)| #4 (13)  | 12 (300) cts.
47 (1175)| #4 (13)  | 12 (300) cts.
48 (1200)| #4 (13)  | 12 (300) cts.
49 (1225)| #4 (13)  | 12 (300) cts.
50 (1250)| #4 (13)  | 12 (300) cts.
51 (1275)| #4 (13)  | 12 (300) cts.
52 (1300)| #4 (13)  | 12 (300) cts.
53 (1325)| #4 (13)  | 12 (300) cts.
54 (1350)| #4 (13)  | 12 (300) cts.
55 (1375)| #4 (13)  | 12 (300) cts.
56 (1400)| #4 (13)  | 12 (300) cts.
57 (1425)| #4 (13)  | 12 (300) cts.
58 (1450)| #4 (13)  | 12 (300) cts.
59 (1475)| #4 (13)  | 12 (300) cts.
60 (1500)| #4 (13)  | 12 (300) cts.
61 (1525)| #4 (13)  | 12 (300) cts.
62 (1550)| #4 (13)  | 12 (300) cts.
63 (1575)| #4 (13)  | 12 (300) cts.
64 (1600)| #4 (13)  | 12 (300) cts.
65 (1625)| #4 (13)  | 12 (300) cts.
66 (1650)| #4 (13)  | 12 (300) cts.
67 (1675)| #4 (13)  | 12 (300) cts.
68 (1700)| #4 (13)  | 12 (300) cts.
69 (1725)| #4 (13)  | 12 (300) cts.
70 (1750)| #4 (13)  | 12 (300) cts.
71 (1775)| #4 (13)  | 12 (300) cts.
72 (1800)| #4 (13)  | 12 (300) cts.
73 (1825)| #4 (13)  | 12 (300) cts.
74 (1850)| #4 (13)  | 12 (300) cts.
75 (1875)| #4 (13)  | 12 (300) cts.
76 (1900)| #4 (13)  | 12 (300) cts.
77 (1925)| #4 (13)  | 12 (300) cts.
78 (1950)| #4 (13)  | 12 (300) cts.
79 (1975)| #4 (13)  | 12 (300) cts.
81 (2025)| #4 (13)  | 12 (300) cts.
82 (2050)| #4 (13)  | 12 (300) cts.
83 (2075)| #4 (13)  | 12 (300) cts.
84 (2100)| #4 (13)  | 12 (300) cts.
85 (2125)| #4 (13)  | 12 (300) cts.
86 (2150)| #4 (13)  | 12 (300) cts.
87 (2175)| #4 (13)  | 12 (300) cts.
88 (2200)| #4 (13)  | 12 (300) cts.
89 (2225)| #4 (13)  | 12 (300) cts.
90 (2250)| #4 (13)  | 12 (300) cts.
91 (2275)| #4 (13)  | 12 (300) cts.
92 (2300)| #4 (13)  | 12 (300) cts.
93 (2325)| #4 (13)  | 12 (300) cts.
94 (2350)| #4 (13)  | 12 (300) cts.
95 (2375)| #4 (13)  | 12 (300) cts.
96 (2400)| #4 (13)  | 12 (300) cts.
97 (2425)| #4 (13)  | 12 (300) cts.
98 (2450)| #4 (13)  | 12 (300) cts.
99 (2475)| #4 (13)  | 12 (300) cts.
100 (2500)| #4 (13)  | 12 (300) cts.
### Quantities

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<th>Reinforcement Without Lap (lbs kg)</th>
<th>Reinforcement With Lap (lbs kg)</th>
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</table>

For cast-in-place construction, increase concrete volumes by approximately 12%.

---

**Concrete End Sections for Pipe Culverts**

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

**STANDARD 542001-06**

(Sheet 3 of 3)
QUANTITIES
3

Concrete yd

Equivalent
Round Size

3

(m )

1

Reinforcement Without Lap lbs. (kg)

Slope of End Section

Reinforcement With Lap lbs (kg)

Slope of End Section

Slope of End Section

Pipe I.D.

1:2

1:3

1:4

1:6

1:2

1:3

1:4

1:6

1:2

1:3

1:4

1:6

15

1.5

1.9

2.3

3.0

220

270

320

420

240

300

350

470

(375)

(1.1)

(1.6)

(1.8)

(2.3)

(120.8)

(148.3)

(172.9)

(228.5)

(132.3)

(164.3)

(192.8)

(257.4)

18

1.5

1.9

2.3

3.0

220

270

320

420

240

300

350

470

(450)

(1.3)

(1.6)

(1.8)

(2.3)

(120.8)

(148.3)

(172.9)

(228.5)

(132.3)

(164.3)

(192.8)

(257.4)

21

2.2

2.8

3.5

4.8

310

390

470

630

330

420

520

700

(525)

(1.7)

(2.1)

(2.7)

(3.7)

(167.2)

(172.9)

(211.5)

(285.2)

(181.8)

(189.3)

(232.9)

(316.3)

24

2.2

2.8

3.5

4.8

310

390

470

630

330

420

520

700

(600)

(1.7)

(2.1)

(2.7)

(3.7)

(167.2)

(172.9)

(211.5)

(285.2)

(181.8)

(189.3)

(232.9)

(316.3)

27

2.5

3.2

3.9

5.4

330

420

510

690

360

460

560

760

(700)

(1.9)

(2.4)

(3.0)

(4.1)

(181.7)

(190.1)

(231.4)

(310.5)

(197.0)

(208.0)

(254.3)

(343.1)

30

2.7

3.5

4.3

5.9

350

450

540

730

380

490

600

810

(750)

(2.1)

(2.7)

(3.3)

(4.5)

(193.1)

(201.9)

(244.9)

(331.3)

(209.5)

(220.4)

(268.7)

(365.3)

36

3.3

4.4

5.4

7.5

430

560

690

940

470

610

740

1020

(900)

(2.5)

(3.4)

(4.1)

(5.7)

(237.6)

(252.2)

(309.3)

(423.4)

(255.8)

(273.0)

(335.9)

(461.8)

42

4.0

5.3

6.6

9.2

510

660

820

1120

550

700

880

1220

(1050)

(3.1)

(4.1)

(5.0)

(7.0)

(279.8)

(295.6)

(369.1)

(508.5)

(299.8)

(317.9)

(398.7)

(551.3)

48

4.7

6.2

7.8

10.9

660

870

1070

1490

710

940

1160

1610

(1200)

(3.6)

(4.7)

(6.0)

(8.3)

(362.5)

(391.5)

(485.4)

(672.8)

(389.5)

(422.8)

(525.7)

(731.4)

54

5.3

7.2

9.0

12.6

730

960

1190

1670

780

1030

1290

1810

(1350)

(4.1)

(5.5)

(6.9)

(9.6)

(400.1)

(434.4)

(540.2)

(756.6)

(428.9)

(467.9)

(583.7)

(820.5)

60

6.3

8.5

10.7

15.1

830

1110

1390

1950

890

1180

1490

2100

(1500)

(4.8)

(6.5)

(8.2)

(11.5)

(458.1)

(500.0)

(629.0)

(882.2)

(488.7)

(535.9)

(676.2)

(951.4)

66

7.1

9.6

12.2

17.2

1080

1470

1840

2610

1180

1610

2030

2880

(1650)

(5.4)

(7.3)

(9.3)

(13.2)

(596.0)

(665.5)

(836.2)

(1185.3)

(650.1)

(729.0)

(918.3)

(1306.3)

72

8.2

11.1

14.0

19.8

1190

1620

2050

2930

1290

1770

2250

3220

(1800)

(6.3)

(8.5)

(10.7)

(14.9)

(653.9)

(734.2)

(931.6)

(1328.9)

(710.7)

(801.7)

(1019.9)

(1460.0)

1

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

GENERAL NOTES
This Standard is used with single pipe culverts and
multi-pipe culvert installations.

For multi-pipe

culvert installations, place the end sections
side-by-side leaving a 3 (75) space between
adjacent end section walls and fill the space(s) with
Class SI concrete.

The number of segments shown in elevation is for
example only.

The length and number of precast

sections required to construct the end section
shall be determined by the Contractor.

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

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

2‚ x 2‚ x Š (56 x 56 x 8) plate washers shall be
provided under each nut required for the anchor
rods.

Holes in the walls for the culvert tie

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

See Standard 542311 for end sections having
traversable pipe grate.

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

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

CONCRETE END SECTIONS FOR ELLIPTICAL
Illinois Department of Transportation

April 15,

2016

ENGINEER OF BRIDGES AND STRUCTURES
April 15,

2016

ENGINEER OF DESIGN AND ENVIRONMENT

1-1-13

APPROVED

ISSUED

APPROVED

PIPE CULVERTS 15" (375 mm)
THRU 72" (1800 mm) EQUIVALENT DIAMETER
(Sheet 3 of 3)

STANDARD 542011-02

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

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

Build tops of headwalls parallel to grade line.

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

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

Switched units to English (metric).

Soft converted metric reinforcement bars.

Added h bars.

SECTION A-A

PLAN

END VIEW

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

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

BAR - v

GENERAL NOTES

Build tops of headwalls parallel to grade line.

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

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

Switched units to English (metric).

Soft converted metric reinforcement bars.

Added h bars.
### WINGS FOR 1½% SLOPE

#### Dimensions for Concrete

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<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>M</th>
<th>N</th>
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<td>15</td>
<td>28</td>
<td>10</td>
<td>29</td>
<td>19</td>
<td>8°-11°</td>
<td>7°-55°</td>
<td>38</td>
<td>19</td>
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<td>3°-6°</td>
<td>2%</td>
<td>4%</td>
</tr>
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<td>14</td>
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<td>38</td>
<td>24</td>
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#### Reinforcement for Bar 2 End Sections

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#### Reinforced Concrete End Sections

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**REINFORCED CONCRETE END SECTIONS**

**FOR PIPE CULVERTS**

15° (375 mm) THRU 36° (900 mm) DIA.

SKEewed WITH ROADWAY

(Sheet 2 of 5)

**STANDARD 542201-02**
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**REINFORCED CONCRETE END SECTIONS**

**FOR PIPE CULVERTS**

15° (375 mm) THRU 36° (900 mm) DIA.

SKEWED WITH ROADWAY

**STANDARD 542201-02**
### Dimensions for Concrete

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**WINGS FOR 1:2 SLOPE**

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### Reinforced Concrete End Sections

**FOR PIPE CULVERTS**

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

(Sheet 4 of 5)
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**DIMENSIONS FOR CONCRETE**

- **Concrete Rein. Bars**: 2 End Sections
- **Concrete Ends**: 2 End Sections
- **Concrete Ends**: 2 End Sections
- **Concrete Ends**: 2 End Sections
- **Concrete Ends**: 2 End Sections
- **Concrete Ends**: 2 End Sections
- **Concrete Ends**: 2 End Sections
- **Concrete Ends**: 2 End Sections

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**WINGS FOR 1:2 SLOPE**

- **Wings**: 1:2 Slope
- **Wings**: 1:2 Slope
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**STANDARD 542201-02**

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- **STANDARD 542201-02**

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**REINFORCED CONCRETE END SECTIONS**

- **Pipe Culverts**: 15° (375 mm) THRU 36° (900 mm) DIA.
- **Pipe Culverts**: 15° (375 mm) THRU 36° (900 mm) DIA.
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- **Pipe Culverts**: 15° (375 mm) THRU 36° (900 mm) DIA.

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**SHEET 5 OF 5**
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.

GENERAL NOTES

Build tops of headwalls parallel to grade line.

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

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

All dimensions are in inches (millimeters) unless otherwise shown.
## Dimensions for Concrete

### 5° Slope

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### Welded Wire Reinforcement

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**REINFORCED CONCRETE END SECTIONS**

**FOR PIPE CULVERTS**

42" (1050 mm) THRU 60" (1500 mm) DIA.

SKEWED WITH ROADWAY

(Sheet 2 of 5)

**STANDARD 542206-04**
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<td>8' -10&quot; (2.71 m)</td>
<td>12,285 (2.4)</td>
</tr>
</tbody>
</table>

**REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS**

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

**STANDARD 542206-04**
<table>
<thead>
<tr>
<th>Slope Angle</th>
<th>Nominal Pipe Dia.</th>
<th>Dimensions for Concrete</th>
<th>Concrete End Secs.</th>
<th>Welded Wire Reinforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>35°</td>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>10</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td>48</td>
<td></td>
<td>13</td>
<td>26</td>
<td>14</td>
</tr>
<tr>
<td>54</td>
<td></td>
<td>17</td>
<td>29</td>
<td>18</td>
</tr>
<tr>
<td>40°</td>
<td></td>
<td>22</td>
<td>33</td>
<td>23</td>
</tr>
<tr>
<td>45°</td>
<td></td>
<td>27</td>
<td>36</td>
<td>28</td>
</tr>
<tr>
<td>50°</td>
<td></td>
<td>32</td>
<td>40</td>
<td>33</td>
</tr>
<tr>
<td>55°</td>
<td></td>
<td>37</td>
<td>43</td>
<td>38</td>
</tr>
<tr>
<td>60°</td>
<td></td>
<td>42</td>
<td>45</td>
<td>43</td>
</tr>
</tbody>
</table>

**REINFORCED CONCRETE END SECTIONS**

**FOR PIPE CULVERTS**

42" (1060 mm) THRU 60" (1500 mm) DIA.

SKEWED WITH ROADWAY

(Sheet 5 of 5)
**SECTION A-A**

**GENERAL NOTES**

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

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

**PRECAST REINFORCED CONCRETE FLARED END SECTION**

**STANDARD 542301-03**

**END VIEW**

**PLATE**

**PLAN**

**END SECTION**

**DATE**

**REVISIONS**

1-1-13

1-1-09

**Carried to pipe dia. on Section A-A**

**Amer to outer cage ref.**

**Switched units to**

**Engineers**

**January 3, 2013**

**January 3, 2013**

**PRECAST REINFORCED CONCRETE FLARED END SECTION**
**SECTION A-A**

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

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

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

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

**Optional Welded Wire Reinforcement Lap**

**PreCast Reinforced Concrete Elliptical Flared End Section**

**DATE**
- 4-1-16

**REVISIONS**
- Changed terminology to "welded wire reinforcement".
- Corrected min. lap dimension.
- Switched units to English (metric).

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

**All dimensions are in inches (millimeters) unless otherwise shown.**
Steel anchor pipe details not shown. (See Detail A for dimensions and intermediate support.)

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

LONGITUDINAL SECTION

PLAN VIEW

SECTION B-B

SECTION D-D

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 1½ (38) unless noted otherwise.

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

TRAVERSABLE PIPE GRATE FOR CONCRETE END SECTIONS

STANDARD 542311-07
### PIPE-GRADE SCHEDULE FOR PIPE CULVERT END SECTIONS

<table>
<thead>
<tr>
<th>Pipe</th>
<th>Slope of End Section</th>
<th>1-3</th>
<th>2-4</th>
<th>2-6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Main Pipe</td>
<td>Int. Support</td>
<td>Total Length</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. / Length</td>
<td>No. / Length</td>
<td>of Pipe</td>
</tr>
<tr>
<td>27</td>
<td></td>
<td>1 @ (2.95 m)</td>
<td>1 @ (3.96 m)</td>
<td>(2.89 m)</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>1 @ (3.45 m)</td>
<td>1 @ (4.60 m)</td>
<td>(3.85 m)</td>
</tr>
<tr>
<td>35</td>
<td></td>
<td>1 @ (3.61 m)</td>
<td>1 @ (5.70 m)</td>
<td>(4.09 m)</td>
</tr>
<tr>
<td>36</td>
<td></td>
<td>1 @ (3.91 m)</td>
<td>1 @ (6.10 m)</td>
<td>(5.20 m)</td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>2 @ (4.50 m)</td>
<td>2 @ (5.70 m)</td>
<td>(9.20 m)</td>
</tr>
<tr>
<td>48</td>
<td></td>
<td>2 @ (4.80 m)</td>
<td>2 @ (6.05 m)</td>
<td>(10.85 m)</td>
</tr>
<tr>
<td>54</td>
<td></td>
<td>2 @ (5.10 m)</td>
<td>2 @ (6.30 m)</td>
<td>(11.40 m)</td>
</tr>
<tr>
<td>59</td>
<td></td>
<td>2 @ (5.40 m)</td>
<td>2 @ (6.60 m)</td>
<td>(11.00 m)</td>
</tr>
<tr>
<td>66</td>
<td></td>
<td>2 @ (5.70 m)</td>
<td>2 @ (6.90 m)</td>
<td>(11.60 m)</td>
</tr>
<tr>
<td>78</td>
<td></td>
<td>2 @ (6.00 m)</td>
<td>2 @ (7.20 m)</td>
<td>(13.20 m)</td>
</tr>
<tr>
<td>94</td>
<td></td>
<td>2 @ (6.40 m)</td>
<td>2 @ (7.60 m)</td>
<td>(14.00 m)</td>
</tr>
<tr>
<td>110</td>
<td></td>
<td>2 @ (6.80 m)</td>
<td>2 @ (7.80 m)</td>
<td>(14.60 m)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Pipe</th>
<th>Slope of End Section</th>
<th>1-3</th>
<th>2-4</th>
<th>2-6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Main Pipe</td>
<td>Int. Support</td>
<td>Total Length</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. / Length</td>
<td>No. / Length</td>
<td>of Pipe</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>1 @ (8.22) m</td>
<td>1 @ (14.2) m</td>
<td>(12.42) m</td>
</tr>
<tr>
<td>44</td>
<td></td>
<td>1 @ (8.88) m</td>
<td>1 @ (16.7) m</td>
<td>(13.58) m</td>
</tr>
<tr>
<td>65</td>
<td></td>
<td>1 @ (9.54) m</td>
<td>1 @ (17.9) m</td>
<td>(17.44) m</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td>1 @ (10.20) m</td>
<td>1 @ (19.4) m</td>
<td>(19.60) m</td>
</tr>
<tr>
<td>146</td>
<td></td>
<td>1 @ (10.86) m</td>
<td>1 @ (21.7) m</td>
<td>(22.56) m</td>
</tr>
<tr>
<td>232</td>
<td></td>
<td>1 @ (11.52) m</td>
<td>1 @ (23.8) m</td>
<td>(25.32) m</td>
</tr>
<tr>
<td>364</td>
<td></td>
<td>1 @ (12.18) m</td>
<td>1 @ (26.0) m</td>
<td>(28.18) m</td>
</tr>
<tr>
<td>550</td>
<td></td>
<td>1 @ (12.84) m</td>
<td>1 @ (28.2) m</td>
<td>(31.04) m</td>
</tr>
</tbody>
</table>

---

**TRAVERSIBLE PIPE GRATE FOR CONCRETE END SECTIONS**

**STANDARD 542311-07**

---
### Revise the text based on the data extracted from the image:

**FIGURE 6-2** Standard 542401-03  
**Metal Flared End Section for Pipe Culverts**  

#### FOR 60 (1500) thru 84 (2250) sizes, reinforced angles shall be supplemented with differen  
metal pipes having helical ends, only the dimple  
metal pipes having annular ends. For corrugated  
Coupler shall be 2\(x\)2\(x\)1\(\frac{3}{4}\) depth annular corrugated pipe.  
Type 3 connection can be used for all pipe sizes.  
Stub shall be either 2\(x\)1\(\frac{3}{4}\) pitch \(x\) \(\frac{13}{16}\) depth or 3\(x\)1\(\frac{1}{2}\) pitch \(x\) \(\frac{13}{16}\) depth annular corrugated pipe.  
Type 4 connection can be used for all pipe sizes.  
Coupler shall be 2\(x\)1\(\frac{3}{4}\) pitch \(x\) \(\frac{13}{16}\) dimple, hugger,  
or annular band of 3\(x\)2\(x\)2\(\frac{1}{4}\).  
The开启了, Hugo, 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 slope ratios are expressed as units of vertical  
displacement to units of horizontal displacement (V:H).

#### CONNECTIONS OF END SECTIONS

- **TYPE 1**  
  For 2\(x\) (300) thru 24 \(x\) (600) only  
  (See Note 1)

- **TYPE 2**  
  For 2\(x\) (300) and  
  3\(x\) (900) only  
  (See Note 2)

- **TYPE 3**  
  (See Note 3)

- **TYPE 4**  
  (See Note 3)

#### METAL FLARED END  
SECTION FOR  
PIPE CULVERTS  

#### METAL FLARED END CONNECTOR  
(For Type 1 only)

- **ALTERNATE STRAP CONNECTOR**  
  (For Type 1 only)

#### 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 (3000) of the pipe length.  
   The connection section shall be attached to the end  
   section by rivets or bolts and shall be the same  
   metal thickness as the end section.  
   Stub shall be either 2\(x\)1\(\frac{3}{4}\) pitch \(x\) \(\frac{13}{16}\) depth or 3\(x\)1\(\frac{1}{2}\) pitch \(x\) \(\frac{13}{16}\) depth annular corrugated pipe.

3. Type 4 connection can be used for all pipe sizes.  
   Coupler shall be 2\(x\)1\(\frac{3}{4}\) pitch \(x\) \(\frac{13}{16}\) dimple, hugger,  
or annular band of 3\(x\)2\(x\)2\(\frac{1}{4}\).  
The开启了, Hugo, 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.
METAL END SECTIONS FOR ROUND PIPE CULVERT

<table>
<thead>
<tr>
<th>PIPE DIAMETER (in)</th>
<th>METAL THICKNESS (in)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>OVERALL WIDTH (in)</th>
<th>L</th>
<th>SLOPE 1:4</th>
<th>SLOPE 1:6</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>0.040</td>
<td>8</td>
<td>6</td>
<td>24</td>
<td>32</td>
<td>37</td>
<td>39</td>
<td>40</td>
</tr>
<tr>
<td>42</td>
<td>0.040</td>
<td>8</td>
<td>6</td>
<td>27</td>
<td>35</td>
<td>40</td>
<td>42</td>
<td>44</td>
</tr>
<tr>
<td>48</td>
<td>0.040</td>
<td>8</td>
<td>6</td>
<td>30</td>
<td>40</td>
<td>40</td>
<td>44</td>
<td>48</td>
</tr>
<tr>
<td>54</td>
<td>0.040</td>
<td>8</td>
<td>6</td>
<td>33</td>
<td>45</td>
<td>50</td>
<td>53</td>
<td>56</td>
</tr>
<tr>
<td>60</td>
<td>0.040</td>
<td>8</td>
<td>6</td>
<td>36</td>
<td>48</td>
<td>50</td>
<td>56</td>
<td>60</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: 1-1-18
REVISIONS: New standard

SLOPED METAL END SECTIONS
FOR PIPE CULVERTS 15" (375 mm) THRU 60" (1500 mm) DIA.

STANDARD 542411
LONGITUDINAL DRAINAGE BAR

SAFETY BAR DETAILS

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

Typical Installation

SLOPED METAL END SECTIONS
FOR PIPE CULVERTS 15" (375 mm)
THRU 60" (1500 mm) DIA.

STANDARD 542411

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

**SAFETY BAR DETAILS**

- 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.

**Typical Installation**

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

ILLINOIS DEPARTMENT OF TRANSPORTATION

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PASSED

ENGINEER OF POLICY AND PROCEDURES

(Sheet 2 of 2)
SECTION A-A

Traffic of box in relation to median.

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

PLAN

3½ (90) O.D. galv. steel pipe

PLAN OF REINFORCEMENT

Material required for one inlet box

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>10</td>
<td>No. 4</td>
<td>7'-9&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. 13</td>
<td>(2.30 m)</td>
</tr>
<tr>
<td>w</td>
<td>10</td>
<td>No. 4</td>
<td>6'-3&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. 13</td>
<td>(1.90 m)</td>
</tr>
<tr>
<td>u1</td>
<td>1</td>
<td>No. 4</td>
<td>5'-8&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. 13</td>
<td>(1.70 m)</td>
</tr>
<tr>
<td>u</td>
<td>6</td>
<td>No. 4</td>
<td>3'-6&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. 13</td>
<td>(1.05 m)</td>
</tr>
<tr>
<td>v1</td>
<td>4</td>
<td>No. 4</td>
<td>2'-4&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. 13</td>
<td>(0.60 m)</td>
</tr>
<tr>
<td>v2</td>
<td>2</td>
<td>No. 4</td>
<td>2'-0&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. 13</td>
<td>(0.60 m)</td>
</tr>
<tr>
<td>Galv. Steel Pipe</td>
<td>6'-0&quot;</td>
<td>O.D. (2.38 m)</td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td>cu. yds.</td>
<td>(m³)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.3</td>
<td>(0.9)</td>
<td></td>
</tr>
<tr>
<td>Reinf. Bars</td>
<td>lbs.</td>
<td>(kg)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>115</td>
<td>(52.2)</td>
<td></td>
</tr>
</tbody>
</table>

GENERAL NOTES

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

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

INLET BOX

TYPE 24 (600) A

(Sheet 1 of 2)
Material required for one inlet box

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>4</td>
<td>No. 4 (No. 13)</td>
<td>12'-4&quot; (3.76 m)</td>
</tr>
<tr>
<td>h1</td>
<td>2</td>
<td>No. 4 (No. 13)</td>
<td>9'-4&quot; (2.84 m)</td>
</tr>
<tr>
<td>h2</td>
<td>2</td>
<td>No. 4 (No. 13)</td>
<td>12'-8&quot; (3.86 m)</td>
</tr>
<tr>
<td>v</td>
<td>2</td>
<td>No. 4 (No. 13)</td>
<td>3'-4&quot; (1.05 m)</td>
</tr>
<tr>
<td>v1</td>
<td>4</td>
<td>No. 4 (No. 13)</td>
<td>3'-8&quot; (1.11 m)</td>
</tr>
<tr>
<td>v2</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>5'-10&quot; (1.75 m)</td>
</tr>
</tbody>
</table>

Concrete

- Cubic yards
- Reinf. Bars
- Galv. Steel Pipe

Switched units to English (metric).

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**

**Plan of Reinforcement**

**Section A-A**

**Plan**

- Bars u, u1 & u2
- 3/4" O.D. galv. steel pipe

**Plan of Inlet Box**

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) B**

Switched units to English (metric).

**Plan of Inlet Box**

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) B**

Switched units to English (metric).
TOP ANCHOR PLATE

SECTION B-B

SECTION C-C

DETAIL AT BLOCKOUTS

INLET BOX
TYPE 24 (600) B

STANDARD 542506-03
**GENERAL NOTES**

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

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

---

**PLAN OF REINFORCEMENT**

- Bar **h1**

- Bar **u & u1**

---

**INLET BOX**

**TYPE 24 (600) D**

---

**STANDARD 542516-03**
3'-7" (1.11 m)  
3 (75) Below normal slope

SECTION A-A

PLAN

SECTION B-B

GENERAL NOTES

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

INLET BOX

TYPE 24 (600) E

Material required for one inlet box

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>8</td>
<td>No. 4</td>
<td>12'-0&quot; (3.66 m)</td>
</tr>
<tr>
<td>h1</td>
<td>2</td>
<td>No. 4</td>
<td>9'-0&quot; (2.75 m)</td>
</tr>
<tr>
<td>L</td>
<td>5</td>
<td>No. 4</td>
<td>5'-0&quot; (1.50 m)</td>
</tr>
<tr>
<td>u</td>
<td>9</td>
<td>No. 4</td>
<td>6'-0&quot; (1.80 m)</td>
</tr>
<tr>
<td>u1</td>
<td>3</td>
<td>No. 4</td>
<td>5'-11&quot; (1.85 m)</td>
</tr>
<tr>
<td>u2</td>
<td>2</td>
<td>No. 4</td>
<td>5'-10&quot; (1.72 m)</td>
</tr>
<tr>
<td>v</td>
<td>6</td>
<td>No. 4</td>
<td>30 (760)</td>
</tr>
<tr>
<td>v1</td>
<td>6</td>
<td>No. 4</td>
<td>24 (610)</td>
</tr>
<tr>
<td>v2</td>
<td>6</td>
<td>No. 4</td>
<td>18 (460)</td>
</tr>
</tbody>
</table>

Concrete

Bar

<table>
<thead>
<tr>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>(1.5)</td>
<td>(79.4)</td>
</tr>
</tbody>
</table>

Galv. Steel Pipe

35.899 (600) O.D. galv. steel pipe

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January 1, 2009

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January 1, 2009

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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 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) F

DATE
REVISIONS
1-1-11
Corrected weld symbols
2 Sheet 2.
1-1-09
Switched units to
English (metric). Revised

GENERAL NOTES

Engineer of Policy and Procedures
APPROVED
January 1, 2011

Engineer of Design and Environment
ISSUED
1-1-97
PASSED

Illinois Department of Transportation
January 1, 2011

STANDARD 542526-03
Material Required for One Inlet Box

<table>
<thead>
<tr>
<th>Bar No.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>No. 6</td>
<td>22'-0&quot; (6.70 m)</td>
</tr>
<tr>
<td>h1</td>
<td>No. 6</td>
<td>11'-0&quot; (3.35 m)</td>
</tr>
<tr>
<td>l</td>
<td>No. 6</td>
<td>24&quot; (600)</td>
</tr>
<tr>
<td>u</td>
<td>No. 6</td>
<td>6'-9&quot; (2.06 m)</td>
</tr>
<tr>
<td>u1</td>
<td>No. 6</td>
<td>5'-11&quot; (1.80 m)</td>
</tr>
<tr>
<td>u2</td>
<td>No. 6</td>
<td>5'-10&quot; (1.80 m)</td>
</tr>
<tr>
<td>v</td>
<td>No. 6</td>
<td>30&quot; (760)</td>
</tr>
<tr>
<td>v1</td>
<td>No. 6</td>
<td>27&quot; (685)</td>
</tr>
<tr>
<td>v2</td>
<td>No. 6</td>
<td>24&quot; (610)</td>
</tr>
<tr>
<td>v3</td>
<td>No. 6</td>
<td>18&quot; (460)</td>
</tr>
<tr>
<td>Concrete</td>
<td>cu. yds.</td>
<td>3.4 (2.6)</td>
</tr>
<tr>
<td>Reinf. Bars</td>
<td>lbs.</td>
<td>250 (113)</td>
</tr>
<tr>
<td>Grating</td>
<td>(sq. ft.)</td>
<td>70.4 (6.54)</td>
</tr>
</tbody>
</table>

**TYPICAL STEEL GRATING**

**TYPICAL CORNER OF STEEL GRATING FRAME**

**SECTION B-B**

**SECTION C-C**

**SECTION D-D**

**INLET BOX TYPE 24 (600) F**

**DETAIL B**

**DETAIL C**

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**ENGINEER OF POLICY AND PROCEDURES**

**APPROVED**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED**

**PASSED**

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

SECTION A-A

PLAN

Detail showing exit from side (or sides)

NOTE:

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.
Material Required for One Inlet Box

<table>
<thead>
<tr>
<th>Bar</th>
<th>No.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>u</td>
<td>17</td>
<td>No. 4 (No. 13)</td>
<td>8'-5&quot; (2.59 m)</td>
</tr>
<tr>
<td>u1</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>6'-11&quot; (2.10 m)</td>
</tr>
<tr>
<td>u2</td>
<td>1</td>
<td>No. 4 (No. 13)</td>
<td>5'-6&quot; (1.68 m)</td>
</tr>
<tr>
<td>v</td>
<td>2</td>
<td>No. 4 (No. 13)</td>
<td>3'-6&quot; (1.06 m)</td>
</tr>
<tr>
<td>v1</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>5'-6&quot; (1.68 m)</td>
</tr>
<tr>
<td>v2</td>
<td>10</td>
<td>No. 4 (No. 13)</td>
<td>4'-0&quot; (1.22 m)</td>
</tr>
<tr>
<td>v3</td>
<td>10</td>
<td>No. 4 (No. 13)</td>
<td>3'-6&quot; (1.06 m)</td>
</tr>
</tbody>
</table>

Concrete

Cu. Yds. (m³)

| Concrete | 3.2 (2.45) |

Reinf. Bars

lbs (kg)

| Reinf. Bars | 270 (122) |

Grating

(㎡)

| Grating | 56.6 (5.20) |

**SECTION B-B**

- 3 x 1/8 (76 x 10) support bar, each end
- 4 x 3 x 1/8 (102 x 76 x 13) angle frame
- 1/4 x 2 x 6 (13 x 50 x 150) bent bars

**SECTION C-C**

**SECTION D-D**

**DETAIL B**

**DETAIL C**

**DETAIL 24 (600) G**

**INLET BOX**

**STANDARD 542531-04**
### GENERAL NOTES

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

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

---

### Material required for one inlet box

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>21</td>
<td>No. 4 (No. 13)</td>
<td>14'-5&quot; (4.40 m)</td>
</tr>
<tr>
<td>h2</td>
<td>8</td>
<td>No. 4 (No. 13)</td>
<td>4'-6&quot; (1.40 m)</td>
</tr>
<tr>
<td>h3</td>
<td>3</td>
<td>No. 4 (No. 13)</td>
<td>5'-6&quot; (1.70 m)</td>
</tr>
<tr>
<td>v</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>10'-0&quot; (3.05 m)</td>
</tr>
<tr>
<td>v2</td>
<td>16</td>
<td>No. 4 (No. 12)</td>
<td>8'-6&quot; (2.59 m)</td>
</tr>
<tr>
<td>v3</td>
<td>2</td>
<td>No. 4 (No. 13)</td>
<td>2'-0&quot; (0.61 m)</td>
</tr>
<tr>
<td>v</td>
<td>8</td>
<td>No. 4 (No. 13)</td>
<td>4'-0&quot; (1.22 m)</td>
</tr>
<tr>
<td>v1</td>
<td>6</td>
<td>No. 4 (No. 13)</td>
<td>1'-6&quot; (0.48 m)</td>
</tr>
<tr>
<td>v2</td>
<td>13</td>
<td>No. 4 (No. 13)</td>
<td>3'-0&quot; (0.91 m)</td>
</tr>
<tr>
<td>v3</td>
<td>10</td>
<td>No. 4 (No. 13)</td>
<td>1'-0&quot; (0.30 m)</td>
</tr>
</tbody>
</table>

**Concrete**

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Qty</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinf. Bars</td>
<td>lbm.</td>
<td>124</td>
<td>560 (147)</td>
</tr>
</tbody>
</table>

**Galv. Steel Pipe**

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Qty</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>3½ (89) O.D. galv. steel pipe</td>
<td>lbs.</td>
<td>5.0</td>
<td>6 (147)</td>
</tr>
</tbody>
</table>

---

### PLAN

**SECTION A-A**

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

---

**INLET BOX TYPE 48 (1200) A**

(Date: 1-1-97)

(Passed: 1-1-97)

(Issued: 1-1-09)

(Revised: 1-1-09)

Illinois Department of Transportation

Engineer of Policy and Procedures

January 1, 2009

ENGINEER OF DESIGN AND ENVIRONMENT

January 1, 2009

APPROVED

PASSED

DATE

REVISIONS

1-1-97

1-1-07

Soft converted metric

Return

STANDARD 542541-02

(Sheet 1 of 2)
Remove concrete along these lines. Clean reinforcement for either tied or welded laps of longitudinal and circumferential reinforcement.

**TIED LAP**

For wire dia. W14 - W6 (10.72 - 7.01), length of weld shall be 8 (20) min.
For wire dia. W5.5 - W2.9 (6.73 - 4.88), length of weld shall be 6 (15) min.
Other wire dia. shall be tied per detail.

**WELDED LAP**

Degree of elbow + 2

2. Each reinforcement shall have a minimum of 0.049 sq. in. (0.31 sq. mm) nominal area when opening is greater than 25° (65).

Grout with mortar. Mortar shall be flush with pipe.

See DETAIL A for laps.

**TRANSVERSE SECTION**

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

**REINFORCED CONCRETE PIPE**

ELBOW 24°, 30° OR 36°
(600 mm, 750 mm OR 900 mm)

**DETAIL A**

Illinois Department of Transportation
January 1, 2011

ENGINEER OF POLICY AND PROCEDURES
APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

PASSED

REVISIONS

DATE
2-1-14 Corr. weld sym. on WELDED
LAP det. Added pipe dia. to

(600 mm, 750 mm OR 900 mm)

STANDARD 542601-03
For 24 (600) pipe riser, weld outer reinforcement cage of barrel to outer reinforcement cage of riser.

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

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

End connection to fit pipe used.

Inner cage circumferential reinforcement = 0.02 sq. in./ft. (114 mm²/m) (min.) longitudinal reinforcement is same as for 36 (900) riser.

Outer cage-standard reinforcement for class III pipe.

End connection to fit pipe used.

Mortar with Grout with

Pipe with

Riser

Barrel

Standard

reinf.

reinf.

Standard

Barrel

TIE WITH 36 (900) RISER

WELDED LAP

TIED LAP

PLAN

TEE WITH 24 (600) RISER

LONGITUDINAL SECTION

TRANSVERSE SECTION

TRANSVERSE SECTION

LONGITUDINAL SECTION

REINFORCED CONCRETE PIPE TEE

STANDARD 542606-02

All dimensions are in inches (millimeters) unless otherwise shown.
An alternate paved invert meeting the approval of the Engineer may be substituted for that shown in side view. All dimensions are in inches (millimeters) unless otherwise shown.

CONCRETE HEADWALL FOR PIPE UNDERDRAINS

STANDARD 601101-02
Pipe to be laid on undisturbed ground when noted on the plans.

Half trap to be used when noted on the plans.

Pipe or greater.

Inside dia. of pipe or greater.

Sand cushion

Hollow section alternate when the precast reinforced concrete section alternate is used.

Sand cushion

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

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

See Standard 602701 for details of steps.
### General Notes
See Standard 602701 for details of steps.
All dimensions are in inches (millimeters) unless otherwise shown.

### Materials Required for One (1)

#### Type B Catch Basin

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty</th>
<th>Size</th>
<th>Shape</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>1</td>
<td>No. 4 (No. 13)</td>
<td></td>
<td>3'-5' (1.02 m)</td>
</tr>
<tr>
<td>h1</td>
<td>3</td>
<td>No. 4 (No. 13)</td>
<td></td>
<td>5'-9' (1.72 m)</td>
</tr>
<tr>
<td>u</td>
<td>14</td>
<td>No. 4 (No. 13)</td>
<td></td>
<td>7'-0' (2.10 m)</td>
</tr>
<tr>
<td>u1</td>
<td>14</td>
<td>No. 4 (No. 13)</td>
<td></td>
<td>9'-0' (2.70 m)</td>
</tr>
<tr>
<td>x</td>
<td>16</td>
<td>No. 4 (No. 13)</td>
<td></td>
<td>6'-9' (2.02 m)</td>
</tr>
<tr>
<td>x</td>
<td>3</td>
<td>No. 4 (No. 13)</td>
<td></td>
<td>1'11&quot; (586)</td>
</tr>
</tbody>
</table>

Concrete:
- cu. yd. (m³): 2.5 (1.90)
- lbs. (kg): 210 (95)

Reinforcement bars:
- cu. yd. (m³): 2.5 (1.90)
- lbs. (kg): 210 (95)

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

---

**CATCH BASIN**

**TYPE B**

**STANDARD 602006-04**

---

**DATE**

1-1-13

**REVISIONS**

1-1-13 Revised and redrafted

1-1-11 Added additional bar identification

---

**Illinois Department of Transportation**

**Engineer of Policy and Procedures**

**Engineer of Design and Environment**

**Issued**

1-1-97

**PASSED**

January 1, 2013

---

Grating removed to show plan of baffles.
ALTERNATE MATERIALS FOR WALLS

- Precast Reinforced Concrete Section: T = 3 in (75 mm)
- Concrete Masonry Unit: T = 5 in (125 mm)
- Cast-in-Place Concrete: T = 6 in (150 mm)
- Brick Masonry: T = 8 in (200 mm)

GENERAL NOTES

- Bottom slabs shall be reinforced with a minimum of 0.27 sq. in./ft. (570 sq. mm/m) in both directions with a maximum spacing of 9 in (230 mm).
- Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.
- All dimensions are in inches (millimeters) unless otherwise shown.

ELEVATION

ALTERNATE BOTTOM SLAB

- Precast reinforced concrete slab
- Prefabricated concrete slab, when the precast reinforced concrete sections alternate is used.

CATCH BASIN TYPE C

DATE
REVISIONS
1.0.11
- Detailed rev. in slabs
- Added max. limit to height
- Added general notes

1.0.09
- Switched units to English (metric)
MATERIALS FOR WALLS

**ALTERNATE**

<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></td>
<td>4&quot; (100)</td>
<td>30 (760)</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></td>
<td>4&quot; (100)</td>
<td>30 (760)</td>
<td>8 (200)</td>
</tr>
<tr>
<td>Precast Reinforced Concrete</td>
<td>36 (900)</td>
<td>15 (380)</td>
<td>3 (75)</td>
</tr>
<tr>
<td>Section</td>
<td>4&quot; (100)</td>
<td>30 (760)</td>
<td>4 (100)</td>
</tr>
<tr>
<td>Cast-in-Place Concrete</td>
<td>36 (900)</td>
<td>15 (380)</td>
<td>6 (150)</td>
</tr>
<tr>
<td></td>
<td>4&quot; (100)</td>
<td>30 (760)</td>
<td>6 (150)</td>
</tr>
</tbody>
</table>

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

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

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

See Standard 602701 for details of steps.

Exposed edges shall be beveled ½ (19).

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

---

**DRAINAGE STRUCTURES TYPES 4 & 5**

(Abbreviation: SEP)

1-1-19

- Deleted Type 6 and revised
- Types 4 and 5 to fit with 44 (1120) height, constant slope barrier.

1-1-09

- Switched units to
- English (metric).

**STANDARD 602106-02**

(Sheet 1 of 2)
REINFORCED LID - TYPE 4 & 5
PLAN

Top of masonry

Concrete fill, 4%

Diameter 24 (600)

Pipe size. See plans for minimum grade of 1%

PLAN

Pipe to be laid on a minimum grade of 1%

Reinforced cast-in-place concrete

Concrete fill, 4%

ELEVATION

ALTERNATE MATERIALS FOR WALLS

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

ALTERNATE METHODS

Bottom slabs shall be reinforced with a minimum of 0.24 sq. in./ft. (0.0 sq. mm/m) in both directions with a maximum spacing of 10 (250).

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

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

GENERAL NOTES

1-1-14

Increased height to 72 (1800) maximum.

1-1-11

Added max. height to height.

ENGINEER OF POLICY AND PROCEDURES
APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

PASSED

DATE

INLET - TYPE A

STANDARD 602301-04

Illinois Department of Transportation

January 1, 2014

Michael Crowell

January 1, 2014

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

**ELEVATION - ECCENTRIC**

**ELEVATION - CONCENTRIC**

**ALTERNATE BOTTOM SLAB**

**GENERAL NOTES**

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

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

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

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

---

**MATERIALS FOR WALLS**

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

---

**INLET - TYPE B**

**STANDARD 602306-03**

---

**DATE**

1-1-11: Detailed notes in slabs.
2-1-11: Added max. limit to height.
1-1-09: Revised general notes.
1-1-97: Switched units to English (American).
SECTION PARALLEL TO PIPE
(Without conical top riser)

SECTION PERPENDICULAR TO PIPE
(With conical top riser)

FLAT SLAB TOP JOINT CONFIGURATIONS
(Optional at access hole)

BASE SLAB JOINT CONFIGURATIONS

GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES

1. A minimum of 9 (230) of monolithic reinforced concrete shall be maintained above the pipe penetration holes > 24 (600).
2. A minimum of 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).
3. A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.
4. Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint 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.
5. The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).
6. Only pipe penetration holes ≤ 15 (380) are allowed in riser sections.

GENERAL NOTES
The manufacturer shall ensure that all precast manhole sections are additionally reinforced where required to resist damage from handling, shipping and installation stresses. Lifting holes shall be located in the sections as per the manufacturer's recommendations, except as noted.

See Standard 602701 for details of manhole steps.

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

<table>
<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>A (min.)</th>
<th>Spacing (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riser</td>
<td>Circumferential</td>
<td>0.12 sq. in./ft.</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.055 sq. in./ft.</td>
<td>8</td>
</tr>
<tr>
<td>Barrel</td>
<td>Circumferential</td>
<td>0.12 sq. in./ft.</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.039 sq. in./ft.</td>
<td>10</td>
</tr>
</tbody>
</table>

**WALL REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>A (min.)</th>
<th>Spacing (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riser</td>
<td>Circumferential</td>
<td>0.12 sq. in./ft.</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.045 sq. in./ft.</td>
<td>8</td>
</tr>
<tr>
<td>Barrel</td>
<td>Circumferential</td>
<td>0.16 sq. in./ft.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.095 sq. in./ft.</td>
<td>12</td>
</tr>
</tbody>
</table>

**BASE SLAB REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Height</th>
<th>WWR or Rebar (each direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>≤ 20 ft. (6.10 m)</td>
<td>0.24 sq. in./ft. (150 sq. mm/min)</td>
</tr>
<tr>
<td></td>
<td>&gt; 20 ft. (6.16 m)</td>
<td>0.24 sq. in./ft. (150 sq. mm/min)</td>
</tr>
</tbody>
</table>

**Connections**

- Inside of manhole wall

**Joint Splice**

- 1½ (32) Ø Threaded rods with 3/4 x 3/4 x 1/2 (15x15x10)
- All nuts shall be brought to a snug tight condition.
- Holes in the walls may be drilled using core bits in lieu of formed holes.

**Connection Angle**

- 1½ (32) Ø
- 1½ (32) Ø
- 1½ (32) Ø
- 1½ (32) Ø
- 1½ (32) Ø

**Plan - Flat Slab Top**

- (Showing layout of welded wire reinforcement and c bars)
**Concrete Fill**

- **Fill**
  - (600)
  - 24
  - 16 (400) cts.

**Steps spaced at 12 (300) to 24 (600)**

**Concrete Fill, 2% max.**

- 9 (230)

**5’ (1.52 m) DIAMETER PRECAST MANHOLE TYPE A**

**FLAT SLAB TOP JOINT CONFIGURATIONS**

(Shown at access hole)

**SECTION PARALLEL TO PIPE**

- (Without conical top riser)

**SECTION PERPENDICULAR TO PIPE**

- (With conical top riser)

**GEOMETRIC LIMITS FOR PIPE PIER MASONRY HOLES**

1. A minimum of 9 (230) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 15 (380).
2. A minimum 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).
3. A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.
4. Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint splice for every location around the perimeter of the joint where the inside arc length between pipe penetration holes is < 24 (600). See joint splice detail.
5. The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).
6. Only pipe penetration holes ≤ 15 (380) are allowed in riser sections.

**BASE SLAB JOINT CONFIGURATIONS**

- See base slab joint configurations

**SHEAR 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, except as noted.
- See Standard 602/701 for details of manhole steps.

**All dimensions are in inches (millimeters) unless otherwise noted.**
PRECAST MANHOLE TYPE A
5' (1.52 m) DIAMETER

Sheet 2 of 2

STANDARD 602402-02

**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>A (min.)</th>
<th>Spacing (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riser</td>
<td>Circumferential</td>
<td>0.15 sq. in./ft. (38 sq. mm/mm)</td>
<td>6</td>
<td>(150)</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.045 sq. in./ft. (1.1 sq. mm/mm)</td>
<td>6</td>
<td>(150)</td>
</tr>
<tr>
<td>Barrel</td>
<td>Circumferential</td>
<td>0.15 sq. in./ft. (38 sq. mm/mm)</td>
<td>6</td>
<td>(150)</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.14 sq. in./ft. (3.4 sq. mm/mm)</td>
<td>4</td>
<td>(100)</td>
</tr>
</tbody>
</table>

### BASE SLAB REINFORCEMENT

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Height</th>
<th>WWR or Rebar (each direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>≤ 20 ft. (6.10 m)</td>
<td>0.24 sq. in./ft. (6.0 sq. mm/mm)</td>
</tr>
<tr>
<td></td>
<td>&gt; 20 ft. (6.10 m)</td>
<td>0.28 sq. in./ft. (7.0 sq. mm/mm)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>A-1</td>
<td>0.11 sq. in./ft. (2.6 sq. mm/mm)</td>
</tr>
</tbody>
</table>

### FLAT SLAB TOP REINFORCEMENT

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>Rebar (each direction except as noted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>(233 sq. mm/mm)</td>
<td>(450)</td>
</tr>
<tr>
<td></td>
<td>(253 sq. mm/mm)</td>
<td>(450)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>(387 sq. mm/mm)</td>
<td>(150)</td>
</tr>
</tbody>
</table>

**See plan view for rebar orientation and spacing and this table for bar size.**

### PLAN - FLAT SLAB TOP

**Showing layout of bottom reinforcement bars and c bars**

- Bar c #5 (#16), 7'-7" (2.31 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.

### PLAN - FLAT SLAB TOP

**Showing layout of welded wire reinforcement and c bars**

- Bar c #5 (#16), 7'-7" (2.31 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.

### JOINT SPlice

- Ø (12) threaded rods with 27x27x(155x355x115) washers under each nut. All nuts shall be brought to a snug tight condition. Holes in the walls may be drilled using core bits in lieu of formed holes.
- Ø (12) threaded rods drilled using core bits in lieu of formed holes.
- Ø (12) threaded rods drilled using core bits in lieu of formed holes.

### TIE PLATE

- Ø (10) (#10) (#13)
- Ø (13) #4, #5 (#13) bars bottom. Bundle first bar with closest WWR bar to the opening and place second bar ±3 (75) away.

### CONNECTION ANGLE

- Bar c #5 (#16), 7'-7" (2.31 m) length, 32 (815) radius top and bottom

### FLAT SLAB TOP REINFORCEMENT

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>Rebar (each direction except as noted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>0.11 sq. in./ft. (123 sq. mm/mm)</td>
<td>4 (150)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>0.10 sq. in./ft. (23.3 sq. mm/mm)</td>
<td>4 (150)</td>
</tr>
</tbody>
</table>

### WALL REINFORCEMENT

<table>
<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>WWR or Rebar</th>
<th>A (min.)</th>
<th>Spacing (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riser</td>
<td>Circumferential</td>
<td>0.15 sq. in./ft. (38 sq. mm/mm)</td>
<td>6</td>
<td>(150)</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.045 sq. in./ft. (1.1 sq. mm/mm)</td>
<td>6</td>
<td>(150)</td>
</tr>
<tr>
<td>Barrel</td>
<td>Circumferential</td>
<td>0.15 sq. in./ft. (38 sq. mm/mm)</td>
<td>6</td>
<td>(150)</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.14 sq. in./ft. (3.4 sq. mm/mm)</td>
<td>4</td>
<td>(100)</td>
</tr>
</tbody>
</table>

**See plan view for rebar orientation and spacing and this table for bar size.**

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

1. A minimum of 9 (230) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 15 (380).
2. A minimum 9 (230) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).
3. A maximum of 60 percent of the inside perimeter of the reinforced concrete sections is allowed to intersect the horizontal #3 (#10) bars.
4. Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint splice at the start of the joint where the inside arc length of the horizontal joints is < 24 (600). See joint splice detail.
5. The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).
6. Only pipe penetration holes ≤ 15 (380) are allowed in riser sections.

OPTIONAL JOINTS

- Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint splice at the start of the joint where the inside arc length of the horizontal joints is < 24 (600). See joint splice detail.
- The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).
- Only pipe penetration holes ≤ 15 (380) are allowed in riser sections.

GENERAL NOTES

- Pipe holes shall be formed to facilitate proper placement of hole reinforcement.
- The manufacturer shall ensure that all precast manhole sections are additionally reinforced where required to resist damage from handling, shipping, and installation stresses.
- Lifting holes shall be located in the sections as per the manufacturer's recommendations, except as noted.
- See Standard 602701 for details of manhole steps.

All dimensions are in inches (millimeters) unless otherwise noted.
**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.
### Joint Splice

![Joint Splice Diagram]

- **Manhole Wall:** Inside of manhole wall.
- **Connection Angle:**
  - **Tie Plate:**
    - **Holes:** Dia. 1 1/4" (32)
    - **WWR:** Dia. 4 1/4" (105)

### Tie Plate

- **Holes:** Dia. 1 1/4" (32)
- **Tie Plate:** 1/4" (6)

### Flat Slab Top Reinforcement

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (ft)</th>
<th>WWR (each direction)</th>
<th>4 ft. (1.22 m) Ø Riser</th>
<th>6 ft. (1.83 m) Ø Barrel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A9 (min.)</td>
<td>Spacing (max.)</td>
<td>A9 (min.)</td>
</tr>
<tr>
<td>Top</td>
<td>All</td>
<td>0.11 sq. in./ft. (123 sq. mm/m)</td>
<td>18</td>
<td>0.11 sq. in./ft. (123 sq. mm/m)</td>
</tr>
<tr>
<td>Bottom</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>0.06 sq. in./ft. (72 sq. mm/m)</td>
<td>6</td>
<td>See plan view for bar orientation and spacing and this table for bar size</td>
</tr>
<tr>
<td></td>
<td>RH &gt; 10 ft. (3.05 m)</td>
<td>0.08 sq. in./ft. (93 sq. mm/m)</td>
<td>6</td>
<td>6</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 (each direction)</th>
<th>4 ft. (1.22 m) Ø Riser</th>
<th>6 ft. (1.83 m) Ø Barrel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A9 (min.)</td>
<td>Spacing (max.)</td>
<td>A9 (min.)</td>
</tr>
<tr>
<td>4 ft. (1.22 m) Ø Riser</td>
<td>Circumferential</td>
<td>0.12 sq. in./ft. (134 sq. mm/m)</td>
<td>6</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.045 sq. in./ft. (51 sq. mm/m)</td>
<td>6</td>
<td>200</td>
</tr>
<tr>
<td>6 ft. (1.83 m) Ø Barrel</td>
<td>Circumferential</td>
<td>0.18 sq. in./ft. (201 sq. mm/m)</td>
<td>6</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.045 sq. in./ft. (51 sq. mm/m)</td>
<td>6</td>
<td>300</td>
</tr>
</tbody>
</table>

### Base Slab Reinforcement

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (ft)</th>
<th>Total Height (ft)</th>
<th>WWR or Rebar (each direction)</th>
<th>A9 (min.)</th>
<th>Spacing (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>&amp; TH ≤ 20 ft. (6.10 m)</td>
<td>0.08 sq. in./ft. (93 sq. mm/m)</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>RH &gt; 10 ft. (3.05 m)</td>
<td>or TH &gt; 20 ft. (6.10 m)</td>
<td>0.45 sq. in./ft. (537 sq. mm/m)</td>
<td>5</td>
<td>150</td>
</tr>
</tbody>
</table>

### Notes
- 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 washers under each nut.
- With 2 1/4x2 1/4x2.5 (55x55x65) dia. 1 1/4" (32)
- 2 1/4x2 1/4x2 1/2 (55x55x13)
- 2 1/4x2 1/4x2 1/2 (55x55x13) dia. 1 1/4" (32)
- 4 1/4x4 1/4x4 (105) dia. 1 1/4" (32)
- 1 1/2 (32) dia. 1 1/4" (32)
- **3 1/2 (32) dia. 1 1/4" (32)**

---

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**APPROVED ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED**

**ENGINEER OF POLICY AND PROCEDURES**

**PASSED**

**STANDARD 602406-10**

**PRECAST MANHOLE TYPE A**

6' (1.83 m) DIAMETER

(Sheet 3 of 3)
**GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES**

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

**SECTION PARALLEL TO PIPE**

*Without conical top riser*

**SECTION PERPENDICULAR TO PIPE**

*With conical top riser*

**BASE SLAB JOINT CONFIGURATIONS**

**FLAT SLAB TOP JOINT CONFIGURATIONS**

*(Shown at access hole)*

**SHEAR KEY GEOMETRY**

*(Reinforcement not shown for clarity)*

**GENERAL NOTES**

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

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

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

See Standard 602701 for details of manhole steps.

All dimensions are in inches (millimeters) unless otherwise noted.
PLAN - FLAT SLAB TOP
(Showing layout of bottom reinforcement bars and c bars)

PLAN - FLAT SLAB TOP
(Showing layout of Welded Wire Reinforcement and c bars)

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

* #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**

<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. (254 sq. mm/m²)</td>
<td>6 (450)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>0.21 sq. in./ft. (440 sq. mm/m²)</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>RH &gt; 10 ft. (3.05 m)</td>
<td>WWR not permitted</td>
<td>See plan view for rebar orientation and spacing and this table for bar size</td>
</tr>
</tbody>
</table>

**WALL REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>WWR or Rebar</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 ft. (1.22 m) Ø Riser</td>
<td>Circumferential</td>
<td>0.045 sq. in./ft. (95 sq. mm/m²)</td>
</tr>
<tr>
<td>7 ft. (2.13 m) Ø Barrel</td>
<td>Vertical</td>
<td>0.045 sq. in./ft. (95 sq. mm/m²)</td>
</tr>
</tbody>
</table>

**BASE SLAB REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (RH)</th>
<th>Total Height (TH)</th>
<th>WWR or Rebar each direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>6 (450) sq. in./ft. (1500 sq. mm/m²)</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>All</td>
<td>0.11 sq. in./ft. (233 sq. mm/m²)</td>
<td>(450)</td>
</tr>
</tbody>
</table>

**JOINT SPLICE**

- Inside of manhole wall
- Ø 1/2 (13) diameter
- ½ (13) Ø ¼ (6) washers under each nut
- Holes in the walls may be drilled using core bits in lieu of formed holes.

**CONNECTION ANGLE**

- Cold Drawn Steel
- 6 (150)
- 2½ (65)
- 3 (75)
- 4 (100)
- 6 (150)
- 2½ (65)
- 3 (75)
- 4 (100)
- 6 (150)

**TIE PLATE**

- Ø 1/4 (6) threaded rod
- Washers under each nut
- ½ (13) Ø ¼ (6) washers under each nut
- 2½ (65) Ø ¼ (6) washers under each nut
- 3 (75)
- 4 (100)
- 6 (150)
- Ø 1/4 (6) threaded rod

**PRECAST MANHOLE TYPE A**

- 7' (2.13 m) DIAMETER
- STANDARD 602411-08
**GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES**

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

**GENERAL NOTES**

Pipe holes shall be formed to facilitate proper placement of reinforcing bars.

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

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

See Standard 602701 for details of manhole steps.

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

**DATE**

1-1-19: Expanded / refined reinforcement options, increased manhole depths.

**REVISIONS**

1-1-19: Expanded / refined reinforcement options, increased manhole depths.

**SECTION PARALLEL TO PIPE**

**BASE SLAB JOINT CONFIGURATIONS**

**SECTION PERPENDICULAR TO PIPE**

**FLAT SLAB TOP JOINT CONFIGURATIONS**

**SHEAR KEY GEOMETRY**

**REINFORCEMENT NOT SHOWN FOR CLARITY**

**OPTIONAL JOINTS**

---

**PIPE PENETRATION HOLES**

1. Min. 12 (300) monolithic reinforced concrete above holes > 3'-4'' (1.02 m).
2. Min. 12 (300) inside arc length of reinforced concrete between holes > 15 (380).
3. Max. 60% of inside perimeter of reinforced concrete may be removed.
4. Horizontal joints > 15 (380) require one joint splice.
5. Recommended pipe penetration hole = O.D. of pipe + 4 (100).

---

**GENERAL NOTES**

All dimensions in inches (millimeters) unless otherwise noted.

The manufacturer shall ensure that all precast manhole sections are reinforced where required to resist damage from handling, shipping and installation stresses. Lifting holes shall be located in the sections as per the manufacturer’s recommendations, except as noted.

See Standard 602701 for details of manhole steps.

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

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

Bar c #5 (#16).
6'-4" (1.93 m)
length, 4'-2" (1.27 m)
radius top and bottom

Bar c #5 (#16).
9'-2" (2.79 m)
length, 6'-2" (1.88 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.

PLAN - FLAT SLAB TOP
(Showing layout of welded wire reinforcement and c bars)
WWR not permitted for rise heights > 10' (3.05 m).

PRECAST MANHOLE TYPE A
8' (2.44 m) DIAMETER

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

### WALL REINFORCEMENT

**Location** | **Orientation** | **WWR or Rebar** | **A_o (min.)** | **Spacing (max.)**
---|---|---|---|---
Top Mat | All | | | |
| 4 ft. (1.22 m) Ø Riser | Circumferential | | 0.12 sq. in./ft. (254 sq. mm/m) | (150)
| | Vertical | | 0.045 sq. in./ft. (95 sq. mm/m) | 8
| 8 ft. (2.44 m) Ø Barrel | Circumferential | | 0.24 sq. in./ft. (508 sq. mm/m) | (150)
| | Vertical | | 0.045 sq. in./ft. (95 sq. mm/m) | 8

**BASE SLAB REINFORCEMENT**

### Location

**Location** | **Riser Height (RH)** | **Total Height (TH)** | **WWR or Rebar each direction** | **A_o (min.)** | **Spacing (max.)**
---|---|---|---|---|---
Top Mat | All | | | | |
| RH ≤ 10 ft. (3.05 m) | | | 0.36 sq. in./ft. (162 sq. mm/m) | (150)
| or TH ≤ 20 ft. (6.10 m) | | | 0.60 sq. in./ft. (270 sq. mm/m) | (150)
| RH > 10 ft. (3.05 m) or TH > 20 ft. (6.10 m) | | | 0.15 sq. in./ft. (67 sq. mm/m) | (450)

**Notes:**
- Only one layer of WWR permitted to avoid congestion.
- See plan view for rebar orientation and spacing and this table for bar size.
- **Only one layer of WWR permitted to avoid congestion.**
GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES

1. A minimum of 12 (300) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 3'-0" (1.12 m).

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

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

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

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

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

FLAT SLAB TOP JOINT CONFIGURATIONS

BASE SLAB JOINT CONFIGURATIONS

SECTION PARALLEL TO PIPE

SECTION PERPENDICULAR TO PIPE

FLAT SLAB TOP JOINT CONFIGURATIONS

(Sheet 1 of 3)
**PRECAST MANHOLE TYPE A**

**9' (2.74 m) DIAMETER**

**PLAN - FLAT SLAB TOP**

(Showing layout of bottom reinforcement bars and c bars)

**PLAN - FLAT SLAB TOP**

(Showing layout of welded wire reinforcement and c bars)

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

* #6 (#19) bars bottom. Bundle first bar with closest WWR bar in the opening and place second bar ±1/2 (17 mm) away.

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

ENGINEER OF POLICY AND PROCEDURES

4-1-06

*PLAN - FLAT SLAB TOP*

**Sheet 2 of 3**

STANDARD 602421-08
**FLAT SLAB TOP REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (ft)</th>
<th>WWR or Rebar (each direction)</th>
<th>Steel or Rebar (each direction except as noted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mat</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>0.11 sq. in./ft. (223 sq. mm/m)</td>
<td>0.11 sq. in./ft. (223 sq. mm/m)</td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>RH &gt; 10 ft. (3.05 m)</td>
<td><strong>0.98 sq. in./ft. (1061 sq. mm/m)</strong></td>
<td><strong>0.98 sq. in./ft. (1061 sq. mm/m)</strong></td>
</tr>
<tr>
<td></td>
<td>WWR not permitted</td>
<td></td>
<td>Bar Size</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>#6 or #4</td>
</tr>
</tbody>
</table>

**WALL REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>WWR or Rebar (each direction)</th>
<th>Steel or Rebar (each direction except as noted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 ft. (1.22 m) Ø Riser</td>
<td>Circumferential</td>
<td>0.12 sq. in./ft. (223 sq. mm/m)</td>
<td>0.12 sq. in./ft. (223 sq. mm/m)</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.045 sq. in./ft. (95 sq. mm/m)</td>
<td>0.045 sq. in./ft. (95 sq. mm/m)</td>
</tr>
<tr>
<td>9 ft. (2.74 m) Ø Barrel</td>
<td>Circumferential</td>
<td>0.27 sq. in./ft. (516 sq. mm/m)</td>
<td>0.27 sq. in./ft. (516 sq. mm/m)</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>0.045 sq. in./ft. (95 sq. mm/m)</td>
<td>0.045 sq. in./ft. (95 sq. mm/m)</td>
</tr>
</tbody>
</table>

**BASE SLAB REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (ft)</th>
<th>Total Height (TH)</th>
<th>WWR or Rebar (each direction)</th>
<th>Steel or Rebar (each direction except as noted)</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>0.44 sq. in./ft. (931 sq. mm/m)</td>
<td>0.44 sq. in./ft. (931 sq. mm/m)</td>
<td></td>
</tr>
<tr>
<td>Bottom Mat</td>
<td>All</td>
<td>0.11 sq. in./ft. (223 sq. mm/m)</td>
<td>0.11 sq. in./ft. (223 sq. mm/m)</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**
- **Only one layer of WWR permitted to avoid congestion.**
- All nuts shall be brought to a snug tight condition.
- All washers under each nut.
- Holes in the walls may be drilled using core bits in lieu of formed holes.
GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES

1. A minimum of 12 (300) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 4'-0" (1.22 m).
2. A minimum of 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).
3. A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.
4. Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint splice for every location around the perimeter of the joint where the inside arc length between pipe penetration holes is < 24 (600). See joint splice detail.
5. The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).
6. Only pipe penetration holes ≤ 15 (380) are allowed in riser sections.
11'-8" (3.56 m)

Bar c #5 (#18).
4'-3" (1.22 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 bottom reinforcement bars and c bars)

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)

* #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).

11'-8" (3.56 m)

Bar c #5 (#18).
4'-3" (1.22 m)
length, 3'-2" (1.07 m)
radius top and bottom

Bar c #5 (#18).
10'-1" (3.07 m)
length, 3'-2" (1.07 m)
radius top and bottom

11'-8" (3.56 m)

PRECAST MANHOLE TYPE A
10' (3.05 m) DIAMETER

STANDARD 602426-02

(Sheet 2 of 3)
### Joint Splice

- **Connection angle**
- **2½ (65)** Tie ø
- **1¼ x 2½ (32 x 65)** Tie
- **¼ (6)** Joint
- **½ (13)** Rebars
- **3 (75)** Holes
- **10 (250)** Ø Riser
- **2½ (65)** Ø Barrel (Inside Mat)
- **2½ (65)** Ø Barrel (Outside Mat)
- **2 (50)** Ø Washer
- **½ (13)** Ø Nut

### Tie Plate

- **¼ (6)** Tie ø
- **½ (13)** Ø Washer
- **½ (13)** Ø Nut

### Flat Slab Top Reinforcement

<table>
<thead>
<tr>
<th>Location</th>
<th>Riser Height (RH)</th>
<th>WWR (each direction)</th>
<th>Riser Reinforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>All</td>
<td>Ø 0.11 sq. in./ft.</td>
<td>Ø 0.11 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(223 sq. mm/m)</td>
<td>(223 sq. mm/m)</td>
</tr>
<tr>
<td>Bottom</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>** Ø 0.88 sq. in./ft.**</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1883 sq. mm/m)</td>
<td>(150)</td>
</tr>
</tbody>
</table>

**Note:** See plan view for rebar orientation and spacing, and the table for bar size limits. Only one layer of WWR permitted to avoid congestion.

### Wall Reinforcement

<table>
<thead>
<tr>
<th>Location</th>
<th>Orientation</th>
<th>RH ≤ 10 ft. (3.05 m)</th>
<th>TH ≤ 20 ft. (6.10 m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Circumferential</td>
<td>Ø 0.12 sq. in./ft.</td>
<td>Ø 0.055 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>Vertical</td>
<td>Ø 0.12 sq. in./ft.</td>
<td>Ø 0.055 sq. in./ft.</td>
</tr>
</tbody>
</table>

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

### 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</td>
<td>RH ≤ 10 ft. (3.05 m)</td>
<td>Ø 0.48 sq. in./ft. (899 sq. mm/m)</td>
</tr>
<tr>
<td>Mat</td>
<td>RH = 10 ft. (3.05 m)</td>
<td>Ø 0.78 sq. in./ft. (1455 sq. mm/m)</td>
</tr>
<tr>
<td>Bottom</td>
<td>All</td>
<td>Ø 0.11 sq. in./ft. (233 sq. mm/m)</td>
</tr>
</tbody>
</table>

**Note:** Only one layer of rebar or WWR permitted to avoid congestion.
Flatslab top joint configurations
(Shown at access hole)

Bar c

2008
4'-0" (1.22 m) diameter

30'-0" (9.15 m) max.

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

See Standard 602701 for details of manhole steps.

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

GENERAL NOTES

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

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

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

See Standard 602701 for details of manhole steps.

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

DATE
REVISIONS
2-1-19 Moved wall reinforcement from inside face to middle.
1-1-19 Expanded / refined reinforcement options. Increased vault depths.

PRECAST VALVE VAULT TYPE A
4' (1.22 m) DIAMETER
(Paragraph 1 of 2)

STANDARD 602501-05
**GENERAL NOTES**

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

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

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

See Standard 602701 for details of manhole steps.

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

**SECTION THRU VALVE VAULT**

**SECTION THRU VALVE VAULT**

**SECTION THRU VALVE VAULT**

 романтическая классика 1929 года. ливингстон

**DATE**

<table>
<thead>
<tr>
<th>Date</th>
<th>Revisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-19</td>
<td>Moved wall reinforcement from inside face to mold.</td>
</tr>
<tr>
<td>1-1-19</td>
<td>Expanded / refined reinforcement options. Increased vault depths.</td>
</tr>
</tbody>
</table>

**STANDARD 602506-02**
**FLAT SLAB TOP REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Wall Reinforcement</th>
<th>Rebar (each direction oriented as noted)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A_t (mm²)</td>
<td>Spacing (max.)</td>
</tr>
<tr>
<td>Top Material</td>
<td>0.13 sq. in./ft.</td>
<td>18</td>
</tr>
<tr>
<td>Bottom Material</td>
<td>0.40 sq. in./ft.</td>
<td>18</td>
</tr>
</tbody>
</table>

* Only one layer of WWR permitted to avoid congestion.

**WALL REINFORCEMENT**

<table>
<thead>
<tr>
<th>Orientation</th>
<th>Wall Reinforcement</th>
<th>A_t (mm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circumferential</td>
<td>0.13 sq. in./ft.</td>
<td>6</td>
</tr>
<tr>
<td>Vertical</td>
<td>0.04 sq. in./ft.</td>
<td>2</td>
</tr>
</tbody>
</table>

**BASE SLAB REINFORCEMENT**

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Height</th>
<th>Wall Reinforcement (each direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A_t (mm²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spacing (max.)</td>
</tr>
<tr>
<td>Top Mat.</td>
<td>≤ 20 ft.</td>
<td>0.24 sq. in./ft.</td>
</tr>
<tr>
<td></td>
<td>&gt; 20 ft.</td>
<td>0.24 sq. in./ft.</td>
</tr>
<tr>
<td>Bottom Mat.</td>
<td></td>
<td>0.13 sq. in./ft.</td>
</tr>
</tbody>
</table>

* Only one layer of WWR permitted to avoid congestion.

**BASE SLAB TOP REINFORCEMENT**

12 #4 (19 mm) bars or equivalent, evenly spaced around perimeter. Cut bars to fit.

Optional joint

**BASE SLAB JOINT CONFIGURATIONS**

**SHEAR KEY GEOMETRY**

(Reinforcement not shown for clarity)

**MATERIALS**

<table>
<thead>
<tr>
<th>Mat</th>
<th>Top</th>
<th>Bottom</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PRECAST VALVE VAULT TYPE A**

5' (1.52 m) DIAMETER

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

APPROVED ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-18

PASSED ENGINEER OF POLICY AND PROCEDURES

(Sheet 2 of 2)

STANDARD 602506-02
**FLAT SLAB TOP JOINT CONFIGURATIONS FOR D = 36 (900) AND D = 4'-0" (1.22 m)**
(Shown at access hole)

**FLAT SLAB TOP JOINT CONFIGURATIONS D = 5'-0" (1.52 m)**
(Shown at access hole)

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

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

**TABLE**

<table>
<thead>
<tr>
<th>D</th>
<th>T</th>
<th>D₁ (min.)</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>4 (150)</td>
</tr>
<tr>
<td>5'-0&quot; (1.52 m)</td>
<td>4 (200)</td>
<td></td>
<td></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 602036 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**

1-1-19

**REVISIONS**

Expanded / refined reinforcement options.

**PRECAST REINFORCED CONCRETE FLAT SLAB TOP**

(Shown 1 of 2)
**FLAT SLAB TOP REINFORCEMENT FOR D = 4'-0" (1.22 m)**

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>Spacing (max.)</th>
<th>A_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>#4</td>
<td></td>
</tr>
<tr>
<td>Mat.</td>
<td>1371 sq. mm/min.</td>
<td>1500</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>Spacing (max.)</th>
<th>A_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>#4</td>
<td></td>
</tr>
<tr>
<td>Mat.</td>
<td>1371 sq. mm/min.</td>
<td>1500</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FLAT SLAB TOP REINFORCEMENT FOR D = 36 (900)**

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>Spacing (max.)</th>
<th>A_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>#4</td>
<td></td>
</tr>
<tr>
<td>Mat.</td>
<td>1371 sq. mm/min.</td>
<td>1500</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Location</th>
<th>WWR (each direction)</th>
<th>Spacing (max.)</th>
<th>A_s (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>223 sq. mm/min.</td>
<td>450</td>
<td>223 sq. mm/min.</td>
<td>450</td>
<td>#10 or #13</td>
</tr>
<tr>
<td>Bottom</td>
<td>* 0.60 sq. in./ft.</td>
<td>6</td>
<td>See plan view for rebar orientation and spacing and this table for bar size</td>
<td>#4</td>
<td></td>
</tr>
<tr>
<td>Mat.</td>
<td>1847 sq. mm/min.</td>
<td>300</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Only one layer of WWR permitted to avoid congestion.

---

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

- First bar with closest WWR bar to the opening and place second bar ±3 (75) away.
- #5 (#16) bars bottom. Bundle second bar ±3 (75) away.
- 2'-6" (750) radius bottom

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

- First bar with closest WWR bar to the opening and place second bar ±3 (75) away.
- #4 (#13) bars bottom. Bundle second bar ±3 (75) away.
- 2'-6" (750) radius bottom

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

- First bar with closest WWR bar to the opening and place second bar ±3 (75) away.
- #5 (#16) bars bottom. Bundle second bar ±3 (75) away.
- 2'-6" (750) radius bottom

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

- First bar with closest WWR bar to the opening and place second bar ±3 (75) away.
- #5 (#16) bars bottom. Bundle second bar ±3 (75) away.
- 2'-6" (750) radius bottom

---

**Concrete Flat Slab Top**

**Location**

- Top
- Bottom

**WWR (each direction)**

- Bar Size
  - (1270 sq. mm/m) 0.60 sq. in./ft.
  - (1312 sq. mm/m) 0.62 sq. in./ft.
  - (847 sq. mm/m) 0.40 sq. in./ft.

**Rebar (each direction except as noted)**

- #4 or #5 (131) #13
- #3 or #4 (847 sq. mm/m) 0.40 sq. in./ft.

---

**Concrete Flat Slab Top**

**Location**

- Top
- Bottom

**WWR (each direction)**

- Bar Size
  - (1270 sq. mm/m) 0.60 sq. in./ft.
  - (1312 sq. mm/m) 0.62 sq. in./ft.
  - (847 sq. mm/m) 0.40 sq. in./ft.

**Rebar (each direction except as noted)**

- #4 or #5 (131) #13
- #3 or #4 (847 sq. mm/m) 0.40 sq. in./ft.

---

**Concrete Flat Slab Top**

**Location**

- Top
- Bottom

**WWR (each direction)**

- Bar Size
  - (1270 sq. mm/m) 0.60 sq. in./ft.
  - (1312 sq. mm/m) 0.62 sq. in./ft.
  - (847 sq. mm/m) 0.40 sq. in./ft.

**Rebar (each direction except as noted)**

- #4 or #5 (131) #13
- #3 or #4 (847 sq. mm/m) 0.40 sq. in./ft.
inside face of structure

checkered tread

plan view

standard 602701-02

manhole steps

illinois department of transportation

january 1, 2009

engineer of policy and procedures

approved

january 1, 2009

engineer of design and environment

issued

1-1-97

passed

date

revisions

switched units to
english metrics.

4-1-06

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

standard 602701-02

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

SECTION A-A

Gray Iron

CAST OPEN LID

SECTION B-B

6 Gaskets shown 10 permitted

SECTION C-C

CAST CLOSED LID

ADA COMPLIANT

CAST OPEN LID

SECTION D-D

Gray Iron Lid

SECTION E-E

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

FRAME AND LIDS

TYPE 1

STANDARD 604001-04
Curb box adjustable from 5\% (135) to 9 (225).
CAST FRAME

SECTION B-B

ALTERNATE CURB BOX

SECTION C-C

CAST GRATE

SECTION D-D

VANE DETAIL

FRAME AND GRATE

TYPE 3V

STANDARD 604011-05
All dimensions are in inches (millimeters) unless otherwise shown.
The four holes in the cast base may be rotated 45° from the position shown in section A-A.

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

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

DETAIL OF BOLTING

FRAME TO BASE

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

GENERAL NOTES

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

BASE, FRAME AND LIDS TYPE 5

STANDARD 604021-03
FRAME AND GRATE
TYPE 6

CAST FRAME

CAST GRATE

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

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

DATE

REVISIONS

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

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

STANDARD 604026-03
SECTION A-A

CAST GRATE

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

DATE: 1-1-15
REVISIONS: Revised grate thickness.

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

GRATE TYPE 7

STANDARD 604031-03
CAST GRATE

6 lugs shown, 3 permitted.

SECTION A-A

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

GRATE TYPE 8

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

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

CAST GRATE

CAST FRAME

FRAME AND GRATE

TYPE 9

STANDARD 604041-03
SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

CAST FRAME

CAST GRATE

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

FRAME AND GRATE

TYPE 10

STANDARD 604046-03

Illinois Department of Transportation

January 1, 2015

APPROVED

ENGINEER OF POLICY AND PROCEDURES

DATE

REVISIONS

1-1-15
Revised dimensions of frame.

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

PASSED

DATE

REVISED

1-1-15

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED
CAST FRAME

SECTION B-B

ALTERNATE CURB BOX

SECTION E-E

CAST GRATE

VANE DETAIL

SIDE RIB DETAIL

MIDDLE RIB DETAIL

STANDARD 604056-04

FRAME AND GRATE
TYPE 11V

All dimensions are in inches (millimeters) unless otherwise shown.
Indiana Department of Transportation

January 1, 2015

ENGINEER OF POLICY AND PROCEDURES
APPROVED

January 1, 2015

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

1-1-97

PASSED

DATE
REVISIONS

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

FRAME AND GRATE
TYPE 12

STANDARD 604061-03

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

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

Slope pavement or gutter flag
12% at inlet.

Slope pavement or gutter flag
12% at inlet.

See DETAIL E

CASE II

CASE I

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

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

1-1-97

ENGINEER OF POLICY AND PROCEDURES

APPROVED

PASSED

FRAMING IBE
d of LID

TYPE 15

DATE

REVISIONS

1-1-09

1-1-97

STANDARD 604066-02
One gusset shown each side, two permitted.

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

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

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

All dimensions are in inches (millimeters) unless otherwise shown.
\textit{\% (M16) Galv. bolt, nut. \\ washer.}

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

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

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

\textit{Safety bar}

\textit{\% (19) Thick}

\textit{Revised frame flanges,}

\textit{changed to a bolt down}

\textit{grate w/ deeper vanes}

\textit{All dimensions are in inches (millimeters) unless otherwise shown.}
Each frame.

Four places each frame.

Three places each grate.

Four places each grate.

Three 19 Dia. holes, three places each frame.

Three 19 Dia. holes, three places each frame.

1/3 (13) Dia. tapped holes for bolting down grate, four places each frame.

1/3 (14) Dia. holes for grate alignment, two places each frame.

Safety bar 229 x 1 x 1

(572 x 19 x 25)

1/3 (19) Dia. holes, three places each frame.

1/3 (19) Dia. stainless steel bolts with washers, through counter bored holes or slots, four places each grate.

Three 1/2 x 2 1/2 (M16 x 64) galv. hex. head bolt & nut with galv. washers.

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

Each frame.

Three places each grate.

Four places each grate.

1/3 (13) Dia. tapped holes for bolting down grate, four places each frame.

1/3 (14) Dia. holes for grate alignment, two places each frame.

Safety bar 229 x 1 x 1

(572 x 19 x 25)

1/3 (19) Dia. holes, three places each frame.

1/3 (19) Dia. stainless steel bolts with washers, through counter bored holes or slots, four places each grate.

Three 1/2 x 2 1/2 (M16 x 64) galv. hex. head bolt & nut with galv. washers.

All dimensions are in inches (millimeters) unless otherwise shown.
Ilinois Department of Transportation

January 1, 2015
ENGINEER OF POLICY AND PROCEDURES
APPROVED

January 1, 2015
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

DATE
REVISIONS
1-1-15 Revised dimensions of frame
1-1-69 Switched units to English (metric)

STANDARD 604086-03

FRAME AND GRATE
TYPE 23

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

REINFORCED CONCRETE PIPE
MEDIAN INLET for 24" (600 mm)

STANDARD 604101-01
SECTION B-B

Frame
Grate

1/4 or 1/6

Welded wire fabric

36 in (900 mm)

1/4 or 1/6

Concrete apron, 4 (100) thick

SECTION A-A

GENERAL NOTES

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

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

DATE REVISIONS
1-1-99 Switched units to English (metric).
1-1-09

REINFORCED CONCRETE PIPE

STANDARD 604106-01

MEDIAN INLET for 36" (900 mm)

Illinois Department of Transportation

January 1, 2009

ENGINEER OF POLICY AND PROCEDURES

APPROVED

January 1, 2009

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

DATE

REVISIONS

1-1-99

1-1-97

1-1-09

1-1-99

Ilinois Department of Transportation
Short radius curve

Contraction joints at 25'-0" (7.5 m) max. ctr. (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

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

Insert 2 (50) thick preformed joint filler
Full depth and width.

Construction joint

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

Drainage casting without curb box
Back of curb

5'-0" (1.5 m)

Construction options:

1. Form with 1/8 (3) thick steel template
2 (50) deep, and seal.
2. Saw 2 (50) deep at 4 to 24 hours, and seal.
3. Insert 2 (20) thick preformed joint filler
Full depth and width.

Undoweled contraction joint (typ.)

2-No. 4 (No. 13) bars

Back of curb

Drainage casting

Pavement

Edge of pavement

HMA surfacing

Base course

Mountable curb shown
(Other types permitted)

Pavement

Tie bar

Concrete Curb Type B

Concrete Curb and Gutter

(Adjoining to PCC Pavement or PCC Base Course)

Plan

ON DISTURBED SUBGRADE

ON UNDISTURBED SUBGRADE

Adjacent to Flexible Pavement

Depressed Curb

Barrier Curb

Adjacent to Flexible Pavement

Depressed Curb

Barrier Curb

Concrete Curb Type B

ILLINOIS DEPARTMENT OF TRANSPORTATION

Illinois Department of Transportation

PASSED

1-1-97

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

January 1, 2018

STANDARD 606001-07
For Section A-A to F-F and curtain wall =
2.38 cu. yds. (1.84 m³) concrete for 0.56 (150) pav't.
2.42 cu. yds. (1.88 m³) concrete for 0.56 (150) pav't.
For Section F-F =
0.069 cu. yds. (0.17 m³) concrete per ft. (m)

GENERAL NOTES

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

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

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

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

OUTLETS FOR CONCRETE CURB AND GUTTER

TYPE B-6.24 (B-15.60)

STANDARD OUTLET
2.01 cu. yds. (1.54 m³) concrete for 10 (250) pav't.
1.98 cu. yds. (1.51 m³) concrete for 9 (225) pav't.

**QUANTITIES**

1.98 cu. yds. (1.51 m³) concrete for 9 (225) pav't.
2.01 cu. yds. (1.54 m³) concrete for 10 (250) pav't.
shoulder paved

Edge of casting

Drainage joint

Expansion joint

Contraction joints

Flow line

1x18 (25x450) dowel bar

placed at mid-depth with pcc shoulder joints or at 25' (7.6 m) cts.

with HMA shoulders

No. 4 (No. 13) rebar (one each side of casting)

placed full depth & width.

filler, 1 (25) thick (min.),

Preformed expansion joint
dowel bar 1x18 (25x450)

min. 1 (25) t/2 225

9

edge Rolled

Shld. 7.5 3

150 6

6 (450) 18

9 (450) 18

450 4

127 27

18

6 (450)

Shld.

edge Rolled

SECTION A-A

SECTION B-B

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

INLET

SECTION C-C

SECTION D-D

EXPANSION JOINT

PLAN

TYPE A GUTTER

(Inlet, Outlet & Entrance)

STANDARD 606101-05

Illinois Department of Transportation

ENGINEER OF POLICY AND PROCEDURES

APPROVED

2016

DATE

REVISIONS

1-1-16

4-1-16

Changed terminology to "welded wire reinforcement"

1-1-97

Switched units to English (metric). Changed radii, adjusted qty's.
### Quantities of Concrete

**Commercial Entrances:**
- Section B-B to C-C: 0.25 cu. yd. (0.56 m³).
- Section (A-A to B-B) + (C-C to D-D): 2.26 cu. yd. (1.79 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): 2.26 cu. yd. (1.73 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).

---

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

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

- Rolled edge
- Shld.
- Dowel bar

- Welded wire reinforcement: 8 (200) for commercial entrances and 6 (150) for all others.
NOTE
If the average grade of pavement for the distance A-D exceeds 2%, this distance shall be increased 6' (1.8 m) for each 1% increase in grade.

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

ENGINEER OF POLICY AND PROCEDURES
APPROVED
April 1, 2016

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
1-1-97

PASSED

Illinois Department of Transportation

TYPE A GUTTER
(INLET, OUTLET & ENTRANCE)

STANDARD 606101-05
If the average grade of pavement for the distance A-E exceeds 3%, this distance shall be increased 6 ft. (1.8 m) for each 1% increase in grade.

Tie bars

Sections A-A, B-B, C-C, D-D, E-E, F-F, G-G, H-H

Plan - Single Outlet
Plan - Double Outlet

Quantities

Materials

Concrete - cu. yd. (m³)
Cast Iron Grate - Ea.
Cast Iron Cover - Ea.
Pipe Drain - Dia. in. (mm)

Sections

Chamfer

General Notes

The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001. All dimensions are in inches (millimeters) unless otherwise shown.

Outlets Type 2

Grate and Cover Type 2A

Ill. HWY.

FOR TYPE A GUTTER

STANDARD 606111-03

Date
Revisions
1-1-97
Switched units to English (metric).
1-1-07
Removed weight of grate and cover.
See plans

**SECTION A-A**

**SECTION B-B**

**SECTION C-C**

**SECTION A-A & C-C**

**SECTION B-B & B'-B'**

**ENTRANCE**

**TYPE B GUTTER**

**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.

---

**BONNIE DEPARTMENT OF TRANSPORTATION**

**DATE**

**REVISIONS**

1-1-16: Deleted first General Note, to avoid conflict with second General Note.

0-2-16: Changed terminology to "welded wire reinforcement".

**ENGINEER OF POLICY AND PROCEDURES**

**APPROVED**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED**

**PASSED**

**DATE**

**REVISIONS**

January 1, 2018

January 1, 2018

---

**STANDARD 606201-04**

**INLET**

**OUTLET & ENTRANCE**

**TYPE B GUTTER**

**INLET, OUTLET & ENTRANCE**

**Sheet 1 of 2**

---

**QUANTITY OF CONCRETE**

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

**QUANTITY OF CONCRETE**

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

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

---

**STANDARD 606201-04**

**INLET, OUTLET & ENTRANCE**

See plans

**REVISIONS**

1-1-16: Deleted first General Note, to avoid conflict with second General Note.

0-2-16: Changed terminology to "welded wire reinforcement".
NOTE
If the average grade of pavement for the distance A-D exceeds 2%, this distance shall be increased 6\' (1.8 m) for each 1% increase in grade.

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

For each 1% increase in grade, the distance shall be increased 6\' (1.8 m) to begin here.

OUTLET

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

SECTION A-A
Rollled edge

SECTION B-B
Rollled edge

SECTION C-C
Rollled edge

SECTION D-D
Rollled edge

SECTION E-E
Rollled edge

SECTION F-F
Rollled edge

SECTIONS AT END OF OUTLET
Rollled edge

TYPE B GUTTER
(INLET, OUTLET & ENTRANCE)

STANDARD 606201-04
The 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 the pavement for the distance A-D exceeds 2%, this distance shall be increased 6'-0" (1.8 m) for each 1% increase in grade.

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

GENERAL NOTES

OUTLET TYPE 1 FOR

TYPE B GUTTER

STANDARD 606206-04

GRATE TYPE B

TIE BARS

SECTION D-D

SECTION E-E

SECTION A-A

SECTION B-B

SECTION C-C

SECTION F-F

QUANTITIES

<table>
<thead>
<tr>
<th>Material</th>
<th>Single</th>
<th>Double</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete - cu. yd. (m³)</td>
<td>1.7</td>
<td>3.1</td>
</tr>
<tr>
<td>Concrete - cf. ft. (m³)</td>
<td>2.7</td>
<td>4.1</td>
</tr>
<tr>
<td>Cast Iron Grate - Ea.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Cast Iron Grate - Lb.</td>
<td>22</td>
<td>33</td>
</tr>
<tr>
<td>Pipe Drain - Dia. in (mm)</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

Double:  

SECTION 1-18

Deleted second General Note
to avoid conflict with first

General Note.

1-1-09

Switched units to

English (metric).
Curb and gutter

See DETAIL II

Grooves

(SEE SHEET 2 FOR DETAILS OF RAMPED NOSES)

24 (600) max.

Var. radius

Face of curb

24 (600) Offset for urban conditions

36 (900) Offset for urban conditions

INTERMEDIATE ISLAND

(FOR RIGHT TURN LANE DESIGN)

TYPICAL PLAN OF MEDIAN ISLAND

(SEE SHEET 2 FOR DETAILS OF RAMPED NOSES)

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

Noses 1 and 2 shall be ramped unless noted otherwise on the plans.

(See sheet 2 for length)

TYPICAL PLANS OF CORNER ISLANDS

(SEE SHEET 2 FOR DETAILS OF RAMPED NOSES)

PC CONCRETE ISLANDS

AND MEDIANS

Ilinois Department of Transportation

ENGINEER OF POLICY AND PROCEDURES

APPROVED

1-1-97

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

PASSED

DATE

REVISIONS

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

1-1-07 Switched to Hot-Mix terminology

STANDARD 606301-04

(Sheet 1 of 2)
1/8 (20) PEJF between rigid pavement and median end. Align with joint in adjacent pavement.

PEJF = Preformed expansion joint filler.

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

Keyed longitudinal construction joints shall be constructed without tie bars.

X = PCC base course plus HMA thickness.

t = Pavement or PCC base course thickness.

Welded wire reinforcement required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

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

PASSED

DATE

REVISIONS

1-1-97

ENGINEER OF DESIGN AND ENVIRONMENT

APPROVED

1-1-97

ENGINEER OF POLICY AND PROCEDURES

APPROVED

1-1-97

ILLINOIS DEPARTMENT OF TRANSPORTATION

STANDARD 606306-04

CORRUGATED PC CONCRETE MEDIANS
TABLE FOR PAVED DITCH TYPE A

<table>
<thead>
<tr>
<th>TYPE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Flow Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>sq ft</td>
<td>sq yd</td>
<td>m²</td>
<td>sq m</td>
</tr>
<tr>
<td>A-15</td>
<td>6</td>
<td>11.5</td>
<td>1.9</td>
<td>0.0278</td>
</tr>
<tr>
<td>A-22</td>
<td>12</td>
<td>23.0</td>
<td>3.9</td>
<td>0.0861</td>
</tr>
<tr>
<td>A-30</td>
<td>24</td>
<td>45.0</td>
<td>7.8</td>
<td>0.1644</td>
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<tr>
<td>A-37</td>
<td>36</td>
<td>67.5</td>
<td>11.2</td>
<td>0.2292</td>
</tr>
<tr>
<td>A-45</td>
<td>48</td>
<td>90.0</td>
<td>15.0</td>
<td>0.3343</td>
</tr>
<tr>
<td>A-52</td>
<td>60</td>
<td>112.5</td>
<td>19.2</td>
<td>0.5400</td>
</tr>
<tr>
<td>A-60</td>
<td>72</td>
<td>135.0</td>
<td>24.0</td>
<td>0.6805</td>
</tr>
</tbody>
</table>

* = \( \frac{W}{X} + (6 \times 150) \times \text{Earth slope} \)

TABLE FOR PAVED DITCH TYPE B

<table>
<thead>
<tr>
<th>TYPE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Flow Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>sq ft</td>
<td>sq yd</td>
<td>m²</td>
<td>sq m</td>
</tr>
<tr>
<td>B-15</td>
<td>6</td>
<td>11.5</td>
<td>1.9</td>
<td>0.0278</td>
</tr>
<tr>
<td>B-22</td>
<td>12</td>
<td>23.0</td>
<td>3.9</td>
<td>0.0861</td>
</tr>
<tr>
<td>B-30</td>
<td>24</td>
<td>45.0</td>
<td>7.8</td>
<td>0.1644</td>
</tr>
<tr>
<td>B-37</td>
<td>36</td>
<td>67.5</td>
<td>11.2</td>
<td>0.2292</td>
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<tr>
<td>B-45</td>
<td>48</td>
<td>90.0</td>
<td>15.0</td>
<td>0.3343</td>
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<tr>
<td>B-52</td>
<td>60</td>
<td>112.5</td>
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<td>0.5400</td>
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<tr>
<td>B-60</td>
<td>72</td>
<td>135.0</td>
<td>24.0</td>
<td>0.6805</td>
</tr>
</tbody>
</table>

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

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

PAVED DITCH

LOCATION AND LIMITS OF PAVED DITCH

ELEVATION

DETAIL OF UPSTREAM END

DETAIL OF DOWNSTREAM END

GENERAL NOTES

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

DATE

REVISIONS

6-1-16

5-1-97

1-1-09

Switched units to English (metric).
Shouder
PCC or HMA
PCC slab
shoulder
PCC or HMA
of pavement
Outside edge
pavements.
with existing joints in
Joints in prolongation
with existing joints in
pavements.

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

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

Shoild width

Shoulder width

Pipe drain 12 (300)

CAST IN PLACE CONCRETE

INSIDE WIDTH

INSIDE LENGTH

INLET TYPE

SHOULDER WIDTH

O-O GRATING FRAME

INLET BOX INSIDE WIDTH

INLET BOX EDGE LENGTH

Type E
8" (200 mm)
4-4" (102 mm)
3-11" (830 mm)
18 (450 mm)

Type F
30" (750 mm)
6-5" (160 mm)
6-0" (200 mm)
22 (550 mm)

Type G
5' (150 mm)
or less
27 (690 mm)
22 (550 mm)
18 (450 mm)

GENERAL NOTES
See Standard 420001 for joint details not shown.

All exposed edges of the inlet, except the upper perimeter, shall be beveled 45° (20).

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

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

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

SHOULDER INLET
WITH CURB.

DATE
REVISIONS
1-1-18
Changed tie bar spacing to
36 (900) cts.
1-1-17
Revised to reflect Midwest

WHO ILLINOIS DEPARTMENT OF TRANSPORTATION

APPROVED

ISSUED

PASSED

ENGINEER OF POLICY AND PROCEDURES

ENGINEER OF DESIGN AND ENVIRONMENT

STANDARD 610001-08

(Sheet 1 of 2)
The extracted content from the image is as follows:

**REQUIRED MATERIAL**

**TYPE F**

<table>
<thead>
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<th>Qty</th>
<th>Size</th>
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<td>6</td>
<td>No. 4</td>
<td>2.96 m</td>
</tr>
<tr>
<td>u5</td>
<td>3</td>
<td>No. 4</td>
<td>2.96 m</td>
</tr>
<tr>
<td>u4</td>
<td>6</td>
<td>No. 4</td>
<td>2.96 m</td>
</tr>
</tbody>
</table>

Concrete:
- Cu. yds.: 3.0
- Sq. ft.: 7.5

Grating:
- Cu. ft.: 4.5
- Sq. ft.: 0.6

**TYPE G**

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty</th>
<th>Size</th>
<th>Length</th>
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</thead>
<tbody>
<tr>
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<td>6</td>
<td>No. 4</td>
<td>2.69 m</td>
</tr>
<tr>
<td>u5</td>
<td>3</td>
<td>No. 4</td>
<td>2.69 m</td>
</tr>
<tr>
<td>u4</td>
<td>4</td>
<td>No. 4</td>
<td>2.69 m</td>
</tr>
</tbody>
</table>

Concrete:
- Cu. yds.: 1.0
- Sq. ft.: 7.3

Grating:
- Cu. ft.: 5.8
- Sq. ft.: 0.3

**TYPE E**

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>u5</td>
<td>6</td>
<td>No. 4</td>
<td>2.28 m</td>
</tr>
<tr>
<td>u4</td>
<td>4</td>
<td>No. 4</td>
<td>2.28 m</td>
</tr>
</tbody>
</table>

Concrete:
- Cu. yds.: 0.6
- Sq. ft.: 2.6

Grating:
- Cu. ft.: 3.3
- Sq. ft.: 0.3

**SECTION D-D**

- See Detail C

**SECTION C-C**

**DETAIL OF CAST GRATE**

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

**SECTION F-F**

**DETAIL OF CAST FRAME**

(Type E shown)

**SECTION E-E**
Rail element splice (See Detail)

Steel plate beam guardrail with bolt slots at 37\(\text{g} (953)\) centers

ELEVATION

TYPE A

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

SECTION A-A

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

SECTION B-B

** When connecting Type D guardrail to an impact attenuator, adjust this dimension to match over a distance of 26'-6" (7.62 m) from point of connection if necessary.

GENERAL NOTES

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

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

STEEL PLATE BEAM GUARDRAIL

STANDARD 630001-12
**STEEL POST CONSTRUCTION**

- Post bolt with std. hex nut
- Steel post
- Std. flat washer

**WOOD POST CONSTRUCTION**

- Bolt not to extend more than 6 (4) past nut
- Bolt with 160 nails

**TWO-PIECE WOOD BLOCKOUT OPTION**

- Toe nail w/ 16D nail
- 12" x 8" (305 x 200)

**WOOD BLOCK-OUT AND STEEL POST DETAILS**

- Four holes each flange
- Std. hex nut

**POST OR SPLICE BOLT & NUT**

- Dia. and depth of recess to suit bolt

**Note:** All holes 3/8 (20) dia.
CABLE ASSEMBLY

(216) 2

rail element

Class A

rail element

Slotted hole

Slotted hole (optional)

Traffic

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.

END SHOE

ENTIRE LENGTH

STANDARD 630001-12

GUARDRAIL

STEEL PLATE BEAM

END SECTION

ALTERNATE END SHOE

ILLINOIS DEPARTMENT OF TRANSPORTATION

APPROVED

2018

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

ENGINEER OF POLICY AND PROCEDURES
GUARDRAIL PLACED BEHIND CURB

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

<table>
<thead>
<tr>
<th>V</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 18</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>&gt; 18 - 31</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>&gt; 31 - 40</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>&gt; 40 - 787</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>&gt; 787 - 150</td>
<td>8</td>
<td>0</td>
</tr>
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</table>

PLAN

Steel or wood post: (steel shown)

ELEVATION

FOOTING FOR POST WHEN IMPERVIOUS MATERIAL IS ENCOUNTERED

LEAVE-OUT FOR POST WHEN PAVED MATERIAL IS ENCOUNTERED

Steel or wood post: (steel shown)

Guardrail placed behind curb

Finished ground line

Aggregate backfill (CA 11)

Steel or wood post

HMA or PCC pavement

Steel or wood post

Aggregate backfill (CA 11)
When connecting to long-span guardrail over culvert, the next post may be the third (farthest from culvert) CRT wood post (See Standard 630106).

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

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

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

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

8 (200) min.

**ELEVATION**

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

<table>
<thead>
<tr>
<th>V</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 6</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>(0 - 152)</td>
<td>(610)</td>
<td>(510)</td>
</tr>
<tr>
<td>&gt; 6 - 28</td>
<td>18</td>
<td>149</td>
</tr>
<tr>
<td>(&gt; 152 - 458)</td>
<td>(458)</td>
<td>(468)</td>
</tr>
<tr>
<td>&gt; 28 - 31</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>(&gt; 458 - 787)</td>
<td>(305)</td>
<td>(368)</td>
</tr>
<tr>
<td>&gt; 31 - 40</td>
<td>12 - 0</td>
<td>8</td>
</tr>
<tr>
<td>(&gt; 787 - 1,902)</td>
<td>(1055)</td>
<td>(203)</td>
</tr>
</tbody>
</table>

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

Drilled holes with sides smoothed.

**NON-BLOCKED STEEL PLATE BEAM GUARDRAIL**

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

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

2 (50) max.

HMA or Controlled Low-Strength Material (CLSM)

HMA or PCC pavement.

Steel post

Aggregate backfill (CA 11)
For details of guardrail elements not shown, see Standard 630001.

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

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

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-17</td>
<td>Omitted all cases but MNT</td>
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<tr>
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<td>ON SLAB: Renamed standard</td>
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<tr>
<td></td>
<td>Added mounting plate detail.</td>
</tr>
<tr>
<td>1-1-11</td>
<td>Revised weld detail</td>
</tr>
<tr>
<td></td>
<td>For Case IV</td>
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</table>

GENERAL NOTES

STANDARD 630101-10

STRONG POST GUARDRAIL ATTACHED TO CULVERT
Pay limits of other type

Pay limits of LONG-SPAN GUARDRAIL OVER CULVERT

Pay limits of other type

Pay limits of other type

Plan

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

6'-3"
(1.905 m)

6'-3"
(1.905 m)

12'-6", 18'-9" or 25'-0"
(3.81 m, 5.72 m or 7.62 m)

6'-3"
(1.905 m)

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

Elevation

Steel posts

CRT wood posts

Top of culvert.

Steel posts

CRT wood posts

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.

Section A-A

CRT Wood Post

Plan

12 (105)
(305)

8 (203)

12 (105)
(305)

DATE

REVISIONS

1-1-17
Revised general notes for non-blocked guardrail option.

1-1-13
Revised pay limits.

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

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

STANDARD 630001-02

LONG-SPAN GUARDRAIL
OVER CULVERT

STANDARD 630106-02
CROSS SECTION

CASE 1, (H+T-R) < 18 (457), TOP MOUNT

Steel post

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

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

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

Greater of $\frac{3}{16} (140)$ or $\frac{1}{2} \times 2$ (R+64)

* R varies between 0 to 6 (152)

ELEVATION

WEAK POST GUARDRAIL ATTACHED TO CULVERT

STANDARD 630111

ILLINOIS DEPARTMENT OF TRANSPORTATION

APPROVED

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ISSUED

ENGINEER OF DESIGN AND ENVIRONMENT

PASSED

January 1, 2017

January 1, 2017

ATTACHED TO CULVERT
Steel post

\[ \% \times 5 \ (M16 \times 127) \] hex bolt and nut

Socket assembly

Two \( \% \times 2 \ (M13 \times 50) \) hex bolts

Greater of 5\( \% \) (140) or \( R + 2\% \) (R+64)

\* R varies between 0 to 6 (152)

**CROSS SECTION**

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

Steel post

\[ \% \times 5 \ (M16 \times 127) \] hex bolt and nut

Socket assembly

Two \( \% \times 2 \ (M13 \times 50) \) hex bolts

Greater of 5\( \% \) (140) or \( R + 2\% \) (R+64)

\* R varies between 0 to 6 (152)

Two 4% (19) threaded rods. Length shall be \( W + 4 \ (102) \)

SQUARE WASHER B

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

**CROSS SECTION**

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

Steel post

\[ \% \times 5 \ (M16 \times 127) \] hex bolt and nut

Socket assembly

Two \( \% \times 2 \ (M13 \times 50) \) hex bolts

Greater of 5\( \% \) (140) or \( R + 2\% \) (R+64)

\* R varies between 0 to 6 (152)

Two 4% (19) threaded rods secured with chemical adhesive

**ELEVATION**

**FOR CASES II & III**

**SIDE VIEW**

**FRONT VIEW**

**TOP VIEW**

**PLATE C**

\[ 3 \ (51) \]

\[ 3 \ (51) \]

\[ 2 \ (64) \]

\[ 2 \ (64) \]

**PLATE D**

\[ 3 \ (76) \]

\[ 3 \ (76) \]

\[ 70 \ xx \] 4% (10)

\[ 70 \ xx \] 4% (10)

\[ 70 \ xx \] 4% (10)

\[ 70 \ xx \] 4% (10)

\[ 70 \ xx \] 4% (10)

\[ 70 \ xx \] 4% (10)

**WEAK POST GUARDRAIL ATTACHED TO CULVERT**

**STANDARD 630111**
Two 7/8" x 7 (M19 x 178) threaded rods secured with chemical adhesive

* R varies between 0 to 6 (152)

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

ELEVATION

TOP VIEW

SIDE VIEW

FRONT VIEW

SOCKET ASSEMBLY
FOR CASE IV

WEAK POST GUARDRAIL
ATTACHED TO CULVERT

STANDARD 630111
Steel post

1/4 x 5 (M18 x 127)
hex bolt and nut

Socket assembly

Two 3/8 x 7 (M13 x 178) threaded rods secured with chemical adhesive

* R varies between 0 to 6 (152)

** R varies between 0 to 6 (152)

CROSS SECTION

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

ELEVATION

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

CROSS SECTION

* R varies between 0 to 6 (152)

Length shall be W + 4 (302).

SQUARE WASHER B

Steel

12 (305) min.

Socket assembly

HHS 4 x 4 x 1/2

GUSSET C

TOP VIEW

SIDE VIEW

FRONT VIEW

SOCKET ASSEMBLY
FOR CASES V & VI

PLATE D

PLATE A

WEAK POST GUARDRAIL
ATTACHED TO CULVERT

ILLINOIS DEPARTMENT OF TRANSPORTATION

APPROVED

ENGINEER OF POLICY AND PROCEDURES

January 1, 2017

ENGINEER OF DESIGN AND ENVIRONMENT

January 1, 2017

PASSED

ATTACHED TO CULVERT

WEAK POST GUARDRAIL

STANDARD 630111
WEAK POST GUARDRAIL
ATTACHED TO CULVERT

STANDARD 630111
New standard.

boards meet (6) gap where 4 1 board. required for continuous boards meet. Only two Four bolts shown where and timber.

Top of post. 

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

ELEVATION WITH W-BEAM GUARDRAIL

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

ELEVATION WITH THRIE-BEAM GUARDRAIL

VIEW A-A

VIEW B-B

\( \frac{1}{6} \) (6) gap where boards meet. Only two required for continuous board.

Top of post and timber

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

Top of W-beam guardrail

Top of thrie-beam guardrail

GENERAL NOTES

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

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

ENGINEER OF POLICY AND PROCEDURES

APPROVED

DATE

REVISIONS

1-1-17 New standard

PASSED

STANDARD 630116
Variable width

Shoulder stabilization

Appropriate guardrail end treatment

Transition to normal shoulder slope

Variable depending on end treatment and flare

Proposed HMA & var.

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

Existing PC/PCC shoulder

Proposed HMA shoulder surface

New grade line of shoulder

Variable slope

Slope 1:1 max.

Variable

12 (610) min.

24 (610) min.

Variable

2x16 (610) min.

6 (150) min.

Variable width

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

GENERAL NOTES

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

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

DATE

REVISIONS

PASSED

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

STANDARD 630201-07
**SHOULDER WIDENING TRANSITION**

*For Flared Terminal*

**SECTION B-B**

(Internal Head omitted for clarity)

- Slope 1:10 or flatter
- Top of tube

**FOR FLARED TERMINAL**

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

**STANDARD 630301-09**
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) or 37-6" (952)
according to type

- Steel plate
- Dia. hole
- Yoke

BEARING PLATE K

FRONT

SIDE

WOOD POST

YOKE

¥4 (5) thick steel

CABLE STRUT

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.

TRAFFIC FLOW

PLAN

ELEVATION

TRANSPORTATION

No. 1

ENGINEER OF POLICY AND PROCEDURES

APPROVED

January 1, 2017

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-97

PASSED

DATE

REVISIONS

1-1-17 Revised wood post length and hole spacing.

1-1-13 Corrected metric dimensions.

for BEARING PLATE K. Changed

pipe dia. ¾ wood post.
TRAFFIC BARRIER TERMINAL TYPE 5

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.

Plate G placed between plate E and rail element.

Plate washer D under nut.

Finished ground line

6' (1.83 m) long wood or steel post

**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 631026-06 for details of guardrail not shown.

All dimensions are in inches (millimeters) unless otherwise shown.
Concrete parapet or parallel wingwall

Formed or drilled 1/2" (25) hole

Steel bearing plates

Bridge approach curb, see plans for details.

Two sections of thrie beam
one set inside the other

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

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

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

Single section of w-beam when no curb is present
within this limit. Two sections of w-beam, one set
inside the other when curb is present within this limit.

Steel post
W6x9.0 (W150x13.5)

2'-0" (610) min.

9'-4½" (2.86 m)

6 spaces at 1'-6" (476)

2'-0" (610)

9 spaces at 3'-1½" (953)

No begining or ending of curb within this limit.

Begin 6" (1.83 m)

TRANSITION SECTION

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.

W6x9.0 (W150x13.5) Steel post

Bridge approach slab

Wood Blockout

24 (610) min.
all posts

DATE
1-1-17

REVISIONS

1-1-17 Revised length of thrie beam. Revised length of posts.
6-1-16 Changed 'Bridge approach slab' to 'Bridge approach curb'.

STANDARD 631031-15

ILLINOIS DEPARTMENT OF TRANSPORTATION
ENGINEER OF POLICY AND PROCEDURES
APPROVED

PASSED

ISSUED
1-1-97

ENGINEER OF DESIGN AND ENVIRONMENT

1-1-17

January 1,
2017

January 1,
2017

ENGINEER OF DESIGN AND ENVIRONMENT

1-1-17

January 1,
2017

January 1,
2017
Five 3/8 (M20) anchor bolts secured with chemical adhesive and five standard washers. After tightening, cut the anchor bolts flush with the nuts, and damage the nuts to prevent them from loosening.

Approach curb, see plans for details.

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

Pay limits of other type

Two sections of thrie beam, one set inside the other when curb is present within this limit.

Single section of w-beam when no curb is present within this limit. Two sections of w-beam, one set inside the other when curb is present within this limit.

PLAN

Two sections of thrie beam, one set inside the other

Single section of thrie beam

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

Pay limits of other type

TRAFFIC BARRIER TERMINAL, TYPE 6

OTHER CONCRETE STRUCTURE

Concrete structure

Thrie beam end shoe

Approach curb, see plans for details.

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

Approach curb, see plans for details.

Pay limits of other type

Two sections of thrie beam, one set inside the other when curb is present within this limit.

Single section of w-beam when no curb is present within this limit. Two sections of w-beam, one set inside the other when curb is present within this limit.

PLAN

Two sections of thrie beam, one set inside the other

Single section of thrie beam

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

Pay limits of other type

TRAFFIC BARRIER TERMINAL, TYPE 6

OTHER CONCRETE STRUCTURE

Concrete structure

Thrie beam end shoe

Approach curb, see plans for details.

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

Approach curb, see plans for details.

Pay limits of other type

Two sections of thrie beam, one set inside the other when curb is present within this limit.

Single section of w-beam when no curb is present within this limit. Two sections of w-beam, one set inside the other when curb is present within this limit.

PLAN

Two sections of thrie beam, one set inside the other

Single section of thrie beam

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

Pay limits of other type

TRAFFIC BARRIER TERMINAL, TYPE 6

OTHER CONCRETE STRUCTURE

Concrete structure

Thrie beam end shoe

Approach curb, see plans for details.

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

Approach curb, see plans for details.

Pay limits of other type

Two sections of thrie beam, one set inside the other when curb is present within this limit.

Single section of w-beam when no curb is present within this limit. Two sections of w-beam, one set inside the other when curb is present within this limit.

PLAN

Two sections of thrie beam, one set inside the other

Single section of thrie beam

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

Pay limits of other type

TRAFFIC BARRIER TERMINAL, TYPE 6

OTHER CONCRETE STRUCTURE

Concrete structure

Thrie beam end shoe

Approach curb, see plans for details.

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

Approach curb, see plans for details.

Pay limits of other type

Two sections of thrie beam, one set inside the other when curb is present within this limit.

Single section of w-beam when no curb is present within this limit. Two sections of w-beam, one set inside the other when curb is present within this limit.

PLAN

Two sections of thrie beam, one set inside the other

Single section of thrie beam

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

Pay limits of other type

TRAFFIC BARRIER TERMINAL, TYPE 6

OTHER CONCRETE STRUCTURE

Concrete structure

Thrie beam end shoe

Approach curb, see plans for details.

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

Approach curb, see plans for details.

Pay limits of other type

Two sections of thrie beam, one set inside the other when curb is present within this limit.

Single section of w-beam when no curb is present within this limit. Two sections of w-beam, one set inside the other when curb is present within this limit.

PLAN

Two sections of thrie beam, one set inside the other

Single section of thrie beam

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

Pay limits of other type

TRAFFIC BARRIER TERMINAL, TYPE 6

OTHER CONCRETE STRUCTURE

Concrete structure

Thrie beam end shoe

Approach curb, see plans for details.

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

Approach curb, see plans for details.

Pay limits of other type

Two sections of thrie beam, one set inside the other when curb is present within this limit.

Single section of w-beam when no curb is present within this limit. Two sections of w-beam, one set inside the other when curb is present within this limit.

PLAN

Two sections of thrie beam, one set inside the other

Single section of thrie beam

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

Pay limits of other type

TRAFFIC BARRIER TERMINAL, TYPE 6

OTHER CONCRETE STRUCTURE

Concrete structure

Thrie beam end shoe

Approach curb, see plans for details.

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

Approach curb, see plans for details.

Pay limits of other type

Two sections of thrie beam, one set inside the other when curb is present within this limit.

Single section of w-beam when no curb is present within this limit. Two sections of w-beam, one set inside the other when curb is present within this limit.

PLAN

Two sections of thrie beam, one set inside the other

Single section of thrie beam

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

Pay limits of other type

TRAFFIC BARRIER TERMINAL, TYPE 6

OTHER CONCRETE STRUCTURE

Concrete structure

Thrie beam end shoe

Approach curb, see plans for details.

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

Approach curb, see plans for details.

Pay limits of other type

Two sections of thrie beam, one set inside the other when curb is present within this limit.

Single section of w-beam when no curb is present within this limit. Two sections of w-beam, one set inside the other when curb is present within this limit.

PLAN

Two sections of thrie beam, one set inside the other

Single section of thrie beam

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

Pay limits of other type

TRAFFIC BARRIER TERMINAL, TYPE 6

OTHER CONCRETE STRUCTURE

Concrete structure

Thrie beam end shoe

Approach curb, see plans for details.

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

Approach curb, see plans for details.

Pay limits of other type

Two sections of thrie beam, one set inside the other when curb is present within this limit.

Single section of w-beam when no curb is present within this limit. Two sections of w-beam, one set inside the other when curb is present within this limit.

PLAN

Two sections of thrie beam, one set inside the other

Single section of thrie beam

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

Pay limits of other type

TRAFFIC BARRIER TERMINAL, TYPE 6

OTHER CONCRETE STRUCTURE

Concrete structure

Thrie beam end shoe

Approach curb, see plans for details.

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

Approach curb, see plans for details.

Pay limits of other type

Two sections of thrie beam, one set inside the other when curb is present within this limit.

Single section of w-beam when no curb is present within this limit. Two sections of w-beam, one set inside the other when curb is present within this limit.

PLAN

Two sections of thrie beam, one set inside the other

Single section of thrie beam

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

Pay limits of other type

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

Bridge approach curb, see plans for details.

Single section of w-beam when no curb is present within 1½ x limit. Two sections of w-beam, one set inside the other when curb is present within this limit.

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

Transition section (see detail)

Pay limits of other type

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

GENERAL NOTES

TRAFFIC BARRIER TERMINAL, TYPE 6A

SECTION A-A

SECTION B-B

WOOD BLOCKOUT

STEEL POST

W6x9.0 (W150x13.5)

24 (610) min. all posts

28½" (724) min. posts

TRAFFIC BARRIER TERMINAL, TYPE 6A

STANDARD 631032-09

DATE
1-1-17

REVISIONS

1-1-17

1-1-13

Revised length of thrie beam. Revised length of posts.

Added notes to see plans for bridge approach curb details.
Guardrail connection plate assembly

Bolts (A307) with washers and self-locking nut, or nut and jam nut. Top bolt Mx9 (22x229).
Bottom bolt Mx5 (22x127) for curb mount or Mx7 (22x179) for side mount.

Note:
Side mounted rail similar as to connection details.

**MODIFIED THRIE BEAM END SHOE DETAIL**

**SECTION C-C**

**POSTS 1-9 WOOD BLOCKOUT DETAIL**

**POST 10 WOOD BLOCKOUT DETAIL**

(See Standard 630001 for post 11-15 blockouts.)

**TRAFFIC BARRIER TERMINAL, TYPE 6A**

(STANDARD 631032-09)
GUARDRAIL CONNECTION PLATE ASSEMBLY DETAILS
(Mirror for opposite end)

VIEW D-D

SECTION E-E

LEGEND

\( \frac{4}{8} \times \frac{1}{2} (25) \) Holes

● for \( \frac{1}{4} \) (22) H.S. bolts and nuts

Drill and tap 3 holes for \( \frac{1}{4} \) (22) H.S. bolts.

Dimensions

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Curb Mounted Rail</td>
<td>8( \frac{3}{8} ) (22)</td>
</tr>
<tr>
<td>For Side Mounted Rail</td>
<td>9( \frac{3}{8} ) (22)</td>
</tr>
</tbody>
</table>

TRAFFIC BARRIER
TERMINAL, TYPE 6A

(Sheet 3 of 3)

STANDARD 631032-09
See details of Wood Blockouts A, B, C, & D.

- With standard washers. After tightening, cut the anchor bolts flush with the nuts and damage the nuts to prevent them from loosening.

Single section of thrie beam

Concrete structure

Thrie beam end shoe

12'-6" (3.81 m) single section of thrie beam

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

PLAN

ELEVATION

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 11
TEMPORARY CONCRETE BARRIER

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

*Splice bolts

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

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

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

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

For details of guardrail not shown, see Standard 630001.

ENGINEER OF POLICY AND PROCEDURES
APPROVED January 1, 2011

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

DATE
REVISIONS
1-1-11 Corrected weld symbol on PLATE G detail
1-1-09 Switched units to English (metric)

TRAFFIC BARRIER TERMINAL Type 11
STANDARD 631051-03
**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.
**TYPICAL FOOTINGS FOR POST AND ANCHOR WHEN IMPERVIOUS MATERIAL IS ENCOUNTERED**

- **NOTES**
  - \( V + W \) shall not exceed 39 (990). When \( V \) is 0 to 15 (380), \( W = 24 \) (610), and posts shall be shortened as required. When \( V \) exceeds 15 (380), \( W \) shall be shortened correspondingly.
  - \( T = 15 \) (380) when \( U \) 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).

**GENERAL NOTES**

The Engineer will determine the stability of the protective material for anchoring.

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

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

**Typical Wood Materials**

<table>
<thead>
<tr>
<th>Item</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post</td>
<td>4x4x10 (50x300x150)</td>
</tr>
<tr>
<td>Block</td>
<td>2x12x18 (50x150x450)</td>
</tr>
<tr>
<td>Rail</td>
<td>2x8</td>
</tr>
<tr>
<td>Spacer</td>
<td>2x8x16 (50x125x400)</td>
</tr>
</tbody>
</table>

**VIEW X-X**

**DATE**: 1-1-97

**REVISIONS**:
- 1-1-05: Corrected note on Post
- 1-1-09: Switched units to Eng. (met.) omitted precision

**ISSUED**: 1-1-97

**PASSED**:
- APPROVED: January 1, 2009
- ENGINEER OF DESIGN AND ENVIRONMENT: January 1, 2009
- ENGINEER OF POLICY AND PROCEDURES: January 1, 2009

**CABLE ROAD GUARD**

**SINGLE STRAND**

**STANDARD 636001-02** (Sheet 1 of 3)
END ANCHOR ARRANGEMENT

INTERMEDIATE ANCHOR ARRANGEMENT

DEAD END ANCHOR ARRANGEMENT

TYPICAL STEEL MATERIALS

<table>
<thead>
<tr>
<th>Item</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post</td>
<td>3x65x754.9 (579x8.9x1.75 m)</td>
</tr>
<tr>
<td>Bottom plate</td>
<td>3/4x148x125 (4.2x6.4x5)</td>
</tr>
<tr>
<td>Side</td>
<td>4x6x24 (4.2x6.4x5)</td>
</tr>
<tr>
<td>Brace</td>
<td>4.4x3x1/2</td>
</tr>
<tr>
<td>Edge</td>
<td>40x3x1/2</td>
</tr>
</tbody>
</table>

CABLE ROAD GUARD
SINGLE STRAND

ILLINOIS DEPARTMENT OF TRANSPORTATION

ENGINEER OF POLICY AND PROCEDURES
APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

PASSED

STANDARD 636001-02
TYPICAL CROSS-SECTION

**NEW MONOLITHIC PCC BASE**
* This dimension shall be 10 (250) minimum when the barrier is confined by earth.

**NEW OR EXISTING BIT/PCC BASE WITH OVERLAY CONFINEMENT**

**EXISTING PCC BASE WITH LONGITUDINAL JOINT**

ANCHORING METHODS

**TYPICAL CROSS-SECTION**

**NEW OR EXISTING**

**VARIABLE CROSS-SECTION**

**GENERAL NOTES**

The Variable Cross-Section shall be used when there is a difference in elevation between the two sides of the barrier.

See standard 836011 for additional light pole foundation details where required in concrete barrier.

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

CONCRETE BARRIER, DOUBLE FACE, 44 in. (1120 mm) HEIGHT

STANDARD 637006-04
Expansion Joint
No. 4 (No. 13) Bar 18 (450) long (typ.)
Bend in field
Concrete glare
Concrete (750) 30 (2.1 m) 7'-0" (2.1 m) ± cts.
No. 4 (No. 13) Bar (typ.)
No. 4 (No. 13) Bar 18 (450) long (typ.)
Concrete barrier
Center on concrete barrier
Necessity for glare screen is dependent upon geometrics

TYPICAL APPLICATION AT MEDIAN OBSTRUCTIONS

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

CONCRETE GLARE SCREEN
STANDARD 638101-02
Each alternate pair of panels shall have a textured surface finish as shown, and shall be alternated with pairs having a smooth finish. The intersection of every two panels having the same finish shall point toward the road as shown.

Face of wall toward road

Plan

A

Elevation

A

Top of wall

36 (900) min. embankment at low point of finished grade (typ.)

Finished grade

36 (900) min. embankment

Sight Screen

Precast Prestressed Concrete Panel Wall

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 (23 MPa)
F_{ci} = 3,250 psi (22 MPa)
F_{c} = 20,000 psi (138 MPa)
F_{ci} = 189,000 psi (1290 MPa)

Structural Steel:
F_{y} = 20,000 psi min. (138 MPa)

Minimum allowable soil bearing pressure: 1.25 ksf (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.

---

**TEXTURED SURFACE FINISH DETAIL**

NOTE

- Thickness of form liner used to obtain surface finish.

---

**STANDARD 639001-02**

**CONCRETE PANEL WALL**

**SIGHT SCREEN**

**PRECAST PRESTRESSED**

**ELEVATION**

**SEC. D-D**

**STRAND and REINFORCEMENT LAYOUT**
Terminal pull post

Dome type caps on pull posts

Loop type caps on line posts

Tops of all footings shall be rounded

Tension cable

Intermediate pull post

Tension cable

Line post

DETAIL A

Truss rod

DETAIL B

DETAIL C

DETAIL A

DETAIL B

DETAIL C

Turnbuckle

Tension cable

Line post

Truss rod

Tension cable

Intermediate pull post

Truss rod

Truss rod

View toward highway

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.

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.

All dimensions are in inches (millimeters)

Fence fabric shall be tied to all line posts, tension cable and brace rails with 9 ga. (3.76) wire tied at 12 (300) cts.

ELEVATION - 6' (1.83 m) FENCE

(looking toward highway)

ELEVATION - 8' (2.43 m) & 10' (3.05 m) FENCES

(looking toward highway)

GENERAL NOTES

Loading for wind 80 mph (130 km/h)
with 30% gust factor. Minimum allowable soil pressure = 3.25 psf (120 kPa).

Tension cable shall be provided with one turn buckle between each pair of pull posts.

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

SIGHT SCREEN

CHAIN LINK FENCE

(Sheet 1 of 2)

REVISIONS

STANDARD 640001-01

January 1, 2009

Illinois Department of Transportation
DETAIL B
(Showing typical method of attaching middle brace rails to posts.)

DETAIL A

DETAILED OF FABRIC
(Looking from highway)

DETAIL C
(Looking toward highway)

SECTION A-A
(Showing method of fastening bottom tension cable and fence fabric to pull posts.)

FENCE INSTALLATION ON SLOPES

PROTECTIVE ELECTRICAL GROUND

PLAN

STANDARD 640001-01
### DETAIL A

- 3x4 (75x100) Rails (nominal dim.)
- Cedar pickets
- 7'-4" (2.2 m) Spacing (typ.)

### DETAIL B

- Fence height
  - (75 ± 50)
  - 3 ± 2

### DETAILS

- **ELEVATION**
  - (Showing typical pocket to rail attachment)
  - 2½ (63) dia. cedar pickets
  - 15 (380) Dia. hole for post
  - 6x8 (200x200)
  - 8x8 (200x200)

- **SECTION B-B**
  - (Notch pickets when required to clear washer and bolt head)

### FENCE HEIGHT

<table>
<thead>
<tr>
<th>Post Size (nominal dim.)</th>
<th>6'-0&quot; (1.8 m)</th>
<th>8'-0&quot; (2.4 m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Length</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10'-0&quot; (3.0 m)</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>14'-0&quot; (4.3 m)</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>4'-0&quot; (1.2 m)</td>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>

### GENERAL NOTES

- Loading is based on 80 mph (130 km/h) with 30% gust factor. Minimum allowable soil pressure = 1.25 tsf (120 kPa).
- All dimensions are in inches (millimeters) unless otherwise shown.

### PLAN

- Facing highway

### TABLES

<table>
<thead>
<tr>
<th>Post Embedment</th>
<th>A (150x200)</th>
<th>B (200x200)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6'-0&quot; (1.8 m)</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>8'-0&quot; (2.4 m)</td>
<td>24</td>
<td>33</td>
</tr>
</tbody>
</table>

### DATE

- 1-1-97
- 1-1-99

### REVISED

- Eng. Design and Environ. Revised
- Sec. B-B to Detail B
- Deleted DN Symbol
- Renum. Standard 2367-3

### ENGLISH (METRIC)

- Changed units to English (metric)

### ISSUED

- 1-1-09
1x4 (25x100) rough-sawn or surfaced wood planks (nominal dim.).

1x4 (75x100) Rails (nominal dim.)

Spacing (typ.) 7'-4" (2.2 m)

DETAIL B

DETAIL A

Fence height

6' 0" (1.8 m) 8' 0" (2.4 m)

Post Size (nominal dim.) 8x8 (200x200) 6x6 (150x150)

Post Length 14'-0" (4.3 m) 10'-0" (3.0 m)

Post Embedment 4'-0" (1.2 m) 6'-0" (1.8 m)

A 15 (380) 18 (460)

B 24 (600) 33 (870)

C 24 (600) 33 (870)

D 32 (800) 35 (880)

Aggregate

Sec. A-A

DETAIL A

(Showing typical plank to rail attachment each rail.)

DETAIL B

(Showing typical panel to post connection details)

GENERAL NOTES

Loading was based on 80 mph (130 km/h) with 30% gust factor. Minimum allowable soil pressure = 1.25 tf (120 kPa).

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

DATE

REVISIONS

1-1-09

Switched sets to English (inches). Changed Section B-B to Detail B.

1-1-97

AIA-2367-3

Dropped DN Symbol.

STANDARD 641006-01
On Portland cement concrete shoulders, no shoulder rumble strip shall be located closer than 6 (150) to a transverse joint.

Omit shoulder rumble strips across structures.

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

SHOULDER RUMBLE STRIPS, 16 in.

STANDARD 642001-02
SECTION A-A

SECTION B-B

GENERAL NOTES

Omit shoulder rumble strips across structures and at mailbox turnouts.

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

TYPICAL APPLICATION AT AN INTERSECTION OR ENTRANCE

SHOULDER RUMBLE STRIPS, 8 in.

STANDARD 642006
**GORE INSTALLATION**
(Traffic approaches on both sides)  
(Test level 2 array shown)

**ROADSIDE INSTALLATION**  
(Traffic approaches on one side)  
(Test Level 2 array shown)

---

**TEST LEVEL 2 ARRAY**  
(for design speed less than or equal to 45 mph.)  
(Numbers inside sand modules indicate sand weight in pounds.)

**TEST LEVEL 3 ARRAY**  
(for design speed greater than 45 mph.)  
(Numbers inside sand modules indicate sand weight in pounds.)

---

**GENERAL NOTES**

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

---

**SAND MODULE IMPACT ATTENUATORS**

STANDARD 643001-02

---

**DATES AND REVISIONS**

- 1-1-14: Revised distance from barrier to hazard.
- 1-1-13: Changed posted speed to "design speed"
PEDESTRIAN GATE ARRANGEMENT

VEHICLE GATE ARRANGEMENT

GENERAL NOTES
Pull posts shall be placed at locations determined by the Engineer. They shall be placed at 660' (200 m) intervals between posts to which the ends of the fabric are clamped or midway between such posts when the distance is less than 1320' (400 m) and greater than 660' (200 m).

X + Y shall not exceed 24 (600), 30 (750), or 36 (900), as applicable. When X ≤ 9 (225), 15 (380), or 21 (525), then Y = 15 (375) and the post shall be shortened as required. When X exceeds 9 (225), 15 (380), or 21 (525), then Y shall be decreased correspondingly.

All dimensions are in inches (millimeters) unless otherwise shown.
### Chain Link Fence

**Line Post**

<table>
<thead>
<tr>
<th>Section</th>
<th>kg/m</th>
<th>lbs./ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Type A 1.90 (48.3) Ø.D.</td>
<td>2.77</td>
<td>(4.05)</td>
</tr>
<tr>
<td>Pipe Type B 1.90 (48.3) Ø.D.</td>
<td>2.28</td>
<td>(3.39)</td>
</tr>
<tr>
<td>Pipe Type C 1.90 (48.3) Ø.D.</td>
<td>2.26</td>
<td>(3.38)</td>
</tr>
<tr>
<td>H 1.875 x 1.625 (47.6 x 41.3)</td>
<td>2.72</td>
<td>(4.05)</td>
</tr>
<tr>
<td>C</td>
<td>1.60</td>
<td>(2.38)</td>
</tr>
<tr>
<td>I</td>
<td>2.30</td>
<td>(3.42)</td>
</tr>
</tbody>
</table>

**Terminal Post**

<table>
<thead>
<tr>
<th>Section</th>
<th>kg/m</th>
<th>lbs./ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Type A 2.375 (60.3) Ø.D.</td>
<td>3.65</td>
<td>(5.43)</td>
</tr>
<tr>
<td>Pipe Type B 2.375 (60.3) Ø.D.</td>
<td>3.11</td>
<td>(4.63)</td>
</tr>
<tr>
<td>Pipe Type C 2.375 (60.3) Ø.D.</td>
<td>2.89</td>
<td>(4.05)</td>
</tr>
<tr>
<td>Roll Formed 36 x 36 (89 x 89)</td>
<td>See detail</td>
<td></td>
</tr>
<tr>
<td>2 x 2 (63.5 x 63.5)</td>
<td>4.32</td>
<td>(6.43)</td>
</tr>
</tbody>
</table>

**Horizontal Brace**

<table>
<thead>
<tr>
<th>Section</th>
<th>kg/m</th>
<th>lbs./ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Type A 1.66 (42.2) Ø.D.</td>
<td>1.84</td>
<td>(2.72)</td>
</tr>
<tr>
<td>Pipe Type B 1.66 (42.2) Ø.D.</td>
<td>1.82</td>
<td>(2.71)</td>
</tr>
<tr>
<td>Pipe Type C 1.66 (42.2) Ø.D.</td>
<td>1.80</td>
<td>(2.70)</td>
</tr>
<tr>
<td>H 1.31 x 1.5 (33.3 x 38.1)</td>
<td>2.24</td>
<td>(3.35)</td>
</tr>
<tr>
<td>Roll Formed 36 x 36 (89 x 89)</td>
<td>See detail</td>
<td></td>
</tr>
</tbody>
</table>

**Gate Posts**

<table>
<thead>
<tr>
<th>Gate Opening * (ft.)</th>
<th>Pipe Type A</th>
<th>Pipe Type B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>Double</td>
<td>Single</td>
</tr>
<tr>
<td>Up to 4 (1.2)</td>
<td>2.73</td>
<td>(4.35)</td>
</tr>
<tr>
<td>Over 4 (1.2) to 8 (2.5)</td>
<td>5.79</td>
<td>(8.46)</td>
</tr>
<tr>
<td>Over 8 (2.5) to 18 (5.5)</td>
<td>7.58</td>
<td>(11.32)</td>
</tr>
<tr>
<td>Over 16 (5.0) to 24 (7.4)</td>
<td>9.28</td>
<td>(14.12)</td>
</tr>
<tr>
<td>Over 20 (6.1) to 26 (7.9)</td>
<td>10.98</td>
<td>(16.82)</td>
</tr>
</tbody>
</table>

* The 36 x 36 (89 x 89) roll formed section as detailed may be used as gate posts for single gate up to 6' (1.8 m) and double gate up to 12' (3.6 m).
**STANDARD GROUND**

- Ground line
- Post
- Wire tension

**COUNTERPOISE GROUND (ALTERNATE)**

- Ground line
- Post
- Wire tension
- Copper clad #6 solid, bare, steel rod.

**PROTECTIVE ELECTRICAL GROUNDS**

- Terminal post
- Ground line

**INSTALLATION ON SLOPES**

- Highway
- Fence
- Post
- R.O.W.

**PLAN**

- Fence line
- Terminal post
- R.O.W.

**ELEVATION**

- Post not centered in concrete.
- Line post
- 36 (900) for 4' (1.2 m) fence. 3'-6'' (1.0 m) for over 4' (1.2 m) fence.

**INSTALLATION AT CORNERS**

- Terminal post
- Ground line

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.

When fence line has a change in direction of 15° or more, a terminal post shall be placed as shown above.

Where angle is less than 15° and existing conditions require a terminal post, they shall be placed as directed by the Engineer.

**INSTALLATION OVER STREAM**

- End post assembly
- Extra length posts where necessary

**INSTALLATION AROUND HEADWALL**

- Corner post assembly
- Top of slope

**DETAIL A**

- 36 (900) for 4' (1.2 m) fence. 3'-6'' (1.0 m) for over 4' (1.2 m) fence.

**CHAIN LINK FENCE**

- Illinois Department of Transportation
- January 1, 2009
- ENGINEER OF POLICY AND PROCEDURES
- APPROVED
- January 1, 2009
- ENGINEER OF DESIGN AND ENVIRONMENT
- ISSUED
- 1-1-97
- PASSED
FENCE USING METAL POSTS

SINGLE GATE

Center brace on gates 7' (2.13 m) to 12' (3.66 m) long, and 2 braces spaced on gates over 12' (3.66 m) long.

Plunger rod and latch with provisions for padlocking.

Gate post - 3/4" (19) dia. galvanized steel rod (typ.)

Concrete - 22" (560) O.D. min. (typ.)

Ground line - 10" (250) Dia. min. (typ.)

Truss rod - (200) 1/2" (12.7)

Woven wire fence

Barbed wire

Line post

Corner or end post

GENERAL NOTES

Pull posts 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.

Bracing for gate posts shall be the same type used for end posts.

The clearance between the bottom fence wire and the ground may be up to 3 (75) for a maximum distance of 8' (2.4 m) when uneven ground is encountered.

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

ENGINEER OF POLICY AND PROCEDURES

APPROVED

January 1, 2009

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

January 1, 2009

PASSED

DATE

REVISIONS

1-1-97

1-1-09

Switched units to English (metric).

Corrected dimensions on sheet 3 and 4.

STANDARD 665001-02

(Sheet 1 of 4)
SINGLE OR DOUBLE GATE

PULL POST

LINE POST

CORNER OR END POST

NOTES

Barbed wires shall be stapled to each post. Top and bottom wire of woven fence shall be stapled to each post. Staple every other wire between, alternating on successive posts.

Metal line posts may be used in lieu of wood line posts.
### GATE FRAMES

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft.</th>
<th>kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A, Pipe 1.66 (42.2) O.D.</td>
<td>2.27 (3.38)</td>
<td>1.59 (1.27)</td>
</tr>
<tr>
<td>Type B, Pipe 1.66 (42.2) O.D.</td>
<td>1.83 (2.29)</td>
<td>1.19 (1.27)</td>
</tr>
<tr>
<td>Type C, Pipe 1.66 (42.2) O.D.</td>
<td>1.83 (2.71)</td>
<td>1.19 (1.17)</td>
</tr>
</tbody>
</table>

### CORNER, END or PULL POSTS

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft.</th>
<th>kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A, Pipe 2.375 (60.3) O.D.</td>
<td>3.65 (5.43)</td>
<td>2.48 (2.53)</td>
</tr>
<tr>
<td>Type B, Pipe 2.375 (60.3) O.D.</td>
<td>3.12 (4.63)</td>
<td>2.16 (2.46)</td>
</tr>
<tr>
<td>Type C, Pipe 2.375 (60.3) O.D.</td>
<td>3.08 (4.60)</td>
<td>2.14 (2.38)</td>
</tr>
<tr>
<td>Tubing 2.5 (63.5) Sq.</td>
<td>4.32 (6.43)</td>
<td>2.93 (3.71)</td>
</tr>
<tr>
<td>Angle 2.875 (73.0) O.D.</td>
<td>4.1 (6.20) min.</td>
<td>2.72 (3.98) min.</td>
</tr>
</tbody>
</table>

### LINE POSTS

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft.</th>
<th>kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A, Pipe 1.315 (33.4) O.D.</td>
<td>1.68 (2.50)</td>
<td>1.13 (1.60)</td>
</tr>
<tr>
<td>Type B, Pipe 1.315 (33.4) O.D.</td>
<td>1.34 (1.99)</td>
<td>0.94 (1.41)</td>
</tr>
<tr>
<td>Type C, Pipe 1.315 (33.4) O.D.</td>
<td>1.33 (1.98)</td>
<td>0.94 (1.39)</td>
</tr>
<tr>
<td>Tubing 1.25 (32.0) O.D.</td>
<td>1.33 (1.98)</td>
<td>0.94 (1.39)</td>
</tr>
<tr>
<td>or other approved structural shapes</td>
<td>1.33 (1.98) min.</td>
<td>0.94 (1.39) min.</td>
</tr>
</tbody>
</table>

### BRACES

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft.</th>
<th>kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A, Pipe 2.375 (60.3) O.D.</td>
<td>3.19 (4.75)</td>
<td>2.14 (2.80)</td>
</tr>
<tr>
<td>Type B, Pipe 2.375 (60.3) O.D.</td>
<td>3.19 (4.75)</td>
<td>2.14 (2.80)</td>
</tr>
<tr>
<td>Type C, Pipe 2.375 (60.3) O.D.</td>
<td>3.19 (4.75)</td>
<td>2.14 (2.80)</td>
</tr>
<tr>
<td>Structural shapes</td>
<td>3.19 (4.75) min.</td>
<td>2.14 (2.80) min.</td>
</tr>
</tbody>
</table>

### METAL ITEMS

#### GATE POSTS

- Single gate up to 4 ft. (1.22 m)
- Double gate up to 8 ft. (2.44 m)
- Over 4 ft. to 8 ft. (1.22 m to 2.44 m)
- Over 8 ft. to 16 ft. (2.44 m to 4.88 m)
- Over 16 ft. to 24 ft. (4.88 m to 7.32 m)

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft.</th>
<th>kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A, Pipe 2.375 (60.3) O.D.</td>
<td>2.875 (73.0) O.D.</td>
<td>5.79 (8.62)</td>
</tr>
<tr>
<td>Type B, Pipe 2.375 (60.3) O.D.</td>
<td>2.875 (73.0) O.D.</td>
<td>5.79 (8.62)</td>
</tr>
<tr>
<td>Type C, Pipe 2.375 (60.3) O.D.</td>
<td>2.875 (73.0) O.D.</td>
<td>5.79 (8.62)</td>
</tr>
<tr>
<td>Tubing 2.5 (63.5) Sq.</td>
<td>3.09 (4.60)</td>
<td>5.79 (8.62)</td>
</tr>
<tr>
<td>Angle 2.875 (73.0) O.D.</td>
<td>3.09 (4.60)</td>
<td>5.79 (8.62)</td>
</tr>
<tr>
<td>or other approved structural shapes</td>
<td>3.09 (4.60) min.</td>
<td>5.79 (8.62) min.</td>
</tr>
</tbody>
</table>

#### WOOD ITEMS

- Wood items
- Metal items

### WOVEN WIRE FENCE

- Woven wire fence
- Illinois Department of Transportation
- January 1, 2009
- Engineer of Policy and Procedures
- Approved January 1, 2009
- Engineer of Design and Environment
- Issued 1-1-97
- Passed
Concrete

Ledge

Ground line

decreased correspondingly.

When X exceeds 12 (300), 18 (450), or 30 (760), Y shall be

Y = 15 (380), and the post shall be shortened as required.

as applicable. When X is 0 to 12 (300), 18 (450), or 30 (760),

X + Y shall not exceed 27 (685), 33 (840), or 3'-9" (1.14 m)

NOTE

+ 3 (75) min.

Post dimension

Grout

Dia. min.

12 (300)

X max.

15 (380)

Y max.

15 (380)

Y

X

NOTE

When X exceeds 12 (300), 18 (450), or 30 (760), Y shall be

decreased correspondingly.

Shallow V cut in brace when round post is used.

Shallow V cut in brace when round post is used.

Grain nailed to post with at least 3-16d common galvanized nails.

Brace nailed to post with at least 3-16d common galvanized nails.

NOTE

Where fence line has a change in direction of 15° or more, a corner post with bracing as required shall be placed as shown above. Where angle is less than 15° and existing conditions require a corner post, they shall be placed as directed by the Engineer.

INSTALLATION AT CORNERS

NOTE

Where fence line has a change in direction of 15° or more, a corner post with bracing as required shall be placed as shown above. Where angle is less than 15° and existing conditions require a corner post, they shall be placed as directed by the Engineer.

INSTALLATION OVER STREAM

NOTE

Where grade line has a change in slope of 15° or more, a corner post with bracing as required shall be placed as shown above. Where angle is less than 15° line posts may be used.

When the tension of the fence tends to pull the posts from the ground, the line posts shall be anchored with the applicable concrete or wood anchorage specified for corner posts.

INSTALLATION AROUND HEADWALL

NOTE

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.

INSTALLATION ON SLOPES

NOTE

The woven wire fabric shall be replaced by Barbed wire strands at 12 (300) maximum centers between the double posts shown on DETAIL A as shown on the plans.

INSTALLATION AT HEADWALL

NOTE

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.
GENERAL NOTE

Reinforcement bars shall be No. 3 (No. 10) unless otherwise specified.

A 25x122 (76x310) shadow box with beveled edges, and a 3 1/2 (9.5) thick indentation may be used with the standard lettering shown.

All dimensions are in inches (millimeters) unless otherwise shown.
No. 3 (No. 10) bars 4'-0" (1.2 m) long
4% (20) Bevel

SECTION A-A

SECTION B-B

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

DRAINAGE MARKERS

STANDARD 667001-01

DATE
REVISIONS
1-1-97

1-1-09
Switched units to English (metric).
Use cement and water or product from approved list of chemical adhesives to seal marker tablet in rock ledge, concrete pavement or structure. Hole shall be 1½ (40) in diameter.

Tablet constructed in rock ledge or concrete.

Magnet when required
½ (13) dia.
¼ (6) thick

See DETAIL A

Ground surface

No. 3 (No. 10) bars to be 30 (750) for 36 (900) min. & 3'-6'' (1.1 m) for 4'-0'' (1.2 m) min.

No. 3 (No. 10) bars to be 4'-0'' (1.2 m) min. in dist. 1, 2, 3, & 4.

To be 36 (900) min. in dist. 5, 6, 7, 8, & 9.

Caps on rock ledge or concrete.

PRECAST MARKER

CAST-IN-PLACE MARKER

ALUMINUM TABLET

DETAIL A

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

Ground surface

Concrete

To be 6'-0" (1.8 m) min. in dist. 1, 2, 3, & 4.

To be 9'-0" (2.7 m) min. in dist. 5, 6, 7, 8, & 9.

Dia. 10 (250)

Dia. 14 (350)

18 (250)

12 (300)

14 (350)

12 (300)

ELEVATION

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

U.S. GEOLOGICAL SURVEY AND NATIONAL GEODETIC SURVEY
BENCHMARKS resetting METHOD

STANDARD 668001-01

Illinois Department of Transportation
January 1, 2009

ENGINEER OF POLICY AND PROCEDURES
APPROVED
January 1, 2009

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED
1-1-97

PASSED
DATE
REVISIONS

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

3-1-97
Amend. Standard 2448
Revised depth
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.
**ROAD AHEAD WORK**

**ROAD CONSTRUCTION**

For contract projects:

- W20-1(0)-48
- W21-1(0)-48

For maintenance and utility projects:

- W20-100-48
- W21-100-48

**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.

**FORMULAS**

Calculate \( L \) as follows:

- \[ L = \frac{W S}{60} \]
- \[ L = \frac{W S}{10} \]
- \[ L = 0.65(W)(S) \]

**SYMBOLS**

- Work area
- Sign
- Cone, drum or barricade

**TYPICAL APPLICATIONS**

- Utility operations
- Culvert extensions
- Side slope changes
- Guardrail installation and maintenance
- Delineator installation
- Landscaping operations
- Shoulder repair
- Sign installation and maintenance

**FOR CONTRACT PROJECTS**

- Work area
- Sign
- Cone, drum or barricade

When the work operation exceeds one hour, cones, drums or barricades shall be placed at 35' (10 m) centers for \( \frac{L}{3} \) distance, and at 50' (15 m) centers through the remainder of the work area.

**FOR MAINTENANCE PROJECTS**

- Work area
- Sign
- Cone, drum or barricade

When the work operation exceeds one hour, cones, drums or barricades shall be placed at 25' (8 m) centers for \( \frac{L}{3} \) distance, and at 50' (15 m) centers through the remainder of the work area.

**STANDARD 701006-05**

**DATE**

1-1-14 Revised workers sign

**REVISIONS**

1-1-13 Directed text: WORKERS

**FROM PAVEMENT EDGE**

**DATE**

1-1-14 Revised workers sign

**REVISIONS**

1-1-13 Directed text: WORKERS

**FROM PAVEMENT EDGE**

**TYPICAL APPLICATIONS**

- Utility operations
- Culvert extensions
- Side slope changes
- Guardrail installation and maintenance
- Delineator installation
- Landscaping operations
- Shoulder repair
- Sign installation and maintenance

**SYMBOLS**

- Work area
- Sign
- Cone, drum or barricade

When the work operation exceeds one hour, cones, drums or barricades shall be placed at 35' (10 m) centers for \( \frac{L}{3} \) distance, and at 50' (15 m) centers through the remainder of the work area.

**FOR CONTRACT PROJECTS**

- Work area
- Sign
- Cone, drum or barricade

When the work operation exceeds one hour, cones, drums or barricades shall be placed at 25' (8 m) centers for \( \frac{L}{3} \) distance, and at 50' (15 m) centers through the remainder of the work area.

**FOR MAINTENANCE PROJECTS**

- Work area
- Sign
- Cone, drum or barricade

When the work operation exceeds one hour, cones, drums or barricades shall be placed at 25' (8 m) centers for \( \frac{L}{3} \) distance, and at 50' (15 m) centers through the remainder of the work area.

**STANDARD 701006-05**

**DATE**

1-1-14 Revised workers sign

**REVISIONS**

1-1-13 Directed text: WORKERS

**FROM PAVEMENT EDGE**
AHEAD MOWING ROAD WORK AHEAD CONSTRUCTION

For contract projects and utility maintenance

For  W20-I103(0)-48 Or  W20-I101(0)-48 W21-I101(0)-48

1000' (300 m) max. 500' (150 m) min.

Varies

Utility operations

Shoulder work

Minimum distance is 200' (60 m). Maximum distance to be determined by the Engineer but should not exceed 1/2 the length required for one normal working day's operation, or 4 miles (6.4 km) whichever is less.

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 701301.

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

SYMBOLS

- Work area
- Sign
- Flagger with traffic control sign when required

TYPICAL APPLICATIONS

Shoulder work
Utility operations

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 701301.

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

DATE REVISIONS
1-1-14 Revised workers sign
number to agree with
Current ROM/COD
1-1-13 Omitted text WORKERS
Sign.

OFF-RD MOVING OPERATIONS,
2L, 2W, DAY ONLY

STANDARD 701011-04
TYPICAL APPLICATIONS
Utility operations
Culvert extensions
Side slope changes
General installation and maintenance
Delineator installation
Landscaping operations
Shoulder repair
Sign installation and maintenance

SYMBOLS
\[ \text{Work area} \]
\[ \text{Sign} \]
\[ \text{Cone, drum or barricade} \]

When the work operation exceeds one hour, cones, drums or barricades shall be placed at 25' (8 m) centers for L/3 distance, and at 50' (15 m) centers through the remainder of the work area.

FORMULAS
\[ L = \frac{W S^2}{60} \]
\[ L = 0.65WS \]

SPEED LIMIT FORMULAS
<table>
<thead>
<tr>
<th>English</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mph (60 km/h) or less:</td>
<td>( L = \frac{WS^2}{60} )</td>
</tr>
<tr>
<td>45 mph (70 km/h) or greater:</td>
<td>( L = 0.65WS )</td>
</tr>
</tbody>
</table>

\( W = \) Width of offset in feet (meters).
\( S = \) Normal posted speed in mph (km/h).

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:
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 30' (15 m) centers. When drums or barricades are used, these intervals between devices may be doubled.

TYPICAL APPLICATIONS

- Isolated patching
- Utility operations
- Storm sewer
- Culverts
- Cable placement

SYMBOLS

- Work area
- Sign
- Barricade or drum
- Cone, drum or barricade
- Flagger with traffic control sign

GENERAL NOTES

This Standard is used where at any time, any vehicles, equipment, workers or their activities will encroach in the area between the center line and a line 24 (600) outside the edge of pavement for daytime 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.
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 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.

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 35 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>Posted Speed</th>
<th>Sign Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>500' (150 m)</td>
</tr>
<tr>
<td>50-45</td>
<td>400' (120 m)</td>
</tr>
<tr>
<td>&lt;45</td>
<td>350' (100 m)</td>
</tr>
</tbody>
</table>

1 = Refer to SIGN SPACING table for distances.

All dimensions are in inches (millimeters) unless otherwise shown.
**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 3 mph (>1 km/h) and less than 4 mph (6 km/h).

When the operation does not exceed 60 minutes, traffic control may be according to Standard 701301.

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

**FOR SPEEDS ≥ 45 MPH**

**LANE CLOSURE, 2L, 2W, SLOW MOVING OPERATIONS DAY ONLY, FOR SPEEDS ≥ 45 MPH**

**STANDARD 701306-04**

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-18</td>
<td>Revised lower speed limit for operation to 3 mph.</td>
</tr>
<tr>
<td>1-1-11</td>
<td>Revised flagger sign.</td>
</tr>
</tbody>
</table>
**GENERAL NOTES**

This standard is used where any vehicle, equipment, workers or their activities will require a continuous moving operation where the average speed is greater than 3 mph (5 km/h).

For shoulder operations not encroaching on the pavement, use DETAIL A, Standard 701426.

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

---

**TYPICAL APPLICATIONS**
- Landscaping work
- Utility work
- Pavement marking
- Weed spraying
- Roadometer measurements
- Debris cleanup
- Crack pouring

**SYMBOLS**
- Arrow board (Hazard Mode only)
- Truck with headlights, emergency flashers and flashing amber light.
  (visible from all directions)
- 18x18 (450x450) mm. orange flag
  (use when guide wheel is used)
- Truck mounted attenuator

**DISTANCE**
*Distance varies depending on terrain and susceptibility of pavement marking or crack sealant to wheel tracking.*

**LANE CLOSURE 2L, 2W MOVING OPERATIONS - DAY ONLY**

---

**DATE**

**REVISIONS**

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-97</td>
<td>Switched units to English (metric). Omitted Pass With Care sign.</td>
</tr>
</tbody>
</table>
### GENERAL NOTES

This Standard is used where, at any time any vehicle, equipment, workers or their activities will encroach on one lane of a bridge and traffic signals are required.

When traffic signals are not in operation, flaggers shall be used and traffic control devices shall conform to Standard 701201 or 701206.

Existing or temporary pavement markings shall be on both sides of open lane from stop bar to stop bar.

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

### ADVISORY SPEED LIMIT

<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>R</td>
<td>G</td>
</tr>
<tr>
<td>Southbound or Westbound</td>
<td>R</td>
<td>R</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Normal posted speed</th>
<th>Advisory speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 - 45 mph</td>
<td>40 mph</td>
</tr>
<tr>
<td>40 mph</td>
<td>35 mph</td>
</tr>
<tr>
<td>35 - 30 mph</td>
<td>30 mph</td>
</tr>
</tbody>
</table>

### TRAFFIC SIGNAL SEQUENCE

**Phase** | **A** | **B**
---|---|---
Northbound or Eastbound | R | R |
Southbound or Westbound | R | R |

### DETECTOR LOOPS

**Stage Lane Width**

- Far loop
- Near loop

### TEMPORARY PAVEMENT MARKING

- White temporary pavement marking

### VERTICAL PANELS

- Post mounted, one each side

### LANE CLOSURE, 2L, 2W, BRIDGE REPAIR, FOR SPEEDS ≥ 45 MPH

**STANDARD 701316-12**
ROAD AHEAD CONSTRUCTION

ROAD AHEAD WORK

XX'-X" ONE LANE ROAD AHEAD MPH XX'-X"

STOP HERE ON RED STOP HERE ON RED

ONE LANE ROAD AHEAD MPH XX'-X"

(60 m) 200' (60 m) 200' (60 m) 200'

200' (60 m) 200' (60 m) 200' (60 m) 200'

(150 m) 500' (150 m) 500' (150 m) 500'

(150 m) 500' (150 m) 500' (150 m) 500'

(60 m) 200' (60 m) 200' (60 m) 200'

Drums at 25' (7.6 m) cts. Drums at 25' (7.6 m) cts.

Drums at 50' (15 m) cts. for 200' (60 m) Drums at 50' (15 m) cts. for 200' (60 m)

1:12 Taper 1:12 Taper

10' (3 m) 10' (3 m)

20' (6 m) 20' (6 m) 20' (6 m) 20' (6 m)

50' (15 m) 50' (15 m) 50' (15 m) 50' (15 m)

30' (9 m) 30' (9 m) 30' (9 m) 30' (9 m)

60' (18 m) 60' (18 m) 60' (18 m) 60' (18 m)

SYMBOLS

Work area

Drum with steady burning bi-directional light

Sign

Temporary concrete barrier

Type II barricade with flashing lights

Traffic signal

Double vertical panel (see detail)

Crystal, bidirectional guardrail/barrier wall reflector

Detector loops

Impact attenuator

Drum

Drums at 25' (7.6 m) cts. white temporary pavement marking (see detail).

Stop bar 24 (600)

Taper ratio of temp. conc. barrier (see table).

See detail for placement of detector loops.

For contract construction projects

For maintenance projects

W20-1(0)-48

W12-100(0)-48

W20-600-48

W3-30(0)-48

R10-6A-2430

W20-100(0)-48

W13-100(0)-48

W20-100(0)-48

For contract construction projects

For maintenance projects

W20-1(0)-48

W12-100(0)-48

W20-600-48

W3-30(0)-48

R10-6A-2430

W20-100(0)-48

W13-100(0)-48

W20-100(0)-48

See Sheet 2 for GENERAL NOTES

LANE CLOSURE, 2L, 2W,
BRIDGE REPAIR WITH BARRIER

DATE

REVISIONS

1-1-16

Drilled lights in tangents.

1-1-17

Added flashing lights to Type II barricades. Revised note 4.

STANDARD 701321-17

Illinois Department of Transportation

APPROVED January 1, 2018

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

PASSED

ENGINEER OF SAFETY PROG. AND ENGINEERING

DATE

REVISIONS

1-1-16

Drilled lights in tangents.

1-1-17

Added flashing lights to Type II barricades. Revised note 4.
**TRAFFIC SIGNAL SEQUENCE**

<table>
<thead>
<tr>
<th>PHASE</th>
<th>INTERVAL</th>
<th>EASTBOUND</th>
<th>NORTHBOUND OR WESTBOUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12</td>
<td>A</td>
<td>G</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>B</td>
<td>Y</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>G</td>
<td>R</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>B</td>
<td>R</td>
</tr>
</tbody>
</table>

**TEMPORARY CONCRETE BARRIER**

<table>
<thead>
<tr>
<th>POSTED SPEED</th>
<th>TAPER RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mph AND ABOVE</td>
<td>12.1</td>
</tr>
<tr>
<td>BELOW 40 mph</td>
<td>8.1</td>
</tr>
</tbody>
</table>

**ADVISORY SPEED LIMIT**

<table>
<thead>
<tr>
<th>POSTED SPEED</th>
<th>NORMAL SPEED</th>
<th>ADVISORY SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mph</td>
<td>30 mph</td>
<td>35 mph</td>
</tr>
<tr>
<td>40 mph</td>
<td>35 mph</td>
<td>40 mph</td>
</tr>
<tr>
<td>55 mph - 45 mph</td>
<td>40 mph</td>
<td>40 mph</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

This Standard is used where, at any time, any vehicle, equipment, workers, or their activities will encroach on one lane of a bridge. Traffic signals and a positive barrier are required.

Traffic signals shall be operational only when all traffic controls are in place. When traffic signals are not in operation, flaggers shall be used and traffic control shall conform to Standard 701201 or 701206.

Temporary concrete barrier shall be according to Standard 704001.

Existing or temporary pavement markings shall be on both sides of open lane from stop bar to stop bar.

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

**LANE CLOSURE, 2L, 2W, BRIDGE REPAIR WITH BARRIER**

**TEMPORARY PAVEMENT MARKING**

**VERTICAL PANELS**

(Post mounted, one each side)
ROAD AHEAD
WORK
One Lane Road Ahead

For projects and utility maintenance

W20-1(0)-48
W20-I103(0)-48
W20-4(0)-48

1000' (300 m) max.
500' (150 m) min.
200' (60 m) centers

Barricades at
200' (60 m) centers
Completed work protected
by barricades

Excavated area where no excavating work is being performed

Excavating operations

Minimum distance is 200' (60 m). Maximum distance to be determined by the Engineer but in no case to exceed the length of ½ day’s normal operation or 2 miles (3200 m) whichever is less.

Signs are not required if distance between work operations is less than 2000' (600 m) unless restricted sight distance exists.

Two flaggers are required for each separate operation.

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

SYMBOLS

Work area

Active Work area

Sign

Barricade, drum, or vertical panels

Flagger with traffic control sign

GENERAL NOTES

This Standard is used where at any time, any vehicular, 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
The advisory speed to be shown below the reverse curve (turn) signs shall be determined at the site and approved by the Engineer.

These signs are not required when T is less than 500' (150 m).

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

This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach in the area between the centerline and a line 24' (600 m) 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 3/8 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 100' (30 m) or cones shall be placed at intervals not greater than 50' (15 m) centers. 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 100' (30 m) or cones shall be placed at intervals not greater than 50' (15 m) centers.

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

SYMBOLS

- ½ mile (800 m) maximum
- Patches
- Sign
- Flagger with traffic control sign
- Barricade or drum
- Cone, barricade or drum
- 20' (6 m) centers
- 50'-2000' (15-600 m) max.
- 100' (30 m)
- 500' (150 m)
- 1000' (300 m) max.

TYPICAL APPLICATIONS

Patching

L umber

DATE   REVISIONS
1-1-19 Revised device spacing in taper
1-1-11 Revised flagger sign

STANDARD 701336-07
The Road Construction Ahead sign shall be located 3 to 5 miles in advance of the project limits.

The message and size of the Work Zone Public Information Sign shall be as specified by the Department.

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" (25' (8 m) centers)
- "Left Lane Closed" / "x Miles Ahead" (25' (8 m) centers)
- "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.

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.

GENERAL NOTES

This standard is used where at any time a lane is closed on a freeway/expressway. When the left lane is closed, LEFT LANE CLOSED signs shall be substituted for the RIGHT LANE CLOSED signs.

The first two signs and the message board are stationary.

The last four signs and 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.

DATE REVISIONS

1-1-17 Added trailer mounted speed display sign
Changed device

1-1-17 Added trailer mounted speed display sign
Revised 2 RIGHT LANES CLOSED X MILE" sign number

APPROACH TO LANE CLOSURE, FREeway/EXPRESSway
STANDARD 701400-09

Illinois Department of Transportation
January 1, 2017

REVISIONS

1-1-17 Added trailer mounted speed display sign
Changed device

1-1-17 Added trailer mounted speed display sign
Revised 2 RIGHT LANES CLOSED X MILE" sign number

APPROACH TO LANE CLOSURE, FREeway/EXPRESSway
STANDARD 701400-09

Illinois Department of Transportation
January 1, 2017
**MINIMUM SPEED LIMIT $XXX FINE**

**ZONE WORK ENFORCED PHOTO LIMIT SPEED ZONE WORK ENFORCED PHOTO**

**END WORK ZONE SPEED LIMIT**

---

**SYMBOLS**

- Arrow board
- Worker
- Sign
- Direction indicator barricade with steady burn monodirectional light
- Type II barricade, drum, or vertical barricade
- Spotter

---

**GENERAL NOTES**

This Standard is used where at any time any vehicular, equipment, workers or their activities will encroach on the lane adjacent to the shoulder, or on the shoulder within 24 (600) of the edge of pavement.

This Standard must always be used in combination with Standard 701400.

This Standard also applies when work is being performed in the left lane. Under these conditions, the setup would be a mirror image to what is shown.

A check barricade shall be placed in the middle of the closed lane and at the shoulder at 1000' (300 m) centers.

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

---

**LANE CLOSURE, FREEWAY/EXPRESSWAY**

**STANDARD 701401-12**

---

**DATE**

1-1-19

**REVISIONS**

1-1-19 Replaced flagger with spotter.

1-1-18 Omitted lights in tangent.
**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 operations exceeding one day and where temporary concrete barrier is utilized.

This Standard must always be used in combination with Standard 704001.

When work is being performed in the left lane, the set up would be a mirror image to what is shown.

Temporary concrete barrier shall be according to Standard 704001.

Calculate L as follows:

\[
L = 0.65W(S)
\]

**POSTED SPEED FORMULAS**

<table>
<thead>
<tr>
<th>Speed in mph (km/h)</th>
<th>English Formula</th>
<th>Metric Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>L=(W)(S)</td>
<td>L=0.65W(S)</td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75</td>
<td></td>
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<td>80</td>
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</tr>
<tr>
<td>85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

L = Width of offset in feet (meters).

S = Normal posted speed in mph (km/h).

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

**LANE CLOSURE, FREEWAY/EXPRESSWAY, WITH BARRIER**

**STANDARD 701402-12**

**SYMBOLS**

- Arrow board
- Work area
- Sign
- Direction indicator barricade with steady burn monodirectional light
- Type II barricade, drum, or vertical barricade with steady burn monodirectional light
- Temporary concrete barrier
- Monodirectional guardrail/barrier wall reflector
- Impact attenuator

**POWER OF ATTORNEY**

Illinois Department of Transportation

January 1, 2017

APPROVED

January 1, 2017

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

ENGINEER OF SAFETY PROG. AND ENGINEERING

DATE

REVISIONS

1-1-17 Revised END WORK ZONE SPEED LIMIT sign from orange to white background.

4-1-16 Added reference to Standards 704001 and 782006 in note (2).
APPLICATION NO. 1

Application No. 1 depicts a modified entrance ramp. This method shall be utilized whenever existing entrance tapers cannot be retained due to the close proximity of the work zone. The entrance location may be shifted, with the approval of the Engineer, to perform work in the entrance area. Application No. 2 shall be put into effect as soon as possible.

APPLICATION NO. 2

Application No. 2 depicts a shortening of the normal entrance ramp. This method shall be used whenever the existing geometrics can be retained. Consideration should be given to the entering motorists' line of sight, through, between, or over the delineation devices.

SYMBOLS

- Work area
- Sign
- Type II barricades or drums with steady burning monodirectional light
- Type II barricades or drums
- Drums with steady burning monodirectional light

GENERAL NOTES

This Standard is used where, at any time any vehicles, equipment, workers or their activities require a lane closure in close proximity of an exit or entrance ramp and supplements other traffic control Standards for lane closures.

These applications also apply when work is being performed in the left lanes and the ramps enter and exit on the left. Under these conditions, the Exit sign arrow and the Side road symbol sign shall be changed.

Cones may be utilized during daylight operations, at one half the spacing of drums/barricades.

Use of these APPLICATION NO. 1 and APPLICATION NO. 3 shall be limited to five days per location.

When work does not exceed five days per location, pavement marking tape may be omitted.

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

LANE CLOSURE, MULTILANE, AT ENTRANCE OR EXIT RAMP, FOR SPEEDS ≥ 45 MPH

STANDARD 701411-09
APPLICATION NO. 3

Application No. 3 depicts a modified exit ramp. The channelizing devices shall provide a clearly defined path for the exiting motorists. The minimum dimensions shown shall be increased as soon as the progress of the work will permit. The open portion of the ramp may be shifted, with the approval of the Engineer, to perform work in stages on the area adjacent to the ramp exit. Application No. 4 shall be put into effect as soon as possible.

APPLICATION NO. 4

Application No. 4 depicts an extension of the normal exit ramp. This method shall be used whenever existing geometrics can be retained. Consideration should be given to the exiting motorists’ line of sight through, between or over the delineation devices.
This Standard is used where at any time, any vehicle, equipment, workers or their activities require the closure of two adjacent lanes and a temporary crossover is provided by making use of one lane of pavement normally used by opposing flow of traffic 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.

Lane Closure, Freeway/Expressway, with Crossover and Barrier

Standard 701416-11

DATE REVISIONS
1-1-18 Omitted lights on drums for the "3 x L" tangent
1-1-17 Revised END WORK ZONE SPEED LIMIT sign from orange to white background
This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach on the lane adjacent to the shoulder, or on the shoulder within 24 (600) of the edge of pavement.

This Standard also applies when work is being performed in the left lane. Under these conditions, LEFT LANE CLOSED signs shall be substituted for RIGHT LANE CLOSED signs. On undivided highways, LEFT LANE CLOSED signs shall be substituted for LEFT LANE CLOSED signs. On undivided highways, signs shall be added in the opposite direction as shown.

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

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach on the lane adjacent to the shoulder, or on the shoulder within 24 (600) of the edge of pavement.

This Standard also applies when work is being performed in the left lane. Under these conditions, LEFT LANE CLOSED signs shall be substituted for RIGHT LANE CLOSED signs. On undivided highways, signs shall be added in the opposite direction as shown.

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

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

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

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

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This Standard also applies when work is being performed in the left lane. Under these conditions, LEFT LANE CLOSED signs shall be substituted for RIGHT LANE CLOSED signs. On undivided highways, signs shall be added in the opposite direction as shown.

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

This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach on the lane adjacent to the shoulder, or on the shoulder within 24 (600) of the edge of pavement.

This Standard also applies when work is being performed in the left lane. Under these conditions, LEFT LANE CLOSED signs shall be substituted for RIGHT LANE CLOSED signs. On undivided highways, signs shall be added in the opposite direction as shown.

All dimensions are in inches (millimeters) unless otherwise shown.
**LANE CLOSURE, MULTILANE, WITH BARRIER, FOR SPEEDS ≥ 45 MPH TO 55 MPH**

**GENERAL NOTES**

This standard is used where at any time any vehicular, equipment, workers or their activities will encroach on the pavement or on the shoulder within 24 (600) of the edge of pavement for daylight operation exceeding one day and where temporary concrete barrier is utilized.

When work is being performed in the left lane, the set up would be a mirror image to what is shown.

Calculate L as follows:

\[
L = 0.65(W)(S)
\]

where:
- \( L \) = length of work zone
- \( W \) = width of offset
- \( S \) = normal posted speed for lane in opposite direction

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

**FORMULAS**

- \( W \) = Width of offset
- \( S \) = Normal posted speed in mph (km/h)
- \( L \) = \( 0.65(W)(S) \) in feet (meters)

**SYMBOLS**

- Arrow board
- Work area
- Sign
- Direction indicator barricade with steady burn monodirectional light
- Type II barricade, drum, or vertical barricade with steady burn monodirectional light
- Temporary concrete barrier
- Monodirectional guardrail/barrier wall reflector
- Impact attenuator
- Type II barricade, drum, or vertical barricade with monodirectional flashing light

**DATE**

**REVISIONS**

1.1.17 Revised END WORK ZONE SPEED

1.1.17 LMT sign. Changed device

Sparrow at first arr. brd.

4.5.16 Corrected reference to standard in note (8)
**PAINT**

**WET**

**ROAD AHEAD**

**CONSTRUCTION**

**RIGHT LANE CLOSED AHEAD**

---

**NOTE**

When a shoulder does not exist or is narrow, use Detail B.

---

**DETAIL A**

---

**DETAIL B**

---

**SYMBOLS**

- **Arrow board**
- **Work area**
- **Truck with flashing amber light**
- **Truck/Trailer mounted attenuator**
- **Flagger with traffic control sign**
- **Sign**

---

**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.

---

**LANE CLOSURE, MULTILANE, INTERMITTENT OR MOVING OPER., FOR SPEEDS ≥ 45 MPH**

**STANDARD 701426-09**

---

**REVISIONS**

- 3-3-17: Revised NOTE on DETAIL A to use DETAIL B in lieu of DETAIL C.
- 4-1-16: Added trailer option for attenuator symbol. Added note 4. Revised gen. notes.
NOTE
When a shoulder does not exist or is narrow, use Detail B.

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 LEFT signs and arrow board indications shall be directed to the right.

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

TYPICAL APPLICATIONS
- Activating work
- Utility work
- Pavement marking
- Weed spraying
- Roadometer measurements
- Debris cleanup
- Crack pouring

SYMBOLS
- Arrow board
- Work area
- Truck with flashing amber light
- Truck/Trailer mounted attenuator
- Flagger with traffic control sign
- Sign

DATE
REVISIONS
2-7-17 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.

LANE CLOSURE, MULTILANE, INTERMITTENT OR MOVING OPER., FOR SPEEDS ≤ 40 MPH

STANDARD 701427-05
CASE I
CASE I depicts the setup of delineating devices for a single outside lane closure. The single lane closure taper shall be installed under CASE I. Under these conditions, the arrow board indications shall be directed to the right.

CASE II
CASE II depicts the setup of delineating devices for a two lane closure. The single lane closure taper(s) and attenuators shall be in place as shown for the setup and removal of the lane closure taper(s) and the first 100’ (30 m) of channelizing devices in the tangent(s). Under these conditions, the arrow board indications shall be directed to the right.

SYMBOLS
- Arrow board
- Truck with flashing amber light
- Truck/Trailer mounted attenuator

GENERAL NOTES
This Standard is used for setup and removal of lane closures on freeways/expressways having ADT greater than 25,000.

Trucks with arrow boards and truck-mounted attenuators shall be in place as shown for the setup and removal of the lane closure taper(s) and the first 100’ (30 m) of channelizing devices in the tangent(s).

This Standard is also applicable when work is being performed in the left lane(s) or on the median shoulder. Under these conditions, arrow board indications shall be directed to the right.

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

MINIMUM $XXX FINE LIMIT

ZONE SPEED WORK ENFORCED PHOTO LIMIT

ZONE SPEED WORK ENFORCED PHOTO

MINIMUM $XXX FINE LIMIT

END WORK ZONE SPEED LIMIT

SYMBOLS

1. Arrow tows
   Work area
   Worker
   Sign
   Direction indicator barricade with steady burn monodirectional light
   Type II barricade, drum, or vertical barricade with steady burn monodirectional light
   Flagger with traffic control sign
   Type II barricade, drum, or vertical barricade

2. Reflectorized temporary pavement marking tape shall be placed throughout the lanes 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.

3. Work zone speed limits signs and FLAGGER signs shall be moved as necessary to maintain the required spacing between the signs and the workers in each separate work activity. Work Zone Speed Limit 55 Photo Enforced sign shall be omitted when the work area dictates that placement of the sign array within 500' (150 m) of the 3rd 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 two lanes of a freeway/expressway.

This Standard must always be used in combination with Standard 701400.

This Standard also applies when work is being performed in the left lanes. Under these conditions, the set up would be a mirror image to what is shown.

Check barricades shall be placed in the middle of the closed lanes at 1000' (300 m) centers. All dimensions are in inches (millimeters) unless otherwise shown.

TWO LANE CLOSURE,
FREEWAY/EXPRESSWAY

STANDARD 701446-09

Illinois Department of Transportation

APPROVED January 1, 2018

ENGINEER OF DESIGN AND ENVIRONMENT

PASSED

ISSUED

REVISIONS

SYMBOLS
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

1-1-18

DATE
1-1-18

REVISIONS
1-1-17

- Added flashing lights to
  Type III barricade

1-1-18

- Dimmed signs on drums
  In tangent

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

- Work area
- Cone, drum or barricade (for moving operations)
- Sign on portable or permanent support
- Flagger with traffic control sign
- Barricade or drum with flashing light
- Type III barricade with flashing lights

**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.

All dimensions are in inches (millimeters) unless otherwise shown.
CASE I
(Signs required for both directions)

1. Refer to SIGN SPACING TABLE for distances.
2. Required for speeds > 40 mph (70 km/h).
3. Required if work exceeds 500' (150 m) or 1 block.
4. Cones at 25' (8 m) centers for 250' (75 m) on approach. Additional cones may be placed at 50' (15 m) centers. When drums or type I or II barricades are used, the interval between devices may be doubled.
5. For approved sideroad closures.
6. Cones, drums or barricades at 20' (6 m) centers in taper.
7. Use flagger sign only when flagger is present.

**SYMBOLS**

- Work area
- Barricade or drum with flashing light
- Flagger with traffic control sign
- Cone, drum or barricade
- Sign on portable or permanent support
- Type III barricade with flashing lights

**SIGN SPACING**

<table>
<thead>
<tr>
<th>Posting Speed</th>
<th>Sign Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>40-45</td>
<td>300 - 1100 m</td>
</tr>
<tr>
<td>&lt;45</td>
<td>200 - 600 m</td>
</tr>
</tbody>
</table>

**FORMULAS**

**SPEED LIMIT**

- 40 mph (70 km/h) or less: \[ L = \frac{W(S)^2}{60} \]
- 45 mph (80 km/h) or greater: \[ L = \frac{W(S)^2}{75} \]

**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 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:

\[ L = 0.65(W)(S) \]

required for both directions.

**STANDARD 701502-09**

**APPROVED**

January 1, 2019

**ISSUED**

1-1-01

**ENGINEER OF DESIGN AND ENVIRONMENT**

1-1-18

**ENGINEER OF SAFETY PROG. AND ENGINEERING**

1-1-19

**REVISIONS**

1-1-19 Revised to allow cones at night

1-1-20 Corrected sign number for
TWO WAY TRAFFIC sign for
CASE E
ROAD CLOSED
ROAD AHEAD CONSTRUCTION
ROAD AHEAD WORK CLOSED
LEFT LANES CLOSED
RIGHT LANES CLOSED
Or
W20-I103(0)-48
Or
W20-I105(0)-48
Or
W21-I106L(0)-48
Or
W21-I106R(0)-48
Or
W20-3(0)-48
Or
W20-I103(0)-48
Or
W20-I105(0)-48
Or
W21-I106L(0)-48
Or
W21-I106R(0)-48
Or
W20-7(0)-48
Or
W20-7(0)-48

Type I or Type II barricades
Type III barricades

URBAN LANE CLOSURE, MULTILANE, 1W OR 2W WITH NONTRAVERSABLE MEDIAN
STANDARD 701601-09
Illinois Department of Transportation
January 1, 2014
APPROVED
January 1, 2014
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED 1-1-97
PASSED
ENGINEER OF SAFETY ENGINEERING
**SPEED LIMITS**

<table>
<thead>
<tr>
<th>Posted Speed</th>
<th>High Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 mph</td>
<td>300' (90 m)</td>
</tr>
<tr>
<td>70 mph</td>
<td>200' (60 m)</td>
</tr>
<tr>
<td>60 mph</td>
<td>500' (150 m)</td>
</tr>
<tr>
<td>50 mph</td>
<td>450' (135 m)</td>
</tr>
<tr>
<td>&lt;40 mph</td>
<td>200' (60 m)</td>
</tr>
</tbody>
</table>

**FORMULAS**

\[ L = \frac{WS^2}{60} \]

\[ L = 0.65(W)(S) \]

where:

- \( L \) is the sign spacing in feet (meters)
- \( W \) is the width of offset in feet (meters)
- \( S \) is the normal posted speed in mph (km/h)

**CASE I**

1. Refer to SIGN SPACING TABLE for distances.
2. Required for speeds > 40 mph (70 km/h).
3. Required if work exceeds 500' (164 m) on approach. Additional cones may be placed at 50' (15 m) centers. When drums or type I or II barricades are used, the interval between devices may be doubled.
4. For approved sideroad closures.
5. Cones, drums or barricades at 20' (6 m) centers in taper.
6. Use flagger sign only when flagger is present.

**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 701602.

Calculate \( L \) as follows:

- **40 mph (70 km/h) or less:** \[ L = \frac{WS^2}{60} \]
- **45 mph (80 km/h) or greater:** \[ L = 0.65(W)(S) \]

\( W \) = Width of offset in feet (meters).

**SPEED LIMIT**

- **English**
- **Metric**

- 40 mph (70 km/h) or less: \[ L = \frac{WS^2}{60} \]
- 45 mph (80 km/h) or greater: \[ L = 0.65(W)(S) \]
**ROAD AHEAD**

**CONSTRUCTION**

**ROAD AHEAD**

**WORK**

**RIGHT LANE CLOSED AHEAD**

**SIGN SPACING**

**Posted Speed**

**Sign Spacing**

<table>
<thead>
<tr>
<th>Speed Limit</th>
<th>Sign Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 mph</td>
<td>500' (150 m)</td>
</tr>
<tr>
<td>50-45 mph</td>
<td>350' (100 m)</td>
</tr>
<tr>
<td>40-35 mph</td>
<td>200' (60 m)</td>
</tr>
</tbody>
</table>

**FORMULAS**

\[
L = \frac{60}{S^2} \\
L = \frac{150}{S^2} \\
L = (W)(S) \\
L = 0.65(W)(S)
\]

**in feet (meters).**

**Width of offset**

**SPEED LIMIT**

**FORMULAS**

<table>
<thead>
<tr>
<th>Speed Limit</th>
<th>English (Mph)</th>
<th>Metric (Km/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mph</td>
<td>L = \frac{W}{S^2}</td>
<td>L = \frac{W}{S^2}</td>
</tr>
<tr>
<td>45 mph</td>
<td>L = \frac{W}{S^2}</td>
<td>L = \frac{W}{S^2}</td>
</tr>
</tbody>
</table>

**Arrow board**

**Cone, drum or barricade**

**Sign on portable or permanent support**

**Work area**

**Barricade or drum with flashing light**

**Flagger with traffic control sign.**

**SYMBOLS**

**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:

**STANDARD 701606-10**

**URBAN SINGLE LANE CLOSURE, MULTILANE, 2W WITH MOUNTABLE MEDIAN**

**DATE**

**REVISIONS**

- 1-1-15: Revised standard - Moved case on Sheet 2 to new Highway Standard.
- 1-1-14: Revised workers sign - Number to agree with current MUTCD.
GENERAL NOTES

This Standard is used where, at any time, pedestrian traffic must be rerouted due to work being performed.

This Standard must be used in conjunction with other Traffic Control & Protection Standards when roadway traffic is affected.

Temporary facilities shall be detectable and accessible.

The temporary pedestrian facilities shall be provided on the same side of the closed facilities whenever possible.

The SIDEWALK CLOSED / USE OTHER SIDE sign shall be placed at the nearest crosswalk or intersection to each end of the closure. Where the closure occurs at a corner, the signs shall be erected on the corners across the street from the closure. The SIDEWALK CLOSED signs shall be used at the ends of the actual closures.

Type III barricades and R11-2-4830 signs shall be positioned as shown in "ROAD CLOSED TO ALL TRAFFIC" detail on Standard 701901.

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

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 positioned as shown in "ROAD CLOSED TO ALL TRAFFIC" detail on Standard 701901.

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

All heights shown shall be measured above the pavement surface.

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

**TRAFFIC CONTROL DEVICES**

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
</table>
| 1-1-18 | Revised cone usage and 
|         | added cones >36" (900 m) height. |
| 1-1-19 | Revised END WORK ZONE |
|        | SPEED LIMIT sign from 
|        | orange to white background |

**STANDARD 701901-08**
**POST MOUNTED SIGNS**

**When curbs or paved shoulders are present**
- Minimum dimension shall be 24 (600) to the face of curb or 6' (1.8 m) to the outside edge of the paved shoulder.
- Minimum height shall be sufficient to be seen behind other devices.

**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.**

**Maximum Width of Signs XX'-XX" X MILES AHEAD**

**WIDTH RESTRICTION SIGN**
- XX'-XX" widths and X miles are variable.

**MAX WIDTH**

**STOP**

**SLOW**

**FLAGGER TRAFFIC CONTROL SIGN**

**HIGH LEVEL WARNING DEVICE**

**WORK LIMIT SIGNING**

**ROAD CONSTRUCTION NEXT X MILES**

**END CONSTRUCTION**

This signing is required for all projects 2 miles (3200 m) or more in length.

**ROAD CONSTRUCTION NEXT X MILES** sign shall be placed 500' (150 m) in advance of project limits.

**END CONSTRUCTION** shall be erected at the end of the job unless another job is within 2 miles (3200 m).

Dual sign displays shall be utilized on multi-lane highways.

**HIGHWAY CONSTRUCTION SPEED ZONE SIGNS**

This sign shall be used when the above sign assembly is used.

**STANDARD 701901-08**
**STANDARD 701901-08**

**TRAFFIC CONTROL DEVICES**

**TYPICAL APPLICATIONS OF TYPE III BARRICADES CLOSING A ROAD**

Reflectorized 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 sign may be mounted on an NCHRP 350 temporary sign supports directly in front of the barricade.

Reflectorized striping shall appear on both sides of the barricades. If a Type III barricade with an attached sign panel which meets NCHRP 350 is not available, the sign may be mounted on NCHRP 350 temporary sign supports directly in front of the barricade.

**TEMPORARY RUMBLE STRIPS**

Face may be stepped or smooth.

**SECTION A-A**

**TYPICAL INSTALLATION**

Weep holes

Epoxy channels

Traffic

**PLAN**

Traffic

**ARROW BOARDS**

**TYPE A**
- ROOF MOUNTED

**TYPE B**
- ROOF OR TRAILER MOUNTED

**TYPE C**
- TRAILER MOUNTED

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

APPROVED

January 1, 2019

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-13

ENGINEER OF SAFETY PROG. AND ENGINEERING

APPROVED
GENERAL NOTES

Each F shape barrier shall be clearly marked with "ILLINOIS F SHAPE", the Producer's mark and the date of manufacture. The markings shall be indented on the barrier or painted thereon with waterproof paint.

The insert for the 9/16 (M12) bolt shall be capable of 3,000 lb (13 kN) pull-out strength.

When barrier separates opposing flows of traffic, reflectors shall be on both sides of barrier.

See Standard 782006 for dimensions of Type C reflector.

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

DATE  REVISIONS
4-1-16  Rev. alt. chamber on all
edges to 1/2. Reference
1-1-12  General ALTERNATE from
connecting and anchoring
pins detail.

STANDARD 704001-08

(Rev.)

Illinois Department of Transportation

APPROVED

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

ENGINEER OF POLICY AND PROCEDURES
PASSED

DATE

REVISIONS

Illinois Department of Transportation

PASSED

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

ENGINEER OF POLICY AND PROCEDURES

DATE

REVISIONS

Illinois Department of Transportation

PASSED

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED

ENGINEER OF POLICY AND PROCEDURES

DATE
**MOUNTING DETAILS**

**SIGN PANEL**

- **Wood or Telescoping Steel Posts**
- **Light or Signal Standards**
- **Breakaway Steel Tubing Posts**

**Supporting Channel Details**

**Route Marker Assembly**

**Steel Posts**
- Hot-dipped galvanized 11 ga. (3.1) mild steel, unless otherwise shown.

**Details**
- **Detail A**
- **Detail B**
- **Detail C**

**Section Modulus (Minimum)**

<table>
<thead>
<tr>
<th>Material</th>
<th>Axis A</th>
<th>Axis B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>0.050 in.³ (819 mm³)</td>
<td>0.105 in.³ (1720 mm³)</td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.150 in.³ (2458 mm³)</td>
<td>0.315 in.³ (5162 mm³)</td>
</tr>
</tbody>
</table>

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

**DATE**

- **1-1-09**: Switched units to English metric.

**SIGN PANEL MOUNTING DETAILS**

**STANDARD 720001-01**
**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).**

**Multilane Highways**

- Shoulder
- Sidewalks, the height shall be at least to view or where signs are located over sidewalks, the height shall be at least 7' (2.1 m).

**Two Lane Rural Highways**

- Shoulder
- Pavement.

**Urban Locations**

- Shoulder
- Sidewalk

---

**Post Spacing for Non-Freeway Sign Panels**

- Tangent Section: $93° ± 1°$
- Curve Section: $90° ± 1°$

---

**Erection Details**

- **Sign Panel**
- **Ground Mount Sign Positioning**
- **Typical Installations**
- **Post Spacing for Non-Freeway Sign Panels**

---

**Revisions**

- 1-1-14: Added shoulders and slopes
- 1-1-12: Rev. Sign elev. for multilane
- 1-1-97: Added shoulders and slopes

---

**Standard 720006-04**

---

**Illinois Department of Transportation**

**January 1, 2014**

**Approved January 1, 2014**

**Engineer of Design and Environment**

**Issued**

**Passed**

**Engineer of Operations**

**Date**

**Revisions**
### GENERAL NOTES

Dimensions shown for cross sections are minimum.

- All holes are \( \frac{\frac{1}{8}}{16} \) (10).

- \( S_{x-x} \) is the minimum section modulus about the \( x \) and \( y \) axes 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.

### Steel

<table>
<thead>
<tr>
<th>Type</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>Stem ( (\text{in}^3/\text{ft}) )</th>
<th>Stem ( (\text{kg/m}) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A</td>
<td>Steel</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
<td>3.405</td>
</tr>
<tr>
<td></td>
<td>Aluminum</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
<td>3.405</td>
</tr>
<tr>
<td>Type C</td>
<td>Steel</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
<td>3.800</td>
</tr>
<tr>
<td></td>
<td>Aluminum</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
<td>3.800</td>
</tr>
</tbody>
</table>

### Metal Posts for Signs, Markers & Delineators

**STANDARD 720011-01**
When road classification only is on the second line, it should not be abbreviated.

### TYPICAL SIGN STYLES

<table>
<thead>
<tr>
<th>SIGN STYLE</th>
<th>DIMENSIONS</th>
<th>LETTER SIZE UC/LC PRIMARY</th>
<th>BORDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.b.s</td>
<td>24 x 6</td>
<td>4/5</td>
<td>3</td>
</tr>
<tr>
<td>c.e</td>
<td>24 x 6</td>
<td>4/5</td>
<td>3</td>
</tr>
<tr>
<td>f</td>
<td>42 x 3</td>
<td>6/5</td>
<td>1</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 720001 or as specified in the plans.

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

### MOUNTING LOCATION

**Supporting Channels**

8' (2.4 m) max. for mastarms 18' (4.9 m) through 55' (17.1 m) through 75' (22.9 m) to mid-point of sign panel or blankout sign.
**FACE OF SIGN PANEL**

- **W**
- **D**
- **6 (152.4)**

**6 (150) PANEL**

- **0.220 (5.59) R**
- **0.078 (1.98)**
- **0.410 (10.4)**
- **0.222 (5.64)**

**TYPE B SIGN PANEL**

- **Full Rad.**
- **0.230 (5.85)**
- **0.687 (17.45)**
- **0.300 (7.62)**
- **0.125 (3.18)**

**TYPE C SIGN PANEL**

- **Full Rad.**
- **3.18 (80.95)**
- **1.98 (49.8)**
- **0.430 (10.92)**
- **0.687 (17.45)**

**SECTION A-A**

- **SECTION B-B**

**SECTION C-C**

- **SIGN MOLDING**

- **(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.)**

- **(Color shall match sign facematerial. To be riveted to sign panel at 24 (600) O.C.)**

**DATE**

- **REVISIONS**

- **1-1-09**
  - Added aluminum clip
  - Switched units to English (metric)
  - Revised stainless steel clip design, and minor changes.

**STANDARD 720021-02**
**TERMINAL MARKERS**

**OBJECT AND TERMINAL MARKERS**

**TYPE 1 OR TYPE 4**

**CASE I**

Parallel to road

**CASE II**

Object marker details

<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>

**TYPE 2**

**TYPE 3**

**GENERAL NOTES**

See detail on Standard 729001 for mounting markers to posts.

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

**TERMINAL MARKER DETAILS**

**DIRECT APPLIED**

Color: Black / Yellow reflectorized

* The width and height (a, b) of the terminal marker shall be within approximately 1 (25) of the outer edge of the terminal end.

**POST MOUNTED**
GROUND MOUNT DETAIL

PAVEMENT MOUNT DETAIL

SPLICE DETAIL

GENERAL NOTES

All bolts $1/2$ (M10) hex head zinc or cadmium plated.

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

TELESCOPING STEEL

SIGN SUPPORT

STANDARD 728001-01

DATE    REVISIONS
1-1-09   Switched units to English imperial.
1-1-07   New Standard. Used to be part of Standard.
For diamond shaped sign with side S as shown, use required post size for a sign with W = 0.7S and D = 1.4S.

NOTE: Minimum of 2 bolts per post required.

GENERAL NOTES


LOADING: For 60 mph (95 km/h) wind velocity with 30% gust factor, normal to sign.

SOIL PRESSURE: Minimum allowable soil pressure 1.25 tsf (120 kPa).

See Standard 729001-01 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

ILLINOIS DEPARTMENT OF TRANSPORTATION

ENGINEER OF POLICY AND PROCEDURES

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

DATE

REVISIONS

1-1-97

English Imaging

1-1-97

Revised Standard 2363-2.

1-1-97

Switched units to English Imaging.

1-1-09

REVISIONS

STANDARD 729001-01

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

DATE

REVISIONS

1-1-97

English Imaging

1-1-97

Revised Standard 2363-2.

1-1-97

Switched units to English Imaging.

1-1-09

STANDARD 729001-01

APPLICATIONS OF TYPES A & B METAL POSTS (FOR SIGNS & MARKERS)

For diamond shaped sign with side S as shown, use required post size for a sign with W = 0.7S and D = 1.4S.

NOTE: Minimum of 2 bolts per post required.

GENERAL NOTES


LOADING: For 60 mph (95 km/h) wind velocity with 30% gust factor, normal to sign.

SOIL PRESSURE: Minimum allowable soil pressure 1.25 tsf (120 kPa).

See Standard 729001-01 for details of Types A and B posts.

All dimensions are in inches (millimeters) unless otherwise shown.
Washer shim. Additional washers shall be used to level the base when necessary.

\( \frac{3}{8} \times \frac{3}{4} (M12 \times 83) \) anchor bolt.

\( \frac{3}{16} \) Hole 3 places

\( \frac{1}{4} \) Hole (16) 8

Letters I, D, and H are 2 (50) wares D raised.

\( \text{PLAN} \)

\( \text{SECTION A-A} \)

\( \text{ANCHOR BOLT DETAIL} \)

\( \text{POST ASSEMBLY DETAIL} \)

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

DATE: 1-1-09

REVISIONS

Switched units to English meaning.

1-1-07

New standard. Used to be part of Standard 720006.
The transverse spread of the "X" may vary according to lane width.

On multi-lane roads, the stop lines shall extend across all approach lanes and separate RRR symbols shall be placed adjacent to each other in each lane.

When the pavement marking symbol is used, a portion of the symbol should be located directly adjacent to the Advance Warning Sign (W10-1) as placed by Table 2C-4, Condition B of the MUTCD.

All dimensions are in inches (millimeters) unless otherwise shown.
The space between adjacent letters or numerals should be approximately 3 (75) for 6' (1.8 m) legend and 4 (100) for 8' (2.4 m) legend.

LETTER AND ARROW GRID SCALE

<table>
<thead>
<tr>
<th>Legend Height</th>
<th>Arrow Size</th>
<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>
Reflectors at 20' (6.1 m) centers
Reflectors at 20' (6.1 m) centers
Reflectors at 40' (12.2 m) centers
Reflectors at 40' (12.2 m) centers
Reflectors at 20' (6.1 m) centers

Direction of traffic flow

MEDIAN ISLAND

Amber curb reflector, typical for median islands.

Face of curb

Curb reflector

Curb

SECTION A-A
(Similar for corner islands.)

FACE OF CURB

Revised title and removed work program.

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

CURB REFLECTORS

STANDARD 782001-01
**REFLECTOR TYPE A**  
(mono-directional shown)

**REFLECTOR TYPE B**  
(bi-directional shown)

Adhesive weep slots or holes  
equally spaced on both sides

Metal rivet

Brass or plastic rivet

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

---

**GUARDRAIL AND BARRIER WALL REFLECTOR**  
**MOUNTING DETAILS**

**DATE**  
4-1-16  
Added reflector spacing

details: Moved TERMINAL;

MARKER to unit 725001;

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

---

**STANDARD 782006**
Reflective area may be rectangular or slight trapezoid.

Minimum total area of base 7.0 sq. in. (45.16 mm²)

3 min. adhesive weep holes or slots each side, variable spacing.

3/8 (9.5) min. at base

Cross section may be "T" or "L" shaped and may have side supports at ends.

Minimum at base

4 (102) max.

REFLECTOR TYPE C

TYPICAL MOUNTING DETAIL
FOR GUARDRAIL REFLECTOR

TYPICAL MOUNTING DETAIL
FOR BRIDGE RAIL REFLECTOR

TYPICAL MOUNTING DETAIL
FOR BARRIER WALL REFLECTOR

REFLECTOR TYPE C

Type A reflector

Type B reflector

Type B or C reflector (type C shown)

Type B or C reflector marker (type C shown)

ILLINOIS DEPARTMENT OF TRANSPORTATION

STANDARD 782006

GUARDRAIL AND BARRIER WALL REFLECTOR MOUNTING DETAILS

(Sheet 2 of 3)
Terminal marker. See standard 725001.

Spacing 80 ft. (24 m) max. for first 400 ft. (122 m) or curve spacing shown in Standard 635001, whichever is less (min. 4 reflectors regardless of length).

After 400 ft. (122 m), transition to normal delineator spacing shown in Standard 635001, and continue as required.

Bidirectional silver/green should be used in lieu of monodirectional silver on both sides of two-lane bridges where the pavement is 24 (610) wider than the pavement approaching the bridge.

Monodirectional crystal

Monodirectional amber

ONE-WAY TRAFFIC

TWO-WAY TRAFFIC

GUARDRAIL / BARRIER WALL

REFLECTION PLACEMENT DETAIL
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 1½ (32) with bend
3. Galvanized conduit clamps
4. Aluminum weatherproof box with gasketed cover. Weatherproof box shall be installed facing the adjacent property line. (See diagram for alternate installation.)
5. Ground stud for neutral connection
6. Service cables
7. Offset weatherproof fitting
8. Circuit breaker

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

ELECTRICAL SERVICE INSTALLATION DETAILS

STANDARD 805001-01
INTEGRAL/SEMI-INTEGRAL ABUTMENT WITH PARAPET ON APPROACH PAVEMENT

JONTED ABUTMENT WITH PARAPET ON APPROACH PAVEMENT

GENERAL NOTES

The barrel in the expansion fitting shall be fully embedded in the concrete on one side of the expansion joint. One half the length of the deflection fitting shall be embedded in the concrete on the other side of the expansion joint.

The Contractor shall install combination expansion deflection fittings at all bridge expansion joints.

With the approval of the Engineer, the Contractor may substitute two 12 x 12 x 6 (300 x 300 x 150) mm. stainless steel junction boxes attached to back of wall and connected with liquidtight flexible nonmetallic conduit for all expansion joints.

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

DATE
1-1-15
REVISIONS
New standard

STANDARD 812001

INTEGRAL/SEMI-INTEGRAL ABUTMENT WITH PARAPET ON APPROACH PAVEMENT

PARAPET ON APPROACH PAVEMENT

INTEGRAL/SEMI-INTEGRAL ABUTMENT WITH PARAPET ON APPROACH PAVEMENT

GENERAL NOTES

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

DATE
1-1-15
REVISIONS
New standard

STANDARD 812001

INTEGRAL/SEMI-INTEGRAL ABUTMENT WITH PARAPET ON APPROACH PAVEMENT

PARAPET ON APPROACH PAVEMENT

INTEGRAL/SEMI-INTEGRAL ABUTMENT WITH PARAPET ON APPROACH PAVEMENT

GENERAL NOTES

The barrel in the expansion fitting shall be fully embedded in the concrete on one side of the expansion joint. One half the length of the deflection fitting shall be embedded in the concrete on the other side of the expansion joint.

The Contractor shall install combination expansion deflection fittings at all bridge expansion joints.

With the approval of the Engineer, the Contractor may substitute two 12 x 12 x 6 (300 x 300 x 150) mm. stainless steel junction boxes attached to back of wall and connected with liquidtight flexible nonmetallic conduit for all expansion joints.

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

DATE
1-1-15
REVISIONS
New standard

STANDARD 812001
INTEGRAL/SEMl-INTEGRAL ABUTMENT WITH PARAPET ENDING ON BRIDGE DECK

- Parapet wall on bridge deck.
- Stainless steel conduit embedded in structure.
- 2 (50) PVC conduit embedded in structure.
- Stainless steel junction box 12 x 12 x 6 (300 x 300 x 150) min.

PLAN

- Gardrail terminal.
- Parapet wall on bridge deck.

ELEVATION

- Gardrail terminal.
- Parapet wall on bridge deck.

VIEW A-A

- Gardrail terminal.
- Parapet wall on bridge deck.

STANDARD 812001

RACEWAY EMBEDDED IN STRUCTURE

Illinois Department of Transportation
APPROVED January 1, 2015
ENGINEER OF POLICY AND PROCEDURES
APPROVED January 1, 2015
ENGINEER OF DESIGN AND ENVIRONMENT
ISSUED 1-1-15
Flush hinge

Conduit

min.

min.

min.

min.

min.

min.

min.

min.

min.

min.

min.

Galvanized steel hooks
Nonmetallic conduit bells
French drain

PORTLAND CEMENT CONCRETE

ELEVATION

DOUBLE HANDHOLES

STANDARD 814006-02

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

Top of bracket shall be mounted no higher than bottom of luminaire.

Luminaire numbering decal bracket. See mounting detail (typ.).

Underpass luminaire mounted to pier or abutment wall (typ.).

Concrete pier or abutment wall.

Direction of traffic.

Unit duct. See plans for size and conductors.

Conduit clamp as needed (typ.).

Stainless steel conduit shall be used beneath conduit.

Rigid conduit may be used in lieu of flexible conduit.

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.

See plans for underpass luminaire locations.

General notes.
**GENERAL NOTES**

See plans for underpass luminaire locations.

Underpass luminaires shall be centered between beams unless otherwise directed by the Engineer.

Optics of underpass luminaires shall be installed 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 underground. Branch circuits may also be routed from bridge parapet above.

All dimensions are in inches (millimeters) unless otherwise shown.
when used. Rodent screen not shown for clarity.

Conductors extended into light poles shall be of a length sufficient for splices to be withdrawn 18 (450) out of pole handole.

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.

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 handole.

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)

ELEVATION AT POLE BASE
WITH CONCRETE FOUNDATION

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 handole.

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)
3-wire, overhead service.

120/240 V, 1-phase, 3-wire, 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.

Rigid steel conduit elbow.

PVC conduit.

(13) Sch. 40 No. 8 Wire.

Controller enclosure; minimum dimensions: 18H x 12W x 8D (450 x 300 x 200).

Insulated mounting board.

Controller enclosure, 2-terminal mounting bracket, U-channel or enclosure.

Controller enclosure.

Photocell.

Neutral bar.

3-channel or mounting bracket, two required.

Service disconnect switch.

Rigid steel conduit elbow.

Rigid steel conduit.

No. 6 bare copper wire.

Ground line.

Branch lighting circuits.

Neutral bar.

Ground rod.

No. 8 Wire.

Equipment ground bar.

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.

1-1-19
Replace ** note with new note regarding consulting utility company standards for installation.

1-1-16
Corrected connection at terminal block.

20 AMP, 2-pole circuit breaker.

15 amp, 1-pole circuit breaker.

Surge arrester.

HAND-OFF-AUTO selector switch.

60 amp, electrically held contactor.

60 amp, electrically held contactor.

Branch lighting circuits.

Service disconnect switch - 2-pole, 3-wire, 30 amp, fused at 30 amp, solid neutral in NEMA 4X enclosure having lockable external handle.

* Size larger as needed.
Service.
3-wire, overhead service.
120/240 V, 1-phase, Weatherhead.

As needed.
Down guy and anchor.

25' (7.5 m) Wood service pole.

3 No. 6 XLP cables in 2 (2%) 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.

Flexible Schedule 40 PVC conduit.

Controller enclosure, minimum dimensions: 300 x 200 x 140* (760 x 510 x 355).

Insulated mounting board.

Service conductors.

Controller enclosure.

Rigid steel conduit.

Rigid steel conduit elbow.

PVC conduit.

No. 6 Wire.*

Neutral bar.

Ground rod.

No. 6 bare copper wire.

Ground line.

Ground bar.

Branch lighting circuits in unit duct(s).

Branch lighting circuits.

CONTROL SCHEMATIC

ELECTRIC SERVICE INSTALLATION

Typical overhead service shown. Cut pole off for underground service and treat cut surface with preservative. Consult utility company standards for exact requirements.

* Size larger as needed.
3-wire, overhead service.

Weatherhead

Down guy and anchor, as needed.

2" (7.5 ml) Wood service pole. *

3 No. 6 XLP cables in 1 (25) rigid steel conduit. **

Malleable iron conduit, campus at 5' (1.5 m) intervals.

Meter (when required). **

Conduit hub.

Service disconnect switch.

Rigid steel conduit elbow.

Rigid steel conduit.

Neutral bar.

Branch lighting circuits in unit duct(s).

Ground rod.

Controller enclosure, minimum dimensions: 30H x 20W x 24D - (760 x 510 x 355)

SERVICE DISCONNECT SWITCH

CONTROLLER ENCLOSURE

Fuses: 60A *

RIGID STEEL CONDUIT

#6 Wire.

Equipment ground bar.

Hand-off-auto selector switch.

Transformer - 1KVA*, 480V primary, 120/240V secondary, single-phase, 60Hz.

GFCI duplex receptacle.

Single-pole, single-throw switch.

Incandescent luminaire, enclosed and gasketed with 100 watt lamp.

Service disconnect switch - 2-pole, 3-wire, 60 amp*, fused at 60 amp*, solid neutral in NEMA 4X enclosure having lockable external handle.

15 amp, 2-pole circuit breaker.

Terminal block sized for conductors as shown on plans.

Size larger as needed.

GENERAL NOTES

Provide (12 x 9 x 1) (305 x 225 x 25) 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.

CONTROL SCHEMATIC

LIGHTING CONTROLLER

POLE MOUNTED, 480V

STANDARD 825006-03
LIGHTING CONTROLLER
PEDESTAL MOUNTED, 480V

ELECTRIC SERVICE INSTALLATION

Service disconnect switch as directed by Utility Company. (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.

25' (7.5 m) Wood service pole.*

Controller enclosure, minimum dimensions:
301 x 209 x 340 *
(760 x 520 x 855)

Insulated mounting board.

Controller enclosure, name plate.
Engraved enclosure.

Controller enclosure, minimum dimensions:
301 x 209 x 340 *
(760 x 520 x 855)

Insulated mounting board.

Controller enclosure, name plate.
Engraved enclosure.

Controller enclosure, minimum dimensions:
301 x 209 x 340 *
(760 x 520 x 855)

Insulated mounting board.

Controller enclosure, name plate.
Engraved enclosure.

Service disconnect switch - 2-pole, single-throw, 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.

Hand-off-auto selector switch.

Neutral bar.

Ground line.

Equipment ground bar.

Branch wiring circuits.

Lighting controller.

Incandescent luminaire, enclosed and gasketed with 100 watt lamp.

 Surge arrester.

Photocell with integral surge arrester.

Service disconnect switch - 2-pole, single-throw, 60 amp*, fused at 60 amp*, solid neutral, in NEMA 4X enclosure having lockable external handle.

20 amp, 2-pole circuit breaker.

(2) Spares required but not shown.

Surge arrester.

Ground line.

Equipment ground bar.

Branch wiring circuits.

Lighting controller.

Incandescent luminaire, enclosed and gasketed with 100 watt lamp.

 Surge arrester.

Photocell with integral surge arrester.

Service disconnect switch - 2-pole, single-throw, 60 amp*, fused at 60 amp*, solid neutral, in NEMA 4X enclosure having lockable external handle.

20 amp, 2-pole circuit breaker.

(2) Spares required but not shown.

Surge arrester.

Ground line.

Equipment ground bar.

Branch wiring circuits.

Lighting controller.
LIGHTING

Service.
3-wire, overhead 120/240 V, 1-phase, Weatherhead needed. anchor, as 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 intervals. clamps at 5' (1.5 m) Malleable iron conduit required). (13) Sch. 40 2 1 (900 ) 36 3 (50 ) 2 3 * Size larger as needed.

PVC conduit. (450 ) 18 (75) 3 (50 ) 2 3 * Size larger as needed.

copper wire. No. 6 bare ground line. Ground (450 ) 18 (75) 3 (50 ) 2 3 * Size larger as needed.

(1270 x 915 x 430) 50H x 36W x 17D minimum dimensions: Controller enclosure, * (305 x 225 x 25) (1270 x 915 x 430)

12 x 9 x 1 (305 x 225 x 25) watertight puch mounted inside door with engraved drawings and schematics. Controller enclosure.

(450 ) 18 (75) 3 (50 ) 2 3 * Size larger as needed.

Additional wiring window as needed. PVC wiring window. 5 (125) Sch. 40

Ground line.

Concrete foundation.

Controller enclosure, maximum dimensions: 50H x 36W x 17D 50H x 36W x 17D (1270 x 915 x 430)

Neutral bar.

Equipment ground bar.

Branch lighting circuits.

Foundation (plan)

Lighting controller.

Neutral bar.

Ground rod in access well.

Added note 12 .

PHOTOCELL with integral surge arrester.

HAND-OFF-AUTO selector switch.

100 amp*, electrically held contactor. 15 amp, 1-pole circuit breaker.

20 amp*, 2-pole circuit breaker (two spares required but not shown).

Surge arrester.

GFCI duplex receptacle.

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

**ELECTRIC SERVICE INSTALLATION**

- 120/240 V, 1-phase, 3-wire, overhead service.
- 25' (7.5 m) Wood service pole. *
- Service conductors in rigid steel conduit, sized as required.
- Malleable iron conduit clamps at 5' (1.5 m) intervals.
- Ground line.
- No. 6 bare copper wire.
- Ground rod.
- 1/2 (13) Sch. 40 PVC conduit.
- Service disconnect switch.
- Down guy and anchor, as needed.
- Weatherhead

* Size larger as needed.

---

**ANCHOR ROD DETAIL**

- 3 (125) Sch. 40 PVC wiring window.
- 12 x 9 x 3 (305 x 229 x 76) masonry block.
- Concrete foundation.
- Controller enclosure.
- Engraved name plate.
- Slotted ventilator in underside of cover overhang.
- Additional wiring window as needed.

---

**NAVIGATION OBSTRUCTION**

**LIGHTING CONTROLLER**

**STANDARD 826001-02**

---

**NOTES**

- All dimensions are in inches (millimeters) unless otherwise shown.
- * Size larger as needed.
- Company standards for installation.
- Replaced ** note with new note regarding consulting utility.
- Work pad not shown.

---

**DATE**

1-1-15

**REVISIONS**

1-1-19

* Added note 00.
Controller enclosure, minimum dimensions: 59H x 44W x 26D (1500 x 1120 x 660)

Service conductors sized as required.

Feeder conductors sized as required.

Neutral bar. Ground rod in ground bar.

Equipment-ground bar.

Navigation lighting circuits.

HAND-OFF-AUTO selector switch.

PHOTOCELL with integral surge arrester for navigation lighting.

PHOTOCELL with integral surge arrester for roadway lighting.

Service disconnect switch - 2-pole, 3-wire, 150 amp*, fused at 100 amp*, solid neutral in NEMA 4X enclosure having lockable external handle.

20 amp*, 2-pole circuit breaker (two shown, quantity as required).

20 amp*, single-pole circuit breaker (two shown, quantity as required).

Surge arrester.

GFCI duplex receptacle.

Single-pole, single-throw switch.

Incandescent luminaire, enclosed and gasketed with 100 watt lamp.

Service disconnect switch - 2-pole, 3-wire, 100 amp*, fused at 100 amp*, solid neutral in NEMA 4X enclosure having lockable external handle.

60 amp*, 2-pole circuit breaker.

30 amp*, 2-pole circuit breaker.

Terminal block sized for conductors as shown on plans.

* Size larger as needed.
ELECTRIC SERVICE INSTALLATION

(Typical overhead service shown. Cut pole off for underground service and treat cut surface with preservative. Consult utility company standards for exact requirements.)

- Size larger as needed.
- When cold sequencing is required, provide a meter disconnect switch as directed by utility company.

240/480 V, 3-phase, 3-wire, overhead service.

25' (7.5 m) Wood service pole *

Service conductors in rigid steel conduit, sized as required.

Malleable iron conduit clamps at 5' (1.5 m) intervals.

Meter (when required). ***

Conduit hub.

Service disconnect switch.

9, (13) Sch. 40 PVC conduit.

Feeder conductors in rigid conduit to lighting controller.

No. 6 bare copper wire.

Ground rod.

ANCHOR ROD DETAIL

To service pole.

LIGHTING CONTROLLER

To service pole.

FOUNDATION (PLAN)

(Work paid not shown.)
**Control Schematic**

- Photocell with integral surge arrester for roadway lighting.
- Photocell with integral surge arrester for navigation lighting.
- Panel board.
- Insulated mounting board.
- Feeder conductors, sized as required.
- Neutral bar.
- Ground rod in access well. **Note:** Size larger as needed.
- Surge arrester.
- Grounded terminal block sized for conductors as shown on plans.
- Transformer - 1 KVA*, 480V primary, 120/240V secondary, single phase, 60 Hz.
- 15 amp, 2-pole circuit breaker.
- 30 amp*, 2-pole circuit breaker.
- 60 amp*, 2-pole circuit breaker.
- 120/240V secondary, single phase, 60 Hz.
- 100 amp*, electrically held contactor. **Note:** as shown on plans.
- 60 amp*, electrically held contactor.
- 15 amp, 1-pole circuit breaker.
- 20 amp*, 2-pole circuit breaker (two spares required but not shown).
- 20 amp*, single-pole circuit breaker (two shown, quantity as required).
- 20 amp*, single-pole circuit breaker (two shown, quantity as required).
- Single-pole, single-throw switch.
- Incandescent luminaire, enclosed and gasketed with 100 watt lamp.
- Photocell with integral surge arrester for navigation lighting.
- Photocell with integral surge arrester for roadway lighting.

**Controller Enclosure**

- Minimum dimensions: 59H x 44W x 26D
- (1500 x 1120 x 660)
- Controller enclosure, minimum dimensions: 59H x 44W x 26D
**GENERAL NOTES**

See Standard 836001 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole identification banding to pole.

Voids in light pole base shall be sealed to prevent rodent entry.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

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

---

**DATE**

*01/01/15*

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**REVISIONS**

*01/16*

---

*HANGER DETAIL**

*01/14*

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*Added pole mounted on bridge parapet. Modified attachment of screen.*

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**STANDARD 830001-03**

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**ILLINOIS DEPARTMENT OF TRANSPORTATION**
Handhole and cover. See orientation detail.

ELEVATION AT CONCRETE FOUNDATION, METAL FOUNDATION OR RETAINING WALL

Omit leveling nuts when breakaway devices are required.

ELEVATION AT BRIDGE PARAPET

POLE BASE DETAILS

HANDHOLE DETAIL

HANDHOLE / IDENTIFICATION ORIENTATION 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>LOWER SHAFT LENGTH</th>
<th>MINIMUM SHAFT DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 35' (10.7 m)</td>
<td>8 tapered to 6 (200 to 154)</td>
</tr>
<tr>
<td>40' (12.2 m)</td>
<td>10 tapered to 6 (250 to 155)</td>
</tr>
<tr>
<td>45' (13.7 m)</td>
<td>10 tapered to 6 (250 to 155)</td>
</tr>
<tr>
<td>50' (15.2 m)</td>
<td>10 tapered to 6 (250 to 155)</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

See Standard 836001 for Light Pole Foundation and grounding electrode.

See Standard 20001 for pole identification banding to pole.

Voids in light pole base shall be sealed to prevent rodent entry.

Provide breakaway devices where required.

* Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

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

---

**DAVIT LIGHT POLE**

* Unless directed otherwise by the Engineer.

---

**TENON DETAIL**

- 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.
Handhole and cover. See orientation detail.

**SECTION A-A**

See Bridge Plans for 1 (25) anchor rod by others.

- 1 (25) self-locking nut, install with torque wrench to match pole base specifications.
- Screen wrapped around nuts and anchor rods between foundation and bottom of pole base. Provide 6 (150) minimum overlap and wire-tie with matching wire.

**DETAIL A**

- Bolt circle
- Hex nut with washer; Washer shall cover entire shank (typ.). Nut covers required but not shown.
- Concrete foundation, barrier or retaining wall.
- Screen wrapped around nuts and anchor rods between foundation and bottom of pole base. Provide 6 (130) minimum overlap and wire-tie with matching wire.
- Concrete foundation, barrier or retaining wall.

**ELEVATION AT CONCRETE FOUNDATION, METAL FOUNDATION OR RETAINING WALL**

- Omit leveling nuts when breakaway devices are required.

**ELEVATION AT BRIDGE PARAPET**

**POLE BASE DETAILS**

- Tapped 5/16 (13) hole for grounding connector
- Reinforcing frame with full circumferential weld

**Handhole / Identification**

**Orientation Detail**

**Handhole Detail**

**Light Pole - Aluminum Davit Arm**

Illinois Department of Transportation

January 1, 2019

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

STANDARD 830006-05
**LIGHT POLE**

(light pole)

- **MOUNTING HEIGHT**
  - 35' (10.7 m) or less: 8 tapered to 4 (200 to 100)
  - Greater than 35' (10.7 m) to 50' (15.2 m): 10 tapered to 4 (250 to 100)

- **SHAFT THICKNESS**
  - 35' (10.7 m) or less: 2 gauge
  - Greater than 35' (10.7 m) to 50' (15.2 m): 7 gauge

- **BASE PLATE**
  - MOUNTING HEIGHT
    - 35' (10.7 m) or less: 1 1/2 (290)
    - Greater than 35' (10.7 m) to 50' (15.2 m): 1 1/4 (320)
  - BOLT CIRCLE DIAMETER
    - 35' (10.7 m) or less: 3
    - Greater than 35' (10.7 m) to 50' (15.2 m): 1
  - BASE PLATE THICKNESS
    - 35' (10.7 m) or less: 1
    - Greater than 35' (10.7 m) to 50' (15.2 m): 1/4

**GENERAL NOTES**

- See Standard 836001 for Light Pole Foundation and grounding electrode.
- See Standard 729001 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**

1-1-14

**REVISIONS**

1-1-19
Revised POL and BASE

POLE tables

1-1-14
Added pole mounted on bridge parapet. Modified attachment of screen.

**STANDARD 830011-03**
**Traffic flow**

**Mast arm.**

**Pole identification.**

**Pole.**

**Traffic flow**

**Pole on median barrier wall.**

**Traffic flow**

**Pole on barrier wall, retaining wall or parapet.**

**Traffic flow**

**Pole on ground mounted foundation.**

---

**SECTION A-A (Bolts not shown)**

**Handhole.**

**Bolt circle.**

**Handhole and cover.**

**See orientation detail.**

**Hex nut with washer.**

**Washer shall cover entire slot (typ.).**

**Nut covers required but not shown.**

**Screen wrapped around nuts and anchor rods between foundation and bottom of pole base. Provide 6 (150) minimum overlap and wire-tie with matching wire.**

**Concrete foundation, barrier or retaining wall.**

---

**ELEVATION AT CONCRETE FOUNDATION, METAL FOUNDATION OR RETAINING WALL**

**4 x 8 (100 x 200) min. foundation and cover.**

**See orientation detail.**

**Screen wrapped around nuts and anchor rods between foundation and bottom of leveling plate. Provide 6 (150) minimum overlap and wire-tie with matching wire.**

**ELEVATION AT BRIDGE PARAPET**

**Bridge parapet.**

---

**DETAIL A**

**2½ O.D. x ½ (64 x 7) washers both sides of 2½ O.D. x ½ (64 x 13) min. isolation washer.**

**Pole base.**

**½ (13) min. isolation pad sized to match pole base.**

**½ (13) min. leveling plate sized to match pole base.**

**1 (25) leveling nut.**

**1 (25) self-locking washer.**

**Install with torque wrench to specifications.**

**See Bridge Plans for 1 (25) anchor rod by others.**

---

**ORIENTATION DETAIL**

**HANDHOLE / IDENTIFICATION ORIENTATION DETAIL**

**Pole.**

**Handhole.**

**Pole identification.**

---

**HANDHOLE DETAIL**

**Handhole frame.**

**Handhole gasket.**

**Handhole cover.**

---

**POLE BASE DETAILS**

**LIGHT POLE STEEL MAST ARM**

**STANDARD 830011-03**

---

**Illinois Department of Transportation**

**APPROVED ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED January 1, 2019**

---

**Electrical and Mechanical Unit Chief**
DAVIT LIGHT POLE
(Single or Twin Mount)
* Unless directed otherwise by the Engineer.

Davit arm length
15'-0" (4.57 m) max. for single
12'-0" (3.66 m) max. for double.

Davit arm. Minimum wall thickness 0.149 (3.8).

Light pole shaft.

Upper shaft length shall be from the bottom of the pole base to the bottom of the slip joint.

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.

**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 plane directly on concrete and level with stainless steel washers.

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

**DATE**

1/1/19  Revised BASE PLATE table

1/1/14  Added pole mounted on bridge parapet. Modified attachment of screen.

**REVISIONS**

STANDARD 830016-03

(Sheet 1 of 2)
**GENERAL NOTES**

- See Standard 836001 for Light Pole Foundation and grounding electrode.
- See Standard 720001 for Pole identification banding to pole.
- Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

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

---

**LIGHT POLE STEEL TENON TOP**

**BASE PLATE**

<table>
<thead>
<tr>
<th>MOUNTING HEIGHT</th>
<th>BOLT CIRCLE DIAMETER</th>
<th>Base Plate Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>35' (10.7 m) or less</td>
<td>115 (290)</td>
<td>3 (25)</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>15 (380)</td>
<td>1.5 (32)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MOUNTING HEIGHT</th>
<th>Minimum Shaft Diameter</th>
<th>Maximum Wall Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>35' (10.7 m) or less</td>
<td>8 tapered to 4 (200 to 100)</td>
<td>7 guage</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>10 tapered to 4 (250 to 100)</td>
<td>7 guage</td>
</tr>
</tbody>
</table>

**LIGHT POLE**

- 2 1/8 (66) O.D. schedule 40 pipe.
- Three 3/4x13/8 self tapping screws at 120°.
- Light pole.

**TWIN TENON DETAIL**

- 2 5/8 (64) I.D. schedule 40 pipe with cap at top.
- Light pole.

**TENON DETAIL**

- Pole identification banded to pole. See orientation detail.
- See pole base and handhole detail.

**STEEL TENON TOP LIGHT POLE**

(Single or twin mount)

*Unless directed otherwise by the engineer.*
Traffic flow

SECTION A-A

Traffic flow

HANDHOLE / IDENTIFICATION

ORIENTATION DETAIL

HANDHOLE DETAIL

ELEVATION AT BRIDGE PARAPET

POLE BASE DETAILS

STEEL TENON TOP

ILLINOIS DEPARTMENT OF TRANSPORTATION

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

JANUARY 1, 2019

STANDARD 830021-03
LUMINAIRE MOUNTING DETAILS

4'-11" (1.5 m) - 24' (7.3 m) mounting height unless noted otherwise on plans.

TWIN MOUNTING BRACKET DETAILS

SINGLE MOUNTING BRACKET DETAILS

LIGHT POLE WITH CIRCUIT ROUTED UNDERGROUND

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  REVISIONS
1-1-13  New standard
1-1-19  Revised Luminaire to be horizontal
1-1-19  Revised Luminaire to be vertical

TEMPORARY ROADWAY LIGHTING

STANDARD 830026-01
Terminal box, Fuse and fuse block, typ.

Luminaire ring power cord plug connector.

Luminaire ring, qty. as req.

Terminal box with plug connector and retained cap.

Luminaire ring power cord to head frame assembly.

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Horizontal mount or multi-mount luminaire (horizontal mount shown).

Luminaires, qty. as req.

Terminal box with plug connector and retained cap.

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.

Lightning rod.

Head frame with hood.

Guide pin (typ.).

Lift cable to head frame assembly (typ.).

Guide pin (typ.).

Luminaire ring.
### 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 1,000 psi. The Contractor shall verify the soil strength during drilling for concrete foundations or by monitoring installation resistance of metal foundations and notify the Engineer if other conditions are encountered.

When rock is encountered, the foundation depth may be reduced 6 in (150 mm) for every 12 in (300 mm) of embedment in rock. The minimum foundation depth shall be 48 in (1.2 m), with 6 in (150 mm) above the bottom of excavated hole. See ring plate detail.

Anchor rods shall be increased in diameter as needed. If No. 12 (230) threaded rod is used, No. 20 (508) or larger diameter anchor rod shall be used. The Contractor shall match the bushing device size or slotted hole size in the plate base plate to accommodate larger rod sizes.

Transformer bases shall not be used on metal foundations.

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

### LIGHT POLE FOUNDATION

**BASE DEPTH (see lighting plans)**

- 5' (150 mm) behind guardrail or other protective barriers, or as directed by the Engineer.
- Maximum pole setback shall be 30' (9 m) from edge of pavement and shall be located no closer than 5' (1.5 m) behind guardrail, or other protective barriers, or as directed by the Engineer.

### METAL FOUNDATION

#### CONCRETE FOUNDATION

**SHAFT DIAMETER**

- 15 (381) O.D. with 115 (292) bolt circle
- 12 (305) O.D. with 15 (381) bolt circle
- 12 (305) O.D. with 17 (432) bolt circle

**TOP PLATE DETAIL**

- 1/2 (12.7) dia.

**ANCHOR ROD DETAIL**

- 1/4 (6.35) hex head nut (typ.)
- Cut and thread anchor rods (typ.)

**RING PLATE DETAIL**

- 1/4 (6.35) hex head nut (typ.)
- Cut and thread anchor rods (typ.)

**CONCRETE FOUNDATION**

- 24 (610) min. dia. with 115 (292) bolt circle, 30 (762) min. dia. with 15 (381) or 17 (432) bolt circle.

#### GENERAL NOTES

- 1-1-19
- Removed multistorey luminaire to agree with BOT Manual.

1-1-18
- Replaced rod hooks with plates.

### METAL FOUNDATION

#### CONCRETE FOUNDATION

**SHAFT DIAMETER**

- 30 (762) O.D. with 13 (330) bolt circle
- 24 (610) O.D. with 15 (381) bolt circle
- 24 (610) O.D. with 17 (432) bolt circle

**TOP PLATE DETAIL**

- 9/16 (14.3) dia.

**ANCHOR ROD DETAIL**

- 1/4 (6.35) hex head nut (typ.)
- Cut and thread anchor rods (typ.)

**RING PLATE DETAIL**

- 1/4 (6.35) hex head nut (typ.)
- Cut and thread anchor rods (typ.)

**CONCRETE FOUNDATION**

- 24 (610) min. dia. with 115 (292) bolt circle, 30 (762) min. dia. with 15 (381) or 17 (432) bolt circle.

#### GENERAL NOTES

- 1-1-19
- Omitted multistorey luminaire to agree with BOT Manual.

1-1-18
- Replaced rod hooks with plates.

### STANDARD 836001-04
**GENERAL NOTES**

See standard 637006 for barrier wall details.

Provide 2 (50) min. separation between all conduits.

When rock is encountered the foundation depth may be reduced 6 (150) for every 12 (300) of embankment in rock. The minimum foundation depth shall be 30 (760) with cut anchor rods 6 (150) above bottom of excavated hole. See ring plate detail.

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

---

**LIGHT POLE FOUNDATION WITH 44 IN. (1120 mm) CONCRETE BARRIER**

---

**PLAN**

Top of grounding electrode 1 (25) below tops of anchor rods. Thread and cap.

Top of anchor rod even with top of barrier.

---

**ELEVATION**

Thread bottom of anchor rod 2 (50) and provide 1 (25) hex head nut fully seated, typ.

---

**RING PLATE DETAIL**

Cut and thread anchor rods (typ.)

---

**JUNCTION BOX ELEVATION**

2 (50) PVC conduit unless otherwise noted on lighting plans.

---

**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 DIAM.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 (254)</td>
<td>6 (152)</td>
<td>4 (102)</td>
<td>38 (965)</td>
<td>116 (295)</td>
</tr>
<tr>
<td>10.4 (264)</td>
<td>6.0 (152)</td>
<td>4.0 (102)</td>
<td>38 (965)</td>
<td>116 (295)</td>
</tr>
<tr>
<td>10.9 (276)</td>
<td>6.2 (157)</td>
<td>4.2 (107)</td>
<td>38 (965)</td>
<td>116 (295)</td>
</tr>
<tr>
<td>12.5 (317)</td>
<td>7.3 (185)</td>
<td>5.3 (135)</td>
<td>38 (965)</td>
<td>116 (295)</td>
</tr>
<tr>
<td>14.0 (356)</td>
<td>9.2 (234)</td>
<td>7.2 (183)</td>
<td>38 (965)</td>
<td>116 (295)</td>
</tr>
</tbody>
</table>
```

---

8x24x10 (200x610x250) min. Stainless steel junction box.

---

2 (50) PVC conduit, one or two required (See lighting plans).

---

1 (25) head nut fully seated, typ.

---

Thread bottom of anchor rod 2 (50) and provide 1 (25) hex head nut fully seated, typ.
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**

**SECTION B-B**

Anchor rods evenly spaced.

**DETAIL A**

2 x ½ (50 x 13)
Steel bar, length as required. (Typ.)

**DETAIL B**

Sch. 40 steel pipe
Typ. L. Dia. ½ (6)
greater than anchor rod diameter.

6W x 1ST (150 x 4)
steel template.

See Detail A

See Detail B

---

**ROD AND REINFORCEMENT TABLE**

<table>
<thead>
<tr>
<th>TOWER HEIGHT</th>
<th>ANCHOR ROD DIAM (MIN)</th>
<th>ROD CIRCLE DIAM (MIN)</th>
<th>TOWER BASE DIAM (MIN)</th>
<th>DRILLED SHAFT DIAM.</th>
<th>V BAR QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>80' (24.3 m)</td>
<td>1½ (38)</td>
<td>30 (760)</td>
<td>24 (610)</td>
<td>4 (125)</td>
<td>14</td>
</tr>
<tr>
<td>90' (27 m)</td>
<td>1½ (38)</td>
<td>30 (760)</td>
<td>24 (610)</td>
<td>4 (125)</td>
<td>14</td>
</tr>
<tr>
<td>100' (30 m)</td>
<td>1½ (38)</td>
<td>30 (760)</td>
<td>24 (610)</td>
<td>4 (125)</td>
<td>14</td>
</tr>
<tr>
<td>110' (33 m)</td>
<td>1½ (38)</td>
<td>30 (760)</td>
<td>24 (610)</td>
<td>4 (125)</td>
<td>14</td>
</tr>
<tr>
<td>120' (37 m)</td>
<td>1½ (38)</td>
<td>36 (915)</td>
<td>26 (660)</td>
<td>4 (145)</td>
<td>18</td>
</tr>
<tr>
<td>130' (40 m)</td>
<td>1½ (38)</td>
<td>36 (915)</td>
<td>28 (710)</td>
<td>4 (145)</td>
<td>18</td>
</tr>
<tr>
<td>140' (43 m)</td>
<td>1½ (38)</td>
<td>36 (915)</td>
<td>28 (710)</td>
<td>4 (145)</td>
<td>18</td>
</tr>
<tr>
<td>150' (46 m)</td>
<td>1½ (38)</td>
<td>36 (915)</td>
<td>30 (760)</td>
<td>5 (155)</td>
<td>22</td>
</tr>
<tr>
<td>160' (49 m)</td>
<td>1½ (38)</td>
<td>36 (915)</td>
<td>32 (850)</td>
<td>5 (155)</td>
<td>22</td>
</tr>
</tbody>
</table>

Diameter based on a 5 (125) conc. cover.

The min. cover shall be 3 (75) in dry shaft excavation and 4 (100) in a wet hole. When rock is encountered a 5 (125) cover against soil and a 2 (50) cover against rock shall be required.

The cost of the foundation.

The foundation shall be poured monolithically and shall have no construction joints.

Grounding electrodes shall be installed in an access well when there is a conflict in using the method shown.

All dimensions are in inches (millimeters) unless otherwise shown.
BREAKAWAY COUPLINGS ON CONCRETE
FOUNDATION FOR STEEL LIGHT POLE
(Provide pole base skirt around wire cloth when required.)

BREAKAWAY COUPLINGS ON METAL
FOUNDATION FOR STEEL POLE
(Provide pole base skirt around wire cloth when required.)

BREAKAWAY TRANSFORMER BASE FOR
STEEL OR ALUMINUM POLE
(Steel pole shown)

Wire cloth wrapped around couplings between foundation and pole base. Provide 6 (150) minimum overlap and wire-tie with matching wire at three locations at each end of overlap.

Concrete foundation.

Light pole base.

Washer.

Breakaway coupling.

Washer.

Hex nut with washer.

Light pole base.

Washer.

Breakaway coupling.

Washer.

Hex nut with washer.

Light pole base.

Washer.

Breakaway coupling.

Washer.

Hex nut with washer.

Light pole base.

Washer.

Breakaway coupling.

Washer.

Hex nut with lock washer.

Stud bolt.

Concrete foundation.

2 1/4 (70) O.D. x 3/8 (13)
thick flat washer.

Hex nut.

Anchor rod.

Hex nut.

1 (25) hex head bolt with washer.

Hex head covers required but not shown.

Pole base.

Transformer base.

1/4 (70) O.D. x 3/8 (13)
thick flat washer.

1-1-18

Illinois Department of Transportation

APPROVED

January 1, 2018

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

1-1-12

PASSED

ENGINEER OF PRELIMINARY ENGINEERING

REVISIONS

DATE

1-1-18

Revised to show nut.
shield installation for aluminum poles.

1-1-14

New Standard.

STANDARD 838001-01

See Sheet 2 for GENERAL NOTES.
**BREAKAWAY COUPLINGS FOR ALUMINUM POLES**

(Provide pole base skirt around wire cloth when required.)

**GENERAL NOTES**

See light pole standard for details not shown.

Use largest transformer base bolt circle possible.

Transformer bases shall not be installed on metal foundations.

Washers on top of pole base shall cover the entire bolt set.

See Standard 836001 for Light Pole Foundation.

Wire cloth shall be stainless steel, have a maximum opening of 1/8 (4), and have a minimum wire size of AWG No. 16 (1.6).

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

**CR1**

- 24V DC Monitor
- Logic Common

**SUPERVISORY RELAY**

**CR2**

- Preempt Interlock (Relay & Controller Harness)
- Supervision Fail Preempt No. 1
- Railroad Preempt Preempt No. 2

**In-line fuse**

- 2 Amp
- #10 AWG to AC-

**GENERAL NOTES**

CR1 and CR2 are 120VAC 3PDT Relays.

Supervision Fail is Preempt No. 1, causing traffic signal controller to implement all red flash following track clearance phase.

Railroad Preempt is Preempt No. 2, causing traffic signal controller to implement railroad preemption routine following 2 second delay.

Preempt No. 1 and Preempt No. 2 shall have priority over all other preempts. The railroad preemption routine shall abbreviate each and all active pedestrian phases by immediately entering into flashing DON'T WALK and timing concurrently with the associated vehicle yellow change interval.

**RELAYS IN NON-PREEMPT STATE - RAILROAD AND PREEMPT RELAYS ENERGIZED**

- All three shields shall be isolated at the railroad facility end.
- All three shields to AC-

**DATE**

1-1-04

**REVISIONS**

- New Standard

**SUPERVISED RAILROAD INTERCONNECT CIRCUIT**

**STANDARD 857006-01**
Charger
Inverter/Relay
Transfer Power
Batteries

Note: The power transfer relay may be internal to the Inverter/Charger.

Inverter/Charger
Power Transfer Relay
Batteries

Manual Bypass Switch
Traffic Signal Equip.

SINGLE LINE BLOCK DIAGRAM

UNINTERRUPTABLE POWER SUPPLY (UPS)
STANDARD 862001-01
**Bonding a Handhole Cover & Frame**

- Cable hooks
- U.L. listed direct burial splice kit
- No. 6 AWG equipment grounding conductor (green)
- Recessed cover
- Equipment grounding conductor to controller double handhole.
- To pole or post
- Handhole frame and cover
- Heavy-duty compression terminal (typical)

**Bonding an Existing Handhole Cover & Frame**

- ⅜ x ⅛ (13 x 31) stainless steel bolt with split lock washer and nylon insert lockout welded to frame and to cover (typical).
- Anti-corrosion compound shall be applied to each assembly.

**Grounding a Mast Arm Pole/Post**

- GROUNDING & BONDING

**Heavy-Duty Compression Terminal**

- Heavy-duty compression terminal

**Heavy-Duty Ground Rod Clamp**

- ½ (19) Clamp Size

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

**Traffic Signal Grounding & Bonding**

- Illinois Department of Transportation
- JANUARY 1, 2009
- APPROVED
- ENGINEER OF DESIGN AND ENVIRONMENT
- 4-1-06
- PASSED
- ENGINEER OF OPERATIONS

- STANDARD 873001-02

**Revisions**

- 1-1-08: Switched units to English (metric)
- 1-1-07: Revised terminology

**Detail A**

- Handhole cover
- Handhole frame
- Heavy-duty compression terminal
- Stainless steel bolt, nut, and two washers. Anti-corrosion compound shall be applied to the assembly.

**Detail B**

- Handhole cover handle
- Heavy-duty compression terminal with stainless steel nut. Anti-corrosion compound shall be applied to the assembly.
**PEDESTRIAN ONE PUSH BUTTON POST**

- 3'-6" (1.05 m) max.
- 30 (762) min.
- 3'-6" (1.05 m) max.
- 30 (762) min.
- 36 (914) preferred

**PEDESTRIAN TWO PUSH BUTTON POST**

- 3'-6" (1.05 m) max.
- 30 (762) min.
- 3'-6" (1.05 m) max.
- 30 (762) min.
- 36 (914) preferred

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

36 x 36 (900 x 900) Sign panel or blankout sign 100 lb (45 kg) max.

**Highest point of pavement**

20 sq. ft. (1.86 sq. m) max. sign panel or blankout sign 100 lb (45 kg) max.

**Mast arm length as specified on the plans**

This signal head only for arms 36 (10.97 m) and longer.

**Removable pole cap**

20 sq. ft. (1.86 sq. m) max. sign panel or blankout sign 100 lb (45 kg) max.

**Steel mast arm assembly and pole 16' through 55'**

**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.

**REVISIONS**

- Revised table for LRFD reqs.
- Revised GEN. NOTES for sign location. Rep. rod hooks with nuts
- Changed sign panel to 36 x 36
- Added max. weight at 150 lb
- Modified dim. to outer signal

**ANCHOR ROD DETAIL**

- Stainless steel mesh
- Thread bottom of anchor rod into handhole and provide matching hex head nut fully seated, typ.
- Bolt covers for each anchor rod

**ANCHOR ROD SIZE**

- 1¾ X 7' (44 X 2.10 m)

**Anchoring rod detail**

- 16' through 20' (4.87 m thru 6.10 m) (450)
- 21 (535)
- 1¾ X 7' (44 X 2.10 m)

**ANCHOR ROD DETAIL**

- 4x8 (100 x 200) Handhole with frame and cover located opposite of oncoming traffic.
- Distance from top of pole base to bottom of hand hole shall match the inside diameter of the pole at the mid-point of the hand hole.
- Ground lug opposite handhole.
Illinois Department of Transportation

January 1, 2018

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED

PASSED

ENGINEER OF OPERATIONS

ASSEMBLY AND POLE
56' THROUGH 75'

STEEL MAST ARM

ANCHOR ROD DETAIL

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 720016 for location of sign panel or blackout sign closest to pole. All dimensions are in inches (millimeters) unless otherwise shown.

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-1-16</td>
<td>Changed sign panel to</td>
</tr>
</tbody>
</table>

Mast arm length as specified on the plans.

Four spaces at 12' (3.6 m) typ. 9' (2.4 m) (min.)

Removable cap

Removable pole cap

Pole height

Removable cap

Thread bottom of anchor rod 2 (50) and provide matching hex head nut fully seated, typ.

Bolt covers (6 required)

Stainless steel mesh

4x8 (100 x 200) Handhole with frame and cover located opposite of oncoming traffic

Ground lug opposite handhole

Distance from top of pole base to bottom of hand hole shall match the inside diameter of the pole at the midpoint of the hand hole.

MAST ARM LENGTH | ANCHOR ROD CIRCLE | ANCHOR ROD SIZE
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>36' thru 64' (17.07 m thru 19.51 m)</td>
<td>6</td>
<td>5/8 x 7' (44 x 2.10 m)</td>
</tr>
<tr>
<td>65' thru 75' (19.81 m thru 22.86 m)</td>
<td>27</td>
<td>2 x 7-6&quot; (54 x 2.29 m)</td>
</tr>
</tbody>
</table>

4x8 (100 x 200) Handhole with frame and cover located opposite of oncoming traffic

Base to bottom of hand hole

Leveling nut (typ.)

36x36 (900 x 900)
Sign panel or blackout sign 100 lb (45 kg) max.

20 sq. ft. (1.86 sq. m) max. sign panel or blackout sign 100 lb (45 kg) max.

1-1-18

Engineer of Design and Environment

Issued

Passed

Engineer of Operations

DATE

REVISIONS

4-1-16 | Changed sign panel to | Replaced rod hooks with nuts. |

STEEL MAST ARM

ASSEMBLY AND POLE

56' THROUGH 75'

STANDARD 877002-04

100 lb (45 kg) max.

Blankout sign closest to pole.

See Standard 720016 for location of sign panel or blanket sign closest to pole.

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

Highest point of pavement

20 sq. ft. (1.86 sq m) max.

sign panel or blankout sign
100 lb (45 kg) max.

36x36 (900x900) Sign panel or
blankout sign 100 lb (45 kg) max.

Removable pole cap

Stainless steel mesh

Ground lug opposite handhole

This signal head only for
arms 36' (10.97 m) and
longer.

4x8 (100x200) Handhole
with frame and cover
located opposite of
oncoming traffic

Bolt covers
(6 required)

MAST ARM LENGTH ANCHOR ROD CIRCLE ANCHOR ROD SIZE

16' thru 30'
(4.87 m thru 9.14 m)

18

(450)

1 1/4" x 7'

(44 x 2.10 m)

32' thru 50'
(9.75 m thru 15.24 m)

21

(535)

2 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 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.

DATE REVISIONS
1-1-18 Revised for LRFD reqs. Revised
GEN. NOTES for sign location.
4-1-16 Revised ANCHOR ROD DETAIL.
Champed sign panel to 36x36.

Added max weight of 100 lb.
Modified dim. to outer signal.

STANDARD 877006-06
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. 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.

<table>
<thead>
<tr>
<th>Mast Arm Length</th>
<th>1 Foundation Depth</th>
<th>2 Foundation Diameter</th>
<th>3 Spiral Diameter</th>
<th>4 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; (6.1 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>8</td>
<td>6 (19)</td>
</tr>
<tr>
<td>Greater than or equal to 30' (9.1 m) and less than 40' (12.2 m)</td>
<td>23'-0&quot; (6.9 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
<td>7 (22)</td>
</tr>
<tr>
<td>Greater than or equal to 40' (12.2 m) and less than 50' (15.2 m)</td>
<td>26'-0&quot; (7.9 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>29'-0&quot; (8.8 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
<td>7 (22)</td>
</tr>
<tr>
<td>Greater than or equal to 55' (16.8 m) and less than 65' (19.8 m)</td>
<td>31'-0&quot; (9.4 m)</td>
<td>36 (900)</td>
<td>30 (750)</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>33'-0&quot; (10.1 m)</td>
<td>36 (900)</td>
<td>30 (750)</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. A minimum Unconfined Compressive Strength (Qu) ≥ 1.0 ft-lb (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.

**CONCRETE FOUNDATION DETAILS**

(Sheet 2 of 2)

STANDARD 878001-10
Drill hole through pavement. Insert conduit and fill with approved sealer.

Insert conduit and fill

Grade

Handhole, junction box, signal base, or control box base

Approved sealer

Curb and gutter (where installed)

Sealed slit for detector loop

2% min. slope toward handhole

SEEDED SLOT (where installed)

DETECTOR LOOP LEAD-IN

PCC PAVEMENT

ASPHALT PAVEMENT

DETECTOR LOOP INSTALLATION

Pavement joint or crack

NOTE

Loop wire shall follow saw cut to bottom, forming slack section at joint.

DETECTOR LOOP AT PAVEMENT

JOINT OR PAVEMENT CRACK

SECTION A-A

LOOP WIRE AND LEAD-IN CABLE SPLICE

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

Illinois Department of Transportation

DATE

REVISIONS

STATEMENT OF OWNERSHIP

January 1, 2009

APPROVED

PASSED

Issued

1-1-09

ENGINEER OF DESIGN AND ENVIRONMENT

Switched units to English (metric)

1-1-02

RENUM. STANDARD 846001

STANDARD 886001-01

1-1-02
Resident traffic and day labor force's equipment to use road shoulder for passing barricade.

Use when shoulders are too narrow for passage of traffic.

Type III Barricades with Standard Sign R11-2 or R11-4 installed as shown.

Reflecterized striping shall appear on both sides of barricades. Barricades shall be positioned so that stripes slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange 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

Type III barricades to be width of pavement only.

Reflecterized striping shall appear on both sides of barricades. Barricades shall be positioned so that stripes slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange 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.
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 approximately 400 (120) m.

All signs are to be removed at completion of the day's operation.

Any unattended obstacle, excavation, or pavement drop off greater than 3 (75) in the work area shall be protected by Type I or Type II barricades with flashing lights.

Longitudinal dimensions may be adjusted slightly to fit field conditions.

All vehicles, equipment, men, and their activities are restricted at all times to one side of the pavement.

Flashing lights or rotating beacons are required for all maintenance vehicles while in operation.

Applicable operations illustrated in Standard 701301 may be used when operations do not exceed 15 minutes on the pavement or 30 minutes on the shoulder respectively.

All warning signs shall have minimum dimensions of 36x36 (900x900) and have black legend on an orange reflectorized background.

When fluorescent signs are used, orange flags are required.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

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

STANDARD B.L.R. 18-6

TRAFFIC CONTROL DEVICES-
DAY LABOR MAINTENANCE
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 locking furnished in place by the Contractor (35) bolts shall be provided with locknut or double nut.

See alternate soil plate connection

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.

See Standard B.L.R. 20-7 for details of guardrail not shown.
TREATED TIMBER BLOCKING
** Approximate Lengths Field Verify

1 (25) Steel plate

ELEVATION

8\% 15
222

% (22)
3
1

% (137)
4

% (138)

1 (17) Square holes

16x17 (17x51) Slot

PLAN

0\°.39\°.32\°.2

360x8.2 (150x12)

RUB RAIL PLATE R-1

1 (25) steel plate

% (1762)
4

% (1762)
2

% (1762)
6

% (1048)

% (1048)
4

% (1048)
4

% (1762) Slotted holes

WEDGE M

19/\%\% (18x25) Steel plate

PLATE WASHER F

% (28) Dia. hole

Tack weld

PLATE WASHER D

% (22) Dia.

PLATE G

% (125) Steel plate

3x13/\% (32x57) Slotted holes

Class A rail element

PLATE E

3x13/\% (32x57) Slotted holes

Class A rail element

TRAFFIC BARRIER
TERMINAL-TYPE 5R

STANDARD B.L.R. 20-7

(Sheet 2 of 2)
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 70/033.

Two Type A Low Intensity Flashing Lights shall be used on each approach in advance of the work area during hours of darkness. One light shall be installed above the barricades and the other above the first advance warning sign.

All warning signs shall have minimum dimensions of 36 x 36 (900 x 900) and have a black legend on an orange reflectorized background.

When fluorescent signs are used, orange flags are not required.

Longitudinal dimensions may be adjusted to fit field conditions.

When the distance between the barricade and the intersection is between 1500' (450 m) and 2000' (600 m), an additional sign shall be placed at the intersection. The additional sign shall give the distance to the barricade.

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

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

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 701601. 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.
**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, at the option of the Contractor. If standard wood posts are used, one post shall be located midway between and in lieu of posts 4 & 5. The offset (Y) for this post shall be 12 (300).
- A two-piece assembly may be substituted for the one piece nose shown above:
  - The bearing plate K shall be held in position by (2) one piece nose shown above.
  - Two eightpenny nails driven into the post and bent over the top of the plate.
- This terminal is used with Standard B.L.R. 23-4A for details of guardrail not shown.
- 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 1

**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>11.345</td>
<td>37.22</td>
</tr>
<tr>
<td>2</td>
<td>9.475</td>
<td>31.09</td>
</tr>
<tr>
<td>3</td>
<td>7.595</td>
<td>24.92</td>
</tr>
<tr>
<td>4</td>
<td>6.335</td>
<td>20.79</td>
</tr>
<tr>
<td>5</td>
<td>5.070</td>
<td>16.64</td>
</tr>
<tr>
<td>6</td>
<td>3.805</td>
<td>12.49</td>
</tr>
<tr>
<td>7</td>
<td>1.905</td>
<td>6.25</td>
</tr>
<tr>
<td>8</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

**PLAN**

- See table of offsets
- 3 Spaces at 6'-2" (1.87 m) steel posts
- 2 Spaces at 6'-3" (1.905 m) wood posts

**SECTION A-A**

- Plate washer F
- Slope 1:10 max. * 1:4 desirable

* If fill height exceeds 2'-0" (0.6 m) use 1:3 max.

**TRAFFIC BARRIER TERMINAL TYPE 1**

(Sheet 1 of 2)
Dimensions - ft. (m)

<table>
<thead>
<tr>
<th>Width of Shoulder (X)</th>
<th>12 (3.6)</th>
<th>10 (3.0)</th>
<th>8 (2.4)</th>
<th>6 (1.8)</th>
<th>5 (1.2)</th>
<th>4 (1.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width of Turnout (Y)</td>
<td>8 (2.4)</td>
<td>8 (2.4)</td>
<td>6 (1.8)</td>
<td>6 (1.8)</td>
<td>4 (1.2)</td>
<td>4 (1.2)</td>
</tr>
</tbody>
</table>

L_1: 10 (3.0) | 10 (3.0) | Variable |

L_2: 20 (6.0) | 20 (6.0) | 15 (4.5) | 10 (3.0) | 10 (3.0) | 10 (3.0) |

Note:
Dimensions for Township and District Roads may vary from the above dimensions.

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

All dimensions are in inches (millimeters) unless otherwise shown.
TYPE 1A BARRICADE
FOR NON-NHS ROUTES

STANDARD B.I.R. 25-1

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

(Sheet 2 of 41)

STANDARD B.L.R. 26-3
NOTE

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

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

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

(D = O desirable to 12 (300) maximum)

WOOD BLOCK-OUT AND STEEL POST DETAILS

<table>
<thead>
<tr>
<th>V</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>(0-410)</td>
<td>(630)</td>
<td>(530)</td>
</tr>
<tr>
<td>&gt;24</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>(410-714)</td>
<td>(530)</td>
<td>(530)</td>
</tr>
<tr>
<td>&gt;714</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>(981)</td>
<td>(350-88)</td>
<td>(273)</td>
</tr>
</tbody>
</table>

1 (M24) double nuts or locknuts and washer connected

Symm. about

% 1/8 dia. (6x19) galvanized cable

STEEL POST DETAILS

SWAGE

CABLE ASSEMBLY

Tighten to taut tension.

STANDARD B.L.R. 26-3

29'' (731mm) HEIGHT

(40,000 lbs. (18,100 kg) min. breaking strength)
1x4 (M24x200) machine bolt with locknut furnished by the Contractor of the structure. Use plate washer D.

**PLATE WASHER D**

**PLACE WASHER D**

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

6'-9" (2.06 m) long wood or steel post.

**PLATE E**

**PLATE F**

Post bolt with plate washer F.

**PLATE G**

Bridge rail placed under head and nut.

**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.
**Plan**

ADJACENT TO PCC PAVEMENT OR PCC BASE COURSE

<table>
<thead>
<tr>
<th>TABLE OF DIMENSIONS</th>
<th>BARRIER CURB</th>
<th>MOUNTABLE CURB</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>M-2.06 (M-5.15)</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>M-2.12 (M-5.30)</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>M-2.18 (M-5.45)</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>M-2.24 (M-5.60)</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

**Example Details**

<table>
<thead>
<tr>
<th>DOWEL BAR TABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAVEMENT THICKNESS</td>
</tr>
<tr>
<td>10 (25) or greater</td>
</tr>
<tr>
<td>8 (20) thru 9.99 (249)</td>
</tr>
<tr>
<td>Less than 8 (200)</td>
</tr>
</tbody>
</table>

**General Notes**

The bottom slope of combination curb and gutter constructed adjacent to pcc pavement shall be the same slope as the subbase or 6% when subbase is omitted.

\[ t = \text{Pavement thickness} \]

Longitudinal joint tie bars shall be No. 5 (16) at 24 (600) centers in accordance with details for longitudinal construction joint shown on Standard 420001.

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

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

See Standard 606301 for details of corner islands except reference to Standard 606001 does not apply.

All dimensions are in inches (millimeters) unless otherwise stated.
Short radius curve

A

A

A

A

A

A

A

A

A

A

A

A

Construction joints at 75'-0" (2.3 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)

(13.5 m)

Edge of pavement

Undoweled contraction joint (Typ.)

construction options:

1. Forms with 1/4 (3) thick steel template

2. (50) deep, and seal.

2. Saw 2 (50) deep at 4 to 24 hours, and seal.

3. Insert 2 (20) thick preformed joint filler

full depth and width.

Construction joint

2-No. 4 (No. 13) bars

with 2 (50) min. cl.

2-No. 4 (No. 13) bars

placed at mid-depth

(when space permits)

340 (3.4 m)

175 (175)

340 (3.4 m)

175 (175)

Pavement

Pavement

1175 (1.175)

(460)

1175 (1.175)

(460)

Tie bar

Tie bar

Pavement

Pavement

1175 (1.175)

(460)

1175 (1.175)

(460)

DEPRESSED CURB

BARRIER CURB

ADJACENT TO FLEXIBLE PAVEMENT

DEPRESSED CURB

BARRIER CURB

ADJACENT TO PCC PAVEMENT OR PCC BASE COURSE

CONCRETE CURB TYPE B

ADJACENT TO FLEXIBLE PAVEMENT

ON DISTURBED SUBGRADE

ON UNDISTURBED SUBGRADE

HMA surfacing

Base course

HMA surfacing

Base course

CONCRETE CURB AND GUTTER

AND COMBINATION

CONCRETE CURB TYPE B
A New standard.

**GENERAL NOTES**

1. Form with 1% (3") thick steel template placed in prolongation with pavement joints construction option.
2. Saw at 4 to 24 hours, and seal.

Pavement expansion joint:

* Such as entrances, short radius curve (such as entrances, side streets and ramp returns).

**TABLE OF DIMENSIONS**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>A (75)</th>
<th>B (75)</th>
<th>C (75)</th>
<th>D (75)</th>
<th>R1 (75)</th>
<th>R2 (75)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-2.06 (M-5.15)</td>
<td>6 (40)</td>
<td>4 (32)</td>
<td>2 (16)</td>
<td>1 (8)</td>
<td>VA</td>
<td>VA</td>
</tr>
<tr>
<td>M-2.12 (M-5.30)</td>
<td>7 (48)</td>
<td>5 (40)</td>
<td>3 (24)</td>
<td>1 (12)</td>
<td>VA</td>
<td>VA</td>
</tr>
<tr>
<td>M-3.06 (M-7.65)</td>
<td>8 (60)</td>
<td>6 (48)</td>
<td>4 (32)</td>
<td>2 (16)</td>
<td>VA</td>
<td>VA</td>
</tr>
<tr>
<td>M-3.12 (M-7.95)</td>
<td>9 (75)</td>
<td>7 (60)</td>
<td>5 (45)</td>
<td>3 (24)</td>
<td>VA</td>
<td>VA</td>
</tr>
<tr>
<td>M-4.06 (M-9.25)</td>
<td>10 (90)</td>
<td>8 (75)</td>
<td>6 (60)</td>
<td>4 (40)</td>
<td>VA</td>
<td>VA</td>
</tr>
<tr>
<td>M-4.12 (M-9.55)</td>
<td>11 (110)</td>
<td>9 (90)</td>
<td>7 (75)</td>
<td>5 (50)</td>
<td>VA</td>
<td>VA</td>
</tr>
<tr>
<td>M-5.06 (M-12.25)</td>
<td>12 (130)</td>
<td>10 (110)</td>
<td>8 (100)</td>
<td>6 (65)</td>
<td>VA</td>
<td>VA</td>
</tr>
<tr>
<td>M-5.12 (M-12.55)</td>
<td>13 (150)</td>
<td>11 (130)</td>
<td>9 (125)</td>
<td>7 (90)</td>
<td>VA</td>
<td>VA</td>
</tr>
</tbody>
</table>

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

Sheet 1 of 2

B.L.R. 28
Short radius curve

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

Edge of pavement

Undoweled contraction joint (typ.)

Construction options:

1. Form with 1/8" (3) thick steel template

   2 (50) deep, and seal.

2. Saw 2 (50) deep at 4 to 24 hours, and seal.

3. Insert 2 (20) thick preformed joint filler

   full depth and width.

Construction joint

2-No. 4 (No. 13) bars

with 2 (50) min. cl.

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

(when space permits)

Drainage casting without curb box

Back of curb

12 (300) (typ.)

10'-0" (3.0 m)

5'-0" (1.5 m)

Edge of pavement

Mountable curb shown

(other types permitted)

HMA surfacing

ON DISTURBED SUBGRADE

ON UNDISTURBED SUBGRADE

Plan

Concrete Curb and Gutter

Concrete Curb Type B

Adjacent to Flexible Pavement

Adjacent to PCC Pavement or PCC Base Course

Concrete Curb Type B

B.L.R. 28