MINNESOTA DEPARTMENT OF TRANSPORTATION

Bridge Office

Bridge Details Manual Part I

MnDOT BRIDGE OFFICE

Bridge Details Manual Part I

B-Details

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Last Date Revised: August 24, 2016

B101
Bridge Nameplate (For New Bridges)

Approved, and signed, November 22, 2002. Last date revised: September 11, 2014

Revised 09-11-2014
At Section A-A: Changed the note pointing to the Nameplate *From:* Set nameplate flush with surface of concrete except at round columns for piers. *To:* Set nameplate flush with surface of concrete.

Removed from the B-Detail: The "Nameplate Placement" and "Section B-B" details. Also removed the "Mn/DOT" reference within the notes.

Approved, and signed, November 22, 2002

B102
Bridge Nameplate (For Bridge Reconstruction)

Approved, and signed, November 22, 2002. Last date revised: September 11, 2014

Revised 09-11-2014

At Section A-A: Changed the note pointing to the Nameplate *From:* Set nameplate flush with surface of concrete except at round columns for piers. *To:* Set nameplate flush with surface of concrete.

Removed from the B-Detail: The "Nameplate Placement" and "Section B-B" details. Also removed the "Mn/DOT" reference within the notes.

Approved, and signed, November 22, 2002

B201
Pile Splice (Cast-In-Place Concrete Piles)

Approved, and signed, November 22, 2002. Last date revised: November 06, 2013

Revised 11-06-2013

At PLAN VIEW SPLICE:

- Changed the name of the detail *from* PLAN VIEW SPLICE *to* PLAN VIEW-SPLICE BACK-UP RING.
- Changed the rod diameter *from* 1/8" DIA. ROD *to* 1/4" DIA. ROD.

Added DETAIL "A" showing the weld configuration.

Under NOTES:

- Changed the first note to read: Approved commercial pile splice back-up ring may be used in lieu of the type detailed, provided that ¼" root is maintained. Back-up ring shall have a tight fit.
- Changed numbered note ①: Changed the ½" dimension *to* ¼" and added See Detail "A".

Approved, and signed, November 22, 2002.

B202
Pile Splice (Steel H Bearing Piles 10” To 14”)

Approved, and signed, November 22, 2002, Last date revised: November 06, 2013

Revised 11-06-2013
Changed the name of the detail: *from* SECTION AT JOINT *to* SECTION AT SPLICE.

At detail 100% BUTT WELDED PILE SPLICE:

- Changed the dimension *from* 1/8” *to* 1/4” at the weld, and added weld symbol.

Approved, and signed, November 22, 2002

B303
Sole Plate (Prestressed Concrete Beams) (For Bearings With Pintles)

Approved, and signed, September 22, 2011.

Re-Approved 09-22-2011
Updated the detail to include MW shape prestressed beams.

Removed from the B detail: Front Elevation-Option 1, and the accompanying Section A-A and Section B-B.

At Front Elevation – Option 2:

- Changed the detail name *from* "Front Elevation – Option 2" *to* "Front Elevation".
- Changed the section arrows *from* "C-C" *to* "A-A".
- Changed the dimension line label at the Shear Stud spacing and the Sole Plate width locations *from* "27M – 81M and 14RB – 22RB Beams" *to* "M and RB Shape Beams".
- Changed the dimension line label at the Shear Stud spacing and the Sole Plate width locations *from* "MN45 – MN63 Beams" *to* "MN Shape Beams"
- Added a dimension line with two dimensions (13 3/8") and (6") and numbered note ② to the Shear Stud spacing dimensions. Labeled the line: "MW Shape Beams".
- Added a dimension line (3'-2 ¾") for the Sole Plate width. Labeled the line: "MW Shape Beams".
- Added ¾" dimension to the Sole Plate to show the thickness.

At Section C-C: Changed the detail name *from* "Section C-C" *to* "Section A-A"

- Changed the dimension line label at the Pintle Hole spacing locations *from* "27M – 81M and 14RB – 22RB Beams" *to* "M and RB Shape Beams".
- Changed the dimension line label at the Pintle Hole spacing locations *from* "MN45 – MN63 Beams" *to* "MN Shape Beams".
- Added a dimension line with two dimensions (11 3/8") and (8") for the Pintle Holes. Labeled the line: "MW Shape Beams".
- Added a label to the existing Sole Plate length dimensions (1'-3") and (7 ½") The label reads: "M, MN and RB Shape Beams".
- Added two dimension lines (1'-5") and (8 1/2") to the Sole Plate length labeled the line: "MW Shape Beams". Also added a designer note to the dimensions. Designer note reads: "Adjust this dimension for large movement bearings and consider the effects on the bearings and the portion of the beam that cantilevers beyond the bearing".

Under Notes: Removed the slash from the Mn/DOT designation to read MnDOT throughout the sheet.

Revised 03-30-2010
AT General Notes:

- Changed numbered note ③ From: The requirements for welding studs shall comply with AASHTO/AWS D1.5. *to* The requirements for welding studs shall comply with AASHTO/AWS D1.1.

Revised 10-28-2008
At FRONT ELEVATION – OPTION 2: changed 7/8" DIA. x 5" LONG UNHEADED SHEAR STUD (6 TYP.) *to* 7/8" DIA. x 4" TO 5" LONG UNHEADED SHEAR STUD (6 TYP.)

At SECTION C-C: changed 7/8" DIA. x 5" LONG UNHEADED SHEAR STUD (6 TYP.) *to* 7/8" DIA. x 4" TO 5" LONG UNHEADED SHEAR STUD (6 TYP.)

Revised 06-14-2006
At FRONT ELEVATION – OPTION 1, FRONT ELEVATION – OPTION2, SECTION A-A, and SECTION C-C:

- changed 27M – 72M BEAMS *to* 27M – 81 M AND 14RB – 22RB BEAMS

- changed MN 45 & MN54 BEAMS *to* MN45 – MN63 BEAMS

Under NOTES: changed PAYMENT FOR SOLE PLATES TO BE INCLUDED IN PRICE BID FOR PRESTRESSED CONCRETE BEAMS. *to* SOLE PLATES ARE INCIDENTAL TO PRESTRESSED CONCRETE BEAMS.

Re-Approved 10-26-2005
At FRONT ELEVATION – OPTION 1, FRONT ELEVATION – OPTION2, SECTION A-A, and SECTION C-C: added MN45" and MN54" PCB dimensions.

Revised 03-04-2004
At FRONT ELEVATION – OPTION 2: changed 7/8" DIA. x 4" LONG SHEAR STUD (6 TYP.) *to* 7/8" DIA. x 5" LONG UNHEADED SHEAR STUD (6 TYP.)

At SECTION C-C: changed 7/8" DIA. x 4" LONG SHEAR STUD (6 TYP.) *to* 7/8" DIA. x 5" LONG UNHEADED SHEAR STUD (6 TYP.)

Revised 06-11-2003
At FRONT ELEVATION – OPTION 2: Changed 7/8" DIA. x 5" LONG SHEAR STUD (TYP. 6) *to* 7/8" DIA. x 4" LONG SHEAR STUD (6 TYP.)

At SECTION C-C: changed 7/8" DIA. x 5" LONG SHEAR STUD (TYP. 6) *to* 7/8" DIA. x 4" LONG SHEAR STUD (6 TYP.)

Revised 06-09-2003
At FRONT ELEVATION – OPTION 2:
- Changed 7/8" DIA. x 5" LONG HEADED SHEAR STUD (TYP. 6) *to* 7/8" DIA. x 5" LONG SHEAR STUD (TYP. 6)
- Added note ③ to weld symbol

At SECTION C-C: changed 7/8" DIA. x 5" LONG HEADED SHEAR STUD (TYP. 6) *to* 7/8" DIA. x 5" LONG SHEAR STUD (TYP. 6)

Under NOTES: added note ③ THE REQUIREMENTS FOR WELDING STUDS SHALL COMPLY WITH AASHTO/AWS D1.5.

Revised 04-29-2003
Added Option 2 allowing six shear studs in place of the two square bars.

Under NOTES: added WELDED STUDS TO BE WELDABLE CARBON STEEL PER Mn/DOT SPEC. 3391.2D.

Approved, and signed, November 22, 2002.

B304
Elastomeric Fixed Bearing Assembly (PCB) (For Replacement Of Inplace Bearings Only)

Approved, and signed, November 22, 2002

B305
Elastomeric Bearing Pad (Prestressed Concrete Beams)

Approved, and signed, November 22, 2002. Last date revised: January 13, 2015

Revised 01-13-2015
Under NOTES –

- Added: Payment for elastomeric bearing pad included in item "Elastomeric Bearing Pad" per each.

Removed from the Designer Note:

- Payment for elastomeric bearing pad, type 1, included in item "Elastomeric Bearing Pad" per each."

Revised 05-24-2012
Under NOTES –

- Removed the "Mn/DOT" from the Mn/DOT Spec. 3741 at the end of the first note.
- Moved from the notes "PAYMENT FOR ELASTOMERIC BEARING PAD, TYPE 1, INCLUDED IN ITEM "ELASTOMERIC BEARING PAD" PER EACH." And added it to the designer note.

Revised 12-17-2008
Under NOTES – Added numbered note "① "D" Indicates the thickness of the bearing pad."

At the TABLE:

- Added numbered note ① to the D column under the Bearing Pad Size.
- Removed the note "See Designer Note" to the right of the table.

At PLAN – Removed the dashed line representing the steel plates and related note.

At the DESIGNER NOTE BOX – Eliminated the box and changed the designer note look to a standard bubbled designer note.

Approved, and signed, November 22, 2002

B308
Elastomeric Bearing Assembly (22” And 30” Concrete Double Tee Beams) (Fixed and Expansion)

Approved, and signed, November 22, 2002. Archived October 22, 2009

10-22-2009 - **ARCHIVED**
B308 was removed from the server and Web site and was placed in an archive file.

B309
Tapered Bearing Plate Assembly (for Integral Abutments or Piers with Continuity Diaphragms)

Approved, and signed, February 27, 2013. Last date revised: November 3rd, 2015

Revised 11-03-2015

At BEARING PLATE DETAIL:

- Changed from welded "keeper" studs" to a welded "keeper" bar.
- Added the 3/16" fillet weld symbol to the welded bar on the lower right side of the detail.
- Changed the "Welded Stud (Typ.) ④" *to* "Welded Bar (Typ.) ④"
- Removed the ½" recess dimension from the top left of the bearing plate.

Under NOTES:

- Changed all notes to "Active Voice" if needed.
- Changed the 4th note to read: Galvanize structural steel bearing assembly after fabrication per spec. 3394.
- Changed numbered note ④ to read: 3/8" x 3/8" bar installed on bearing plate around perimeter of bearing pad. Bar length is 2" less than adjacent pad dimension, centered on pad. Centerline of bar to edge of pad dimension = 1/2".

Approved, and signed, February 27, 2013

NEW DETAIL

B310
Curved Plate Bearing Assembly (Prestressed Concrete Beams) (Fixed)

Approved, and signed, September 22, 2011. Last date revised: November 3rd, 2015

Revised 11-03-2015
At SECTION Y-Y:
- Changed from welded "keeper" studs" to a welded "keeper" bar.
- Added the 3/16" fillet weld symbol to the welded bar on the lower left side of the detail.
- Changed the "Welded Stud (Typ.) ③" *to* "Welded Bar (Typ.) ③"

At SECTION X-X:
- Changed the shape of the beam *from* an M *to* a MN shape. Also made the change at the "Side Elevation".
- Changed the note pointing to the beam to read: MN shape (other shapes similar).
- Removed the note "2'-2" Bottom Flange Shown" from below the Section X-X title.

Under NOTES:
- Changed all notes to "Active Voice" if needed.
- At the 3rd note, changed the spec to 3385, TYPE A.
- Changed numbered note ③ to read: 3/8" x 3/8" bar installed on bearing plate around perimeter of bearing pad. Bar length is 2" less than adjacent pad dimension, centered on pad. Centerline of bar to edge of pad dimension = 1/2".

ADDED:
- "RB" (to represent the Rectangular Beam) to the Beam Size column in the TABLE.
- Added "RB" to accompany the M, & MN shapes within the Designer Note.

Revised 11-06-2013
Under NOTES:
- In the 3rd note, Changed the galvanize spec. number from 3394 to 3392.
- Removed the "MnDOT" from the MnDOT Spec. references throughout the detail.

Re-Approved 09-22-2011
Updated the detail to include MW shape prestressed beams.

At PLAN: placed an asterisk (*) in the open dimension locations on each side of the "H" dimension for the bearing width. Also added: "* EQUAL DISTANCE" outside the bearing dimensions.

At TABLE: under the Beam Size column, added "M & MN" to the first row of dimensions.
- Added another row of dimensions for the MW shape to the table.

Under NOTES: Removed the slash from the Mn/DOT designation to read MnDOT throughout the sheet.

Changed the Designer Note to read: "Minimum size of bearing pad, 12" x 24" x ½", is shown for M & MN shapes 16" x 36" x ½", is shown for MW shapes"

Revised 10-28-2008
At SECTION Y-Y: changed THE PINTLE-TO-CURVED PLATE WELD DETAILS TO MATCH THE WELD SYMBOL.

Revised 08-10-2006
Under NOTES: Revised ① *from* THE MIN. RADIUS OF THE CURVED PLATE IS SHOWN. THE MAX. RADIUS IS 30". FINISH TO … *to* THE MIN. RADIUS SHALL BE 16" UNLESS OTHERWISE SPECIFIED IN THE TABLE. THE MAX. RADIUS SHALL BE 24". FINISH TO …

Re-Approved 10-26-2005
At PLAN: replaced 4" dimension with an "enter data field" on both sides of H dimension

At SECTION X-X: Added subtitle: 2'-2" BOTTOM FLANGE SHOWN

At TABLE: replaced 34" dimension with an "enter data field" for E dimension

Revised 12-01-2004
In the TABLE:
- Added +/- column under ANCHOR ROD OFFSET

Revised 04-20-2004
In the TABLE:
- Added CURVED PLATE column
- Changed dimension F *from* $1\,^{3}/_{8}$" *to* $1^{1}/_{2}$"
- Changed dimension J *from* $1\,^{3}/_{8}$" *to* $1^{1}/_{4}$"

Under NOTES: Revised ① *from* THE RADIUS OF THE CURVED PLATE SHALL BE 1'-4" MINIMUM AND 2'-0" MAXIMUM. FINISH TO 250 … *to* THE MIN. RADIUS OF THE CURVED PLATE IS SHOWN. THE MAX. RADIUS IS 30". FINISH TO 250 …

Approved, and signed, November 22, 2002.

B311
Curved Plate Bearing Assembly (Prestressed Concrete Beams) (Expansion)

Approved, and signed, September 22, 2011. Last date revised: November 3rd, 2015

Revised 11-03-2015
At SECTION Y-Y:
- Changed from welded "keeper" studs" to a welded "keeper" bar.
- Added the 3/16" fillet weld symbol to the welded bar on the lower left side of the detail.
- Changed the "Welded Stud (Typ.) ④" *to* "Welded Bar (Typ.) ④"

At SECTION X-X:
- Changed the shape of the beam *from* an M *to* a MN shape. Also made the change at the "Side Elevation".
- Changed the note pointing to the beam to read: MN shape (other shapes similar).

Under NOTES:
- Changed all notes to "Active Voice" if needed.
- Changed numbered note ③ to read: 3/8" x 3/8" bar installed on bearing plate around perimeter of bearing pad. Bar length is 2" less than adjacent pad dimension, centered on pad. Centerline of bar to edge of pad dimension = 1/2".

ADDED:
- "RB" (to represent the Rectangular Beam) to the Beam Size column in the TABLE.
- Added "RB" to accompany the M, & MN shapes within the Designer Note.

Re-Approved 09-22-2011
Updated the detail to include MW shape prestressed beams.

At TABLE: under the Beam Size column, added "M & MN" to the first row of dimensions.
- Added another row of dimensions for the MW shape to the table.

Under NOTES: Removed the slash from the Mn/DOT designation to read MnDOT throughout the sheet.

Changed the Designer Note to read: "Minimum size of bearing pad, 12" x 24", is shown for M & MN shapes 16" x 36", is shown for MW shapes"

Revised 03-30-2010
At SECTION X-X: Removed subtitle "2'-2" BOTTOM FLANGE SHOWN".
- Added dashed line representing the MN SHAPE.
- Added labels to the M SHAPE and the MN SHAPE lines.

THROUGHOUT SHEET: Made adjustment to the "hatching" on multiple details for consistency.

Revised 10-28-2008
At SECTION Y-Y: changed THE PINTLE-TO-CURVED PLATE WELD DETAILS TO MATCH THE WELD SYMBOL.

Revised 08-10-2006
Under NOTES: Revised ① *from* THE MIN. RADIUS OF THE CURVED PLATE IS SHOWN. THE MAX. RADIUS IS 30". FINISH TO … *to* THE MIN. RADIUS SHALL BE 16" UNLESS OTHERWISE SPECIFIED IN THE TABLE. THE MAX. RADIUS SHALL BE 24". FINISH TO …

Re-Approved 10-26-2005
At SECTION X-X: Added subtitle: 2'-2" BOTTOM FLANGE SHOWN

Revised 04-20-2004

In the TABLE:

- Added CURVED PLATE column
- Changed dimension F *from* $1\ ^{3}/_{8}$" *to* $1^{1}/_{2}$"
- Changed dimension J *from* $1\ ^{3}/_{8}$" *to* $1^{1}/_{4}$"

Under NOTES: Revised ① *from* THE RADIUS OF THE CURVED PLATE SHALL BE 1'-4" MINIMUM AND 2'-0" MAXIMUM. FINISH TO 250 … *to* THE MIN. RADIUS OF THE CURVED PLATE IS SHOWN. THE MAX. RADIUS IS 30". FINISH TO 250 …

B312
Pot Type Bearing Assembly (Prestressed Concrete Beam) (Guided Expansion)

Approved, and signed, November 22, 2002. Last date revised: November 3rd, 2015

Revised 11-03-2015
Under NOTES:

- Changed all notes to "Active Voice" if needed.
- Changed 4th note spec. number *from* 2471.3L2 *to* 2471.3.L.2.
- Added 5th note: Provide anchor rods per spec. 3385, type B. Galvanize per spec. 3392.
- Changed the "shimming note" to read: Perform shimming under plate "D" with fabric pads per AASHTO LRFD Bridge Construction spec. section 18.10.
- Changed the "bearing assembly" note to read: Manufacturer to submit any bearing assembly dimensions, details, or materials not shown to the engineer for approval.

Approved, and signed, November 22, 2002.

B313
Pot Type Bearing Assembly (Prestressed Concrete Beams) (Non-Guided Expansion)

Approved, and signed, November 22, 2002. Last date revised: November 3rd, 2015

Revised 11-03-2015
Under NOTES:

- Changed all notes to "Active Voice" if needed.
- Changed 4th note spec. number *from* 2471.3L2 *to* 2471.3.L.2.
- Added 5th note: Provide anchor rods per spec. 3385, type B. Galvanize per spec. 3392.
- Changed the "shimming note" to read: Perform shimming under plate "D" with fabric pads per AASHTO LRFD Bridge Construction spec. section 18.10.
- Changed the "bearing assembly" note to read: Manufacturer to submit any bearing assembly dimensions, details, or materials not shown to the engineer for approval.

Approved, and signed, November 22, 2002.

B314
Pot Type Bearing Assembly (Steel Beams) (Guided Expansion)

Approved, and signed, September 18, 2007. Last date revised: November 3rd, 2015

Revised 11-03-2015
Under NOTES:
- Changed all notes to "Active Voice" if needed.
- Changed the 2nd note to read: Provide steel plates and pintles per spec. 3309.
- Added 4th note: Provide anchor rods per spec. 3385, Type B. Galvanize per spec. 3392.
- Changed "shimming note" to read: Perform shimming under masonry plate with preformed fabric pads per AASHTO LRFD Bridge Construction spec. section 18.10.
- Changed "bearing assembly" note to read: Manufacturer to submit any bearing assembly dimensions, details, or materials not shown to the engineer for approval.
- Changed the Metalize Piston and Pot spec. *from* 2471.3L2 *to* 2471.3.L.2.

Added to the DESIGNER NOTE:
- Added - When specifying offset dimension "M", consider the size and proximity of the diaphragm and longitudinal pier reinforcement to allow adequate room for installation of anchor rods.

Revised 12-17-2008
Under NOTES:
- (3rd sentence) Changed the word from "pintles" to "pintle plate" in the sentence.
- Changed numbered note ③ to read – "Pot Bearing Manufacturer to Determine the Final Dimensions and Number of All Bearing Components including Piston, Pot, Masonry Plate, Sole Plate, Threaded Fasteners, Bolted Flange Connections, Pintles and overall height, and coordinate sharing this information with the beam fabricator and contractor."
- Changed numbered note ④ to read – "Factored horizontal resistance shall be a minimum of 15% of the strength limit state vertical load unless stated otherwise."
- Changed numbered note ⑥ to a "DESIGNER NOTE" to read – "Two 1½" diameter rods have a factored horizontal resistance of 95 kips. Designer shall increase diameter, number of rods or both when needed."
- Renumbered note ⑦ to ⑥.

At the DETAIL AT MASONRY PLATE:
- Renumbered note ⑦ to ⑥.
- Removed numbered note ⑥ from the " 2" Ø hole for 1 ½" Ø anchor rod (typ.)⑥" note on the masonry plate.
- Changed the dimension from 3" to 3" MIN. (TYP.)

At the ANCHOR ROD DETAIL – Removed the numbered note ⑥.
At the BEARING ASSEMBLY TABLE:
- Moved location of note ④ from adjacent to "Design Loads (Kips)" to adjacent to "Strength Limit State – Horizontal".
- Renumbered note ⑦ to ⑥.

At B-DETAIL NUMBER BLOCK – Added the words "DETAIL NO." above the B314 number.

Re-Approved 09-18-2007
Revised detail and Renamed from: "PLAN" to "DETAIL AT MASONRY PLATE"

Revised and Renamed Table from: "BEARING ASSEMBLY DIMENSIONS" to "BEARING ASSEMBLY TABLE" with additional new columns, sub-columns and numbered notes.

At B-DETAIL TITLE – Change title name from: "POT TYPE BEARING ASSEMBLY" to "POT BEARING ASSEMBLY"

Under NOTES:

- (3rd sentence) Removed the words "pintle plate" from the sentence.
- Replace note ① with the following text – "Factored live load (LL) rotation or 0.02 radians whichever is greater."
- Changed note ② to read – "The sole plate is included in the pot bearing assembly quantity. 1¼" min. thickness is required. Sole plate shall be tapered to finished grade including transverse taper for skewed bridges."
- Changed note ③ to read – "Pot bearing manufacturer to determine the final dimensions and number of all bearing components including piston, pot, masonry plate, sole plate, threaded fasteners, bolted flange connections, pintles and overall height. Minimum pintle size is 1½" diameter." Also added ③ to the MASONRY PLATE location in the BEARING ASSEMBLY TABLE.
- Changed note ④ to read – "Horizontal resistance shall be a minimum of 20% of the vertical applied load unless stated otherwise." Also added ④ to DESIGN LOAD (KIPS) location in the BEARING ASSEMBLY TABLE.
- Added note ⑤ - "See framing plan." Also added ⑤ to angle dimension at the DETAIL AT MASONRY PLATE.
- Added note ⑥ - "Two 1½" diameter anchor rods have a maximum resistance of 95 kips. Designer shall increase diameter, number of rods or both when needed." Also added ⑥ to ANCHOR ROD DETAIL and anchor rod note at the DETAIL AT MASONRY PLATE.
- Added note ⑦ -" "+" Denotes offset as shown." " "-" Denotes offset opposite as shown." Also added ⑦ to dimension "M" showing the offset from centerline pier at the DETAIL AT MASONRY PLATE and at ANCHOR ROD OFFSET +/- location in the BEARING ASSEMBLY TABLE.

At DETAIL AT PINTLE:

- Removed the word "(TYP.)" from the " ¼" BEVEL (TYP.)."
- Changed from - "1½" DIA. PINTLE (DRIVING FIT)" to "PINTLE"
- Added leader "DRIVING FIT" at Pintle/Pintle Plate location.
- Changed Dimension from - "1¾" DIA." to " ¼" Ø LARGER THAN PINTLE"

At SECTION X-X:

- Removed the section Y-Y section arrows.
- Changed "BOLTED CONNECTION (TYP.)" to "BOLTED FLANGE CONNECTION"
- Changed "1 ½" DIA. PINTLE (TYP)" to "PINTLE"
- Replaced the two 3" dimensions (at the centerline beam to pintle) to a dimension line with a note ③.
- Removed "(TYP.)" from the FLAT BRASS SEALING RINGS (TYP.).
- Removed the ¾" dimension showing the Masonry Plate thickness.

At DETAIL F – Removed dimension lines showing the silicone compound or approved equal and replaced it with a leader line.

At SECTION Y-Y:

- Removed "Bolted Connection (TYP.) ③" note.
- Changed " 1½" DIAMETER PINTLE" to "SEE PINTLE DETAIL."

Removed – "DESIGN DATA:" block from the lower right portion of the detail.

Revised 12-06-2006

Throughout detail:

- Renamed PLATE "A" to PINTLE PLATE
- Renamed PLATE "B" to PISTON
- Renamed PLATE "C" to POT
- Renamed PLATE "D" to MASONRY PLATE

At PLAN:

- Removed "tab" for anchor rods and increased N dimension.
- Renamed N dimension to D

At SECTION X-X:

- Added BOLTED CONNECTION (TYP.) ③ (detail and note)

At SECTION Y-Y:

- Added BOLTED CONNECTION (TYP.) ③ (detail and note)

Changed table.

Under NOTES:

- Renumbered note ③ *to* ④
- Added new note ③ Pot bearing manufacturer …

Approved, and signed, November 22, 2002.

B315
Pot Type Bearing Assembly (Steel Beams) (Non-Guided Expansion)

Approved, and signed, September 18, 2007. Last date revised: November 3rd, 2015

Revised 11-03-2015

Under NOTES:

- Changed all notes to "Active Voice" if needed.
- Changed the 2nd note to read: Provide steel plates and pintles per spec. 3309.
- Added 4th note: Provide anchor rods per spec. 3385, Type B. Galvanize per spec. 3392.
- Changed "shimming note" to read: Perform shimming under masonry plate with preformed fabric pads per AASHTO LRFD Bridge Construction spec. section 18.10.
- Changed "bearing assembly" note to read: Manufacturer to submit any bearing assembly dimensions, details, or materials not shown to the engineer for approval.
- Changed the Metalize Piston and Pot spec. *from* 2471.3L2 *to* 2471.3.L.2.

Added to the DESIGNER NOTE:

- Added - When specifying offset dimension "M", consider the size and proximity of the diaphragm and longitudinal pier reinforcement to allow adequate room for installation of anchor rods.

Revised 12-17-2008

Under NOTES:

- (3rd sentence) Changed the word from "pintles" to "pintle plate" in the sentence.
- Changed numbered note ③ to read – "Pot Bearing Manufacturer to Determine the Final Dimensions and Number of All Bearing Components including, Piston, Pot, Masonry Plate, Sole Plate, Threaded Fasteners, Bolted Flange Connections, Pintles and overall height, and coordinate sharing this information with the beam fabricator and contractor."
- Changed numbered note ④ to read – "Factored horizontal resistance shall be a minimum of 10% of the strength limit state vertical load unless stated otherwise."
- Changed numbered note ⑥ to a "DESIGNER NOTE" to read – "Two 1½" diameter rods have a factored horizontal resistance of 95 kips. Designer shall increase diameter, number of rods or both when needed."
- Renumbered note ⑦ to ⑥.

At the DETAIL AT MASONRY PLATE:

- Renumbered note ⑦ to ⑥.
- Removed numbered note ⑥ from the " 2" Ø hole for 1 ½" Ø anchor rod (typ.)⑥" note on the masonry plate.
- Changed the dimension from 3" to 3" MIN. (TYP.)

At the ANCHOR ROD DETAIL – Removed the numbered note ⑥.

At the BEARING ASSEMBLY TABLE:

- Renumbered note ⑦ to ⑥.
- Moved location of note ④ from adjacent to "Design Loads (Kips)" to adjacent to "Strength Limit State – Horiz".

Re-Approved 09-18-2007

Revised detail and Renamed from: "PLAN" to "DETAIL AT MASONRY PLATE"

Revised and Renamed Table from: "BEARING ASSEMBLY DIMENSIONS" to "BEARING ASSEMBLY TABLE" with additional new columns, sub-columns and numbered notes.

At B-DETAIL TITLE – Change title name from: "POT TYPE BEARING ASSEMBLY" to "POT BEARING ASSEMBLY"

Under NOTES:

- (3rd sentence) Removed the words "pintle plate" from the sentence.
- Replace note ① with the following text – "Factored live load (LL) rotation or 0.02 radians whichever is greater."
- Changed note ② to read – "The sole plate is included in the pot bearing assembly quantity. 1¼" min. thickness is required. Sole plate shall be tapered to finished grade including transverse taper for skewed bridges."
- Changed note ③ to read – "Pot bearing manufacturer to determine the final dimensions and number of all bearing components including piston, pot, masonry plate, sole plate, threaded fasteners, bolted flange connections, pintles and overall height. Minimum pintle size is 1½" diameter." Also added ③ to the MASONRY PLATE location in the BEARING ASSEMBLY TABLE.
- Changed note ④ to read – "Horizontal resistance shall be a minimum of 20% of the vertical applied load unless stated otherwise." Also added ④ to DESIGN LOAD (KIPS) location in the BEARING ASSEMBLY TABLE.
- Added note ⑤ - "See framing plan." Also added ⑤ to angle dimension at the DETAIL AT MASONRY PLATE.
- Added note ⑥ - "Two 1½" diameter anchor rods have a maximum resistance of 95 kips. Designer shall increase diameter, number of rods or both when needed." Also added ⑥ to ANCHOR ROD DETAIL and anchor rod note at the DETAIL AT MASONRY PLATE.
- Added note ⑦ - ""+" Denotes offset as shown." ""-" Denotes offset opposite as shown." Also added ⑦ to dimension "M" showing the offset from centerline pier at the DETAIL AT MASONRY PLATE and at ANCHOR ROD OFFSET +/- location in the BEARING ASSEMBLY TABLE.

At DETAIL AT PINTLE :

- Removed the word "(TYP.)" from the " ¼" BEVEL (TYP.)."
- Changed from - "1½" DIA. PINTLE (DRIVING FIT)" to "PINTLE"
- Added leader "DRIVING FIT" at Pintle/Pintle Plate location.
- Changed Dimension from - "1¾" DIA." to " ¼" Ø LARGER THAN PINTLE"

At SECTION X-X:

- Removed the section Y-Y section arrows.
- Changed "BOLTED CONNECTION (TYP.)" to "BOLTED FLANGE CONNECTION"
- Changed "1½" DIA. PINTLE (TYP)" to "PINTLE"
- Replaced the two 3" dimensions (at the centerline beam to pintle) to a dimension line with a note ③.
- Removed "(TYP.)" from the FLAT BRASS SEALING RINGS (TYP.).
- Removed the ¾" dimension showing the Masonry Plate thickness.

At DETAIL F – Removed dimension lines showing the silicone compound or approved equal and replaced it with a leader line.

At SECTION Y-Y:

- Removed "Bolted Connection (TYP.) ③" note.
- Changed "1½" DIAMETER PINTLE" to "SEE PINTLE DETAIL."

Removed – "DESIGN DATA:" block from the lower right portion of the detail.

Revised 12-06-2006

Throughout detail: Renamed PLATE "A" to PINTLE PLATE
Renamed PLATE "B" to PISTON
Renamed PLATE "C" to POT
Renamed PLATE "D" to MASONRY PLATE

At PLAN:

- Removed “tab” for anchor rods and increased N dimension.
- Renamed N dimension to D

At SECTION X-X:

- Added BOLTED CONNECTION (TYP.) ③ (detail and note)

At SECTION Y-Y:

- Added BOLTED CONNECTION (TYP.) ③ (detail and note)

Changed table.

Under NOTES:

- Renumbered note ③ *to* ④
- Added new note ③ Pot bearing manufacturer …

Approved, and signed, November 22, 2002.

B316
Pot Type Bearing Assembly (Steel Beams) (Fixed)

Approved, and signed, September 18, 2007. Last date revised: November 3rd, 2015

Revised 11-03-.2015
Under NOTES:

- Changed all notes to "Active Voice" if needed.
- Changed the 2nd note to read: Provide steel plates and pintles per spec. 3309.
- Added 4th note: Provide anchor rods per spec. 3385, Type B. Galvanize per spec. 3392.
- Changed "shimming note" to read: Perform shimming under masonry plate with preformed fabric pads per AASHTO LRFD Bridge Construction spec. section 18.10.
- Changed "bearing assembly" note to read: Manufacturer to submit any bearing assembly dimensions, details, or materials not shown to the engineer for approval.
- Changed the Metalize Piston and Pot spec. *from* 2471.3L2 *to* 2471.3.L.2.

Added to the DESIGNER NOTE:

- Added - When specifying offset dimension "M", consider the size and proximity of the diaphragm and longitudinal pier reinforcement to allow adequate room for installation of anchor rods.

Revised 12-17-2008
Under NOTES:

- (3rd sentence) Removed the word "pintles" from the sentence.
- Changed numbered note ③ to read – "Pot Bearing Manufacturer to Determine the Final Dimensions and Number of All Bearing Components including, Piston, Pot, Masonry Plate, Sole Plate, Threaded Fasteners, Bolted Flange Connections, Pintles and overall height, and coordinate sharing this information with the beam fabricator and contractor."
- Changed numbered note ④ to read – "Factored horizontal resistance shall be a minimum of 15% of the strength limit state vertical load unless stated otherwise."
- Changed numbered note ⑥ to a "DESIGNER NOTE" to read – "Two 1½" diameter rods have a factored horizontal resistance of 95 kips. Designer shall increase diameter, number of rods or both when needed."
- Renumbered note ⑦ to ⑥.

At the DETAIL AT MASONRY PLATE:

- Renumbered note ⑦ to ⑥.
- Removed numbered note ⑥ from the " 2" Ø hole for 1 ½" Ø anchor rod (typ.)⑥" note on the masonry plate.
- Changed the dimension from 3" to 3" MIN. (TYP.)

At the ANCHOR ROD DETAIL – Removed the numbered note ⑥.

At the BEARING ASSEMBLY TABLE:

- Renumbered note ⑦ to ⑥.
- Moved location of note ④ from adjacent to "Design Loads (Kips)" to adjacent to "Strength Limit State – Horizontal".

At SECTION X-X – Changed "1 ½" Anchor Rod" to "Anchor Rod"

Re-Approved 09-18-2007
Revised detail and Renamed detail from: "PLAN" to "DETAIL AT MASONRY PLATE"

Revised and Renamed Table from: "BEARING ASSEMBLY DIMENSIONS" to "BEARING ASSEMBLY TABLE" with additional new columns, sub-columns and numbered notes.

At B-DETAIL TITLE – Change title name from: "POT TYPE BEARING ASSEMBLY" to "POT BEARING ASSEMBLY"

Under NOTES:

- Replace note ① with the following text – "Factored live load (LL) rotation or 0.02 radians whichever is greater."
- Changed note ② to read – "The sole plate is included in the pot bearing assembly quantity. 1¼" min. thickness is required. Sole plate shall be tapered to finished grade including transverse taper for skewed bridges."
- Changed note ③ to read – "Pot bearing manufacturer to determine the final dimensions and number of all bearing components including piston, pot, masonry plate, sole plate, threaded fasteners, bolted flange connections, pintles and overall height. Minimum pintle size is 1½" diameter." Also added ③ to the MASONRY PLATE location in the BEARING ASSEMBLY TABLE.
- Changed note ④ to read – "Horizontal resistance shall be a minimum of 20% of the vertical applied load unless stated otherwise." Also added ④ to DESIGN LOAD (KIPS) location in the BEARING ASSEMBLY TABLE.
- Added note ⑤ - See framing plan. Also added ⑤ to angle dimension at the DETAIL AT MASONRY PLATE.
- Added note ⑥ - "Two 1½" diameter anchor rods have a maximum resistance of 95 kips. Designer shall increase diameter, number of rods or both when needed." Also added ⑥ to ANCHOR ROD DETAIL and anchor rod note at the DETAIL AT MASONRY PLATE.
- Added note ⑦ -""+" Denotes offset as shown." ""-" Denotes offset opposite as shown." Also added ⑦ to dimension "M" showing the offset from centerline pier at the DETAIL AT MASONRY PLATE and at ANCHOR ROD OFFSET +/- location in the BEARING ASSEMBLY TABLE.

At DETAIL AT PINTLE:

- Removed the word "(TYP.)" from the "¼" BEVEL (TYP.)."
- Changed from - "1½" DIA. PINTLE (DRIVING FIT)" to "PINTLE"
- Added leader "DRIVING FIT" at Pintle/Pintle Plate location.
- Changed Dimension from - "1¾" DIA." to " ¼" Ø LARGER THAN PINTLE"

At SECTION X-X:

- Removed the section Y-Y section arrows.
- Changed "BOLTED CONNECTION (TYP.)" to "BOLTED FLANGE CONNECTION"
- Changed "1½" DIA. PINTLE (TYP)" to "PINTLE"
- Replaced the two 3" dimensions (at the centerline beam to pintle) to a dimension line with a note ③.
- Removed "(TYP.)" from the FLAT BRASS SEALING RINGS (TYP.).
- Removed the ¾" dimension showing the Masonry Plate thickness.
- Added – 1½" to the front of the anchor rod leader.

At DETAIL F – Removed dimension lines showing the silicone compound or approved equal and replaced it with a leader line.

At SECTION Y-Y:

- Removed "Bolted Connection (TYP.) ③" note.
- Changed "1½" DIAMETER PINTLE" to "SEE PINTLE DETAIL."

Removed – "DESIGN DATA:" block from the lower right portion of the detail.

Revised 12-06-2006

Throughout detail: Renamed PLATE "A" to PISTON
Renamed PLATE "B" to POT
Renamed PLATE "C" to MASONRY PLATE

At PLAN:
- Removed “tab” for anchor rods and increased N dimension.
- Renamed N dimension to D

At SECTION X-X:
- Added BOLTED CONNECTION (TYP.) ③ (detail and note)

At SECTION Y-Y:
- Added BOLTED CONNECTION (TYP.) ③ (detail and note)

Changed table.

Under NOTES:
- Removed note ③ MARK CENTERLINE OF BRG. PLATES "A" AND "B" TO FACILITATE PLACEMENT.
- Added new note ③ Pot bearing manufacturer …

Approved, and signed, November 22, 2002.

B317
Curved Cast Bearing Assembly (PCB) (Fixed)

Approved, and signed, November 22, 2002.

11-10-2005 – **ARCHIVED**
B317 was removed from the server and Web site and was placed in an archive file. The Mn/DOT Bridge Office is discontinuing the use of the cast bearing option. Designers should no longer place Standard Details B317 and B318 in their bridge plans as an alternate to our fabricated assembly.

B318
Curved Cast Bearing Assembly (PCB) (Expansion)

Approved, and signed, November 22, 2002.

11-10-2005 – **ARCHIVED**
B318 was removed from the server and Web site and was placed in an archive file. The Mn/DOT Bridge Office is discontinuing the use of the cast bearing option. Designers should no longer place Standard Details B317 and B318 in their bridge plans as an alternate to our fabricated assembly.

B354
Curved Plate Bearing Assembly (Steel Beams) (Fixed)

Approved, and signed, November 22, 2002. Last date revised: November 3rd, 2015

Revised 11-03-2015
At BEARING PLATE DETAIL:
- Changed from welded "keeper" studs" to a welded "keeper" bar.
- Added the 3/16" fillet weld symbol to the welded bar on the lower left side of the detail.
- Changed the "Welded Stud ⑤" *to* "Welded Bar (Typ.) ⑤"

Under NOTES:
- Changed all notes to "Active Voice" if needed.
- Changed numbered note ⑤ to read: 3/8" x 3/8" bar installed on bearing plate around perimeter of bearing pad. Bar length is 2" less than adjacent pad dimension, centered on pad. Centerline of bar to edge of pad dimension = 1/2".

Added DESIGNER NOTE:
- Two 1½" diameter anchor rods have a factored horizontal resistance of 95 kips. Designer shall increase diameter, number of rods or both when needed.
  When specifying offset dimension "M", consider the size and proximity of the diaphragm and longitudinal pier reinforcement to allow adequate room for installation of anchor rods.

Revised 11-06-2013
Under NOTES:
- In the 3rd note, Changed the galvanize spec. number from 3394 to 3392.
- Removed the "MnDOT" from the MnDOT Spec. references throughout the detail.

Revised 12-17-2008
Under NOTES: Minor spelling correction to note ⑤.

Revised 08-10-2006
Under NOTES: Revised ① *from* THE RADIUS OF THE CURVED PLATE SHALL BE 1'-4" MINIMUM AND 2'-0" MAXIMUM UNLESS OTHERWISE SPECIFIED IN THE TABLE. FINISH TO … *to* THE MIN. RADIUS SHALL BE 16" UNLESS OTHERWISE SPECIFIED IN THE TABLE. THE MAX. RADIUS SHALL BE 24". FINISH TO …

In the TABLE: Added +/- column under ANCHOR ROD OFFSET

B355
Curved Plate Bearing Assembly (Steel Beams) (Expansion)

Approved, and signed, November 22, 2002. Last date revised: November 3rd, 2015

Revised 11-03-2015
At BEARING PLATE DETAIL:
- Changed from welded "keeper" studs" to a welded "keeper" bar.
- Added the 3/16" fillet weld symbol to the welded bar on the lower left side of the detail.
- Changed the "Welded Stud ⑤" *to* "Welded Bar (Typ.) ⑤"

Under NOTES:
- Changed all notes to "Active Voice" if needed.
- Changed numbered note ⑤ to read: 3/8" x 3/8" bar installed on bearing plate around perimeter of bearing pad. Bar length is 2" less than adjacent pad dimension, centered on pad. Centerline of bar to edge of pad dimension = 1/2".

Revised 12-17-2008
Under NOTES: Minor spelling correction to note ⑤.

Revised 08-10-2006
Under NOTES: Revised ① *from* THE RADIUS OF THE CURVED PLATE SHALL BE 1'-4" MINIMUM AND 2'-0" MAXIMUM UNLESS OTHERWISE SPECIFIED IN THE TABLE. FINISH TO … *to* THE MIN. RADIUS SHALL BE 16" UNLESS OTHERWISE SPECIFIED IN THE TABLE. THE MAX. RADIUS SHALL BE 24". FINISH TO …

B357
Curved Plate Bearing Assembly (Steel Beams) (Vulcanized Expansion)

Approved, and signed, November 22, 2002. . Last date revised: 08-10-2006.

08-25-2006
ARCHIVED – B-Detail no longer used.

Revised 08-10-2006
Under NOTES: Revised ① *from* THE RADIUS OF THE CURVED PLATE SHALL BE 1'-4" MINIMUM AND 2'-0" MAXIMUM UNLESS OTHERWISE SPECIFIED IN THE TABLE. FINISH TO … *to* THE MIN. RADIUS SHALL BE 16" UNLESS OTHERWISE SPECIFIED IN THE TABLE. THE MAX. RADIUS SHALL BE 24". FINISH TO …

B400
Splices For Steel Beams (3309 Steel)

Approved, and signed, November 22, 2002. Last date revised: 05-24-2012

Revised 05-24-2012

At SHEET-TITLE: Removed the sub-title "(3309 STEEL)" from the detail.

Under NOTES: Removed the 1st note "Splice design is for structural steel Mn/DOT Spec. 3309."

Revised 10-22-2009

At ELEVATION:

- To allow for easier fabrication, changed the horizontal dimension between the inner most 2 columns of bolts from 3 ½" to 4".

Approved, and signed, November 22, 2002.

B402
Bolted Diaphragms (For Steel Beams)

Approved, and signed, March 26, 2009

Re-Approved 03-26-2009
Various revisions were made to this detail including providing the designer an option in selecting the connection between the diaphragm connection stiffener and the flanges. Other changes include;

Under NOTES: Eliminated note ① "Weld size need not exceed 5/16" for intermediate diaphragm stiffeners". Removed all existing numbered notes ① from the sheet. Renumbered note ⑥ ("Use same shear stud height as used on the beams.") to note ①. Replaced numbered note ⑥ with ① at the INTERIOR BEAM (at abutment diaphragms).

At SECTION A-A:
- Removed – "5/16" PLATE" note from the detail.

At FASCIA BEAM (At Pier and Intermediate Diaphragms):
- At the 6" and 3" dimensions between the flanges and the diaphragm, the word "(MIN)" has been replaced with a numbered note ④ in four locations.

At INTERIOR BEAM (At Pier and Intermediate Diaphragms):
- The top and bottom flange "TIGHT FIT…" notes have been replaced with a DESIGNER NOTE that gives the designer a choice of connection type.
- A 5/16" DIAPHRAGM PLATE note has been added.
- The " 3/8" x 7" PLATE FOR INTERMEDIATE DIAPHRAGMS…" note has been changed to read " 3/8" x 7" CONNECTION STIFFENER FOR INTERMEDIATE DIAPHRAGMS. SEE PLAN FOR STIFFENER SIZES OVER BEARINGS."

At FASCIA BEAM (At Abutment Diaphragms):
- At the 1.5" dimension between the top flange and the diaphragm, the word "(MIN)" has been replaced with a numbered note ④.

09-11-2004
Throughout detail: changed FACIA to FASCIA
changed title INTERMEDIATE BEAMS to INTERIOR BEAM

At INTERIOR BEAM – AT PIER AND INTERMEDIATE DIAPHRAGMS: changed 3/8" x 7" PLATE FOR INTERIOR DIAPHRAGMS. to 3/8" x 7" PLATE FOR INTERMEDIATE DIAPHRAGMS.

Approved, and signed, November 22, 2002.

B403
Steel Intermediate Diaphragm (For 36M, MN45 - MN63 Prestressed Concrete Beams)

Approved, and signed, November 3, 2015.

Re-Approved 11-03-2015

At PART TRANSVERSE SECTION at DIAPHRAGM:
- Moved the section arrows to better clarify the section A-A location

At SECTION A-A:
- Removed from the Cast-In-Place bolt anchorage note "Torque anchor bolts to 80 ft.-lbs."

At DETAIL A:
- Moved the channel, diaphragm connection plates, and Section B-B to better represent the actual location in relationship to the beam. Also raised the channel by ½" by adjusting the channel hole dimensions.

At the DIAPHRAGM CONNECTION details, The B-DETAIL sub-title and in the TABLE:
- Removed all references to the 45M and 54M beam types.
- At the Diaphragm Connection for the MN54 – MN63 beams: Aligned the "tic marks" for the hole locations on the beam face and the diaphragm faces

Under NOTES:
- Changed all notes to "Active Voice" if needed.
- Added 3rd note: Torque all bolts, including anchor bolts to 80 ft.-lbs."

Revised 09-11-2014

REMOVED: the term "Mn/DOT" from all locations referencing MnDOT Spec. throughout the detail.

At DETAIL A:
- Added "PER SPEC. 3391.2.B" to the bolt description in the note pointing to the diaphragm bolts.
- Changed the spec number *From:* 3391.2A *To:* 3391.2.A within the note pointing to the bolts going through the beam web.

At Section A-A:
- Added "PER SPEC. 3391.2.B" to the H.S. Bolt description within the note pointing to the anchorage.

Under NOTES:
- Changed the spec. number in the 2nd note: *From:* 2405.3M *To:* 2405.3.K.
- Changed the 3rd note to read: Shop bend the leg of the 12" plate to conform to the diaphragm. A 3/8" x 6" x 6" angle may be used for diaphragms perpendicular to beams.
- Changed the 4th note to read: Include all structural steel shown on this detail, including bolts and washers, in unit price bid for diaphragms for prestressed beams.
- Changed the 6th note to read: Galvanize steel plates and shapes in accordance with spec. 3394.

Revised 10-22-2009

Under NOTES:
- Added note: STEEL PLATES AND SHAPES SHALL BE GALVANIZED IN ACCORDANCE WITH Mn/DOT SPEC. 3394.
- Added note: GALVANIZE BOLTS, NUTS AND WASHERS PER Mn/DOT SPEC. 3392.

Revised 06-14-2006

Changed B-Detail subtitle (For 36M – 54M, MN45 AND MN54 Prestressed Concrete Beams) *to* (For 36M – 54M, MN45 - MN63 Prestressed Concrete Beams)

At DIAPHRAGM CONNECTION and TABLE: added MN63

Under NOTES:
- changed SEE Mn/DOT SPEC. 2405.3M FOR INSTALLATION. *to* INSTALLATION SHALL CONFORM TO Mn/DOT SPEC. 2405.3M.
- changed ALL STRUCTURAL STEEL SHOWN ON THIS DETAIL, INCLUDING BOLTS AND WASHERS, SHALL BE INCLUDED IN THE PAYMENT FOR DIAPHRAGMS FOR PRESTRESSED BEAMS. *to* ALL STRUCTURAL STEEL SHOWN ON THIS DETAIL, INCLUDING BOLTS AND WASHERS, SHALL BE INCLUDED IN UNIT PRICE BID FOR DIAPHRAGMS FOR PRESTRESSED BEAMS.

Re-Approved 10-26-2005
Changed B-Detail subtitle (For 36M – 54M Prestressed Concrete Beams) *to* (For 36M – 54M, MN45 AND MN54 Prestressed Concrete Beams)

At DIAPHRAGM CONNECTION FOR BEAMS: Changed subtitle 36M AND 45M BEAMS *to* FOR 36M, 45M AND MN45 BEAMS

At DIAPHRAGM CONNECTION FOR BEAMS:
- Changed subtitle 54M BEAMS *to* FOR 54M AND MN54 BEAMS
- Specified dimensions for 54M beams and added MN54 dimensions

At TABLE: Added MN45 and MN54 information

Revised 09-11-2004
At SECTION B-B: changed subtitle TYPICAL SECTION AT CONTINUOUS OR STAGGERED INTERIOR DIAPHRAGMS *to* TYPICAL SECTION AT INTERIOR BEAM WITH CONTINUOUS OR STAGGERED INTERMEDIATE DIAPHRAGMS

Revised 09-09-03
At DIAPHRAGM CONNECTION FOR BEAMS (36M AND 45M BEAMS): Changed 1" x $2^1/_4$" LONG SLOTTED HOLE … *to* $1^1/_8$" x $2^3/_8$" LONG SLOTTED HOLE …

At DIAPHRAGM CONNECTION FOR BEAMS (54MBEAMS): Changed 1" x $2^1/_4$" LONG SLOTTED HOLE … *to* $1^1/_8$" x $2^3/_8$" LONG SLOTTED HOLE …

Approved, and signed, November 22, 2002.

B406
Steel Intermediate Bolted Diaphragm (For 63M – 81M Prestressed Concrete Beams)

Archived 09-22-2011. Previously Approved, and signed, November 22, 2002. Last date revised: 10-22-2009.

09-22-2011 - **ARCHIVED**
The 63M – 81M prestressed beam sheets were archived on 05-24-2011 and hence this detail is no longer needed. This detail was used as the basis for the development of the new B 412 detail which will be used with 82MW and 96 MW prestressed beam shapes.

Revised 10-22-2009
Under NOTES:
- Added note: STEEL PLATES AND SHAPES SHALL BE GALVANIZED IN ACCORDANCE WITH Mn/DOT SPEC. 3394.
- Added note: GALVANIZE BOLTS, NUTS AND WASHERS PER Mn/DOT SPEC. 3392.

Revised 10-28-2008
Under NOTES: Added "INSTALLATION SHALL CONFORM TO Mn/DOT SPEC. 2405.3M"

Revised 09-11-2004
At PART TRANSVERSE SECTION: changed $^{1}/_{2}$" x 17" BENT PLATE DIAPHRAGM SUPPORT to $^{1}/_{2}$" x 17" BENT PLATE DIAPHRAGM SUPPORT (TYP.)

At INTERMEDIATE DIAPHRAGM: changed subtitle TYPICAL SECTION AT INTERIOR DIAPHRAGMS to TYPICAL SECTION AT INTERIOR BEAM WITH CONTINUOUS OR STAGGERED INTERMEDIATE DIAPHRAGMS

At DIAPHRAGM SUPPORT: changed HOLES FOR $^{7}/_{8}$" DIA. BOLTS to HOLES FOR $^{7}/_{8}$" DIA. BOLTS (TYP.). Removed redundant leader lines.

Revised 09-09-2003
At PART TRANSVERSE SECTION: Changed dimension L-6" (MIN.) ② to L-6" (MIN.)

Approved, and signed, November 22, 2002.

B407
Cross Frame Intermediate Diaphragm (For Straight Steel Beams)

Approved, and signed, March 23, 2009. Last date revised: November 3rd, 2015

Revised 11-03-2015
At the ELEVATION:
- Coped the cross members at the gusset plates to match both Detail "A" and Detail "B".

REMOVED: Changed "*Mn/DOT*" to "*MnDOT*" in the designer notes.

Under NOTES:
- Changed the first note *from:* All steel shall conform to Mn/DOT spec. 3309 *to* Provide steel per spec. 3309.
- Added to the end of ①: For diaphragms located beneath deck joint, orient flanges of cross frame members away from the deck joint.

Re-Approved 03-26-2009
This detail has undergone substantial revisions including changing the connection of the diagonal members from bolted to welded and providing the designer an option in selecting the connection between the diaphragm connection stiffener and the flanges.

At Sheet Sub Title: changed from "FOR STEEL BEAMS" to "FOR STRAIGHT STEEL BEAMS".

Under NOTES: Notes and note numbers have changed throughout the sheet.

Removed: Section D-D and the Section D-D arrows were removed from the sheet.

Added: Designer note reading "Designer to specify gusset plate thickness, ½" minimum. Filler plate thickness to match gusset."

At ELEVATION:
- Widened the bottom flange of the beams.
- Changed note from " _x_x_ FILL PLT." to "_" FILLER PLATE".
- Changed note at the Interior Beam from "SEE COPED STIFFENER DETAIL B411" to "SEE STIFFENER DETAILS, DETAIL B411".
- Moved the top and bottom flange "TIGHT FIGHT…" notes from the fascia beam to the interior beam and replaced them with a DESIGNER NOTE that gives the designer a choice of connection type.
- Moved the weld symbol from the interior beam/web location to the fascia beam/web location and removed numbered Note ①.
- Moved Section C-C arrows to reflect the view shown.
- Removed the bolting details from the lower gusset plates.
- Changed note "③ INTERMEDIATE DIAPHRAGM STIFFENER" to "② DIAPHRAGM CONNECTION STIFFENER".
- Added weld symbol to the filler plate/cross frame location.
- Removed the 90 degree angle at the bottom of the fascia beam.
- Changed the labeling "INTERIOR BEAMS" to "INTERIOR BEAM"
- Added numbered note ① under 6" dimension at the fascia beam flanges.
- Added numbered note ② to the "USE OUTSIDE STIFFENER…" note.
- Changed numbered note at the "BEAM SPACING" dimension from ③ to ②.
- Changed numbered note at the fascia beam dimension between top and bottom flange from ③ to ②.
- Removed the weld symbol from the gusset plate/L-shape at the fascia beam.

At DETAIL "A":
- Changed the numbered note at the weld symbol from ① to ④.

- Changed note "INTERMEDIATE DIAPHRAGM STIFFENER" to "DIAPHRAGM CONNECTION STIFFENER".
- Added "1 ½" min." horizontal dimension between the stiffener and the cross member with clipped corner of the cross member shown.
- Added a z-break line to the left side of the detail.

At DETAIL "B":

- Added a z-break line to the left and bottom sides of the detail.
- Removed the bolting detail and dimensions from the cross member to gusset plate connection.
- Changed note "INTERMEDIATE DIAPHRAGM STIFFENER" to "DIAPHRAGM CONNECTION STIFFENER".
- Remove numbered note ④ from the gusset plate note.
- Moved the weld symbol location and added double leader lines to clarify weld locations.
- Changed the numbered note at the weld symbol from ① to ④.

At SECTION C-C:

- Removed bolted detail for the cross member to gusset plate connections.
- Removed the "PLATE CONNECTION OPTION…" note and the bolted plate connections.
- Widened bottom flange to match change at the elevation view.
- Changed note from " x_x_ INTERMEDIATE DIAPHRAGM STIFFENER" to "DIAPHRAGM CONNECTION STIFFENER" and added numbered note ②.
- Changed gusset plate note from " _x_x_ ", to " _" thickness".
- Added weld symbol with numbered note ④ to gusset plate/L-shape cross member connection.
- Removed the lower L-shape member and the " L_x_x_ " designations on the left side of section C-C to reflect the section arrows in the elevation view.

09-11-2004

At ELEVATION: changed ③ INTERMEDIATE STIFFENER PLATE to ③ INTERMEDIATE DIAPHRAGM STIFFENER

At DETAIL "A": changed INTERMEDIATE STIFFENER PLATE to INTERMEDIATE DIAPHRAGM STIFFENER

At DETAIL "B": changed INTERMEDIATE STIFFENER PLATE to INTERMEDIATE DIAPHRAGM STIFFENER

At SECTION D-D: changed __ x __ x __ INT. STIFFENER PLATE to __ x __ x __ INTERMEDIATE DIAPHRAGM STIFFENER

At SECTION C-C: changed __ x __ x __ INT. STIFFENER PLATE to __ x __ x __ INTERMEDIATE DIAPHRAGM STIFFENER

Approved, and signed, November 22, 2002.

B408
Cross Frame Intermediate Diaphragm (For Curved Steel Beams)

Approved, and signed, March 26, 2009. Last date revised: November 3rd, 2015

Revised 11-03-2015
Under NOTES:
- Changed the first note *from:* All steel shall conform to Mn/DOT spec. 3309 *to* Provide steel per spec. 3309.
- Changed numbered note ① to read: Project neutral axis of member through center of bolt pattern.
- Added ⑤: For diaphragms located beneath deck joint, orient flange of cross frame members away from the deck joint.

At ELEVATION:
- Added numbered note ⑤ to the size designation for the top and bottom L shape members of the diaphragm.

Re-Approved 03-26-2009
This detail has undergone substantial revisions including changing the connection of the diagonal members from bolted to welded.

Under NOTES: Notes and note numbers have changed throughout the sheet.

Removed: Section D-D and the Section D-D arrows were removed from the sheet.

Added: Designer note reading "Designer to specify gusset plate thickness, ½" minimum. Filler plate thickness to match gusset".

At ELEVATION:
- Added "(See Detail B410)" to both "TIGHT FIT…" notes and moved the notes from the fascia beam to the interior beam. Removed numbered note ① from "TIGHT FIT…" note at the bottom flange.
- Changed the lower horizontal member from a WT_ x_ to L_x_x_.
- Removed the weld symbol from the gusset plate to WT connection at the fascia beam.
- Moved the Section C-C arrows to reflect the view shown.
- Removed the bolting details from the upper and lower cross member to gusset plate connections and at the filler plate location.
- Moved the weld symbol from the interior beam/web location to the fascia beam/web location and removed numbered note ①.
- Added the wording "BEAM SPACING" to the centerline to centerline dimension and changed the numbered note from ④ to ②.
- Added weld symbol to the filler plate/cross frame location.
- Added numbered note ② to the "USE OUTSIDE STIFFENER…" note.
- Removed the 90 degree angle at the bottom of the fascia beam.
- Change note "INTERIOR DIAPHRAGM STIFFENER" to "DIAPHRAGM CONNECTION STIFFENER" and added numbered note ②.
- Changed numbered note at the fascia beam dimension between top and bottom flange from ④ to ②.

At DETAIL "A":
- Removed the bolting details and dimensions from the cross member to gusset plate connection.
- Changed note from "INTERMEDIATE DIAPHRAGM STIFFENER" to "DIAPHRAGM CONNECTION STIFFENER".
- Added a double leader line from the weld symbol to clarify weld locations. Changed the numbered note at the weld symbol from ① to ④.
- Changed note from "NEUTRAL AXIS OF L_x_x_ " to "NEUTRAL AXSIS OF ANGLES" and changed numbered note from ⑤ to ①.

At DETAIL "B":

- Removed the bolting details and dimensions from the cross member to gusset plate connection.
- Changed note from "INTERMEDIATE DIAPHRAGM STIFFENER" to "DIAPHRAGM CONNECTION STIFFENER".
- Combined notes "NETURAL AXIS OF WT_x_" and "NETURAL AXIS OF L_x_x_" to "NETURAL AXIS OF ANGLES" and changed numbered note from ⑤ to ①. Leader line points to both locations.
- Moved the weld symbol location and added double leader line to clarify weld locations. Changed the numbered note from ① to ④.

At SECTION C-C:

- Removed bolted detail from the cross member to gusset plate connections.
- Removed note "PLATE CONNECTION OPTION SHOWN".
- Changed note from "INTERMEDIATE DIAPHRAGM STIFFENER" to "DIAPHRAGM CONNECTION STIFFENER (7" MIN)" and added numbered note ②.
- Removed notes "L_x_x_" and "WT_x_" and "WT_x_ TO BE COPED TO CLEAR GUSSET PLATE. (TYP.)" and their leader lines.
- Changed note "BEAM FLANGE" to "BOTTOM BEAM FLANGE".
- Changed the connection plates at the bottom flange to show a two bolt pattern on each side of the gusset plate.
- Added weld symbol with "(TYP.)" and numbered note ④ to gusset plate/L-shape connection.
- Added "(BOLTED CONNECTION SHOWN)" under Section C-C title.
- Removed the L-shape cross member on the left side of section C-C to reflect the section arrows in the elevation view.
- Changed note " _" GUSSET PLATE" to " _" GUSSET PLATE (TYP.)".

09-11-2004

At ELEVATION: changed STIFFENER PLATE to INTERMEDIATE DIAPHRAGM STIFFENER

At DETAIL "A": changed STIFFENER PLATE to INTERMEDIATE DIAPHRAGM STIFFENER

At DETAIL "B": changed STIFFENER PLATE to INTERMEDIATE DIAPHRAGM STIFFENER

At SECTION D-D: changed INTERMEDIATE STIFFENER (7" MIN.) to INTERMEDIATE DIAPHRAGM STIFFENER (7" MIN.)

At SECTION C-C: changed INTERMEDIATE STIFFENER to INTERMEDIATE DIAPHRAGM STIFFENER

Approved, and signed, November 22, 2002.

B410
Bolted Flange To Stiffener Detail (For Straight Steel Beams Only)

Approved, and signed, November 22, 2002. Last date revised: May 24, 2012.

Revised 05-24-2012
Under NOTES-

- Removed the "Mn/DOT" from the Mn/DOT Spec.3309. at the end of the first note.
- Changed numbered note ⑤ to read: "BENT PLATE DIAPHRAGMS SHOWN. FOR CROSS FRAME DIAPHRAGM SEE DETAIL B407 FOR STRAIGHT BEAMS AND DETAIL B408 FOR CURVED BEAMS."

Revised 10-28-2008

- Added Designer Note to detail.
- Removed (FOR STRAIGHT STEEL BEAMS ONLY) Under sheet title.

Revised 09-11-2004
Throughout detail: in subtitles, changed INTERMEDIATE BEAMS to INTERIOR BEAMS

At SECTION B-B: changed BEAM STIFFENER PLATE to DIAPHRAGM STIFFENER

At SECTION C-C: changed BEAM STIFFENER PLATE to DIAPHRAGM STIFFENER

Under NOTES: changed note ③ BOLT PLATE TO BEAM FLANGE PRIOR TO WELDING PLATE TO BEAM STIFFENER PLATE to ③ BOLT PLATE TO BEAM FLANGE PRIOR TO WELDING PLATE TO DIAPHRAGM STIFFENER

Approved, and signed, November 22, 2002.

B411
Stiffener Details (For Steel Beams)

Approved, and signed, October 22, 2008.

Re-Approved 10-22-2008

The following changes were suggested by the Fabrication Methods and Structural Steel Inspection Units to aid fabricators in painting the coped area. They suggested two options be allowed.

- At STIFFENER COPE DETAIL added: Details showing "STIFFENEER TO FLANGE CONNECTION" (OPTION 2) and "STIFFENER TO TAB PLATE CONNECTION" (OPTION 2).
- Changed: Detail name in the lower left corner from "PLACING SOLE PLATE AT BEARING" to "SOLE PLATE AT BEARING"

Removed: The word "TABLE" from the information box showing – WEB THICKNESS and DIMENSION C.

Approved and signed, November 22, 2002.

B412
Steel Intermediate Bolted Diaphragm (All MW Prestressed Concrete Beams)

Approved, and signed, 09-22-2011. Last date revised: November 3rd, 2015

Revised 11-03-2015
At Section B-B and Section C-C:
- Removed from the common note for the two details "Torque anchor bolts to 80 ft.-lbs.".

Under NOTES:
- Changed all notes to "Active Voice" if needed.
- Added a 4th note: Torque all bolts, including anchor bolts to 80 ft.-lbs.

Revised 09-11-2014
REMOVED: the term "Mn/DOT" from all locations referencing MnDOT Spec. throughout the detail.

At PART TRANSVERSE SECTION:
- Changed the term *From*: "SHALL BE" *To*: "IS" in two locations within the Minimum Distance note.
- Added "PER SPEC. 3391.2.B" to the bolt description in the note pointing to the diaphragm bolts.

At INTERMEDIATE DIAPHRAGM DETAIL:
- Changed the spec number *From:* 3391.2A *To:* 3391.2.A within the note pointing to the bolts going through the beam web.

At Section B-B and Section C-C:
- Added "PER SPEC. 3391.2.B" to the H.S. Bolt description within the note pointing to the anchorage.

Under NOTES:
- Changed the 2nd note to read: Include all structural steel shown on this detail, including bolts and washers, in the payment for diaphragms for prestressed beams.
- Changed the spec. number in the 3rd note: *From:* 2405.3M *To:* 2405.3.K.
- Changed the 4th note to read: Galvanize steel plates and shapes in accordance with spec. 3394.
- Changed numbered note ② to read: Space bolt holes so as to miss prestressed strands in concrete beams. See prestressed concrete beam sheets for more information.

APPROVED 09-22-2011
New B-DETAIL for the MW shape prestressed concrete beams. The basis of the B412 was the recently archived detail B406, "Steel Intermediate Bolted Diaphragm (For 63M – 81M Prestressed Concrete Beams)"

Revision to the detail included modifying the diaphragm height, bolt spacing and steel angle sizes to accommodate the MW shape for beam spacing up to 13'-0".

Approved, and signed, September 22, 2011.
NEW B-DETAIL

B553
Protection Plate (For End Of Slab)

Approved, and signed, November 22, 2002.

B701
Bridge Floor Drain (Welded Box)

Approved, and signed, November 22, 2002.

B702
Bridge Floor Drain (Structural Tube)

Approved, and signed, November 22, 2002. Last date revised: 01-13-2004.

01-13-2004
At SECTION A-A: Eliminated (½ TOTAL BEAM HEIGHT) from dimension. Called out MID-HEIGHT OF BEAM.

B705
Bridge Offset Floor Drain (Welded Box)

Approved, and signed, November 22, 2002.

B706
Bridge Offset Floor Drain (Structural Tube)

Approved, and signed, November 22, 2002.

B710
Floor Drain For Tee Beams

Approved, and signed, November 22, 2002. Archived October 22, 2009

10-22-2009 - **ARCHIVED**
B710 was removed from the server and Web site and was placed in an archive file.

B801
Contraction Joint

Approved, and signed, November 22, 2002. Last date revised: 03-30-2010.

Revised 03-30-2010
At PART SECTION THROUGH ABUTMENT AT JOINT: Changed "JOINT WATERPROOFING" *to* "MEMBRANE WATERPROOFING SYSTEM" at two locations.

At SECTION A-A: Changed note from "APPLY JOINT WATERPROOFING PER Mn/DOT……" *to* "APPLY MEMBRANE WATERPROOFING SYSTEM PER Mn/DOT……"

Approved, and signed, November 22, 2002.

B807
Concrete End Diaphragm (For Double Tee Beam Spans With Contraction Abutment)

Approved, and signed, November 22, 2002. Revised and Archived December 17, 2008.

12-17-2008 – **ARCHIVED**
B807 was removed from the server and Web site and was placed in an archive file at the request of the Bridge State Aid Unit. Since Double Tee Beams are very rarely used, it was not necessary to continue to publish this standard. The detail was updated to include the note below prior to being archived.

Revised 12-17-2008
Under NOTES:

- Added the following note; "Concrete for end diaphragms shall be the same mix as used in deck", per SSRC meeting 12/01/08.

Approved, and signed, November 22, 2002.

B809
Concrete End Diaphragm (For Steel Beams with Contraction Abutment)

Approved, and signed, November 22, 2002. Revised and Archived December 17, 2008.

12-17-2008 – **ARCHIVED**
B809 was removed from the server and Web site and was placed in an archive file at the request of the Bridge State Aid Unit. Since this type of contraction abutment is very rarely used, it was not necessary to continue to publish this standard. The detail was updated to include the note below prior to being archived.

Revised 12-17-2008
Under NOTES:

- Added the following note; "Concrete for end diaphragms shall be the same mix as used in deck", per SSRC meeting 12/01/08.

Approved, and signed, November 22, 2002.

B811
Concrete End Diaphragm (27M – 81M, MN45 – MN63 Prestressed Concrete Beams) (Contraction Abutment)

Approved, and signed, October 26, 2005. Revised and Archived December 17, 2008.

12-17-2008 – **ARCHIVED**
B811 was removed from the server and Web site and was placed in an archive file at the request of the Bridge State Aid Unit. Since this type of contraction abutment is very rarely used, it was not necessary to continue to publish this standard. The detail was updated to include the note below prior to being archived.

Revised 12-17-2008
Under NOTES:

- Added the following note; "Concrete for end diaphragms shall be the same mix as used in deck", per SSRC meeting 12/01/08.

Revised 06-14-2006
Changed B-Detail subtitle (27M – 81M, MN45 AND MN54 Prestressed Concrete Beams) *to* (27M – 54M, MN45 – MN63 Prestressed Concrete Beams) (Contraction Abutment)

At SD1603E: changed 12:12 ratio *to* 1:1

Under NOTES:

- Changed DIAPHRAGM CONCRETE AND REINFORCEMENT QUANTITIES ARE INCLUDED IN SUPERSTRUCTURE QUANTITIES. *to* QUANITITIES FOR END DIAPHRAGM CONCRETE AND REINFORCMENT SHOWN ON THIS DETAIL SHALL BE LISTED IN SUPERSTRUCTURE QUANTITES.
- added ALL END DIAPHRAGM MATERIALS ARE INCLUDED IN ITEM "DIAPHRAGMS FOR TYPE __ PRESTRESSED BEAMS".
- changed ② 1'-6" FOR 27M – 81M PCB; 1'-8" FOR MN45 AND MN54 PCB. *to* ② 1'-6" FOR 27M – 81M PCB; 1'-8" FOR MN45 – MN63 PCB.

Re-Approved 10-26-2005
Changed B-Detail subtitle (27M – 81M Prestressed Concrete Beams) (Contraction Abutment) *to* (27M – 81M, MN45 And MN54 Prestressed Concrete Beams) (Contraction Abutment)

At PART TRANSVERSE SECTION AT END DIAPHRAGM: replaced 1'-6" dimension for vertical rebar at beam *to* ②

Under NOTES: added ② 1'-6" FOR 27M – 81M PCB; 1'-8" FOR MN45 AND MN54 PCB.

Approved, and signed, November 22, 2002.

B812
Concrete End Diaphragm (63M – 81M Prestressed Concrete Beams) (Parapet Abutment)

Archived 05-24-2012. Approved, and signed, November 22, 2002. Last date revised: 04-02-2009

05-24-2012 - **ARCHIVED**
The 63M – 81M prestressed beam sheets have been archived and the detail is no longer needed.

Revised 04-02-2009

At the PART TRANSVERSE SECTION:
- Changed the dimension from 4" to 4½" CLR at the top of roadway slab to diaphragm reinforcement location.
- Added 9" TYP. Dimension from the beam web to the bottom horizontal diaphragm bars.
- Added the "EDGE OF TOP FLANGE" note to the detail.
- Added "1-" to the SD__05E bar designation.
- Removed the 3" dimension showing the clearance from the bottom of diaphragm to the reinforcement.

At SECTION A-A:
- Added a " 2" MIN" dimension to the bottom of diaphragm to end of beam location.
- Added bar designations to the bottom three bars in the end diaphragm.
- Added the 10” MIN. dimension from the top of beam to the front edge of the diaphragm.
- Changed the dimension from 4" to 4½" CLR at the top of roadway slab to diaphragm reinforcement location.
- Added bars SD1607E, SD1608E with note ③.
- Modified the dimension line indicating the distance from the end of the deck to the CL of the end diaphragm.

CHANGES TO REINFORCEMENT:
- Added bar bend for SD1608E with note ③.
- Changed height of bar SD1301E from 2'-6" to 2'-5". Also changed overall length from 7'-6" to 7'-4".
- Changed height of bar SD1606E from 2'-6" to 2'-4".
- Changed partial length dimension of bar SD__05E from 2'-6" to 2'-4".
- Added bars SD1607E and SD1608E if the end of diaphragm dimension exceeds 1'-8".

CHANGES TO THE “NOTES:”
- Modified the concrete mix design for the end diaphragms to; "Concrete for end diaphragms shall be the same mix as used in deck", per SSRC meeting 12/01/08.
- Modified the note regarding threaded rods to use the word "incidental".
- Added note ③ "Add if dimension ② exceeds 1'-8" "

Approved, and signed, November 22, 2002.

B814
Concrete End Diaphragm (27M & 36M, MN45 – MN63, 82MW & 96MW Prestressed Concrete Beams) (Parapet Abutment)

Approved, and signed, September 22, 2011. Last date revised: November 06, 2013

Revised 11-06-2013
Removed note: "* Check Length Over Fascia Beam" and the asterisk at the 4'-0" dimension at bar bends SD506E and SD5__05E.

Changed numbered note ⑤ to read: "Add SD507E and SD508E only if No. of bars and lengths are included in bill of reinforcement. Space SD508E at 1'-6" max. for entire length of diaphragm. Refer to "Part Transverse Section" above."

Added the Designer Note to the detail.

Revised 04-17-2013
This B-detail was updated to convert reinforcing bar marks from metric to U.S. customary bar designations.

Re-Approved 09-22-2011
Updated the detail to include MW shape prestressed beams.

Rearranged reinforcement bar bend details on the detail due to available space.

At SHEET TITLE: changed the sub title *from:* (27M - 54M, MN45 - MN63 Prestressed Concrete Beams)(Parapet Abutment). *to:* (27M & 36M, MN45 - MN63, 82MW & 96MW Prestressed Concrete Beams)(Parapet Abutment).

At the SD1301E bar bend detail: Replaced the 1'-0" dimension with the "_ _ _ _" (to be filled in symbol).

At the PART TRANSVERSE SECTION: changed the note at the beam shape *from* "MN Shape PCB" *to* "MW or MN Shape PCB"

- Lengthened the legs of the SD__05E bars to better represent the actual length.
- Changed the height of the "M" shape beam to better represent the actual height.
- Added SD1608E bars throughout the section.
- Added note "Place additional SD1608E at end of beam as shown per note ⑤ (typ.)" with dimension lines pointing to the reinforcement at the end of the beam.
- Changed the reinforcement dimension label to read: "SD1301E and SD1608E ⑤"

At SECTION A-A:

- Changed the dimension label from the top of beam to the front edge of the diaphragm to read:
  10" MIN. for 27M & 36M
  1'-1" MIN. for MN45 – MN63
  1'-2" MIN. for 82MW & 96MW
- Changed the dimension label from the top of beam to the threaded rods to read:
  4" (27M & 36M)
  2" (MN45 – MN63)
  1 ¾" (82MW & 96MW)
- Changed the 1'-8" dimension label for the depth of diaphragm to read: 36M & MN45
- Changed the 2'-0" dimension label for the depth of diaphragm to read: MN54 & MN63
- Added the 2'-8" dimension for the depth of diaphragm for the 82MW & 96MW beams.
- Seperated the 1'-4" and 2"Min. dimensions by moving the 2" dimension and changing it to read "2" MIN. ALONG WEB FACE" for better clarification.
- Changed the reinforcement label *from* SD1607E ⑤ *to* SD1607E entire length of diaphragm ⑤.

Under NOTES:

- Removed the text “SEE PLANS FOR DIMENSION.” From numbered note ②.
- Changed numbered notes ③ to read: 1’-11” (27M); 2’-1” (36M AND MN45); 2’-5” (MN54 AND MN63); 3’-1” (82MW AND 96MW). Based on 3” stool and 9” deck.
- Changed numbered note ④ to read: 1’-10” (27M); 2’-0” (36M AND MN45); 2’-4” (MN54 AND MN63); 3’0” (82MW AND 96MW). Based on note ③.
- Changed numbered note ⑤ to read: Add SD1607E and SD1608E if dimension ② exceeds 1’-8”. Space SD1608E at 1’-6” max. for entire length of diaphragm. Refer to “Part Transverse Section” above.

Revised 04-02-2009

At the PART TRANSVERSE SECTION:

- Changed the dimension from 4" to 4½" CLR at the top of roadway slab to diaphragm reinforcement location.
- Added 9" TYP. Dimension from the beam web to the bottom horizontal diaphragm bars.
- Removed the 3" dimension showing the clearance from the bottom of diaphragm to the reinforcement.
- Changed the beam of the right side of the detail from an M shape to an MN shape. Added leader lines depicting M shape and MN shape.

At SECTION A-A:

- Added a " 2" MIN" dimension to the bottom of diaphragm to end of beam location.
- Added bar designations to the bottom three bars in the end diaphragm.
- Added 10” MIN. dimension from the top of beam to the front edge of the diaphragm for M shapes and 1'-1" MIN dimension for MN shapes.
- Changed the dimension from 4" to 4½" CLR at the top of roadway slab to diaphragm reinforcement location.
- Added bars SD1607E, SD1608E with note ⑤.
- Modified the dimension line indicating the distance from the end of the deck to the CL of the end diaphragm.
- Added “(M SHAPE PCB SHOWN)” under section A-A title.

CHANGES TO REINFORCEMENT:

- Added bar bend for SD1608E with note ⑤.
- Changed height of bar SD1301E. (see note ③)
- Changed height of bar SD1606E and partial length dimension of bar SD__05E. (see note ④)
- Added bars SD1607E and SD1608E if the end of diaphragm dimension exceeds 1'-8". (see note ⑤)

CHANGES TO THE "NOTES:"

- Reduced the height of bar SD1301E by changing note ③ from " 2'-0" (27M); 2'-2" (36M, 45M and MN 45); 2'-6" (54M, MN54 and MN63). Based on 3" stool and 9" deck" to " 1'-11" (27M); 2'-1" (36M, 45M and MN 45); 2'-5" (54M, MN54 and MN63). Based on 3" stool and 9" deck".
- Changed the dimensions on bars SD__05E and SD1606E by adding note ④ " 1'-10" (27M); 2'-0" (36M, 45M and MN 45); 2'-4" (54M, MN54 and MN63). Based on note ③".
- Modified the concrete mix design for the end diaphragms to; "Concrete for end diaphragms shall be the same mix as used in deck", per SSRC meeting 12/01/08.
- Added note ⑤ "Add if dimension ② exceeds 1'-8" "

Revised 06-14-2006

Changed B-Detail subtitle (27M – 54M, MN45 And MN54 Prestressed Concrete Beams) (Parapet Abutment) *to* (27M – 54M, MN45 – MN63 Prestressed Concrete Beams) (Parapet Abutment)

At SECTION A-A:

- changed 2" (MN45 & MN54) *to* 2" (MN45 – MN63)

- changed 54M & MN54 *to* 54M, MN54 & MN63

Under NOTES:

- changed DIAPHRAGM CONCRETE TO BE MIX NO. 3Y43. *to* END DIAPHRAGM SHALL BE CONC. MIX NO. 3Y43.
- changed ALL DIAPHRAGM CONCTETE AND REINFORCEMENT BARS SHOEN ON THIS DETAIL TO BE INCLUDED IN PAYMENT FOR SUPERSTRUCTURE QUANTITIES. *to* QUANTITIES FOR END DIAPHRAGM COCNRETE AND REINFORCEMENT SHOWN ON THIS DETAIL SHALL BE LISTED IN SUPERSTRUCTURE QUANTITIES.
- changed THREADED RODS ARE INCLUDED IN PAYMENT FOR PRESTRESSED CONCRETE BEAMS. *to* THREADED RODS ARE INCIDENTAL TO PRESTRESSED CONCRETE BEAMS.
- changed ③ … 2'-6" (54M AND MN54). BASED … *to* ③ … 2'-6" (54M, MN54 AND MN63). BASED …

Re-Approved 10-26-2005

Changed B-Detail subtitle (27M – 54M Prestressed Concrete Beams) (Parapet Abutment) *to* (27M – 54M, MN45 And MN54 Prestressed Concrete Beams) (Parapet Abutment)

At PART TRANSVERSE SECTION: Called out EDGE OF TOP FLANGE

At SECTION A-A:

- Specified 4" dimension for top threaded rods for 27M – 54M PCB and added 2" dimension for top threaded rods for MN45 and MN54 PCB
- Specified distance from top of beam to bottom of diaphragm for MN45 and MN54 PCB

Under NOTES: Changed ③ 2'-0" (27M), 2'-2" (36M AND 45M), 2'-6" (54M) … *to* ③ 2'-0" (27M); 2'-2" (36M, 45M AND MN45); 2'-6" (54M AND MN54). …

Approved, and signed, November 22, 2002

B816
Concrete End Diaphragm (14", 18" & 22" Rectangular Prestressed Concrete Beams) (Integral Abutment)

Approved, and signed, May 24, 2012. Last date revised: August 24, 2016

Revised 08-24-2016
At PARTIAL ELEVATION:
- Changed the shape of the barrier from an F shape to an S shape.

Revised 04-17-2013
This B-detail was updated to convert reinforcing bar marks from metric to U.S. customary bar designations.

Re-Approved 05-24-2012
At PARTIAL ELEVATION:
- Changed the look of the barrier by adding the 2" x 1'-0" coping and by removing the rustication.
- Moved the fascia beam out slightly to show less cantilever.
- Added reinforcement bar SD1308E (fillet bar) to the detail.
- Changed the size of the SD1602E front face bars to SD1902 and also changed the SD1602E at the threaded rod location to SD1607E.
- Changed the size of SD1605E to SD1905E, and SD1603E to SD1903E.
- Added the SD1609E bar to the detail and changed the dimension line to read "SD1904E*, SD1905E*, SD1906S* & SD1609E* " to represent the reinforcement changes between the beams.

At SECTION A-A:
- Moved the fascia beam out slightly to show less cantilever.
- Changed the SD1603E back face bar designation to SD1903E.
- Changed the SD1904E (epoxy) approach panel tie to SD1906S (stainless steel).
- Changed the size of the SD1602E front face bars to SD1902 and also changed the SD1602E at the threaded rod location to SD1607E.
- Added reinforcement bar SD1308E (fillet bar) to the detail.
- Added reinforcement bar "SD1609E (TYP.) * "to the detail.
- Changed the SD1605E bar designation to SD1905E.
- Added "(See Abutment Sheet)" to the A16__E DOWEL FF (TYP.)
- Added "A___E TIE BF (TYP.)(SEE ABUT. SHT.) with circled leader line.

At SECTION B-B:
- Changed the size of SD1605E to SD1905E.
- Added BF and FF representing back face and front face of integral abutment.
- Changed bar designation *from* "A16__E TIE BF" *to* "A____E TIE BF" and also changed the bar shape.
- Replaced "3-PLY JOINT WATERPROOFING" with numbered note ⑨.
- Changed note: 4" x ½" BIT FELT *to* 7" x ½" BIT FELT and changed the look of the bit felt accordingly.
- Changed the SD1904E (epoxy) approach panel tie to SD1906S (stainless steel).
- Changed the shape of SD1906S and SD1904E by adding a leg at the bottom of the diaphragm.
- Added "1'-9" Embedment" and "1'-9" Projection" for the front face dowel.
- Changed the fillet size from 6" to 8" and also added the SD1308E bar with leader line to the fillet.
- Added the 2'-6" dimension showing the distance from end of fillet to the end of the SD1904E bar.
- Added the 3'-8" dimension showing the distance from end of deck to the end of the SD1905E bar.
- Added the SD1609E bar with leader line.
- Changed the dimension showing the distance from end of deck to end of beam from 2" (Min.) to 5"(Min.).
- Changed the note from "℄ END DIAPHRAGM AND THREADED INSERTS" to "℄ THREADED INSERTS"
- Added numbered note ⑧ to the SD1904E and SD1905E bars.

Added bubbled DESIGNER NOTE: "Use B-Detail when bars are not called out in superstructure plan. Concrete volume and rebar weight shall be included in the superstructure quantities. Maximum beam spacing is 13 feet. Adjust section A-A and bar SD1601E for skew."

Under NOTES:

- At numbered note ⑤ the bar sizes have been changed from #16 to #19 bars.
- Changed numbered note ⑥ to read: " ½" MIN. TYPE B POLYSTYRENE UNDER COMPLETE FLANGE"
- Added numbered note: "⑧ TIE BAR TO TOP MAT."
- Added numbered note : "⑨ MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481.3B.

At the BAR BENDING DETAILS:

- Changed the shape of the SD1904E and also added the SD1906S to the same shape noting that the SD1906S bar is stainless steel.
- Added the SD1609E shaped bar.

At the BILL OF REINFORCEMENT FOR END DIAPHRAGM:

- Changed the SD1602E bar size to SD1902E and updated the location to "Horizontal FF".
- Changed the SD1603E bar size to SD1903E.
- Changed the SD1605E bar size to SD1905E.
- Changed the shape of the SD1904E bar and updated the location to "Diaph./Fillet Tie".
- Added SD1906S, SD1607E, SD1308E and SD1609E reinforcement.

Revised 12-17-08
Under NOTES:

- Added the following note; "Concrete for end diaphragms shall be the same mix as used in deck", per SSRC meeting 12/01/08.

11-30-2004
NEW DETAIL

B822
Concrete Pier Diaphragm (For Double Tee Beams)

Approved, and signed, November 22, 2002. Revised and Archived December 17, 2008.

12-17-2008 – **ARCHIVED**
B822 was removed from the server and Web site and was placed in an archive file at the request of the Bridge State Aid Unit. Since Double Tee Beams are very rarely used, it was not necessary to continue to publish this standard. The detail was updated to include the note below prior to being archived.

Revised 12-17-2008
Under NOTES:

- Added the following note; "Concrete for end diaphragms shall be the same mix as used in deck", per SSRC meeting 12/01/08.

Approved, and signed, November 22, 2002.

B830
Concrete Barrier or Parapet (Slipform Alternate)

Approved and signed, August 24, 2016.

Approved 08-24-2016
GENERAL:

- Changed the title of the sheet from "Concrete Railing (Type F) (Slipform Alternate)" to "Concrete Barrier or Parapet (Slipform Alternate)". B830 now includes Type F, Type S, and Parapet details.
- Archived B831 "Concrete Parapet Railing (Slipform Alternate)" since the parapet details were merged onto this detail.

This is a brand new detail that combines the old B830 & B831 requirements and adds Type S barriers. The detail has been completely updated and revised to match current construction practices.

Revised 04-17-2013
This B-detail was updated to convert reinforcing bar marks from metric to U.S. customary bar designations.

Approved, and signed, November 22, 2002.

B831
Concrete Parapet Railing (Slipform Alternate)

Archived on August 24, 2016

Archived 08-24-2016
B831 was archived and all of the pertinent information from this detail was added to B830.

Revised 04-17-2013
This B-detail was updated to convert reinforcing bar marks from metric to U.S. customary bar designations.

Approved, and signed, November 22, 2002.

B850
Concrete Relief Joint Detail (Bridge Reconstruction On Trunk Highway Bridges)

Approved, and signed, November 22, 2002. Last date revised: April 17, 2013

Revised 04-17-2013
This B-detail was updated to convert reinforcing bar marks from metric to U.S. customary bar designations.

05-26-2006
Per Bridge Construction Unit: changed $^{1}/_{8}$" THICK PLASTIC SHEETING TO BREAK BOND … *to* 8 MIL. THICK PLASTIC SHEETING TO BREAK BOND …

Approved, and signed, November 22, 2002.

B901
Median Sign Post Anchor

Approved, and signed, November 22, 2002. Last date revised: April 17,2013

Revised 04-17-2013
This B-detail was updated to convert reinforcing bar marks from metric to U.S. customary bar designations.

Revised 10-05-2006
Replaced the $2^{1}/_{2}$" nom. dia. standard pipe sleeve with a 3" x 3" $^{5}/_{16}$" HSS sleeve.

Approved, and signed, November 22, 2002.

B905
Fence Post Anchorage

Approved, and signed, November 22, 2002.

B910
Drainage System

Approved, and signed, March 26, 2009. Last day revised: December 2, 2015.

Revised 12-2-2015
The detail was updated to move the pipe drain for integral abutments to pass under the wing wall instead of through the bottom of the wing wall.

At SECTION THROUGH INTEGRAL ABUTMENT:
- Changed the note in lower left corner from "4" NOMINAL DIA. PERFORATED PIPE" to "4" NOMINAL DIA. PERFORATED PIPE (HIGH SIDE)". Added a low side drawing of the pipe and the note "LOW SIDE".

At SECTION B-B:
- Removed the "COUPLING" and "PIPE SLEEVE" labels.
- Moved the end of the perforated pipe to the 45 degree elbow and eliminated a short section of non-perforated pipe.
- Added circled note 2 indicating the pipe slope.
- Changed the note "CAP END" to "CAP END ON HIGH SIDE".

Re-Approved 01-13-2015
At detail: "Section Through Parapet and Semi Integral Abutments" a hyphen (-) was added between "Semi" and "Integral".
Removed from the B-Detail:
- The Summary of Quantities for Drainage System and the accompanying notes.

Under Notes:
- Added, to become the 1st note: Payment will be included in the single lump sum price for "Drainage System Type (B910)", includes but is not limited to 4" diameter perforated and non-perforated pipe, elbows, end caps, couplings, sleeves and precast concrete headwalls.
- Changed 2nd note to read: All pipe to comply with spec. 3245.
- Changed 3rd note to read: Wrap perforated pipe with geotextile per spec. 3733, Type 1. Attach to pipe per spec. 2502.
- Changed numbered note ① to read: At contractor's option, may tie approach panel drainage system and abutment drainage system into a single precast concrete headwall or into a catch basin as long as a minimum of 1% positive slope can be maintained.
  Use precast concrete headwall with rodent screen. See standard plate 3131 for details.
- Changed numbered note ③ to read: Refer to grading plans for abutment backfill requirements.

Revised 10-22-2009
At SECTIONS A-A and B-B:
- Added the pipe sleeve through the wingwall for the drain pipe.

Re-Approved 03-26-2009
This standard plate has been revised to include new drainage details for integral and semi-integral abutments.

At the SHEET TITLE:
- Removed the sub note (FOR HIGH ABUTMENTS).

Under NOTES:
- Changed the first note to read "ALL PIPE SHALL COMPLY WITH Mn/DOT SPEC.3245".
- Added a numbered note ③ "Material shall comply…" note which has been moved from the "SECTION THROUGH ABUTMENT" location.

At SECTION THROUGH ABUTMENT:

- Changed name to "SECTION THROUGH PARAPET AND SEMI INTEGRAL ABUTMENTS".
- Added a numbered note ③ to replace the "Material shall comply…" note which has been moved under the NOTES: portion of the detail.

At SECTION A-A:

- Downsized the width of the section to allow room for new details.

Added: New detail "SECTION THROUGH INTEGRAL ABUTMENT" and "SECTION B-B" to the sheet.

08-25-2006

In notes under SUMMARY OF QUANTITIES: changed … ITEM 2502.601 … *to* … ITEM 2502.502 … which corresponds to 2005 Spec. Book Pay Items.

04-20-2004

In SECTION THROUGH ABUTMENT: eliminated 1 vertical:1.5 horizontal slope for granular borrow material.

Approved, and signed, November 22, 2002.

B911
Drainage System (For Slab Over Parapet Abutments) (With No Approach Treatment)

Approved, and signed, November 22, 2002. Archived, January 13, 2015

January 13, 2015 – **ARCHIVED**
B911 was removed from the server and website and was placed in an archive file.

B920
Temporary Portable Precast Concrete Barrier Anchorage (Temporary Usage In Limited Barrier Displacement Areas)

Approved, and signed, December 21, 2011. Last date revised: May, 24 2012

Revised 05-24-2012
Changed: "MnDOT" to "SPEC."at multiple locations on the detail and in the notes.

At ANCHORAGE DETAILS, OPTION 1 and OPTION 2: Added the wearing coarse to the details on the traffic side of the barrier.

At SIDE VIEW: Added "TORQUE ANCHOR BOLTS TO 80 FT. LBS." to the end of the existing note.

UNDER NOTES:
- Changed the 3rd note *From*: "Cost of anchorages, anchor removal …. *To:* Cost of anchorage system, anchor removal……..
- Changed 4th note *From:* "Pin barriers together per MnDOT standard plate 8337." *To:* "Pin barriers together per standard plate 8337."
- Removed the 9th note: "Fill anchorage holes with……"
- Changed 10th note *From:* "See special provisions for barrier removal requirements." *To:* "See special provisions for barrier installation and removal requirements."

Re-Approved 12-21-2011

At SHEET TITLE: changed the title *from:* "Portable Precast Barrier Anchorage" *to:* Temporary Portable Precast Concrete Barrier Anchorage".

Removed the "ANCHOR BRACKET FOR OPTION 1" detail from the sheet.

Added a bubbled "DESIGNER NOTE" to the sheet. Note reads: Refer to MnDOT LRFD Manual "Memo to Designers (2011-03)" For Guidance on Edge Distance.

UNDER NOTES:
- Changed the 1st note to read: "All hardware to be galvanized per MnDOT 3392."
- Changed the 2nd note to read: "All structural steel to be MnDOT 3306 unless otherwise noted."
- Changed the 3rd note to read: "Cost of anchorages, anchor removal and grouting of hole are incidental to the cost of placing the temporary portable precast barrier."
- Added 4th note: "Pin barriers together per MnDOT standard plate 8337."
- Added 5th note: "Through bolt anchors must be used if the deck is penetrated during drilling process."
- Added 6th note: "Do not use on bridges or approach panels with a bituminous overlay."
- Added 7th note: "Refer to traffic control plans for deployment length and barrier termination requirements."
- Added 8th note: "Anchor on traffic side of barrier only."
- Added 10th note: "See special provisions for barrier removal requirements."
- Added numbered note "② 1 ½" minimum to prevent bottom of slab from spalling or fracturing during drilling."
- Added numbered note "③ 5 ½" minimum and 6" maximum for bridge decks with top mat reinforcement and sound concrete. 9" minimum and 10 ½" maximum for sound concrete approach panels."

At ANCHORAGE DETAILS: (Option 1 and Option 2)
- Updated the shape of the barriers.
- Removed the dimension and anchorage bracket between the anchor rods and removed the outside anchor rod.
- Moved the See section "A" circle to the traffic side of the barrier.

- Added a dimension with bubbled "See Designer Note" between the edge of barrier and the edge of deck.
- Added the leader line showing the "Edge of Deck".
- Added the underlined designation showing the "Traffic Side" of the barrier.
- Added note "Reinforced Concrete Bridge Deck or Approach Panel" with leader line to both options.
- Changed the note *from:* "See Standard Plate 8337B…….*to: :*"See Standard Plate 8337 for Barrier Details"

(at Option 1)

- Changed the look of the anchorage by adding the plate washer to the top of the anchorage and adding the plate washer and jam nuts to the bottom with updated note: "2-Heavy Hex Jam Nuts, ½" Plate Washer".

(at Option 2)

- Added the " 1½" Min. ②" dimension between the bottom of the deck and the bottom of the anchorage.
- Changed the note pointing to the anchorage to read: 3 – 1 1/8" Dia. MnDOT 3385 Type A Anchor Rods Per Barrier Segment.
- Changed the note showing the dimension from the top of the deck to the bottom of the anchorage to read: "Anchorage Embedment Depth ③"
- Changed the note for ultimate pullout strength *from:* 16 KIPS *to:*14 KIPS

At OPTION 1 ANCHOR:

- Added sub title "(3 PER BARRIER SEGMENT)" to the detail.
- Rotated the view and added Top and Bottom for clarification.
- Changed the dimension *from:* 1'-1" + Slab Thickness *to:* 9" + Slab Thickness.
- Added to the detail: 2-heavy hex jam nuts and 5"x5" plate washer (bottom), and 3"x3" plate washer (top).
- Changed note to read: "Heavy Hex Nut, Lock Washer and ½" Plate Washer. Check Plan for Number Required".
- Changed note to read: "1 1/8" Dia. MnDOT 3385 Type A Anchor Rod"
- Changed note to read: "2-Heavy Hex Jam Nuts, ½" Plate Washer. Check Plan for Number Required".

At PLATE WASHER:

- Changed the detail title *to:* "TOP PLATE WASHER"
- Changed the look to better represent the actual shape and removed the side view of the plate washer.
- Added: ½" x 3" x 3" Plate Washer note to the detail.

Added: "BOTTOM PLATE WASHER" detail to the sheet with plate dimensions, hole location and size.

At the SIDE VIEW:

- Changed the dimension for the block out in the barrier *from:* 5" *to:* 4"
- Removed the 4 ½" vertical dimension for the block out in the barrier.
- Changed the note *from:* ½" Plate Washer with Heavy Hex Nut and Lock Washer *to:* Heavy Hex Nut, Lock Washer and ½" Plate Washer.
- Changed the look of the nut, lock washer and plate washer to better represent the actual size.

At DETAIL "A":

- Mirrored the detail to match the traffic side of the barrier on the sheet.
- Changed the shape of the barrier to better represent the actual shape.
- Changed the look of the nut, lock washer and plate washer to better represent the actual size.
- Removed the 3" and 1 ½" dimensions showing the depth of block out and anchor location.
- Added a 3" dimension from the edge of the barrier to the anchorage.

07-28-03

At ANCHORAGE DETAILS: Changed SEE STANDARD PLATE 8337A … to SEE STANDARD PLATE 8337B …

B922
Portable Precast Barrier Anchorage (Temporary Usage On Roadways)

Approved, and signed, November 22, 2002.

05-24-2011 - **ARCHIVED**
B922 was removed from the server and Web site and was placed in an archive file.

B935
Triple Beam Guardrail

Approved, and signed, November 22, 2002.

B942
Inspection Door (In Vertical Or Horizontal Position)

Approved, and signed, November 22, 2002.

B950
Anchor Bolt Cluster For Light Poles

Approved and signed, August 24, 2016.

Approved 08-24-2016
GENERAL:
This detail was completely redesigned with 2 new alternatives for holding the anchors in place (anchor bar alternate and anchor plate alternate). The welded cage alternate was eliminated.

The design of the anchorage and the notes were updated to comply with current best practices for design, construction, and maintenance.
The notes were also updated to use active voice.
A Designer Note was added.
The anchor length table was updated to include Type S and other barrier/parapet types.

03-02-2005
At ELEVATION: changed 4" MIN. *to* 5" MIN.

Under NOTES: changed …FLAT WASHERS PER Mn/DOT SPEC. 3391.2B FOR … *to* …FLAT WASHERS PER Mn/DOT SPEC. 3391.2A FOR …

10-26-2004
Changed title *from* LIGHT POLE ANCHORAGE *to* ANCHOR BOLT CLUSTER FOR LIGHT POLES

At ELEVATION:
- per rod, changed three heavy hex nuts to two heavy hex nuts, two flat washers, and two jam nuts.
- Changed note ③ to SEE DETAIL "A". Added DETAIL "A".

Removed ALTERNATE I NOTES and ALTERNATE II NOTES.

Under NOTES: changed …
ALL RODS ARE TO BE 1" NOMINAL DIA.

TOP OF THE LOWER NUTS SHALL BE FLUSH WITH TOP OF CONCRETE RAILING. WRAP THE THREADS BELOW THE NUTS WITH 3 LAYERS OF PLASTIC ELECTRICAL TAPE.

SUBSTITUTE MATERIALS AS PER Mn/DOT SPEC. 1605.

to …

ALL RODS ARE TO BE 1" NOMINAL DIA. WITH 1 - 8UNC - 2A THREADS. HEAVY HEX NUTS, JAM NUTS, AND FLAT WASHERS PER Mn/DOT SPEC. 3391.2B FOR 1"DIA. THREADED RODS. NUTS TO BE TAPPED $^{1}/_{64}$" OVERSIZED PRIOR TO GALVANIZING, AND RETAPPED TO STANDARD SIZE AFTER GALVANIZING.

GALVANIZE THREADED RODS, CAGES, AND NUTS AFTER FABRICATION AS PER Mn/DOT SPEC. 3392.

TOP OF THE LOWER NUTS SHALL BE FLUSH WITH TOP OF CONCRETE RAILING.

SUBSTITUTE MATERIALS PER Mn/DOT SPEC. 1605.

① THREADED RODS, STEEL AS PER Mn/DOT SPEC. 3309, 3310, OR 3385 TYPE B (6 REQUIRED).

② PROVIDE A MECHANICAL OR WELDED CAGE FOR ROD ALIGNMENT. STEEL AS PER Mn/DOT SPEC. 3306 (2 REQUIRED).

③ HEAVY HEX NUTS FOR 1" DIA. RODS (12 REQUIRED).

④ FLAT WASHERS FOR 1" DIA. RODS (12 REQUIRED).

⑤ JAM NUTS FOR 1" DIA. RODS (12 REQUIRED).

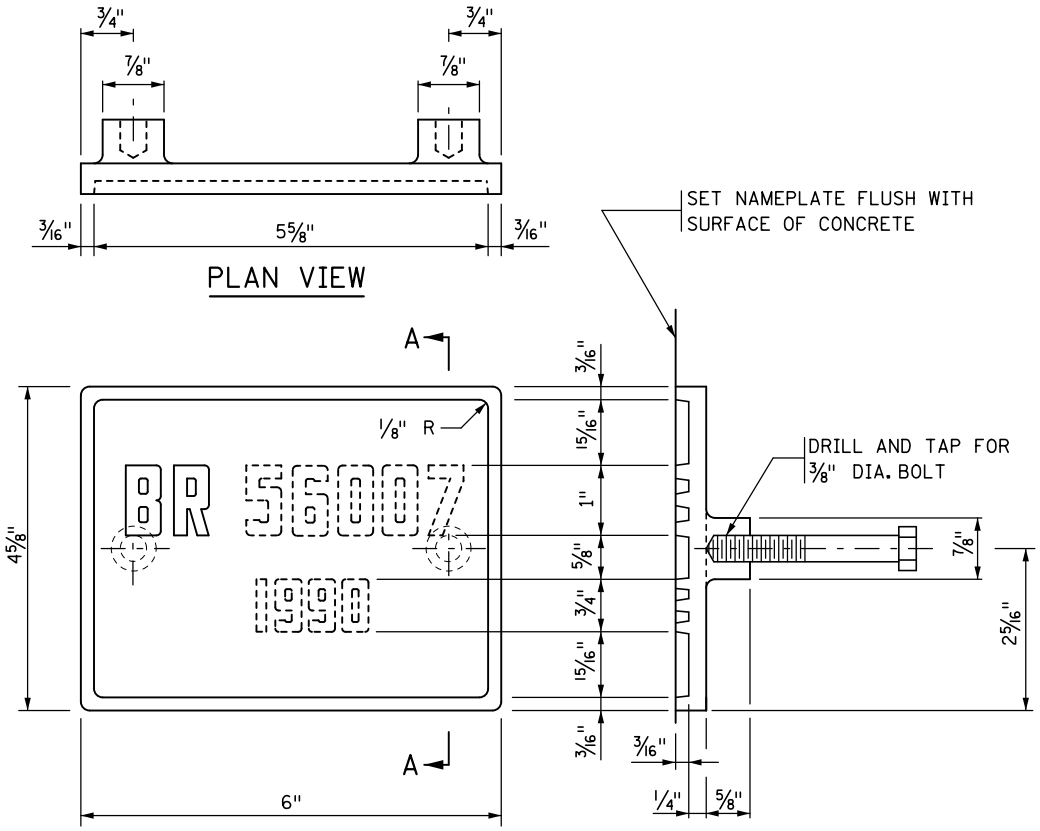
DETAIL N0.	DESCRIPTION	DATE APPROVED	DATE REVISED
B101	Bridge Nameplate (For New Bridges)	Nov. 22, 2002	09-11-2014
B102	Bridge Nameplate (For Bridge Reconstruction)	Nov. 22, 2002	09-11-2014
B201	Pile Splice (Cast-In-Place Concrete Piles)	Nov. 22, 2002	11-06-2013
B202	Pile Splice (Steel H Bearing Piles 10” To 14”)	Nov. 22, 2002	11-06-2013
B303	Sole Plate (Prestressed Concrete Beams) (For Bearings With Pintles)	Sept. 22, 2011	
B304	Elastomeric Fixed Bearing Assembly (Prestressed Concrete Beams) (For Replacement Of Inplace Bearings Only)	Nov. 22, 2002	
B305	Elastomeric Bearing Pad (Prestressed Concrete Beams)	Nov. 22, 2002	01-13-2015
B309	Tapered Bearing Plate Assembly (For Integral Abutments or Piers with Continuity Diaphragms)	Feb. 27,2013	11-03-2015
B310	Curved Plate Bearing Assembly (Prestressed Concrete Beams) (Fixed)	Sept. 22, 2011	11-03-2015
B311	Curved Plate Bearing Assembly (Prestressed Concrete Beams) (Expansion)	Sept. 22, 2011	11-03-2015
B312	Pot Type Bearing Assembly (Prestressed Concrete Beams) (Guided Expansion)	Nov. 22, 2002	11-03-2015
B313	Pot Type Bearing Assembly (Prestressed Concrete Beams) (Non-Guided Expansion)	Nov. 22, 2002	11-03-2015
B314	Pot Bearing Assembly (Steel Beams) (Guided Expansion)	Sept. 18, 2007	11-03-2015
B315	Pot Bearing Assembly (Steel Beams) (Non-Guided Expansion)	Sept. 18, 2007	11-03-2015
B316	Pot Bearing Assembly (Steel Beams) (Fixed)	Sept. 18, 2007	11-03-2015
B354	Curved Plate Bearing Assembly (Steel Beams) (Fixed)	Nov. 22, 2002	11-03-2015
B355	Curved Plate Bearing Assembly (Steel Beams) (Expansion)	Nov. 22, 2002	11-03-2015
B400	Splices For Steel Beams	Nov. 22, 2002	05-24-2012
B402	Bolted Diaphragms (For Steel Beams)	Mar. 26, 2009	
B403	Steel Intermediate Diaphragm (For 36M - 54M, MN45 - MN63 Prestressed Concrete Beams)	Nov. 03, 2015	
B407	Cross Frame Intermediate Diaphragm (For Straight Steel Beams)	Mar. 26, 2009	11-03-2015

DETAIL N0.	DESCRIPTION	DATE APPROVED	DATE REVISED
B408	Cross Frame Intermediate Diaphragm (For Curved Steel Beams)	Mar. 26, 2009	11-03-2015
B410	Bolted Flange To Stiffener Detail	Nov. 22, 2002	05-24-2012
B411	Stiffener Details (For Steel Beams)	Oct. 22, 2008	
B412	Steel Intermediate Bolted Diaphragm (All MW Prestressed Concrete Beams)	Sept. 22, 2011	11-03-2015
B553	Protection Plate (For End Of Slab)	Nov. 22, 2002	
B701	Bridge Floor Drain (Welded Box)	Nov. 22, 2002	
B702	Bridge Floor Drain (Structural Tube)	Nov. 22, 2002	01-13-2004
B705	Bridge Offset Floor Drain (Welded Box)	Nov. 22, 2002	
B706	Bridge Offset Floor Drain (Structural Tube)	Nov. 22, 2002	
B801	Contraction Joint	Nov. 22, 2002	03-30-2010
B814	Concrete End Diaphragm (27M & 36M, MN45 - MN63, 82MW & 96MW Prestressed Concrete Beams) (Parapet Abutment)	Sept. 22, 2011	11-06-2013
B816	Concrete End Diaphragm (14", 18" & 22" Rectangular Prestressed Concrete Beams) (Integral Abutment)	May 24, 2012	08-24-2016
B830	Concrete Barrier or Parapet (Slipform Alternate)	Aug. 24, 2016	
B850	Concrete Relief Joint Detail (Bridge Reconstruction On Trunk Highway Bridges)	Nov. 22, 2002	04-17-2013
B901	Median Sign Post Anchor	Nov. 22, 2002	04-17-2013
B905	Fence Post Anchorage	Nov. 22, 2002	
B910	Drainage System	Jan. 13, 2015	12-02-2015
B920	Temporary Portable Precast Concrete Barrier Anchorage (Temporary Usage In Limited Barrier Displacement Areas)	Dec. 21, 2011	05-24-2012
B935	Triple Beam Guardrail	Nov. 22, 2002	
B942	Inspection Door (In Vertical Or Horizontal Position)	Nov. 22, 2002	
B950	Anchor Bolt Cluster for Light Poles	Aug. 24, 2016	

DETAIL NO.	DESCRIPTION	DATE APPROVED	DATE REVISED
B308	Elastomeric Bearing Assembly (22" And 30" Concrete Double Tee Beams) (Fixed and Expansion) **ARCHIVED 10-22-2009**	Nov. 22, 2002	
B317	Curved Cast Bearing Assembly (Prestressed Concrete Beams) (Fixed) **ARCHIVED 11-10-2005**	Nov. 22, 2002	
B318	Curved Cast Bearing Assembly (Prestressed Concrete Beams) (Expansion) **ARCHIVED 11-10-2005**	Nov. 22, 2002	
B341	Fixed Bearing Assembly (Rocker Type) **ARCHIVED 01-17-2000**	July 30, 1999	
B342	Expansion Bearing Assembly (Rocker Type) **ARCHIVED 01-17-2000**	July 30, 1999	
B351	Bearing Assembly (Steel Beams) (Fixed) **ARCHIVED 03-25-2004**	Nov. 22, 2002	
B352	Bearing Assembly (Steel Beams) (Expansion with Guide Bars) **ARCHIVED 01-17-2000**	July 30, 1999	
B353	Bearing Assembly (Steel Beams) (Expansion without Guide Bars) **ARCHIVED 01-18-2000**	July 30, 1999	
B357	Curved Plate Bearing Assembly (Steel Beams) (Vulcanized Expansion) **ARCHIVED 08-25-2006**	Nov. 22, 2002	
B406	Steel Intermediate Bolted Diaphragm (For 63M – 81M Prestressed Concrete Beams) **ARCHIVED 09-22-2011**	Nov. 22, 2002	10-22-2009
B601	Expansion Hinge for Welded Beams (For Straight Bridges) **ARCHIVED 02-11-2000**	July 30, 1999	
B602	Expansion Hinge for Wide Flange Beams (For Straight Bridges) **ARCHIVED 02-11-2000**	July 30, 1999	
B704	Drain Extension **ARCHIVED 03-22-2002**	July 30, 1999	
B710	Floor Drain For Tee Beams **ARCHIVED 10-22-2009**	Nov. 22, 2002	

DETAIL NO.	DESCRIPTION	DATE APPROVED	DATE REVISED
B802	Concrete Intermediate Diaphragm (28M – 40" Prestressed Concrete Beam Spans) **ARCHIVED 09-17-1997**	May 23, 1995	
B803	Concrete End Diaphragm (28M – 40" Prestressed Concrete Beams) (Parapet Abutment) **ARCHIVED 03-22-2002**	July 30, 1999	
B806	Concrete Intermediate Diaphragm (63" – 81" Prestressed Concrete Beam Spans) **ARCHIVED 09-17-1997**	May 23, 1995	
B807	Concrete End Diaphragm (For Double Tee Beams with Contraction Abutment) **ARCHIVED 12-17-2008**	Nov. 22, 2002	12-17-2008
B809	Concrete End Diaphragm (For Steel Beams With Contraction Abutment) **ARCHIVED 12-17-2008**	Nov. 22, 2002	12-17-2008
B810	Concrete End Diaphragm (28M – 40" Prestressed Concrete Beams) (Pile Bent Abutment) **ARCHIVED 03-22-2002**	July 30, 1999	
B811	Concrete End Diaphragm (27M – 81M, MN45 – MN63 Prestressed Concrete Beams) (Contraction Abutment) **ARCHIVED 12-17-2008**	Oct. 26, 2005	12-17-2008
B812	Concrete End Diaphragm (63M – 81M Prestressed Concrete Beams) (Parapet Abutment) **ARCHIVED 05-24-2012**	Nov. 22, 2002	05-24-2012
B813	Concrete Intermediate Diaphragm (45M – 54M Prestressed Concrete Beam Spans) **ARCHIVED 09-17-1997**	May 23, 1995	
B822	Concrete Pier Diaphragm (For Double Tee Beams) **ARCHIVED 12-17-2008**	Nov. 22, 2002	12-17-2008
B831	Concrete Parapet Railing (Slipform Alternate) **ARCHIVED 08-24-2016**	Nov. 22, 2002	08-24-2016
B911	Drainage System (For Slab Over Parapet Abutments) (With No Approach Treatment) **ARCHIVED 01-13-2015**	Nov. 22, 2002	

B922	Portable Precast Barrier Anchorage (Temporary Usage On Roadways) **ARCHIVED 05-24-2011**	Nov. 22, 2002



THE DASHED NUMBERS SHOWN ABOVE ARE FOR ILLUSTRATION.
DATA TO BE SHOWN ON NAMEPLATE IS AS FOLLOWS:

BRIDGE _____

YEAR _____

NUMBERS FOR NAMEPLATE

NOTES:

MATERIAL SHALL COMPLY WITH SPEC. 3327.

LETTERS AND NUMBERS SHALL CONFORM TO THOSE SHOWN.

DRAFT ON LETTERS AND NUMBERS SHALL NOT BE MORE THAN 3" IN 12".

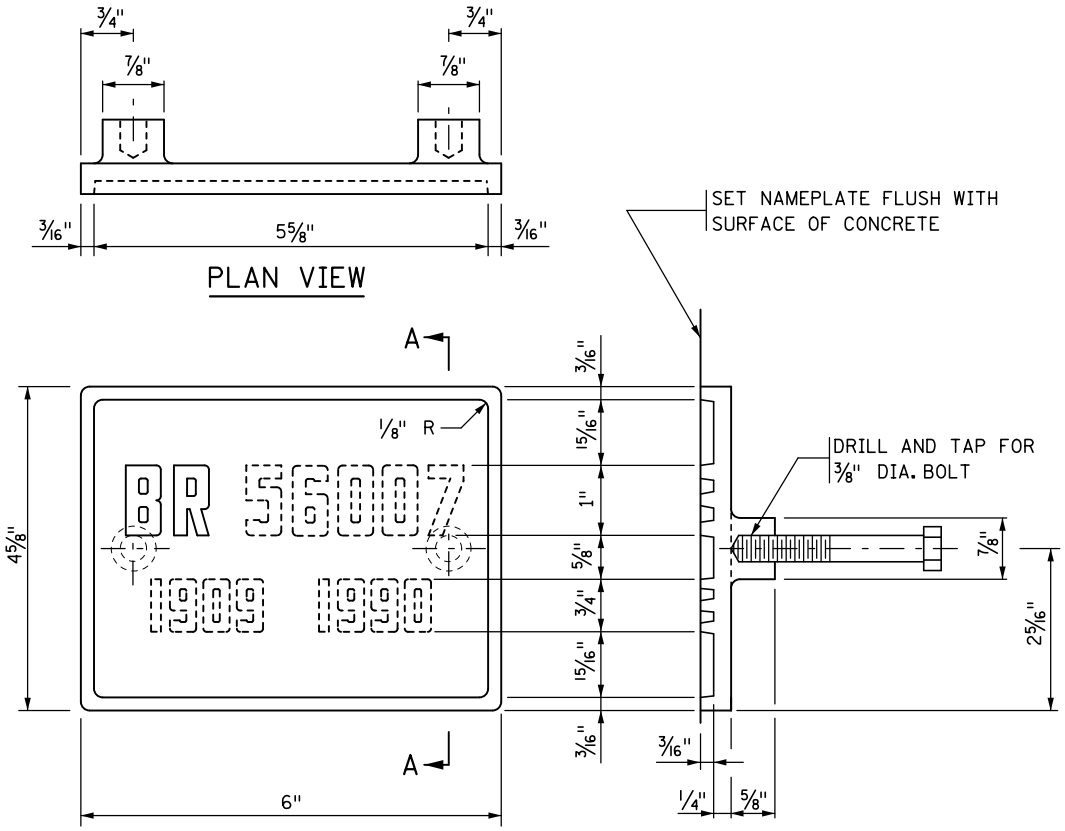
HORIZONTAL SPACING OF LETTERS AND NUMBERS SHALL PRODUCE A BALANCED LAYOUT IN PROPORTION TO SPACING SHOWN.

TOP SURFACE OF LETTERS, NUMBERS AND FRAMES SHALL BE BURNISHED.

FURNISH 2 STEEL BOLTS 3/8" DIA. x 3" LONG WITH EACH PLATE.

ALL DIMENSIONS FOR 3/4" HIGH LETTERS AND NUMBERS SHALL BE IN DIRECT PROPORTION TO THOSE SHOWN FOR THE 1" HIGH LETTERS AND NUMBERS.

APPROVED: NOVEMBER 22, 2002	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION 09-11-2014	DETAIL NO.
Daniel L Morgan STATE BRIDGE ENGINEER	BRIDGE NAMEPLATE (FOR NEW BRIDGES)		B101



THE DASHED NUMBERS SHOWN ABOVE ARE FOR ILLUSTRATION.
DATA TO BE SHOWN ON NAMEPLATE IS AS FOLLOWS:

BRIDGE: _____

YEAR: _____ YEAR: _____

NUMBERS FOR NAMEPLATE

NOTES:

NO SHOP DRAWING REQUIRED.

MATERIAL SHALL COMPLY WITH SPEC. 3327.

LETTERS AND NUMBERS SHALL CONFORM TO THOSE SHOWN.

DRAFT ON LETTERS AND NUMBERS SHALL NOT BE MORE THAN 3" IN 12".

HORIZONTAL SPACING OF LETTERS AND NUMBERS SHALL PRODUCE A BALANCED LAYOUT IN PROPORTION TO SPACING SHOWN.

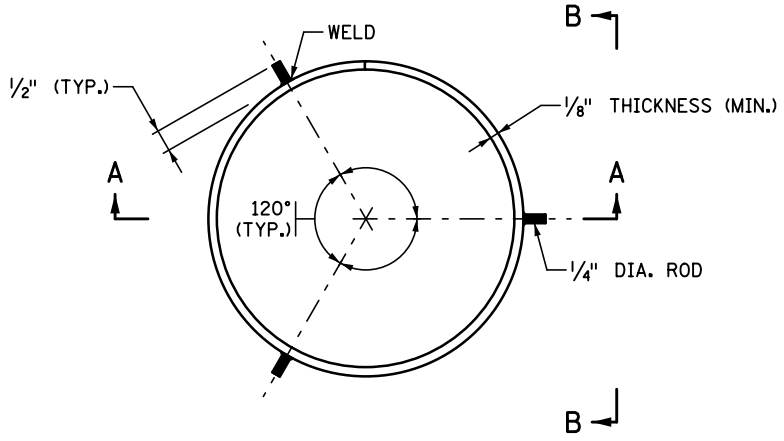
BALANCED LAYOUT IN PROPORTION TO SPACING SHOWN.

TOP SURFACE OF LETTERS, NUMBERS AND FRAMES SHALL BE BURNISHED.

FURNISH 2 STEEL BOLTS 3/8" DIA. x 3" LONG WITH EACH PLATE.

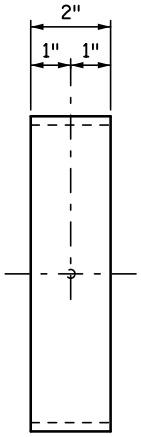
ALL DIMENSIONS FOR 3/4" HIGH LETTERS AND NUMBERS SHALL BE IN DIRECT PROPORTION TO THOSE SHOWN FOR THE 1" HIGH LETTERS AND NUMBERS.

APPROVED: NOVEMBER 22, 2002 Daniel L Morgan STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION BRIDGE NAMEPLATE (FOR BRIDGE RECONSTRUCTION)	REVISION 09-11-2014	DETAIL NO. B102



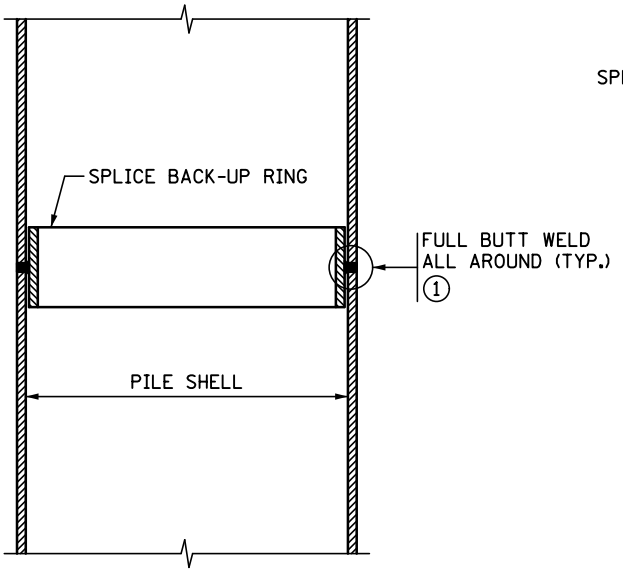
PLAN VIEW - SPLICE BACK-UP RING

PILE NOT SHOWN

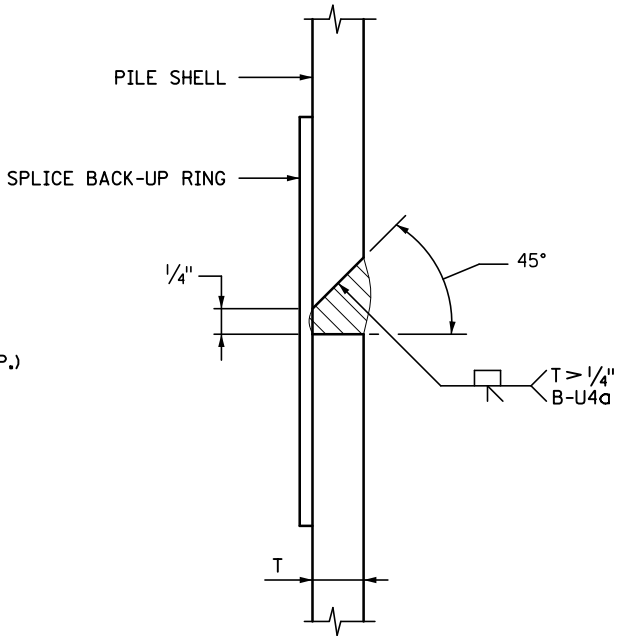


SECTION B-B

PILE NOT SHOWN



SECTION A-A



DETAIL "A" ①

NOTES:

APPROVED COMMERCIAL PILE SPLICE BACK-UP RING MAY BE USED IN LIEU OF THE TYPE DETAILED, PROVIDED THAT ¼" ROOT IS MAINTAINED. BACK-UP RING SHALL HAVE A TIGHT FIT.

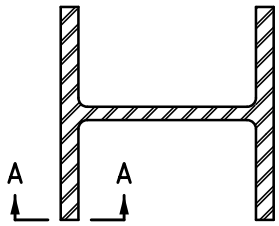
WELDING ELECTRODES SHALL BE CELLULOSIC TYPE ELECTRODES E-6010 OR E-6011.

ELECTRODES WHICH HAVE BECOME WET, SOILED OR DAMAGED SHALL NOT BE USED.

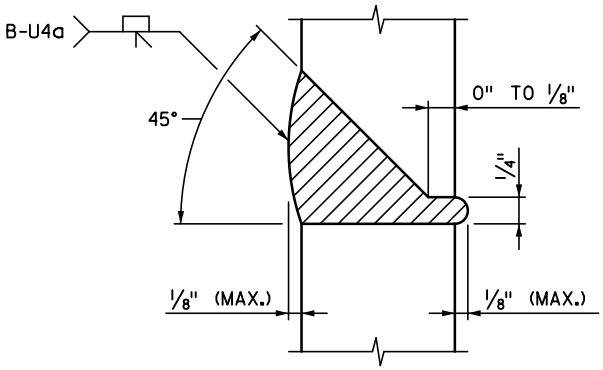
WELDING SHALL NOT BE DONE WHEN THE AMBIENT TEMPERATURE IS LOWER THAN 0° F. OR WHEN THE PILE IS WET OR EXPOSED TO FALLING RAIN OR SNOW. WHEN THE PILE METAL TEMPERATURE IS BELOW 32° F., THE PILE METAL IN THE AREA OF THE WELD SHALL BE HEATED TO A MINIMUM TEMPERATURE OF 70° F. AND MAINTAINED AT THIS TEMPERATURE DURING WELDING.

① FOR PILE SHELL THICKNESSES GREATER THAN ¼", USE A B-U4a WELD CONFIGURATION. SEE DETAIL "A".

APPROVED: NOVEMBER 22, 2002 Daniel L Worgan STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION PILE SPLICE (CAST-IN-PLACE CONCRETE PILES)	REVISION: 11-06-2013	DETAIL NO. B201



SECTION AT SPLICE



SECTION A-A

100% BUTT WELDED PILE SPLICE

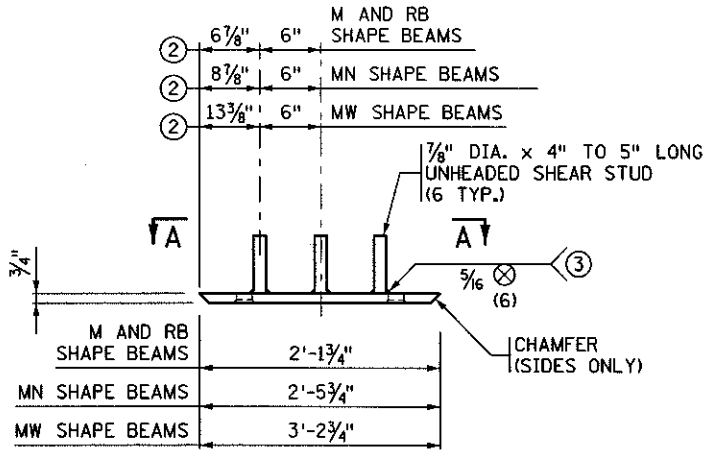
NOTES:

CELLULOSIC TYPE ELECTRODES E-6010 OR E-6011 SHALL BE USED FOR 100% BUTT WELDED SPLICES.

ELECTRODES WHICH HAVE BECOME WET, SOILED OR DAMAGED SHALL NOT BE USED.

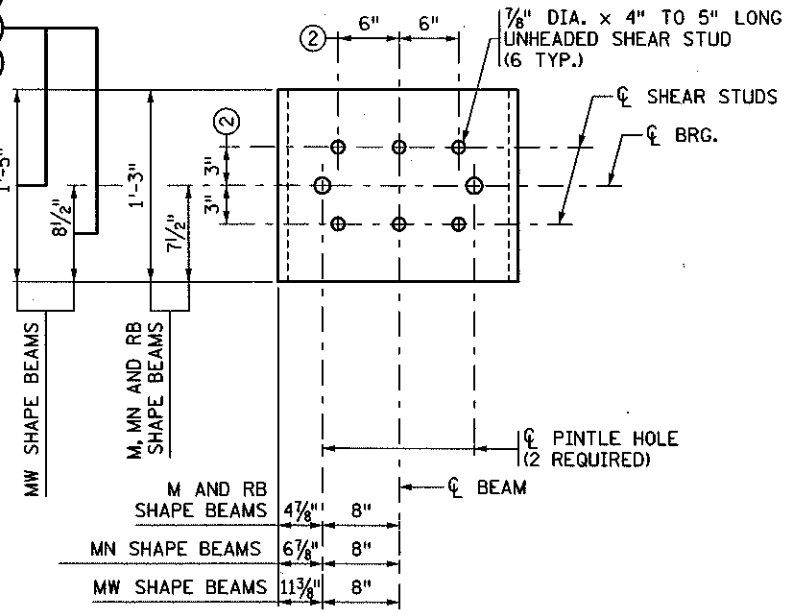
WELDING SHALL NOT BE DONE WHEN THE AMBIENT TEMPERATURE IS LOWER THAN 0° F. OR WHEN THE PILE IS WET OR EXPOSED TO FALLING RAIN OR SNOW. WHEN THE PILE METAL TEMPERATURE IS BELOW 32° F., THE PILE METAL IN THE AREA OF THE WELD SHALL BE HEATED TO A MINIMUM TEMPERATURE OF 70° F. AND MAINTAINED AT THIS TEMPERATURE DURING WELDING.

APPROVED: NOVEMBER 22, 2002 Daniel L Worgan STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION PILE SPLICE (STEEL H BEARING PILES 10" TO 14")	REVISION: 11-06-2013	DETAIL NO. B202

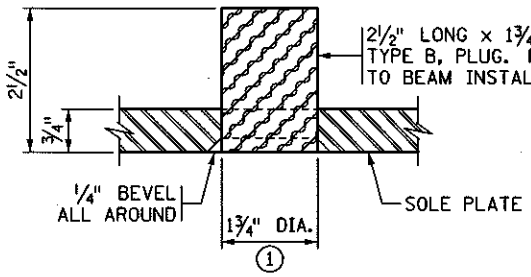


FRONT ELEVATION

DESIGNER NOTE (REMOVE PRIOR TO PLOTTING FINAL PLAN): ADJUST THIS DIMENSION FOR LARGE MOVEMENT BEARINGS AND CONSIDER THE EFFECTS ON THE BEARINGS AND PORTION OF THE BEAM THAT CANTILEVERS BEYOND THE BEARING.



SECTION A-A



PINTLE HOLE DETAIL

NOTES:

MATERIAL TO BE STRUCTURAL STEEL PER MnDOT SPEC. 3306.

WELDED STUDS TO BE WELDABLE CARBON STEEL PER MnDOT SPEC. 3391.2D.

SOLE PLATE FOR BEARING ASSEMBLY TO BE GALVANIZED PER MnDOT SPEC. 3394 AFTER FABRICATION.

PINTLE HOLES SHALL BE FREE OF ZINC BUILD UP FROM GALVANIZING.

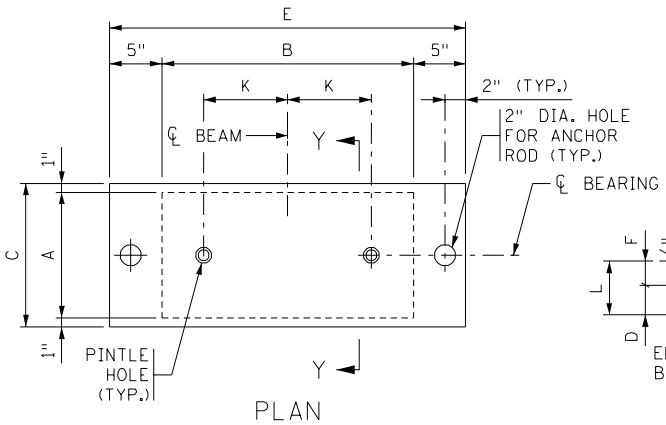
SOLE PLATES ARE INCIDENTAL TO PRESTRESSED CONCRETE BEAMS.

(1) FOR 1½" DIA. PINTLES.

(2) THESE DIMENSIONS MAY BE MODIFIED TO CLEAR PRESTRESSED STRANDS. HOWEVER, CHANGES MUST BE APPROVED BY THE ENGINEER.

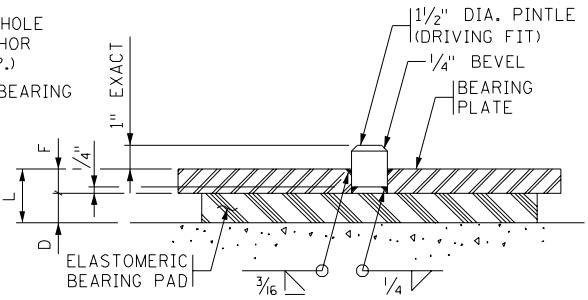
(3) THE REQUIREMENTS FOR WELDING STUDS SHALL COMPLY WITH AASHTO/AWS D1.1.

APPROVED: SEPTEMBER 22, 2011 Nancy Daubenberger STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION SOLE PLATE (PRESTRESSED CONCRETE BEAMS) (FOR BEARINGS WITH PINTLES)	REVISED	DETAIL NO. B303



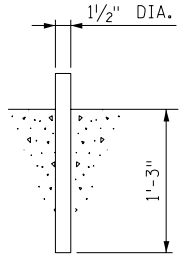
PLAN

BEAM NOT SHOWN

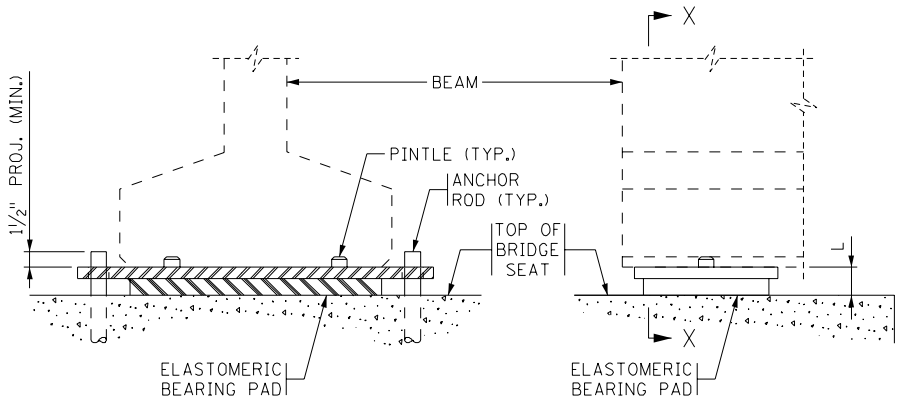


SECTION Y-Y

ENLARGED



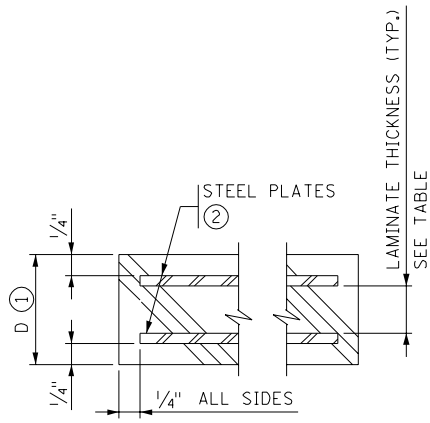
ANCHOR ROD
DETAIL



SECTION X-X

SIDE ELEVATION

PINTLES NOT SHOWN



SECTION THROUGH
ELASTOMERIC BEARING PAD

TABLE

ASSEMBLY TYPE	LOCATION	BEAM SIZE	BEARING PAD SIZE			STEEL PLATES		LAMINATES		SHAPE FACTOR	BEARING PLATE SIZE			PINTLE DISTANCE	ASSY. HEIGHT
			A	B	D	NO.	THICK.	NO.	THICK.		C	E	F	K	L
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
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NOTES:

ELASTOMERIC MATERIALS AND PAD CONSTRUCTION SHALL COMPLY WITH Mn/DOT SPEC. 3741.

ALL STEEL PLATES SHALL COMPLY WITH Mn/DOT SPEC. 3306.

ANCHOR RODS SHALL COMPLY WITH Mn/DOT SPEC. 3306. GALVANIZE PER Mn/DOT SPEC. 3394.

PINTLE SHALL COMPLY WITH Mn/DOT SPEC. 3309.

GALVANIZE STRUCTURAL STEEL BEARING ASSEMBLY AFTER FABRICATION PER Mn/DOT SPEC. 3394, EXCEPT AS NOTED.

PAYMENT FOR BEARING ASSEMBLY SHALL INCLUDE ALL MATERIAL ON THIS DETAIL.

① THE TOTAL THICKNESS SHOWN INCLUDES THE STEEL PLATES.

② DO NOT GALVANIZE THESE PLATES.

DESIGN DATA:

MAXIMUM HORIZONTAL LOAD IS 70 KIPS FOR 1½" PINTLES.

APPROVED: NOVEMBER 22, 2002

Daniel L Morgan

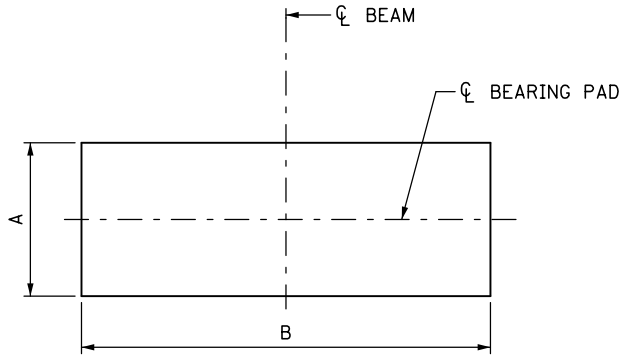
STATE BRIDGE ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

ELASTOMERIC FIXED BEARING ASSEMBLY

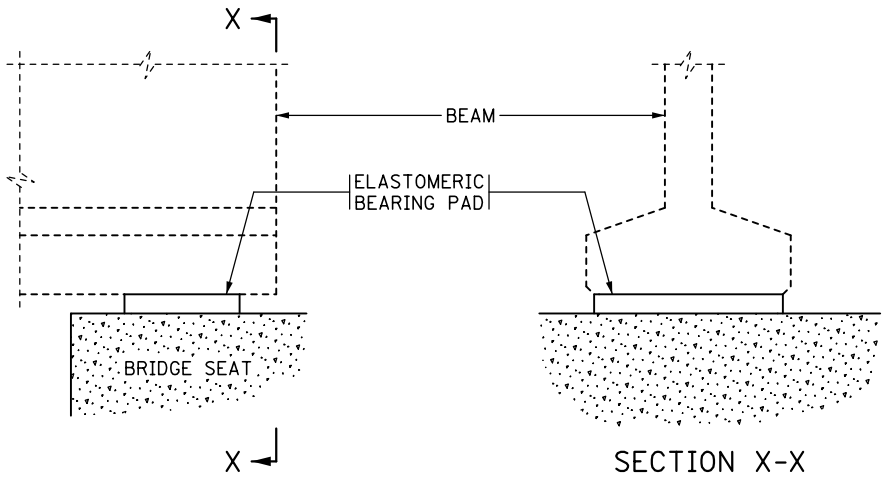
(PRESTRESSED CONCRETE BEAMS)
(FOR REPLACEMENT OF INPLACE BEARINGS ONLY)

REVISION	DETAIL NO.
	B304



PLAN

(BEAM NOT SHOWN)



SIDE ELEVATION

SECTION X-X

TABLE

PAD TYPE	LOCATION	BEAM SIZE	BEARING PAD SIZE			SHAPE FACTOR
			A	B	D ①	
			12	24	½	8.0

NOTES:

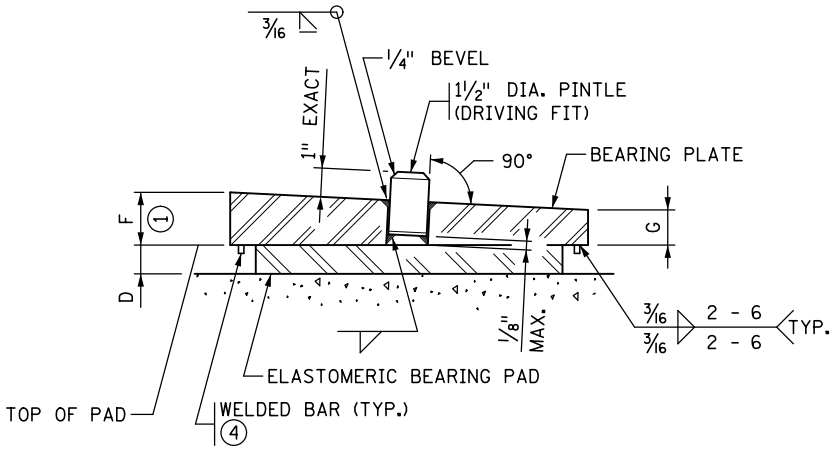
ELASTOMERIC MATERIALS AND PAD CONSTRUCTION SHALL COMPLY WITH SPEC. 3741.

PAYMENT FOR ELASTOMERIC BEARING PAD INCLUDED IN ITEM "ELASTOMERIC BEARING PAD" PER EACH.

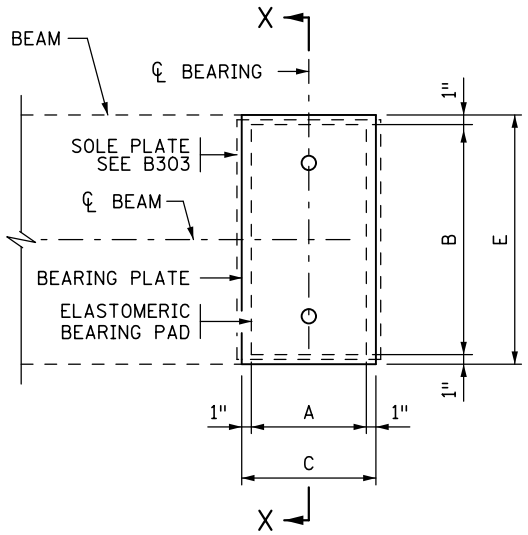
① "D" INDICATES THE THICKNESS OF THE BEARING PAD.

DESIGNER NOTE
(REMOVE DESIGNER NOTE PRIOR TO PLOTTING FINAL PLAN):
USE ½" UNREINFORCED PAD WITH CONTINUITY DIAPHRAGMS OR INTEGRAL ABUTMENTS.

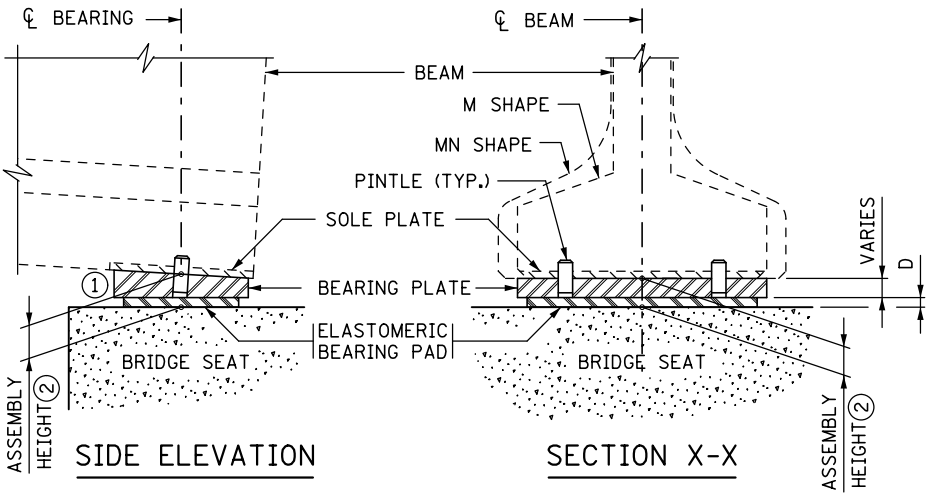
APPROVED: NOVEMBER 22, 2002	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION 12-17-2008 05-24-2012 01-13-2015	DETAIL NO.
Daniel L Morgan STATE BRIDGE ENGINEER	ELASTOMERIC BEARING PAD (PRESTRESSED CONCRETE BEAMS)		B305



BEARING PLATE DETAIL



PLAN



SIDE ELEVATION

SECTION X-X

DESIGNER NOTE
(REMOVE DESIGNER NOTE PRIOR TO PLOTTING FINAL PLAN):

USE TAPERED PLATE FOR GRADES EXCEEDING 3%. MAINTAIN SAME TAPERED PLATE THICKNESS WITHIN 2% SLOPE INCREMENTS, I.E. 3-5% OR 4-6%.

MINIMUM THICKNESS OF TAPERED PLATE IS 1/2". ROUND ASSEMBLY HEIGHT TO NEAREST 1/8". MODIFY FRAMING PLAN PER NOTE (1).

USE 1/2" UNREINFORCED PAD WITH CONTINUITY DIAPHRAGMS OR INTEGRAL ABUTMENTS.

TABLE

ASSEMBLY TYPE	LOCATION	BEAM SIZE	BEARING PAD SIZE			SHAPE FACTOR	BEARING PLATE SIZE				ASSEMBLY HEIGHT
			A	B	D (3)		C	E	F	G	HT. (2)
			12	24	1/2	8.0	14"	26"			

NOTES:

PROVIDE ELASTOMERIC MATERIALS AND PAD CONSTRUCTION PER SPEC. 3741.

PROVIDE STEEL PLATES PER SPEC. 3306.

PROVIDE PINTLES PER SPEC. 3309.

GALVANIZE STRUCTURAL STEEL BEARING ASSEMBLY AFTER FABRICATION PER SPEC. 3394.

PAYMENT FOR "TAPERED BEARING PLATE ASSEMBLY" IS PER EACH, AND INCLUDES ALL MATERIAL ON THIS DETAIL.

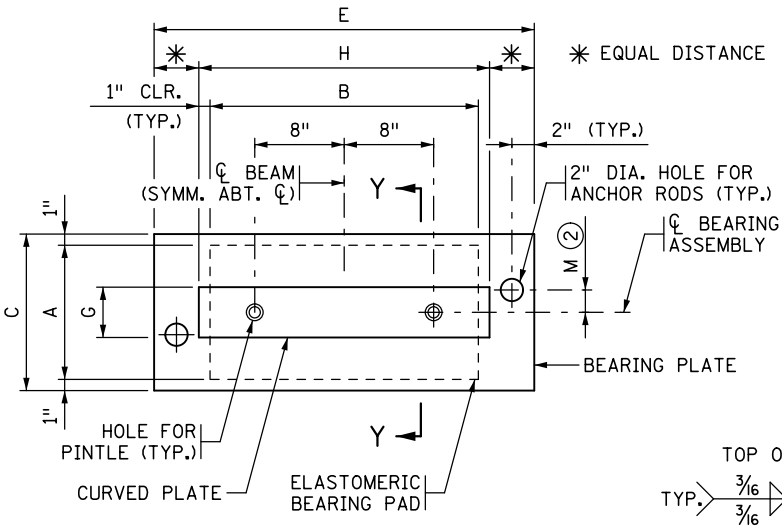
(1) MARK THICKER SIDE OF SLOPED PLATES WITH AN "H" FOR PLACEMENT. SEE FRAMING PLAN SHEET NO. __.

(2) BEARING PAD AND BEARING PLATE THICKNESS AT ℄ BEARING.

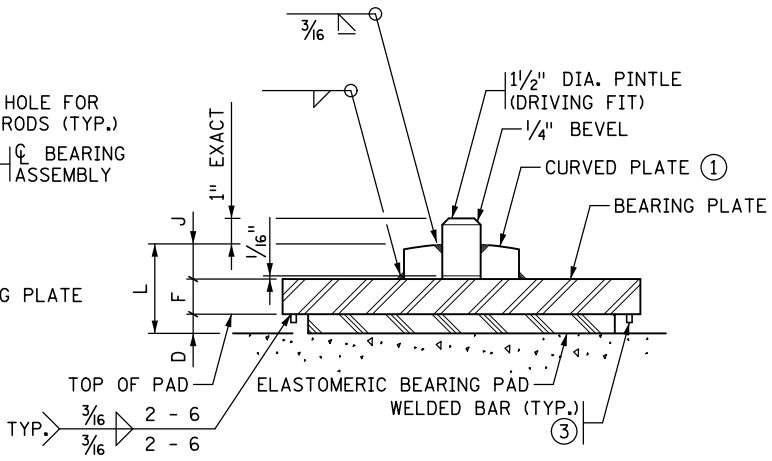
(3) "D" INDICATES THE THICKNESS OF THE BEARING PAD.

(4) 3/8" X 3/8" BAR INSTALLED ON BEARING PLATE AROUND PERIMETER OF BEARING PAD. BAR LENGTH IS 2" LESS THAN ADJACENT PAD DIMENSION, CENTERED ON PAD. CENTERLINE OF BAR TO EDGE OF PAD DIMENSION = 1/2".

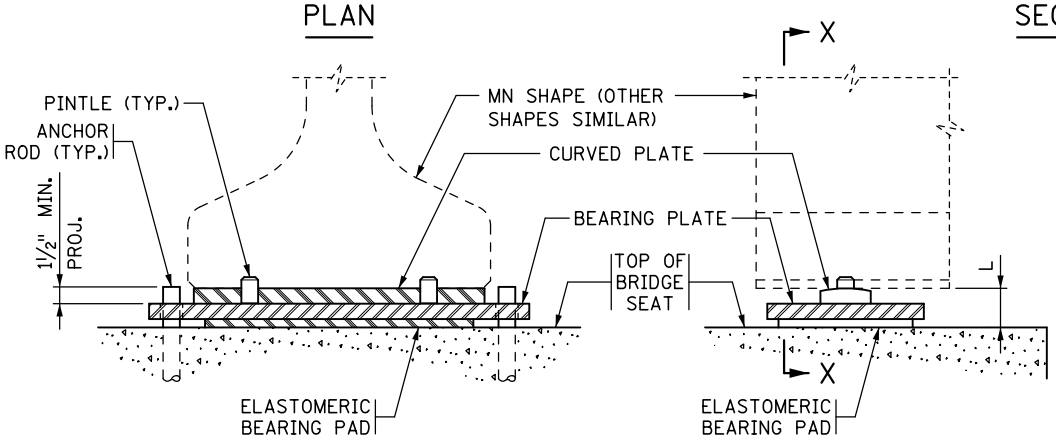
APPROVED: FEBRUARY 27, 2013	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION 11-03-2015	DETAIL NO.
Nancy Daubenberger STATE BRIDGE ENGINEER	TAPERED BEARING PLATE ASSEMBLY (FOR INTEGRAL ABUTMENTS OR PIERS WITH CONTINUITY DIAPHRAGMS)		B309



PLAN



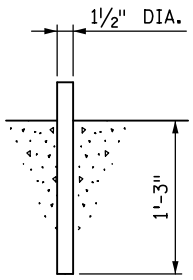
SECTION Y-Y



SECTION X-X

SIDE ELEVATION

ANCHOR RODS NOT SHOWN



ANCHOR ROD DETAIL

TABLE																
ASSEMBLY TYPE	LOCATION	BEAM SIZE	BEARING PAD SIZE			SHAPE FACTOR	BEARING PLATE SIZE			CURVED PLATE SIZE			ANCHOR ROD OFFSET		ASSY. HEIGHT	CURVED PLATE
			A	B	D		C	E	F	G	H	J	+/- ②	M	L	R ①
		RB, M, & MN	12"	24"	½"	8.0	14"		1½"	4½"	26"	1¼"			3¼"	
		MW	16"	36"	½"	11.1	18"		1½"	4½"	38"	1¼"			3¼"	

NOTES:

PROVIDE ELASTOMERIC MATERIALS AND PAD CONSTRUCTION PER SPEC. 3741.

PROVIDE STEEL PLATES PER SPEC. 3306.

PROVIDE ANCHOR RODS PER SPEC. 3385, TYPE A. GALVANIZE PER SPEC. 3392.

PROVIDE PINTLES PER SPEC. 3309.

GALVANIZE STRUCTURAL STEEL BEARING ASSEMBLY AFTER FABRICATION PER SPEC. 3394, EXCEPT AS NOTED.

PAYMENT FOR BEARING ASSEMBLY INCLUDES ALL MATERIAL ON THIS DETAIL.

① THE MIN. RADIUS IS 16" UNLESS OTHERWISE SPECIFIED IN THE TABLE. THE MAX. RADIUS IS 24". FINISH TO 250 MICRO. THE FINISHED THICKNESS OF THE PLATE MAY BE 1/16" LESS THAN SHOWN.

② "+" DENOTES OFFSET AS SHOWN.
"−" DENOTES OFFSET OPPOSITE OF SHOWN.

③ ⅜" X ⅜" BAR INSTALLED ON BEARING PLATE AROUND PERIMETER OF BEARING PAD. BAR LENGTH IS 2" LESS THAN ADJACENT PAD DIMENSION, CENTERED ON PAD. CENTERLINE OF BAR TO EDGE OF PAD DIMENSION = ½".

DESIGNER NOTE (REMOVE PRIOR TO PLOTTING FINAL PLAN):
MINIMUM SIZE OF BEARING PAD,
12" x 24" x ½", IS SHOWN FOR RB, M, & MN SHAPES
16" x 36" x ½", IS SHOWN FOR MW SHAPES

DESIGN DATA:

MAXIMUM HORIZONTAL LOAD IS 70 KIPS FOR 1½" PINTLES.

APPROVED: SEPTEMBER 22, 2011

Nancy Daubenberger
STATE BRIDGE ENGINEER

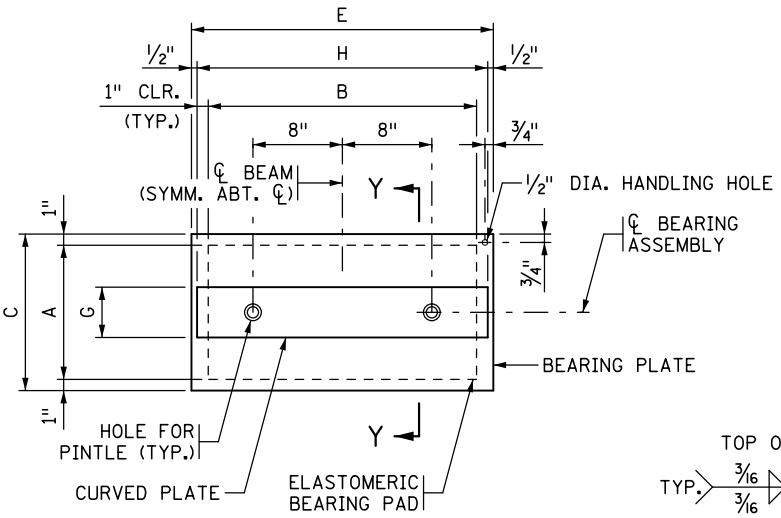
STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

CURVED PLATE BEARING ASSEMBLY

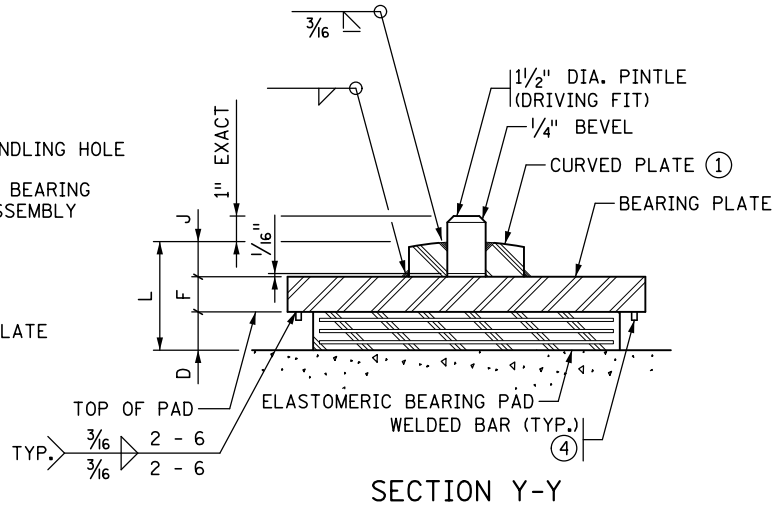
(PRESTRESSED CONCRETE BEAMS)
(FIXED)

REVISED
11-06-2013
11-03-2015

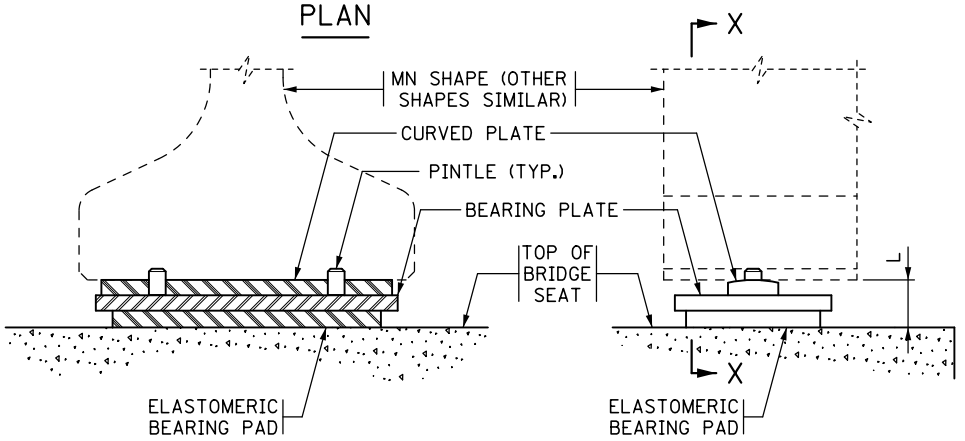
DETAIL NO.
B310



PLAN

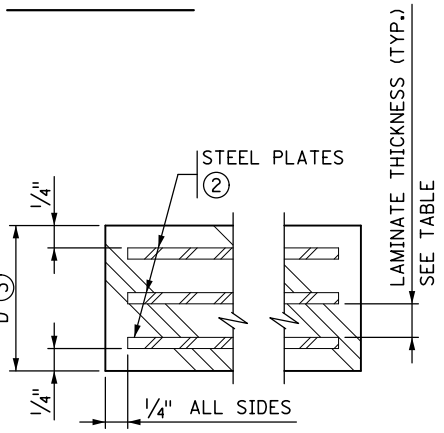


SECTION Y-Y



SECTION X-X

SIDE ELEVATION



SECTION THROUGH
ELASTOMERIC BEARING PAD

TABLE																		
ASSEMBLY TYPE	LOCATION	BEAM SIZE	BEARING PAD SIZE			STEEL PLATES		LAMINATES		SHAPE FACTOR	BEARING PLATE SIZE			CURVED PLATE SIZE			ASSY. HEIGHT	CURVED PLATE
			A	B	D	NO.	THICK.	NO.	THICK.		C	E	F	G	H	J	L	R ①
		RB, M, & MN	12"	24"			⅛"		½"		14"	27"	1½"	4½"	26"	1¼"		
		MW	16"	36"			⅛"		½"		18"	39"	1½"	4½"	38"	1¼"		

NOTES:

PROVIDE ELASTOMERIC MATERIALS AND PAD CONSTRUCTION PER SPEC. 3741.

PROVIDE STEEL PLATES PER SPEC. 3306.

PROVIDE PINTLES PER SPEC. 3309.

GALVANIZE STRUCTURAL STEEL BEARING ASSEMBLY AFTER FABRICATION PER SPEC. 3394, EXCEPT AS NOTED.

PAYMENT FOR BEARING ASSEMBLY INCLUDES ALL MATERIAL ON THIS DETAIL.

① THE MIN. RADIUS IS 16" UNLESS OTHERWISE SPECIFIED IN THE TABLE. THE MAX. RADIUS IS 24". FINISH TO 250 MICRO. THE FINISHED THICKNESS OF THE PLATE MAY BE 1/16" LESS THAN SHOWN.

② DO NOT GALVANIZE THESE PLATES.

③ THE TOTAL THICKNESS SHOWN INCLUDES THE STEEL PLATES.

④ ⅜" X ⅜" BAR INSTALLED ON BEARING PLATE AROUND PERIMETER OF BEARING PAD. BAR LENGTH IS 2" LESS THAN ADJACENT PAD DIMENSION, CENTERED ON PAD. CENTERLINE OF BAR TO EDGE OF PAD DIMENSION = ½".

DESIGNER NOTE (REMOVE PRIOR TO PLOTTING FINAL PLAN):
MINIMUM SIZE OF BEARING PAD,
12" x 24", IS SHOWN FOR RB, M, & MN SHAPES
16" x 36", IS SHOWN FOR MW SHAPES

DESIGN DATA:

MAXIMUM HORIZONTAL LOAD IS 70 KIPS FOR 1½" PINTLES.

APPROVED: SEPTEMBER 22, 2011

Nancy Daubenberger

STATE BRIDGE ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

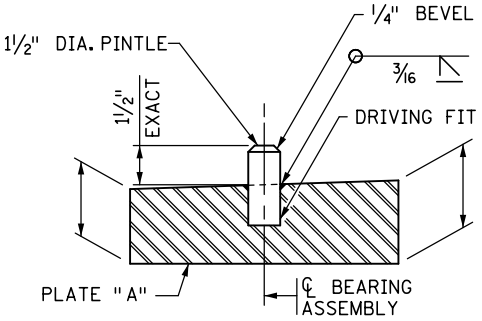
CURVED PLATE BEARING ASSEMBLY

(PRESTRESSED CONCRETE BEAMS)
(EXPANSION)

REVISED
11-03-2015

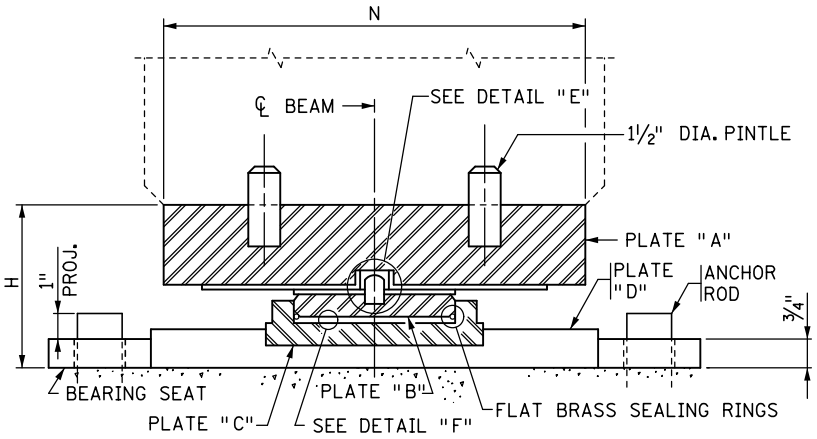
DETAIL NO.

B311

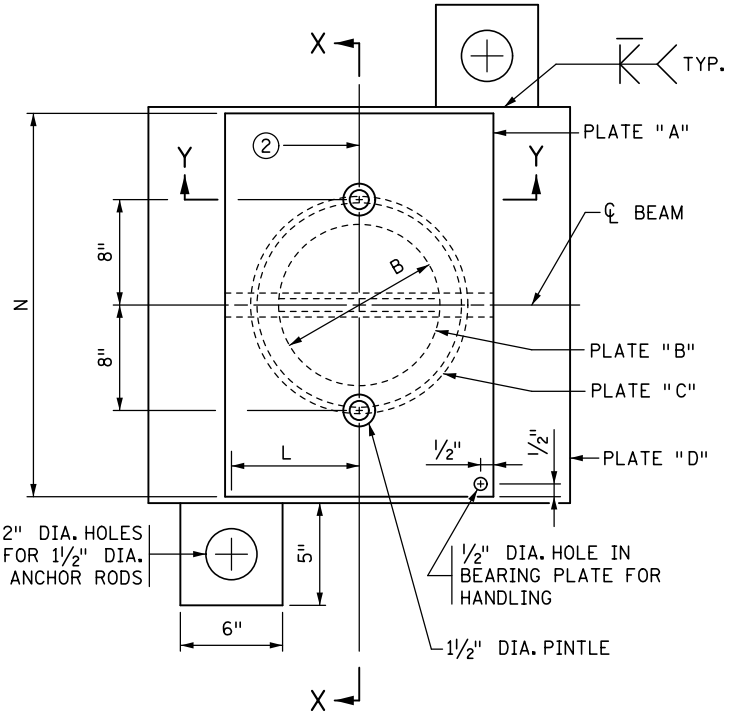


SECTION Y-Y

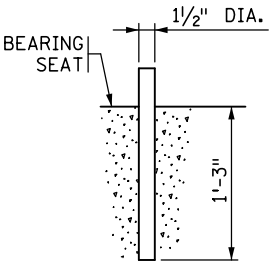
(ALL PLATES & MATERIALS BELOW PLATE "A" NOT SHOWN)



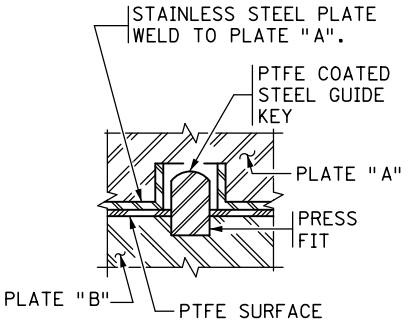
SECTION X-X



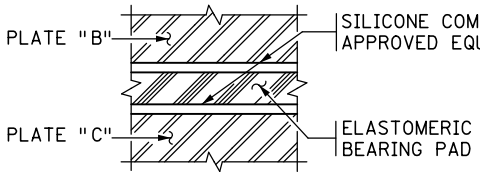
PLAN



ANCHOR ROD DETAIL



DETAIL "E"



DETAIL "F"

NOTES:

PROVIDE MATERIALS, DESIGN AND FABRICATION PER SPECIAL PROVISIONS.

PROVIDE STEEL PLATES AND PINTLES PER SPEC. 3309.

GALVANIZE PLATES "A", "D" AND PINTLES PER SPEC. 3394.

METALIZE PLATES "B" & "C" PER SPEC. 2471.3.L.2.

PROVIDE ANCHOR RODS PER SPEC. 3385, TYPE B.
GALVANIZE PER SPEC. 3392.

PERFORM SHIMMING UNDER PLATE "D" WITH FABRIC PADS PER AASHTO LRFD BRIDGE CONSTRUCTION SPEC. SECTION 18.10.

MANUFACTURER TO SUBMIT ANY BEARING ASSEMBLY DIMENSIONS, DETAILS, OR MATERIALS NOT SHOWN TO THE ENGINEER FOR APPROVAL.

ALL MATERIAL SHOWN IS INCLUDED IN THE PRICE BID FOR EACH BEARING ASSEMBLY, EXCEPT AS NOTED.

① MINIMUM ROTATION OF .02 RADIANS

② MARK ℄ OF BRG. PLATES "A" AND "B" TO FACILITATE PLACEMENT.

③ HEIGHT IS MINIMUM DIMENSION IF PLATE IS TAPERED.

BEARING ASSEMBLY DIMENSIONS

ASSEMBLY TYPE	ROTATION ①	TOTAL LOAD (KIPS)	TOTAL MOVEMENT (INCHES)	PLATE "A" ③	PLATE "B" (DIA.)	PLATE "C" (DIAMETER)	PLATE "D" (MAXIMUM)	DIMENSION "L"	DIMENSION "H"	DIMENSION "N"

DIMENSION "N" = BOTTOM FLANGE WIDTH OF BEAMS MINUS 1½"

DESIGN DATA:
MAXIMUM HORIZONTAL LOAD IS 70 KIPS FOR 1½" PINTLES.

APPROVED: NOVEMBER 22, 2002

Daniel L. Worgan

STATE BRIDGE ENGINEER

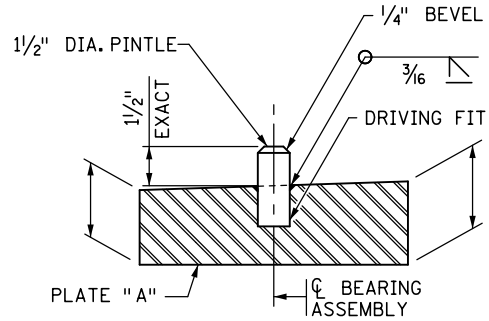
STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

POT TYPE BEARING ASSEMBLY

(PRESTRESSED CONCRETE BEAMS)
(GUIDED EXPANSION)

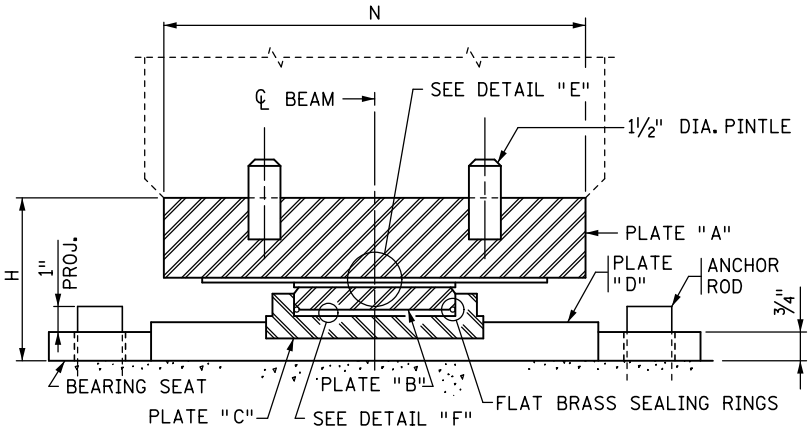
REVISION 11-03-2015

DETAIL NO. B312

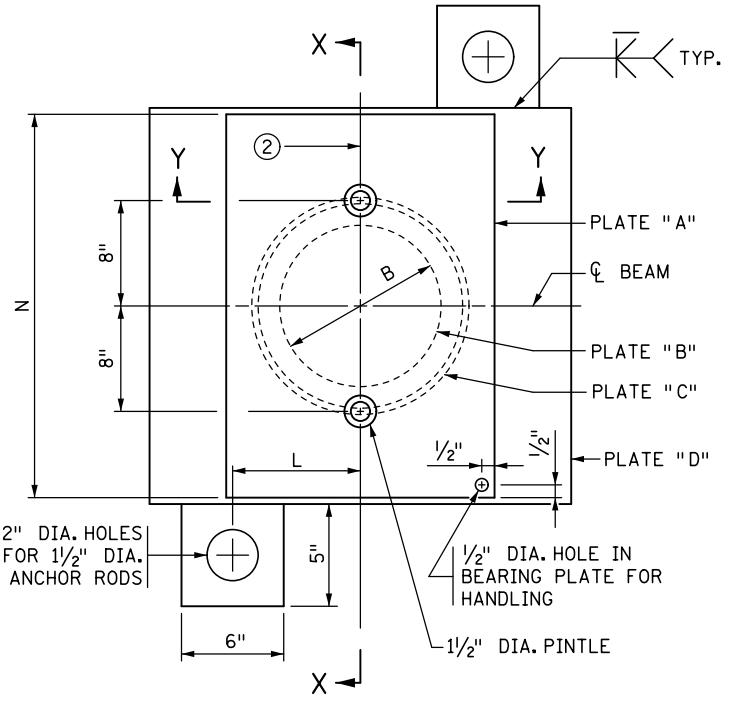


SECTION Y-Y

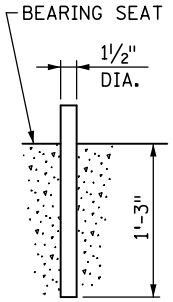
(ALL PLATES & MATERIALS BELOW PLATE "A" NOT SHOWN)



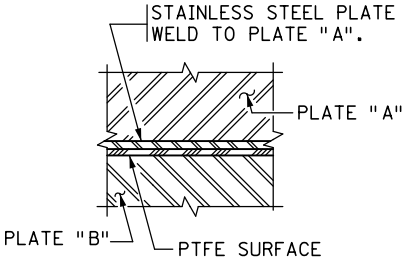
SECTION X-X



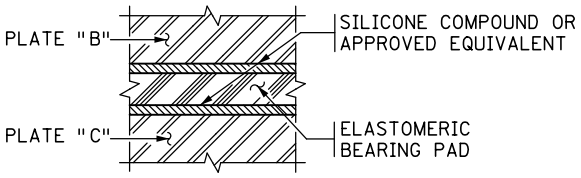
PLAN



ANCHOR ROD DETAIL



DETAIL "E"



DETAIL "F"

NOTES:

PROVIDE MATERIALS, DESIGN AND FABRICATION PER SPECIAL PROVISIONS.

PROVIDE STEEL PLATES AND PINTLES PER SPEC. 3309.

GALVANIZE PLATES "A", "D" AND PINTLES PER SPEC. 3394.

METALIZE PLATES "B" & "C" PER SPEC. 2471.3.L.2.

PROVIDE ANCHOR RODS PER SPEC. 3385, TYPE B.
GALVANIZE PER SPEC. 3392.

PERFORM SHIMMING UNDER PLATE "D" WITH FABRIC PADS PER AASHTO LRFD BRIDGE CONSTRUCTION SPEC. SECTION 18.10.

MANUFACTURER TO SUBMIT ANY BEARING ASSEMBLY DIMENSIONS, DETAILS, OR MATERIALS NOT SHOWN TO THE ENGINEER FOR APPROVAL.

ALL MATERIAL SHOWN IS INCLUDED IN THE PRICE BID FOR EACH BEARING ASSEMBLY, EXCEPT AS NOTED.

① MINIMUM ROTATION OF .02 RADIANS

② MARK ℄ OF BRG. PLATES "A" AND "B" TO FACILITATE PLACEMENT.

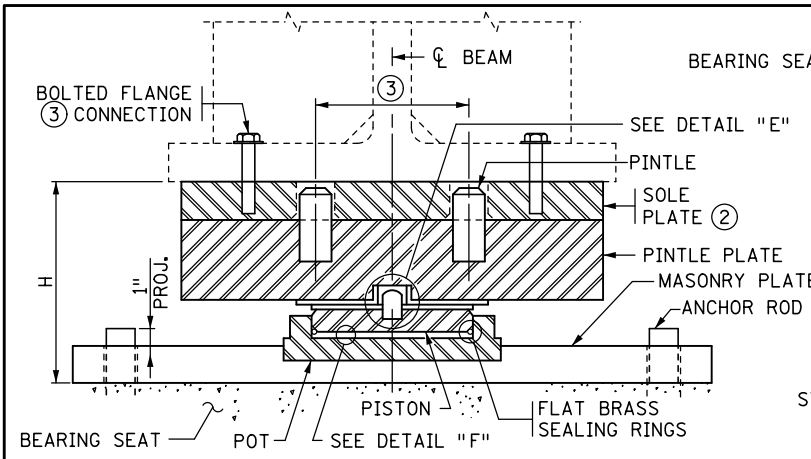
③ HEIGHT IS MINIMUM DIMENSION IF PLATE IS TAPERED.

BEARING ASSEMBLY DIMENSIONS

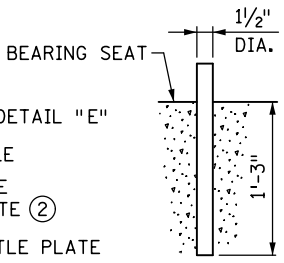
ASSEMBLY TYPE	ROTATION ①	TOTAL LOAD (KIPS)	TOTAL MOVEMENT (INCHES)	PLATE "A" ③	PLATE "B" (DIA.)	PLATE "C" (DIAMETER)	PLATE "D" (MAXIMUM)	DIMENSION "L"	DIMENSION "H"	DIMENSION "N"

DIMENSION "N" = BOTTOM FLANGE WIDTH OF BEAMS MINUS 1½"

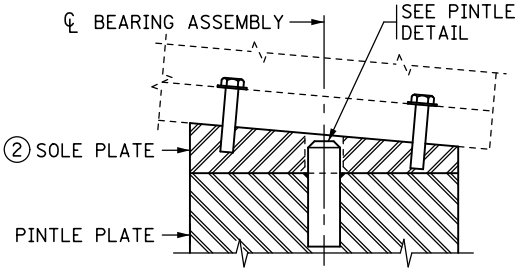
APPROVED: NOVEMBER 22, 2002	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION 11-03-2015	DETAIL NO.
Daniel L Worgan STATE BRIDGE ENGINEER	POT TYPE BEARING ASSEMBLY (PRESTRESSED CONCRETE BEAMS) (NON-GUIDED EXPANSION)		B313



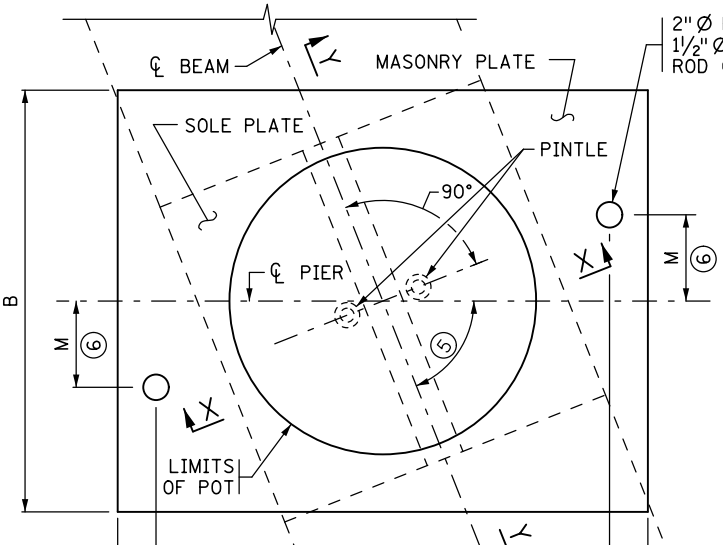
SECTION X-X



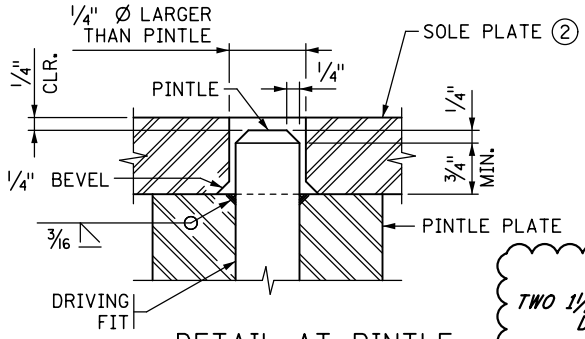
ANCHOR ROD DETAIL



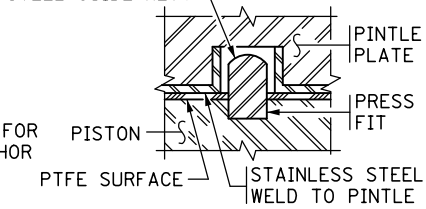
SECTION Y-Y



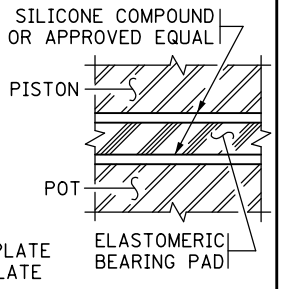
DETAIL AT MASONRY PLATE



DETAIL AT PINTLE



DETAIL "E"



DETAIL "F"

NOTES:

PROVIDE MATERIALS, DESIGN AND FABRICATION PER SPECIAL PROVISIONS.

PROVIDE STEEL PLATES AND PINTLES PER SPEC. 3309.

GALVANIZE SOLE PLATE, MASONRY PLATE AND PINTLE PLATE PER SPEC. 3394.

PROVIDE ANCHOR RODS PER SPEC. 3385, TYPE B. GALVANIZE PER SPEC. 3392.

PERFORM SHIMMING UNDER MASONRY PLATE WITH PREFORMED FABRIC PADS PER AASHTO LRFD BRIDGE CONSTRUCTION SPEC. SECTION 18.10.

MANUFACTURER TO SUBMIT ANY BEARING ASSEMBLY DIMENSIONS, DETAILS, OR MATERIALS NOT SHOWN TO THE ENGINEER FOR APPROVAL.

ALL MATERIAL SHOWN IS INCLUDED IN THE PRICE BID FOR EACH BEARING ASSEMBLY, EXCEPT AS NOTED.

METALIZE PISTON AND POT PER SPEC. 2471.3.L.2.

① FACTORED LIVE LOAD (LL) ROTATION OR 0.02 RADIANS WHICHEVER IS GREATER.

② THE SOLE PLATE IS INCLUDED IN THE POT BEARING ASSEMBLY QUANTITY. 1¼" MIN. THICKNESS IS REQUIRED. TAPER SOLE PLATE TO FINISHED GRADE INCLUDING TRANSVERSE TAPER FOR SKEWED BRIDGES.

③ POT BEARING MANUFACTURER TO DETERMINE THE FINAL DIMENSIONS AND NUMBER OF ALL BEARING COMPONENTS INCLUDING PISTON, POT, MASONRY PLATE, SOLE PLATE, THREADED FASTENERS, BOLTED FLANGE CONNECTIONS, PINTLES AND OVERALL HEIGHT, AND COORDINATE SHARING THIS INFORMATION WITH THE BEAM FABRICATOR AND CONTRACTOR. MINIMUM PINTLE SIZE IS 1½" DIAMETER.

④ FACTORED HORIZONTAL RESISTANCE IS A MINIMUM OF 15% OF THE STRENGTH LIMIT STATE VERTICAL LOAD UNLESS STATED OTHERWISE.

⑤ SEE FRAMING PLAN

⑥ "+" DENOTES OFFSET AS SHOWN.
"-" DENOTES OFFSET OPPOSITE OF SHOWN.

DESIGNER NOTE (REMOVE DESIGNER NOTE PRIOR TO PLOTTING FINAL PLAN):

TWO 1½" DIAMETER ANCHOR RODS HAVE A FACTORED HORIZONTAL RESISTANCE OF 95 KIPS. DESIGNER SHALL INCREASE DIAMETER, NUMBER OF RODS OR BOTH WHEN NEEDED.

WHEN SPECIFYING OFFSET DIMENSION "M", CONSIDER THE SIZE AND PROXIMITY OF THE DIAPHRAGM AND LONGITUDINAL PIER REINFORCEMENT TO ALLOW ADEQUATE ROOM FOR INSTALLATION OF ANCHOR RODS.

BEARING ASSEMBLY TABLE

ASSEMBLY TYPE	LOCATION	FACTORED LL ROTATION ① (RAD)	TOTAL MOVEMENT (INCHES)	MASONRY PLATE ③		ANCHOR ROD OFFSET		ASSUMED HEIGHT "H" ③	BOTTOM FLANGE WIDTH	DESIGN LOADS (KIPS)			
										SERVICE LIMIT STATE		STRENGTH LIMIT STATE	
				A	B	+/- ⑥	M			VERTICAL	HORIZONTAL	VERTICAL	HORIZONTAL ④
			"	"	"	"	"	"	"				
			"	"	"	"	"	"	"				

APPROVED: SEPTEMBER 18, 2007

Daniel L Morgan

STATE BRIDGE ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

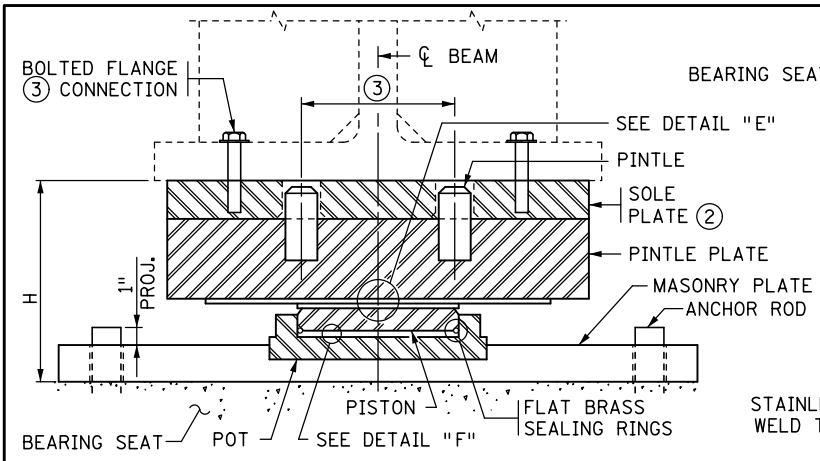
POT BEARING ASSEMBLY

(STEEL BEAMS)
(GUIDED EXPANSION)

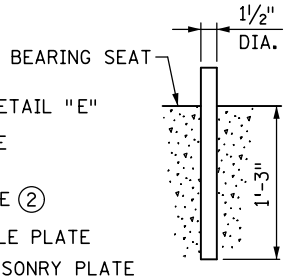
REVISION
12-17-2008
11-03-2015

DETAIL NO.

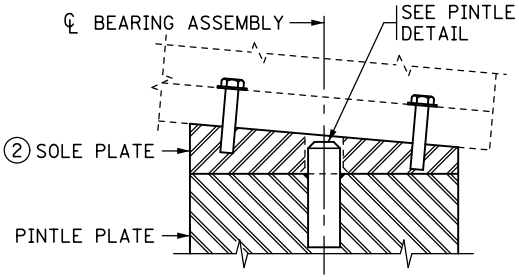
B314



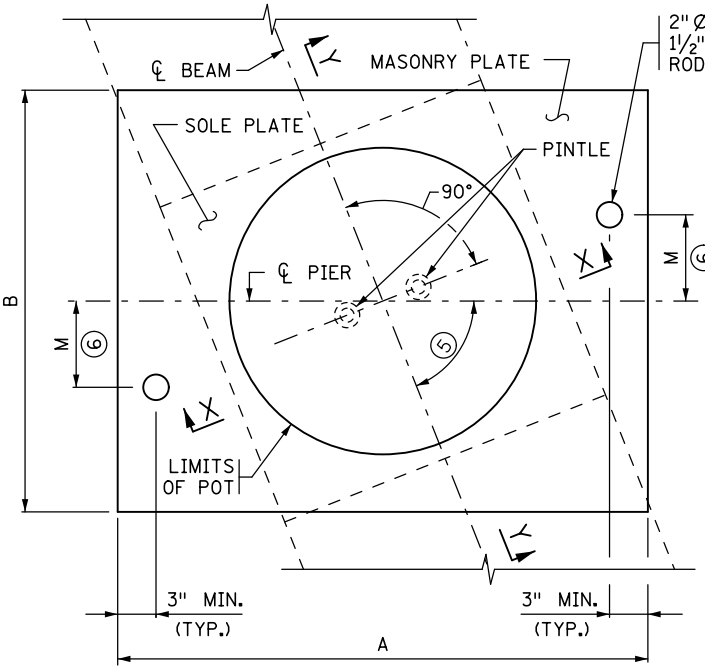
SECTION X-X



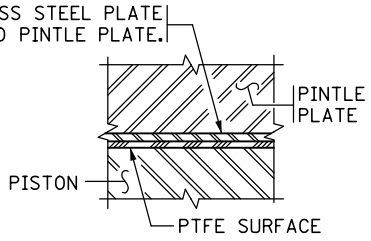
ANCHOR ROD DETAIL



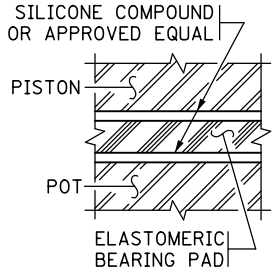
SECTION Y-Y



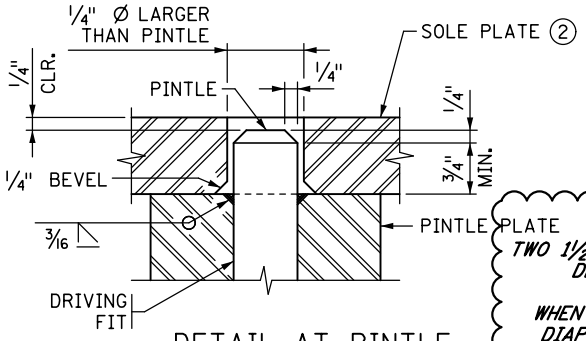
DETAIL AT MASONRY PLATE



DETAIL "E"



DETAIL "F"



DETAIL AT PINTLE

NOTES:

PROVIDE MATERIALS, DESIGN AND FABRICATION PER SPECIAL PROVISIONS.

PROVIDE STEEL PLATES AND PINTLES PER SPEC. 3309.

GALVANIZE SOLE PLATE, MASONRY PLATE AND PINTLE PLATE PER SPEC. 3394.

PROVIDE ANCHOR RODS PER SPEC. 3385, TYPE B. GALVANIZE PER SPEC. 3392.

PERFORM SHIMMING UNDER MASONRY PLATE WITH PREFORMED FABRIC PADS PER AASHTO LRFD BRIDGE CONSTRUCTION SPEC. SECTION 18.10.

MANUFACTURER TO SUBMIT ANY BEARING ASSEMBLY DIMENSIONS, DETAILS, OR MATERIALS NOT SHOWN TO THE ENGINEER FOR APPROVAL.

ALL MATERIAL SHOWN IS INCLUDED IN THE PRICE BID FOR EACH BEARING ASSEMBLY, EXCEPT AS NOTED.

METALIZE PISTON AND POT PER SPEC. 2471.3.L.2.

(1) FACTORED LIVE LOAD (LL) ROTATION OR 0.02 RADIANS WHICHEVER IS GREATER.

(2) THE SOLE PLATE IS INCLUDED IN THE POT BEARING ASSEMBLY QUANTITY. 1¼" MIN. THICKNESS IS REQUIRED. TAPER SOLE PLATE TO FINISHED GRADE INCLUDING TRANSVERSE TAPER FOR SKEWED BRIDGES.

(3) POT BEARING MANUFACTURER TO DETERMINE THE FINAL DIMENSIONS AND NUMBER OF ALL BEARING COMPONENTS INCLUDING PISTON, POT, MASONRY PLATE, SOLE PLATE, THREADED FASTENERS, BOLTED FLANGE CONNECTIONS, PINTLES AND OVERALL HEIGHT, AND COORDINATE SHARING THIS INFORMATION WITH THE BEAM FABRICATOR AND CONTRACTOR. MINIMUM PINTLE SIZE IS 1½" DIAMETER.

(4) FACTORED HORIZONTAL RESISTANCE IS A MINIMUM OF 10% OF THE STRENGTH LIMIT STATE VERTICAL LOAD UNLESS STATED OTHERWISE.

(5) SEE FRAMING PLAN

(6) "+" DENOTES OFFSET AS SHOWN.
"-" DENOTES OFFSET OPPOSITE OF SHOWN.

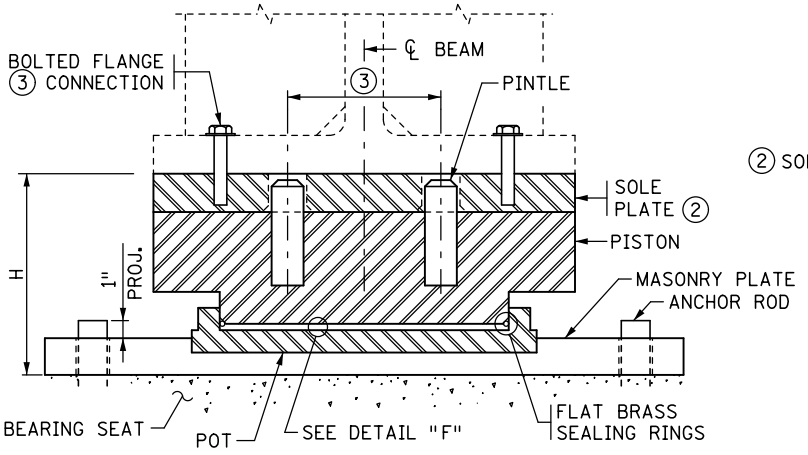
DESIGNER NOTE (REMOVE DESIGNER NOTE PRIOR TO PLOTTING FINAL PLAN):
TWO 1½" DIAMETER ANCHOR RODS HAVE A FACTORED HORIZONTAL RESISTANCE OF 95 KIPS. DESIGNER SHALL INCREASE DIAMETER, NUMBER OF RODS OR BOTH WHEN NEEDED.

WHEN SPECIFYING OFFSET DIMENSION "M", CONSIDER THE SIZE AND PROXIMITY OF THE DIAPHRAGM AND LONGITUDINAL PIER REINFORCEMENT TO ALLOW ADEQUATE ROOM FOR INSTALLATION OF ANCHOR RODS.

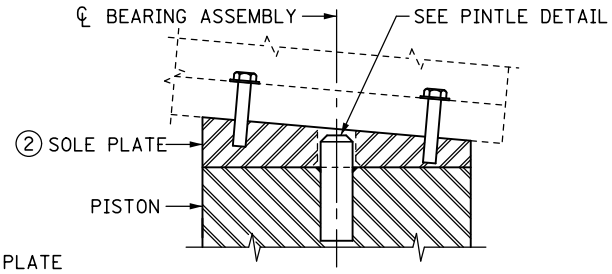
BEARING ASSEMBLY TABLE

ASSEMBLY TYPE	LOCATION	FACTORED LL ROTATION (1) (RAD)	TOTAL MOVEMENT (INCHES)		MASONRY PLATE (3)		ANCHOR ROD OFFSET		ASSUMED HEIGHT "H" (3)	BOTTOM FLANGE WIDTH	DESIGN LOADS (KIPS)			
											SERVICE LIMIT STATE		STRENGTH LIMIT STATE	
			TRANSVERSE	LONGITUDINAL	A	B	+/- (6)	M			VERTICAL	HORIZONTAL	VERTICAL	HORIZ. (4)
			"	"	"	"	"	"	"	"				
			"	"	"	"	"	"	"	"				

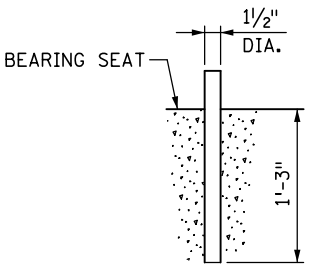
APPROVED: SEPTEMBER 18, 2007	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION 12-17-2008 11-03-2015	DETAIL NO.
Daniel L Morgan STATE BRIDGE ENGINEER	POT BEARING ASSEMBLY (STEEL BEAMS) (NON-GUIDED EXPANSION)		B315



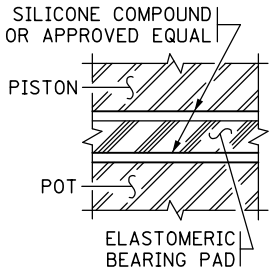
SECTION X-X



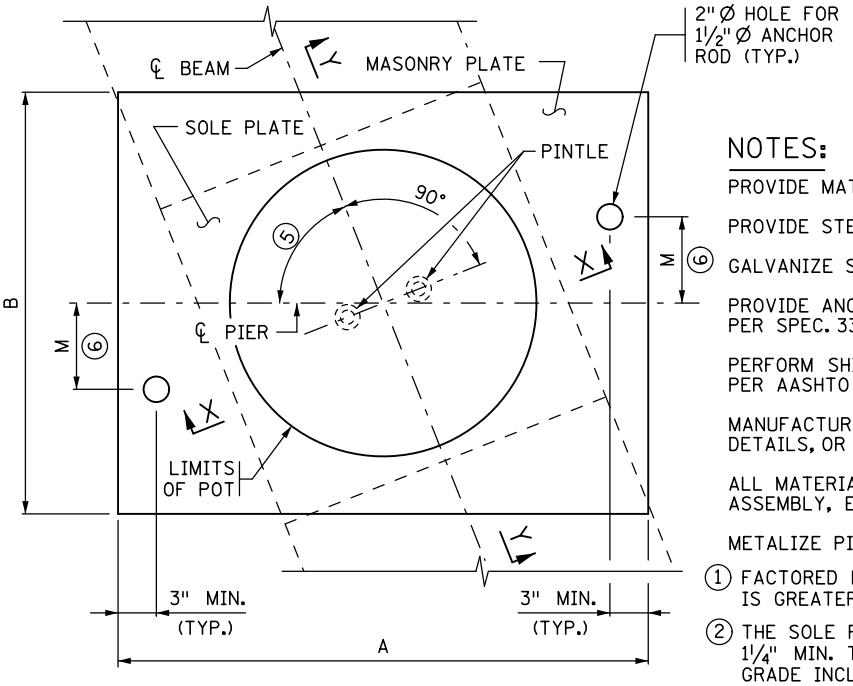
SECTION Y-Y



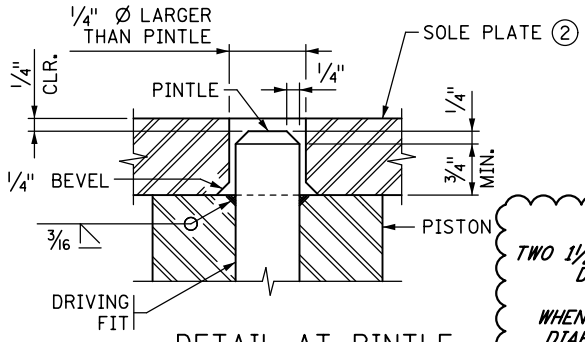
ANCHOR ROD DETAIL



DETAIL "F"



DETAIL AT MASONRY PLATE



DETAIL AT PINTLE

NOTES:

PROVIDE MATERIALS, DESIGN AND FABRICATION PER SPECIAL PROVISIONS.

PROVIDE STEEL PLATES, PINTLES AND ANCHOR RODS PER SPEC. 3309.

GALVANIZE SOLE PLATE, AND MASONRY PLATE PER SPEC. 3394.

PROVIDE ANCHOR RODS PER SPEC. 3385, TYPE B. GALVANIZE PER SPEC. 3392.

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METALIZE PISTON AND POT PER SPEC. 2471.3.L.2.

① FACTORED LIVE LOAD (LL) ROTATION OR 0.02 RADIANS WHICHEVER IS GREATER.

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③ POT BEARING MANUFACTURER TO DETERMINE THE FINAL DIMENSIONS AND NUMBER OF ALL BEARING COMPONENTS INCLUDING PISTON, POT, MASONRY PLATE, SOLE PLATE, THREADED FASTENERS, BOLTED FLANGE CONNECTIONS, PINTLES AND OVERALL HEIGHT, AND COORDINATE SHARING THIS INFORMATION WITH THE BEAM FABRICATOR AND CONTRACTOR. MINIMUM PINTLE SIZE IS 1½" DIAMETER.

④ FACTORED HORIZONTAL RESISTANCE IS A MINIMUM OF 15% OF THE STRENGTH LIMIT STATE VERTICAL LOAD UNLESS STATED OTHERWISE.

⑤ SEE FRAMING PLAN

⑥ "+" DENOTES OFFSET AS SHOWN.
"-" DENOTES OFFSET OPPOSITE OF SHOWN.

DESIGNER NOTE (REMOVE DESIGNER NOTE PRIOR TO PLOTTING FINAL PLAN):

TWO 1½" DIAMETER ANCHOR RODS HAVE A FACTORED HORIZONTAL RESISTANCE OF 95 KIPS. DESIGNER SHALL INCREASE DIAMETER, NUMBER OF RODS OR BOTH WHEN NEEDED.

WHEN SPECIFYING OFFSET DIMENSION "M", CONSIDER THE SIZE AND PROXIMITY OF THE DIAPHRAGM AND LONGITUDINAL PIER REINFORCEMENT TO ALLOW ADEQUATE ROOM FOR INSTALLATION OF ANCHOR RODS.

BEARING ASSEMBLY TABLE

ASSEMBLY TYPE	LOCATION	FACTORED LL ROTATION ① (RAD)	MASONRY PLATE ③		ANCHOR ROD OFFSET		ASSUMED HEIGHT "H" ③	BOTTOM FLANGE WIDTH	DESIGN LOADS (KIPS)			
									SERVICE LIMIT STATE		STRENGTH LIMIT STATE	
			A	B	+/- ⑥	M			VERTICAL	HORIZONTAL	VERTICAL	HORIZONTAL ④
			"	"	"	"	"	"				
			"	"	"	"	"	"				

APPROVED: SEPTEMBER 18, 2007

Daniel L Morgan

STATE BRIDGE ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

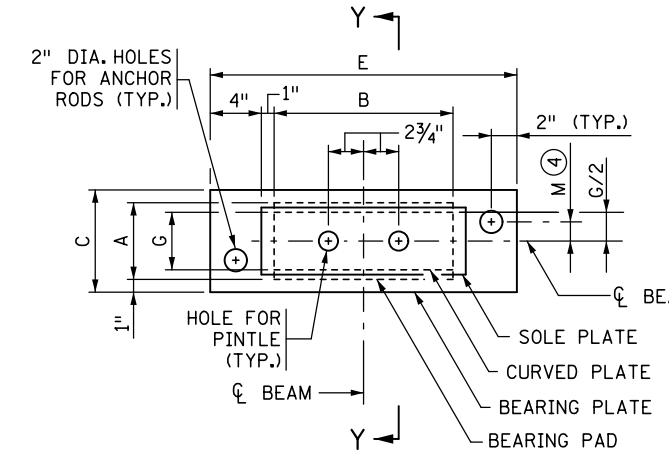
POT BEARING ASSEMBLY

(STEEL BEAMS)
(FIXED)

REVISION
12-17-2008
11-03-2015

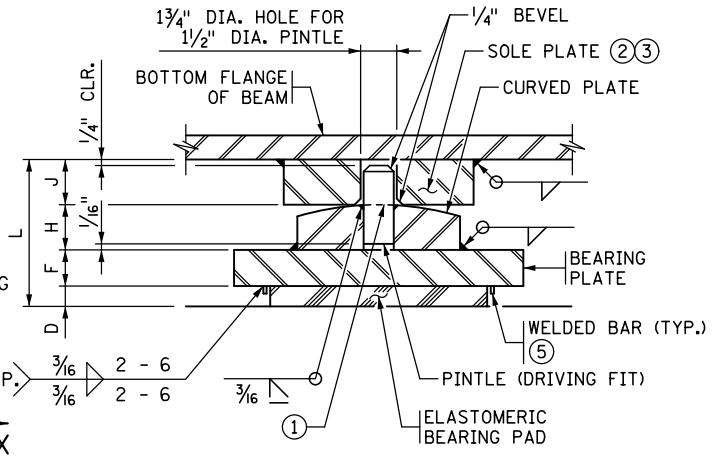
DETAIL NO.

B316



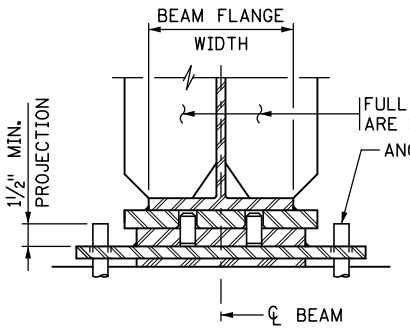
PLAN

BEAM NOT SHOWN

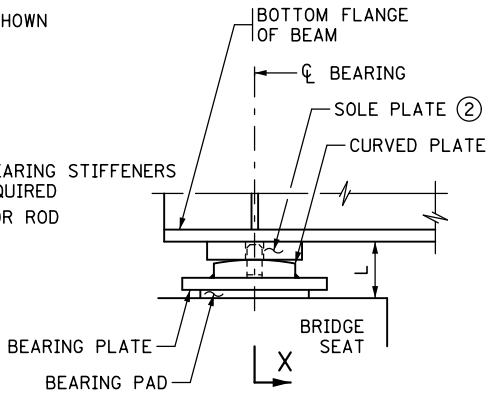


SECTION Y-Y

ENLARGED

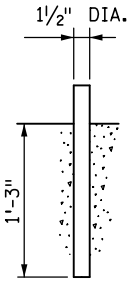


SECTION X-X



SIDE ELEVATION

ANCHOR RODS NOT SHOWN



ANCHOR ROD DETAIL

TABLE

ASSEMBLY TYPE	LOCATION	BEAM FLANGE WIDTH	BEARING PAD SIZE			SHAPE FACTOR	BEARING PLATE SIZE			CURVED PLATE SIZE				SOLE PLATE SIZE			PINTLE DIA.	ASSY. HEIGHT	ANCHOR ROD OFFSET	
			A	B	D		C	E	F	G	B	H	R ①	WID.	LEN.	J ②		L	+/- ④	M

NOTES:

PROVIDE ELASTOMERIC MATERIALS AND PAD CONSTRUCTION PER SPEC. 3741.

PROVIDE STEEL PLATES PER SPEC. 3306 EXCEPT THE SOLE PLATE. PROVIDE SOLE PLATE WITH THE SAME MATERIAL SPECIFICATION AS THE STEEL BEAMS.

PROVIDE ANCHOR RODS PER SPEC. 3385, TYPE A. GALVANIZE PER SPEC. 3392.

FOR SPANS UP TO 150 FEET, USE 1½" DIAMETER ANCHOR RODS. ABOVE 150 FOOT SPANS, DESIGN ANCHOR RODS PER AASHTO DESIGN CRITERIA.

PROVIDE PINTLES PER SPEC. 3309.

GALVANIZE STRUCTURAL STEEL BEARING ASSEMBLY AFTER FABRICATION PER SPEC. 3394, EXCEPT AS NOTED.

PAYMENT FOR BEARING ASSEMBLY INCLUDES ALL MATERIAL ON THIS DETAIL EXCEPT THE SOLE PLATE. THE SOLE PLATE IS INCLUDED IN THE WEIGHT OF STRUCTURAL STEEL.

① 16" MIN. RADIUS UNLESS OTHERWISE SPECIFIED IN THE TABLE. THE MAX. RADIUS IS 24". FINISH TO 250 MICRO. THE FINISHED THICKNESS OF THE PLATE MAY BE 1/16" LESS THAN SHOWN.

② WHEN THE SOLE PLATE IS TAPERED, DIMENSIONS "J" AND "L" ARE THICKNESS OF SOLE PLATE AND BEARING ASSEMBLY AT CENTERLINE OF BEARING.

③ DO NOT GALVANIZE THIS PLATE.

④ "+ " DENOTES OFFSET AS SHOWN.
"- " DENOTES OFFSET OPPOSITE OF SHOWN.

⑤ ⅜" X ⅜" BAR INSTALLED ON BEARING PLATE AROUND PERIMETER OF BEARING PAD. BAR LENGTH IS 2" LESS THAN ADJACENT PAD DIMENSION, CENTERED ON PAD. CENTERLINE OF BAR TO EDGE OF PAD DIMENSION = ½".

DESIGNER NOTE (REMOVE DESIGNER NOTE PRIOR TO PLOTTING FINAL PLAN):
TWO 1½" DIAMETER ANCHOR RODS HAVE A FACTORED HORIZONTAL RESISTANCE OF 95 KIPS. DESIGNER SHALL INCREASE DIAMETER, NUMBER OF RODS OR BOTH WHEN NEEDED.
WHEN SPECIFYING OFFSET DIMENSION "M", CONSIDER THE SIZE AND PROXIMITY OF THE DIAPHRAGM AND LONGITUDINAL PIER REINFORCEMENT TO ALLOW ADEQUATE ROOM FOR INSTALLATION OF ANCHOR RODS.

DESIGN DATA:

MAXIMUM HORIZONTAL LOAD IS 70 KIPS. MINIMUM SOLE PLATE THICKNESS IS 1¼".

APPROVED: NOVEMBER 22, 2002

STATE BRIDGE ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

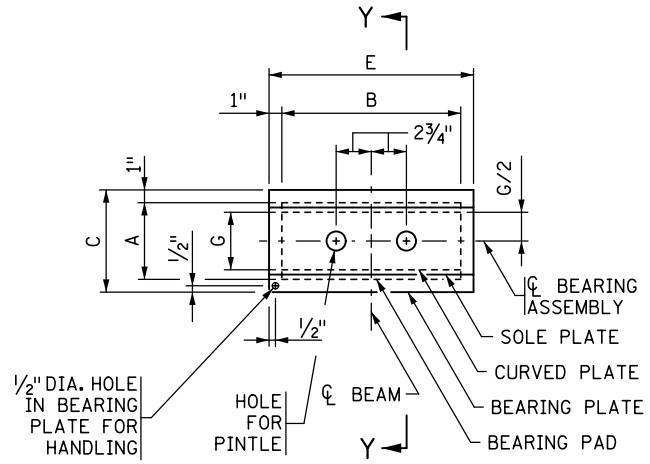
CURVED PLATE BEARING ASSEMBLY

(STEEL BEAMS)
(FIXED)

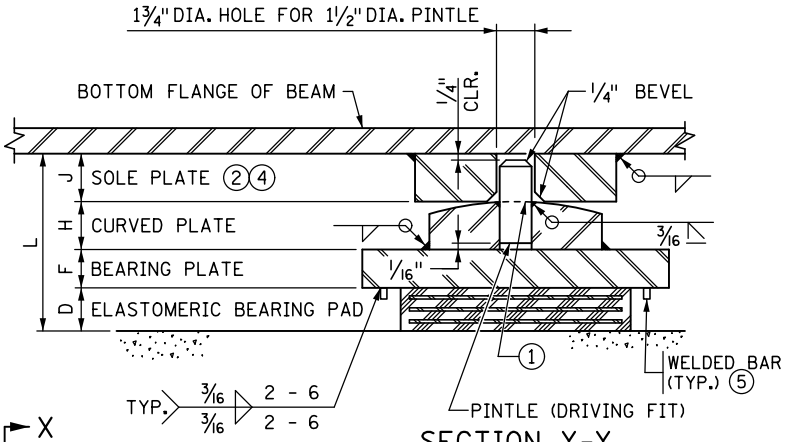
REVISED
08-10-2006
12-17-2008
11-06-2013
11-03-2015

DETAIL NO.

B354

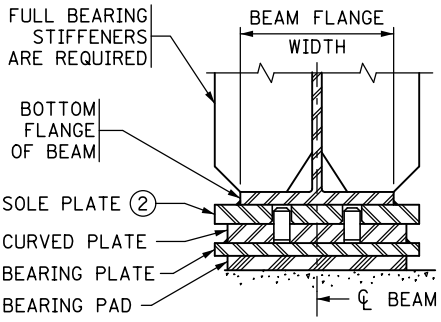


PLAN

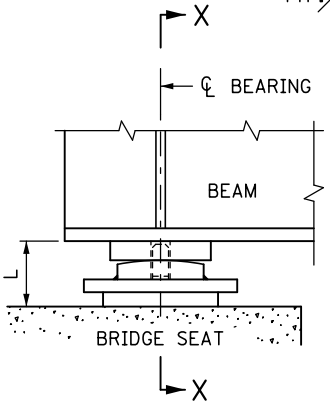


SECTION Y-Y

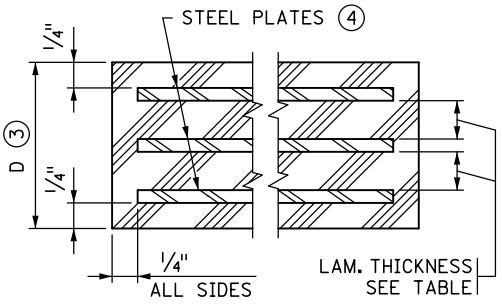
ENLARGED BEARING ASSEMBLY



SECTION X-X



SIDE ELEVATION



SECTION THROUGH BEARING PAD

TABLE

ASSEMBLY TYPE	LOCATION	BEAM FLANGE WIDTH	BEARING PAD SIZE			STEEL PLATES		LAMINATES		SHAPE FACTOR	BEARING PLATE SIZE			CURVED PLATE SIZE				SOLE PLATE SIZE			PINTLE DIA.	ASSY. HEIGHT
			A	B	D	NO.	THICK.	NO.	THICK.		C	E	F	G	B	H	R ①	WID.	LEN.	J ②		L

NOTES:

PROVIDE ELASTOMERIC MATERIALS AND PAD CONSTRUCTION PER SPEC. 3741.

PROVIDE STEEL PLATES PER SPEC. 3306 EXCEPT THE SOLE PLATE. PROVIDE SOLE PLATE WITH THE SAME MATERIAL SPECIFICATION AS THE STEEL BEAMS.

PROVIDE PINTLES PER SPEC. 3309.

GALVANIZE STRUCTURAL STEEL BEARING ASSEMBLY AFTER FABRICATION PER SPEC. 3394, EXCEPT AS NOTED.

PAYMENT FOR BEARING ASSEMBLY INCLUDES ALL MATERIAL ON THIS DETAIL EXCEPT THE SOLE PLATE. THE SOLE PLATE IS INCLUDED IN THE WEIGHT OF STRUCTURAL STEEL.

① THE MIN. RADIUS IS 16" UNLESS OTHERWISE SPECIFIED IN THE TABLE. THE MAX. RADIUS IS 24". FINISH TO 250 MICRO. THE FINISHED THICKNESS OF THE PLATE MAY BE 1/16" LESS THAN SHOWN.

② WHEN THE SOLE PLATE IS TAPERED, DIMENSIONS "J" AND "L" ARE THICKNESS OF SOLE PLATE AND BEARING ASSEMBLY AT CENTERLINE OF BEARING.

③ THE TOTAL THICKNESS SHOWN INCLUDES THE STEEL PLATES.

④ DO NOT GALVANIZE THIS PLATE.

⑤ 3/8" X 3/8" BAR INSTALLED ON BEARING PLATE AROUND PERIMETER OF BEARING PAD. BAR LENGTH IS 2" LESS THAN ADJACENT PAD DIMENSION, CENTERED ON PAD. CENTERLINE OF BAR TO EDGE OF PAD DIMENSION = ½".

DESIGN DATA:

MAXIMUM HORIZONTAL LOAD IS 70 KIPS. MINIMUM SOLE PLATE THICKNESS IS 1¼".

APPROVED: NOVEMBER 22, 2002

Daniel L Worgan

STATE BRIDGE ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

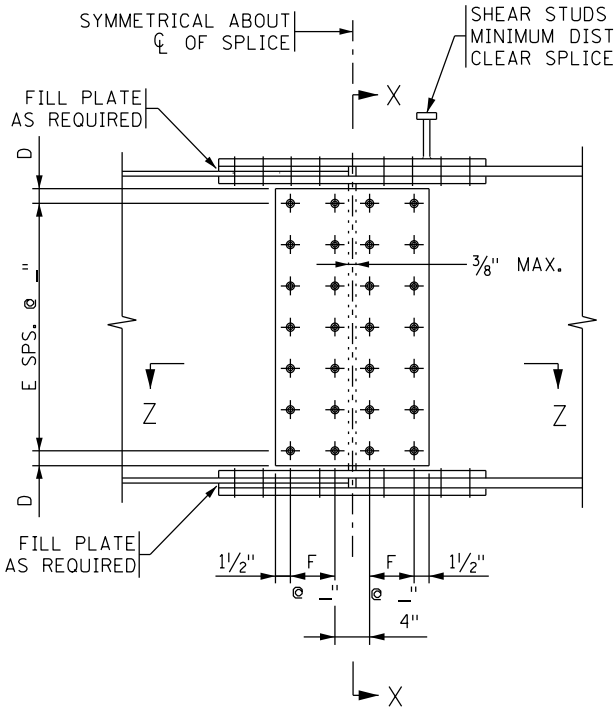
CURVED PLATE BEARING ASSEMBLY

(STEEL BEAMS)
(EXPANSION)

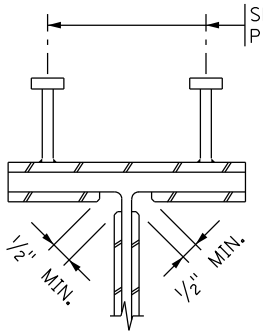
REVISED
08-10-2006
12-17-2008
11-03-2015

DETAIL NO.

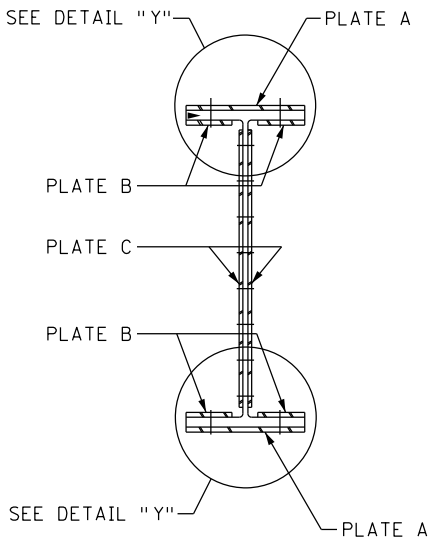
B355



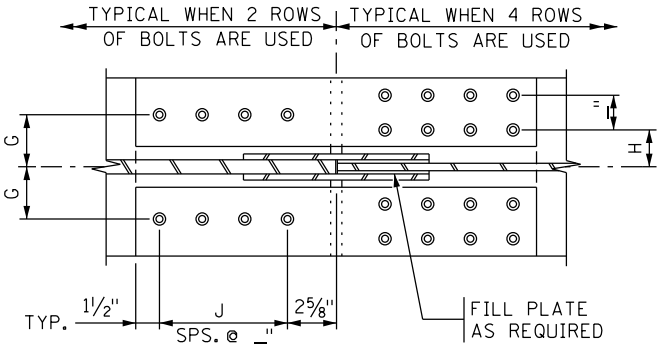
ELEVATION



DETAIL "Y"



SECTION X-X



SECTION Z-Z

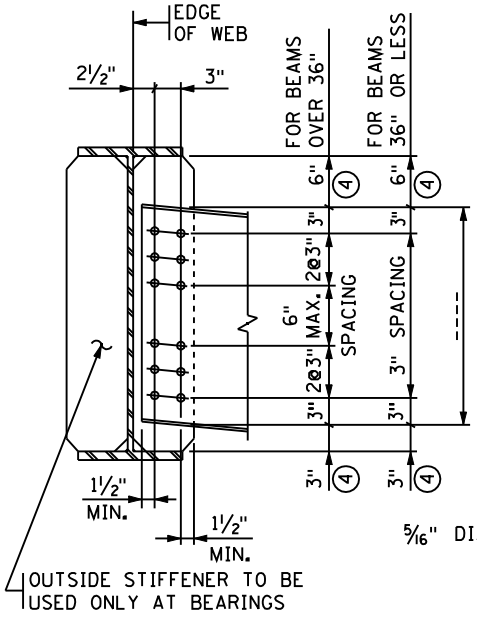
NOTES:

FILL PLATES SHALL BE STRUCTURAL STEEL, MINIMUM THICKNESS 1/16". WHERE THE DIFFERENCE IN WEB THICKNESS IS 1/8" OR MORE, PLACE FILL PLATES OF SAME THICKNESS ON BOTH SIDES OF THINNER WEB. WHERE DIFFERENCE IN WEB THICKNESS IS LESS THAN 1/16" OMIT FILLS.

TABLE

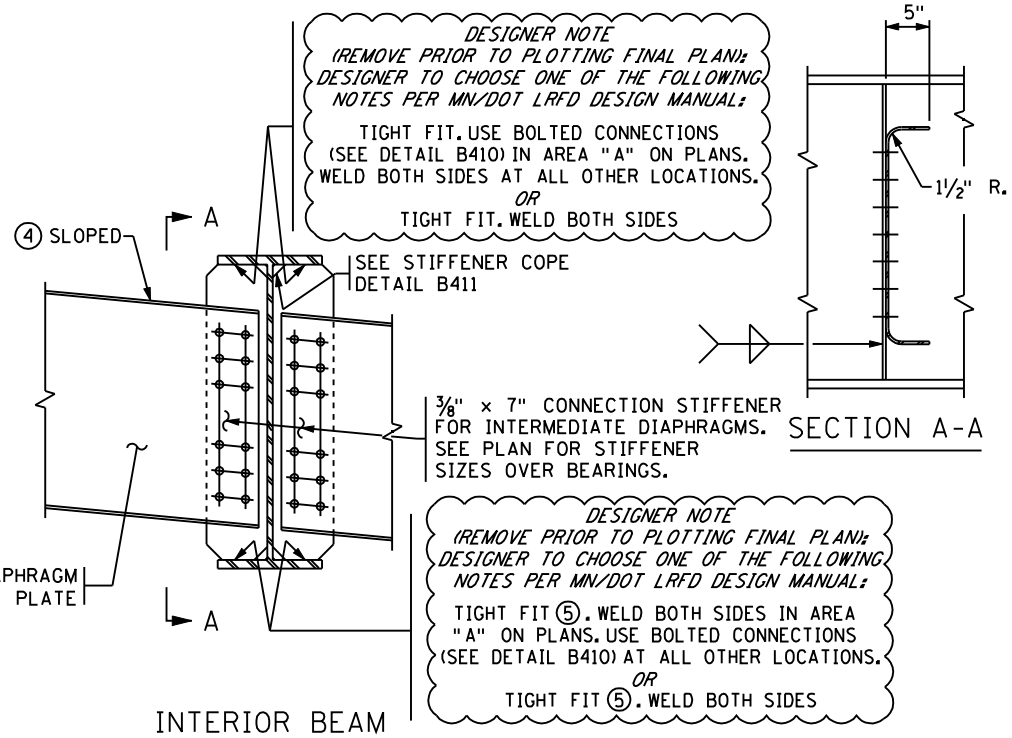
BEAM SIZE	PLATE A (IN.)	PLATE B (IN.)	PLATE C (IN.)	D	E	F	G	H	J	FLANGE FILL PLATE	WEB FILL PLATE

APPROVED: NOVEMBER 22, 2002	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION 10-22-2009 05-24-2012	DETAIL NO.
Daniel L Morgan STATE BRIDGE ENGINEER	SPLICES FOR STEEL BEAMS		B400



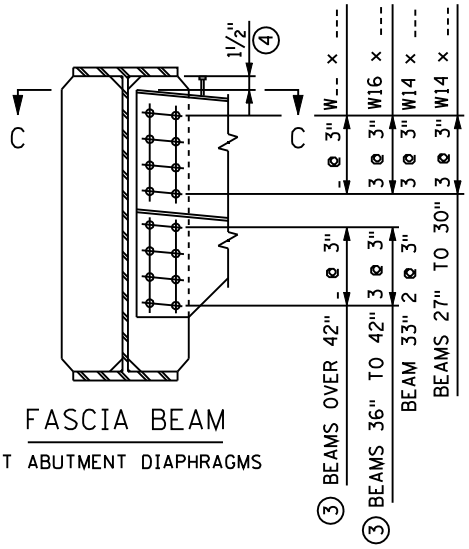
FASCIA BEAM

AT PIER AND INTERMEDIATE DIAPHRAGMS



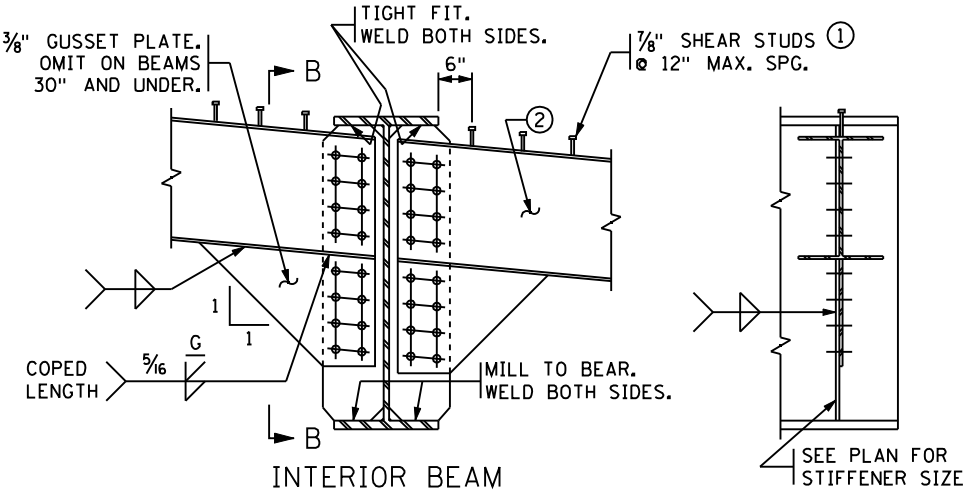
INTERIOR BEAM

AT PIER AND INTERMEDIATE DIAPHRAGMS



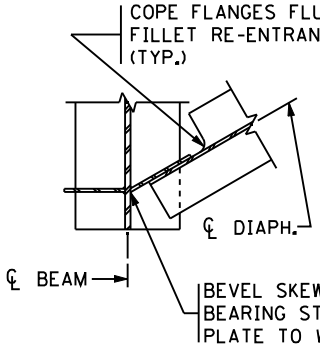
FASCIA BEAM

AT ABUTMENT DIAPHRAGMS



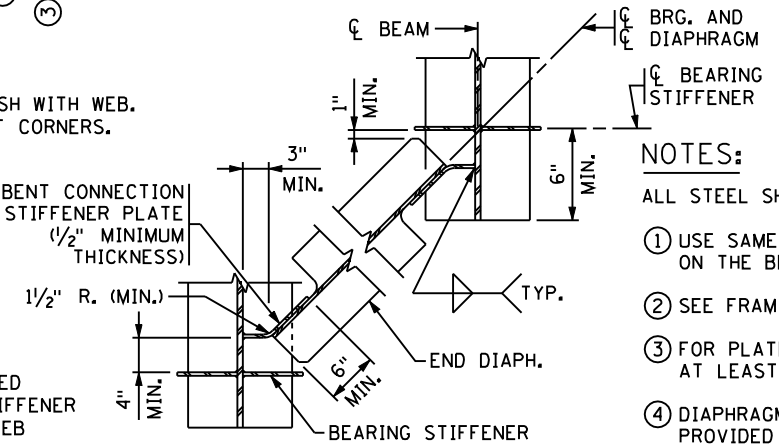
INTERIOR BEAM

AT ABUTMENT DIAPHRAGMS



SECTION C-C

SKEWS TO 30° MAX.



SECTION C-C

SKEWS OVER 30° TO 60°

NOTES:

ALL STEEL SHALL CONFORM TO Mn/DOT SPEC. 3309.

① USE SAME SHEAR STUD HEIGHT AS USED ON THE BEAMS.

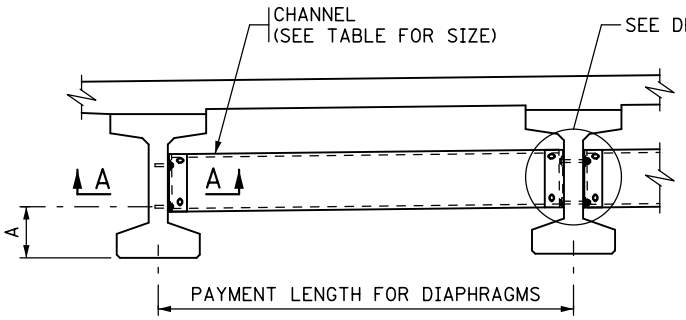
② SEE FRAMING PLAN FOR SIZE OF DIAPHRAGM.

③ FOR PLATE GIRDERS, END DIAPHRAGMS SHALL BE AT LEAST ½ THE BEAM HEIGHT.

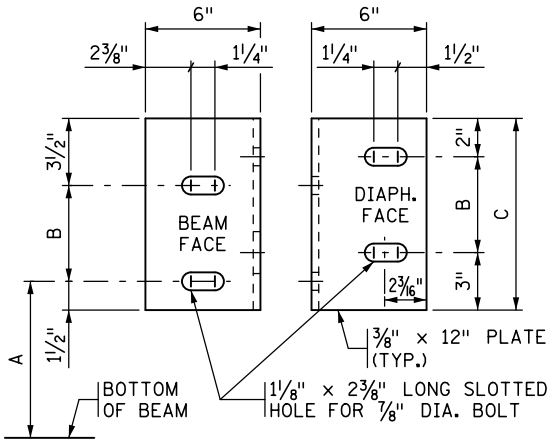
④ DIAPHRAGMS MAY BE PLACED LEVEL, PROVIDED MINIMUM CLEARANCES ARE MET.

⑤ MILL TO BEAR FOR BEARING STIFFENERS.

APPROVED: MARCH 26, 2009 Daniel L Worgan STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION BOLTED DIAPHRAGMS (FOR STEEL BEAMS)	REVISED	DETAIL NO. B402

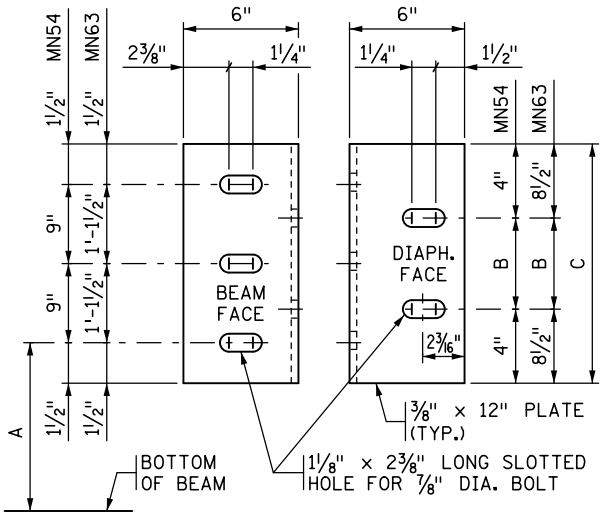


PART TRANSVERSE SECTION AT DIAPHRAGM



DIAPHRAGM CONNECTION

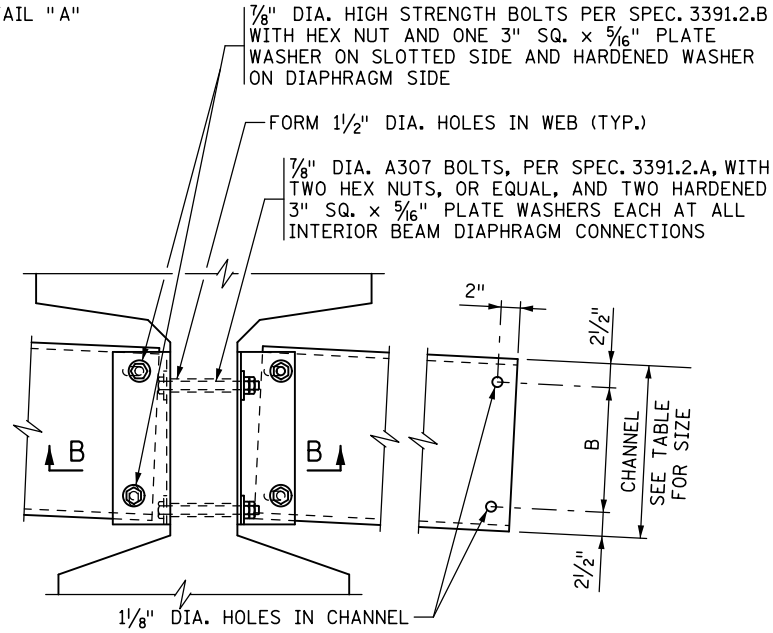
FOR 36M, AND MN45 BEAMS



DIAPHRAGM CONNECTION

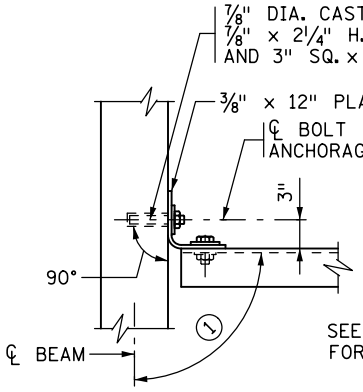
FOR MN54 AND MN63 BEAMS

TABLE				
BEAM HEIGHT	DISTANCE			CHANNEL SIZE
	A	B	C	
36M	1'-3"	7"	1'-0"	C12x20.7
MN45	1'-7¾"	7"	1'-0"	C12x20.7
MN54	1'-7¾"	1'-1"	1'-9"	MC18x42.7
MN63	1'-7¾"	1'-1"	2'-6"	MC18x42.7



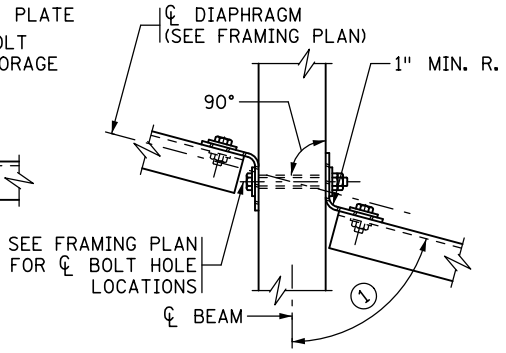
DETAIL "A"

INTERIOR BEAM WITH CONTINUOUS LINE OF DIAPHRAGMS



SECTION A-A

TYPICAL SECTION AT ALL FASCIA BEAMS



SECTION B-B

TYPICAL SECTION AT INTERIOR BEAM WITH CONTINUOUS OR STAGGERED INTERMEDIATE DIAPHRAGMS

NOTES:

PROVIDE STEEL PER SPEC. 3306.

INSTALL PER SPEC. 2405.3.K.

TORQUE ALL BOLTS, INCLUDING ANCHOR BOLTS TO 80 FT.-LBS.

SHOP BEND THE LEG OF THE 12" PLATE TO CONFORM TO THE DIAPHRAGM. A ⅜" × 6" × 6" ANGLE MAY BE USED FOR DIAPHRAGMS PERPENDICULAR TO BEAMS.

INCLUDE ALL STRUCTURAL STEEL SHOWN ON THIS DETAIL, INCLUDING BOLTS AND WASHERS, IN UNIT PRICE BID FOR DIAPHRAGMS FOR PRESTRESSED BEAMS.

BENT PLATES MAY BE USED IN PLACE OF CHANNELS IF THE BENT PLATES HAVE THE SAME HEIGHT AS THE CHANNELS THEY REPLACE, ARE 5⁄16" IN THICKNESS, AND HAVE LEGS 5" LONG.

GALVANIZE STEEL PLATES AND SHAPES PER SPEC. 3394.

GALVANIZE BOLTS, NUTS AND WASHERS PER SPEC. 3392.

① FOR SKEW ANGLES UNDER 20°, USE 90° LESS THE SKEW ANGLE. FOR SKEW ANGLES OVER 20°, USE 90°.

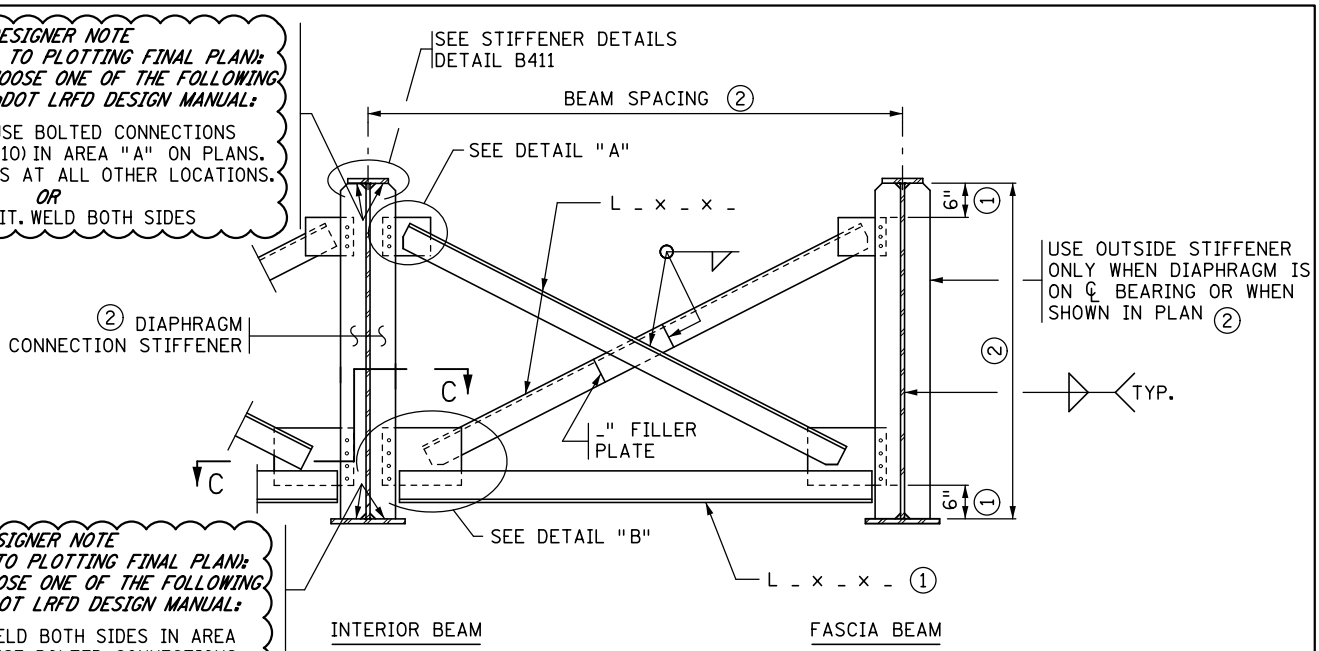
APPROVED: NOVEMBER 03, 2015	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISED	DETAIL NO.
Beverly A. J. Kanaker STATE BRIDGE ENGINEER	STEEL INTERMEDIATE DIAPHRAGM (FOR 36M, MN45 - MN63 PRESTRESSED CONCRETE BEAMS)		B403

DESIGNER NOTE
(REMOVE PRIOR TO PLOTTING FINAL PLAN):
DESIGNER TO CHOOSE ONE OF THE FOLLOWING NOTES PER MnDOT LRFD DESIGN MANUAL:

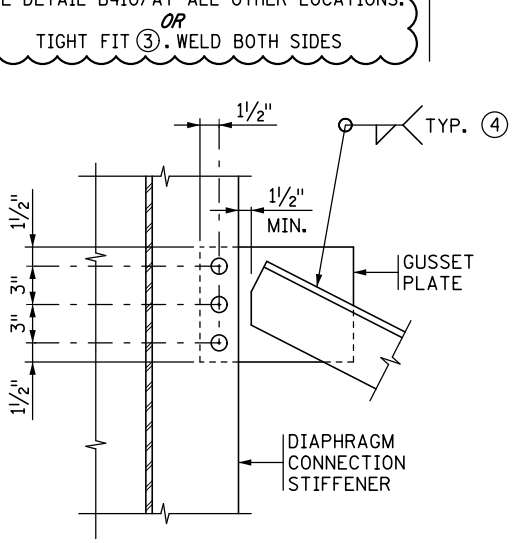
TIGHT FIT. USE BOLTED CONNECTIONS (SEE DETAIL B410) IN AREA "A" ON PLANS. WELD BOTH SIDES AT ALL OTHER LOCATIONS.
OR
TIGHT FIT. WELD BOTH SIDES

DESIGNER NOTE
(REMOVE PRIOR TO PLOTTING FINAL PLAN):
DESIGNER TO CHOOSE ONE OF THE FOLLOWING NOTES PER MnDOT LRFD DESIGN MANUAL:

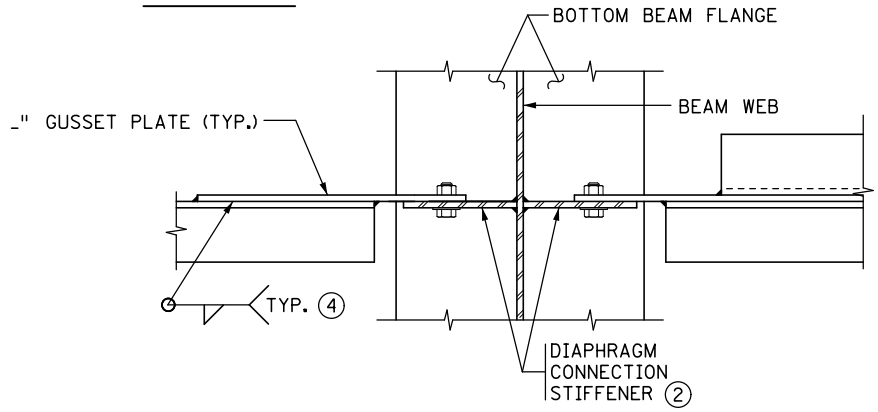
TIGHT FIT ③. WELD BOTH SIDES IN AREA "A" ON PLANS. USE BOLTED CONNECTIONS (SEE DETAIL B410) AT ALL OTHER LOCATIONS.
OR
TIGHT FIT ③. WELD BOTH SIDES



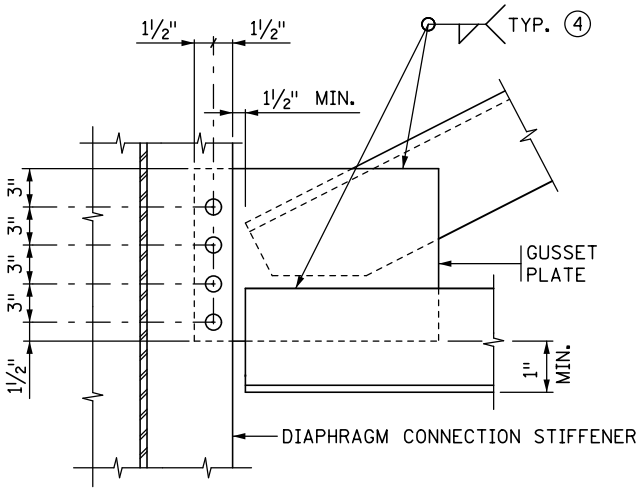
ELEVATION



DETAIL "A"



SECTION C-C



DETAIL "B"

DESIGNER NOTE
(REMOVE PRIOR TO PLOTTING FINAL PLAN):
DESIGNER TO SPECIFY GUSSET PLATE THICKNESS, ½" MINIMUM. FILLER PLATE THICKNESS TO MATCH GUSSET.

NOTES:

PROVIDE STEEL PER SPEC. 3309.

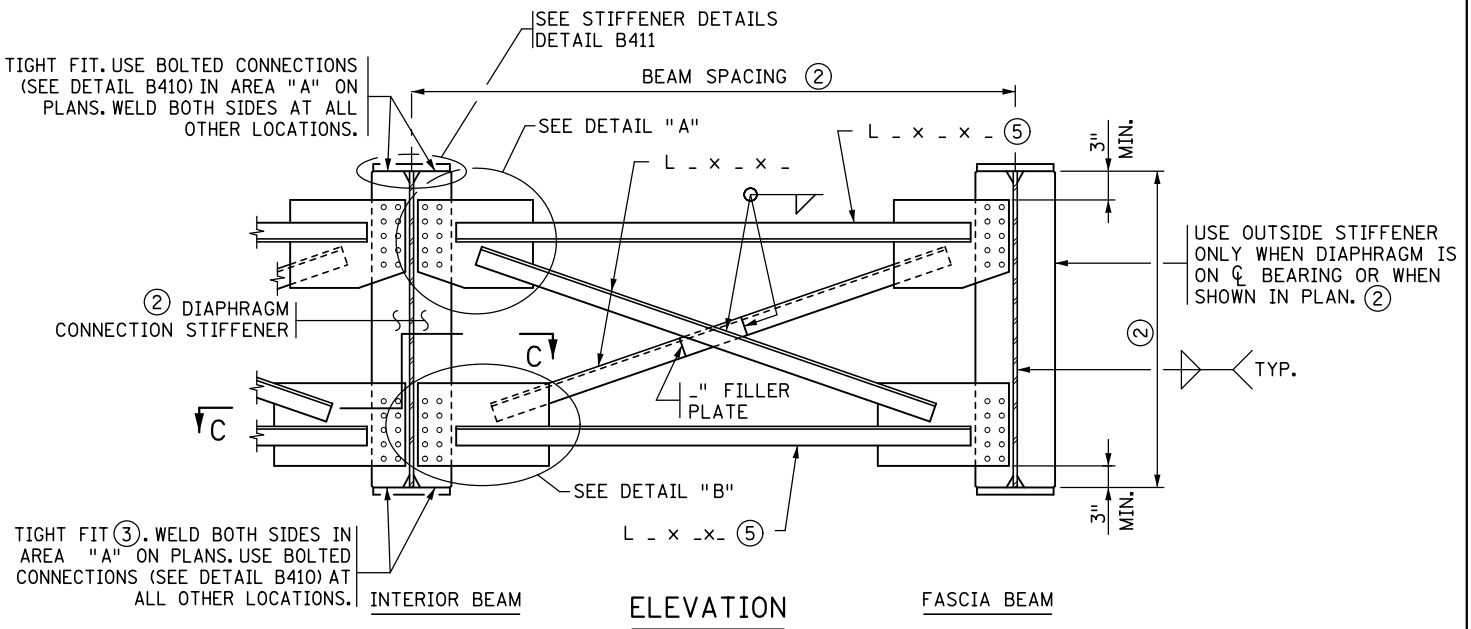
① DIAPHRAGMS MAY BE PLACED LEVEL PROVIDED MINIMUM CLEARANCES ARE MET. FOR DIAPHRAGMS LOCATED BENEATH DECK JOINT, ORIENT FLANGES OF CROSS FRAME MEMBERS AWAY FROM THE DECK JOINT.

② SEE BRIDGE FRAMING PLAN AND GIRDER ELEVATIONS FOR ADDITIONAL INFORMATION.

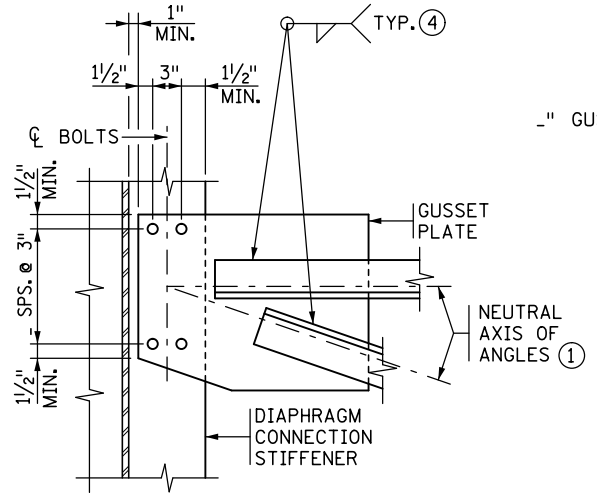
③ MILL TO BEAR AT BEARING STIFFENERS.

④ MINIMUM TOTAL WELD LENGTH EQUAL TO 4 TIMES NOMINAL ANGLE SIZE.

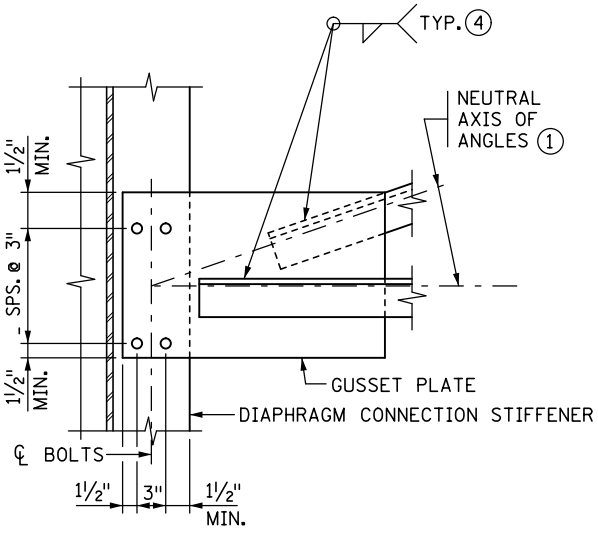
APPROVED: MARCH 26, 2009	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISED 11-03-2015	DETAIL NO.
Daniel L Morgan STATE BRIDGE ENGINEER	CROSS FRAME INTERMEDIATE DIAPHRAGM (FOR STRAIGHT STEEL BEAMS)		B407



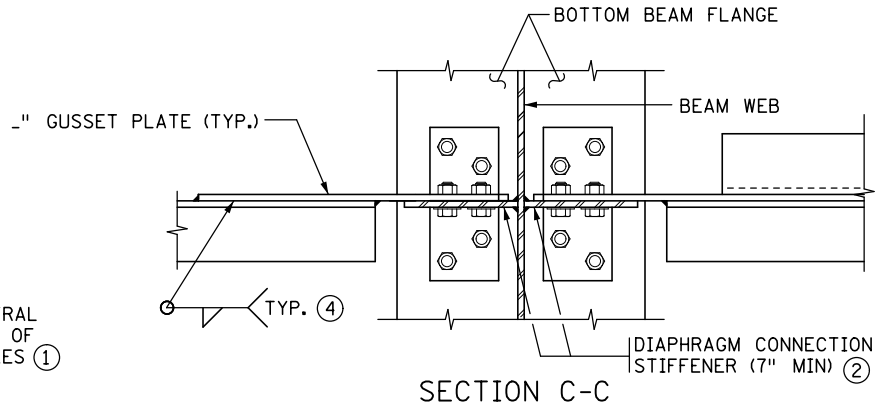
ELEVATION



DETAIL "A"



DETAIL "B"



SECTION C-C

(BOLTED CONNECTION SHOWN)

DESIGNER NOTE
(REMOVE PRIOR TO PLOTTING FINAL PLAN):

DESIGNER TO SPECIFY GUSSET PLATE THICKNESS, ½" MINIMUM. FILLER PLATE THICKNESS TO MATCH GUSSET.

NOTES:

PROVIDE STEEL PER SPEC. 3309.

(1) PROJECT NEUTRAL AXIS OF MEMBER THROUGH CENTER OF BOLT PATTERN.

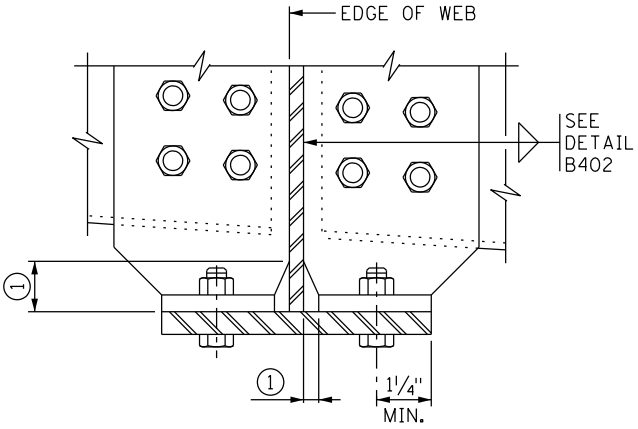
(2) SEE BRIDGE FRAMING PLAN AND GIRDER ELEVATIONS FOR ADDITIONAL INFORMATION.

(3) MILL TO BEAR AT BEARING STIFFENERS.

(4) MINIMUM TOTAL WELD LENGTH EQUAL TO 4 TIMES NOMINAL ANGLE SIZE.

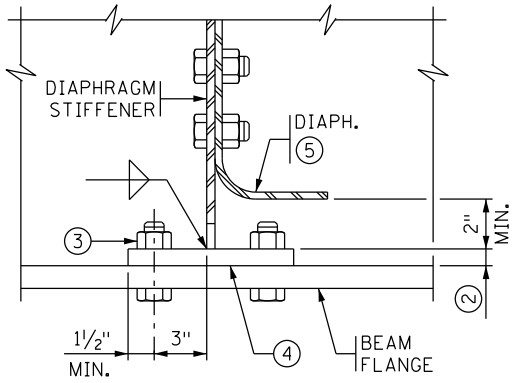
(5) FOR DIAPHRAGMS LOCATED BENEATH DECK JOINT, ORIENT FLANGES OF CROSS FRAME MEMBERS AWAY FROM THE DECK JOINT.

APPROVED: MARCH 26, 2009 Daniel L Morgan STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION CROSS FRAME INTERMEDIATE DIAPHRAGM (FOR CURVED STEEL BEAMS)	REVISED 11-03-2015	DETAIL NO. B408



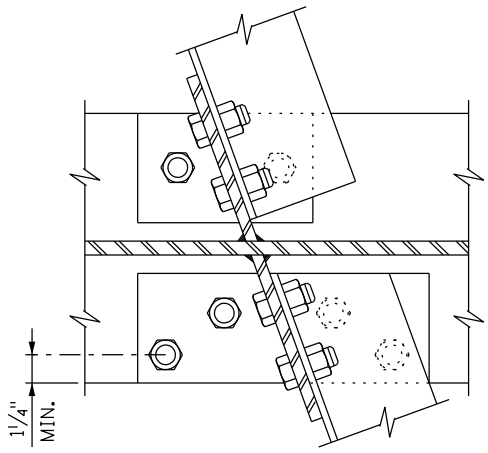
SECTION A-A

CONNECTION WITH 2 BOLTS AT INTERIOR BEAMS



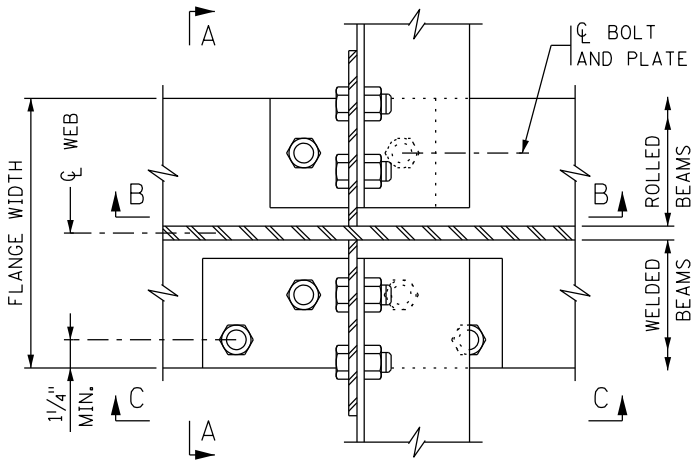
SECTION B-B

CONNECTION WITH 2 BOLTS



PLAN VIEW

AT INTERIOR BEAMS (UP TO 20° SKEW)

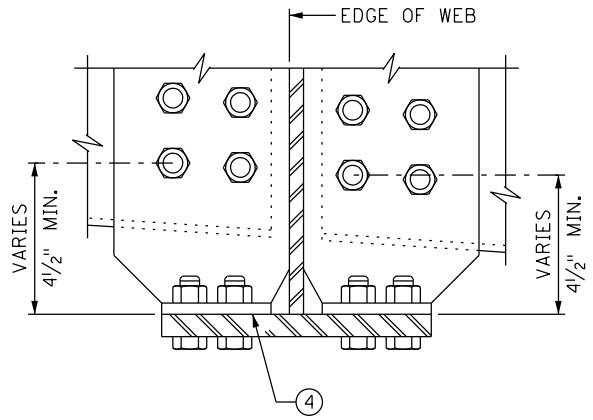


PLAN VIEW

AT INTERIOR BEAMS

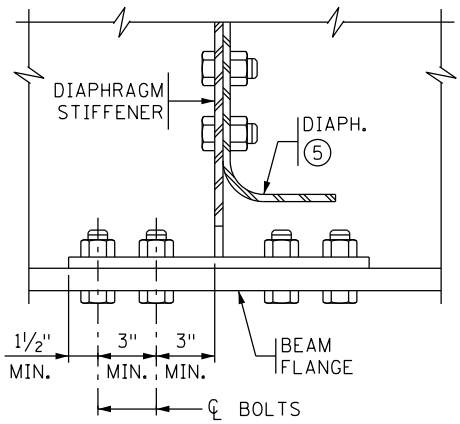
DESIGNER NOTE (REMOVE PRIOR TO PLOTTING FINAL PLAN):

DETAILS SHOWN ARE FOR STRAIGHT BEAMS ONLY. DESIGNER SHALL MODIFY THE NUMBER OF BOLTS AS NECESSARY FOR CURVED BEAMS.



SECTION A-A

CONNECTION WITH 4 BOLTS AT INTERIOR BEAMS



SECTION C-C

CONNECTION WITH 4 BOLTS

NOTES:

ALL STEEL SHALL CONFORM TO SPEC. 3309.

(1) SEE DETAIL B411.

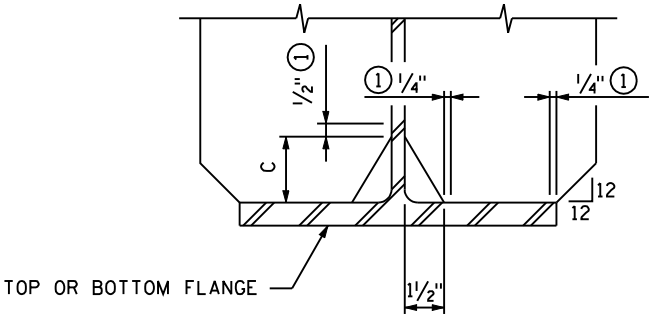
(2) MINIMUM PLATE THICKNESS SHALL BE ¾".

(3) BOLT PLATE TO BEAM FLANGE PRIOR TO WELDING PLATE TO DIAPHRAGM STIFFENER.

(4) REMOVE LOOSE SCALE AND RUST FROM CONTACT AREA AT DIAPHRAGM CONNECTION. SURFACE MUST BE FLAT AND PRIMED.

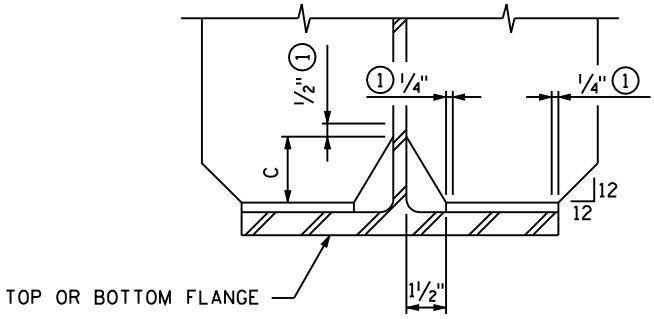
(5) BENT PLATE DIAPHRAGMS SHOWN. FOR CROSS FRAME DIAPHRAGM SEE DETAIL B407 FOR STRAIGHT BEAMS AND DETAIL B408 FOR CURVED BEAMS.

APPROVED: NOVEMBER 22, 2002	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISED	DETAIL NO.
Daniel L Morgan STATE BRIDGE ENGINEER	BOLTED FLANGE TO STIFFENER DETAIL	09-11-2004 10-28-2008 05-24-2012	B410



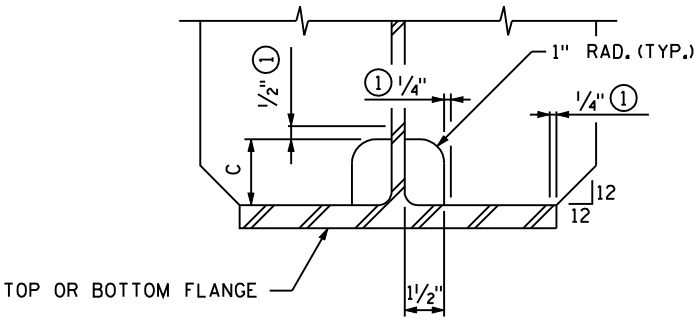
STIFFENER TO FLANGE CONNECTION

OPTION 1



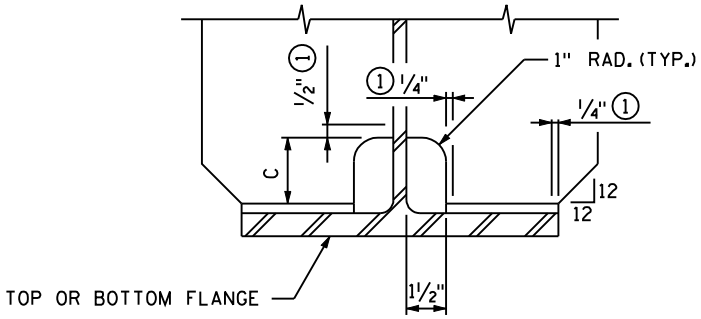
STIFFENER TO TAB PLATE CONNECTION

OPTION 1



STIFFENER TO FLANGE CONNECTION

OPTION 2

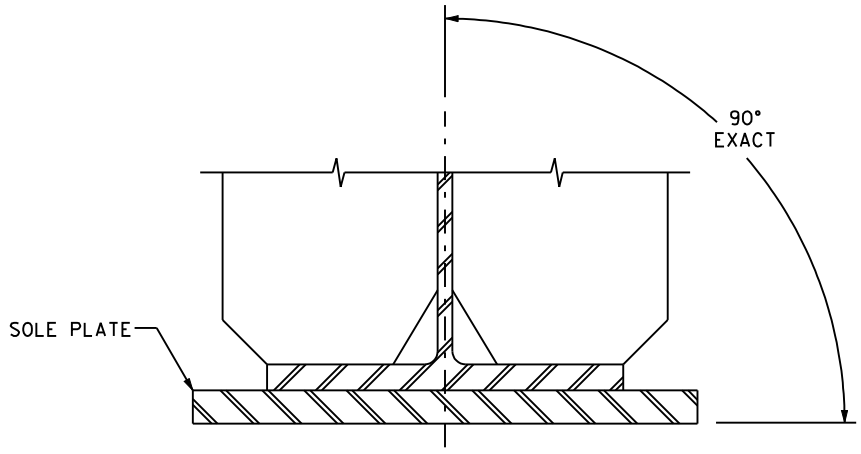


STIFFENER TO TAB PLATE CONNECTION

OPTION 2

STIFFENER COPE DETAIL

PLATE GIRDER OR ROLLED BEAM



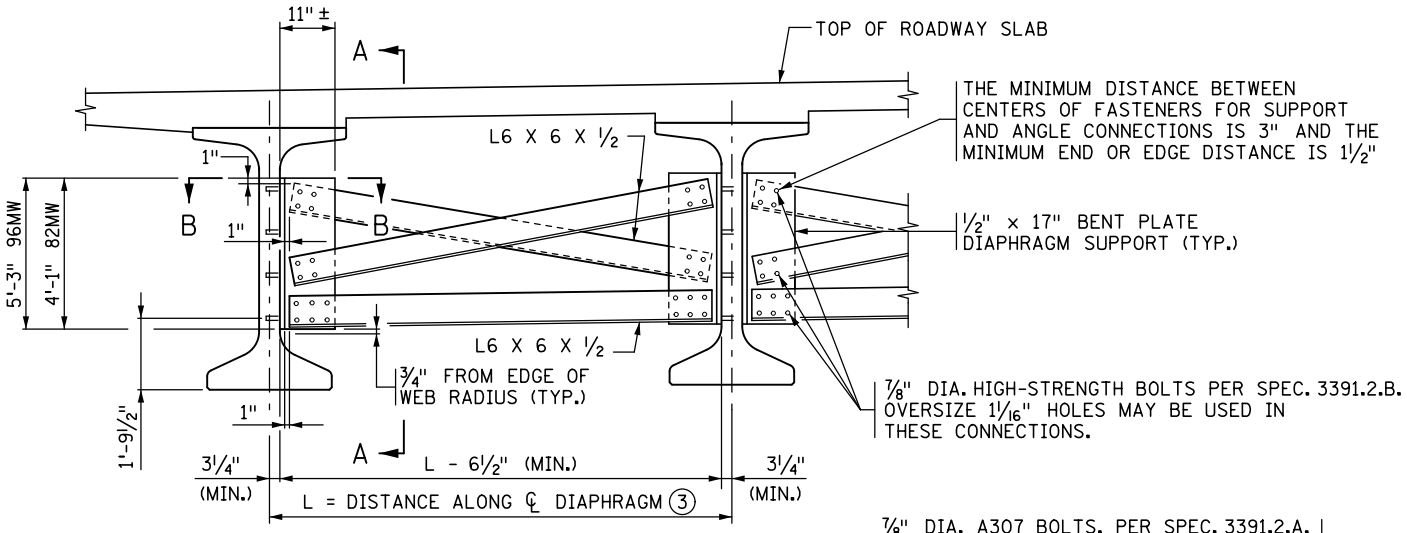
SOLE PLATE AT BEARING

WEB THICKNESS	DIMENSION C
½", 9/16", 5/8"	2½"
11/16", ¾"	3"

NOTES:

① DO NOT WELD IN THIS AREA. SEE B410 FOR CONNECTION DETAILS.

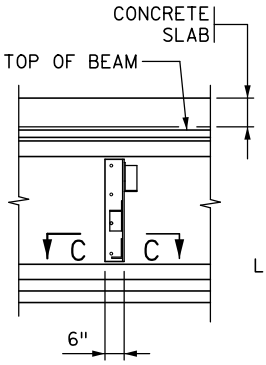
APPROVED: OCTOBER 22, 2008 Daniel L Morgan STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION STIFFENER DETAILS (FOR STEEL BEAMS)	REVISION	DETAIL NO. B411



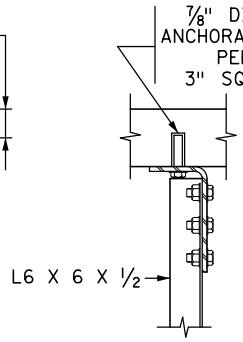
PART TRANSVERSE SECTION

SQUARE BRIDGE SHOWN

⅞" DIA. A307 BOLTS, PER SPEC. 3391.2.A, WITH TWO HEX NUTS, OR EQUAL, AND TWO HARDENED 3" SQ. x 5/16" PLATE WASHERS EACH AT ALL INTERIOR BEAM DIAPHRAGM CONNECTIONS

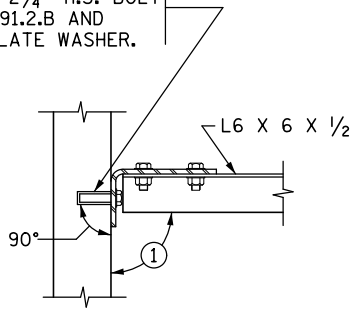


SECTION A-A



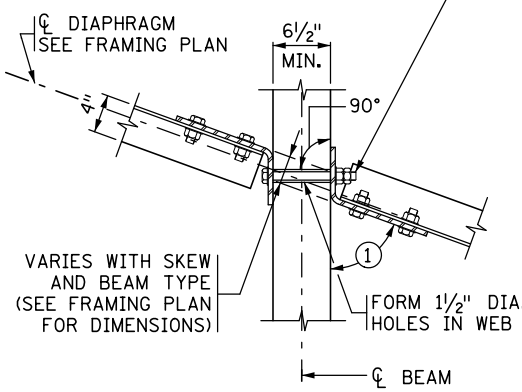
SECTION C-C

FASCIA BEAM



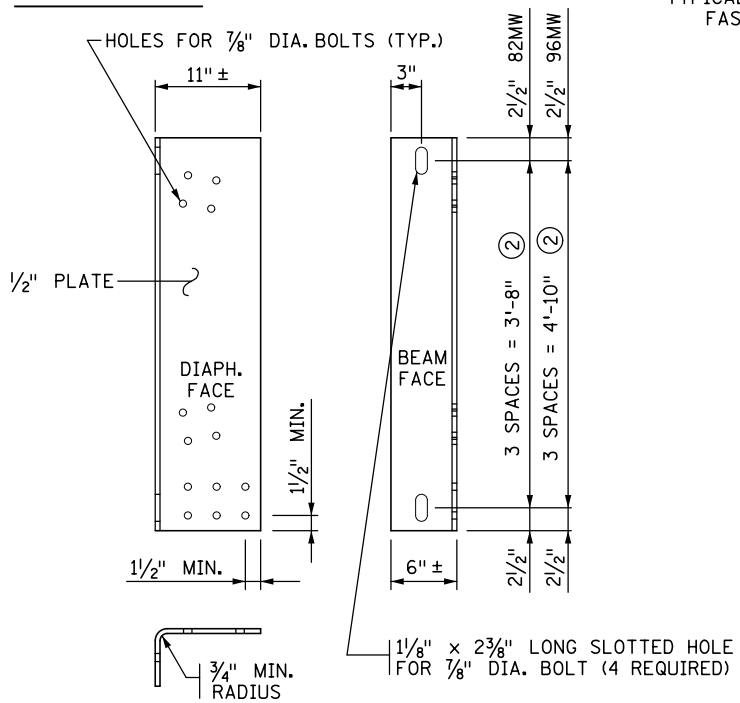
SECTION B-B

TYPICAL SECTION AT FASCIA BEAM



INTERMEDIATE DIAPHRAGM

TYPICAL SECTION AT INTERIOR BEAM WITH CONTINUOUS OR STAGGERED INTERMEDIATE DIAPHRAGMS



DIAPHRAGM SUPPORT

NOTES:

PROVIDE STEEL PER SPEC. 3306.

INCLUDE ALL STRUCTURAL STEEL SHOWN ON THIS DETAIL, INCLUDING BOLTS AND WASHERS, IN THE PAYMENT FOR DIAPHRAGMS FOR PRESTRESSED BEAMS.

INSTALLATION PER SPEC. 2405.3.K

TORQUE ALL BOLTS, INCLUDING ANCHOR BOLTS TO 80 FT. LBS.

GALVANIZE STEEL PLATES AND SHAPES PER SPEC. 3394.

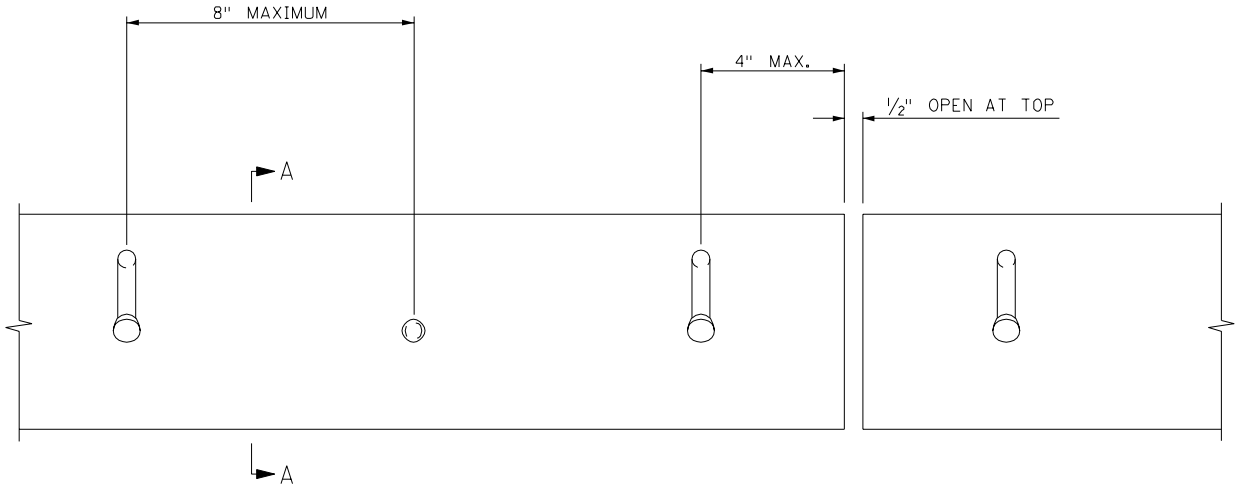
GALVANIZE BOLTS, NUTS AND WASHERS PER SPEC. 3392.

① FOR SKEW ANGLES UNDER 20°, USE 90° LESS THE SKEW ANGLE. FOR SKEW ANGLES OVER 20°, USE 90°.

② SPACE BOLT HOLES SO AS TO MISS PRESTRESSED STRANDS IN CONCRETE BEAMS. SEE PRESTRESSED CONCRETE BEAM SHEETS FOR MORE INFORMATION.

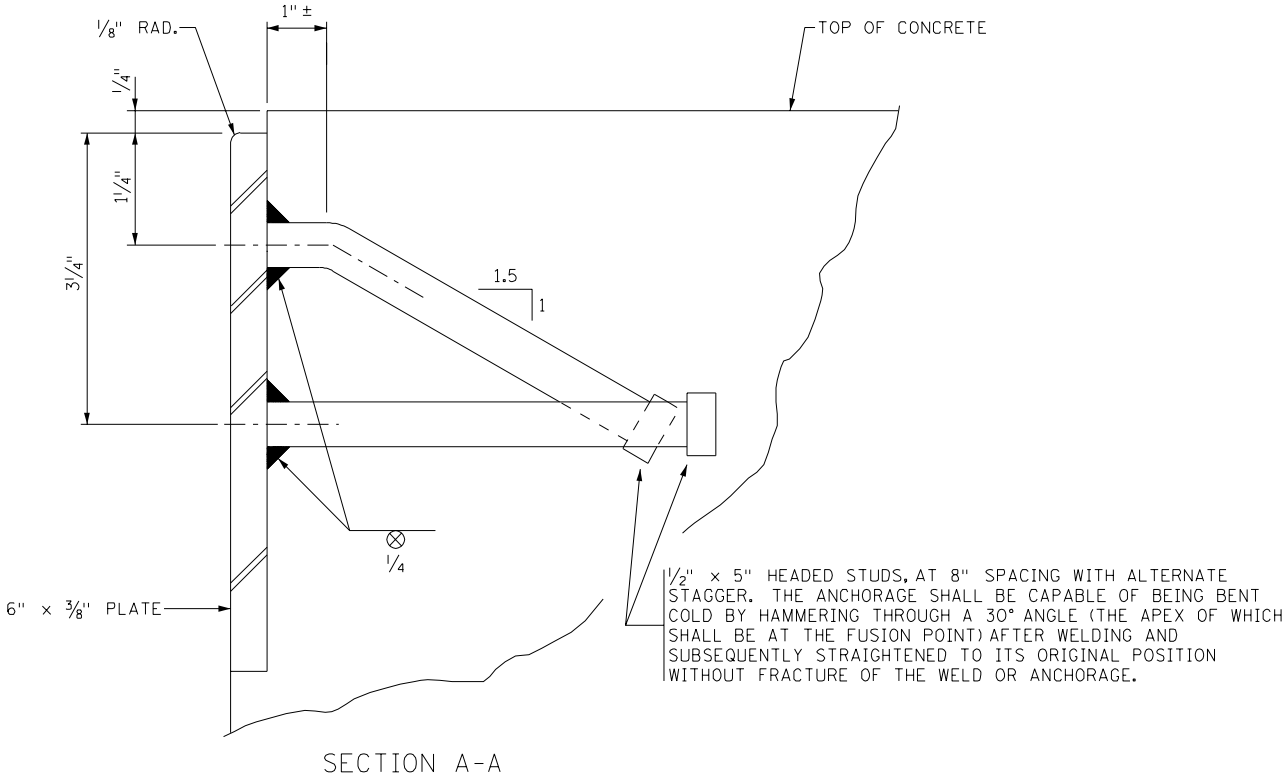
③ DIAPHRAGM SHOWN DESIGNED FOR BEAM SPACING UP TO 13'-0".

APPROVED: SEPTEMBER 22, 2011 Nancy Daubenberger STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION STEEL INTERMEDIATE BOLTED DIAPHRAGM (ALL MW PRESTRESSED CONCRETE BEAMS)	REVISED 09-11-2014 11-03-2015	DETAIL NO. B412



ELEVATION

CONCRETE NOT SHOWN



SECTION A-A

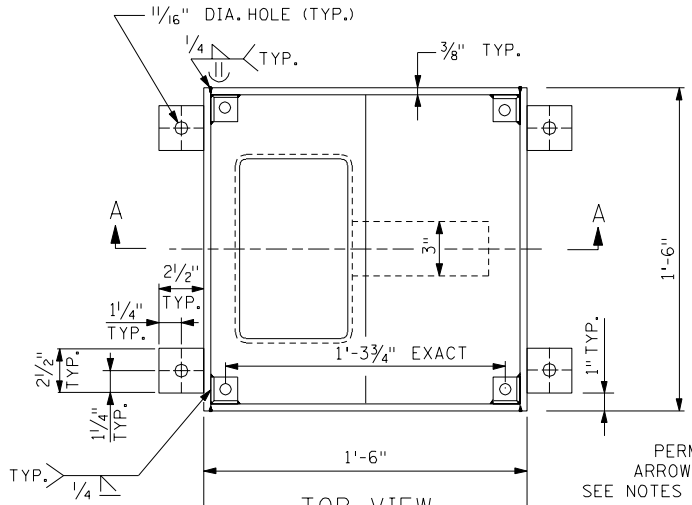
NOTES:

PLATES SHALL EXTEND FULL WIDTH OF ROADWAY BETWEEN GUTTER LINES WITH A 1/2" OPEN JOINT AT EACH BREAK IN CROWN PROFILE. MAX. LENGTH 22 FT.

MATERIALS: STRUCTURAL STEEL PER Mn/DOT SPEC. 3306. GALVANIZE AFTER FABRICATION PER Mn/DOT SPEC. 3394

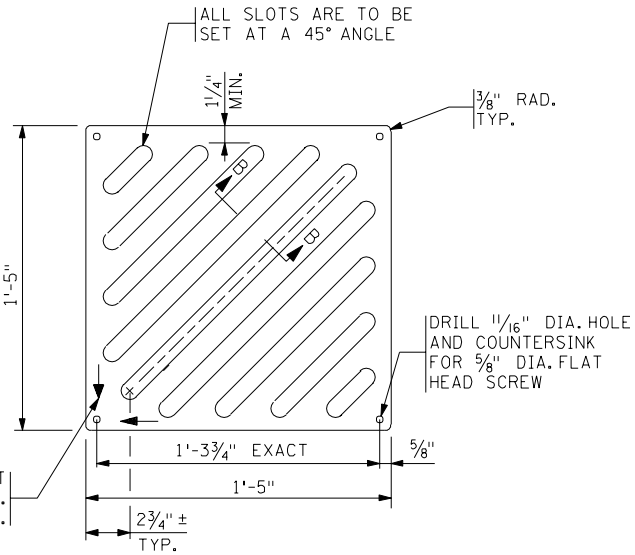
SET PLATE TO PROPER GRADE AND CROWN.

APPROVED: NOVEMBER 22, 2002	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION	DETAIL NO.
Daniel L Morgan STATE BRIDGE ENGINEER	PROTECTION PLATE (FOR END OF SLAB)		B553



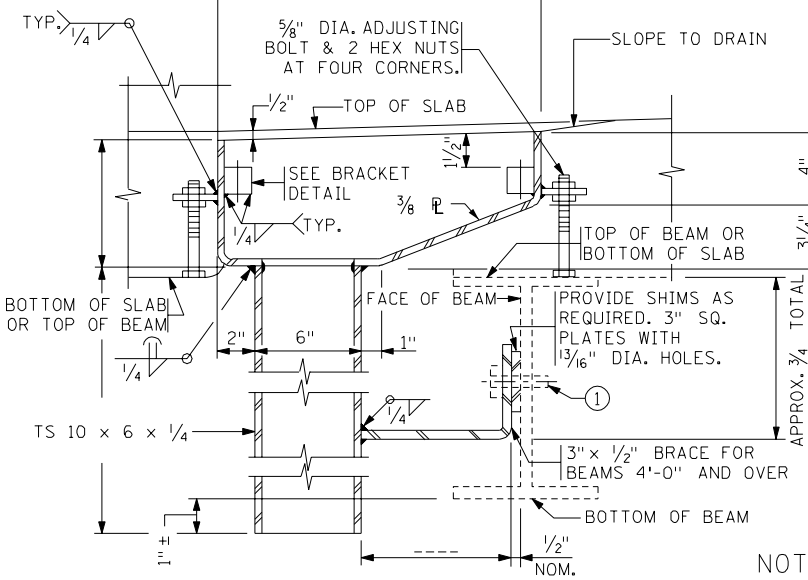
TOP VIEW

SCUPPER



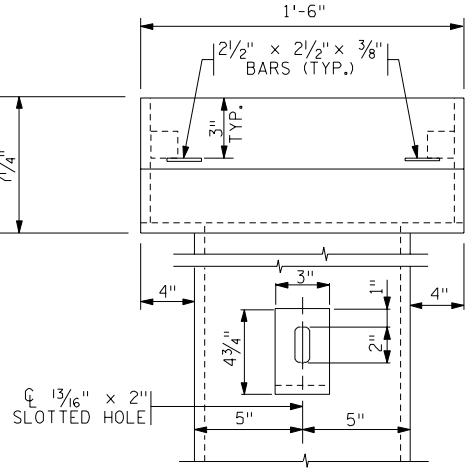
TOP VIEW

GRATE

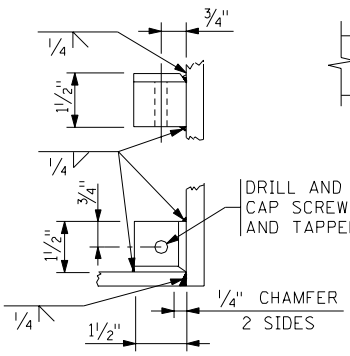


SECTION A-A

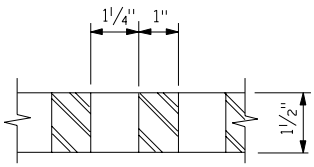
STEEL BEAM SHOWN



FRONT VIEW



BRACKET DETAIL



SECTION B-B

NOTES:

ALL STEEL PLATES PER Mn/DOT SPEC. 3306. CAST IRON MAY BE USED AS AN ALTERNATE. FABRICATE GRATE USING AUTOMATICALLY CONTROLLED CUTTING TORCH

CAST IRON GRATE, PER Mn/DOT SPEC. 3321, CLASS 35B, MAY BE USED AS AN ALTERNATE.

WORKMANSHIP AND FABRICATION PER Mn/DOT SPEC. 2471.

BLAST CLEAN SCUPPER AND GRATE AFTER FABRICATION. GALVANIZE, EXCEPT CAST IRON, PER Mn/DOT SPEC. 3394.

GALVANIZE HARDWARE PER Mn/DOT SPEC. 3392.

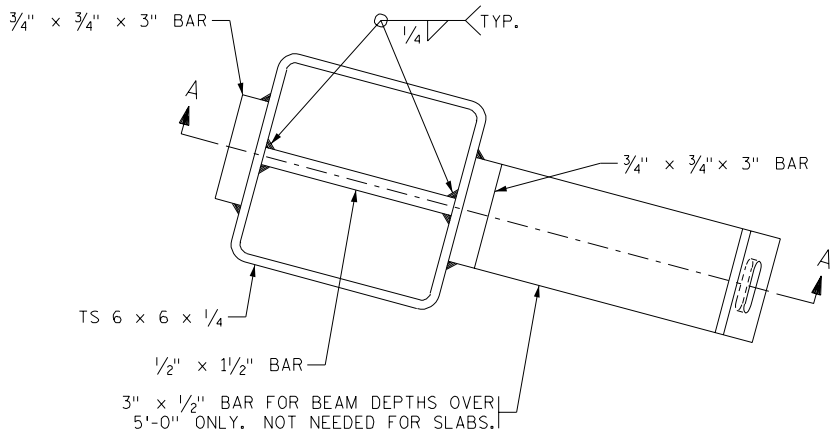
INSTALL GRATE WITH ARROW ON CURB SIDE AND IN DIRECTION OF FLOW.

PAYMENT FOR FLOOR DRAIN, TYPE ____ SHALL INCLUDE ALL MATERIAL ON THIS DETAIL.

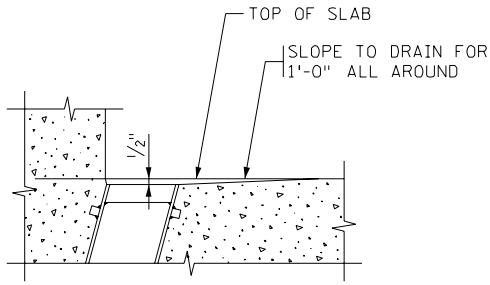
GRATE OPENING AREA IS 106 SQ. IN.

(1) ATTACH TO BEAM WITH 3/4" DIA. BOLT, LOCKWASHER AND NUT AS REQUIRED. SEE SPECIAL PROVISIONS FOR APPROVED ANCHORAGE REQUIRED FOR CONCRETE BEAMS. ANCHORAGE TO MISS DRAPED STRANDS.

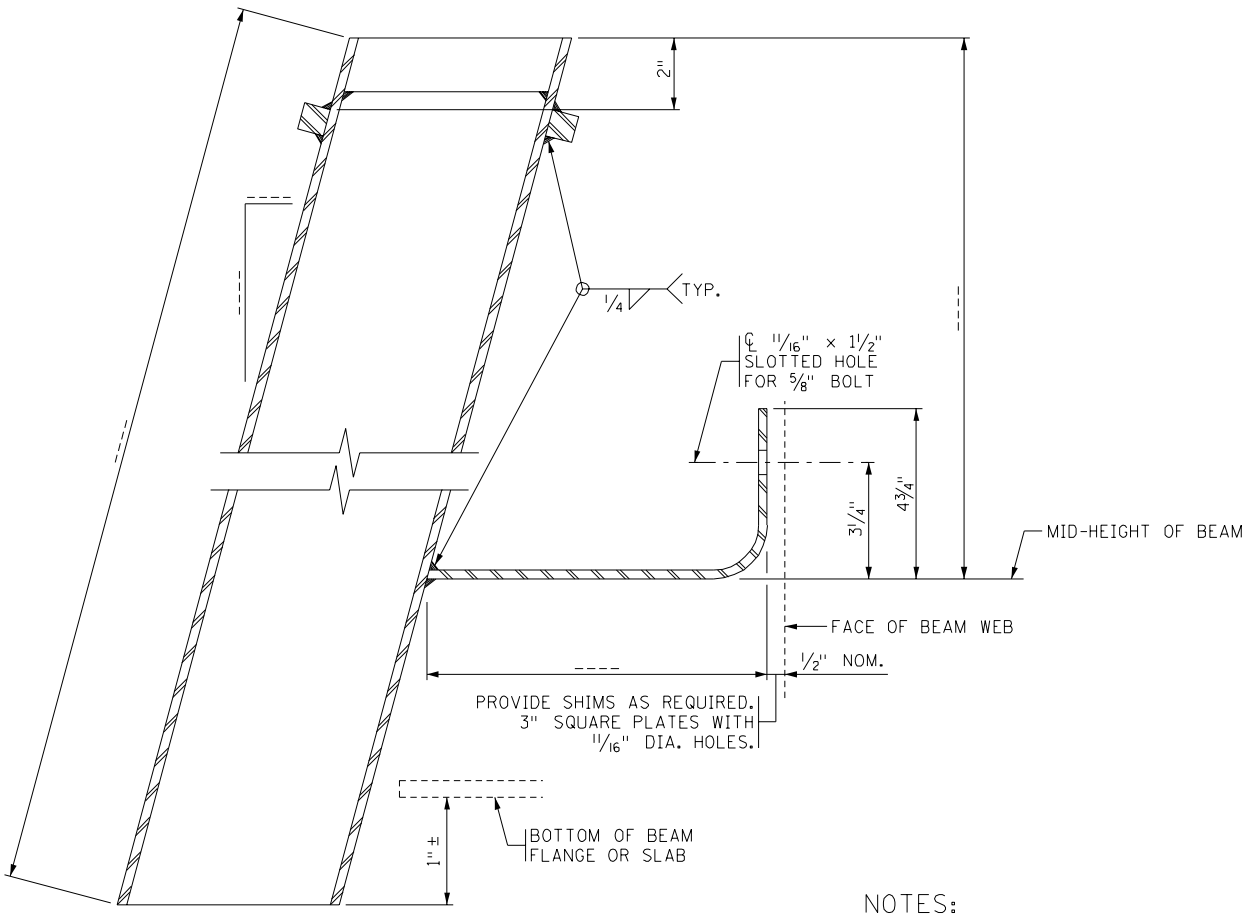
APPROVED: NOVEMBER 22, 2002	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION	DETAIL NO.
Daniel L Worgan STATE BRIDGE ENGINEER	BRIDGE FLOOR DRAIN (WELDED BOX)		B701



PLAN VIEW



PLACEMENT DIAGRAM



SECTION A-A

NOTES:

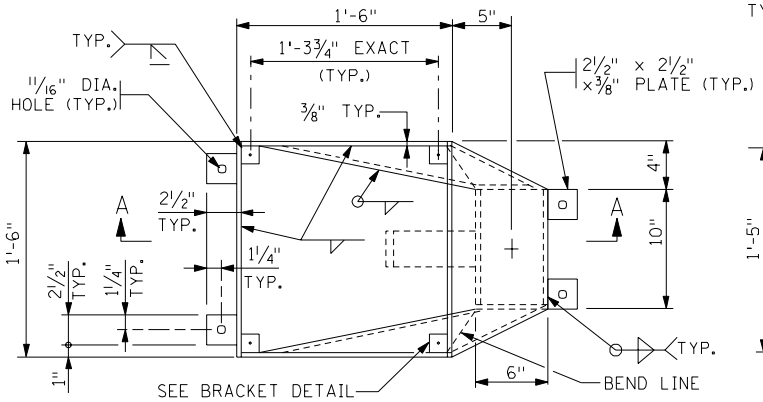
MATERIAL TO BE STRUCTURAL STEEL PER Mn/DOT SPEC. 3306.

GALVANIZE BOLTS AND WASHER PER Mn/DOT SPEC. 3392.

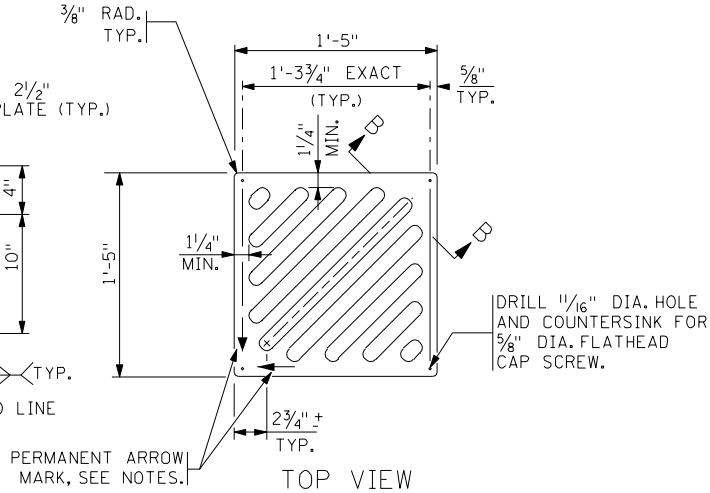
GALVANIZE OTHER MATERIALS PER Mn/DOT SPEC. 3394 AFTER FABRICATION.

PAYMENT FOR FLOOR DRAIN TYPE ____ SHALL INCLUDE ALL MATERIAL SHOWN ON THIS DETAIL.

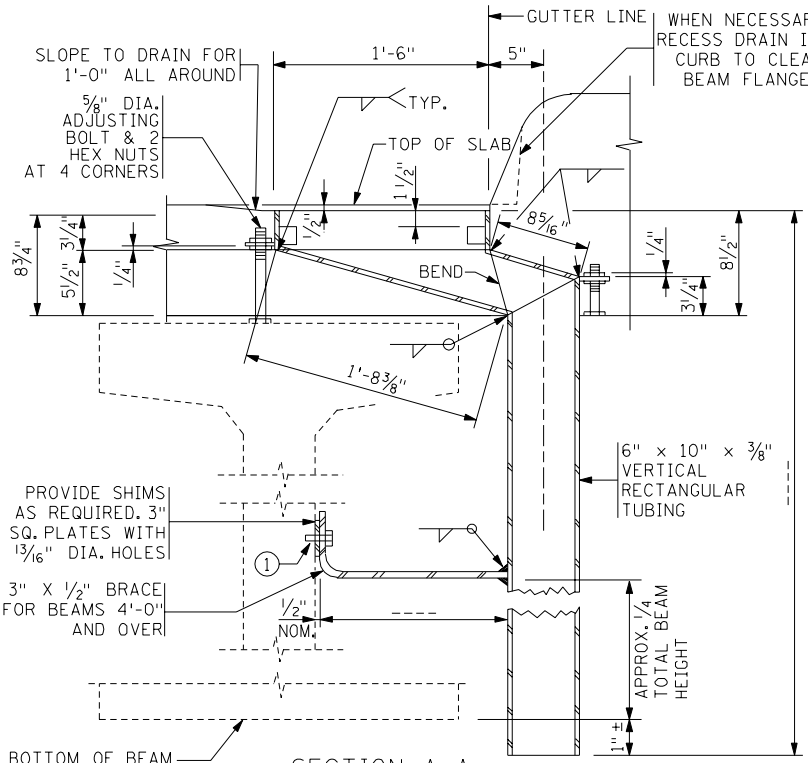
APPROVED: NOVEMBER 22, 2002	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISED 01-13-2004	DETAIL NO.
Daniel L Morgan STATE BRIDGE ENGINEER	BRIDGE FLOOR DRAIN (STRUCTURAL TUBE)		B702



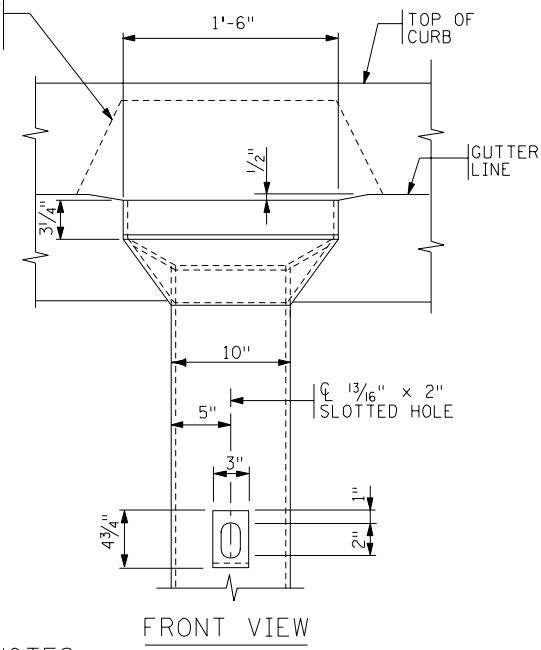
TOP VIEW
(SCUPPER)



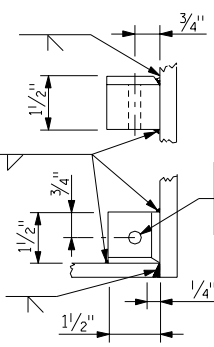
TOP VIEW
(GRATE)



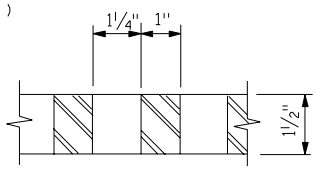
SECTION A-A
(CONCRETE BEAM SHOWN)



FRONT VIEW



BRACKET DETAIL



SECTION B-B

NOTES:

ALL STEEL PLATES PER Mn/DOT SPEC. 3306. FABRICATE GRATE USING AUTOMATICALLY CONTROLLED CUTTING TORCH.

CAST IRON GRATE PER Mn/DOT SPEC. 3321, CLASS 35B, MAY BE USED AS AN ALTERNATE.

WORKMANSHIP AND FABRICATION PER Mn/DOT SPEC. 2471.

BLAST CLEAN SCUPPER AND GRATE AFTER FABRICATION. GALVANIZE, EXCEPT CAST IRON, PER Mn/DOT SPEC. 3394.

GALVANIZE HARDWARE PER Mn/DOT SPEC. 3392.

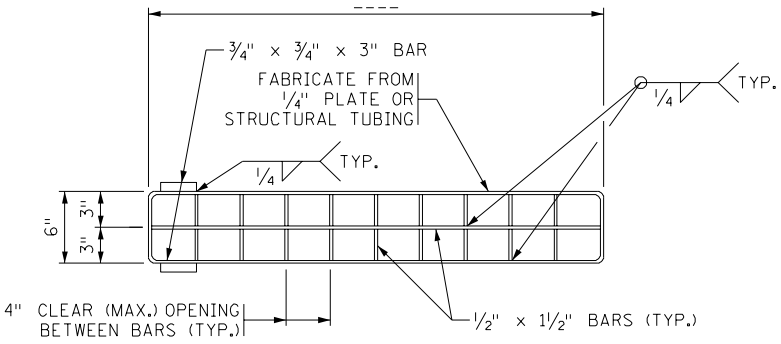
INSTALL GRATE WITH ARROW ON CURB SIDE AND IN DIRECTION OF FLOW.

PAYMENT FOR FLOOR DRAIN, TYPE ____ SHALL INCLUDE ALL MATERIAL ON THIS DETAIL.

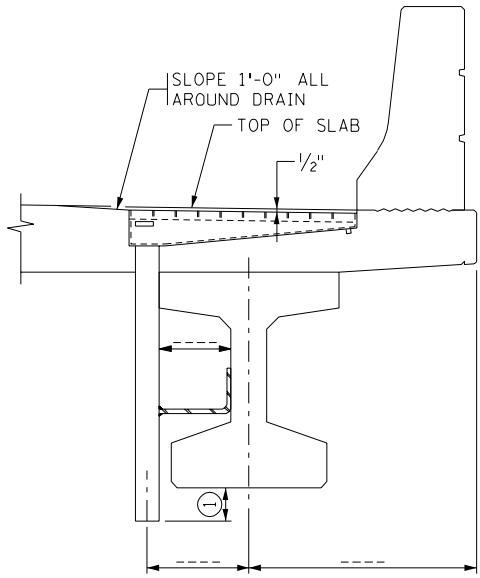
GRATE OPENING AREA IS 106 SQ. IN.

(1) ATTACH TO BEAM WITH ¾" DIA. BOLT, LOCKWASHER AND NUT AS REQUIRED. SEE SPECIAL PROVISIONS FOR APPROVED ANCHORAGE REQUIRED FOR CONCRETE BEAMS. ANCHORAGE TO MISS DRAPED STRANDS.

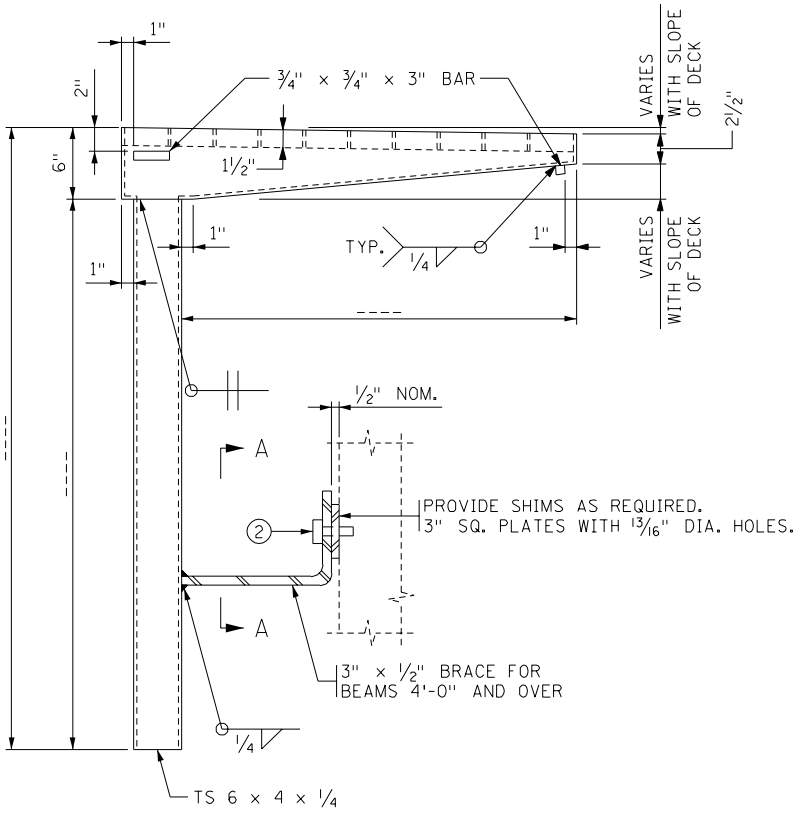
APPROVED: NOVEMBER 22, 2002	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION	DETAIL NO.
Daniel L Morgan STATE BRIDGE ENGINEER	BRIDGE OFFSET FLOOR DRAIN (WELDED BOX)		B705



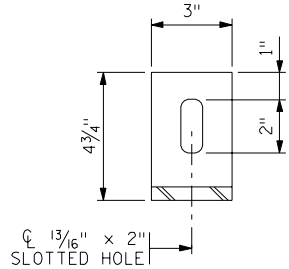
PLAN



FLOOR DRAIN PLACEMENT DIAGRAM



ELEVATION



SECTION A-A

NOTES:

MATERIAL TO BE STRUCTURAL STEEL PER Mn/DOT SPEC. 3306.

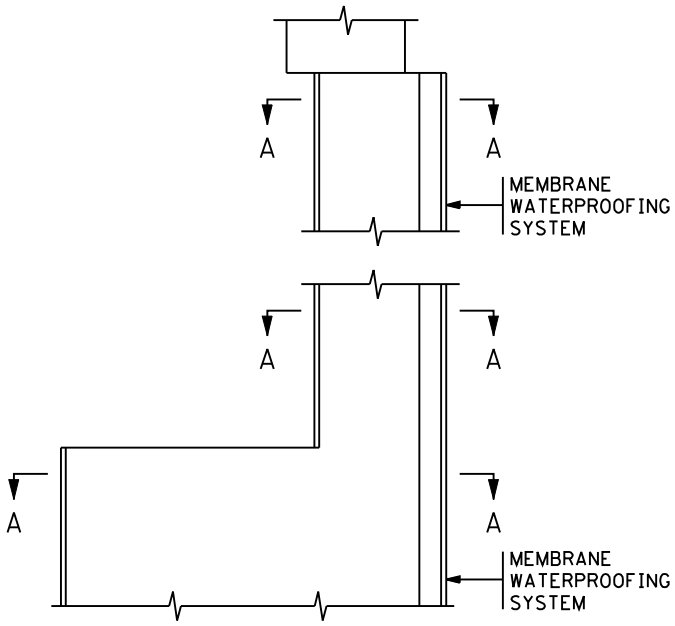
GALVANIZE MATERIAL PER Mn/DOT SPEC. 3394 AFTER FABRICATION.

PAYMENT FOR FLOOR DRAIN, TYPE _, SHALL INCLUDE ALL MATERIAL SHOWN ON THIS DETAIL.

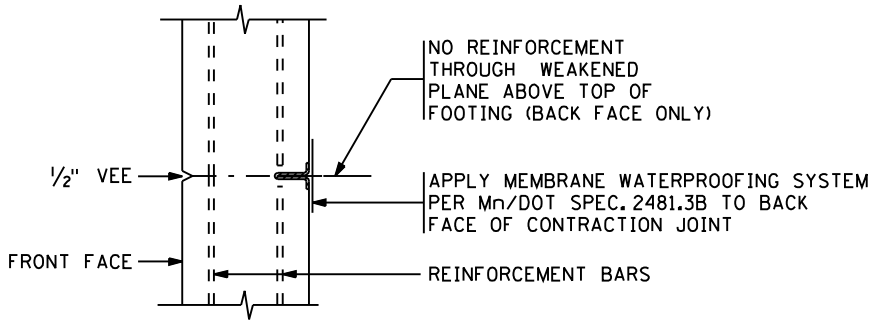
(1) 1" ± BELOW BOTTOM OF BEAM EXCEPT ON RURAL STREAM CROSSINGS WHERE DRAIN SHOULD BE EVEN TO BOTTOM OF BEAM.

(2) ATTACH TO BEAM WITH ¾" DIA. BOLT, LOCKWASHER AND NUT AS REQUIRED. SEE SPECIAL PROVISIONS FOR APPROVED ANCHORAGE REQUIRED FOR CONCRETE BEAMS. ANCHORAGE TO MISS DRAPED STRANDS.

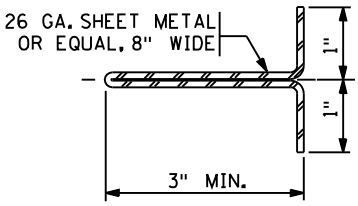
APPROVED: NOVEMBER 22, 2002	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISION	DETAIL NO.
Daniel L Morgan STATE BRIDGE ENGINEER	BRIDGE OFFSET FLOOR DRAIN (STRUCTURAL TUBE)		B706



PART SECTION THROUGH
ABUTMENT AT JOINT



SECTION A-A



BACK STRIP

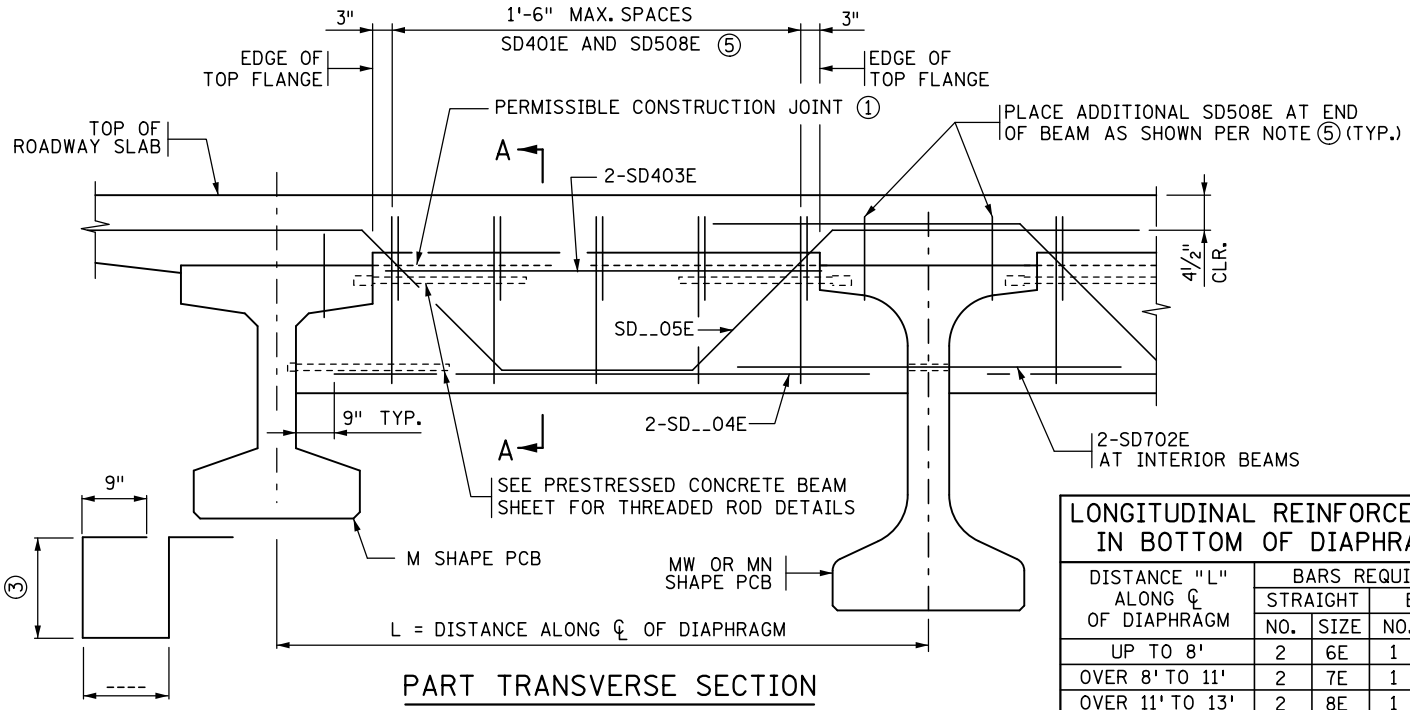
NOTES:

THE METHODS AND MATERIALS INDICATED ON THIS SHEET SHALL BE CONSIDERED AS SUGGESTED ONLY. VARIATIONS WILL BE PERMITTED, SUBJECT TO APPROVAL BY THE ENGINEER, BUT MUST PROVIDE DUMMY JOINTS OF A DEPTH SHOWN. THE SEPARATION OF THE HORIZONTAL REINFORCEMENT BARS IN THE BACK OF THE PARAPET AND BACK FACE OF THE ABUTMENT SHALL NOT BE LESS THAN 1½" NOR MORE THAN 3", CENTERED AS SHOWN, REGARDLESS OF THE PROCEDURE USED FOR FORMING THE DUMMY JOINT.

THE BACK STRIP MAY BE GALVANIZED METAL, A SUITABLE PLASTIC, OR OTHER DURABLE MATERIAL SATISFACTORY TO THE ENGINEER. THE BACK STRIP SHALL REMAIN IN PLACE AFTER THE FORMS ARE REMOVED.

THE COST OF FORMING THE JOINT SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS.

APPROVED: NOVEMBER 22, 2002 Daniel L Morgan STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION CONTRACTION JOINT	REVISION 03-30-2010	DETAIL NO. B801



PART TRANSVERSE SECTION

(L > 8′ SHOWN)

DESIGNER NOTE
(REMOVE DESIGNER NOTE PRIOR TO PLOTTING FINAL PLAN):

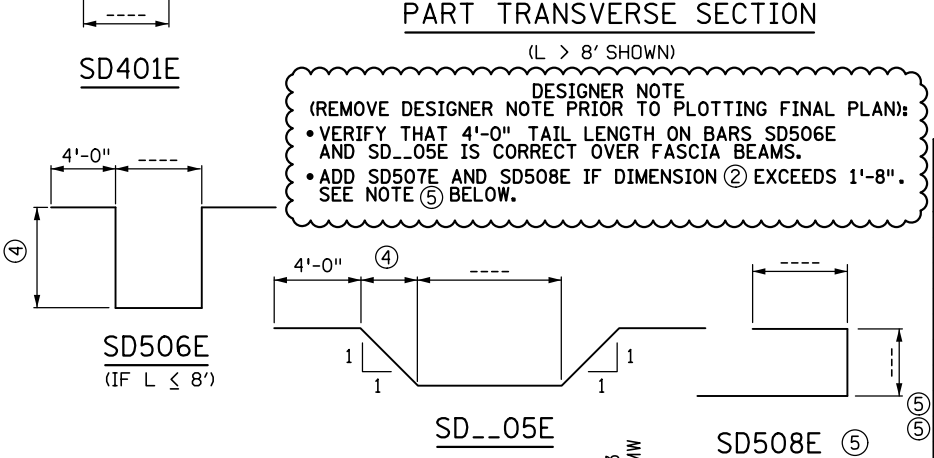
- VERIFY THAT 4'-0" TAIL LENGTH ON BARS SD506E AND SD__05E IS CORRECT OVER FASCIA BEAMS.
- ADD SD507E AND SD508E IF DIMENSION ② EXCEEDS 1'-8". SEE NOTE ⑤ BELOW.

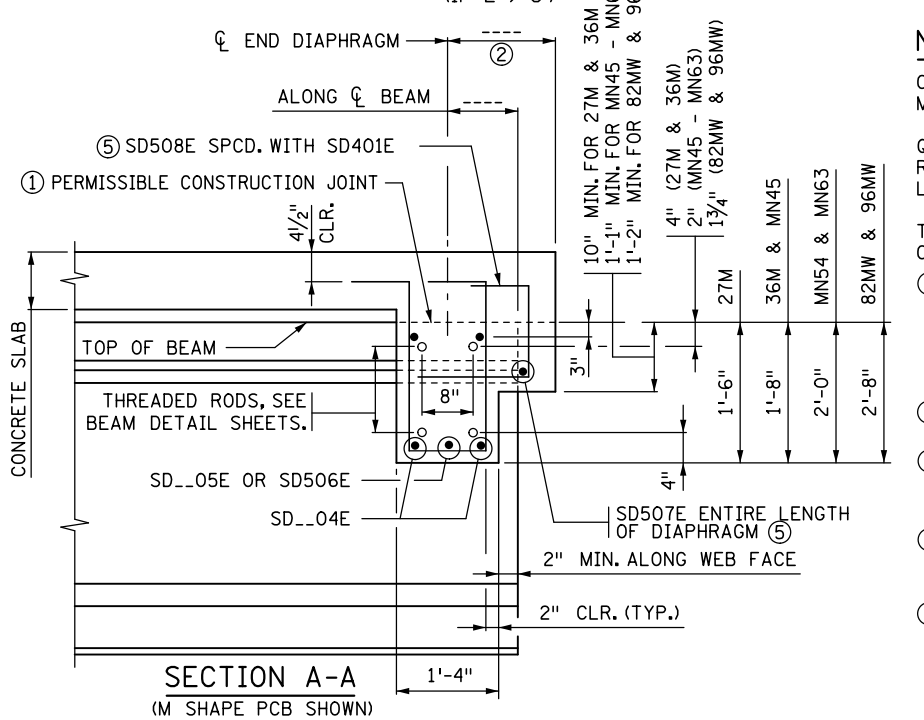
LONGITUDINAL REINFORCEMENT IN BOTTOM OF DIAPHRAGM

DISTANCE "L" ALONG ℄ OF DIAPHRAGM	BARS REQUIRED			
	STRAIGHT		BENT	
	NO.	SIZE	NO.	SIZE
UP TO 8'	2	6E	1	5E
OVER 8' TO 11'	2	7E	1	6E
OVER 11' TO 13'	2	8E	1	8E
OVER 13' TO 15'	2	9E	1	10E
OVER 15' TO 18'	2	11E	1	11E

BILL OF REINFORCEMENT FOR END DIAPHRAGM

BAR	NO.	LENGTH	SHAPE	LOCATION
SD401E				VERTICAL TIE
SD702E		5'-0"		LONG. THRU BEAM
SD403E				LONG. TOP
SD__04E				LONG. BOTTOM
SD__05E				LONGITUDINAL
SD506E				LONGITUDINAL
⑤ SD507E				LONGITUDINAL
⑤ SD508E				VERTICAL TIE





SECTION A-A

(M SHAPE PCB SHOWN)

NOTES:

CONCRETE FOR END DIAPHRAGMS SHALL BE THE SAME MIX AS USED IN DECK.

QUANTITIES FOR END DIAPHRAGM CONCRETE AND REINFORCEMENT SHOWN ON THIS DETAIL SHALL BE LISTED IN SUPERSTRUCTURE QUANTITIES.

THREADED RODS ARE INCIDENTAL TO PRESTRESSED CONCRETE BEAMS.

① USE OF CONSTRUCTION JOINT REQUIRES CLEARANCE FOR EXPANSION DEVICE. WHEN CONSTRUCTION JOINT IS USED AT THIS LOCATION, DIAPHRAGM FALSEWORK SHALL REMAIN INPLACE UNTIL COMPLETION OF SLAB CURING PERIOD.

② PERPENDICULAR TO CENTERLINE OF DIAPHRAGM.

③ 1'-11" (27M); 2'-1" (36M AND MN45); 2'-5" (MN54 AND MN63); 3'-1" (82MW AND 96MW). BASED ON 3" STOOL AND 9" DECK.

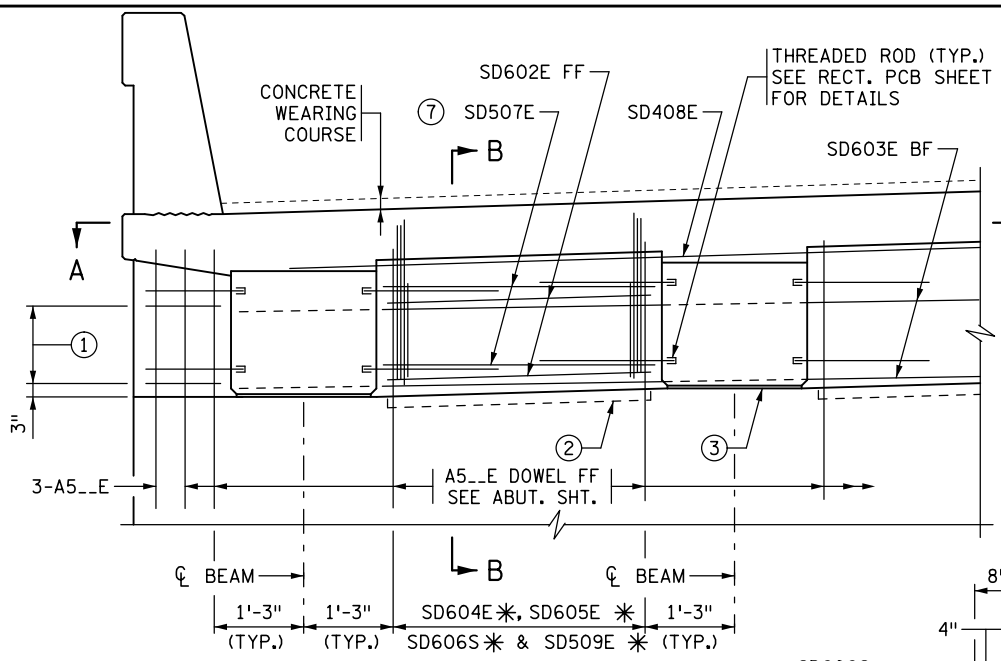
④ 1'-10" (27M); 2'-0" (36M AND MN45); 2'-4" (MN54 AND MN63); 3'-0" (82MW AND 96MW). BASED ON NOTE ③.

⑤ ADD SD507E AND SD508E ONLY IF NO. OF BARS AND LENGTHS ARE INCLUDED IN BILL OF REINFORCEMENT. SPACE SD508E AT 1'-6" MAX. FOR ENTIRE LENGTH OF DIAPHRAGM. REFER TO "PART TRANSVERSE SECTION" ABOVE.

APPROVED: SEPTEMBER 22, 2011	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISED 04-17-2013 11-06-2013	DETAIL NO.
Nancy Daubenberger STATE BRIDGE ENGINEER	CONCRETE END DIAPHRAGM (27M & 36M, MN45 - MN63, 82MW & 96MW PRESTRESSED CONCRETE BEAMS) (PARAPET ABUTMENT)		B814

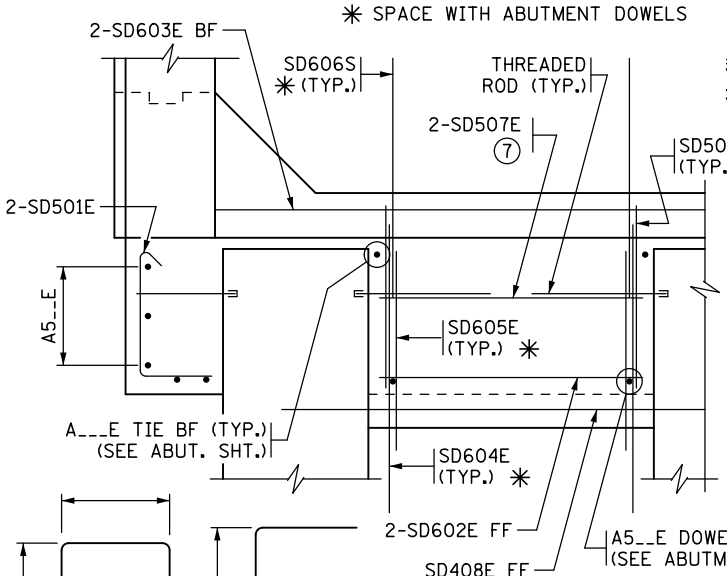
TEXT IN ITALICS ARE DESIGNER NOTES. REMOVE PRIOR TO PLOTTING FINAL PLAN.

USE B-DETAIL WHEN BARS ARE NOT CALLED OUT IN SUPERSTRUCTURE PLAN. CONCRETE VOLUME AND REBAR WEIGHT SHALL BE INCLUDED IN THE SUPERSTRUCTURE QUANTITIES. MAXIMUM BEAM SPACING IS 13 FEET. ADJUST SECTION A-A AND BAR SD501E FOR SKEW.



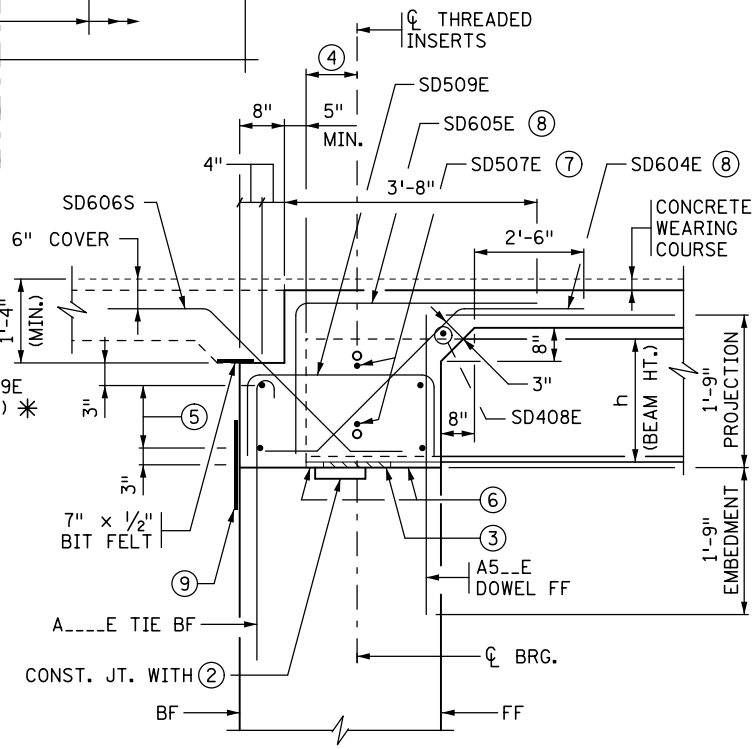
PARTIAL ELEVATION

✳ SPACE WITH ABUTMENT DOWELS



SECTION A-A

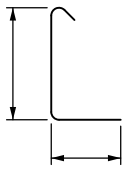
✳ SPACE WITH ABUTMENT DOWELS



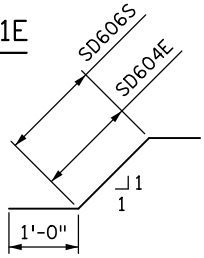
SECTION B-B

SD509E

SD605E



SD501E



SD604E, SD606S

SD606S BAR IS STAINLESS STEEL

BILL OF REINFORCEMENT FOR END DIAPHRAGM

BAR	NO.	LENGTH	SHAPE	LOCATION
SD501E		'- "	⌐¬	HORIZONTAL END TIE
SD602E		'- "	——	HORIZONTAL FF
SD603E		'- "	——	HORIZONTAL BF
SD604E		'- "	⌐	DIAPH./FILLET TIE
SD605E		'- "	⌐	DIAPH./DECK TIE
SD606S		'- "	⌐	DIAPH./APPROACH TIE
SD507E		'- "	——	HORIZONTAL
SD408E		'- "	——	FILLET HORIZONTAL
SD509E		'- "	⌐¬	DIAPHRAGM TIE

NOTES:

DIAPHRAGM CONCRETE AND REINFORCEMENT QUANTITIES ARE INCLUDED IN SUPERSTRUCTURE QUANTITIES.

CONCRETE FOR END DIAPHRAGMS SHALL BE THE SAME MIX AS USED IN DECK.

BF DENOTES BACK FACE. FF DENOTES FRONT FACE.

① SD501E END TIE

② 2" × 12" KEYWAY (BETWEEN BEAMS ONLY)

③ 12" × 24" × ½" ELASTOMERIC BEARING PAD

④ SEE BEAM DETAIL SHEETS FOR DIMENSION.

⑤ SD603E BF & SD602E FF HORIZONTAL

⑥ ½" MIN. TYPE B POLYSTYRENE UNDER COMPLETE FLANGE

⑦ SPACE WITH THREADED RODS.

⑧ TIE BAR TO TOP MAT.

⑨ MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481.3.B.

APPROVED: May 24, 2012

Nancy Daubenberger
STATE BRIDGE ENGINEER

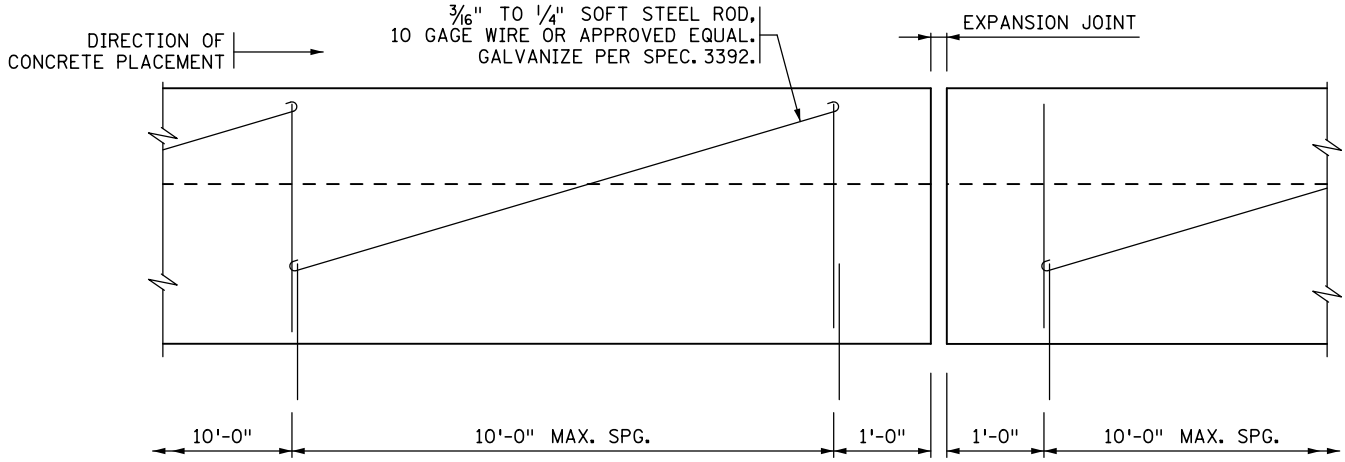
STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

CONCRETE END DIAPHRAGM

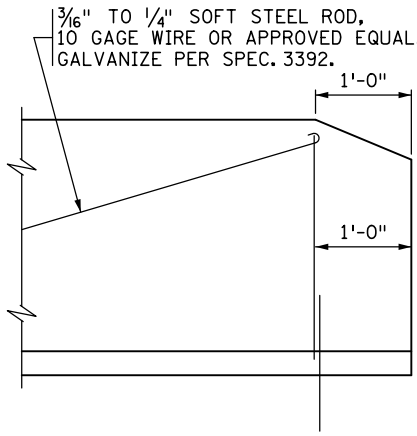
(14", 18" AND 22" RECTANGULAR PRESTRESSED CONCRETE BEAMS)
(INTEGRAL ABUTMENT)

REVISED
4-17-2013
8-24-2016

DETAIL NO.
B816

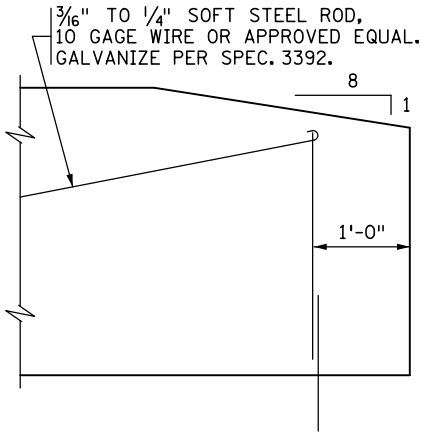


INSIDE ELEVATION OF BARRIER OR PARAPET



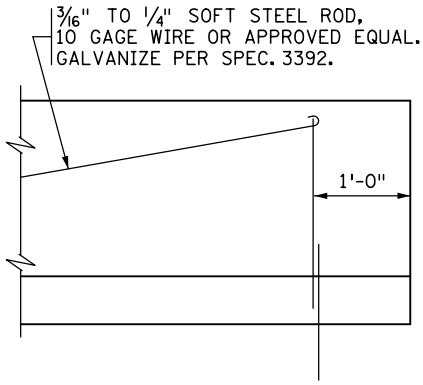
INSIDE ELEVATION OF F BARRIER

AT END OF BARRIER



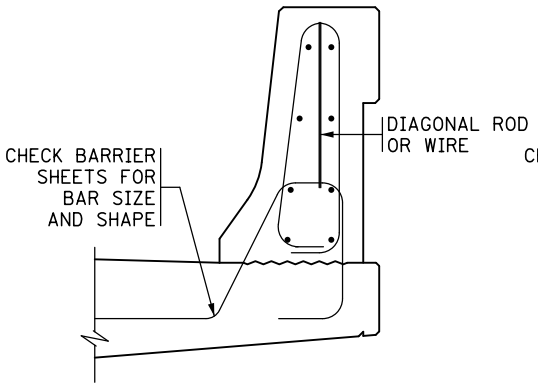
INSIDE ELEVATION OF S BARRIER

AT END OF BARRIER

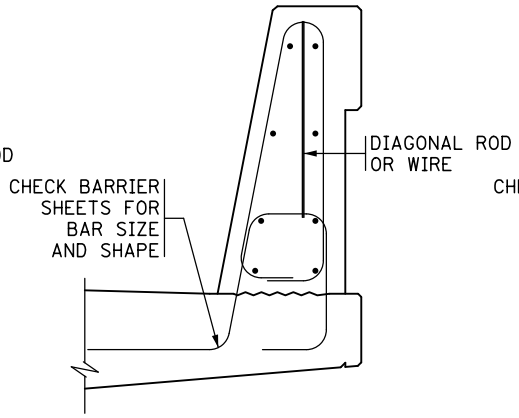


INSIDE ELEVATION OF PARAPET

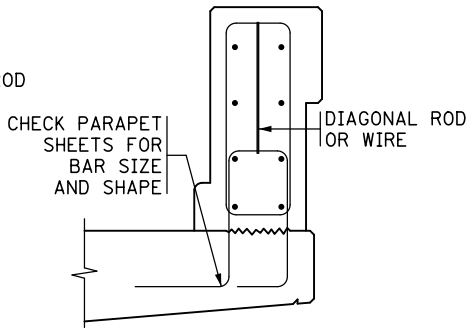
AT END OF PARAPET



F BARRIER SECTION



S BARRIER SECTION



PARAPET SECTION

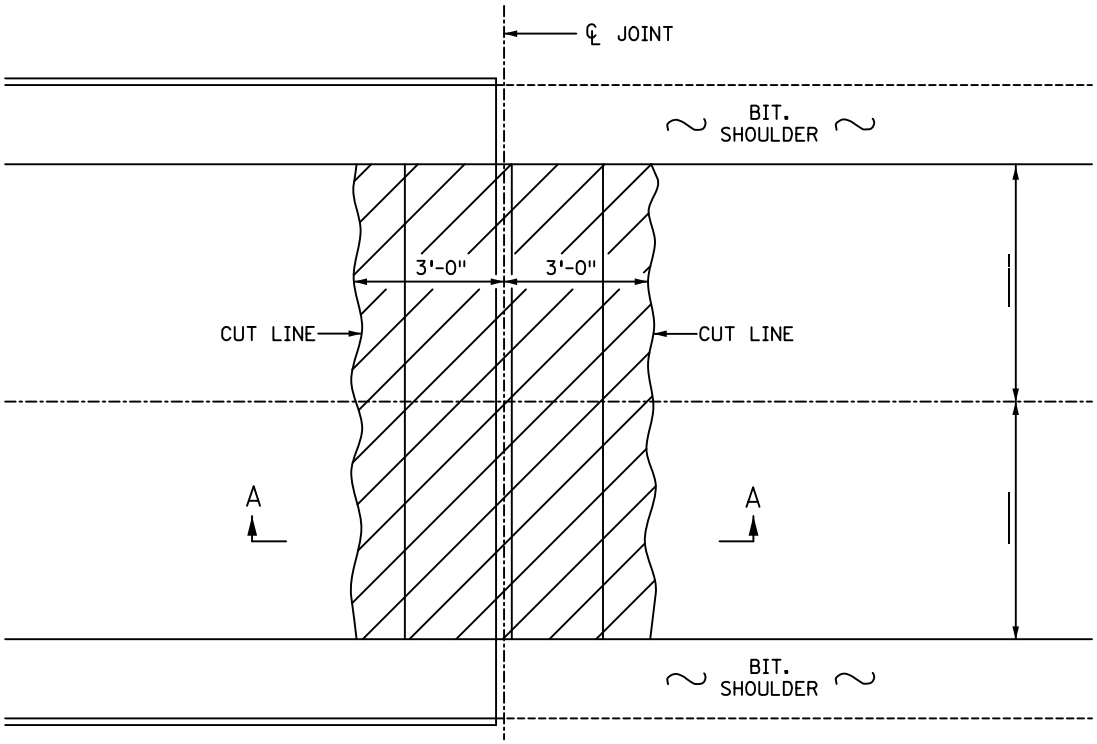
NOTES:

FOR ADDITIONAL DIMENSIONS, DETAILS, REINFORCEMENT, NOTES, AND CONTROL JOINT SPACING SEE BARRIER OR PARAPET SHEET.

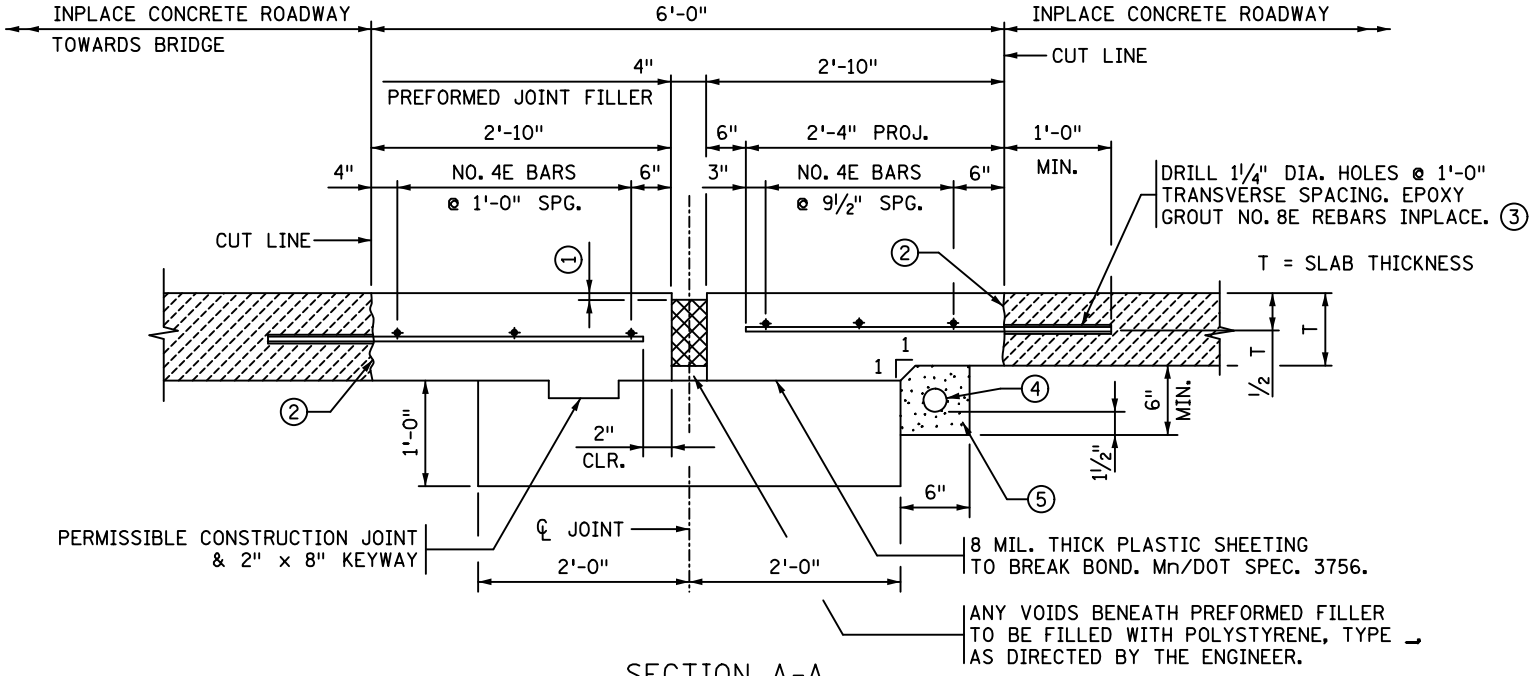
PAY QUANTITIES WILL NOT BE ADJUSTED AS A RESULT OF SELECTING SLIPFORM ALTERNATE.

USE A SIMILAR METHOD FOR TALLER BARRIERS OR MODIFIED VERSIONS OF THIS BARRIER.

APPROVED: AUGUST 24, 2016 Kevin Western STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION CONCRETE BARRIER OR PARAPET (SLIPFORM ALTERNATE)	REVISION	DETAIL NO. B830



CONCRETE ROADWAY



SECTION A-A

DESIGNER NOTE (REMOVE PRIOR TO PLOTTING FINAL PLAN): DEFINE TYPE A OR B FOR POLYSTYRENE.

① TOP OF FILLER TO BE PLACED ¾" TO 1" BELOW TOP OF PAVEMENT. PLACE JOINT SEALER Mn/DOT SPEC. 3720 ABOVE FILLER ⅜" ± ⅛" BELOW TOP OF PAVEMENT.

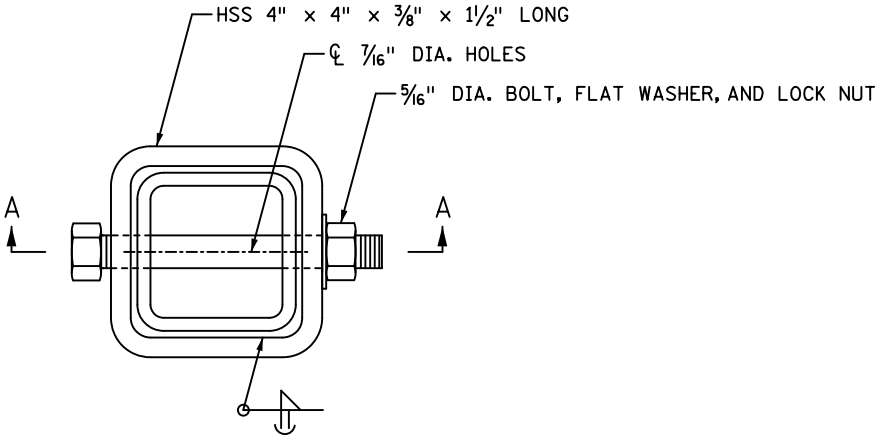
② CLEAN EXPOSED FACE BY SAND BLASTING AND AIR BLASTING. APPLY APPROVED BONDING GROUT IMMEDIATELY PRIOR TO CONCRETE PLACEMENT. CONCRETE TO BE MIX NO. 3X33.

③ REBARS SHALL BE PLACED PARALLEL TO ℄ OF ROADWAY ON SKEWS AND TANGENT TO ℄ ON CURVED ROADWAYS.

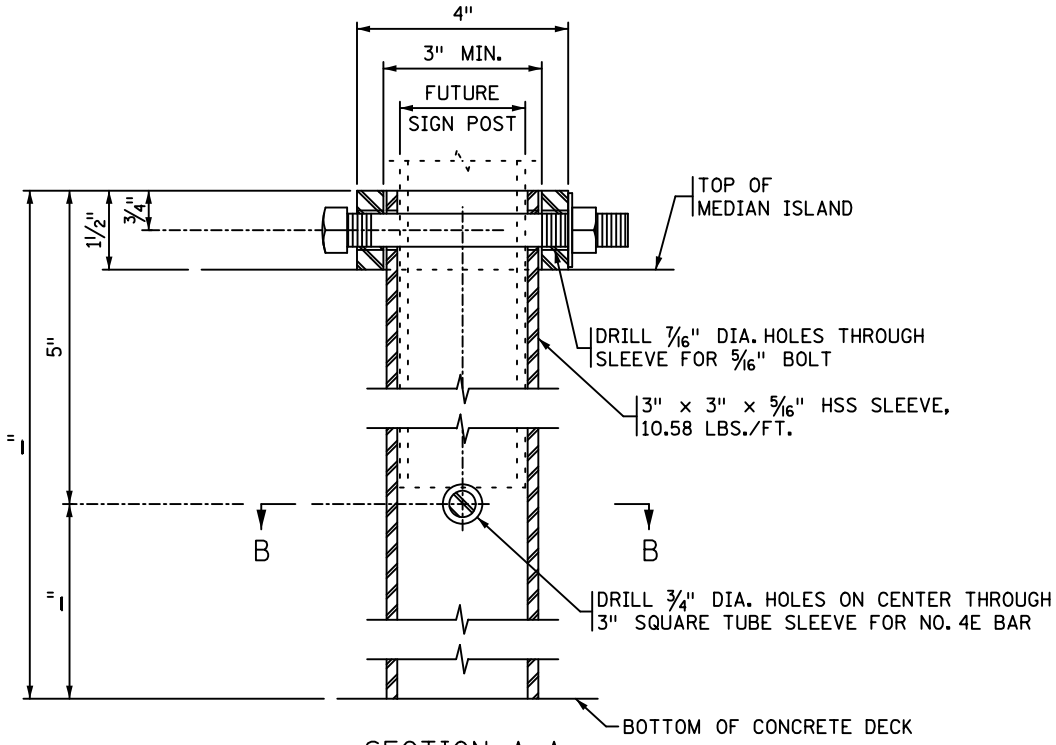
④ 2" NOMINAL DIA. THERMOPLASTIC PERFORATED PIPE AS PER Mn/DOT SPEC. 3245. WRAP PIPE WITH GEOTEXTILE AS PER Mn/DOT SPEC. 3733. SLOPE PIPE TO DITCH ON LOW SIDE, ⅛" PER FOOT. MINIMUM SLOPE. FURNISHING AND INSTALLING DRAIN SYSTEM SHALL BE INCIDENTAL WITH NO DIRECT PAYMENT.

⑤ BACKFILL WITH FINE AGGREGATE, Mn/DOT SPEC. 3149, MODIFIED TO 0-3% PASSING A NO. 200 SIEVE.

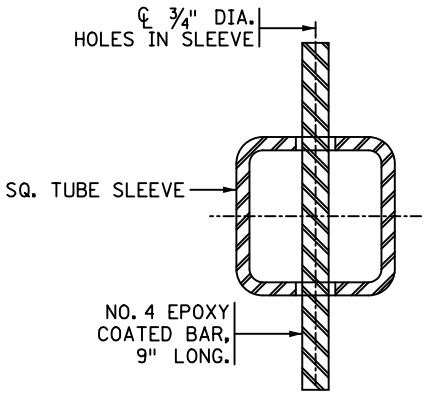
APPROVED: NOVEMBER 22, 2002 Daniel L Hegyan STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION CONCRETE RELIEF JOINT DETAIL (BRIDGE RECONSTRUCTION ON TRUNK HIGHWAY BRIDGES)	REVISED 05-26-2006 04-17-2013	DETAIL NO. B850



PLAN VIEW



SECTION A-A



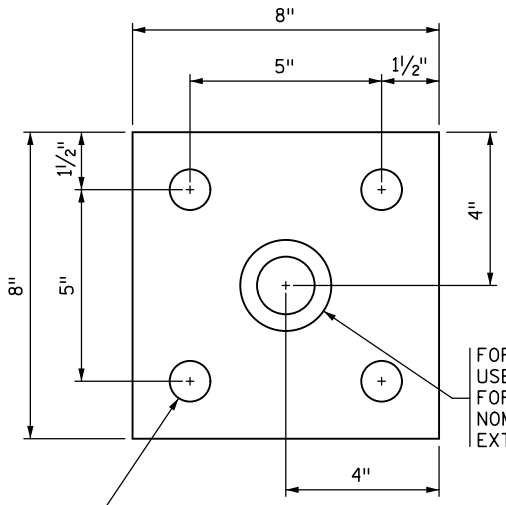
SECTION B-B

NOTES:

GALVANIZE SIGN ANCHOR AFTER FABRICATION AS PER Mn/DOT SPEC. 3394

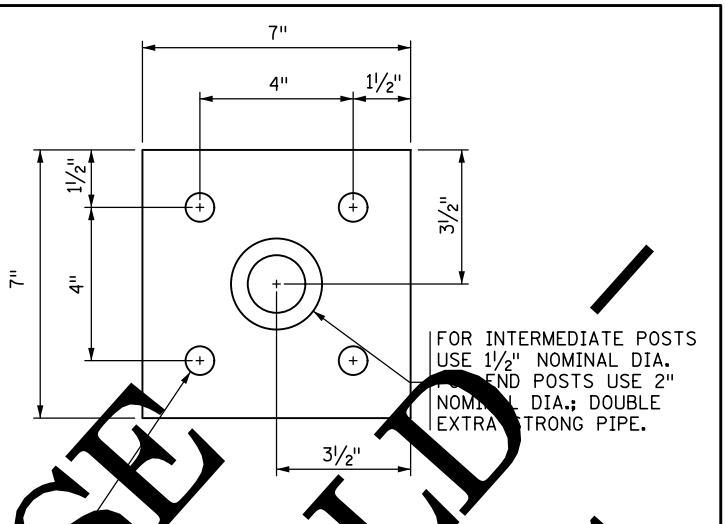
STRUCTURAL STEEL TUBING AS PER Mn/DOT SPEC. 3361, TYPE A, EXCEPT AS NOTED.

APPROVED: NOVEMBER 22, 2002	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISED 10-06-2006 4-17-2013	DETAIL NO.
Daniel L Hogan STATE BRIDGE ENGINEER	MEDIAN SIGN POST ANCHOR		B901



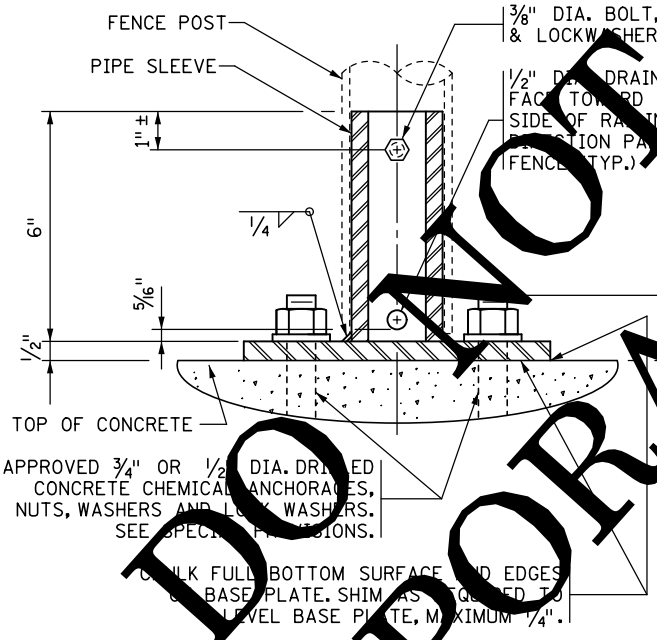
PLAN VIEW - TYPE A

ESTIMATED WEIGHT = 12 OR 14 LBS.

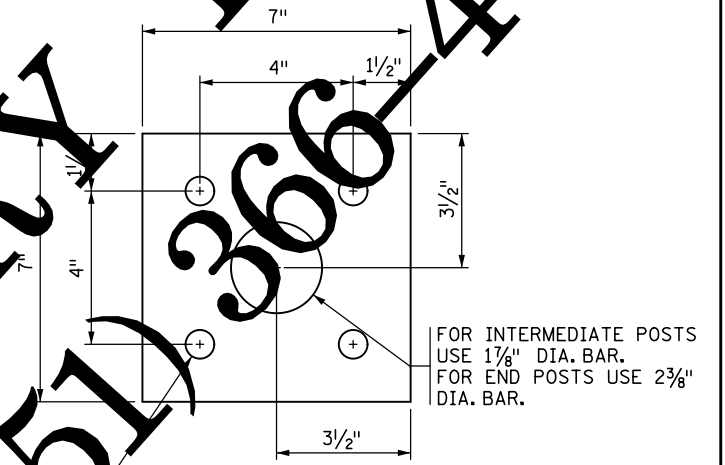


PLAN VIEW - TYPE B

ESTIMATED WEIGHT = 10 OR 12 LBS.

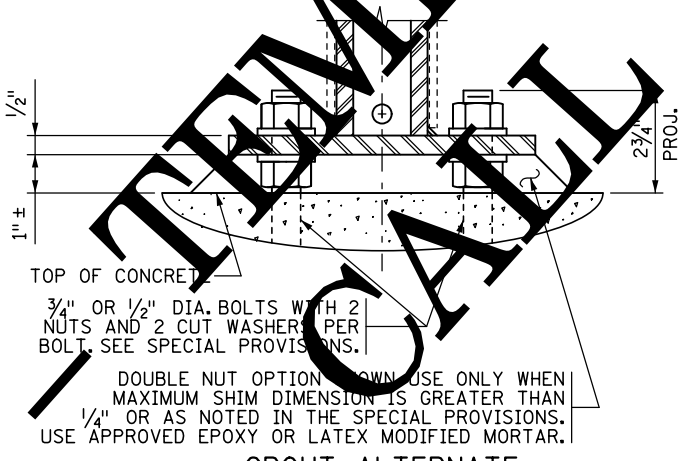


TYPICAL SECTION



PLAN VIEW - TYPE C

ESTIMATED WEIGHT = 12 OR 15 LBS.



GROUT ALTERNATE

NOTES:

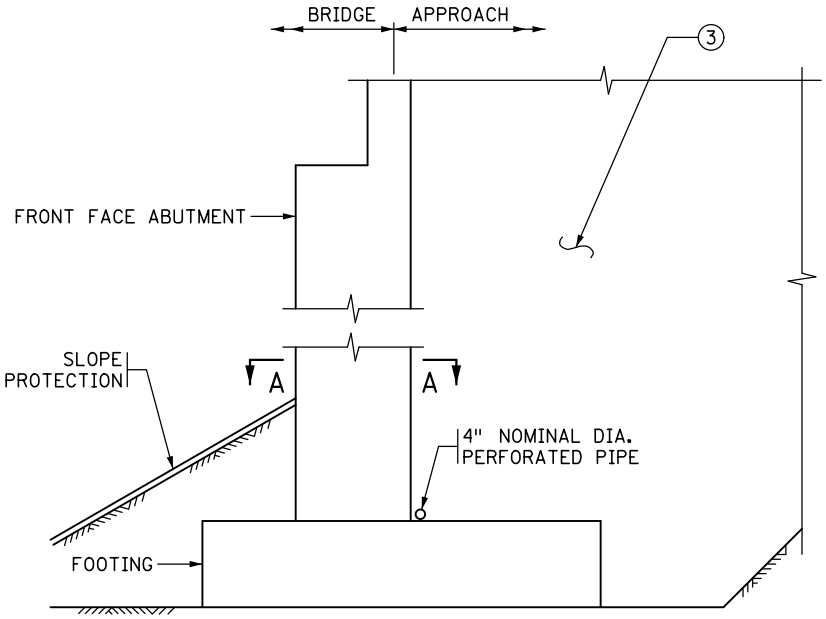
STRUCTURAL STEEL PER Mn/DOT SPEC. 3306

STRUCTURAL PIPE PER Mn/DOT SPEC. 3362

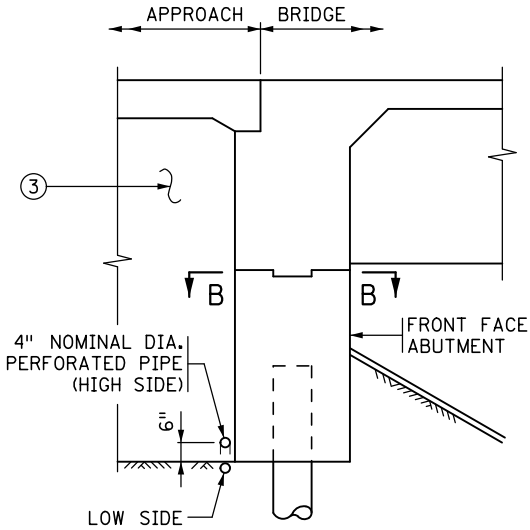
GALVANIZE THE FENCE POST ANCHORAGE AFTER FABRICATION PER Mn/DOT SPEC. 3394. GALVANIZE THE FASTENERS PER Mn/DOT SPEC. 3392.

DOUBLE EXTRA STRONG PIPE WEIGHTS:
1½" NOMINAL DIA. = 6.41 LBS./FT.
2" NOMINAL DIA. = 9.03 LBS./FT.

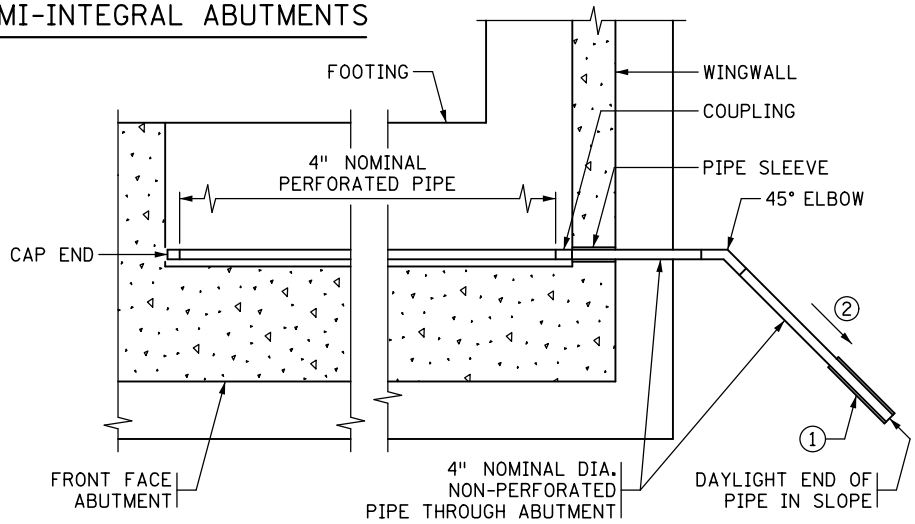
APPROVED: NOVEMBER 22, 2002 Daniel L Morgan STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION FENCE POST ANCHORAGE	REVISION	DETAIL NO. B905



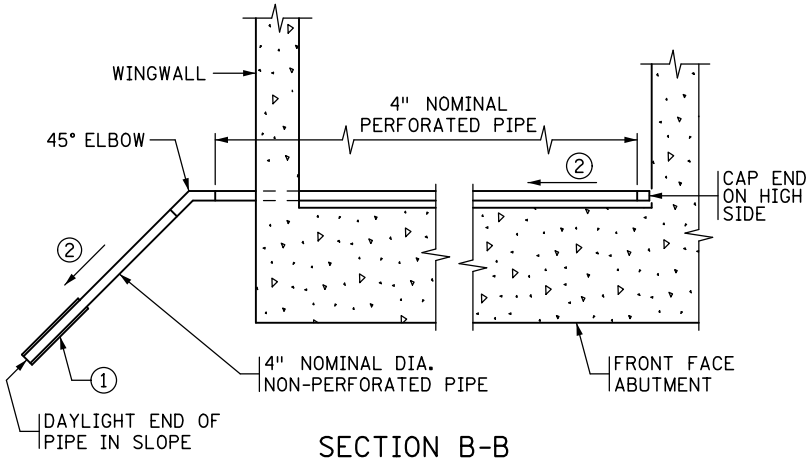
SECTION THROUGH PARAPET AND SEMI-INTEGRAL ABUTMENTS



SECTION THROUGH INTEGRAL ABUTMENT



SECTION A-A



SECTION B-B

NOTES:

PAYMENT WILL BE INCLUDED IN THE SINGLE LUMP SUM PRICE FOR "DRAINAGE SYSTEM TYPE (B910)", INCLUDES BUT IS NOT LIMITED TO 4" DIAMETER PERFORATED AND NON-PERFORATED PIPE, ELBOWS, END CAPS, COUPLINGS, SLEEVES AND PRECAST CONCRETE HEADWALLS.

ALL PIPE TO COMPLY WITH SPEC. 3245.

WRAP PERFORATED PIPE WITH GEOTEXTILE PER SPEC. 3733, TYPE 1. ATTACH TO PIPE PER SPEC. 2502.

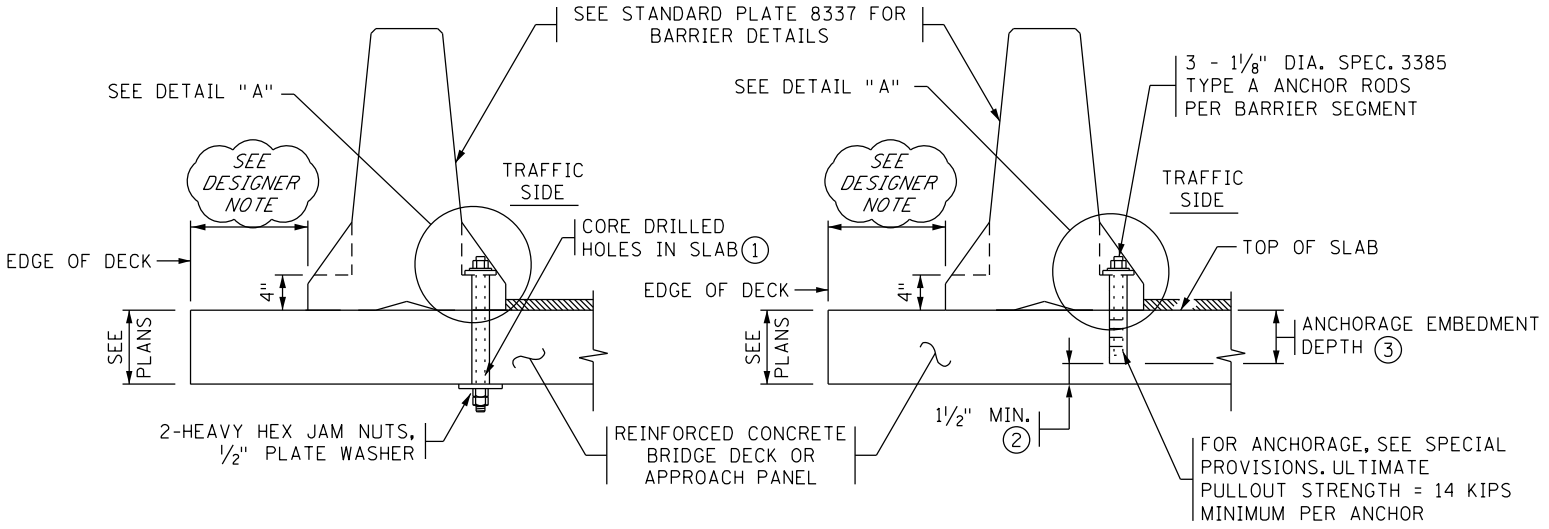
(1) AT CONTRACTOR'S OPTION, MAY TIE APPROACH PANEL DRAINAGE SYSTEM AND ABUTMENT DRAINAGE SYSTEM INTO A SINGLE PRECAST CONCRETE HEADWALL OR INTO A CATCH BASIN AS LONG AS A MINIMUM OF 1% POSITIVE SLOPE CAN BE MAINTAINED.

USE PRECAST CONCRETE HEADWALL WITH RODENT SCREEN. SEE STANDARD PLATE 3131 FOR DETAILS.

(2) 1/8" PER FT. MINIMUM SLOPE.

(3) REFER TO GRADING PLANS FOR ABUTMENT BACKFILL REQUIREMENTS.

APPROVED: JANUARY 13, 2015	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISED 12-02-2015	DETAIL NO.
Nancy Daubenberger STATE BRIDGE ENGINEER	DRAINAGE SYSTEM		B910



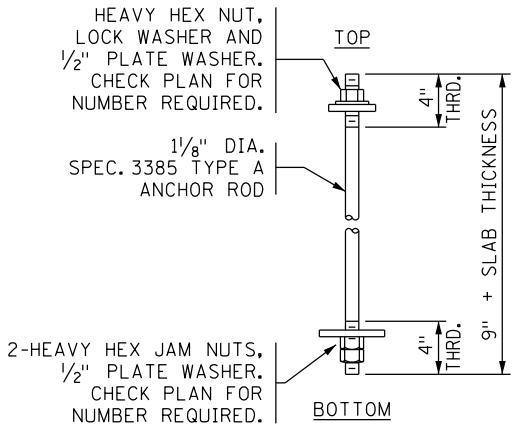
OPTION 1

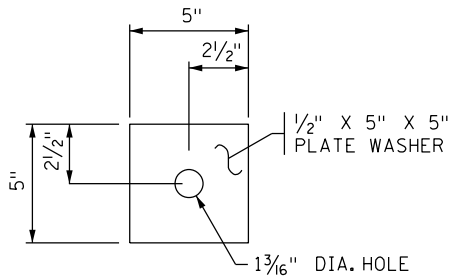
DO NOT USE ON NEW DECK

OPTION 2

ANCHORAGE DETAILS

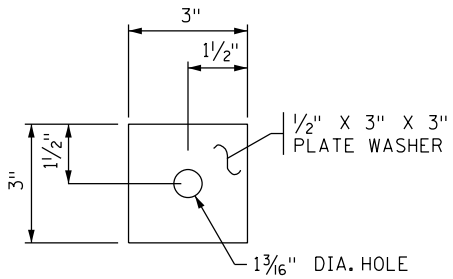
REINFORCEMENT NOT SHOWN





BOTTOM PLATE WASHER

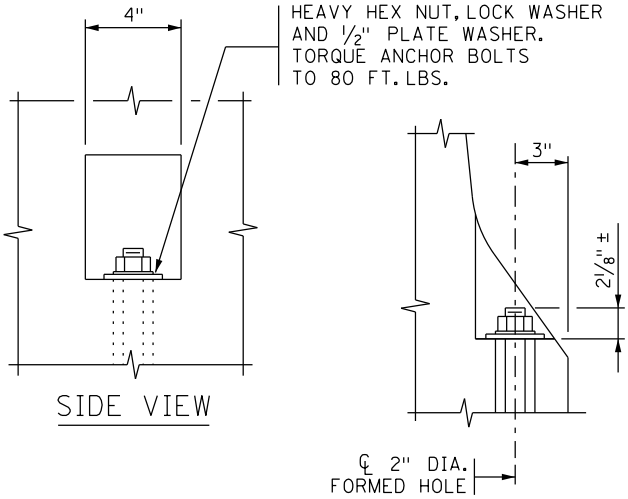
(ONLY USED FOR OPTION 1)



TOP PLATE WASHER

OPTION 1 ANCHOR

(3 PER BARRIER SEGMENT)



SIDE VIEW

DETAIL "A"

TEXT IN ITALICS ARE DESIGNER NOTES. REMOVE PRIOR TO PLOTTING FINAL PLAN.

REFER TO MnDOT LRFD MANUAL "MEMO TO DESIGNERS (2011-03)" FOR GUIDANCE ON EDGE DISTANCE.

NOTES:

ALL HARDWARE TO BE GALVANIZED PER SPEC. 3392.

ALL STRUCTURAL STEEL TO BE SPEC. 3306 UNLESS OTHERWISE NOTED.

COST OF ANCHORAGE SYSTEM, ANCHOR REMOVAL AND GROUTING OF HOLE ARE INCIDENTAL TO THE COST OF PLACING THE TEMPORARY PORTABLE PRECAST BARRIER.

PIN BARRIERS TOGETHER PER STANDARD PLATE 8337.

THROUGH BOLT ANCHORS MUST BE USED IF THE DECK IS PENETRATED DURING DRILLING PROCESS.

DO NOT USE ON BRIDGES OR APPROACH PANELS WITH A BITUMINOUS OVERLAY.

REFER TO TRAFFIC CONTROL PLANS FOR DEPLOYMENT LENGTH AND BARRIER TERMINATION REQUIREMENTS.

ANCHOR ON TRAFFIC SIDE OF BARRIER ONLY.

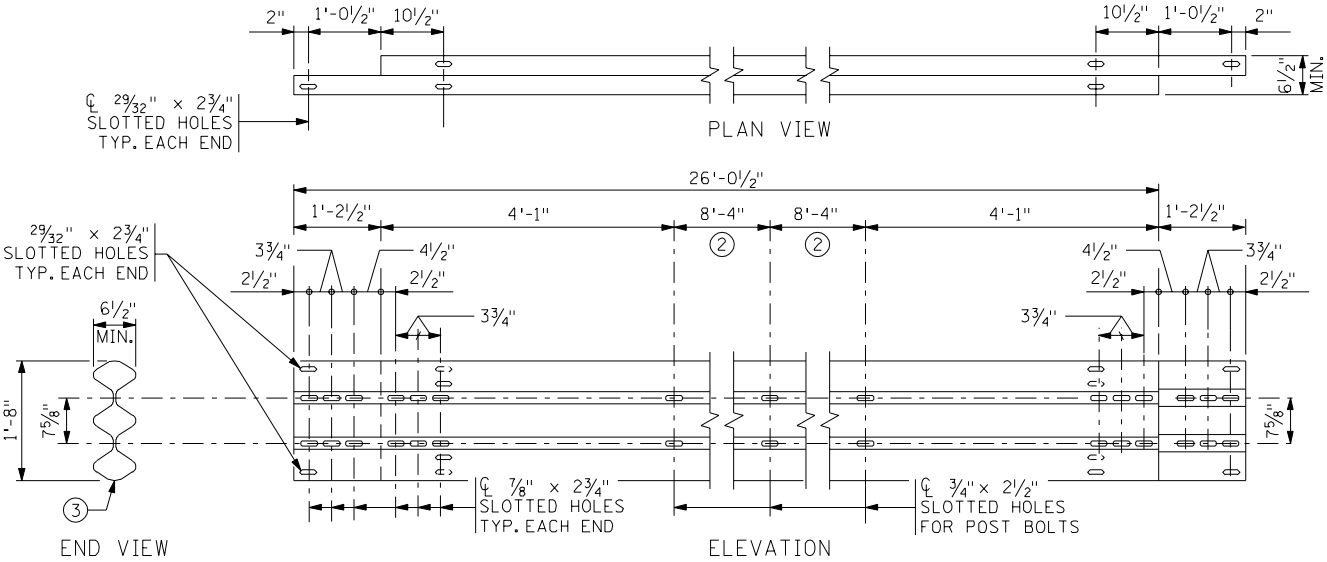
SEE SPECIAL PROVISIONS FOR BARRIER INSTALLATION AND REMOVAL REQUIREMENTS.

(1) PERCUSSION DRILLING OF THESE HOLES IS NOT PERMITTED.

(2) 1 1/2" MINIMUM TO PREVENT BOTTOM OF SLAB FROM SPALLING OR FRACTURING DURING DRILLING.

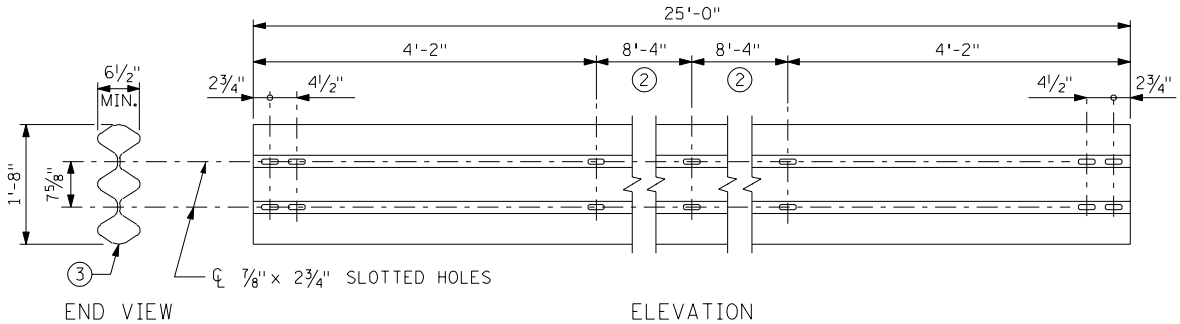
(3) 5 1/2" MINIMUM AND 6" MAXIMUM FOR BRIDGE DECKS WITH TOP MAT REINFORCEMENT AND SOUND CONCRETE. 9" MINIMUM AND 10 1/2" MAXIMUM FOR SOUND CONCRETE APPROACH PANELS.

APPROVED: DECEMBER 21, 2011 Nancy Daubenberger STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION TEMPORARY PORTABLE PRECAST CONCRETE BARRIER ANCHORAGE (TEMPORARY USAGE IN LIMITED BARRIER DISPLACEMENT AREAS)	REVISED 05-24-2012	DETAIL NO. B920



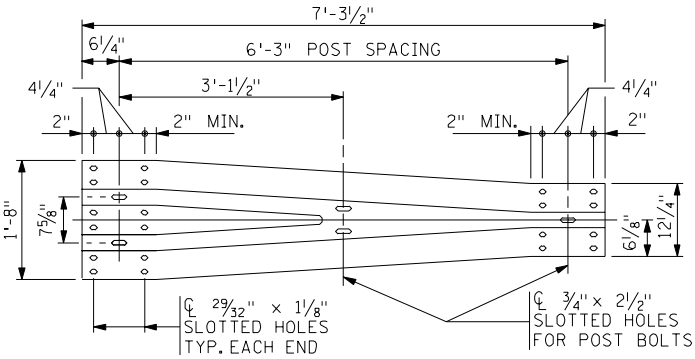
STANDARD BRIDGE BEAM SECTION

(OVERLAPPING SPLICE)

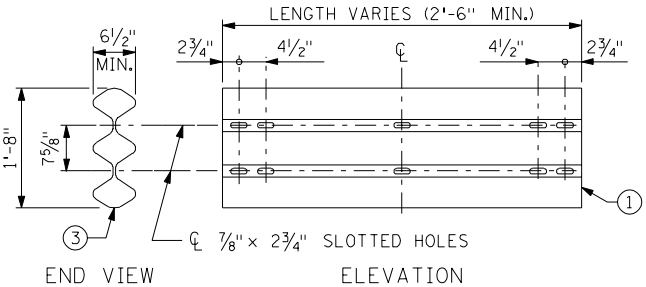


STANDARD BRIDGE BEAM SECTION

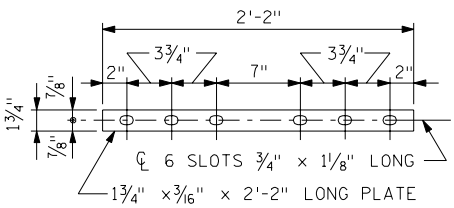
(FOR USE WITH TUBULAR SLEEVE SPLICE)



TRANSITION BEAM SECTION



CUSTOM BRIDGE BEAM SECTION



SPLICE PLATE WASHER

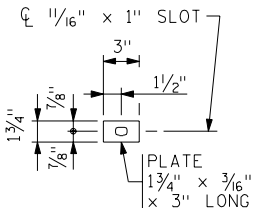


PLATE WASHER

NOTES:

THE TUBULAR TRIPLE BEAM RAIL SECTIONS SHALL BE FABRICATED BY WELDING TWO (2) 10 GAUGE TRIPLE BEAM RAIL ELEMENTS AS SHOWN.

CONSTRUCT TRAFFIC BARRIER PER Mn/DOT SPEC. 2554, EXCEPT AS NOTED.

GALV. RAIL COMPONENTS PER Mn/DOT SPEC. 3394 AFTER FABRICATION.

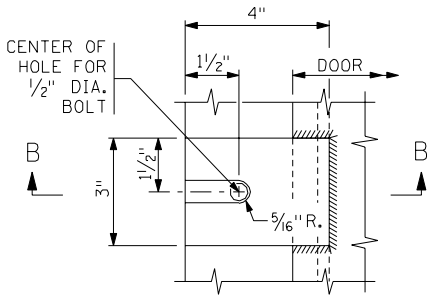
TRIPLE AND PLATE BEAM GUARDRAIL HARDWARE DIMENSIONS AND BOLT SPACING SHALL CONFORM TO AASHTO M180.

(1) FOR ADDITIONAL BOLT HOLE SPACING FOR CONNECTION TO TRANSITION BEAM SECTION, SEE TRANSITION BEAM SECTION.

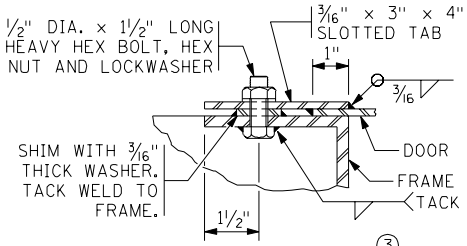
(2) TYPICAL POST SPACING, EXCEPT AS NOTED.

(3) 60% MIN. WELD PENETRATION TOP AND BOTTOM.

APPROVED: NOVEMBER 22, 2002 Daniel D Morgan STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION TRIPLE BEAM GUARDRAIL	REVISION	DETAIL NO. B935

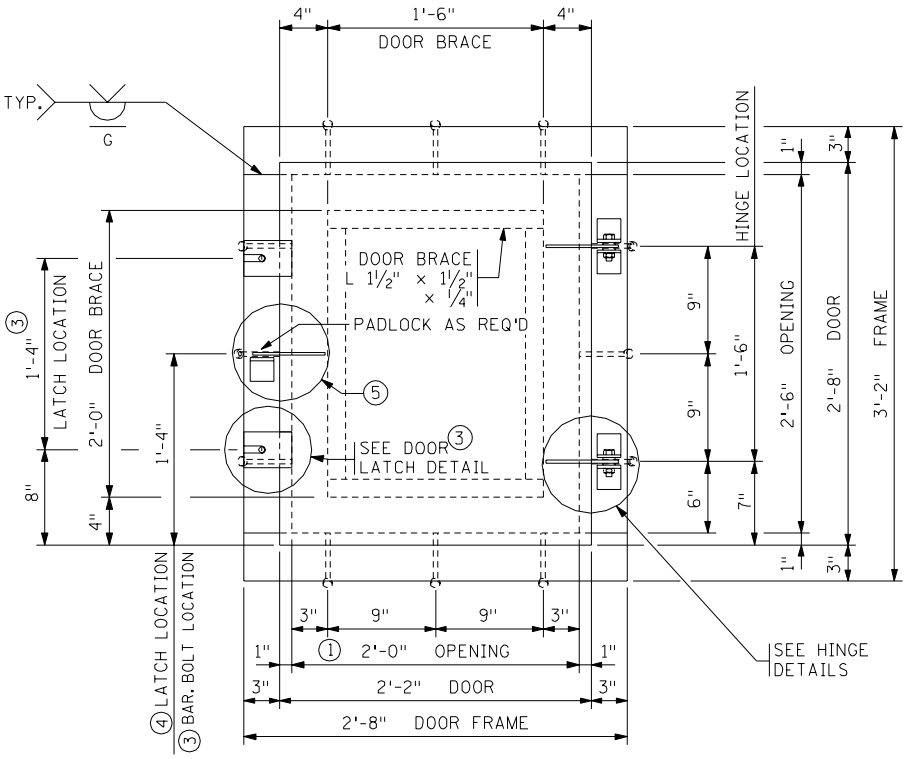


PLAN VIEW



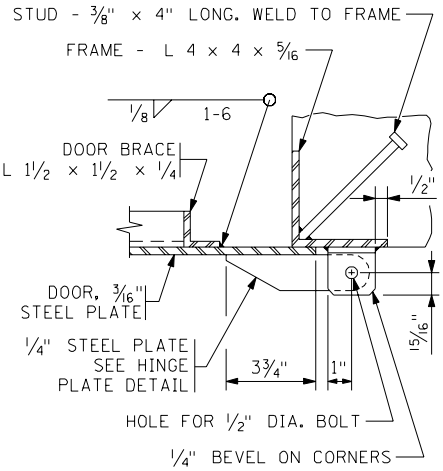
SECTION B-B ③

DOOR LATCH DETAIL

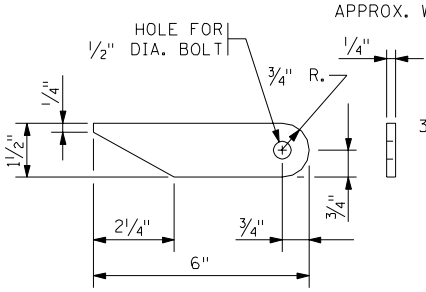


FRONT ELEVATION

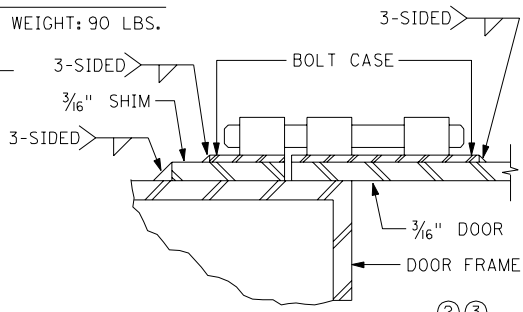
APPROX. WEIGHT: 90 LBS.



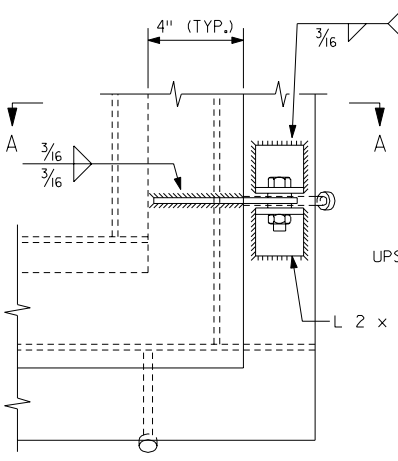
SECTION A-A



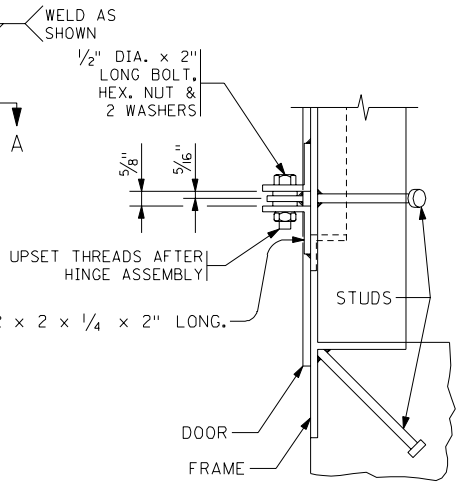
HINGE PLATE DETAIL



BARREL BOLT DETAIL ②③



FRONT VIEW



HINGE DETAILS

SIDE VIEW

NOTES:

WELDING PER Mn/DOT SPEC. 2471.

DOOR AND FRAME TO BE FLAT AFTER FABRICATION.

GALVANIZE STRUCTURAL SHAPES AFTER FABRICATION PER Mn/DOT SPEC. 3394.

GALVANIZE HARDWARE PER Mn/DOT SPEC. 3392.

ALL MATERIAL ON THIS DETAIL TO BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS.

ALL STEEL TO BE 3306, UNLESS OTHERWISE NOTED.

DOOR TO BE LOCATED AWAY FROM TRAFFIC LANES.

① DIMENSION TRANSVERSE TO ℄ BRIDGE WHEN IN HORIZONTAL POSITION TO MINIMIZE EFFECT ON THE BOTTOM SLAB REINFORCEMENT.

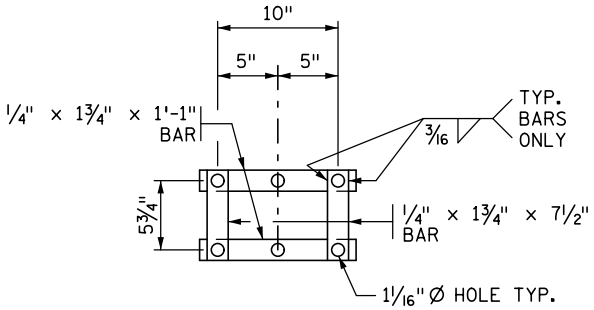
② 4" BARREL BOLT (STANLEY NO. 1084 OR EQUAL)

③ HORIZONTAL POSITION ONLY

④ VERTICAL POSITION ONLY

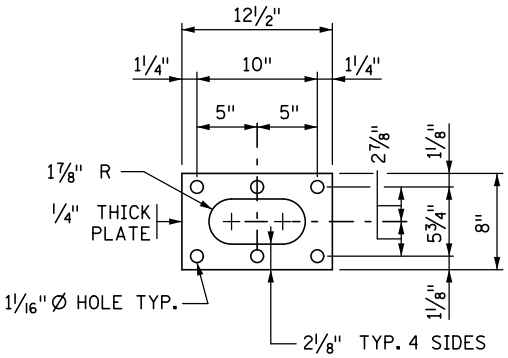
⑤ BARREL BOLT - HORIZONTAL POSITION
LATCH PLATE & ANGLE - VERTICAL POSITION

APPROVED: NOVEMBER 22, 2002 Daniel L Morgan STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION INSPECTION DOOR (IN VERTICAL OR HORIZONTAL POSITION)	REVISION	DETAIL NO. B942



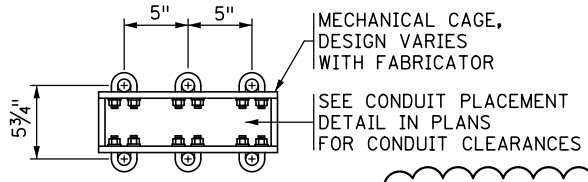
SECTION A-A

ANCHOR BAR ALTERNATE



SECTION A-A

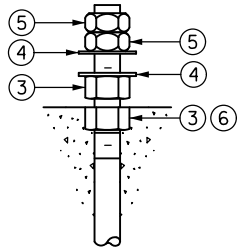
ANCHOR PLATE ALTERNATE



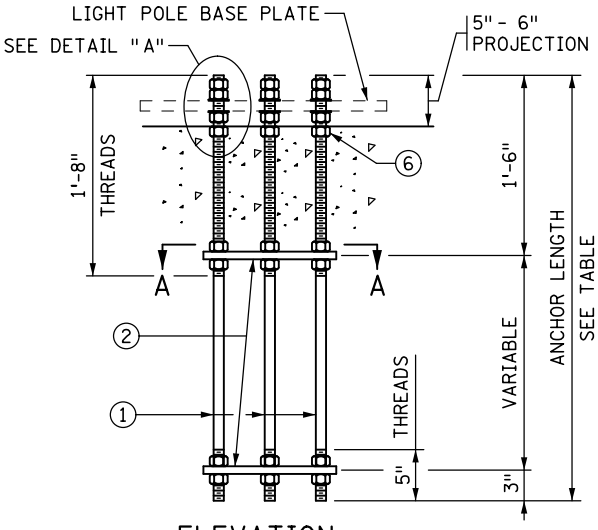
SECTION A-A

MECHANICAL CAGE ALTERNATE

DESIGNER NOTE (REMOVE PRIOR TO PLOTTING FINAL PLAN): DESIGNER TO ENSURE REINFORCEMENT IN BARRIER OR PARAPET CAN DEVELOP YIELD STRENGTH OF ANCHORAGE RODS.



DETAIL "A"



ELEVATION

(ANCHOR PLATE ALTERNATE SHOWN)

STANDARD BARRIER AND PARAPET TYPES (SEE PLANS FOR TYPE)	ANCHOR LENGTH
36" TYPE "S" W/O CONCRETE WEARING COURSE	3'-5"
36" TYPE "S" W/ CONCRETE WEARING COURSE	3'-7"
42" TYPE "S" W/O CONCRETE WEARING COURSE	3'-11"
42" TYPE "S" W/ CONCRETE WEARING COURSE	4'-1"
54" TYPE "S" W/O CONCRETE WEARING COURSE	4'-11"
54" TYPE "S" W/ CONCRETE WEARING COURSE	5'-1"
32" TYPE "F" W/O CONCRETE WEARING COURSE	3'-1"
32" TYPE "F" W/CONCRETE WEARING COURSE	3'-3"
32" TYPE "F" MEDIAN W/O CONC. WEARING COURSE	3'-1"
32" TYPE "F" MEDIAN W/ CONC. WEARING COURSE	3'-3"
32" TYPE "F" ON RETAINING WALL	3'-1"
36" TYPE "S" ON RETAINING WALL	3'-5"
32" CONCRETE PARAPET (TYPE P4) W/O CONC. W. C.	3'-1"
32" CONCRETE PARAPET (TYPE P4) W/ CONC. W. C.	3'-3"

NOTES:

PROVIDE HEAVY HEX NUTS, JAM NUTS, AND FLAT WASHERS PER SPEC. 3391.2.A FOR 1" DIA. THREADED RODS. TAP NUTS 1/64" OVERSIZED PRIOR TO GALVANIZING, AND RETAP TO STANDARD SIZE AFTER GALVANIZING.

WRAP THE THREADS OF THE TOP 5-6 INCHES OF EACH ANCHOR ROD WITH THREE LAYERS OF PLASTIC ELECTRICAL TAPE TO AVOID CONTAMINATION BY CONCRETE DURING PLACEMENT.

USE A BRUSH TO APPLY ANTI-SIEZE COMPOUND PER MIL-PRF-907E TO THE THREADS OF ANCHOR RODS AND THE FACE OF NUTS AGAINST FLAT WASHERS.

GALVANIZE THREADED RODS, WASHERS, AND NUTS AFTER FABRICATION PER SPEC. 3392.

GALVANIZE PLATES, BARS, AND CAGES PER SPEC. 3394.

TACK WELDING OF ANY COMPONENTS IS PROHIBITED.

SUBSTITUTE MATERIALS ALLOWED PER SPEC. 1605.

(1) PROVIDE 1" NOMINAL DIA. ANCHOR RODS WITH 1-8UNC-2A THREADS. USE TYPE C HIGH STRENGTH ANCHOR RODS PER ASTM F1554 GR. 105 PER SPEC 3385.2.C FOR 49' LIGHT STANDARDS WITH TWIN ARMS 10' OR LONGER. USE TYPE B INTERMEDIATE STRENGTH ANCHOR RODS PER ASTM F1554 GR. 55 PER SPEC 3385.2.B FOR ALL OTHER INSTALLATIONS (6 REQUIRED).

(2) PROVIDE A PLATE, BAR, OR MECHANICAL CAGE FOR ROD ALIGNMENT. STEEL PER SPEC. 3306 (2 REQUIRED PER ASEMBLY).

(3) HEAVY HEX NUTS FOR 1" DIA. RODS (12 REQUIRED PER ASSEMBLY).

(4) FLAT WASHERS FOR 1" DIA. RODS (12 REQUIRED PER ASSEMBLY).

(5) LOCK NUTS (6 REQUIRED PER ASSEMBLY) OR JAM NUTS (12 REQUIRED PER ASSEMBLY) FOR 1" DIA. ANCHOR RODS.

(6) INSTALL TOP OF THE LOWER NUTS FLUSH WITH TOP OF CONCRETE PARAPET OR BARRIER.

APPROVED: AUGUST 24, 2016	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISED	DETAIL NO.
Kevin Western STATE BRIDGE ENGINEER	ANCHOR BOLT CLUSTER FOR LIGHT POLES		B950