## Section B  Drainage Structures, Curbs & Gutter

<table>
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<th>Standard</th>
<th>Modification Summary</th>
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<td>B3</td>
<td>Type G-2/G-3 Gutter Transition at Traffic Barrier Terminal, Type T6</td>
</tr>
<tr>
<td>Sheet 1</td>
<td>Revised Gutter G-3 Transition length, tapers and sections due to changes to the TBT Type T6 terminal.</td>
</tr>
<tr>
<td>Sheet 2</td>
<td>Revised Gutter G-2 Transition length, tapers and sections due to changes to the TBT Type T6 terminal.</td>
</tr>
<tr>
<td>Sheet 3</td>
<td>Revised Gutter G-3 Transition length, tapers and sections due to changes to the TBT Type T6 terminal.</td>
</tr>
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<td>Sheet 4</td>
<td>Revised Gutter G-3 Transition length, tapers and sections due to changes to the TBT Type T6 terminal.</td>
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<tr>
<td>Sheet 5</td>
<td>Revised Gutter G-2 Transition length, tapers and sections due to changes to the TBT Type T6 terminal.</td>
</tr>
<tr>
<td>Sheet 6</td>
<td>Revised Gutter G-3 Transition length, tapers and sections due to changes to the TBT Type T6 terminal.</td>
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| B7       | Catch Basin, Type B |
| Sheet 1  | Revised callouts on the Typical Reinforcement Around Storm Sewer Pipe detail. |

| B8       | Catch Basins Type G and Type G-3 Modified, Frames and Grates |
| Sheet 1  | Revised callouts on the Typical Reinforcement Around Storm Sewer Pipe detail. |
| Sheet 1  | Revised Bar h1(E) detail. |
| Sheet 1  | Added Catch Basin, Type G-3, Modified with Type 20A Frame and Grate detail. |
| Sheet 1  | Added #8 h2(E) bars to the reinforced concrete lids. |
| Sheet 2  | Revised callouts on the Typical Reinforcement Around Storm Sewer Pipe detail. |
| Sheet 2  | Revised #6 Bar h1(E) detail. |
| Sheet 2  | Added #8 h2(E) bars to the reinforced concrete lids. |
| Sheet 3  | Revised callouts on the Typical Reinforcement Around Storm Sewer Pipe detail. |
| Sheet 3  | Revised #6 Bar h1(E) detail. |
| Sheet 3  | Added #8 h2(E) bars to the reinforced concrete lids. |

| B10      | Sloped Headwalls Type III Details |
| Sheet 1  | Revised Note 8 to say “compressive strength in accordance with the standard specifications”. |
| Sheet 1  | Added Note 12 stating that rebar reinforcement may be used as an option to welded wire reinforcement. |
| Sheet 2  | Revised Note 7 to say “compressive strength in accordance with the standard specifications”. |
| Sheet 2  | Added Note 11 stating that welded wire reinforcement may be used as an option to rebar reinforcement. |
| Sheet 2  | Added callout in Section A-A indicating station, offset, and invert elevation location. |

| B24      | Pipe Underdrains |
| Sheet 1  | Added composite pavement as an option for pavement type. |
1. For concrete curb, type C transitions, the leading edge of curb in the direction of traffic shall begin flush with adjacent pavement or shoulder surface and transition to full height at the rate of one inch vertical to one foot horizontal.

2. Gutter transition details shall be shown on the plans.

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

4. Reinforcement steel shall be accurately placed and firmly held in the position specified using epoxy-coated steel chairs. Chair spacing shall not exceed 4'-0".

5. Gutter reinforcement shall be placed 3" above bottom of gutter following the subgrade slope.

6. Other gutter and curb transition details will be shown on the plans.

7. Continuous #4 bars shall be lapped a minimum of 1'-1".

8. For concrete gutter overlays, crack control joints shall be placed at locations of underlying joints and working cracks.

9. Gutter crack control joints shall be in alignment with PCP shoulder joint locations. Crack control joints shall be sealed full depth and sealed in accordance with the standard specifications.

10. Expansion joints shall be constructed in gutter at maximum joint spacing of 60'-0". See expansion joint detail on sheet 2 of this standard.

11. Gutter removal to be paid as gutter removal (special).

12. Gutter depth shall match paved shoulder depth.

NOTES:

1. For concrete curb, type C transitions, the leading edge of curb in the direction of traffic shall begin flush with adjacent pavement or shoulder surface and transition to full height at the rate of one inch vertical to one foot horizontal.

2. Gutter transition details shall be shown on the plans.

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

4. Reinforcement steel shall be accurately placed and firmly held in the position specified using epoxy-coated steel chairs. Chair spacing shall not exceed 4'-0".

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10. Expansion joints shall be constructed in gutter at maximum joint spacing of 60'-0". See expansion joint detail on sheet 2 of this standard.

11. Gutter removal to be paid as gutter removal (special).

12. Gutter depth shall match paved shoulder depth.
GUTTER TRANSITION NOTES:

1. PROVIDE 1" EXPANSION JOINT WITH PREFORMED JOINT FILLER BETWEEN TRANSITION SECTION AND RAMP, BARRIER, OR PARAPET.

2. SEE STANDARD B3 FOR GUTTER TRANSITIONS AT BRIDGE APPROACH.

3. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).

4. REINFORCEMENT BARS SHALL BE ACCURATELY PLACED AND FIRMLY HELD AT THE POSITION USING EPOXY COATED CHAIRS. CHAIR SPACING SHALL NOT EXCEED 4'-0".

5. GUTTER REINFORCEMENT BARS SHALL BE PLACED 3" ABOVE BOTTOM OF GUTTER FOLLOWING SUBGRADE SLOPE.

6. CONTINUOUS #4 BARS SHALL BE LAPPED A MINIMUM OF 3'-0".

7. GUTTER DEPTH SHALL MATCH PAVED SHOULDER DEPTH.

GUTTER TRANSITION AT ENTRANCE RAMP TERMINALS

GUTTER TRANSITION AT EXIT RAMP TERMINALS

APPROACH.
GUTTER, TYPE G-3 TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6 TO CONSTANT-SLOPE CONCRETE PARAPET

GUTTER TRANSITION NOTES:
1. SLOPE TO MATCH ADJACENT SHOULDER SLOPE.
2. PROVIDE 1" EXPANSION JOINT WITH PREFORMED JOINT FILLER BETWEEN TRANSITION SECTION AND MINIWALL OR BARRIER WALL.

3. INSTALLATION ON CURVED MINIWALLS SIMILAR.
4. FOR DETAILS OF TRAFFIC BARRIER TERMINAL TYPE T6, SEE ILLINOIS TOLLWAY STANDARD C9.
5. GUTTER TRANSITIONS SHALL BE CONSTRUCTED TO FIT THE STANDARD LOCATION OF THE TRAFFIC BARRIER TERMINAL, TYPE T6.
6. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).

7. GUTTER SECTION SHOWN AT BARRIER WALL SHALL MATCH PROFILE AND VERTICAL FACE OF BARRIER, MODIFY GUTTER FACE TO MATCH OTHER BARRIER/PARAPET PROFILES.
8. CONTINUOUS #4 BARS SHALL BE LAPPED A MINIMUM OF 1'-1".
9. MATCH SHOULDER SLOPE IN FRONT OF PARAPET OR BARRIER.
10. GUTTER DEPTH SHALL MATCH PAVED SHOULDER DEPTH.

LEGEND
1. AGGREGATE SHOULDER
SPECIAL TYPE C

SHEET 1 OF 6
TYPE G-2/G-3 GUTTER TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6
STANDARD B3-09
NOTE 7: SEE NOTE 1 OF THIS SERIES FOR GUTTER, TYPE G-3 TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6, TO CONSTANT-SLOPE CONCRETE BARRIER, SINGLE FACE.

NOTE 10: SEE SHEET 1 OF THIS SERIES FOR GUTTER TRANSITION NOTES.
ELEVATION

GUTTER, TYPE G-3 TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6 TO F-SHAPE CONCRETE PARAPET

NOTE:
SEE SHEET 1 OF THIS SERIES FOR GUTTER TRANSITION NOTES.

ARCHITECT

DATE: 2-7-2012

ILLINOIS TOLLWAY

STANDARD B3-09
PLAN

GUTTER FLOW LINE

GUTTER, TYPE G-2

ELEVATION

FRONT EDGE BOTTOM OF GUTTER

F-SHAPE CONCRETE PARAPET

Paved Shoulder

6" Min. (See Note 10)

Continuous #4 Epoxy Coated Bars (Typ.)

aggregate shoulders special, type C

NOTE:
See Sheet 1 of this series for gutter transition notes.

LEGEND

15'-0" FROM PARAPET
8'-9" FROM PARAPET
6'-3"

SUBGRADE SLOPE

Elevation

GUTTER, TYPE G-2 TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6

TO F-SHAPE CONCRETE PARAPET
CONCRETE FLUME DETAILS

NOTES:
1. Concrete flumes shall be constructed flush with the adjacent existing or proposed surfaces.
2. Class SI concrete shall be used throughout.
3. Welded wire reinforcement shall be epoxy coated 6x6 wire woven, 0.75 lbs. per 100 sq. ft.
4. #4 epoxy coated tie bars 2'-6" long at 12" O/C shall be provided at all construction joints.
5. Epoxy coated expanded metal fabric of equivalent strength may be used in lieu of welded wire reinforcement subject to Engineer's approval.
6. The location of the anchor wall may be adjusted as directed by the Engineer.
7. The materials and construction of the concrete flume shall conform to the applicable portions of the Standard Specifications.

PLAN

SECTION A-A
ADJACENT TO GUTTER

SECTION B-B

COARSE AGGREGATE CA-6

NOTE: 0.62 C.Y. CONCRETE / L.F.
**HEADWALL TYPE III ALTERNATE PRECAST CONCRETE DETAILS**

**GENERAL NOTES:**
1. The number of segments shown in elevation is for example only. The length and number of segments required to construct the final section shall be determined by the engineer.
2. The concrete shall consist of high-performance concrete in accordance with AASHTO M 111, or equivalent. The concrete shall be reinforced in accordance with AASHTO M270, or equivalent.
3. The concrete shall be cast in place in accordance with the Cast-In-Place and Precast Concrete Details specifications.
4. MATERIALS: The concrete shall be high-performance concrete in accordance with AASHTO M 111, or equivalent. The concrete shall be reinforced in accordance with AASHTO M270, or equivalent.
5. The concrete shall be cast in place in accordance with the Cast-In-Place and Precast Concrete Details specifications.

**SLOPE RATIOS:**
For 1:3, 1:4, 1:6, and 1:8 slopes

**HEADWALL TYPE III ALTERNATE PRECAST CONCRETE DETAILS**

**EXHIBIT A: PRECAST SEGMENT DETAILS**
- **ELEVATION**
  - Restraint Angle with the Plate (Typ.)
  - TIE PLATE DETAIL
- **PLAN**
  - Overall Width (W)
  - Overall Height (H)
- **SECTION F-F**
  - Restraint Angle Detail
  - Tie Plate Detail
- **END VIEW**
  - Overall Width (W)
  - Overall Height (H)

**DETAILS:**
- **RESTRAINT ANGLE DETAIL**
  - Restraint Angle with Tie Plate (Typ.)
  - Tie Plate Detail
- **TIE PLATE DETAIL**
  - Tie Plate with Anchor Rods
  - Anchor Rods with Washers
- **PRECAST CONNECTION DETAIL**
  - Precast Segment Details
  - Restraint Angle with Tie Plate (Typ.)
  - Tie Plate Detail

**REFERENCES:**
- Sheet 1 in this series for reinforcing cover requirements.
- Sheet 2 in this series for reinforcing cover requirements.
- Sheet 3 in this series for reinforcing cover requirements.
- Sheet 4 in this series for reinforcing cover requirements.

**SUPPLEMENTARY NOTES:**
- *CONCRETE:* The concrete shall be high-performance concrete in accordance with AASHTO M 111, or equivalent. The concrete shall be reinforced in accordance with AASHTO M270, or equivalent.
- *MATERIALS:* The concrete shall be high-performance concrete in accordance with AASHTO M 111, or equivalent. The concrete shall be reinforced in accordance with AASHTO M270, or equivalent.
- *HANDLING AND INSTALLATION:* The concrete shall be cast in place in accordance with the Cast-In-Place and Precast Concrete Details specifications.

**NOTES:**
- The concrete shall be cast in place in accordance with the Cast-In-Place and Precast Concrete Details specifications.
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**DATE:**
5-1-2009

**CHIEF ENGINEERING OFFICER:**

**STANDARD:**
B6-07
1. FOR MATERIALS AND CONSTRUCTION REQUIREMENTS OF THE CATCH BASIN REFER TO THE STANDARD SPECIFICATIONS.

2. FRAME AND GRATE FOR CATCH BASIN TYPE B SHALL BE JORDAN IRON WORKS V5360-1 OR APPROVED EQUAL.

3. REINFORCEMENT BARS DESIGNATED (E) SHALL BE EPOXY COATED.

CATCH BASIN TYPE B

STORM SEWER PIPE AS SHOWN ON PLANS

CLASS SJ CONCRETE

STATION ELEVATION AND RIM ELEVATION

1/4 MORTAR GROUT AS REQUIRED (TYP.)

NOTES:

1. FOR MATERIALS AND CONSTRUCTION REQUIREMENTS OF THE CATCH BASIN REFER TO THE STANDARD SPECIFICATIONS.

2. FRAME AND GRATE FOR CATCH BASIN TYPE B SHALL BE JORDAN IRON WORKS V5360-1 OR APPROVED EQUAL.

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CATCH BASIN TYPE B

STORM SEWER PIPE AS SHOWN ON PLANS

CLASS SJ CONCRETE

STATION ELEVATION AND RIM ELEVATION

1/4 MORTAR GROUT AS REQUIRED (TYP.)

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CLASS SJ CONCRETE

STATION ELEVATION AND RIM ELEVATION

1/4 MORTAR GROUT AS REQUIRED (TYP.)

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STORM SEWER PIPE AS SHOWN ON PLANS

CLASS SJ CONCRETE

STATION ELEVATION AND RIM ELEVATION

1/4 MORTAR GROUT AS REQUIRED (TYP.)

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CATCH BASIN TYPE B

STORM SEWER PIPE AS SHOWN ON PLANS

CLASS SJ CONCRETE

STATION ELEVATION AND RIM ELEVATION

1/4 MORTAR GROUT AS REQUIRED (TYP.)

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CATCH BASIN TYPE B

STORM SEWER PIPE AS SHOWN ON PLANS

CLASS SJ CONCRETE

STATION ELEVATION AND RIM ELEVATION

1/4 MORTAR GROUT AS REQUIRED (TYP.)

NOTES:

1. FOR MATERIALS AND CONSTRUCTION REQUIREMENTS OF THE CATCH BASIN REFER TO THE STANDARD SPECIFICATIONS.

2. FRAME AND GRATE FOR CATCH BASIN TYPE B SHALL BE JORDAN IRON WORKS V5360-1 OR APPROVED EQUAL.

3. REINFORCEMENT BARS DESIGNATED (E) SHALL BE EPOXY COATED.
NOTES:
1. PRECAST CONCRETE UNITS WILL BE ACCEPTABLE PROVIDED THEY MEET ALL THE REQUIREMENTS AS SHOWN ON THIS DRAWING. NOTE INFORMATION ON SPECIFICATIONS, FABRICATION DRAWINGS SHOWING PIPE OPENINGS, REINFORCEMENT AND OTHER DEPARTMENT REQUIREMENTS WILL BE REQUESTED FOR EACH UNIT, FOR APPROVAL BY THE ENGINEER PRIOR TO FABRICATION.
2. CATCH BASIN, TYPE G-2 SHALL BE USED ALONG RAMPS WHERE GUTTER TYPE G-2 IS PROVIDED.
3. CATCH BASIN, TYPE G-3 MODIFIED SHALL BE PROVIDED WITH A REINFORCED CONCRETE SLAB TOP AS SHOWN ON PLAN.
4. CATCH BASIN, TYPE G-3 MODIFIED SHALL BE USED WHERE CATCH BASIN, TYPE G-3 IS PROVIDED.
5. CATCH BASIN, TYPE G-3 MODIFIED SHALL BE PROVIDED WITH A REINFORCED CONCRETE SLAB TOP AS SHOWN ON THIS DRAWING.
6. TYPE G-2 FRAME AND GRATE SHALL BE NEENAH R-3508-A2, EAST JORDAN IRON WORKS 7300 OR APPROVED EQUAL.
7. TYPE G-3 FRAME AND GRATE SHALL BE NEENAH INLET FOR ROLL TYPE CURB R-3501-U OR EAST JORDAN IRON WORKS 7546 OR APPROVED EQUAL.
8. TYPE G-3, MODIFIED FRAME AND GRATE SHALL BE NEENAH R-3508-A2, EAST JORDAN IRON WORKS 7545 OR APPROVED EQUAL.
9. TYPE G-3 MODIFIED, FRAMES AND GRATES FOR ROLL TYPE CURB R-3501-U OR EAST JORDAN IRON WORKS 7546 OR APPROVED EQUAL.
10. TYPE G-3 FRAME AND GRATE FOR ROLL TYPE CURB R-3508-B2 OR APPROVED EQUAL.
11. TYPE G-3 MODIFIED FRAME AND GRATE FOR ROLL TYPE CURB R-3501-U OR EAST JORDAN IRON WORKS 7546 OR APPROVED EQUAL.
12. E.O.P. = EDGE OF PAVEMENT.
13. ALL CONCRETE SHALL BE CRACK AND MORTAR GROUT AS SHOWN ON PLANS.
14. FRAME AND GRATE ARE SET IN PLACE.
15. LIFTING LOOP TO BE 3'-8" X 5'-0" TO BE USED AFTER PRECAST CONCRETE LID IS SET IN PLACE.
16. NOTE: FROM BACK OF GUTTER LINE.
17. FROM 3'-2" TO 5'-4" MEASURED POSITION OF OPENING VARIES.
18. MORTAR OR SEALER SHALL BE USED WHEN A PRECAST REINFORCED CONCRETE LID IS USED.
19. REINFORCEMENT BARS DESIGNATED (E) SHALL BE EPOXY COATED.
20. ALL CONCRETE SHALL BE CRACK AND MORTAR GROUT AS SHOWN ON PLANS.
NOTES:
1. See sheet 1 of this series for additional notes.
2. Catch basin type G-5 shall be used in tandem sections and on the low side of super-elevated pavement.
3. Catch basin type G-5 shall be provided with a reinforced concrete slab top as detailed on this drawing.
4. Catch basin type G-5 shall be used when gutter type G-3 is provided.
5. Mortar or sealer shall be used when a precast reinforced concrete lid is used.
6. Frame and grate rim elevation and offset measured at the edge of shoulder.
7. 60" man, outfall pipe for type G-5 catch basin.
8. All concrete shall be class SI concrete.
9. Distance from a outfall pipe to roadway to be verified by Engineer.
PLAN - DOUBLE SLOPED HEADWALL

SECTION A-A

SECTION B-B

SECTION C-C

NOTES:
1. THE DOUBLE SLOPED HEADWALL SHALL BE CONSTRUCTED FLUSH WITH EXISTING OR PROPOSED SURFACES.
2. ALL REINFORCEMENT BARS SHALL BE EPOXY COATED (E).
3. CLASS SI CONCRETE SHALL BE USED THROUGHOUT.
4. BAR BENDING DETAILS ARE DIMENSIONED OUT TO OUT OF BARS.
5. COVER FROM FACE OF CONCRETE TO FACE OF REINFORCEMENT BAR SHALL BE 3" FOR CONCRETE FORMED AGAINST EARTH AND 2" FOR ALL OTHER SURFACES UNLESS OTHERWISE SHOWN.
6. PRECAST UNIT USE IS OPTIONAL. THE COMPLETE STRUCTURE MAY BE CAST IN PLACE.
7. AFTER THE PRECAST SLOPED HEADWALL HAS BEEN PLACED, THE SPACE BETWEEN THE HEADWALL AND PIPE SHALL BE COMPLETELY FILLED WITH AN APPROVED NON-SHRINK GROUT WITH A MINIMUM COMPRESSIVE STRENGTH IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
8. THE DOUBLE SLOPED HEADWALL DETAILS SHOWN ON THIS DRAWING ARE FOR USE ONLY WITH PIPES HAVING DIAMETER OR SPAN OF 8" OR LESS.
9. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
10. THE DOUBLE SLOPED HEADWALL SHALL BE CONSTRUCTED FLUSH WITH EXISTING OR PROPOSED SURFACES.
11. WELDED WIRE REINFORCEMENT MAY BE USED AS AN OPTION TO REBAR.

STIRRUP HEIGHT TABLE FOR DOUBLE SLOPED HEADWALL TYPE III

<table>
<thead>
<tr>
<th>Slope</th>
<th>Stirrup Height, H</th>
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<tr>
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<td>1 TO 4 SLOPE AND C=1'-11&quot;</td>
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<tr>
<td>d1 E</td>
<td>17'-6&quot;</td>
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<tr>
<td>d2 E</td>
<td>14'-6 1/2&quot;</td>
</tr>
<tr>
<td>d3 E</td>
<td>11'-3 1/4&quot;</td>
</tr>
<tr>
<td>d4 E</td>
<td>8'-2 1/2&quot;</td>
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<tr>
<td>d5 E</td>
<td>5'-0&quot;</td>
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<tr>
<td>d6 E</td>
<td>-</td>
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<td>d7 E</td>
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<table>
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<td>4'-10&quot;</td>
</tr>
<tr>
<td>d9 E</td>
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### Type III Details

#### Sloped Headwalls

**Standard B10-11 Approved**

**Date:** 2-7-2012

**Chief Engineering Officer:**

**Page 3 of 3**

#### For Double Sloped Headwall Type III

<table>
<thead>
<tr>
<th>Slope</th>
<th>Dimensions</th>
<th>Concrete</th>
<th>Precast</th>
<th>Cu Yd</th>
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#### For Double Sloped Headwall Type II

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<td>(2) - 6&quot; PIPE</td>
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### Dimensions and Quantities for Double Sloped Headwall Type III

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<th>Pipe</th>
<th>A</th>
<th>B</th>
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<th>N</th>
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<th>H</th>
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<th>CONCRETE</th>
<th>Cu Yd</th>
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<td>11'-1 3/4&quot;</td>
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<td>(1) - 6&quot; PIPE</td>
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**Illinois Tollway**

**Sloped Headwalls Type III Details**

**Standard B10-11**
NOTES:

1. Outlet pipes and preformed channel inlets shall be sloped at 0.6% or steeper toward outlet regardless of the surface slope.

2. Trench drain may be stubbed directly into drainage structures or outlet pipes may be used to connect trench drain to drainage structures.

3. Trench excavation must allow for a minimum of 12 inches of concrete to be placed under and alongside the trench drain channel system.

4. The finished level of concrete must be approximately 1/8" above the top of the drain channel.

5. Trench drains shall be in accordance with the manufacturers details and specifications.

6. Provide 1" expansion joint with preformed joint filler between paved shoulder and trench drain encasement.

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

8. When the concrete encasement for trench drain is within 6" of the pavement, replace the gore surfacing with class si concrete 9" depth. Pay Item: Portland cement concrete shoulders (jointed) 9".

**Maximum rollover and ** maximum slope from edge of shoulder varies from the physical nose to the gore nose according to the following:

FOR EXIT RAMPS:

- **5% max rollover and**
- **9% max slope from edge of shoulder**

FOR ENTRANCE RAMPS:

- **7% max rollover and**
- **10% max slope from edge of shoulder**

SHEET 1 OF 2

TRENCH DRAIN INSTALLATION

SECTION A-A

TRENCH DRAIN INSTALLATION

PLAN

SECTION A-A

TRENCH DRAIN INSTALLATION
CONTRACTOR SHALL PROVIDE 2#3 ANCHOR BARS (TYP.) SEE DETAIL B SHOWING DIMENSIONS.

NOTE: ALL ANCHOR BARS MUST BE EMBEDDED A MINIMUM OF 1'-3". THE MIDSPAN AS SHOWN.


NOTE: V, P1 AND U BARS ARE TO BE FIELD CUT PER CUTTING DIAGRAM. PLACE ONE-HALF OF THE BARS IN OR NEAR EACH WINGWALL BARS WITH DIMENSIONS PER CUTTING DIAGRAM. PLACE ONE-HALF OF THE BARS IN OR NEAR EACH WINGWALL.


NOTE: V, P1 AND U BARS ARE TO BE FIELD CUT PER CUTTING DIAGRAM. PLACE ONE-HALF OF THE BARS IN OR NEAR EACH WINGWALL.

NOTE: CONCRETE A MINIMUM OF 1'-3". THE MIDSPAN AS SHOWN.


NOTE: V, P1 AND U BARS ARE TO BE FIELD CUT PER CUTTING DIAGRAM. PLACE ONE-HALF OF THE BARS IN OR NEAR EACH WINGWALL.

NOTE: CONCRETE A MINIMUM OF 1'-3". THE MIDSPAN AS SHOWN.


NOTE: V, P1 AND U BARS ARE TO BE FIELD CUT PER CUTTING DIAGRAM. PLACE ONE-HALF OF THE BARS IN OR NEAR EACH WINGWALL.

NOTE: CONCRETE A MINIMUM OF 1'-3". THE MIDSPAN AS SHOWN.


NOTE: V, P1 AND U BARS ARE TO BE FIELD CUT PER CUTTING DIAGRAM. PLACE ONE-HALF OF THE BARS IN OR NEAR EACH WINGWALL.

NOTE: CONCRETE A MINIMUM OF 1'-3". THE MIDSPAN AS SHOWN.


NOTE: V, P1 AND U BARS ARE TO BE FIELD CUT PER CUTTING DIAGRAM. PLACE ONE-HALF OF THE BARS IN OR NEAR EACH WINGWALL.

NOTE: CONCRETE A MINIMUM OF 1'-3". THE MIDSPAN AS SHOWN.


NOTE: V, P1 AND U BARS ARE TO BE FIELD CUT PER CUTTING DIAGRAM. PLACE ONE-HALF OF THE BARS IN OR NEAR EACH WINGWALL.

NOTE: CONCRETE A MINIMUM OF 1'-3". THE MIDSPAN AS SHOWN.


NOTE: V, P1 AND U BARS ARE TO BE FIELD CUT PER CUTTING DIAGRAM. PLACE ONE-HALF OF THE BARS IN OR NEAR EACH WINGWALL.

NOTE: CONCRETE A MINIMUM OF 1'-3". THE MIDSPAN AS SHOWN.

<table>
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<tr>
<th>Length (in)</th>
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<th>#6 @ 9&quot;</th>
<th>#8 @ 6&quot;</th>
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<tr>
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<tr>
<td>3'-8&quot;</td>
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<tr>
<td>4'-12&quot;</td>
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</tbody>
</table>

**NOTE:**

Reinforcement bars bending dimensions are cut to cut.
**ANNEX A**

**SHEET 1 OF 2**

**FOR PIPE AND PIPE-ARCH CULVERTS**

**SECTION F-F**

**NOTES**

1. All concrete shall be Class C75.
2. All concrete shall be in accordance with the requirements of the Standard Specifications for Highway Construction.
3. The concrete shall be provided by the contractor.

**SECTION A-A**

**NOTES**

1. All concrete shall be in accordance with the requirements of the Standard Specifications for Highway Construction.
2. The concrete shall be provided by the contractor.

**SECTION C-C**

**NOTES**

1. All concrete shall be in accordance with the requirements of the Standard Specifications for Highway Construction.
2. The concrete shall be provided by the contractor.

**SECTION E-E**

**NOTES**

1. All concrete shall be in accordance with the requirements of the Standard Specifications for Highway Construction.
2. The concrete shall be provided by the contractor.

**GENERAL NOTES**

1. All concrete shall be in accordance with the requirements of the Standard Specifications for Highway Construction.
2. The concrete shall be provided by the contractor.

**DATE**

10-01-2010

**REVISIONS**

Sheet 1 of 2

**SHEETS**

1

**APPENDIX**

**FOR BOX CULVERTS**

**SECTION D-D**

**NOTES**

1. All concrete shall be in accordance with the requirements of the Standard Specifications for Highway Construction.
2. The concrete shall be provided by the contractor.

**SECTION E-E**

**NOTES**

1. All concrete shall be in accordance with the requirements of the Standard Specifications for Highway Construction.
2. The concrete shall be provided by the contractor.

**DATE**

10-01-2010

**REVISIONS**

Sheet 1 of 2

**SHEETS**

1
### Table of Dimensions

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<thead>
<tr>
<th>No.</th>
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<th>Length (ft)</th>
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### Table of Reinforcement Bars for One End

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<th>Length (ft)</th>
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</table>

### Notes for Table of Dimensions:
1. The number of S, T, and Z bars shall be determined for each 1 foot of pipe or box added.
2. The number of D bars shall be determined for each 1 foot of pipe or box added.
3. The number of E bars shall be determined for each 1 foot of pipe or box added.
4. This condition shall be maintained for each 1 foot of pipe or box added.

### Field Cutting Diagram

- **S(E) Bars**
- **D(E) Bars**
- **H(E) Dowels**
- **V(E) BARS**
- **Z(E) BARS**

### Concrete Quantities for Min. "S" (Single Pipe or Concrete Box Culvert)

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<th>Length (ft)</th>
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<td>0.25</td>
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### Notes:
- Reinforcement bars placed in concrete shall be cut to size.
- The number of S, T, and Z bars shall be determined for each 1 foot of pipe or box added.
### Table of Reinforcing Steel for One End

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<th>90° Wall</th>
<th>Length</th>
<th>R. E.</th>
<th>No. of</th>
<th>8 x 4</th>
<th>7 x 3</th>
<th>4 x 4</th>
<th>18'-7&quot;</th>
<th>4'-11&quot;</th>
<th>12'-0&quot;</th>
<th>6'-0&quot;</th>
<th>6'-5&quot;</th>
<th>16'-9&quot;</th>
<th>10'-4&quot;</th>
<th>11'-8&quot;</th>
<th>9'-4&quot;</th>
<th>13'-9&quot;</th>
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### Table of Reinforcement Bars for One End

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<thead>
<tr>
<th>S. W.</th>
<th>0° Wall</th>
<th>90° Wall</th>
<th>Length</th>
<th>R. E.</th>
<th>No. of</th>
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<th>18'-7&quot;</th>
<th>4'-11&quot;</th>
<th>12'-0&quot;</th>
<th>6'-0&quot;</th>
<th>6'-5&quot;</th>
<th>16'-9&quot;</th>
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</tr>
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</table>

### Notes
- Reinforcement bars bending dimensions are cut to length.
- The header of the sectional data and the sectional continuity of concrete is to be detailed in the sectional drawing.

### Pipe Arch and Elliptical Pipe Culverts

Pipe arch and elliptical pipe culverts shall be approved by the Illinois Tollway. The following sectional drawings show one arch and one elliptical pipe culvert. The member without the pipe arch is shown. The design of the sectional data and the sectional continuity of concrete is to be detailed in the sectional drawing.
### Table of Reinforcement Bars for One End

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### Table of Pipe Runner Layout

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<td>9'-8&quot;</td>
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<td>9'-3&quot;</td>
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</tr>
</tbody>
</table>

### Notes for Tables:
- The number of U(E) bars and Z(E) bars shall be incremented by 1 for each foot of increase in dimension "H".
- The number of DEM bars shall be incremented by 1 for each foot of increase in dimension "H".
- The number of pipe runners for each pipe shall be incremented by 1 for each foot of increase in dimension "H".

**Standard:** B16-05
ANCHOR BARS (E) PER SIDEWALL BOLT UNLESS OTHERWISE SHOWN.
OF CONCRETE TO THE FACE OF REINFORCEMENT BARS SHALL BE 2".
CHAMFER ON VERTICAL EDGES SHALL BE CONTINUED A MINIMUM OF
ALL EXPOSED CONCRETE EDGES SHALL HAVE A ¼" X 45° CHAMFER.

NOTE:
PIECE BARS ARE TO BE PLACED IN THE PIPE ARCH FOR EROSION PROTECTION AND NOTES.
NOTE:
ADJUSTED CONCRETE CEMENT SHALL BE A 4:1:1 CEMENT MORTAR.
HOLE DO NOT USE RICH CONCRETE CEMENT MATERIALS OF VARIOUS EXCUSES, SIZES AND TYPES.

NOTE:
ALL CONCRETE SLABS OR CONCRETE CEMENT TO THE TOTAL LENGTH OF THE PIPE ARCH DRILLED THROUGH THE PIPING O.D. X 4 + 1".

NOTE:
CONCRETE CYLINDERS SHOWN ON SHEET 1 OF 2 IN PIPES ARE FOR USE IN CONCRETE CEMENT MATERIALS OR aluminum CEMENT MATERIALS AS ShOWN.

NOTE:
CONCRETE CYLINDERS SHOWN ON SHEET 1 OF 2 IN PIPES ARE FOR USE IN CONCRETE CEMENT MATERIALS OR aluminum CEMENT MATERIALS AS ShOWN.

NOTE:
CONCRETE CYLINDERS SHOWN ON SHEET 1 OF 2 IN PIPES ARE FOR USE IN CONCRETE CEMENT MATERIALS OR aluminum CEMENT MATERIALS AS ShOWN.

NOTE:
TREATMENT OF PORCH FACES OF CONCRETE CEMENT MATERIALS, TYPICAL PEAK VERTICAL FORESTING ON THE MEASURED AS SHOWN.

NOTE:
ADJUSTED CONCRETE CEMENT SHALL BE A 4:1:1 CEMENT MORTAR.
HOLE DO NOT USE RICH CONCRETE CEMENT MATERIALS OF VARIOUS EXCUSES, SIZES AND TYPES.

NOTE:
All CONCRETE CYLINDERS SHOWN ON SHEET 1 OF 2 IN PIPES ARE FOR USE IN CONCRETE CEMENT MATERIALS OR aluminum CEMENT MATERIALS AS ShOWN.

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NOTE:
All CONCRETE CYLINDERS SHOWN ON SHEET 1 OF 2 IN PIPES ARE FOR USE IN CONCRETE CEMENT MATERIALS OR aluminum CEMENT MATERIALS AS ShOWN.
### TABLE OF DIMENSIONS

<table>
<thead>
<tr>
<th>Dim</th>
<th>Dia.</th>
<th>Loc.</th>
<th>Ext.</th>
<th>Thr.</th>
<th>Thr.</th>
<th>Size</th>
<th>Thr.</th>
<th>Thr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
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<td>6&quot;</td>
<td>6&quot;</td>
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</tr>
</tbody>
</table>

### PIPE RUNNER LAYOUT

**NOTE**
- All dimensions are given in feet.
- The thicknesses are given in inches.
- The reinforcement bars are given in square inches per foot.

### TABLE OF REINFORCEMENT BARS FOR ONE END

#### 1ST WALL

<table>
<thead>
<tr>
<th>Dia.</th>
<th>Thr.</th>
<th>Size</th>
<th>Thr.</th>
<th>Thr.</th>
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</thead>
<tbody>
<tr>
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#### 2ND WALL

<table>
<thead>
<tr>
<th>Dia.</th>
<th>Thr.</th>
<th>Size</th>
<th>Thr.</th>
<th>Thr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
</tr>
</tbody>
</table>

### PIPE ARCH AND ELLIPTICAL PIPE CULVERTS

**NOTE**
- The dimensions shown are for single culverts.
- The pipe sizes are given in inches.
- The thicknesses are given in inches.
- The reinforcement bars are given in square inches per foot.

---

*Approval: [Date]*

*Sheet 2 of 2*

*Illinois Tollway*

*30° SKEW 1/4 SLOPE H < 4°*

*STANDARD B41-04*
TABLE OF DIMENSIONS

<table>
<thead>
<tr>
<th>No.</th>
<th>LENGTH</th>
<th>2'-7&quot;</th>
<th>6'-10&quot;</th>
<th>2'-9&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3'-5&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2'-0&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3'-2&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2'-8&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE OF REINFORCEMENT BARS FOR ONE END

<table>
<thead>
<tr>
<th>No.</th>
<th>LENGTH</th>
<th>2'-7&quot;</th>
<th>6'-10&quot;</th>
<th>2'-9&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3'-5&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2'-0&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3'-2&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2'-8&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTES:
- The number of #4 bars shall be increased by 1 for each foot of increase in dimension "W".
- The number of #5 bars shall be increased by 1 for each foot of increase in dimension "W".
- The length of pipe and the bars shall be increased by 1 for each foot of increase in dimension "W".
- The number of pipe bars shown in the tables above applies to single pipes, and the number shall be multiplied by 2 for each multiple of 1 pipe of 4 pipe.
- This dimension shall be increased by 10% for 1 in 10 increase in dimension "W".
- 2 bars for 15° wall, 2 bars for 45° wall.
- The length of pipe shall include one end thickness.
NOTES:

1. THE PREFERRED METHOD FOR ACHIEVING EROSION PROTECTION AT END SECTIONS SHALL BE THROUGH THE USE OF PRODUCTS THAT PROMOTE REVEGETATION WITHIN THE AREA OF CONCERN.

2. THICKNESS "t" WILL BE DETERMINED BY THE MANUFACTURER'S RECOMMENDATION FOR THE PRODUCT USED.

3. EROSION PROTECTION PLACEMENT SHALL BE INSTALLED FLUSH WITH ADJACENT GRADE.

4. FOR USE WITH STANDARDS B10 TO B18.

5. STONE RIPRAP SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND DRAINAGE DESIGN MANUAL.

SECTION A-A

PLAN-0° SKEW, H = 4'

PLAN-0° SKEW, H = 8'

SECTION AT HEADWALL

SECTION B-B

PLAN-SKEW, H = 4'

PLAN-SKEW, H = 8'
### Typical Grate (No Skew)

**Plan View (No Skew)**

- Single Box Culvert § 84" Wide

**Section A-A**

End Treatment - Multiple or Single Cell Box Culvert

### Typical Grate (With Skew)

**Plan View (With Skew)**

- Single Box Culvert § 84" Wide

**Typical Grate**

**Grating Dimensions and Quantities**

- In One Headwall Type IV Based on a 1 Foot Width, 4:1 Slope, and No Skew

<table>
<thead>
<tr>
<th>Grating Width</th>
<th>Number of Bars</th>
<th>Bar for Each Grate</th>
<th>Length</th>
<th>Required Metal</th>
<th>Length</th>
<th>Each Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>36&quot;</td>
<td>5</td>
<td>2</td>
<td>16.6W - 19.3</td>
<td>2'-0&quot; Type B Grate (Nominal)</td>
<td>1&quot;</td>
<td></td>
</tr>
<tr>
<td>42&quot;</td>
<td>5</td>
<td>2</td>
<td>16.6W - 19.3</td>
<td>2'-0&quot; Type B Grate (Nominal)</td>
<td>1&quot;</td>
<td></td>
</tr>
<tr>
<td>48&quot;</td>
<td>6</td>
<td>2</td>
<td>16.6W - 19.3</td>
<td>2'-0&quot; Type B Grate (Nominal)</td>
<td>1&quot;</td>
<td></td>
</tr>
<tr>
<td>54&quot;</td>
<td>6</td>
<td>2</td>
<td>16.6W - 19.3</td>
<td>2'-0&quot; Type B Grate (Nominal)</td>
<td>1&quot;</td>
<td></td>
</tr>
<tr>
<td>60&quot;</td>
<td>6</td>
<td>2</td>
<td>16.6W - 19.3</td>
<td>2'-0&quot; Type B Grate (Nominal)</td>
<td>1&quot;</td>
<td></td>
</tr>
</tbody>
</table>

### General Notes:

1. All dimensions and quantities are for single box culvert applications. To adapt any of these tables for double box culverts, double the number of grate lengths and add an additional wall. Wall thickness shall be same as the center wall thickness of the box culvert.
2. For quantity calculations, dimensions "L" shall be measured in feet.
3. Quantities for ribbed headwalls not shown.
4. For items identified by an asterisk (*), quantities are estimated by an assumption ± 10%.
5. All lengths are expressed as units of vertical displacement to units of horizontal displacement type.

**Dimensions 'S' for Slope 1:2**

For Various Culvert Sizes and Skews

<table>
<thead>
<tr>
<th>Grating Width</th>
<th>S Made Width</th>
<th>15°</th>
<th>30°</th>
<th>45°</th>
<th>60°</th>
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<td>15</td>
<td>15</td>
<td>15</td>
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<tr>
<td>42&quot;</td>
<td>16.6W</td>
<td>15</td>
<td>15</td>
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<td>15</td>
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<tr>
<td>48&quot;</td>
<td>16.6W</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
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<tr>
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<td>15</td>
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<td>15</td>
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<tr>
<td>60&quot;</td>
<td>16.6W</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

**Notes:**

- All changes are made on a copy of the original and submitted to the appropriate authority.
- Invert elevation moved.
- Plan view.
- Section B-B.
NOTE:
GENERAL NOTES:
1. ALL WALL DIMENSIONS AND QUANTITIES ARE FOR SINGLE CULVERTS MEASURED TO CENTER OF THE WALL. (WALL THICKNESS SHALL BE SAME AS THE CENTER WALL THICKNESS OF THE CULVERT.)
2. PAY ITEMS ARE IDENTIFIED BY AN ASTERISK (*).
3. QUANTITIES FOR SKEWED HEADWALLS NOT SHOWN.
4. DISTANCES ARE MEASURED FROM CENTERLINE OF PIPE-ARCH CULVERTS.
5. ALL SLOPES AND OFFSETS ARE SHOWN IN UNITS OF VERTICAL DISTANCE IN ENDS OF HORIZONTAL DISTANCE.

DIMENSIONS "S" FOR SLOPE 1:4 FOR VARIOUS CULVERT SIZES AND SKEWS

<table>
<thead>
<tr>
<th>H</th>
<th>MIN.</th>
<th>MAX.</th>
<th>2'-0&quot;</th>
<th>2'-6&quot;</th>
<th>3'-2&quot;</th>
<th>3'-8&quot;</th>
<th>4'-3&quot;</th>
<th>4'-9&quot;</th>
<th>5'-3&quot;</th>
<th>5'-10&quot;</th>
<th>6'-4&quot;</th>
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<tbody>
<tr>
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<tr>
<td>4°</td>
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<tr>
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</tbody>
</table>

GENERAL NOTES:
1. ALL WALL DIMENSIONS AND QUANTITIES ARE FOR SINGLE CULVERTS MEASURED TO CENTER OF THE WALL. (WALL THICKNESS SHALL BE SAME AS THE CENTER WALL THICKNESS OF THE CULVERT.)
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DIMENSIONS "S" FOR SLOPE 1:4 FOR VARIOUS CULVERT SIZES AND SKEWS

<table>
<thead>
<tr>
<th>H</th>
<th>MIN.</th>
<th>MAX.</th>
<th>2'-0&quot;</th>
<th>2'-6&quot;</th>
<th>3'-2&quot;</th>
<th>3'-8&quot;</th>
<th>4'-3&quot;</th>
<th>4'-9&quot;</th>
<th>5'-3&quot;</th>
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</tr>
</tbody>
</table>
NOTES:

1. ALL FRAMES AND GRATES SHALL CONFORM TO THE REQUIREMENTS OF ART. 1006.14 FOR GRAY IRON CASTINGS AND TO ART. 1006.15 FOR DUCTILE IRON CASTINGS.

2. FRAME AND GRATE TO BE NEENAH FOUNDRY COMPANY, NEENAH NO. R-3528-V, EAST JORDAN IRON WORKS TS35 OR APPROVED EQUAL.

3. GRATE SHALL NOT BE BOLTED TO FRAME.
CAST FRAME

- 22\(\frac{3}{4}\)" X \(\frac{3}{8}\)" X 1" SAFETY BAR
- 22\(\frac{3}{4}\)" X \(\frac{3}{8}\)" CORED SLOTS FOR GRATE ALIGNMENT (2 REQ'D PER FRAME)

FRAMES BOLTED TOGETHER w/
(3) \(\frac{3}{8}\)" X 3 GALV. HEX. HD.
BOLT AND NUT w/ GALV. WASHERS

(3) BOLT HOLES \(\frac{3}{8}\)" DIA.

ALIGNMENT (2 REQ'D PER FRAME)

SECTION A-A

TOP VIEW
NOTES:
1. ALL FRAMES AND GRATES SHALL CONFORM TO THE REQUIREMENTS OF ART. 1006.14 FOR GRAY IRON CASTINGS AND TO ART. 1006.15 FOR DUCTILE IRON CASTINGS.

2. FRAME AND GRATE TO BE NEENAH FOUNDRY COMPANY, NEENAH NO. R-3529-V, EAST JORDAN IRON WORKS 7536 OR APPROVED EQUAL.

3. GRATE SHALL NOT BE BOLTED TO FRAME.
GENERAL NOTES:

1. GUTTER TRANSITIONS SHALL BE PAID FOR PER FOOT AS GUTTER, TYPE G-2 OR GUTTER, TYPE G-3, AS SPECIFIED IN THE PLANS.

2. REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING C1 FOR ADDITIONAL GUARDRAIL INFORMATION.

3. REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING C6 FOR SHOULDER WIDENING INFORMATION.
NOTE: SEE SHEET 1 OF THIS SERIES FOR ADDITIONAL DETAIL.

GUTTER, TYPE G-3, MODIFIED TRANSITION TERMINATION AT TRAFFIC BARRIER TERMINAL, TYPE T1 (SPECIAL)
SECTION A-A

GUTTER, TYPE G-2 TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T1-A (SPECIAL)

GENERAL NOTES:

1. GUTTER TRANSITIONS SHALL BE PAID FOR PER FOOT AS GUTTER, TYPE G-2 OR AS SPECIFIED IN THE PLANS.

2. REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING C1 FOR ADDITIONAL GUARDRAIL INFORMATION.

3. REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING C12 FOR SHOULDER WIDENING INFORMATION.
DEFINED CLEAR ZONE LOCATIONS

PLAN VIEW: NOT TO SCALE

DEFINED CLEAR ZONE LOCATIONS

PLAN VIEW: NOT TO SCALE

CLEAR ZONE

SHIELDED LOCATIONS

PLAN VIEW: NOT TO SCALE

NOTES:
1. INSTALL STONE CHECK DAMS AT 50' SPACING ALONG FURROW. STONE CHECK DAMS TO CONSIST OF CA-7 STONE.
2. FURROW TO BE SLICED/TILLED ALONG LEVEL CONTOUR DESIGNING.
3. FURROWS SHALL NOT BE INSTALLED IN UNSHIELDED, UNDEFINED CLEAR ZONE LOCATIONS.
**DIAMETER**

- 8' (2.4 m) & 9' (2.7 m)

**FLAT SLAB TOP & BOTTOM**

- BAR C
  - NO. 4 (NO. 13)
  - LENGTH
    - 8'-6" (2.59 m)
  - RADIUS
    - 4'-2" (1.27 m)
  - 4'-8" (1.42 m)

**SECTION A-A**

- MIN. 9'-6" (2.90 m)
- SEALER (TYP.)
  - USE MORTAR OR BAR C
- I.D.
  - 8' (2.4 m)
  - (255)
  - 10
- SECTION B-B

- MIN. 10'-8" (3.25 m)
- SEALER (TYP.)
  - USE MORTAR OR BAR C
- I.D.
  - 9' (2.7 m)
  - (275)
  - 11

**8' MANHOLE PLAN**

- SHOWING REBAR REQUIREMENTS
- NO. 8 (NO. 25) UNLESS OTHERWISE SHOWN
- NO. 8 (NO. 25) BARS 8'-6" (2.59 m) LONG
- TOP & BOTTOM
- DIRECTION (300) CENTERS EACH NO. 4 (NO. 13) AT 12" (300) CENTERS EACH DIRECTION

**9' MANHOLE PLAN**

- SHOWING REBAR REQUIREMENTS
- NO. 8 (NO. 25) UNLESS OTHERWISE SHOWN
- NO. 8 (NO. 25) BARS 9'-6" (2.90 m) LONG
- TOP & BOTTOM
- DIRECTION (300) CENTERS EACH NO. 4 (NO. 13) AT 12" (300) CENTERS EACH DIRECTION

**Typical Location for Lifting Device**

- BOTTOM MAT OF REBAR SHOWN TOP MAT
  - NO. 4 (NO. 13) AT 12" (300) CENTERS EACH DIRECTION