



<p>OS-299 (5-21)</p>  <p>pennsylvania DEPARTMENT OF TRANSPORTATION www.penndot.gov</p>	<p>TRANSMITTAL LETTER</p>	<p>PUBLICATION: Publication 219M</p> <hr/> <p>DATE: 10/7/2024</p>
<p>SUBJECT: Standards for Bridge Construction September 2016 Edition Change 7</p>		
<p>INFORMATION AND SPECIAL INSTRUCTIONS:</p> <p>Incorporate the attached revisions into the September 2016 Edition of Publication 219M.</p> <p>These revisions provide details for the connection of W-Beam Guide Rail (Type 31-S) to bridge barriers on the trailing end of bridges on divided highways and one-way roadways.</p> <p>These standards may be used immediately and can be adopted as soon as practical on all new and existing projects without affecting letting schedules and in conjunction with the current Publication 408 Specifications. Projects let after April 11, 2025 must incorporate these new standards.</p> <p>A description of the changes made to the 2016 Edition since Change 6 on March 27, 2024 are listed in the attached multi-sheet table. On the standards, light red highlighting indicates Change 7 revisions to details and notes.</p> <p>Comments or questions concerning this Publication may be directed to the Bureau of Bridge.</p>		
<p>CANCEL AND DESTROY THE FOLLOWING:</p> <p>Existing BC-700M Series standards need to be retained for projects under construction and for future rehabilitation work.</p>	<p>ADDITIONAL COPIES ARE AVAILABLE FROM:</p> <p><input checked="" type="checkbox"/> PennDOT website - www.penndot.gov <i>Click on Forms, Publications & Maps</i></p>	<p>APPROVED FOR ISSUANCE BY:</p> <p>MICHAEL B. CARROLL Secretary of Transportation</p> <p>BY:  Gavin E. Gray, P.E. Chief Engineer Highway Administration</p>

**PUBLICATION #219M
SEPTEMBER 2016 EDITION
CHANGE NO. 7**

The major revisions for each Standard Drawing are presented below. Since minor changes are not indicated, it is strongly advised that all recipients thoroughly examine the changes and revisions incorporated in this release.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-706M	1 of 2	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Added “- 1” to sheet title. <p>PA 3-RAIL BRIDGE BARRIER:</p> <ul style="list-style-type: none"> Added “WITH THRIE-BEAM CONNECTION” to detail name. <p>GENERAL NOTES:</p> <ul style="list-style-type: none"> Note 2: Revised “RAILING TUBES” to “RAIL TUBES”. Note 3: Revised “RAILING POSTS” to “POSTS”. Note 4: Revised “ACCORDING TO” to “AS SPECIFIED IN”. Note 5: Revised “RAILING TUBES” to “RAIL TUBES”. <p>ELEVATION VIEW:</p> <ul style="list-style-type: none"> Added callout for “CL THRIE-BEAM RAIL” <p>REFERENCE DRAWINGS:</p> <ul style="list-style-type: none"> Added RC-51M – TYPE 31 STRONG POST GUIDE RAIL.
	2 OF 2	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Added “- 2” to sheet title. <p>Added PA 3-RAIL BRIDGE BARRIER WITH W-BEAM CONNECTION.</p> <p>Added W-BEAM CONNECTION NOTES.</p>
BC-709M	General	Inserted new sheet 5 and renumbered subsequent sheets; updated total number of sheets.
	1 of 13 (formerly 1 of 12)	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Added “- 1 to sheet title” <p>PA TYPE 10M BRIDGE BARRIER:</p> <ul style="list-style-type: none"> Added “WITH THRIE-BEAM CONNECTION” to sheet title. <p>PLAN VIEW:</p> <ul style="list-style-type: none"> Removed “TOP” from the callout for “HSS 5x5x3/8” RAIL TUBE”. Added bottom rail to detail. Added “(TOP RAIL)” to the callout for the “BEND POINT”. <p>ELEVATION VIEW:</p> <ul style="list-style-type: none"> Added callout for “CL THRIE-BEAM RAIL”. Added 1’-9” and 1 3/4" dimensions. Added 3/4" hole, callout and 10 3/4" dimension for the hole in the bottom rail.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-709M (cont.)	1 of 13 (formerly 1 of 12) (cont.)	<p>GENERAL NOTES:</p> <ul style="list-style-type: none"> Note 2: Revised “RAILING TUBES” to “RAIL TUBES”. Note 3: <ul style="list-style-type: none"> Revised “RAILING POSTS” to “POSTS”. Removed “OR 50W” (2 places). Note 4: Revised “ACCORDING TO” to “AS SPECIFIED IN”. Note 5: Revised “RAILING TUBES” to “RAIL TUBES”. Note 11: <ul style="list-style-type: none"> Added “A.” to the anchor bolt tightening note. Added “B. SNUG TIGHTEN ALL THREADED ANCHOR STUDS.” Note 13: Revised “FOR BARRIER RAIL TO POST CONNECTION AND SIDEWALK RAIL CONNECTION” to “FOR RAIL TUBE TO POST CONNECTION AND SIDEWALK RAIL TUBE CONNECTION”. <p>REFERENCE DRAWINGS:</p> <ul style="list-style-type: none"> Added RC-51M – TYPE 31 STRONG POST GUIDE RAIL.
	2 of 13 (formerly 2 of 12)	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Added “- 2” to sheet title. <p>RAIL TUBE CAP DETAILS:</p> <ul style="list-style-type: none"> Added “TUBE” in titles of all four views.
	3 of 13 (formerly 3 of 12)	<p>PA TYPE 10M BRIDGE BARRIER TYPICAL SIDEWALK:</p> <ul style="list-style-type: none"> Added “WITH THRIE-BEAM CONNECTION” to detail name. <p>PLAN VIEW:</p> <ul style="list-style-type: none"> Removed “TOP” from the callout for “HSS 5x5x3/8” RAIL TUBE”. Added bottom rail to detail. Added “(TOP RAIL)” to the callout for the “BEND POINT”. <p>ELEVATION VIEW:</p> <ul style="list-style-type: none"> Added callout for “CL THRIE-BEAM RAIL”. Added 1’-9” and 1 3/4" dimensions. Added 3/4" hole, callout and 10 3/4" dimension for the hole in the bottom rail.
	4 of 13 (formerly 4 of 12)	<p>PA TYPE 10M BRIDGE BARRIER ALTERNATE SIDEWALK:</p> <ul style="list-style-type: none"> Added “WITH THRIE-BEAM CONNECTION” to detail name. <p>PLAN VIEW:</p> <ul style="list-style-type: none"> Removed “TOP” from the callout for “HSS 5x5x3/8” RAIL TUBE”. Added bottom rail to detail. Added callout “(TOP RAIL)” to the callout for the “BEND POINT”. <p>ELEVATION VIEW:</p> <ul style="list-style-type: none"> Added callout for “CL THRIE-BEAM RAIL”. Added 1’-9” and 1 3/4" dimensions. Added 3/4" hole, callout and 10 3/4" dimension for the hole in the bottom rail.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-709M (cont.)	5 OF 13 (NEW)	New Sheet – W-BEAM CONNECTION ELEVATIONS. Added ELEVATIONS and W-BEAM CONNECTION NOTES to show how the W-Beam Terminal Connection is attached to the PA Type 10M Bridge Barrier.
BC-713M	General	Inserted new sheets 7 and 8 and renumbered subsequent sheets; updated total number of sheets.
	1 of 16 (formerly 1 of 14)	TITLE BLOCK: <ul style="list-style-type: none"> Added “ – 1” to sheet title. PA BRIDGE BARRIER: <ul style="list-style-type: none"> Added “WITH THRIE-BEAM CONNECTION” to detail name. PLAN: <ul style="list-style-type: none"> Revised callout for “DETAIL C” to “DETAIL B”. ELEVATION VIEW: <ul style="list-style-type: none"> Added callout for “CL THRIE-BEAM RAIL”. Added 1’-9” dimension. GENERAL NOTES: <ul style="list-style-type: none"> Note 2: Revised “RAILING TUBES” to “RAIL TUBES”. Note 3: <ul style="list-style-type: none"> Revised “RAILING POSTS” to “POSTS”. Removed “OR 50W” (2 places). Note 4: <ul style="list-style-type: none"> Revised “ACCORDING TO” to “AS SPECIFIED IN”. Added “CONNECTOR PLATES”. Note 5: Revised “RAILING TUBES” to “RAIL TUBES”. Note 9: Revised “FOR BARRIER RAIL TO POST CONNECTION AND SIDEWALK RAIL CONNECTION” to “FOR RAIL TUBE TO POST CONNECTION AND SIDEWALK RAIL TUBE CONNECTION”. REFERENCE DRAWINGS: <ul style="list-style-type: none"> Added RC-51M – TYPE 31 STRONG POST GUIDE RAIL.
	2 of 16 (formerly 2 of 14)	TITLE BLOCK: <ul style="list-style-type: none"> Added “ – 2” to sheet title. DETAIL B – BASE PLATE DETAIL: <ul style="list-style-type: none"> Removed “DETAIL B” from detail name. SIDEWALK RAIL ROD ANCHOR PLATE DETAIL: <ul style="list-style-type: none"> Revised “ANCHOR” to “CONNECTOR” in detail name. NOTES: <ul style="list-style-type: none"> Note 1: Revised “ANCHOR” to “CONNECTOR” (2 places).
	3 of 16 (formerly 3 of 14)	TITLE BLOCK: <ul style="list-style-type: none"> Added “ – 3” to sheet title. Renamed DETAIL C to DETAIL B.

STANDARD	SHEET	DESCRIPTION OF CHANGES	
BC-713M (cont.)	4 of 16 (formerly 4 of 14)	PA BRIDGE BARRIER TYPICAL SIDEWALK: <ul style="list-style-type: none"> Added “WITH THRIE-BEAM CONNECTION” to detail name. PLAN: <ul style="list-style-type: none"> Revised callout for “ANCHOR PLATE” to “CONNECTOR PLATE”. Revised callout for “DETAIL C” to “DETAIL B”. ELEVATION VIEW: <ul style="list-style-type: none"> Added callout for “CL THRIE-BEAM RAIL”. Added 1’-9” dimension. SECTION C-C BARRIER SECTION: <ul style="list-style-type: none"> Revised “ANCHOR PLATE” to “CONNECTOR PLATE” in web hole callout. 	
	5 of 16 (formerly 5 of 14)	PA BRIDGE BARRIER ALTERNATE SIDEWALK: <ul style="list-style-type: none"> Added “WITH THRIE-BEAM CONNECTION” to sheet title. PLAN: <ul style="list-style-type: none"> Revised callout for “ANCHOR PLATE” to “CONNECTOR PLATE”. Revised callout for “DETAIL C” to “DETAIL B”. ELEVATION VIEW: <ul style="list-style-type: none"> Added callout for “CL THRIE-BEAM RAIL”. Added 1’-9” dimension. Removed the 8” dimension for the sidewalk height. SECTION E-E BARRIER SECTION: <ul style="list-style-type: none"> Revised “ANCHOR PLATE” to “CONNECTOR PLATE” in web hole callout. 	
	6 of 16 (formerly 6 of 14)	PA BRIDGE BARRIER RAISED SIDEWALK: <ul style="list-style-type: none"> Added “WITH THRIE-BEAM CONNECTION” to sheet title. PLAN: <ul style="list-style-type: none"> Revised callout for “ANCHOR PLATE” to “CONNECTOR PLATE”. Revised callout for “DETAIL C” to “DETAIL B”. ELEVATION VIEW: <ul style="list-style-type: none"> Added callout for “CL THRIE-BEAM RAIL”. Added 1’-9” dimension. SECTION F-F BARRIER SECTION: <ul style="list-style-type: none"> Revised “ANCHOR PLATE” to “CONNECTOR PLATE” in web hole callout. 	
	7 OF 16 (NEW)	New Sheet – W-BEAM CONNECTION ELEVATIONS – 1 Added ELEVATIONS and NOTES to show how the W-Beam Terminal Connection is attached to the PA Type 10M Bridge Barrier.	
	8 OF 16 (NEW)	New Sheet – W-BEAM CONNECTION ELEVATIONS – 2 Added ELEVATIONS and NOTES to show how the W-Beam Terminal Connection is attached to the PA Type 10M Bridge Barrier.	

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-713M (cont.)	12 of 16 (formerly 10 of 14)	Renamed DETAIL D to DETAIL C. Renamed DETAIL E to DETAIL D. SECTION S-S: <ul style="list-style-type: none"> • Revised callout for “DETAIL E” to “DETAIL D”. SECTION U-U: PLAN: <ul style="list-style-type: none"> • Revised callout for “DETAIL D” to “DETAIL C”.
	13 of 16 (formerly 11 of 14)	SECTION V-V: <ul style="list-style-type: none"> • Revised callout for “DETAIL F” to “DETAIL E”. Renamed DETAIL F to DETAIL E. POST AND BASE PLATE: <ul style="list-style-type: none"> • Revised callout for “DETAIL B,” to “THE BASE PLATE DETAIL ON”.

OS-299 (5-21)



TRANSMITTAL LETTER

PUBLICATION:

Publication 219M

DATE:

3/27/2024

SUBJECT:

Standards for Bridge Construction
September 2016 Edition
Change 6

INFORMATION AND SPECIAL INSTRUCTIONS:

Incorporate the attached revised standard BC-719M into the September 2016 Edition of Publication 219M.

BC-719M has been revised to bring the Department's temporary bridge barriers into compliance with the AASHTO Manual for Assessing Safety Hardware (MASH 2016).

This standard may be used immediately and can be adopted as soon as practical on all new and existing projects without affecting letting schedules and in conjunction with the current Publication 408 Specifications. Projects let after October 11, 2024 must incorporate these new standards.

A description of the changes made to the 2016 Edition since Change 5 on February 14, 2023 are listed in the attached multi-sheet table. On the standard, light purple highlighting indicates Change 6 revisions to details and notes.

Comments or questions concerning this Publication may be directed to the Bureau of Bridge.

CANCEL AND DESTROY THE FOLLOWING:

Existing BC-700M Series standards need to be retained for projects under construction and for future rehabilitation work.

ADDITIONAL COPIES ARE AVAILABLE FROM:

PennDOT website - www.penndot.gov
Click on Forms, Publications & Maps

APPROVED FOR ISSUANCE BY:

MICHAEL B. CARROLL
Secretary of Transportation

BY:

Richard W. Runyen, P.E.
Director, Bureau of Bridge,
Highway Administration

**PUBLICATION #219M
SEPTEMBER 2016 EDITION
CHANGE NO. 6**

The major revisions for the Standard Drawing are presented below. Since minor changes are not indicated, it is strongly advised that all recipients thoroughly examine the changes and revisions incorporated in this release.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-719M	1 of 7 (formerly 1 of 8)	<p>GENERAL NOTES:</p> <ul style="list-style-type: none"> Note 1: Revised "WORKMANSHIP" to "PERFORM WORK". Note 7: First Sentence: Added "(ASTM A709, GRADE 36)" after "WASHER". Note 8: Revised Note to the following: <ul style="list-style-type: none"> THE FOLLOWING TWO TYPE OF INSTALLATIONS ARE PERMITTED: <ul style="list-style-type: none"> TYPE 1: TRAFFIC PRESENT ON ONE SIDE OF THE TEMPORARY BARRIER. PROVIDE ANCHORS ON THE TRAFFIC SIDE OF THE TEMPORARY BARRIER. TYPE 2: TRAFFIC PRESENT ON BOTH SIDES OF THE TEMPORARY BARRIER. PROVIDE ANCHORS ON BOTH SIDES OF THE TEMPORARY BARRIER. THE 42" TEMPORARY SINGLE FACE CONCRETE BARRIER IS NOT PERMITTED FOR TYPE 2 INSTALLATIONS. Note 9: Revised Note to the following: <ul style="list-style-type: none"> MASH DESIGNATIONS: <ul style="list-style-type: none"> THE 32" TEMPORARY CONCRETE MEDIAN BARRIER WITH 4'-0" (MAXIMUM) ANCHOR SPACINGS IS DESIGNATED AS MASH TL-3. THE 50" TEMPORARY CONCRETE MEDIAN BARRIER WITH 2'-0" (MAXIMUM) ANCHOR SPACINGS IS DESIGNATED AS MASH TL-4. THE 42" TEMPORARY SINGLE FACE CONCRETE BARRIER WITH 2'-0" (MAXIMUM) ANCHOR SPACINGS IS DESIGNATED AS MASH TL-4. Note 11: First Sentence: Removed "BARRIER OR MEDIAN". Note 12: Removed last Sentence: "SPACING OF ADHESIVE ANCHORS VARIES FROM 4'-0" TO 1'-0" AS SHOWN IN THE TABLE." Added notes 18, 19 and 20. <p>TABLE 1:</p> <ul style="list-style-type: none"> Revised table based on Barrier Type. Revised Note under table. <p>REFERENCE DRAWINGS:</p> <ul style="list-style-type: none"> Removed RC-57M. Added TC-8604 – DELINEATION.



STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-719M (cont.)	2 of 7 (formerly 2 of 8)	<p>CONSTRUCTION NOTES:</p> <ul style="list-style-type: none"> Note 3: Revised last three sentences from "IF BARRIERS CANNOT BE REPOSITIONED AND REBAR IS ENCOUNTERED, MOVE TO ALTERNATE BOLT POCKETS IN TYPE A AND B INSTALLATIONS. FOR EXISTING DECKS, TYPE C INSTALLATIONS WILL REQUIRE DRILLING THROUGH DECK REINFORCEMENT STEEL, ALTERNATIVELY, ONE BOLT PER BARRIER SECTION MAY BE ELIMINATED WITH APPROVAL OF THE ENGINEER. FOR NEW DECKS WITH TYPE C INSTALLATIONS, PROPERLY PLAN AND PLACE DECK REINFORCEMENT STEEL TO AVOID DAMAGE DURING DRILLING" to "IF BARRIERS CANNOT BE REPOSITIONED AND REBAR IS ENCOUNTERED, MOVE TO ALTERNATE BOLT POCKETS. FOR EXISTING DECKS DRILLING THROUGH DECK REINFORCEMENT STEEL IS PERMITTED ONLY IF THE DECK IS DEMOLISHED IN A LATER STAGE OF CONSTRUCTION. FOR NEW DECKS, PROPERLY PLAN AND PLACE DECK REINFORCEMENT STEEL TO AVOID DAMAGE DURING DRILLING" Note 5: Removed "BUT NOT TO EXCEED 2'-0" IN THE SEGMENT LENGTH ON THE BRIDGE" from the last sentence. Note 6: Note removed since it was not MASH compliant. Note 7 was renumbered to be Note 6: <ul style="list-style-type: none"> 1st Bullet: Revised "SECTION 1080.2 (C) OF PUB. 408" to "PUBLICATION 408, SECTION 1080.2(c)". 2nd Bullet: Revised "MANUFACTURES" to "MANUFACTURERS" and added "AND FILL THE HOLE WITH GROUT IN ACCORDANCE WITH PUBLICATION 408, SECTION 1080.2(c)". 4th Bullet: Revised "FILL HOLES WITH POLYMER MORTAR AND CONCRETE PER BULLETIN 15, SECTION 679.2(e), PART C, AFTER THE REMOVAL OF THE TEMPORARY BARRIER" to "FILL HOLES WITH RAPID SET CONCRETE PATCHING MATERIAL (TYPE C) AS LISTED IN BULLETIN 15, SECTION 679.2(a)5, AFTER THE REMOVAL OF THE TEMPORARY BARRIER". Note 8 was renumbered to be Note 7: <ul style="list-style-type: none"> Revised "BEHIND A BARRIER OR MEDIAN BARRIER MOUNTED" to "BEHIND A TEMPORARY BARRIER MOUNTED". Note 9 was renumbered to be Note 8: <ul style="list-style-type: none"> Revised note from "ANCHORS ARE REQUIRED FOR TRAFFIC SIDE ONLY" to "ANCHORS ARE REQUIRED ON THE TRAFFIC SIDE OF THE TEMPORARY BARRIER". Note 10 was renumbered to be Note 9. <p>TABLE 2:</p> <ul style="list-style-type: none"> Revised table based on Barrier Type. Removed "TABLE 2 NOTE". <p>SLOTTED PLATE CONNECTION – PARTIAL PLAN – SLOT DETAIL:</p> <ul style="list-style-type: none"> Revised "CL BARRIER" to "CL SLOT".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-719M (cont.)	3 of 7 (formerly 3 of 8)	<p>Removed “NOTE: SEE TABLE 1, SHEET 1 FOR SPACING AND MINIMUM REQUIRED ADHESIVE ANCHOR ULTIMATE CAPACITY.” (2 places)</p> <p>ALL DETAILS:</p> <ul style="list-style-type: none"> Added callout “SEE NOTE 4” to the deck width behind the barrier. <p>ADHESIVE ANCHOR DETAIL:</p> <ul style="list-style-type: none"> Revised Note below title from “CONCRETE TEMPORARY BARRIER SHOWN; TEMPORARY MEDIAN BARRIER SIMILAR AT FACE(S) ADJACENT TO TRAFFIC” to “TEMPORARY SINGLE FACE BARRIER SHOWN; TEMPORARY MEDIAN BARRIER SIMILAR AT FACE(S) ADJACENT TO TRAFFIC”. <p>ADHESIVE ANCHOR ON COMPOSITE ADJACENT BOX BEAMS DETAIL:</p> <ul style="list-style-type: none"> Revised Note below title from “CONCRETE TEMPORARY BARRIER SHOWN; TEMPORARY MEDIAN BARRIER SIMILAR AT EITHER FACE” to “TEMPORARY SINGLE FACE BARRIER SHOWN; TEMPORARY MEDIAN BARRIER SIMILAR AT FACE(S) ADJACENT TO TRAFFIC”. ** Note: Revise 2nd sentence from “FOR 5” DECK SLAB THICKNESS, USE ANY TYPE A INSTALLATION OR TYPE B INSTALLATION WITH EITHER 1’-0” OR 2’-0” BOLT SPACINGS” to “FOR 5” DECK SLAB THICKNESS, USE 1’-0” BOLT SPACINGS” <p>TYPICAL BOLT THROUGH ANCHOR DETAIL:</p> <ul style="list-style-type: none"> Revised Note below title from “CONCRETE TEMPORARY BARRIER SHOWN; TEMPORARY MEDIAN BARRIER SIMILAR AT FACE(S) ADJACENT TO TRAFFIC” to “TEMPORARY SINGLE FACE BARRIER SHOWN; TEMPORARY MEDIAN BARRIER SIMILAR AT FACE(S) ADJACENT TO TRAFFIC”. <p>ALTERNATE CONNECTION DETAIL WITH SPACER FOR HAUNCH CLEARANCE LESS THAN 2” DETAIL:</p> <ul style="list-style-type: none"> Revised Note below title from “CONCRETE TEMPORARY BARRIER SHOWN; TEMPORARY MEDIAN BARRIER SIMILAR AT FACE(S) ADJACENT TO TRAFFIC” to “TEMPORARY SINGLE FACE BARRIER SHOWN; TEMPORARY MEDIAN BARRIER SIMILAR AT FACE(S) ADJACENT TO TRAFFIC”. Revised the Minimum Channel Length from 5’-10” to 4’-10”. Added callout for “THREADED ANCHOR (MINIMUM LENGTH = THICKNESS OF DECK + OVERLAY + THICKNESS OF HAUNCH + 11”)”. <p>ALTERNATE BOLT THROUGH ANCHOR DETAIL:</p> <ul style="list-style-type: none"> Revised Note below title from “CONCRETE TEMPORARY BARRIER SHOWN; TEMPORARY MEDIAN BARRIER SIMILAR AT FACE(S) ADJACENT TO TRAFFIC” to “TEMPORARY SINGLE FACE BARRIER SHOWN; TEMPORARY MEDIAN BARRIER SIMILAR AT FACE(S) ADJACENT TO TRAFFIC”. Revised the Minimum Channel Length from 5’-10” to 4’-10”. <p>NOTES:</p> <ul style="list-style-type: none"> Added Note 4.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-719M (cont.)	4 of 7 (formerly 4 of 8)	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised “REINFORCEMENT DETAILS” to “REINFORCEMENT DETAILS – 1”. <p>ELEVATION:</p> <ul style="list-style-type: none"> Removed ELEVATION shown with 2’-0” anchor pocket spacings and added the ELEVATION from original Sheet 5. <p>SECTION A-A:</p> <ul style="list-style-type: none"> Revised Title “TEMPORARY GLARE SCREEN MEDIAN BARRIER 50” TYPICAL REINFORCEMENT DETAIL to “50” TEMPORARY CONCRETE MEDIAN BARRIER”. <ul style="list-style-type: none"> Added 2’-4” dimension. Revised Title “TEMPORARY MEDIAN BARRIER 32” TYPICAL REINFORCEMENT DETAIL to “32” TEMPORARY CONCRETE MEDIAN BARRIER”. <ul style="list-style-type: none"> Added 2’-0” dimension. Revised “#4” to “#4 SEE ELEVATION FOR SPACING”. Revised Title “TEMPORARY BARRIER 42” TYPICAL REINFORCEMENT BARS” to “42” TEMPORARY SINGLE FACE CONCRETE BARRIER”. <ul style="list-style-type: none"> Removed the “Deck linework”. <p>BARRIER DRAINAGE OPENING DETAIL:</p> <ul style="list-style-type: none"> Removed text for “5” WIDTH FOR 2’-0” ANCHOR HOLE SPACING”. Added “BARRIER DRAINAGE NOTES”. <p>NOTES:</p> <ul style="list-style-type: none"> Added Note 3.
	5 of 7 (formerly 5 of 8)	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised “END SECTION DETAILS AND REINFORCEMENT DETAILS” to “REINFORCEMENT DETAILS – 2”. <p>Revised Title “TRAFFIC FACE OF ALTERNATE TEMPORARY CONCRETE BARRIER AND BOTH FACES OF TYPICAL TEMPORARY CONCRETE MEDIAN BARRIER” to “TRAFFIC FACE OF SINGLE FACE TEMPORARY CONCRETE BARRIER AND BOTH FACES OF TEMPORARY CONCRETE MEDIAN BARRIER”.</p> <p>ELEVATION:</p> <ul style="list-style-type: none"> ELEVATION moved to Sheet 4. Added 11” dimensions (2 places). Added B-B (2 places). Revised locations of drainage openings. Revised “SEE REINFORCEMENT DETAILS THIS SHT.” to “FOR REINFORCEMENT DETAILS, SEE SECTION A-A”. Revised “#4, SEE REINFORCEMENT DETAILS THIS SHT.” to “FOR REINFORCEMENT DETAILS, SEE SECTION A-A”. Remove note under title for bolt spacing.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-719M (cont.)	5 of 7 (formerly 5 of 8) (cont.)	<p>PLAN AT ENDS:</p> <ul style="list-style-type: none"> Added Title “REINFORCEMENT AT SLOTTED PLATE CONNECTION – PLAN (ANCHOR POCKETS NOT SHOWN)”. Revised title “TEMPORARY MEDIAN BARRIER – PLAN” to “32” AND 50” TEMPORARY CONCRETE MEDIAN BARRIER”. Revised title “TEMPORARY BARRIER – PLAN” to “42” TEMPORARY SINGLE FACE CONCRETE BARRIER”. Removed callout “SEE REINFORCEMENT DETAILS THIS SHT.”. Added “A-A” (2 places). <p>SECTION B-B:</p> <ul style="list-style-type: none"> Revised Title “ALTERNATE TEMPORARY MEDIAN BARRIER 32” to “32” TEMPORARY CONCRETE MEDIAN BARRIER”. <ul style="list-style-type: none"> Added 2’-0” dimension. Added the 4 7/8” and 2 3/8” dimensions. Revised Title “TEMPORARY GLARE SCREEN MEDIAN BARRIER 50” to “50” TEMPORARY CONCRETE MEDIAN BARRIER”. <ul style="list-style-type: none"> Added 2’-4” dimension. Added the 4 7/8” and 4 1/4” dimensions. Revised Title “TEMPORARY BARRIER 42” to “42” TEMPORARY SINGLE FACE CONCRETE BARRIER”. <ul style="list-style-type: none"> Added 3” and 7” dimensions. <p>NOTES: Note 3: Added “BARRIER ELEVATION AND”.</p>
	6 of 7 (formerly 6 of 8)	<p>Revised Title “TEMPORARY BARRIER TYPICAL REINFORCEMENT BARS” to “42” TEMPORARY SINGLE FACE BARRIER REINFORCEMENT BARS”.</p> <p>Revised Title “MEDIAN BARRIER 32” to “32” TEMPORARY MEDIAN BARRIER”.</p> <p>Revised Title “GLARE SCREEN MEDIAN BARRIER 50” to “50” TEMPORARY MEDIAN BARRIER”.</p> <p>Revised Title “TEMPORARY MEDIAN BARRIER TYPICAL REINFORCEMENT BARS” to “TEMPORARY MEDIAN BARRIER REINFORCEMENT BARS”.</p>
	7 of 7 (formerly 7 of 8)	<p>ALTERNATE ANCHOR POCKET DETAIL:</p> <ul style="list-style-type: none"> Revised the title “PARTIAL PLAN B-B” to “PARTIAL PLAN D-D”. PLAN: Revised “A-A” to “C-C”. Revised the title “BARRIER SECTION A-A” to “BARRIER SECTION C-C”. BARRIER ELEVATION: Revised “1” CLR. (TYP.)” to “3/4” CLR (TYP)”. <p>ALTERNATE ANCHOR POCKET DETAIL:</p> <ul style="list-style-type: none"> Revised the title “PARTIAL PLAN B-B” to “PARTIAL PLAN F-F”. PARTIAL PLAN F-F: Added 5” dimension. PLAN: Revised “A-A” to “E-E”. Revised the title “BARRIER SECTION A-A” to “BARRIER SECTION E-E”. BARRIER ELEVATION: Revised “1” CLR. (TYP.)” to “3/4” CLR (TYP)”.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-719M (cont.)	7 of 7 (formerly 7 of 8) (cont.)	NOTES: Note 3: Revised “SEE SHEETS 4 AND 5” to “SEE SHEET 4”.
	formerly 8 of 8	Sheet removed. Temporary Barrier with Pin Connected Drop-Pin Anchor is not MASH compliant.

<p>OS-299 (5-21)</p>  <p>pennsylvania DEPARTMENT OF TRANSPORTATION www.penndot.gov</p>	<p>TRANSMITTAL LETTER</p>	<p>PUBLICATION: Publication 219M</p> <hr/> <p>DATE: 2/14/2023</p>
<p>SUBJECT: Standards for Bridge Construction September 2016 Edition Change 5</p>		
<p>INFORMATION AND SPECIAL INSTRUCTIONS:</p> <p>Incorporate the attached revisions into the September 2016 Edition of Publication 219M.</p> <p>These revisions introduce the PA 3-Rail Bridge Barrier which replaces the Structure Mounted Guide Rail.</p> <p>These standards may be used immediately and can be adopted as soon as practical on all new and existing projects without affecting letting schedules and in conjunction with the current Publication 408 Specifications. Projects let after October 6, 2023 must incorporate these new standards.</p> <p>A description of the changes made to the 2016 Edition since Change 4 of November 23, 2022 are listed in the attached multi-sheet Table. On the standards, pink highlighting indicates Change 5 revisions to details and notes.</p> <p>Comments or questions concerning this Publication may be directed to the Bridge Office.</p>		
<p>CANCEL AND DESTROY THE FOLLOWING:</p> <p>Existing BC-700M Series standards need to be retained for projects under construction and for future rehabilitation work.</p>	<p>ADDITIONAL COPIES ARE AVAILABLE FROM:</p> <p><input checked="" type="checkbox"/> PennDOT website - www.penndot.gov <i>Click on Forms, Publications & Maps</i></p> <hr/> <p>APPROVED FOR ISSUANCE BY:</p> <p>MICHAEL B. CARROLL Acting Secretary of Transportation</p> <p>BY: </p> <p>Jonathan R. Fleming Chief Executive Highway Administration</p>	

**PUBLICATION #219M
SEPTEMBER 2016 EDITION
CHANGE NO. 5**

The major revisions for each Standard Drawing are presented below. Since minor changes are not indicated, it is strongly advised that all recipients thoroughly examine the changes and revisions incorporated in this release.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-706M	All Sheets	New Standard for the PA 3-Rail Bridge Barrier.
BC-798M	1 of 3	No Changes.
BC-798M	2 of 3	SKEWED BARRIER LAYOUT GUIDELINES: <ul style="list-style-type: none">• Note 6: Added "S8 BARS FOR THE PA 3-RAIL BRIDGE BARRIER ARE NOT SHOWN IN THE PLAN VIEW BUT NEED TO BE INCLUDED. IF REQUIRED BEND THE BARS NEAR THE GUTTER LINE AND ROTATE BARS TO PROVIDE 1 1/2" MIN. CONCRETE COVER. DO NOT SHORTEN THE BAR LENGTH."
BC-798M	3 of 3	No Changes.

OS-299 (5-21)



TRANSMITTAL LETTER

PUBLICATION:

Publication 219M

DATE:

11/23/2022

SUBJECT:

Standards for Bridge Construction
September 2016 Edition
Change 4

INFORMATION AND SPECIAL INSTRUCTIONS:

Incorporate the attached revisions into the September 2016 Edition of Publication 219M.

These standards may be used immediately and can be adopted as soon as practical on all new and existing projects without affecting letting schedules and in conjunction with the current Publication 408 Specifications. All projects let after April 30, 2023 must incorporate these new standards.

A description of the changes made to the 2016 Edition since Change 3 of February 19, 2021 are listed in the attached multi-sheet Table. On the standards, light orange highlighting indicates Change 4 revisions to details and notes.

Comments or questions concerning this Publication may be directed to the Bridge Office.

CANCEL AND DESTROY THE FOLLOWING:

Existing BC-700M Series standards need to be retained for projects under construction and for future rehabilitation work.

ADDITIONAL COPIES ARE AVAILABLE FROM:

PennDOT website - www.penndot.gov
Click on Forms, Publications & Maps

APPROVED FOR ISSUANCE BY:

YASSMIN GRAMIAN, P.E.
Secretary of Transportation

BY:

Jonathan R. Fleming
Chief Executive
Highway Administration



Standard	Sheet	Description of Changes
BC-701M	All Sheets	Revised base plate anchor bolt spacing in the transverse direction from 5" to 4" throughout the standard.
BC-709M	General	Updated all rail tube designations throughout the standard from TS to HSS.
	1 of 12	VERTICAL V-NOTCH DETAIL: Corrected depiction of bolt and v-notch locations.
	2 of 12	SPLICE TUBE ELEVATION: Removed redundant ASTM reference from splice tube call-out. RAIL TUBE CAP DETAILS: Removed "HAND" from titles of 5" rail details.
	6 of 12	NOTES: Added Note 4 to mention that an alternate strip seal dam (draining to fascia) similar to that shown on BC-767M is permitted when shown on the contract plans
	7 of 12	NOTES: Added Note 4 to mention that an alternate strip seal dam (draining to fascia) similar to that shown on BC-767M is permitted when shown on the contract plans
BC-711M	General	Revised base plate anchor bolt spacing in the transverse direction from 5" to 4" throughout the standard.
	1 of 4	DETAIL A: Revised base plate thickness from 3/4" to 7/8".
		DETAIL B: Revised base plate thickness from 3/8" to 1/2".
	2 of 4	SECTION D-D: Revised base plate thickness from 3/8" to 1/2".
		SECTION C-C: Revised base plate thickness from 3/4" to 7/8".
		ANCHOR BOLT DETAIL: Added dimension to require 9" minimum effective embedment. DETAIL E: Revised plate thickness from 3/4" to 7/8".
BC-713M	General	Updated all rail tube designations throughout the standard from TS to HSS.
	1 of 14	GENERAL NOTES: In Note 20 added that the PA Bridge Barrier attached to a moment slab is designated MASH TL-4.
	3 of 14	ANCHOR PLATE DETAIL: Revised cut-out from squared corners to 1" radius corners. Corrected anchor plate width from 11 1/2" to 10 1/4".
	4 of 14	ELEVATION - PA BRIDGE BARRIER - TYPICAL SIDEWALK: Revised middle rail tube wall thickness from 1/2" to 1/4".
	8 of 14	NOTES: Added Note 5 to mention that an alternate strip seal dam (draining to fascia) similar to that shown on BC-767M is permitted when shown on the contract plans
	9 of 14	NOTES: Added Note 5 to mention that an alternate strip seal dam (draining to fascia) similar to that shown on BC-767M is permitted when shown on the contract plans
BC-716M	1 of 2	ELEVATION: Removed the leveling pad beneath all railing posts and revised extent of splice tubes to match details on Sheet 2.
		DETAIL A: Replaced the leveling pad with leveling nuts on the anchor bolts. Replaced the maximum leveling pad height with a minimum clearance under post base.
		ALTERNATE DETAIL A: Replaced the leveling pad with leveling nuts on the anchor bolts. Replaced the maximum leveling pad height with a minimum clearance under post base.
		SECTION A-A: Replaced the leveling pad with leveling nuts on the anchor bolts.
	2 of 2	TYPICAL SIDEWALK DETAIL: Replaced the leveling pad with leveling nuts on the anchor bolts. TYPICAL EXPANSION PANEL DETAIL: Removed leveling pad, added Post CL, correctly extended 7 1/2" dimension to CL Post, and added 1/2" dimension from CL Post to splice tube.
BC-732M	1 of 3	DETAIL A: Revised length of vertical leg of angle from 2-1/2" to 2" MIN.
BC-736M	2 of 3	DEVELOPMENT LENGTH OF STANDARD HOOKS IN TENSION: Eliminated bar sizes above #11 for conformance with AASHTO 5.10.8.2.1 and DM-4 5.10.8.2.1.
	3 of 3	DEVELOPMENT LENGTH AND LAP SPLICE LENGTH OF DEFORMED BARS IN TENSION: Eliminated bar sizes above #11 for conformance with AASHTO 5.10.8.2.1 and DM-4 5.10.8.2.1.
		DEVELOPMENT LENGTH AND LAP SPLICE LENGTH OF DEFORMED BARS IN TENSION – TABLE B: Revised the development lengths and lap lengths for horizontal bars that had been calculated incorrectly previously.
BC-752M	1 of 3	NOTES: Revised Note 4 including adding references to Publication 408.
		NOTES: Revised Note 5 to remove the PA Bridge Barrier and PA Type 10M Bridge Barrier.
		NOTES: Deleted Note 9 concerning epoxy bonding compound.
		NOTES: Rearranged Notes 6 through 9 (formerly 10).
		NOTES: Updated Pub. 408 section reference in Note 7.

Standard	Sheet	Description of Changes
BC-752M (cont.)	1 of 3 (cont.)	NOTES: Added new Note 10 concerning High Molecular Weight Methacrylate (HMWM).
	2 of 3	ALTERNATE TRANSVERSE CONSTRUCTION AND CRACK CONTROL JOINT: Replaced saw cut and epoxy bonding compound with HMWM.
		CONSTRUCTION JOINT DETAILS, LONGITUDINAL DETAIL: Replaced saw cut and epoxy bonding compound with HMWM.
		CONSTRUCTION JOINT DETAILS, TRANSVERSE DETAIL: Replaced saw cut and epoxy bonding compound with HMWM.
		CONSTRUCTION JOINT DETAILS: Renamed DETAIL X to DETAIL A.
		CONSTRUCTION JOINT DETAILS, DETAIL A: Revised detail for use of HMWM without saw cut instead of Epoxy Bonding Compound in saw cut.
		CONSTRUCTION JOINT DETAILS: Added two notes to details.
3 of 3 (NEW)	Added new LATEX MODIFIED CONCRETE (LMC) WEARING SURFACE CONSTRUCTION JOINT PREPARATION details which include sequencing.	
BC-754M	1 of 2	INTERMEDIATE DIAPHRAGM DETAIL: Added (SEE NOTE 21) to the Typical Connection Detail callouts (two instances) and Alternate Connection Detail callouts (two instances).
		ALTERNATE INTERMEDIATE DIAPHRAGM DETAIL: Added (SEE NOTE 21) to the Typical Connection Detail callouts (two instances) and Alternate Connection Detail callouts (two instances).
	2 of 2	NOTES: Added new Note 21 to provide direction for bolt spacings, edge distances and clearances at the typical and alternate connections. DIAPHRAGM CONNECTION PLATE DETAILS, DETAIL F: Added "(MIN.)" to K + 1" dimension (2 instances)
BC-756M	6 of 6	TAPPED SCREW CONNECTION FOR PRESTRESSED CONCRETE BEAM – END VIEW: Added stainless steel sheet welded to sole plate.
		TAPPED SCREW CONNECTION FOR PRESTRESSED CONCRETE BEAM, PLAN – SOLE PLATE: Added stainless steel sheet welded to sole plate and added text to tapped screw callout concerning avoiding interference with stainless steel.
BC-766M	General	Removed outdated notes and callouts that do not apply to an approach slab joint, or revised to make applicable.
		Revised barrier and sidewalk names in detail titles and callouts to match latest BD-601M.
		Revised callouts from SAW CUT OR FORMED GROOVE to SAW CUT SEAL GROOVE.
	1 of 2	GENERAL NOTES: Deleted notes 6, 12, 14, 15, and renumbered subsequent notes.
		GENERAL NOTES: Extended Note 3 to reference Pub. 408 specification for painting galvanized steel surfaces.
		GENERAL NOTES: Revised note 6 (formerly 7) to simply specify a fixed 1/2" movement classification.
		GENERAL NOTES: In note 9 (formerly 10), revised seal recess from 1/4" min. to 1/8" min. and from 1/2" max. to 1/4" max.
		GENERAL NOTES: Added Note 13 to clarify that details on sheet 2 are applicable for Type 1 approach slabs (without overlay) supported by the superstructure.
2 of 2	PLAN: Added call for preformed neoprene compression seal. Removed dimension "A". Replaced TYPICAL JOINT DETAIL with more extensive details similar to deleted Details H and J from BD-628M. Moved SECTION AT BARRIER to sheet 2.	
	Rearranged sheet. Added SECTION AT SPLIT MEDIAN BARRIERS from sheet 1, removed reference to Alternate Detail, added note to see Section Thru Joint with F-Shaped Barrier for additional information. Removed ALTERNATE DETAIL. Added NOTE to clarify that details on sheet 2 are applicable for Type 1 approach slabs (without overlay) supported by the superstructure. SECTION THRU JOINT AT TYPICAL SIDEWALK: Removed beam and underside of deck slab from detail, added note to see Section Thru Joint with F-Shaped Barrier for additional information.	

Standard	Sheet	Description of Changes	
BC-766M (cont.)	2 of 2 (cont.)	SECTION THRU JOINT WITH ALTERNATE SIDEWALK: Removed beam and underside of deck slab from detail, deleted spliced seal details and associated callouts, continuous seal shown as standard, added note to see Section Thru Joint with F-Shaped Barrier for additional information.	
		SECTION A-A: Removed sidewalk and barrier from detail, revised Width of Basic Joint to Sawed Seal Groove, added callout for Formed Basic Joint, revised Closed Cell Foam to Closed Cell Neoprene Sponge, and added note to see joint details on sheet 1 for more information.	
		SECTION C-C: Revised JOINT WIDTH to SEAL GROOVE WIDTH, revised DAM to JOINT (2 places), added callout for Formed Basic Joint, and revised additional recess for expansion from JOINT WIDTH + 1/4" to a fixed 3/4".	
BC-767M	1 of 7	GENERAL NOTES: In Note 11, updated "Construction and Material Division, Bureau of Project Delivery" to "Materials Division, Bureau of Construction and Materials".	
	2 of 7	TYPICAL SECTION AT ABUTMENT FIXED & EXPANSION, FOR P/S SPREAD BEAMS: Revised slab thickness to include haunch.	
		TYPICAL SECTION AT PIER FIXED & EXPANSION, FOR P/S SPREAD BEAMS: Revised Slab thickness to include haunch.	
	3 of 7	TYPICAL SECTION AT ABUTMENT FIXED & EXPANSION, FOR P/S ADJACENT BEAMS: Revised blockout depth to include the haunch/variable deck thickness over adjacent box beams.	
		TYPICAL SECTION AT PIER FIXED & EXPANSION, FOR P/S ADJACENT BEAMS: Revised blockout depth to include the haunch/variable deck thickness over adjacent box beams.	
		OVERHANG SECTION AT ABUTMENT - FIXED & EXPANSION: Added detail of typical overhang section (between the outside of the fascia beam and the barrier/gutterline) where the deck does not corbel as it does between beams.	
		OVERHANG SECTION AT PIER - FIXED & EXPANSION: Added detail of typical overhang section (between the outside of the fascia beam and the barrier/gutterline) where the deck does not corbel as it does between beams.	
6 of 7	All Sections: Added shoulder cross slope to the details.		
7 of 7 (NEW)	ALTERNATE NEOPRENE STRIP SEAL DAM: Added four details for the Alternate Neoprene Strip Seal Dam which continues under the barrier to the deck fascia and eliminates the upturn miter.		
BC-772M	1 of 5	GENERAL, NOTE 2: Added "PRIMARY" before "BRACING"	
		Added BRACING REQUIREMENT CRITERIA to clarify the requirement of primary lateral bracing, secondary lateral bracing or no lateral bracing.	
		STABILITY CRITERIA, NOTE c., W_{wv} WIND PRESSURE: Added missing text "HALF OF" in description of location about which the upward wind pressure acts.	
		Added title "INSTALLATION INSTRUCTIONS" over the primary bracing and secondary bracing instructions, and moved the primary bracing instructions before the secondary bracing instructions.	
		INSTALLATION INSTRUCTONS, SECONDARY BRACING, NOTE a.: Revised the design method from ASD to LRFD unless noted otherwise; revised the application of the horizontal wind pressure to include interior beams in accordance with the AASHTO Guide Specification for Wind Loads on Bridges During Construction, 1st Edition (2017) which is newly referenced.	
		INSTALLATION INSTRUCTONS, SECONDARY BRACING: Added Note f. which lists the design criteria for secondary bracing.	
		INSTALLATION INSTRUCTONS, SECONDARY BRACING: Added Note g. concerning design method for cables and turnbuckles.	
		Added WIND PRESSURE DISTRIBUTION TO GIRDERS schematic from BD-620M to illustrate the revised wind pressure distribution to exterior and interior beams in accordance with the AASHTO Guide Specification for Wind Loads on Bridges During Construction, 1st Edition (2017).	
		2 of 5	PLAN and ELEVATION: Removed the turnbuckles shown at the sides leaving just the turnbuckle along the top; expanded the turnbuckle call-outs to indicate "SIZE AS REQUIRED BY DESIGN, LOCATION DETERMINED BY CONTRACTOR"; added the following note to turnbuckle call-out: "* MINIMUM WORKING LOAD IS 22 KIP FOR 5 GIRDERS. MORE THAN 5 GIRDERS, DESIGN IS REQUIRED."
			PLAN: Removed second paragraph of triple asterisk (***) note.
ELEVATION: Replaced specified minimum cable diameter with "AS REQUIRED BY DESIGN" and noted that "DESIGN IS REQUIRED".			

Standard	Sheet	Description of Changes
BC-775M	1 of 3	DOWEL DETAIL: For consistency with BD-656M, revised reference point for 1'-0" minimum dowel length from top of substructure unit to bottom of diaphragm and added reduced minimum lengths for 17" and 21" deep beams.
		GENERAL NOTES: In Note 2, updated terminology from "bituminous tar paper" to "asphalt-saturated paper".
	2 of 3	TYP. TENDON PLACEMENT: Divided into two details to clarify difference between skews above or below 75°. Increased minimum diaphragm width to be consistent with 6" MIN. offset required in Detail A.
		DETAIL A: Revised to clarify geometric requirements for tendon pocket.
		TYPICAL SECTION OF TENDON POCKET: Clarified limits of tendon pocket depth.
	3 of 3	SHEAR KEY DETAIL: Added width and tolerance of open joint between beams above the shear key.
		PARTIAL PLAN – BEAMS FOR STAGED CONSTRUCTION: Divided each partial plan into two so that differences between skew angles above and below 75° could be shown.
		STAGED CONSTRUCTION NOTES: Amended Note 2 to clarify splice chuck pocket's impact on available prestressing strand locations.
		STAGED CONSTRUCTION NOTES: Added Note 5 to provide instructions when omitting the secondary post-tensioning duct (corresponds with DM-4 revision).
BC-788M	1 of 12	NOTES: In Note 8, updated terminology from "bituminous material pavements" to "asphalt pavements".
	4 of 12	SECTION U-U: Updated terminology from "bituminous approach" to "asphalt pavement approach".
	8 of 12	SECTION G-G: Updated terminology from "bituminous pavement" to "asphalt pavement" and from "bituminous approach" to "asphalt pavement approach".
		Updated detail title from BITUMINOUS APPROACH AT STRUCTURE to ASPHALT PAVEMENT APPROACH AT STRUCTURE. Also updated terminology from "bituminous approach" to "asphalt pavement approach" in call-out.
	9 of 12	MEMBRANE WATERPROOFING DETAIL: Revised wearing course type from HMA to WMA (2 instances). Updated terminology from "bituminous wearing course" to "asphalt pavement wearing course".
	10 of 12	NOTES: Revised Note 1 to remove reduction in waterproofing membrane for fill depths greater than 2'-0".
		MEMBRANE WATERPROOFING DETAIL: Revised wearing course type from HMA to WMA. Updated terminology from "bituminous wearing course" to "asphalt pavement wearing course".
	11 of 12	Updated detail title from BITUMINOUS OVERLAY AND WATERPROOFING MEMBRANE DETAILS AT DECK DRAINS" to "ASPHALT PAVEMENT OVERLAY . . . "
		Updated terminology from "bituminous wearing course" to "asphalt pavement wearing course" in three details.
	12 of 12	WATERPROOFING DETAIL AT ABUTMENT WITHOUT BACKWALL, WITH PAVING NOTCH: Updated terminology from "two-ply bituminous paper" to "two-ply asphalt-saturated paper".
BC-798M	--	Switched order of sheets 2 and 3.
1 of 3	Renamed DETAIL D to DETAIL A and updated reference in JOINT DETAIL.	
	DETAIL A: Added 1/2" dimension of joint.	
	2 of 3	PLAN VIEW – BARRIER VERTICAL REINFORCEMENT AT SEGMENT JOINT: Revised barrier depiction and call-outs to not be specific to one barrier type. Revised note 2 to clearly prohibit the cutting of bars.
SKEWED BARRIER LAYOUT GUIDELINES: Deleted note 6 due to the PA Structure Mounted Guiderail being discontinued.		
GALVANIZED STRAP CONNECTION DETAIL: Renamed SECTION A-A to SECTION B-B.		
	GALVANIZED STRAP CONNECTION DETAIL – ELEVATION: Revised detail to show a single strap. Revised distance from joint to fastener from 10" to 9" MIN. for consistency with BD-632M.	

Standard	Sheet	Description of Changes
BC-798M (cont.)	2 of 3 (cont.)	<p>GALVANIZED STRAP CONNECTION DETAIL – CONNECTION STRAP: Revised strap dimensions to be minimums for consistency with BD-632M.</p> <p>GALVANIZED STRAP CONNECTION DETAIL – SECTION B-B: Revised bolt, washer and insert call-outs and added double asterisk (**) note. Removed length from strap call-out. Removed note about number of straps per connection.</p> <p>Added new END SECTION CONNECTION STRAP PLACEMENT detail.</p>
BC-799M	9 of 13	SHOULDER RELIEF JOINT, PLAN and SECTION K-K: Increased shoulder relief joint and open joint in barrier from 1'-0" to 2'-0" for consistency with revisions to BD-628M.

<p>OS-299 (7-08)</p> 	<p>TRANSMITTAL LETTER</p>	<p>PUBLICATION:</p> <p>Publication 219M September 2016 Edition Change No. 3</p> <hr/> <p>DATE:</p> <p>February 19, 2021</p>
<p>SUBJECT:</p> <p style="text-align: center;">Revisions to Standards for Bridge Construction September 2016 Edition</p>		
<p>INFORMATION AND SPECIAL INSTRUCTIONS:</p> <p>Incorporate the attached revisions into the September 2016 Edition of Publication 219M. These standards are being issued to address bridge barriers and transitions to bridge barriers that are compliant with the AASHTO Manual for Assessing Safety Hardware (MASH 2016). These standards may be used immediately and can be adopted as soon as practical on new and existing designs without affecting letting schedules. However, projects with T.S.&L. submissions after July 1, 2021 and projects let after April 1, 2022 shall incorporate these standards. A description of the changes made to the 2016 Edition since Change 2 dated January 31, 2019 are listed in the attached multi-sheet Table. On the standards, light blue highlighting indicates Change 3 revisions. Highlighting of Change 1 and Change 2 revisions has been omitted for clarity. Comments or questions concerning this Publication may be directed to the Bureau of Project Delivery, Bridge Design and Technology Division.</p>		
<p>CANCEL AND DESTROY THE FOLLOWING:</p> <p>Existing BC-700M Series standards need to be retained for projects under construction and for future rehabilitation work.</p>	<p>ADDITIONAL COPIES ARE AVAILABLE FROM:</p> <p><input type="checkbox"/> PennDOT SALES STORE (717) 787-6746 phone (717) 787-8779 fax ra-penndotsalesstore.state.pa.us</p> <p><input checked="" type="checkbox"/> PennDOT website - www.dot.state.pa.us <i>Click on Forms, Publications & Maps</i></p> <p><input type="checkbox"/> DGS warehouse (PennDOT employees ONLY)</p> <hr/> <p>APPROVED FOR ISSUANCE BY:</p> <p>YASSMIN GRAMIAN, P.E. Secretary of Transportation</p> <p>BY:</p>  <p>Brian G. Thompson, P.E. Director, Bureau of Project Delivery, Highway Administration</p>	

**PUBLICATION #219M
SEPTEMBER 2016 EDITION
CHANGE NO. 3**

The major revisions for each Standard Drawing are presented below. Since minor changes are not indicated, it is strongly advised that all recipients thoroughly examine the changes and revisions incorporated in this release.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-701M	1 of 3	<p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Revised "WORKMANSHIP" to "PERFORM WORK". Note 8: Revised "MEETING THE REQUIREMENTS OF" to "CONFORMING TO". Revised "SECTION 705.8(b)" to "SECTION 705.7(b)". <p>SECTION A-A:</p> <ul style="list-style-type: none"> Revised "TYPICAL OR VERTICAL BARRIER" to ①. Revised "ALTERNATE BARRIER" to ②. Revised note "ALTERNATE SIDEWALK DETAIL SHOWN (TYP. AND ALT. CONCRETE BARRIER SIMILAR)" to "ALTERNATE SIDEWALK WITH 42" VERTICAL WALL CONCRETE BARRIER SHOWN (45", 42" AND 32" F-SHAPE CONCRETE BARRIER SIMILAR)". <p>BASE PLATE DETAIL:</p> <ul style="list-style-type: none"> Revised 2" to 1 1/2" (2 locations). Revised 4" to 5". <p>Added "LEGEND:</p> <p>① 45" F-SHAPE, 42" F-SHAPE OR 42" VERTICAL WALL CONCRETE BARRIER.</p> <p>② 32" F-SHAPE CONCRETE BARRIER."</p>
	2 of 3	<p>LEVELING PAD DETAIL:</p> <ul style="list-style-type: none"> Revised "AT SIDEWALK" to "AT TYPICAL SIDEWALK SHOWN (RAISED SIDEWALK SIMILAR)". Revised 5" to 4 1/2" in section view. Revised 4" to 5" in section and plan view. Revised 2" to 1 1/2" in plan view. <p>BARRIER PROTECTIVE FENCE:</p> <ul style="list-style-type: none"> Revised "TYPICAL OR VERTICAL BARRIER" to ①. Revised "ALTERNATE BARRIER" to ②. Revised 6" to "6" FOR ①" and "6 1/2" FOR ②" (2 locations). Revised 4" to 5". Revised "ALTERNATE SIDEWALK DETAIL SHOWN (TYP. AND ALT. CONCRETE BARRIER SIMILAR)" to "ALTERNATE SIDEWALK WITH 42" VERTICAL WALL CONCRETE BARRIER SHOWN (45", 42" AND 32" F-SHAPE CONCRETE BARRIER SIMILAR)". <p>SIDEWALK DETAIL:</p> <ul style="list-style-type: none"> Added "TYPICAL" to "SIDEWALK DETAIL".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-701M (cont.)		<p>POST BRACKET DETAIL, PLAN:</p> <ul style="list-style-type: none"> Revised "3'-6" BARRIER" to ①. Revised "2'-8" BARRIER" to ②. Revised 4" to 5". Revised 2" to 1 1/2". <p>Added "LEGEND:</p> <p>① 45" F-SHAPE, 42" F-SHAPE OR 42" VERTICAL WALL CONCRETE BARRIER.</p> <p>② 32" F-SHAPE CONCRETE BARRIER."</p>
	3 of 3	<p>BARRIER MOUNTED DETAILS, SECTION D-D (left):</p> <ul style="list-style-type: none"> Added callout "RAILROAD PROTECTIVE FENCE, CURVED TOP". Revised to 10'-0" and 8'-0" heights to be measured from top of sidewalk. <p>BARRIER MOUNTED DETAILS, SECTION D-D (right):</p> <ul style="list-style-type: none"> Added callout "RAILROAD PROTECTIVE FENCE". Revised "TYPICAL" to "F-SHAPE". <p>CURB MOUNTED DETAILS, SECTION D-D:</p> <ul style="list-style-type: none"> Added callout "RAILROAD PROTECTIVE FENCE, CURVED TOP, CURB MOUNTED". Added "(RAISED SIDEWALK DETAIL SIMILAR)".
BC-703M	ALL	Standard discontinued.
BC-707M	ALL	Standard discontinued.
BC-708M	ALL	Standard discontinued.
BC-709M	1 of 12	<p>GENERAL NOTES:</p> <ul style="list-style-type: none"> Note 1: Revised "WORKMANSHIP" to "PERFORM WORK". Note 2: Revised "IN ACCORDANCE WITH" to "CONFORMING TO". Note 3: Revised to "PROVIDE RAILING POSTS CONFORMING TO AASHTO M270 (ASTM A709) GRADE 50 OR 50W OR ASTM A992. PROVIDE BASE PLATES CONFORMING TO AASHTO M270 (ASTM A709) GRADE 50 OR 50W. PROVIDE ANCHOR PLATES CONFORMING TO AASHTO M270 (ASTM A709) GRADE 36." Note 4: Revised to "ALL RAILING COMPONENTS SHALL BE GALVANIZED (AFTER FABRICATION) ACCORDING TO PUBLICATION 408, SECTION 1105.02(s) UNLESS OTHERWISE SHOWN ON PLANS. GALVANIZE POSTS, BASE PLATES, ANCHOR PLATES, AND SPLICE SLEEVES ACCORDING TO ASTM A123. GALVANIZE RAIL TUBES ACCORDING TO WITH ASTM A123, EXCEPT COATING ON THREADED STUDS AND NUTS USED WITH THE STUDS SHALL MEET THE REQUIREMENTS OF ASTM A153 FOR CLASS C MATERIAL. GALVANIZE ALL ANCHOR HARDWARE ACCORDING TO ASTM A153 OR ASTM B695." Note 6: Revised "IN ACCORDANCE WITH" to "CONFORMING TO".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-709M (cont.)	1 of 12 (cont.)	<ul style="list-style-type: none"> Note 7: Removed. Note 8: Revised note "8" to "7". Note 9: Revised note "9" to "8". Note 10: Revised note "10" to "9". Note 11: Revised note "11" to "10". Revised $\frac{7}{8}$" to $\frac{5}{8}$". Note 12: Removed. Note 13: Revised note "13" to "11". Note 14: Removed. Added note – "12. MILL TO BEAR IS DEFINED AS FOLLOWS: A MINIMUM OF 25% OF THE POST WEB AND COMPRESSION FLANGE END AREA MUST FIT WITHIN $\frac{1}{32}$" OF THE BASE PLATE WITH NO GAP MORE THAN 0.040" FOR THE REMAINING 75% OF THE END AREA." Added note – "13. FOR BARRIER RAIL TO POST CONNECTION AND SIDEWALK RAIL CONNECTION, USE AUTOMATIC WELDED THREADED ANCHOR STUDS MEETING THE REQUIREMENTS OF ASTM A108. USE HEX NUTS MEETING THE REQUIREMENTS OF ASTM A563. USE A $\frac{3}{16}$" THICK PLATE LOCK WASHER ON EACH STUD AND A $\frac{3}{8}$" THICK PLATE ASTM A709, GRADE 36 KSI WASHER. U-WASHERS SHALL MEET THE REQUIREMENTS OF ASTM A709, GRADE 36 KSI STEEL." Added note – "14. FOR ANCHOR BOLTS, USE 1" DIA. BOLTS CONFORMING TO THE REQUIREMENTS OF ASTM F1554, GRADE 105 KSI, INCLUDING THE SUPPLEMENTARY REQUIREMENT, S5, FOR CHARPY IMPACT STRENGTH. USE ASTM A563, GRADE DH HEAVY HEX NUTS. USE ONE ASTM F436 WASHER AT THE TOP." Added note – "15. NO POST REQUIRED ADJACENT TO FLUSH JOINTS AT WINGWALL, IF POSTS LOCATED AT EXPANSION JOINT/ABUTMENT CORNER." Added note – "16. THE CENTERLINE OF THE RAIL TUBE SPLICE TO A POST IS TO BE 1'-8" MINIMUM AND 2'-6" MAXIMUM FROM THE CENTERLINE OF THE RAILING POST." Added note – "17. ONE OR MORE 10'-0" MAXIMUM POST SPACINGS MAY BE REDUCED TO 5'-0" MINIMUM IN ORDER TO MAINTAIN APPROPRIATE SPACING DIMENSIONS FROM THE END OF THE RAIL, EXPANSION JOINTS AND DRAINAGE SCUPPERS." Added note – "18. LOCATE RAIL SPLICES AT EXPANSION JOINTS AND AT OTHER LOCATIONS, WHERE NECESSARY PROVIDE RAILS AS LONG AS PRACTICAL, WITH MINIMUM OF THREE POSTS BETWEEN SPLICES, UNLESS OTHERWISE REQUIRED FOR EXPANSION." Added note – "19. PROVIDE RAIL TUBES CONTINUOUS OVER NOT LESS THAN TWO RAILING POSTS. NO WELDED BUTT SPLICES WILL BE ALLOWED IN THE RAIL TUBE SECTION." Added note – "20. PLACE POST AND POST ANCHOR BOLTS NORMAL TO GRADE AND RAILS PARALLEL TO GRADE." Added note – "21. COAT ALL SURFACES OF THE BASE PLATE IN CONTACT WITH CONCRETE WITH CAULKING COMPOUND PRIOR TO ERECTION. AFTER ERECTION AND ALIGNMENT, SEAL OPENINGS BETWEEN THE METAL SURFACES AND THE CONCRETE WITH CAULKING COMPOUND CONFORMING TO PUBLICATION 408, SECTION 705.7(b)."

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-709M (cont.)	1 of 12 (cont.)	<ul style="list-style-type: none"> Added note – "22. THE PA TYPE 10M BRIDGE BARRIER IS DESIGNATED AS MASH TL-4." Added note – "23. FOR GUIDE RAIL TRANSITION TO PA TYPE 10M BRIDGE BARRIER, SEE RC-50M." Added note – "24. PROVIDE VERTICAL V-NOTCHES ON BARRIER WALL FRONT AND REAR FACES AT ALL POST ANCHOR BOLT LOCATIONS. SEE DETAIL THIS SHEET." <p>BARRIER SECTION:</p> <ul style="list-style-type: none"> Added "BARRIER WALL" to 1'-6". Revised 2'-11" to 3'-3". Added a second row of anchor bolts and replaced anchor bar with an anchor plate. Added 4" horizontal dimension. Added "1'-5" BARRIER WALL". Added "(SEE DETAIL, SHEET 2)" to "DELINEATOR AT EACH POST". Added $\frac{3}{4}$" to BASE PL. Added $\frac{1}{2}$" vertical dimension. Added $\frac{1}{2}$" horizontal dimension. Revised "ANCHOR BAR 2" X $\frac{3}{8}$" X 6" (GALVANIZED)" to "ANCHOR PLATE 6" X 6" X $\frac{1}{4}$" (GALVANIZED)(SEE DETAIL, SHEET 2)". Added "CONSTR. JT. & V-NOTCH (RAKED FINISH)". <p>ELEVATION-POST:</p> <ul style="list-style-type: none"> Added $\frac{7}{8}$" vertical dimension. Revised "RAILING POST W8 x 18" to "W8 x 18 POST". Revised "$\frac{1}{2}$" θ DRAIN HOLE (SEAL WELD PLATED INSIDE DRAIN HOLE)" to "$\frac{1}{2}$" θ DRAIN HOLE (1/8" ABOVE WELD) (SEAL WELD PLATE INSIDE DRAIN HOLE)". <p>PLAN-POST:</p> <ul style="list-style-type: none"> Moved to sheet 2. Revised "PLAN – POST" to "BASE PLATE DETAIL". Revised "* SEE NOTE" to "MILL TO BEAR (SEE NOTE 12, SHEET 1)". Removed "RAILING" from W8 x 18 POST. Added $\frac{2}{8}$" and 4" horizontal dimensions. Added 2 additional $\frac{1}{8}$" diameter holes. <p>Removed "ANCHOR BAR DETAIL" detail.</p> <p>ALTERNATE SIDEWALK RAIL – BARRIER SECTION:</p> <ul style="list-style-type: none"> Moved to sheet 4. Added "BARRIER WALL" to 1'-6". Added a second row of anchor bolts and replaced anchor bar with an anchor plate. Added 4" horizontal dimension. Added 3'-10" vertical dimension. Added "1'-5" BARRIER WALL". Added $\frac{3}{4}$" to BASE PL. Added $\frac{1}{2}$" vertical dimension. Added $\frac{1}{2}$" horizontal dimension.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-709M (cont.)	1 of 12 (cont.)	<ul style="list-style-type: none"> Revised section marks "A" to "C". Added "CONSTR. JT. & V-NOTCH (RAKED FINISH)". Revised "ANCHOR BAR 2" X 3/8" X 6" (GALVANIZED)" to "ANCHOR PLATE 6" X 6" X 1/4" (GALVANIZED)(SEE DETAIL SHEET 2)". Added "(SEE DETAIL, SHEET 2)" to DELINEATOR AT EACH POST. <p>ALTERNATE SIDEWALK RAIL – ELEVATION-POST:</p> <ul style="list-style-type: none"> Moved to sheet 4. Added 7³/₈" vertical dimension. Removed "RAILING" from W8 x 18 POST. Revised 1/2" φ DRAIN HOLE 1/8" ABOVE WELD" to "1/2 φ DRAIN HOLE (1/8" ABOVE WELD) (SEAL WELD PLATE INSIDE DRAIN HOLE)". <p>ANCHOR STUD DETAIL:</p> <ul style="list-style-type: none"> Moved to sheet 2. <p>SECTION A-A:</p> <ul style="list-style-type: none"> Moved to sheet 4: Revised "SECTION A-A" to "SECTION C-C". Added "HAND" to RAIL SUPPORT ANGLE. Shown opposite hand. <p>DELINEATOR DETAIL:</p> <ul style="list-style-type: none"> Moved to sheet 2. <p>REFERENCE DRAWINGS:</p> <ul style="list-style-type: none"> Removed "BC-708M THRIE-BEAM TO PA TYPE 10M BRIDGE BARRIER TRANSITION CONNECTION". <p>Added "PA TYPE 10M BRIDGE BARRIER" with "PLAN" and "ELEVATION" views to show new MASH barrier end transition.</p> <p>Added "BARRIER WALL GEOMETRY DETAIL".</p> <p>Added "VERTICAL V-NOTCH DETAIL".</p>
	2 of 12	<p>Added "RECESS SECTION".</p> <p>Added "BASE PLATE DETAIL" detail from sheet 1.</p> <p>RAILING JOINTS ELEVATION:</p> <ul style="list-style-type: none"> Added "1'-0" MIN." to OFFSET RAILING. Removed expansion joint detailing. <p>DELINEATOR DETAIL:</p> <ul style="list-style-type: none"> Moved from sheet 1. <p>Added "ANCHOR PLATE DETAIL".</p> <p>TYPICAL WELD AT MITERS:</p> <ul style="list-style-type: none"> Moved from sheet 3.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-709M (cont.)	2 of 12 (cont.)	<p>RAIL TUBE CAP DETAILS:</p> <ul style="list-style-type: none"> Moved from sheet 3. <p>RAIL SPLICE:</p> <ul style="list-style-type: none"> Moved from sheet 4. <p>RAIL SPLICE TABLE:</p> <ul style="list-style-type: none"> Moved from sheet 4 <p>SPLICE TUBE:</p> <ul style="list-style-type: none"> Moved from sheet 4. <p>SIDEWALK RAIL – BARRIER SECTION:</p> <ul style="list-style-type: none"> Moved to sheet 3. Shown opposite hand. Added "BARRIER WALL" to 1'-6". Revised "VEHICULAR WIDTH" to "ROADWAY". Added 7³/₈" horizontal dimension. Added 4" horizontal dimension. Added a second row of anchor bolts and replaced anchor bar with an anchor plate. Revised "3'-6" to 3'-10". Added 3'-3" vertical dimension. Added "1'-5" BARRIER WALL". Added 3/4" to BASE PL. Added 1/2" vertical dimension. Added 1/2" horizontal dimension. Added "ANCHOR PLATE 6"X6"X1/4" (GALVANIZED) (SEE DETAIL, SHEET 2)". Added "CONSTR. JT. (RAKED FINISH)". Added 2" dimension. <p>SIDEWALK RAIL – DETAIL A:</p> <ul style="list-style-type: none"> Move to sheet 3. Shown opposite hand. <p>SECTION B-B:</p> <ul style="list-style-type: none"> Moved to sheet 3. <p>ELEVATION-POST:</p> <ul style="list-style-type: none"> Moved to sheet 3. Shown opposite hand. Revised "VEHICULAR WIDTH" to "ROADWAY". Added 7³/₈" vertical dimension. Revised 1/2" φ DRAIN HOLE" to "1/2 φ DRAIN HOLE (1/8" ABOVE WELD) (SEAL WELD PLATE INSIDE DRAIN HOLE)". <p>Removed "RAISED SIDEWALK RAIL" details.</p>
	3 of 12	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised "END OF RAIL" to "TYPICAL SIDEWALK".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-709M (cont.)	3 of 12 (cont.)	<p>Added "PA TYPE 10M BRIDGE BARRIER TYPICAL SIDEWALK".</p> <ul style="list-style-type: none"> "PLAN" and "ELEVATION" views. <p>BARRIER SECTION:</p> <ul style="list-style-type: none"> Moved from sheet 2. <p>DETAIL A:</p> <ul style="list-style-type: none"> Moved from sheet 2. <p>SECTION B-B:</p> <ul style="list-style-type: none"> Moved from sheet 2. <p>ELEVATION-POST:</p> <ul style="list-style-type: none"> Moved from sheet 2. <p>TYPICAL WELD AT MITERS:</p> <ul style="list-style-type: none"> Moved to sheet 2. Shown opposite hand. <p>RAIL TUBE CAP DETAIL:</p> <ul style="list-style-type: none"> Moved to sheet 2. Shown opposite hand. Removed end connection angle and anchor studs along with associated notes and dimensions. <p>Removed "TYPICAL RAIL" detail.</p> <p>Removed "SIDEWALK RAIL" and "TOP VIEW" details.</p> <p>Removed "ALTERNATE SIDEWALK RAIL" and "TOP VIEW" details.</p>
	4 of 12	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised "END OF RAIL" to "ALTERNATE SIDEWALK". <p>Added "PA TYPE 10M BRIDGE BARRIER ALTERNATE SIDEWALK".</p> <ul style="list-style-type: none"> "PLAN" and "ELEVATION" views to show new MASH barrier end transition. <p>Added "RAIL TUBE END DETAIL".</p> <ul style="list-style-type: none"> "PLAN" and "ELEVATION" views to show additional handrail dimensions. <p>BARRIER SECTION:</p> <ul style="list-style-type: none"> Moved from sheet 1. <p>ELEVATION-POST:</p> <ul style="list-style-type: none"> Moved from sheet 1. <p>SECTION C-C:</p> <ul style="list-style-type: none"> Moved from sheet 1. <p>Removed "RAISED SIDEWALK RAIL" and "TOP VIEW" details.</p>

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-709M (cont.)	4 of 12 (cont.)	<p>Removed "RAISED SIDEWALK RAIL" and "TOP VIEW" details.</p> <p>Removed "END CAP SIZES FOR VARIOUS RAIL TUBES TABLE".</p> <p>RAIL SPLICE:</p> <ul style="list-style-type: none"> Moved to sheet 2. Removed "TS 5 x 3 x 3/8 AND". Revised "SECTION C-C" to SECTION A-A". Revised section marks "C-C" to "A-A". <p>RAIL SPLICE TABLE:</p> <ul style="list-style-type: none"> Moved to sheet 2. Removed "TS 5 x 3 x 3/8". Removed "TS 4 x 2 x 5/16 ASTM A500, GR. B OR C". <p>SPLICE TUBE:</p> <ul style="list-style-type: none"> Moved to sheet 2. Removed "AS DESIGNED".
	5 of 12	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised "MISCELLANEOUS DETAILS" to "DETAILS AT TOOTH EXPANSION DAM". <p>PLAN – SKEW ANGLE $\geq 75^\circ$:</p> <ul style="list-style-type: none"> Revised "CURB" to "BARRIER WALL". Revised section marks "E-E" to "F-F". Revised "(AT GUTTER LINE SHOWN; AT END OF ALTERNATE SIDEWALK SIMILAR)" to "(AT GUTTER LINE SHOWN; AT ALTERNATE SIDEWALK SIMILAR)". Corrected concrete recess. <p>PLAN AT SIDEWALK – SKEW ANGLE $\geq 75^\circ$:</p> <ul style="list-style-type: none"> Revised "PLAN AT SIDEWALK – SKEW ANGLE $\geq 75^\circ$" to "PLAN AT TYPICAL SIDEWALK – SKEW ANGLE $\geq 75^\circ$". Revised "CURB" to "BARRIER WALL". Revised section marks "F-F" to "E-E". Revised section marks "E-E" to "F-F". Removed "(AT SIDEWALK SHOWN; AT RAISED SIDEWALK SIMILAR)". <p>PLAN AT SIDEWALK – SKEW ANGLE $< 75^\circ$:</p> <ul style="list-style-type: none"> Revised "PLAN AT SIDEWALK – SKEW ANGLE $< 75^\circ$" to "PLAN AT TYPICAL SIDEWALK – SKEW ANGLE $< 75^\circ$". Revised "CURB" to "BARRIER WALL". Added "SIDEWALK". Revised section marks "F-F" to "E-E". Revised section marks "E-E" to "F-F". Removed "(AT SIDEWALK SHOWN; AT RAISED SIDEWALK SIMILAR)".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-709M (cont.)	5 of 12 (cont.)	<p>PLAN – SKEW ANGLE < 75°:</p> <ul style="list-style-type: none"> Revised “CURB” to “BARRIER WALL”. Revised section marks “E-E” to “F-F”. Revised “(AT GUTTER LINE SHOWN; AT END OF ALTERNATE SIDEWALK SIMILAR)” to “(AT GUTTER LINE SHOWN; AT ALTERNATE SIDEWALK SIMILAR)” Corrected concrete recess. <p>SECTION D-D:</p> <ul style="list-style-type: none"> Added “(NO SIDEWALK CONDITION SHOWN; ALTERNATE SIDEWALK SIMILAR)”. Revised 6” to 8”. <p>SECTION F-F:</p> <ul style="list-style-type: none"> Revised “SECTION F-F” to “SECTION E-E”. Removed “(AT SIDEWALK).” Added “SIDEWALK”. Added “BARRIER WALL”. Added “GUTTERLINE”. Revised 6” to 8”. Fixed weld on rear face. <p>SECTION E-E:</p> <ul style="list-style-type: none"> Revised “SECTION E-E” to “SECTION F-F”. Added “(SECTION G-G IS OPPOSITE HAND)”. <p>PA TYPE 10M BRIDGE BARRIER AT EXPANSION TOOTH DAM:</p> <ul style="list-style-type: none"> Revised “PA TYPE 10M BRIDGE BARRIER AT EXPANSION TOOTH DAM” to “PA TYPE 10M BRIDGE BARRIER AT TOOTH EXPANSION DAM”. <p>NOTES:</p> <ul style="list-style-type: none"> Note 2: Revised “CURB” to “BARRIER WALL”. Note 3: Added “BRIDGES” (2 locations). <p>Removed “SECTION F-F” at raised sidewalk.</p> <p>Removed “SECTION G-G” at raised sidewalk.</p>
	6 of 12	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised “MISCELLANEOUS DETAILS” to “DETAILS AT NEOPRENE STRIP SEAL DAM”. <p>PLAN – SKEW ANGLE ≥ 75°:</p> <ul style="list-style-type: none"> Revised “CURB” to “BARRIER WALL”. Corrected concrete recess. Revised “(SEE NOTE 3)” to “(SEE NOTE 2)”. Revised “(SEE NOTE 2)” to “(SEE NOTE 1)”. <p>PLAN AT SIDEWALK – SKEW ANGLE ≥ 75°:</p> <ul style="list-style-type: none"> Revised “PLAN AT SIDEWALK – SKEW ANGLE ≥ 75°” to “PLAN AT TYPICAL SIDEWALK – SKEW ANGLE ≥ 75°”.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-709M (cont.)	6 of 12 (cont.)	<ul style="list-style-type: none"> Revised “CURB” to “BARRIER WALL”. Revised section marks “K-K” to “J-J”. Revised section marks “J-J” to “K-K”. Removed “(AT SIDEWALK SHOWN; AT RAISED SIDEWALK SIMILAR)”. Revised “(SEE NOTE 3)” to “(SEE NOTE 2)”. Revised “(SEE NOTE 2)” to “(SEE NOTE 1)”. <p>PLAN AT SIDEWALK – SKEW ANGLE < 75°:</p> <ul style="list-style-type: none"> Revised “PLAN AT SIDEWALK – SKEW ANGLE < 75°” to “PLAN AT TYPICAL SIDEWALK – SKEW ANGLE < 75°”. Revised “CURB” to “BARRIER WALL”. Added “SIDEWALK”. Revised section marks “J-J” to “K-K”. Revised section marks “K-K” to “J-J”. Removed “(AT SIDEWALK SHOWN; AT RAISED SIDEWALK SIMILAR)”. Revised “(SEE NOTE 3)” to “(SEE NOTE 2)”. Revised “(SEE NOTE 2)” to “(SEE NOTE 1)”. <p>PLAN – SKEW ANGLE < 75°:</p> <ul style="list-style-type: none"> Revised “CURB” to “BARRIER WALL”. Corrected concrete recess. Revised “(SEE NOTE 3)” to “(SEE NOTE 2)”. <p>SECTION K-K:</p> <ul style="list-style-type: none"> Revised “SECTION K-K” to “SECTION J-J”. Revised 6” to 8”. Removed “(AT SIDEWALK).” Added “SIDEWALK/BARRIER WALL/GUTTERLINE”. <p>SECTION J-J:</p> <ul style="list-style-type: none"> Revised “SECTION J-J” to “SECTION K-K”. Revised “NOTE 3” to “NOTE 2”. <p>SECTION H-H:</p> <ul style="list-style-type: none"> Revised 6” to 8”. <p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Removed. Note 2: Revised note “2” to “1”. Revised “CURB” to “BARRIER WALL”. Note 3: Revised note “3” to “2”. Added “BRIDGES” (2 locations). Note 4: Revised note “4” to “3”. Revised “MAXIMUM DISTANCE FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3.” to “MAXIMUM DISTANCE ALONG THE EXTRUSION FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3.”. <p>Removed “SECTION K-K” at raised sidewalk.</p> <p>Added “SECTION L-L”.</p> <ul style="list-style-type: none"> Moved from sheet 7.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-709M (cont.)	7 of 12	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised "MISCELLANEOUS DETAILS" to "DETAILS AT NEOPRENE STRIP SEAL DAM". <p>PLAN AT ALTERNATE SIDEWALK – SKEW ANGLE $\geq 75^\circ$:</p> <ul style="list-style-type: none"> Revised "CURB" to "BARRIER WALL". Revised "NOTE 3" to "NOTE 2". Revised "NOTE 2" to "NOTE 1". Corrected concrete recess. <p>PLAN AT ALTERNATE SIDEWALK – SKEW ANGLE $< 75^\circ$:</p> <ul style="list-style-type: none"> Revised "CURB" to "BARRIER WALL". Added "SIDEWALK". Revised "NOTE 3" to "NOTE 2". Revised "NOTE 2" to "NOTE 1". Corrected concrete recess. <p>SECTION M-M:</p> <ul style="list-style-type: none"> Revised 6" to 8". <p>SECTION N-N:</p> <ul style="list-style-type: none"> Revised "NOTE 3" to "NOTE 2". <p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Removed. Note 2: Revised note "2" to "1". Revised "CURB" to "BARRIER WALL". Note 3: Revised note "3" to "2". Added "BRIDGES" (2 locations). Note 4: Revised note "4" to "3". Revised "MAXIMUM DISTANCE FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3." to "MAXIMUM DISTANCE ALONG THE EXTRUSION FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3". <p>SECTION C-C:</p> <ul style="list-style-type: none"> Moved to sheet 6. Revised "SECTION C-C" to "SECTION L-L". Revised "NOTE 3" to "NOTE 2". <p>Removed "SECTION L-L".</p>
	8 of 12	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised "MISCELLANEOUS DETAILS" to "ALUMINUM PROTECTIVE BARRIER DETAILS". <p>DETAIL B:</p> <ul style="list-style-type: none"> Revised "DETAIL B" to "DETAIL C". Added "FILL PLATE". Added "1/2" CLR." Added "THREADS OF BOLTS TO BE BURRED OFF AT FACE OF NUT AFTER CONNECTION IS MADE."

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-709M (cont.)	8 of 12 (cont.)	<p>DETAIL C:</p> <ul style="list-style-type: none"> Revised "DETAIL C" to "DETAIL B". Removed "RAILING" from W8 x 18 POST. Revised "CURB" to "BARRIER WALL". Added "CL $1\frac{1}{16}$"θ HOLES FOR". <p>SECTION Q-Q: PLAN:</p> <ul style="list-style-type: none"> Revised "CONCRETE CURB" to "BARRIER WALL" (2 locations). Revised "DETAIL C" to "DETAIL B". Removed "RAILING" from W8 x 18 POST. <p>SECTION P-P (TYPICAL):</p> <ul style="list-style-type: none"> Revised 8'-6" to 8'-3". Revised 2'-10" to 2'-9" (3 locations). Removed "RAILING" from W8 x 18 POST. Revised "ANCHOR BAR 2"x3/8"x6" (GALV.)(TYP.)(SEE DETAIL, SHEET 1)" to "Anchor plate 6"x6"x 1/4" GALV.)(TYP.)(SEE DETAIL, SHEET 2)". Revised "CURB" to "BARRIER WALL". Revised 2'-11" to 3'-3". Revised 6'-8 1/2" to 6'-5 1/2". Revised "4" anchor bolts to "2". <p>SECTION P-P (WITH ALTERNATE SIDEWALK):</p> <ul style="list-style-type: none"> Revised 9'-0" to 8'-9". Revised 3'-0" to 2'-11" (3 locations). Added "SEE DETAIL C, THIS SHEET". Revised "ANCHOR BAR 2"x3/8"x6" (GALV.)(TYP.)(SEE DETAIL, SHEET 1)" to "ANCHOR PLATE 6"x6"x 1/4" GALV.)(TYP.)(SEE DETAIL, SHEET 2)". Revised "CURB" to "BARRIER WALL". Revised 3'-6" to 3'-10". Revised 6'-7 1/2" to 6'-4 1/2". Revised "4" anchor bolts to "2". Added "Q-Q" section callout. <p>ELEVATION:</p> <ul style="list-style-type: none"> Revised 1'-1" to "1'-5" BARRIER WALL". Revised 2'-11" to 3'-3".
	9 of 12	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised "MISCELLANEOUS DETAILS" to "ALUMINUM PROTECTIVE BARRIER DETAILS". <p>POST AND BASE PLATE:</p> <ul style="list-style-type: none"> Revised 2 1/2" to 2 7/8". Revised 4 3/8" to 4". Revised "SHEET 1" to "SHEET 2". <p>POST MOUNTING ON GRADE:</p> <ul style="list-style-type: none"> Revised "CONCRETE CURB" to "BARRIER WALL".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-709M (cont.)	9 of 12 (cont.)	SECTION S-S: <ul style="list-style-type: none"> Revised "TOP WIDTH" to "BARRIER WALL". NOTES: <ul style="list-style-type: none"> Note 1: Revised "1107.02(p)" to "1113.03(h)" (2 locations).
	10 of 12	TITLE BLOCK: <ul style="list-style-type: none"> Revised "MISCELLANEOUS DETAILS" to "M.S.E. WALL DETAILS". TYPICAL CAST-IN-PLACE BARRIER DIMENSIONS ON M.S.E. WALLS: <ul style="list-style-type: none"> Revised "TYPICAL CAST-IN-PLACE BARRIER DIMENSIONS ON M.S.E. WALLS" to "CAST-IN-PLACE BARRIER DIMENSIONS ON M.S.E. WALLS". Added 4" horizontal dimension. Added a second row of anchor bolts and replaced anchor bar with an anchor plate. Added "BARRIER WALL" on 1'-6". Revised 1'-1" to "1'-5" BARRIER WALL". Revised 3'-3" to 3'-7". Added 3'-3". TYPICAL C.I.P. BARRIER WITH CEMENT CONCRETE SHOULDER ON M.S.E. WALLS: <ul style="list-style-type: none"> Revised "TYPICAL C.I.P. BARRIER WITH CEMENT CONCRETE SHOULDER ON M.S.E. WALLS" to "C.I.P. BARRIER WITH CEMENT CONCRETE SHOULDER ON M.S.E. WALLS". Added a second row of anchor bolts and replaced anchor bar with an anchor plate. TYPICAL C.I.P. BARRIER WITH BITUMINOUS SHOULDER ON M.S.E. WALLS: <ul style="list-style-type: none"> Revised "TYPICAL C.I.P. BARRIER WITH BITUMINOUS CONCRETE SHOULDER ON M.S.E. WALLS" to "C.I.P. BARRIER WITH ASPHALT-PAVED SHOULDER ON M.S.E. WALLS". Added a second row of anchor bolts and replaced anchor bar with an anchor plate. CONCRETE CURB ELEVATION: <ul style="list-style-type: none"> Revised "CONCRETE CURB ELEVATION" to "BARRIER WALL ELEVATION". Revised "CONCRETE CURB" to "BARRIER WALL". Revised "SHOULDER" to "MOMENT SLAB". NOTES: <ul style="list-style-type: none"> Note 2: Revised "CONCRETE CURB" to "BARRIER WALL" (2 locations). Add "8 AND".
	11 of 12	TITLE BLOCK: <ul style="list-style-type: none"> Revised "MISCELLANEOUS DETAILS" to "M.S.E. WALL DETAILS".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-709M (cont.)	11 of 12 (cont.)	PRECAST BARRIER WITH BITUMINOUS SHOULDER: <ul style="list-style-type: none"> Revised "PRECAST BARRIER WITH BITUMINOUS SHOULDER" to "PRECAST BARRIER WITH ASPHALT-PAVED SHOULDER ON M.S.E. WALLS". Added a second row of anchor bolts and replaced anchor bar with an anchor plate. Revised "CONCRETE CURB" to "BARRIER WALL". PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER: <ul style="list-style-type: none"> Revised "PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER" to "PRECAST BARRIER WITH CEMENT CONCRETE ON M.S.E. WALLS". Added a second row of anchor bolts and replaced anchor bar with an anchor plate. Revised "CONCRETE CURB" to "BARRIER WALL". DIMENSIONS: <ul style="list-style-type: none"> Added a second row of anchor bolts and replaced anchor bar with an anchor plate. Revised 3'-3" to 3'-7". Revised 11 1/2" to 1'-3 1/2". Revised 1'-1" to "1'-5" BARRIER WALL". REINFORCEMENT FOR BARRIER WITH BITUMINOUS SHOULDER: <ul style="list-style-type: none"> Revised "REINFORCEMENT FOR BARRIER WITH BITUMINOUS SHOULDER" to "REINFORCEMENT FOR PRECAST BARRIER WITH ASPHALT-PAVED SHOULDER". Added anchor bolt and anchor plate. Revised "CONCRETE CURB" to "BARRIER WALL". REINFORCEMENT FOR BARRIER WITH CEMENT CONCRETE SHOULDER: <ul style="list-style-type: none"> Revised "REINFORCEMENT FOR BARRIER WITH CONCRETE CEMENT SHOULDER" to "REINFORCEMENT FOR PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER". Added anchor bolt and anchor plate. Revised "CONCRETE CURB" to "BARRIER WALL". TRAFFIC BARRIER AND MOMENT SLAB NOTES: <ul style="list-style-type: none"> Note 1: Revised "CONCRETE CURB" to "BARRIER WALL" (2 locations). Note 4: Revised "AS PER PUB. 408" to "AS SPECIFIED IN PUBLICATION 408,". Note 5: Revised "PROVIDE REINFORCEMENT AS PER DETAIL A, SHEET 3, BC-799M." to "PROVIDE LEVELING CONCRETE AS PER BC-799M, SHEET 3, DETAIL A.".
	12 of 12	SECTION T-T: <ul style="list-style-type: none"> Revised 1'-1" to "1'-5" BARRIER WALL". JUNCTION BOX NOTES: <ul style="list-style-type: none"> Note 3: Revise "SIDEWALK RAIL" to "TYPICAL SIDEWALK". Note 4: Removed.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-709M (cont.)	12 of 12 (cont.)	<p>OPEN JOINT NOTES:</p> <ul style="list-style-type: none"> Note 2: Revised "PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH SECTION 705.8(b) OF PUB 408." to "PROVIDE CAULKING COMPOUND CONFORMING TO PUBLICATION 408, SECTION 705.7(b).". Note 3: Revised "PROVIDE JOINT BACKING MATERIAL IN ACCORDANCE WITH SECTION 705.9 OF PUB. 408." to "PROVIDE JOINT BACKING MATERIAL CONFORMING TO PUBLICATION 408, SECTION 705.8.". Note 4: Revised "PROVIDE PREMOLDED EXPANSION JOINT FILLER IN ACCORDANCE WITH PUB. 408, SECTION 705.1." to "PROVIDE PREMOLDED EXPANSION JOINT FILLER CONFORMING TO PUBLICATION 408, SECTION 705.1.".
BC-711M	1 of 4	<p>SECTION G-G:</p> <ul style="list-style-type: none"> Fixed fillet weld symbol. <p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Revised "WORKMANSHIP" to "PERFORM WORK". Note 6: Revised "MEETING THE REQUIREMENTS OF SECTION 705, PUBLICATION 408" to "CONFORMING TO PUBLICATION 408, SECTION 705.7(b)." <p>REFERENCE DRAWINGS:</p> <ul style="list-style-type: none"> Deleted "BC-739M BRIDGE BARRIER TO GUIDE RAIL TRANSITION".
	2 of 4	<p>SECTION C-C:</p> <ul style="list-style-type: none"> Added * to PROTECTIVE BARRIER. Revised 1'-6" to 1'-5". Revised 4'-6" to 4'-3". Added "*DIMENSIONS BASED ON 45" F-SHAPE CONCRETE BARRIER. FOR 42" F-SHAPE CONCRETE BARRIER AND 42" VERTICAL WALL CONCRETE BARRIER, USE 4'-6" ALUMINUM PROTECTIVE BARRIER HEIGHT AND 1'-6" PANEL HEIGHTS.". <p>TYPICAL SLOPED BARRIER SECTION:</p> <ul style="list-style-type: none"> Revised "TYPICAL SLOPED BARRIER SECTION" to "F-SHAPE CONCRETE BARRIER SECTION". Added "3'-9" OR" to 3'-6". <p>ALTERNATE SIDEWALK SECTION:</p> <ul style="list-style-type: none"> Revised "ALTERNATE SIDEWALK SECTION" to "ALTERNATE SIDEWALK WITH 42" VERTICAL WALL CONCRETE BARRIER SECTION". <p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Revised "AND CONFORM TO SECTION 1103 OF PUBLICATION 408" to "CONFORMING TO PUBLICATION 408, SECTION 1103". Note 2: Revised "WHICH CONFORM TO SECTION 1103 OF PUBLICATION 408" to "CONFORMING TO PUBLICATION 408, SECTION 1103".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-711M	2 of 4 (cont.)	<ul style="list-style-type: none"> Note 6: Revised to "PROTECTIVE BARRIER CONNECTION DETAIL SHOWN FOR 42" AND 45" F-SHAPE CONCRETE BARRIER SECTION, TYPICAL SIDEWALK SECTION AND ALTERNATE SIDEWALK WITH 42" VERTICAL WALL CONCRETE BARRIER SECTION. FOR WIDER BARRIERS WIDTHS, HOLD INSIDE FACE FLUSH.".
BC-712M	ALL	Standard discontinued.
BC-713M	OLD 1 of 13 NEW 1 of 14	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised "SHEET 1 OF 13" to "SHEET 1 OF 14". <p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Revised "WORKMANSHIP" to "PERFORM WORK". Note 2: Revised "IN ACCORDANCE WITH" to "CONFORMING TO". Note 3: Revised to "PROVIDE RAILING POSTS CONFORMING TO AASHTO M270 (ASTM A709) GRADE 50 OR 50W OR ASTM A992. PROVIDE BASE PLATES CONFORMING TO AASHTO M270 (ASTM A709) GRADE 50 OR 50W. PROVIDE ANCHOR PLATES CONFORMING TO AASHTO M270 (ASTM A709) GRADE 36.". Note 4: Revised "ALL RAILING COMPONENTS SHALL BE GALVANIZED (AFTER FABRICATION) ACCORDING TO PUBLICATION 408, SECTION 1105.02(s) UNLESS OTHERWISE SHOWN ON THE PLANS. GALVANIZE POSTS, BASE PLATES, ANCHOR PLATES AND SPLICE SLEEVES ACCORDING TO ASTM A123. GALVANIZE RAIL TUBES ACCORDING TO ASTM A123, EXCEPT COATING ON THREADED STUDS AND NUTS USED WITH THE STUDS SHALL MEET THE REQUIREMENTS OF ASTM A153 FOR CLASS C MATERIAL. GALVANIZE ALL ANCHOR HARDWARE ACCORDING TO ASTM A153 OR ASTM B695.". Note 5: Added "WHEN RADIUS IS LESS THAN 1,500 FEET". Note 8: Removed "-2002" (3 locations). Note 9: Revised "MEETING THE REQUIREMENTS OF" to "CONFORMING TO" (3 locations). Note 10: Removed "FOR ANCHOR PLATES USE ASTM A 709 GRADE 36 KSI STEEL.". Note 14: Removed. Note 15: Removed. Note 16: Revised note "16" to "14". Note 17: Revised note "17" to "15". Note 18: Removed. Note 19: Revised note "19" to "16". Note 20: Revised note "20" to "17". Note 21: Revised note "21" to "18". Note 22: Revised note "22" to "19". Revised "MEETING THE REQUIREMENTS OF SECTION 705.8, PUBLICATION 408" to "CONFORMING TO PUBLICATION 408, SECTION 705.7(b)". Added note 20 – "THE PA BRIDGE BARRIER IS DESIGNATED AS MASH TL-5.". Added note 21 – "FOR GUIDE RAIL TRANSITION TO PA BRIDGE BARRIER, SEE RC-50M.".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-713M (cont.)	OLD 1 of 13 NEW 1 of 14 (cont.)	<ul style="list-style-type: none"> Added note – “22. PROVIDE VERTICAL V-NOTCHES ON BARRIER WALL FRONT AND REAR FACES AT ALL POST ANCHOR BOLT LOCATIONS. SEE DETAIL THIS SHEET.”. <p>POST DETAIL:</p> <ul style="list-style-type: none"> Revised “POST DETAIL” to “ELEVATION-POST”. Revised “RAILING POST W8x31” to “W8x31 POST”. Added “FOR DELINEATOR” after CL ¾” ϕ HOLE. <p>BARRIER WALL GEOMETRY DETAIL:</p> <ul style="list-style-type: none"> Added “REAR FACE”. <p>TYPICAL PA BRIDGE BARRIER ELEVATION:</p> <ul style="list-style-type: none"> Removed detail. <p>TYPICAL SECTION:</p> <ul style="list-style-type: none"> Revised “TYPICAL SECTION” to “SECTION A-A BARRIER SECTION”. Added “BARRIER WALL” to 1’-6”. Revised “RAILING POST W8x31 SEE POST DETAIL” to “W8x31 POST”. Added ½” horizontal dimension. Added 1” horizontal dimension. Added 4’-2” vertical dimension. Added 2’-0” BARRIER WALL. Added “CONSTR. JOINT AND V-NOTCH (RAKED FINISH)”. Revised “SHEET 5” to “SHEET 3” (2 locations). <p>REFERENCE DRAWINGS:</p> <ul style="list-style-type: none"> Removed “BC-712M THRIE-BEAM TO PA BRIDGE BARRIER TRANSITION CONNECTION”. <p>Added “PLAN” to show new MASH barrier end transition.</p> <p>Added “PA BRIDGE BARRIER ELEVATION” to show new MASH barrier end transition.</p> <p>Added “VERTICAL V-NOTCH DETAIL”.</p>
	OLD 2 of 13 NEW 2 of 14	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised “SHEET 2 OF 13” to “SHEET 2 OF 14”. <p>RAIL SPLICE TABLE:</p> <ul style="list-style-type: none"> Removed “NOTE: FOR SIDEWALK RAIL DETAILS, SEE SHEET 3.”. <p>DETAIL B RAIL SPLICE:</p> <ul style="list-style-type: none"> Revised “DETAIL B RAIL SPLICE” to “RAIL TUBE SPLICE”. <p>DETAIL C POST TO BASE PLATE WELD:</p> <ul style="list-style-type: none"> Revised “DETAIL C POST TO BASE PLATE WELD” to “DETAIL B BASE PLATE DETAIL”. Revised “TRAFFIC” to “ROADWAY”. Added 1’-2 ½” vertical dimension. Added 1’-0” horizontal dimension.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-713M (cont.)	OLD 2 of 13 NEW 2 of 14 (cont.)	<p>SIDEWALK RAIL ROD ANCHOR PLATE DETAIL:</p> <ul style="list-style-type: none"> Added “(SEE NOTE 1)”. <p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Removed. Note 2: Revised note “2” to “1”. Added new note – “2. FOR ADDITIONAL NOTES, SEE SHEET 1.”. <p>ALTERNATE BARRIER SECTION:</p> <ul style="list-style-type: none"> Moved to sheet 5. Shown opposite hand. Revised “ALTERNATE BARRIER SECTION” to “SECTION E-E BARRIER SECTION”. Added “BARRIER WALL” to 1’-6”. Added ½” horizontal dimension. Added 1” horizontal dimension. Added 4’-2” vertical dimension. Added 2’-0” BARRIER WALL. Revised “RAILING POST W8x31” to “W8x31 POST”. Revised “SHEET 5” to “SHEET 3” (2 locations). Added “CONSTR. JOINT AND V-NOTCH (RAKED FINISH)”. Added “ON SHEET 2”. <p>ALTERNATE POST DETAIL:</p> <ul style="list-style-type: none"> Moved to sheet 5. Shown opposite hand. Revised “ALTERNATE POST DETAIL” to “ELEVATION-POST”. Revised “RAILING POST W8x31” to “W8x31 POST”. Added “FOR DELINEATOR” after CL ¾” ϕ HOLE. <p>Added “RAILING JOINTS ELEVATION”.</p>
	OLD 3 of 13 NEW 3 of 14	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised “SHEET 3 OF 13” to “SHEET 3 OF 14”. <p>TYPICAL SIDEWALK RAIL – BARRIER SECTION:</p> <ul style="list-style-type: none"> Moved to sheet 4. Shown opposite hand. Revised “BARRIER SECTION” to “SECTION C-C BARRIER SECTION”. Revised section cut “A” to “D”. Added “BARRIER WALL” to 1’-6”. Added ½” horizontal dimension. Added 1” horizontal dimension. Added 2’-0” BARRIER WALL. Added “W8x31 POST”. Added 1” to BASE PL. Revised “SHEET 5” to “SHEET 3” (2 locations). Added “1 ⅛” ϕ HOLE IN WEB FOR 1” ϕ SIDEWALK RAIL ROD (SEE ANCHOR PLATE DETAIL ON SHEET 2)”.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-713M (cont.)	OLD 3 of 13 NEW 3 of 14 (cont.)	<p>TYPICAL SIDEWALK RAIL – ELEVATION-POST:</p> <ul style="list-style-type: none"> Moved to sheet 4. Shown opposite hand. Revised “RAILING POST W8x31” to “W8x31 POST”. Added “1 1/8” ϕ HOLE IN WEB FOR 1” ϕ SIDEWALK RAIL ROD”. Added “FOR DELINEATOR” after CL 3/4” ϕ HOLE. <p>SECTION A-A:</p> <ul style="list-style-type: none"> Moved to sheet 4. Shown opposite hand. Revised “SECTION A-A” to SECTION D-D”. Revised “SHEET 5” to “SHEET 3”. <p>PLATE WASHER DETAIL:</p> <ul style="list-style-type: none"> Moved to sheet 4. <p>RAISED SIDEWALK RAIL – BARRIER SECTION:</p> <ul style="list-style-type: none"> Moved to sheet 6. Shown opposite hand. Revised “BARRIER SECTION” to “SECTION F-F BARRIER SECTION”. Revised section cut “A-A” to “D-D”. Added “BARRIER WALL” to 1’-6”. Added 1/2” horizontal dimension. Added 1” horizontal dimension. Added 4’-2” vertical dimension. Added 2’-0” BARRIER WALL. Added “W8x31 POST”. Added 1” to BASE PL. Revised “SHEET 5” to “SHEET 3” (2 locations). Added “ON SHEET 2”. Added “1 1/8” ϕ HOLE IN WEB FOR 1” ϕ SIDEWALK RAIL ROD (SEE ANCHOR PLATE DETAIL ON SHEET 2)”. <p>RAISED SIDEWALK RAIL – ELEVATION-POST:</p> <ul style="list-style-type: none"> Moved to sheet 6. Shown opposite hand. Revised “RAILING POST W8x31” to “W8x31 POST”. Added “FOR DELINEATOR” after CL 3/4” ϕ HOLE. <p>ANCHOR PLATE DETAIL:</p> <ul style="list-style-type: none"> Moved from sheet 5. <p>BARRIER RAIL ANCHOR STUD DETAIL:</p> <ul style="list-style-type: none"> Moved from sheet 5. <p>U-WASHER DETAIL:</p> <ul style="list-style-type: none"> Moved from sheet 5. <p>DELINEATOR DETAIL:</p> <ul style="list-style-type: none"> Moved from sheet 5.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-713M (cont.)	OLD 3 of 13 NEW 3 of 14 (cont.)	<p>TYPICAL RAIL TOP POST DETAIL:</p> <ul style="list-style-type: none"> Moved from sheet 5. <p>SIDEWALK RAIL ANCHOR STUD DETAIL:</p> <ul style="list-style-type: none"> Moved from sheet 5. <p>RAIL TUBE CAP DETAIL:</p> <ul style="list-style-type: none"> Moved from sheet 4. <p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Removed. Note 2: Removed. Note 3: Removed. Note 4: Removed. Note 5: Removed. Note 6: Removed. Revised note “7” to “2”. Note 8: Removed. Note 9: Removed. Added new note – “1. COMPLETE JOINT PENETRATION GROOVE WELD. GRIND FLUSH ON OUTSIDE FACE. SHOW SPECIFIC WELD SYMBOL ON SHOP DRAWINGS.”.
	OLD 4 of 13 NEW 4 of 14	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised “END OF RAIL” to “TYPICAL SIDEWALK”. Revised “SHEET 4 OF 13” to “SHEET 4 OF 14”. <p>Added “PA BRIDGE BARRIER TYPICAL SIDEWALK”:</p> <ul style="list-style-type: none"> “PLAN” “ELEVATION” <p>SECTION C-C BARRIER SECTION:</p> <ul style="list-style-type: none"> Moved from sheet 3. <p>ELEVATION-POST:</p> <ul style="list-style-type: none"> Moved from sheet 3. <p>SECTION D-D:</p> <ul style="list-style-type: none"> Moved from sheet 3. <p>PLATE WASHER DETAIL:</p> <ul style="list-style-type: none"> Moved from sheet 3. <p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Removed. Note 2: Removed. Note 3: Revised note “3” to “1”. Note 4: Removed. <p>Removed “TYPICAL RAIL ELEVATION”.</p>

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-713M (cont.)	OLD 4 of 13 NEW 4 of 14 (cont.)	<p>Removed "TYPICAL SIDEWALK RAIL ELEVATION".</p> <p>Removed "ALTERNATE SIDEWALK RAIL ELEVATION".</p> <p>RAIL TUBE CAP DETAIL – END VIEW:</p> <ul style="list-style-type: none"> Moved to sheet 3. <p>RAIL TUBE CAP DETAIL – ELEVATION VIEW:</p> <ul style="list-style-type: none"> Moved to sheet 3. Shown opposite hand. Removed "PL 1/2"x3 1/2"x1'-10" Removed 2³/₁₆" dimension. Removed "CL 7/8"Ø BOLT (ASTM A307)". Removed "BOTTOM RAIL TUBE MEMBER SHOWN, TOP RAIL TUBE SIMILAR BUT WITHOUT BOLT AND PL 1/2"x3 1/2"x1'-10" <p>RAIL TUBE CAP DETAIL – DETAIL D:</p> <ul style="list-style-type: none"> Moved to sheet 3. Shown opposite hand. Revised "DETAIL D" to "DETAIL C". Revised "NOTE 4" to "NOTE 1". Revised 9 1/4" to 8 1/4". Revised 2'-3" to 2'-0".
	NEW 5 of 14	<p>New sheet added. PA BRIDGE BARRIER ALTERNATE SIDEWALK DETAILS.</p> <p>Added "PA BRIDGE BARRIER ALTERNATE SIDEWALK":</p> <ul style="list-style-type: none"> "PLAN" "ELEVATION" <p>Added "NOTES".</p> <p>SECTION E-E BARRIER SECTION:</p> <ul style="list-style-type: none"> Moved from sheet 2. <p>ELEVATION-POST:</p> <ul style="list-style-type: none"> Moved from sheet 2.
	OLD 5 of 13 NEW 6 of 14	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised "MISCELLANEOUS RAILING" to "RAISED SIDEWALK". Revised "SHEET 5 OF 13" to "SHEET 6 OF 14". <p>Added "PA BRIDGE BARRIER RAISED SIDEWALK":</p> <ul style="list-style-type: none"> "PLAN" "ELEVATION" <p>SECTION F-F BARRIER SECTION:</p> <ul style="list-style-type: none"> Moved from sheet 3. <p>ELEVATION-POST:</p> <ul style="list-style-type: none"> Moved from sheet 3.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-713M (cont.)	OLD 5 of 13 NEW 6 of 14 (cont.)	<p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Removed. Note 2: Removed. Note 3: Revised note "3" to "1". <p>Removed "TOP VIEW".</p> <p>Removed "RAISED SIDEWALK RAIL ELEVATION".</p> <p>ANCHOR PLATE DETAIL:</p> <ul style="list-style-type: none"> Moved to sheet 3. Revised 11 1/2" to 10 1/4". Revised 3 1/2" to 2 1/4". Revised 1 3/4" to 1 1/8". Revised 4 1/2" to 5 3/4". Added 1 3/4" dimension. <p>BARRIER RAIL ANCHOR STUD DETAIL:</p> <ul style="list-style-type: none"> Moved to sheet 3. <p>DELINEATOR DETAIL:</p> <ul style="list-style-type: none"> Moved to sheet 3. <p>TYPICAL RAIL TO POST DETAIL:</p> <ul style="list-style-type: none"> Moved to sheet 3. Shown opposite hand. Revised "SHEET 3" to "SHEET 4". <p>U-WASHER:</p> <ul style="list-style-type: none"> Moved to sheet 3. <p>SIDEWALK RAIL ANCHOR STUD DETAIL:</p> <ul style="list-style-type: none"> Moved to sheet 3.
	OLD 6 of 13 NEW 7 of 14	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised "SHEET 6 OF 13" to "SHEET 7 OF 14". <p>PLAN – SKEW ANGLE ≥ 75°:</p> <ul style="list-style-type: none"> Revised "CURB" to "BARRIER WALL". Revised section marks "A-A" to "G-G". Revised section marks "B-B" to "H-H". Corrected concrete recess. <p>PLAN AT SIDEWALK – SKEW ANGLE ≥ 75°:</p> <ul style="list-style-type: none"> Added "TYPICAL" (2 locations). Revised "CURB" to "BARRIER WALL". Revised section marks "C-C" to "J-J". Revised section marks "D-D" to "K-K". Revised section marks "B-B" to "H-H".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-713M (cont.)	OLD 6 of 13 NEW 7 of 14 (cont.)	<p>PLAN AT SIDEWALK – SKEW ANGLE < 75°:</p> <ul style="list-style-type: none"> Added “TYPICAL” (2 locations). Revised “CURB” to “BARRIER WALL”. Added “SIDEWALK”. Revised section marks “C-C” to “J-J”. Revised section marks “D-D” to “K-K”. Revised section marks “B-B” to “H-H”. <p>PLAN – SKEW ANGLE < 75°:</p> <ul style="list-style-type: none"> Revised “CURB” to “BARRIER WALL”. Revised section marks “A-A” to “G-G”. Revised section marks “B-B” to “H-H”. Corrected concrete recess. <p>SECTION C-C (2 locations):</p> <ul style="list-style-type: none"> Added “TYPICAL”. Added “SIDEWALK/BARRIER WALL/GUTTERLINE”. Revised “SECTION C-C” to “SECTION J-J”. Revised weld symbol. <p>SECTION D-D:</p> <ul style="list-style-type: none"> Revised “SECTION D-D” to “SECTION K-K”. Added “TYPICAL”. <p>SECTION A-A:</p> <ul style="list-style-type: none"> Revised “SECTION A-A” to “SECTION G-G”. <p>SECTION B-B:</p> <ul style="list-style-type: none"> Revised “SECTION B-B” to “SECTION H-H”. Added “TYPICAL”. <p>NOTES:</p> <ul style="list-style-type: none"> Note 3: Revised “-9°F” to -10°F”. Added “BRIDGES” (2 locations).
	OLD 7 of 13 NEW 8 of 14	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised “SHEET 7 OF 13” to “SHEET 8 OF 14”. <p>PLAN – SKEW ANGLE ≥ 75°:</p> <ul style="list-style-type: none"> Revised “CURB” to “BARRIER WALL”. Revised section marks “A-A” to “L-L”. Revised section marks “B-B” to “M-M”. Corrected concrete recess. <p>PLAN AT SIDEWALK – SKEW ANGLE ≥ 75°:</p> <ul style="list-style-type: none"> Added “TYPICAL” (2 locations). Revised “CURB” to “BARRIER WALL”. Revised section marks “C-C” to “N-N”. Revised section marks “D-D” to “P-P”. Revised section marks “B-B” to “M-M”. Corrected concrete recess.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-713M (cont.)	OLD 7 of 13 NEW 8 of 14 (cont.)	<p>PLAN AT SIDEWALK – SKEW ANGLE < 75°:</p> <ul style="list-style-type: none"> Added “TYPICAL” (2 locations). Revised “CURB” to “BARRIER WALL”. Added “SIDEWALK”. Revised section marks “C-C” to “N-N”. Revised section marks “D-D” to “P-P”. Revised section marks “B-B” to “M-M”. Revised detail to show skew correctly. <p>PLAN – SKEW ANGLE < 75°:</p> <ul style="list-style-type: none"> Revised “CURB” to “BARRIER WALL”. Revised section marks “A-A” to “L-L”. Revised section marks “B-B” to “M-M”. Corrected concrete recess. <p>SECTION C-C (2 locations):</p> <ul style="list-style-type: none"> Revised “SECTION C-C” to “SECTION N-N”. Added “TYPICAL”. Added “SIDEWALK/BARRIER WALL/GUTTERLINE”. <p>SECTION A-A:</p> <ul style="list-style-type: none"> Revised “SECTION A-A” to “SECTION L-L”. <p>SECTION B-B:</p> <ul style="list-style-type: none"> Revised “SECTION B-B” to “SECTION M-M”. <p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Revised “D-D” to “P-P”. Revised “SHEET 8” to “SHEET 9”. Note 3: Revised “-9°F” to -10°F”. Added “BRIDGES” (2 locations). Note 4: Revised to “MAXIMUM DISTANCE ALONG THE EXTRUSION FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3”.
	OLD 8 of 13 NEW 9 of 14	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised “SHEET 8 OF 13” to “SHEET 9 OF 14”. <p>SECTION D-D (2 locations):</p> <ul style="list-style-type: none"> Revised “SECTION D-D” to “SECTION P-P”. Added “TYPICAL”. Corrected concrete recess, at raised sidewalk. <p>PLAN AT ALTERNATE SIDEWALK – SKEW ANGLE ≥ 75°:</p> <ul style="list-style-type: none"> Revised “CURB” to “BARRIER WALL”. Revised section marks “F-F” to “Q-Q”. Revised section marks “E-E” to “R-R”. Correct concrete recess. <p>PLAN AT ALTERNATE SIDEWALK – SKEW ANGLE < 75°:</p> <ul style="list-style-type: none"> Revised how joint is detailed at bend. Revised “CURB” to “BARRIER WALL”. Replaced “GUTTERLINE” with “SIDEWALK”. Revised section marks “F-F” to “Q-Q”. Revised section marks “E-E” to “R-R”.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-713M (cont.)	OLD 8 of 13 NEW 9 of 14 (cont.)	SECTION F-F: <ul style="list-style-type: none"> Revised "SECTION F-F" to "SECTION Q-Q". SECTION E-E: <ul style="list-style-type: none"> Revised "SECTION E-E" to "SECTION R-R". NOTES: <ul style="list-style-type: none"> Note 1: Revised to "FOR LOCATION OF SECTION P-P, SEE SHEET 8.". Note 3: Revised "-9°F" to "-10°F". Added "BRIDGES" (2 locations). Note 4: Revised to "MAXIMUM DISTANCE ALONG THE EXTRUSION FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3".
	OLD 9 of 13 NEW 10 of 14	TITLE BLOCK: <ul style="list-style-type: none"> Revised "SHEET 9 OF 13" to "SHEET 10 OF 14". DETAIL A: <ul style="list-style-type: none"> Revised "DETAIL A" to "DETAIL E". Added "TACK WELD NUT TO CONNECTION PLATE" DETAIL B: <ul style="list-style-type: none"> Revised "DETAIL B" to "DETAIL D". Removed "RAILING" (2 locations). SECTION B-B: PLAN: <ul style="list-style-type: none"> Revised "SECTION B-B: PLAN" to "SECTION U-U: PLAN". Revised section marks "C-C" to "T-T". Revised "DETAIL B" to "DETAIL D". Removed "RAILING" (2 locations). SECTION A-A (2 locations): <ul style="list-style-type: none"> Revised section "A-A" to "S-S". Revised section marks "B-B" to "U-U". Revised "DETAIL A" to "DETAIL E". SECTION C-C: <ul style="list-style-type: none"> Revised section "C-C" to "T-T". RAILING END SECTION: <ul style="list-style-type: none"> Revised "SECTION A-A" to "SECTION S-S". TYPICAL POST SECTION: <ul style="list-style-type: none"> Revised section marks "A-A" to "S-S". NOTES: <ul style="list-style-type: none"> Revised to "1. SEE SHEET 11 FOR NOTES.".
	OLD 10 of 13 NEW 11 of 14	TITLE BLOCK: <ul style="list-style-type: none"> Revised "SHEET 10 OF 13" to "SHEET 11 OF 14". ELEVATION: <ul style="list-style-type: none"> Revised section marks "J-J" to "V-V".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-713M (cont.)	OLD 10 of 13 NEW 11 of 14 (cont.)	<ul style="list-style-type: none"> Revised "DETAIL C" to DETAIL F". Removed "RAILING". POST AND BASE PLATE: <ul style="list-style-type: none"> Revised "DETAIL C" to "DETAIL B". SECTION J-J: <ul style="list-style-type: none"> Revised "SECTION J-J" to "SECTION V-V". Revised "DETAIL C" to "DETAIL F". Added "BARRIER WALL" to 1'-6". DETAIL C: <ul style="list-style-type: none"> Revised "DETAIL C" to "DETAIL F". NOTES: <ul style="list-style-type: none"> Note 1: Revised "WORKMANSHIP" to "PERFORM WORK". Note 2: Added "PUBLICATION" (2 locations).
	OLD 11 of 13 NEW 12 of 14	TITLE BLOCK: <ul style="list-style-type: none"> Revised "SHEET 11 OF 13" to "SHEET 12 OF 14". CAST-IN-PLACE BARRIER DIMENSIONS ON M.S.E. WALLS: <ul style="list-style-type: none"> Revised "BARRIER WALL GEOMETRY DETAIL" to "DETAIL A". Added 4'-2" vertical dimension. C.I.P. BARRIER WITH BITUMINOUS CONCRETE SHOULDER ON M.S.E. WALLS: <ul style="list-style-type: none"> Revised "C.I.P. BARRIER WITH BITUMINOUS CONCRETE SHOULDER ON M.S.E. WALLS" to "C.I.P. BARRIER WITH ASPHALT-PAVED SHOULDER ON M.S.E. WALLS". Revised "ASPHALT JOINT SEALANT (AC-20)" to "ASPHALT RUBBER SEALING COMPOUND [PUB.408, SECTION 705.4(g)]". Added "(P.C.P.)" to PREFORMED CELLULAR POLYSTYRENE. CONCRETE BARRIER WALL ELEVATION ON M.S.E. WALL: <ul style="list-style-type: none"> Labeled "BARRIER WALL". NOTES: <ul style="list-style-type: none"> Note 2: Revised "SHEET 7" to "SHEET 8 AND 9". Added "LEGEND: C.C.N.S. CLOSED CELL NEOPRENE SPONGE".
	OLD 12 of 13 NEW 13 of 14	TITLE BLOCK: <ul style="list-style-type: none"> Revised "SHEET 12 OF 13" to "SHEET 13 OF 14". PRECAST BARRIER WITH BITUMINOUS CONCRETE SHOULDER ON M.S.E. WALLS: <ul style="list-style-type: none"> Revised "PRECAST BARRIER WITH BITUMINOUS CONCRETE SHOULDER ON M.S.E. WALLS" to "PRECAST BARRIER WITH ASPHALT-PAVED SHOULDER ON M.S.E. WALLS".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-713M (cont.)	OLD 12 of 13 NEW 13 of 14 (cont.)	<ul style="list-style-type: none"> Revised "ASPHALT JOINT SEALANT (AC-20)" to "ASPHALT RUBBER SEALING COMPOUND [PUB.408, SECTION 705.4(g)]". Added "(P.C.P.)" to PREFORMED CELLULAR POLYSTYRENE. <p>PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER ON M.S.E. WALLS:</p> <ul style="list-style-type: none"> Added "(P.C.P.)" to PREFORMED CELLULAR POLYSTYRENE. <p>PRECAST BARRIER DIMENSIONS ON M.S.E. WALLS:</p> <ul style="list-style-type: none"> Revised "FINISHED CURB AS PER DETAIL D, SHEET 2. (TYP.)" to "FINISH BARRIER WALL AS PER DETAIL A, SHEET 1 (TYP.)". Added 2'-0" to BARRIER WALL. <p>REINFORCEMENT FOR PRECAST BARRIER WITH BITUMINOUS CONCRETE SHOULDER:</p> <ul style="list-style-type: none"> Revised: "REINFORCEMENT FOR PRECAST BARRIER WITH BITUMINOUS CONCRETE SHOULDER" to "REINFORCEMENT FOR PRECAST BARRIER WITH ASPHALT-PAVED SHOULDER". <p>NOTES:</p> <ul style="list-style-type: none"> Note 4: Revised to "USE SILICONE JOINT SEALING MATERIAL AS SPECIFIED IN PUBLICATION SECTION 705.4(a).". Note 5: Revised "PROVIDE REINFORCEMENT AS PER DETAIL A, SHEET 3, BC-799M." to "PROVIDE LEVELING CONCRETE IN ACCORDANCE WITH BC-799M, SHEET 3, DETAIL A.". Note 6: Revised "SHEET 11" to "SHEET 12". <p>Added "LEGEND: C.C.N.S. CLOSED CELL NEOPRENE SPONGE".</p>
	OLD 13 of 13 NEW 14 of 14	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised "SHEET 13 OF 13" to "SHEET 14 OF 14". <p>ELEVATION:</p> <ul style="list-style-type: none"> Revised section marks "A-A" to "W-W". <p>SECTION A-A:</p> <ul style="list-style-type: none"> Revised "SECTION A-A" to "SECTION W-W". Revised section marks "B-B" to "X-X". <p>SECTION B-B:</p> <ul style="list-style-type: none"> Revised "SECTION B-B" to "SECTION X-X" <p>SECTION A-A:</p> <ul style="list-style-type: none"> Revised "SECTION A-A" to "SECTION Y-Y". <p>PLAN:</p> <ul style="list-style-type: none"> Added "BARRIER WALL" to 1'-6". Revised section marks "A-A" to "Y-Y". <p>NOTES:</p> <ul style="list-style-type: none"> Revised title "NOTES" to OPEN JOINT NOTES".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-713M (cont.)	OLD 13 of 13 NEW 14 of 14 (cont.)	<ul style="list-style-type: none"> Note 2: Revised "SECTION 705.8(b) OF PUB. 408" to "PUBLICATION 408 SECTION 705.8(b)". Note 3: Revised "SECTION 705.9 OF PUB. 408" to "PUBLICATION 408 SECTION 705.9". Added new note – "4. PROVIDE PREMOLDED EXPANSION JOINT FILLER IN ACCORDANCE WITH PUBLICATION 408 SECTION 705.1.". Note 4: Revised note "4" to "5". Note 5: Revised note "5" to "6". <p>Added "JUNCTION BOX NOTES".</p>
BC-718M	ALL	Standard discontinued.
BC-720M	1 of 1	<p>ELEVATION:</p> <ul style="list-style-type: none"> Revised "PAVEMENT" to "PAYMENT". Added "SIDEWALK" callout. Revised note "BRIDGE HAND RAILING ON 2'-8" VERTICAL WALL SHOWN, BRIDGE HAND RAILING ON ALTERNATE CONCRETE BARRIER, TYPICAL CONCRETE BARRIER AND 3'-6" VERTICAL WALL SIMILAR, SEE NOTE 8" to "BRIDGE HAND RAILING ON ALTERNATE SIDEWALK WITH 42" VERTICAL WALL CONCRETE BARRIER SHOWN, BRIDGE HAND RAILING ON 32", 42" OR 45" F-SHAPE CONCRETE BARRIER AND 32" OR 42" VERTICAL WALL CONCRETE BARRIER SIMILAR, SEE NOTE 8". <p>SECTION A-A:</p> <ul style="list-style-type: none"> Revised 2'-8" to 3'-6". <p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Revised "WORKMANSHIP" to "PERFORM WORK". Note 7: Revised "MEETING THE REQUIREMENTS OF" to "CONFORMING TO". Revised "SECTION 705.8(b)" to "SECTION 705.7(b)". Note 8: Revised "FOR TYPICAL CONCRETE BARRIER OR 3'-6" VERTICAL WALL BRIDGE BARRIER" to "FOR BRIDGE HAND RAILING ON 42" OR 45" F-SHAPE CONCRETE BARRIER OR 42" VERTICAL WALL CONCRETE BARRIER". <p>REFERENCE DRAWINGS:</p> <ul style="list-style-type: none"> Deleted "BC-739M BRIDGE BARRIER TO GUIDE RAIL TRANSITION". Added "RC-50M GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS".
BC-721M	1 of 2	<p>CONDUIT DETAILS AT ENDS OF BRIDGE:</p> <ul style="list-style-type: none"> ELEVATION and PLAN VIEW – revised to remove 10° flare and show new end barrier transition. <p>JUNCTION BOX JB25:</p> <ul style="list-style-type: none"> Revised "(SECTION 1101 OF PUB. 408)" to "(PUBLICATION 408, SECTION 1101)".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-721M (cont.)	1 of 2 (cont.)	<p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Revised "WORKMANSHIP" to "PERFORM WORK". Revised "PUB." to "PUBLICATION". Note 2: Revised "FOR PROPER GROUNDING OF GALV. STEEL CONDUIT OR NON-METALLIC CONDUIT, AS SPECIFIED IN PUB. 408 SECTION 910." to "GROUND LIGHTING POLES, UNDERPASS LUMINARIES, AND METAL JUNCTION BOXES ON STRUCTURES IN ACCORDANCE WITH PUBLICATION 408, SECTION 910.3(q).". "Note 5: Revised "PARAPETS" to "BARRIERS". <p>REFERENCE DRAWINGS:</p> <ul style="list-style-type: none"> Deleted "BC-739M BRIDGE BARRIER TO GUIDE RAIL TRANSITION" Added "RC-50M GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS".
	2 of 2	<p>CONDUIT EXPANSION NOTES:</p> <ul style="list-style-type: none"> Note 2: Revised "PER" to "ACCORDING TO". Note 4: Revised "PER PUB." to "IN ACCORDANCE WITH PUBLICATION". <p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Removed. Note 2: Removed.
BC-722M	1 of 2	<p>BLISTER DIMENSIONS:</p> <ul style="list-style-type: none"> Revised "F-BARRIER TYPE" to "F-SHAPE BARRIER". Revised "TYP." to "42" & 45". Revised "ALT." to "32" <p>ALTERNATE – PLAN:</p> <ul style="list-style-type: none"> Revised "TYPICAL" to "42" & 45" F-SHAPE CONCRETE". Revised "ALTERNATE" to "32" F-SHAPE CONCRETE". <p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Revised "WORKMANSHIP" to "PERFORM WORK".
BC-734M	OLD 1 of 3 NEW 1 of 2	<p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Revised "WORKMANSHIP" to "PERFORM WORK". Note 8: Deleted "(2) ATTACHING BASE PLATES FOR FENCE, PEDESTRIAN RAILING, PROTECTIVE BARRIERS AND BRIDGE RAILING POSTS TO CONCRETE DECKS OR PARAPETS.". <p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised "SHEET 1 OF 3" to "SHEET 1 OF 2".
	OLD 2 of 3	DELETED SHEET
	OLD 3 of 3 NEW 2 of 2	<p>CONSTRUCTION NOTES:</p> <ul style="list-style-type: none"> Note 1: Revised "SECURITY" to "SECURELY".



STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-734M (cont.)	OLD 3 of 3 NEW 2 of 2 (cont.)	<p>TITLE BLOCK:</p> <ul style="list-style-type: none"> Revised "SHEET 3 OF 3" to "SHEET 2 OF 2".
BC-739M	ALL	Standard discontinued
BC-752M	1 of 2	<p>NOTES:</p> <ul style="list-style-type: none"> Note 1: Revised "WORKMANSHIP" to "PERFORM WORK". Note 5: Revised to "OPEN JOINT DETAILS AND MODIFIED DEFLECTION JOINTS APPLY TO THE FOLLOWING TYPES OF BARRIERS: 32", 42" AND 45" F-SHAPE CONCRETE BARRIERS, 32" AND 50" SPLIT CONCRETE MEDIAN BARRIERS, 32" AND 50" CONCRETE MEDIAN BARRIERS, ALTERNATE SIDEWALK DETAIL, RAISED SIDEWALK DETAIL, 32" AND 42" VERTICAL CONCRETE BARRIERS, AND BARRIER WALLS FOR THE PA BRIDGE BARRIER AND PA TYPE 10M BRIDGE BARRIER.". Note 6: Revised to "PROVIDE CAULKING COMPOUND CONFORMING TO PUBLICATION 408, SECTION 705.7(b).". Note 7: Revised to "PROVIDE JOINT BACKING MATERIAL CONFORMING TO PUBLICATION 408, SECTION 705.9.". Note 9: Revised to "PROVIDE AN EPOXY BONDING COMPOUND, TYPE 1, GRADE 3, CONFORMING TO PUBLICATION 408, SECTION 706.1.". Note 10: Revised to "PROVIDE PREMOLDED EXPANSION JOINT FILLER CONFORMING TO PUBLICATION 408, SECTION 705.1.".
BC-767M	1 of 6	<p>NOTES:</p> <ul style="list-style-type: none"> Note 2: Revised "WORKMANSHIP" to "PERFORM WORK". Note 11: Revise "MOVEMENT CLASSIFICATION OF SEAL TO BE NOT LESS THAN THE CLASSIFICATION SPECIFIED ON THE DESIGN DRAWINGS. ALL SEALS TO CONFORM TO THE REQUIREMENTS OF SECTION 705 OF PUBLICATION 408. OBTAIN APPROVAL FOR USE OF THE SEAL FROM THE CHIEF MATERIALS ENGINEER, LABORATORY TESTING SECTION, INNOVATION AND SUPPORT SERVICES DIVISION, BUREAU OF PROJECT DELIEVER." to "PROVIDE SEALS WITH MOVEMENT CLASSIFICATION NOT LESS THAN THE CLASSIFICATION SPECIFIED ON THE DESIGN DRAWINGS. ALL SEALS SHALL CONFORM TO THE REQUIREMENTS OF PUBLICATION 408, SECTION 705. OBTAIN APPROVAL FOR USE OF THE SEAL FROM THE CHIEF MATERIALS ENGINEER, LABORATORY TESTING SECTION, CONSTRUCTION AND MATERIALS DIVISION, BUREAU OF PROJECT DELIEVERY.". <p>SECTION B-B:</p> <ul style="list-style-type: none"> Revised detail for a 4" curb height and angle for steel extrusion.
	4 of 6	<p>PLAN AT SIDEWALK:</p> <ul style="list-style-type: none"> Revised "PLAN AT SIDEWALK" to "PLAN AT TYPICAL SIDEWALK".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-767M (cont.)	4 of 6 (cont.)	SECTION AT SIDEWALK: <ul style="list-style-type: none"> Revised "SECTION AT SIDEWALK" to "SECTION AT TYPICAL SIDEWALK".
	5 of 6	SECTION AT BARRIER: <ul style="list-style-type: none"> Revised "SPACING OF THE SCREWS IS THE SAME FOR THE ALTERNATE BARRIER." to "SPACING OF THE SCREWS IS THE SAME FOR ALL F-SHAPE BARRIERS." SECTION AT SPLIT CONCRETE DIVISOR: <ul style="list-style-type: none"> Revised "SECTION AT SPLIT CONCRETE DIVISOR" to "SECTION AT SPLIT CONCRETE MOUNTABLE DIVISOR".
BC-779M	1 of 9	GENERAL NOTES: <ul style="list-style-type: none"> Note 2: Revised "WORKMANSHIP" to "WORK QUALITY". Added note – "22. PROVIDE VERTICAL V-NOTCHES ON BARRIER WALL FRONT AND REAR FACES AT ALL POST ANCHOR BOLT LOCATIONS FOR SOUND BARRIERS MOUNTED ON TOP OF BARRIERS ON BRIDGES, RETAINING WALLS AND MOMENT SLABS. SEE DETAIL SHEET 8."
	2 of 9	MATERIAL NOTES: <ul style="list-style-type: none"> Note 3: Revised "THAT MEET THE REQUIREMENTS OF" to "CONFORMING TO". Note 4: Revised "THAT MEET THE REQUIREMENTS OF" to "CONFORMING TO". Note 12: Revised "SECTION 705.8(b)" to "SECTION 705.7(b)". Note 14: Revised "SECTION 705.9" to "SECTION 705.8".
	3 of 9	BARRIER MOUNTED/RETAINING WALL MOUNTED SOUND BARRIER ELEVATION: <ul style="list-style-type: none"> Revised "(SEE NOTE 7) to "(SEE NOTE 8)". BARRIER MOUNTED SOUND BARRIER ON MOMENT SLAB TYPICAL SECTION: <ul style="list-style-type: none"> Added ▲ to 3'-6". Revised "SEE NOTE 4" to "SEE NOTE 5". Revised "SEE NOTES 5 & 6" to "See NOTES 6 & 7". BARRIER MOUNTED SOUND BARRIER ON BRIDGE TYPICAL SECTION: <ul style="list-style-type: none"> Revised 3'-4" to 3'-7". Revised 3'-6" to 3'-9". BARRIER MOUNTED SOUND BARRIER ON RETAINING WALL TYPICAL SECTION: <ul style="list-style-type: none"> Revised 3'-4" to 3'-7". Revised 3'-6" to 3'-9".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-779M (cont.)	3 of 9 (cont.)	NOTES: <ul style="list-style-type: none"> Note 4: Revised to read "45" F-SHAPE CONCRETE BARRIER SHOWN, 42" F-SHAPE CONCRETE BARRIER AND 42" VERTICAL WALL CONCRETE BARRIER SIMILAR." New Note 5: 42" F-SHAPE CONCRETE BARRIER SHOWN, 42" VERTICAL WALL CONCRETE BARRIER SIMILAR. Renumbered notes 5, 6, 7 to 6, 7, 8. LEGEND: <ul style="list-style-type: none"> Added ▲ 45" F-SHAPE CONCRETE BARRIER NOT PERMITTED ON MOMENT SLAB.
	7 of 9	Detail E: <ul style="list-style-type: none"> Removed 3'-4" dimension. Revised Note to read "45" F-SHAPE CONCRETE BARRIER SHOWN, 42" F-SHAPE CONCRETE BARRIER AND 42" VERTICAL WALL CONCRETE BARRIER SIMILAR."
	8 of 9	Added "VERTICAL V-NOTCH DETAIL".
BC-799M	1 of 13	GENERAL NOTES: <ul style="list-style-type: none"> Note 5: Revised "WORKMANSHIP" to "PERFORM WORK". Note 27: Revised "IN ACCORDANCE WITH PUB." to "AS SPECIFIED IN PUBLICATION". New Note: "29. THE 45" F-SHAPE CONCRETE BARRER IS NOT PERMITTED ON MOMENT SLABS." New Note: "30. THE 42" F-SHAPE CONCRETE BARRIER ATTACHED TO A MOMENT SLAB IS DESIGNATED AS MASH TL-4. THE 32" F-SHAPE CONCRETE BARRIER ATTACHED TO MOMENT SLAB IS DESIGNATED AS MASH TL-3. THE ALTERNATE SIDEWALK WITH 42" VERTICAL WALL CONCRETE BARRIER ATTACHED TO A MOMENT SLAB IS DESIGNATED AS MASH TL-2." REFERENCE DRAWINGS: <ul style="list-style-type: none"> Deleted "BC-739M BRIDGE BARRIER TO GUIDE RAIL TRANSITION". Added "RC-50M GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS".
	3 of 13	DRAINAGE DITCH DETAIL: <ul style="list-style-type: none"> Revised "SOIL IN ACCORDANCE WITH PUB. 408 SECTION 206(a)1.a" to "SOIL CONFORMING TO PUBLICATION 408, SECTION 206.2(a)1.a".
	4 of 13	TYPICAL CAST-IN-PLACE BARRIER DIMENSIONS: <ul style="list-style-type: none"> Revised Title to "CAST-IN-PLACE 42" F-SHAPE CONCRETE BARRIER DIMENSIONS". Added note "32" F-SHAPE CONCRETE BARRIER SIMILAR" and "(SEE NOTE 29, SHEET 1)". TYPICAL C.I.P. BARRIER WITH CEMENT CONCRETE SHOULDER: <ul style="list-style-type: none"> Revised title to "C.I.P. F-SHAPE CONCRETE BARRIER WITH CEMENT CONCRETE SHOULDER".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-799M (cont.)	4 of 13 (cont.)	<p>TYPICAL C.I.P. BARRIER WITH BITUMINOUS SHOULDER:</p> <ul style="list-style-type: none"> Revised title to "C.I.P. F-SHAPE CONCRETE BARRIER WITH ASPHALT-PAVED SHOULDER".
	5 of 13	<p>PRECAST BARRIER WITH BITUMINOUS SHOULDER:</p> <ul style="list-style-type: none"> Revised title to "PRECAST F-SHAPE CONCRETE BARRIER WITH ASPHALT-PAVED SHOULDER". <p>PRECAST BARRIER WITH CONCRETE SHOULDER:</p> <ul style="list-style-type: none"> Revised title to "PRECAST F-SHAPE CONCRETE BARRIER WITH CEMENT CONCRETE SHOULDER". <p>TYPICAL PRECAST BARRIER DETAILS:</p> <ul style="list-style-type: none"> Revised title to "PRECAST 42" F-SHAPE CONCRETE BARRIER DETAILS". <p>REINFORCEMENT FOR BARRIER WITH BITUMINOUS SHOULDER:</p> <ul style="list-style-type: none"> Revised title to "REINFORCEMENT FOR BARRIER WITH ASPHALT-PAVED SHOULDER". <p>DIMENSIONS:</p> <ul style="list-style-type: none"> Revised "1/2" CHAMFER" to "1/2" x 1/2" CHAMFER". Added "1/2" x 1/2" CHAMFER". <p>NOTES:</p> <ul style="list-style-type: none"> Note 7: Revised "AS PER PUB." to "AS SPECIFIED IN PUBLICATION".
	6 of 13	<p>TYPE 1 AND TYPE 2 OPEN JOINT IN PRECAST BARRIER:</p> <ul style="list-style-type: none"> Revised title to "TYPE 1 AND TYPE 2 OPEN JOINT IN PRECAST F-SHAPE CONCRETE BARRIER". <p>BARRIER MOMENT SLAB NOTES:</p> <ul style="list-style-type: none"> Note 1: Revised "AS PER PUBLICATION 408, SEC.705.4(a)" to "AS SPECIFIED IN PUBLICATION 408, SECTION 705.4(a)".
7 of 13	<p>SIDEWALK BARRIER SECTION:</p> <ul style="list-style-type: none"> Revised title to "ALTERNATE SIDEWALK WITH 42" VERTICAL WALL CONCRETE BARRIER SECTION". <p>BARRIER TO GUIDE RAIL TRANSITION:</p> <ul style="list-style-type: none"> Revised PLAN and ELEVATION for new barrier transition. <p>ALTERNATE TRAFFIC BARRIER:</p> <ul style="list-style-type: none"> Revised title to "32" F-SHAPE CONCRETE BARRIER". Revised "TYPICAL" to "F-SHAPE CONCRETE". Added R=1". Added "1/2" x 1/2" CHAMFER" (2 locations). <p>BARRIER WITH BITUMINOUS SHOULDER:</p> <ul style="list-style-type: none"> Revised title to "BARRIER WITH ASPHALT-PAVED SHOULDER". 	

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-799M (cont.)	8 of 13	<p>DRAINAGE PIPE NOTES:</p> <ul style="list-style-type: none"> Note 1: Revised "MEETING REQUIREMENTS OF PUB." to "CONFORMING TO PUBLICATION". Deleted "(SOL 431-10-04, DATED MARCH 17, 2010)".
	9 of 13	<p>PLAN – SHOULDER DETAILS AT INLET:</p> <ul style="list-style-type: none"> Added "2" CLR". Added "(ROADWAY ITEM)" to "INLET". <p>SHOULDER RELIEF JOINT – DETAIL D:</p> <ul style="list-style-type: none"> Revised "PG 46-40" to "PG 64S-22". Revised "SECTION 470.2(a)" to "SECTION 471.2(a)". <p>SHOULDER RELIEF JOINT – SECTION K-K:</p> <ul style="list-style-type: none"> Revised note "ADJUST FOR SIDEWALK AND ALTERNATE BARRIER" to "DIMENSIONS SHOWN ARE FOR 42" F-SHAPE CONCRETE BARRIER AND ALTERNATE SIDEWALK WITH 42" VERTICAL WALL CONCRETE BARRIER. ADJUST FOR 32" F-SHAPE CONCRETE BARRIER." <p>SECTION L-L – BARRIER WITH BITUMINOUS SHOULDER:</p> <ul style="list-style-type: none"> Revised title to "BARRIER WITH ASPHALT-PAVED SHOULDER".

<p>OS-299 (7-08)</p> 	<p>TRANSMITTAL LETTER</p>	<p>PUBLICATION:</p> <p>Publication 219M September 2016 Edition Change No. 2</p>
		<p>DATE:</p> <p>January 31, 2019</p>
<p>SUBJECT:</p> <p style="text-align: center;">Revisions to Standards for Bridge Construction September 2016 Edition</p>		
<p>INFORMATION AND SPECIAL INSTRUCTIONS:</p> <p>Incorporate the attached revisions into the September 2016 Edition of Publication 219M.</p> <p>These standards may be used immediately and can be adopted as soon as practical on all new and existing designs without affecting letting schedules. All projects let after June 28, 2019 must incorporate these new standards.</p> <p>A description of the changes made to the 2016 Edition since Change 1 of August 4, 2017 are listed in the attached multi-sheet Table. On the standards, light green highlighting indicates Change 2 revisions to details and notes; light yellow highlighting indicates Change 1 revisions.</p>		
<p>CANCEL AND DESTROY THE FOLLOWING:</p> <p>Existing BC-700M Series standards need to be retained for projects under construction and for future rehabilitation work.</p>	<p>ADDITIONAL COPIES ARE AVAILABLE FROM:</p> <p><input type="checkbox"/> PennDOT SALES STORE (717) 787-6746 phone (717) 787-8779 fax ra-penndotsalesstore.state.pa.us</p> <p><input checked="" type="checkbox"/> PennDOT website - www.dot.state.pa.us <i>Click on Forms, Publications & Maps</i></p> <p><input type="checkbox"/> DGS warehouse (PennDOT employees ONLY)</p>	
		<p>APPROVED FOR ISSUANCE BY:</p> <p>LESLIE S. RICHARDS Secretary of Transportation</p> <p>BY: </p> <p>Melissa J. Batula, P.E. Acting Director, Bureau of Project Delivery, Highway Administration</p>

Standard	Sheet	Description of Changes
BC-700M	1 Sht.	Added new BC-790M and revised approval date for standards included in Change 2.
BC-701M	3 of 3	LEVELING PAD DETAIL - SECTION: added note to leveling pad thickness dimension: * - LEVELING PAD CAN BE CONTINUOUSLY POURED MONOLITHICALLY WITH CURB. LEVELING PAD CAN BE ELIMINATED IF SLOPE/GRADE ON TOP OF CURB IS LESS THAN 1%.
BC-706M	1 of 2	RAIL AT END OF BRIDGE - PLAN and SECTION B-B: updated bolt designation from ASTM A325 to ASTM F3125 GRADE A325.
BC-707M	4 of 5	Updated bolt designations from ASTM A325 and A325 to ASTM F3125 GRADE A325. (five instances)
	5 of 5	POST MOUNTING ON GRADE: updated bolt designation from ASTM A325 to ASTM F3125 GRADE A325.
BC-709M	1 of 12	GENERAL NOTES: removed Note 15 because it is an exact repeat of Note 11.
	3 of 12	Removed the ** note stating the end connection angle is a roadway item because it is a bridge item, and removed all ** note indicators.
		RAIL TUBE CAP - ELEVATION VIEW: increased corner cope size from 3/4" to 1 1/8".
	4 of 12	Removed the ** note stating that the end connection angle is a roadway item because it is a bridge item, and removed all ** note indicators.
		SPLICE TUBE - ELEVATION: revised the steel designation for the 1/8" thick fill plate from ASTM A709 to ASTM 1101 OR EQUIVALENT.
	8 of 12	DETAIL B and DETAIL C: added ASTM F3125 GRADE A325 designation and SEE NOTE 1 ON SHEET 9 to bolt callout.
		DETAIL C: revised bolt designation from H.S. to ASTM F3125 GRADE A325.
		SECTION Q-Q: PLAN: removed bolt callout because it is in Detail C.
	9 of 12	SECTION P-P (TYPICAL) and ELEVATION: updated bolt designation from ASTM A325 to ASTM F3125 GRADE A325.
		ELEVATION and DETAIL D: added (SEE NOTE 1) to bolt callout.
10 of 12	SECTION J-J corrected to be SECTION S-S	
	DETAIL D: revised bolt designation from H.S. to ASTM F3125 GRADE A325.	
	TYPICAL C.I.P. BARRIER WITH SHOULDER ON M.S.E. WALLS (two places): increased #4 rebar's horizontal leg from 12" to 1'-7".	
11 of 12	PLAN - BARRIER MOMENT SLAB details: revised moment slab length from (VARIES) 30' MIN., 40'-0" MAX. to 30'-0"; and in third line, revised ONE PAVEMENT JOINT to TWO PAVEMENT JOINTS; and revised RC-20M to RC-27M in NOTE B.	
	PRECAST BARRIER WITH BITUMINOUS SHOULDER and PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER details: removed 1'-6" MIN. dimension which is already shown in corresponding reinforcement detail at bottom of sheet.	
BC-712M	1 of 3	GENERAL NOTES: added Note 9 to refer to Sheet 2 for Transition Without Inlet Placement. PLAN VIEW and ELEVATION VIEW: removed WITHOUT INLET PLACEMENT SIMILAR from note below titles
	2 of 3	Added new sheet for Thrie-Beam to PA Bridge Barrier Connection without Inlet Placement. Previous sheet 2 renumbered sheet 3.
BC-713M	1 of 13	NOTES: In notes 4, 10 and 18 revised ANCHOR BARS to ANCHOR PLATES. TYPICAL SECTION: revised post anchorage from two bars to an anchor plate; revised callout from ANCHOR BAR to ANCHOR PLATE.
	2 of 13	ALTERNATE BARRIER SECTION: revised post anchorage from two bars to an anchor plate; revised callout from ANCHOR BAR to ANCHOR PLATE.
	3 of 13	BARRIER SECTIONS (two places): revised post anchorage from two bars to an anchor plate; revised callout from ANCHOR BAR to ANCHOR PLATE.
	4 of 13	RAIL TUBE CAP DETAIL - END VIEW: increased corner cope size from 3/4" to 1 1/8".
	5 of 13	Revised ANCHOR BAR DETAIL to ANCHOR PLATE DETAIL in which two bars replaced with 1/4"x11 1/2"x1'-3" plate with 4 1/2"x8" cut-out.
	9 of 13	Added SEE NOTE 2 ON SHEET 10 to bolt callouts (five instances).
		DETAIL A and DETAIL B: added ASTM F3125 GRADE A325 designation to bolt callout.


Standard	Sheet	Description of Changes
9 of 13 (cont.)	9 of 13 (cont.)	DETAIL B: revised bolt designation from H.S. to ASTM F3125 GRADE A325.
		SECTION A-A (two places): revised post anchorage from two bars to an anchor plate.
		SECTION A-A (TYPICAL): updated bolt designation from ASTM A325 to ASTM F3125 GRADE A325.
		ELEVATION: updated bolt designation from A325 to ASTM F3125 GRADE A325. Added NOTE: SEE SHEET 10 FOR NOTES.
BC-713M	10 of 13	Added (SEE NOTE 2) to all bolt callouts (three instances). DETAIL C: added ASTM F3125 GRADE A325 designation to bolt callout (two places).
	11 of 13	Three C.I.P. Barrier Sections: revised post anchorage from two bars to an anchor plate.
		C.I.P. BARRIER WITH CEMENT CONCRETE SHOULDER ON M.S.E. WALLS: increased #4 rebar's horizontal leg from 1'-0" to 1'-7". C.I.P. BARRIER WITH BITUMINOUS CONCRETE SHOULDER ON M.S.E. WALLS: increased #5 rebar's inclined leg from 1'-6" MIN. to 2'-0" MIN.
12 of 13	PLAN - BARRIER MOMENT SLAB details: revised moment slab length from (VARIES) 30' MIN., 40'-0" MAX. to 30'-0"; and in third line, revised ONE PAVEMENT JOINT to TWO PAVEMENT JOINTS; and revised RC-20M to RC-27M in NOTE B.	
	In five barrier sections: revised post anchorage from two bars to an anchor plate. PRECAST BARRIER WITH BITUMINOUS SHOULDER and PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER details: removed 1'-6" MIN. dimension which is already shown in corresponding reinforcement detail at bottom of sheet. NOTE A: revised RC-20M to RC-27M.	
BC-719M	6 of 8	TEMPORARY BARRIER TYPICAL REINFORCEMENT BARS: revised a dimension from 1'-6" to 1'-7"
BC-726M	5 shts.	Made numerous revisions throughout the standard based on recommendations from the Bridge Grid Flooring Manufacturers Association.
	1 of 5	GENERAL NOTES, Note 9: revised to PROVIDE A 3/4" DIAMETER LEVELING BOLT THAT IS EITHER: ASTM A307 GRADE A HEADED BOLT OR EQUIVALENT. OR A WELDED ASSEMBLY CONSISTING OF THREADED ROD AND HEX NUT. • THREADED ROD: ASTM A307, ASTM F1554 GRADE 36, OR EQUIVALENT • HEX NUT: ASTM A194 OR ASTM A563 FURNISH LEVELING BOLTS UNCOATED UNLESS REQUIRED TO BE GALVANIZED. SEE SHEET 4 FOR DETAILS
		GENERAL NOTES: added Note 10 - USE THE 5 3/16" MAIN BEARING BAR WITH OR WITHOUT THE MIDDLE RIB FOR FULL DEPTH CONCRETE DECKS.
		GENERAL NOTES: added Note 11 - HOT DIP GALVANIZE PANELS PER PUB. 408, SECTION 1105.02(S).
		SECTION A-A: added callout of main bearing bar in full-depth side of detail with reference to Note 10.
		SECTION C-C: added FORM PAN SHIPPED LOOSE AND FIELD INSTALLED callout; added SHOP INSTALLED to outer pan callout; and added reference to Note 10 in main bearing bar callout.
	SECTION E-E: added 20 GA SHEET METAL FORM PAN SHIPPED LOOSE AND FIELD INSTALLED callout.	
MAIN BEARING BAR - 4 1/4" BAR WITHOUT RIB: corrected dimension line for bottom flange thickness of 4 1/4" bar.		
2 of 5	TYPICAL EXPANSION JOINT DETAILS: added trim plate weld callout CONTRACTOR HAS OPTION TO SHOP WELD BEARING BAR TO TRIM PLATE; added ALLOW 2" MIN BETWEEN GRID COMPONENTS AND TRIM PLATE callout for dimension between cross bar and trim plate; and added REMOVE BOTTOM ROUND BAR FOR FULL DEPTH DECK to bottom round bar callout.	

Standard	Sheet	Description of Changes	
BC-726M (cont.)	2 of 5 (cont.)	TYPICAL HAUNCH FORM DETAIL: SECTION VIEW: added +1/2" TO -1" to end of bulkhead pan dimension; added callout OMIT...BEAMS to cross bar; added FIELD INSTALLED to the beginning and added MIN. after 16 GAGE for haunch angle callout.	
		DETAIL A: revised TYPICAL to SEE EXTRUSION NOTE for top weld note; added 3/16" dimension callout for trim plate fillet weld; and added extrusion note ONE PIECE EXTRUSION IN LIEU OF TWO PIECE MEMBER (EXTRUSION AND PLATE COMBINATION) IS PERMITTED. WELD IN ACCORDANCE WITH AASHTO/AWS D1.5M SPECIFICATIONS;	
	3 of 5	END SECTION DETAIL: moved flat pans to mid-depth of main bearing bars.	
		SCUPPER INSTALLATION DETAILS - PLAN VIEW: replaced weld note with WELD ALL BARS TO DRAIN FRAME; replaced dimensions with AS SHOWN ON PLANS; and revised callout for bars to be cut.	
		FORMED ANGLE – WELDED STRAP: In strap callout deleted WELDED BETWEEN HAUNCH ANGLES and added (OR ALTERNATE THREADED ROD).	
		MAIN BAR SPLICE AT PANEL ENDS: added AND SUPPLEMENTAL BARS to weld callouts (three instances)	
	4 of 5	Renamed FIELD WELD DETAIL to OPTIONAL FIELD WELD DETAIL WITHOUT HAUNCH	
		LEVELING BOLT DETAIL: revised bolt to consist of a threaded rod with a hex nut that is connected via a plug weld and added THREADED ROD (A307, F1554 GR 36, OR EQUAL) callout.	
		Added SHEAR CONNECTION AT PARTIALLY AND FULLY FILLED GRID DECKS detail.	
		PARTIAL TRANSVERSE SECTION THRU GRID DECK – SECTION VIEW: changed drip ledge to form pan dimension from 1/2" to 1/2" TO 1"; replaced FIELD FORMS AT OVERHANG BY CONTRACTOR. FORM PANS IN GRID DECK OMITTED with FORM PANS SHOP INSTALLED. FIELD INSTALLED FORMS OPTIONAL. (FULL DEPTH OVERHAND) for form pan callout; added form pan line work; and added note MAIN BAR CAMBERING AS PERMITTED BY AWS D1.5 PUB.408.	
		END TRIM PLATE WELD DETAIL: revised 1 3/4" to 1 1/2" for dimension in between top of bearing bar and end trim plate.	
		LEVELING PLATE WELD DETAIL: added second note • THE LEVELING NUT MAY BE PLACED UNDER THE MAIN BAR WHEN CONDITIONS PERMIT. ALTERNATE LEVELING DETAILS PERMITTED AS APPROVED BY THE DISTRICT BRIDGE ENGINEER.	
		LEVELING PLATE WELD DETAIL – PLAN VIEW: replaced dimensions with AS REQUIRED.	
		LEVELING PLATE WELD DETAIL - SECTION I-I: removed 5/8" and 11/16" from hex nut and plate hole centerline callout; changed 2" to AS REQUIRED for dimensions between hex nut centerline and inner cross bars; removed 3" x 1/2" x 5" LG. from end of leveling plate callout.	
		5 of 5	CONCRETE GRID TRANSVERSE SPLICE BETWEEN PANELS (two places): added note OPTIONAL BOLTED SPLICE PERMITTED AS APPROVED BY THE DISTRICT BRIDGE ENGINEER.
			SECTION J-J and SECTION K-K: added solid lines for precast concrete surfaces; revised line work of pans; added FLAT PAN FIELD INSTALLED (TYP.) callout.; and added 8" C.C. spacing to stud callout
	Added note: NOTE: SPLICE DETAILS CAN ALSO BE USED FOR CAST-IN-PLACE WITHOUT BLOCKOUT CLOSURE POURS.		
BC-732M	1 of 3	SUPPORT AT P/S CONCRETE DEAM: added SEE DETAIL X callout and circle.	
		Added new DETAIL X detail.	
	NOTES: In Note 16 deleted text in last 2 lines after 'TABLES'.		
3 of 3	Removed notes below each portion of Table.		
BC-734M	1 of 3	NOTE 8, item (1): inserted TRANSITION after GUIDE RAIL.	
BC-736M	1 of 3	GENERAL NOTES, Note 1: reworded to refer to Pub. 408 Specifications. WELDED WIRE FABRIC table: corrected designation W2.0xW2.0 to be W2.1xW2.1.	
	2 of 3	Moved all content related to development length and lap splice length of deformed bars in tension (Table A, Notes, Guidelines) to sheet 3.	

Standard	Sheet	Description of Changes
BC-736M (cont.)	2 of 3 (cont.)	DEVELOPMENT LENGTH AND LAP SPLICE LENGTH OF DEFORMED BARS IN COMPRESSION: revised AASHTO article numbers from 5.11.2.2.1 to 5.10.8.2.2a and from 5.11.5.5.1 to 5.10.8.4.5a to comply with AASHTO 8th Edition (2017).
		DEVELOPMENT LENGTH OF STANDARD HOOKS IN TENSION: removed reference to Grade 40; revised AASHTO article number from 5.11.2.4.1 to 5.10.8.2.4a to comply with AASHTO 8th Edition (2017), and revised factor in Note 1 from 0.7 to 0.8.
	3 of 3	Moved TABLE A, NOTES..., and GUIDELINES... here from Sheet 2.
		Class C splices have been removed based on AASHTO 8th Edition (2017) reinforcement design changes.
		Lap lengths and development lengths in Tables A, B and C have been revised and updated based on AASHTO 8th Edition (2017) reinforcement design changes.
		TABLES A, B and C: removed references to Grade 40 and revised TOP BARS to HORIZONTAL BARS with a note to SEE NOTE 3.
NOTES FOR DEFORMED BARS IN TENSION: Revised and updated the notes for Development Length and Lap Splice Length and made the definition of horizontal bars (formerly top bars) a separate item 3.		
BC-739M	2 of 2	SECTION G-G and SECTION H-H: corrected the safety wingwall rear face to be vertical instead of battered.
BC-751M	1 of 7	NOTES: deleted Note 11 and re-numbered remaining notes.
	3 of 7	DRAIN BOX DETAIL – PLAN and DETAIL F - PLAN: replaced 'ADHESIVE' with 'x 3 3/4" EXPANSION' in anchor bolts callout; revised size from 3/4" to 3/8"; and deleted *NOTE above details.
BC-753M	1 of 3	NOTES: added Note 19. OPTIONAL METHOD FOR STUD LOCATION IS TO STAGGER STUD ROWS TRANSVERSELY ACROSS DECK. BY NOT PLACING STUDS AT SAME LOCATION ON ALL THE BEAMS. SEE STAGGERED STUD ROW ON SHEET 3. [This note is based on PSU research report, "Bridge Deck Cracking: Effects on In-Service Performance, Prevention, and Remediation".]
	2 of 3	LONGITUDINAL-TRANSVERSE STIFFENER INTERSECTION DETAILS – PLAN VIEW: added CONTINUOUS THROUGH INTERMEDIATE STIFFENERS ONLY to longitudinal stiffener callout.
	3 of 3	New sheet with GIRDER HAUNCH STIFFENER DETAIL and STAGGERED STUD ROW PLAN details.
BC-754M	1 of 2	DETAIL A and DETAIL B: corrected the bolts spacings because they violated the minimum spacing.
		NOTES, Notes 11, 12 and 13: updated bolt designation from ASTM A325 to ASTM F3125 GRADE 325.
BC-755M	1 of 4	ELEVATION – EXPANSION BEARING and ELEVATION – FIXED BEARING: added 1/2" MIN. BOLT THREAD PROTRUSION callout to anchor bolt.
	2 of 4	SECTION A-A: added 1/2" MIN. BOLT THREAD PROTRUSION call-out to anchor bolt.
	3 of 4	Added 1/2" MIN. BOLT THREAD PROTRUSION callout to anchor bolt (three places).
	4 of 4	EXPANSION BEARINGS end elevations (three places): revised distance from edge of beam flange to edge of sole plate from 0 MIN. to 1/2" MIN. and added 1/2" MIN. BOLT THREAD PROTRUSION callout to anchor bolt.
BC-762M	1 of 7	GENERAL NOTES, Note 1: removed first sentence about reinforcement requirements and added REINFORCEMENT before BARS in remaining sentence.
		GENERAL NOTES, Note 3: revise note to require galvanized steel in all cases and painting only if specified [for consistency with changes to Pub. 408, Sect. 1026]
		GENERAL NOTES, Note 4: added GALVANIZED after steel grade designation.
BC-766M	7 of 7	TYP. DRAIN BOX INSTALLATION @ PIERS - FOR P/S BEAMS: removed steel plates from the top of the end diaphragms.
		SECTION H-H: added missing object line for side of drain box.
BC-766M	2 of 2	SECTION A-A: revised to indicate joint between end of DECK SLAB and APPROACH SLAB.
BC-767M	1 of 6	GENERAL NOTES, Note 1: removed first sentence about reinforcement requirements and added REINFORCEMENT BARS after STEEL in remaining sentence.

Standard	Sheet	Description of Changes
BC-767M (cont.)	1 of 6 (cont.)	GENERAL NOTES, Note 3: Revise note to require galvanized of steel in all cases and painting only if specified (for consistency with changes to Pub. 408, Sect. 1026). GENERAL NOTES, Note 4: added GALVANIZED after steel grade designation.
	2 of 6	DIMENSION "A" TABLE: added USE 2 1/2" MIN. FOR DIMENSION "A" to note below table.
BC-770M	1 of 4	GENERAL NOTES, notes 3, 11, and 13: updated bolt designation from A325 to ASTM F3125 GRADE A325. GENERAL NOTES, note 3: added DIAMETER after 7/8".
	2 of 7	MATERIAL NOTES, Note 3: deleted second bullet regarding soft converted metric sizes.
BC-776M	4 of 7	PRECAST CONCRETE PANEL - ELEVATION: revised lap splice length of #4 perimeter rebar from 11" to 1'-3" for uncoated or galvanized and from 1'-4" to 1'-6" for epoxy coated. LEGEND FOR WELDED WIRE FABRIC: for C and D definitions, replaced SIZE with CROSS SECTIONAL AREA IN SQ. INCHES MULTIPLIED BY 100.
	5 of 7	ELEVATION – SLOPED TOP and ELEVATION – LEVEL TOP: revised lap splice length of #4 perimeter rebar from 11" to 1'-3" for uncoated or galvanized and from 1'-4" to 1'-6" for epoxy coated.
	7 of 7	ACCESS DOOR DETAIL: revised lap splice length of #4 perimeter rebar from 11" to 1'-3" for uncoated or galvanized and from 1'-4" to 1'-6" for epoxy coated.
	7 of 12	DETAIL 3 - ELEVATION: added 3" dimensions from optional construction joint in caisson to ties. VERTICAL SPLICE NOTES: updated WWF from 4x4-D4.0 x D4.0 to 4x4-W4.0xW4.0.
BC-777M	9 of 12	DETAIL 5 - ELEVATION: added 3" dimensions from optional construction joint in caisson to ties.
	10 of 12	DETAIL 6 - ELEVATION: added 3" dimensions from optional construction joint in caisson to ties.
BC-779M	5 of 9	PRECAST CONCRETE PANEL – ELEVATION details: revised lap splice length of #4 perimeter rebar from 11" to 1'-3" for uncoated or galvanized and from 1'-4" to 1'-6" for epoxy coated.
BC-780M	4 of 8	STANDARD PANEL – ELEVATION and STANDARD SLOPED PANEL – ELEVATION: revised lap splice length of #5 perimeter rebar from 1'-1" to 1'-7" for uncoated or galvanized and from 1'-8" to 1'-11" for epoxy coated. LEGEND FOR WELDED WIRE FABRIC: for C and D definitions, replaced SIZE with CROSS SECTIONAL AREA IN SQ. INCHES MULTIPLIED BY 100.
	5 of 8	Updated bolt designations from ASTM A325 to ASTM F3125 GRADE A325 (three instances).
	2 of 4	ELEVATION VIEW: revised welded wire mesh size from 3x3-W10xW10 to 2x2-W4.0xW4.0. REINFORCED CONCRETE REPAIR TYPE 2 NOTES, Note 10: revised 3x3-W10xW10 to 2x2-W4.0xW4.0.
BC-783M	3 of 4	Updated welded wire mesh designations from 2x2-W4xW4 to 2x2-W4.0xW4.0 (four instances).
	4 of 4	Updated welded wire mesh designations from 4"x4"-W8xW8 to 4x4-W2.1xW2.1 (five instances).
	4 of 12	ABUTMENT PLANS (two places): added SPONGE between NEOPRENE and WASHER in callouts.
BC-788M	5 of 12	SECTION-ABUTMENT WITH BACKWALL - PRESTRESSED AND STEEL I-BEAM: added waterproofing membrane; adjusted height of protective panel; added CONSTR. JT. at base of backwall.
	9 of 12	MEMBRANE WATERPROOFING DETAIL: in bituminous wearing course callout revised FJ-1, LEVELING COURSE to HMA WEARING COURSE (LEVELING), 4.75MM MIX (two places).
	10 of 12	MEMBRANE WATERPROOFING DETAIL: in bituminous wearing course callout revised FJ-1, LEVELING COURSE to HMA WEARING COURSE (LEVELING), 4.75MM MIX.
BC-790M	1 of 1	Initial Release of Standard: POST-TENSIONING OF CONCRETE GIRDERS GROUTING SPECIFICATIONS
BC-794M	1 of 1	GENERAL NOTES: added Note 5 - INSERTS TO BE GALVANIZED OR COMPLETELY ZINC-ELECTROPLATED. UTILITIES SUPPORTED BY I-BEAMS: added, SEE NOTE 5 to insert callouts (two instances).
	1 of 3	DETAIL D: added joint dimension of 1 1/2" MAX. TYP. BOX SECTION SHOWING STRAND LOCATIONS: removed H and S dimensions. POST-TENSION CONNECTION DETAILS – TYPICAL STRAND & DETAILS: removed AND ACCEPTANCE BY ENGINEER from callout for "CUT STRANDS".

Standard	Sheet	Description of Changes
BC-798M (cont.)	1 of 3 (cont.)	INSTRUCTIONS FOR POST-TENSIONING NOTES, item 11: removed AND APPROVED after WITNESSED. INSTRUCTIONS FOR POST-TENSIONING NOTES, item 13: removed second sentence. INSTRUCTIONS FOR POST-TENSIONING NOTES: added item 18 - ALTERNATE POST-TENSIONING SEQUENCE VARYING FROM DETAILS SHOWN ON THIS STANDARD MUST BE DETAILED ON SHOP DRAWINGS AND ACCEPTED BY DISTRICT BRIDGE ENGINEER. INSTRUCTIONS FOR POST-TENSIONING NOTES: added item 19 - POST-TENSIONING DUCTS MUST BE ADEQUATELY SECURED TO PREVENT DEFLECTION DURING CONCRETE PLACEMENT. DUCTS THAT ARE NOT STRAIGHT MUST BE ACCEPTED BY CHIEF STRUCTURAL MATERIALS ENGINEER.
	1 of 13	GENERAL NOTES, Note 21: replaced statement in quotes with "I CERTIFY THAT ALL ASUMPTIONS MADE IN DESIGNING THIS WALL HAVE BEEN VALIDATED THROUGH CONSTRUCTION DETAILS, SPECIAL NOTES AND/OR INSTRUCTIONS TO THE FABRICATOR, ERECTOR AND CONTRACTOR".
	2 of 13	BRIDGE ABUTMENT: removed "R" roadway item symbol and SEE BD628M from BRIDGE APPROACH SLAB callout.
	3 of 13	CRASH WALL REQUIREMENTS: in title, replaced BRIDGES OVER with M.S.E. WALLS NEAR. C.I.P. CONCRETE COPING DETAIL: added EMBEDMENT to 1'-6" MIN. dimension; removed quantity from #4 DOWELS callout. DETAIL A – ELEVATION: replaced EMBEDDED 12" INTO PANEL with DOWELS.
BC-799M	4 of 13	TYPICAL C.I.P. BARRIER WITH CEMENT CONCRETE SHOULDER: revised vertical reinforcement across slab/barrier construction joint, replaced 90 degree hook with 180 degree hook at end of slab top rebar, and eliminated 90 degree hook from end of slab bottom rebar. TYPICAL C.I.P. BARRIER WITH BITUMINOUS SHOULDER: increased #6 rebar's horizontal leg from 2'-3" MIN. to 2'-4" MIN.
	5 of 13	PRECAST BARRIER WITH BITUMINOUS SHOULDER: In Note A, revised RC-20M to RC-27M. REINFORCEMENT FOR BARRIER WITH CEMENT CONCRETE SHOULDER: added MIN. to 1'-6" vertical rebar lap length.
BC-799M	6 of 13	PLAN - BARRIER MOMENT SLAB details (two places): revised moment slab length from (VARIES) 30' MIN., 40'-0" MAX. to 30'-0"; and in third line, revised ONE PAVEMENT JOINT to TWO PAVEMENT JOINTS; and revised RC-20M to RC-27M in NOTE B.
	10 of 13	TIE STRIP LOCATION: updated bolt designation from A325 to ASTM F3125 GRADE A325.
	11 of 13	TIE STRIP LOCATION: updated bolt designation from A325 to ASTM F3125 GRADE A325.

OS-299 (7-08) 	TRANSMITTAL LETTER	PUBLICATION: Publication 219M September 2016 Edition Change No. 1
		DATE: August 4, 2017

SUBJECT:

**Revisions to
Standards for Bridge Construction
September 2016 Edition**

INFORMATION AND SPECIAL INSTRUCTIONS:

Incorporate the attached revisions into the September 2016 Edition of Publication 219M.


The revisions pertain primarily to:

- * Manual for Assessing Safety Hardware (MASH) 2016 Edition.
- * Adding a new Standard Drawing for Type 31 Strong Post Guide Rail (RC-51M) (31" height to top of W-beam rail element).
- * Deleting an existing Standard Drawing for Type 2 Strong Post Guide Rail (RC-52M) (27 3/4" height to top of W-Beam rail element).

These revised Standard Drawings should be adopted on all new and existing designs as soon as possible without affecting any letting schedules and in conjunction with the current Publication 408 Specifications. Regardless, revised standards must be used on projects let after December 31, 2017.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-703M	Sheet 1	Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised W-Beam to Thrie-Beam Transition Sections in the two elevation views between Post 3 and Post 5 from a symmetrical shape to an asymmetrical shape.
BC-706M	Sheet 1	Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised Elevation A-A to indicate RC-51M.
BC-708M	Sheet 1	Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised Note 4 to indicate RC-51M.
BC-712M	Sheet 1	Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised W-Beam to Thrie-Beam Transition Section in Elevation View between Post 5 and Post 7 from a symmetrical shape to an asymmetrical shape. Revised Note 4 to indicate RC-51M.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-734M	Sheet 1	Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail).
BC-739M	Sheet 1	Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised Note 5 and Section C-C to indicate RC-51M. Revised Note 6 to indicate Test Level 4 (TL-4) equivalence and Test Level 3 (TL-3) equivalence based on NCHRP Report 350 criteria.
	Sheets 1-2	Revised Elevation Views for Typical Concrete Bridge Barriers and Alternate Concrete Bridge Barriers to indicate Type 31-SC Guide Rail and RC-51M.
BC-741M	Sheet 1	Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail).
BC-743M	Sheet 1 Sheet 2	Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised details for Typical Shoulder Installations to indicate RC-51M. Revised Table "A" to indicate column as "MINIMUM UNOBSTRUCTED DISTANCE" rather than "REQUIRED CLEARANCES". Modified note under Table "A" that refers to the column for "MINIMUM UNOBSTRUCTED DISTANCE". Revised values in Table "A" of minimum unobstructed distances for Type 31 Strong Post Guide Rail, Type 2 Weak Post Guide Rail, and Median Barrier.
BC-744M	Sheet 1 Sheet 2	Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised details for Typical Shoulder Installations to indicate RC-51M. Revised Table "A" to indicate column as "MINIMUM UNOBSTRUCTED DISTANCE" rather than "REQUIRED CLEARANCES". Modified note under Table "A" that refers to the column for "MINIMUM UNOBSTRUCTED DISTANCE". Revised values in Table "A" of minimum unobstructed distances for Type 31 Strong Post Guide Rail, Type 2 Weak Post Guide Rail, and Median Barrier.
BC-745M	Sheet 1 Sheet 2	Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised details for Typical Shoulder Installations to indicate RC-51M. Revised Table "A" to indicate column as "MINIMUM UNOBSTRUCTED DISTANCE" rather than "REQUIRED CLEARANCES". Modified note under Table "A" that refers to the column for "MINIMUM UNOBSTRUCTED DISTANCE". Revised values in Table "A" of minimum unobstructed distances for Type 31 Strong Post Guide Rail, Type 2 Weak Post Guide Rail, and Median Barrier.
BC-747M	Sheet 1 Sheet 5	Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised Table "A" to indicate column as "MINIMUM UNOBSTRUCTED DISTANCE" rather than "REQUIRED CLEARANCES". Modified note under Table "A" that refers to the column for "MINIMUM UNOBSTRUCTED DISTANCE".

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-747M (cont.)	Sheet 5	Revised values in Table "A" of minimum unobstructed distances for Type 31 Strong Post Guide Rail, Type 2 Weak Post Guide Rail, and Median Barrier.
<p>CANCEL AND DESTROY THE FOLLOWING:</p> <p>The following revised BC-700M Series standards need to be retained for projects under construction and for future rehabilitation work:</p> <p>Index Sheet - Sept. 30, 2016 BC-703M - Sept. 30, 2016 BC-706M - Sept. 30, 2016 BC-708M - Sept. 30, 2016 BC-712M - Sept. 30, 2016 BC-734M - Sept. 30, 2016 BC-739M - Sept. 30, 2016 BC-741M - Sept. 30, 2016 BC-743M - Sept. 30, 2016 BC-744M - Sept. 30, 2016 BC-745M - Sept. 30, 2016 BC-747M - Sept. 30, 2016</p>		<p>ADDITIONAL COPIES ARE AVAILABLE FROM:</p> <p><input type="checkbox"/> PennDOT SALES STORE (717) 787-6746 phone (717) 787-8779 fax ra-penndotsalesstore.state.pa.us</p> <p><input checked="" type="checkbox"/> PennDOT website - www.dot.state.pa.us <i>Click on Forms, Publications & Maps</i></p> <p><input type="checkbox"/> DGS warehouse (PennDOT employees ONLY)</p>
		<p>APPROVED FOR ISSUANCE BY:</p> <p>LESLIE S. RICHARDS Secretary of Transportation</p> <p>BY:</p> <p> Brian G. Thompson, P.E. Director, Bureau of Project Delivery, Highway Administration</p>

OS-299 (11-13)



TRANSMITTAL LETTER

PUBLICATION:

Publication 219M
September 2016 Edition

DATE: October 5, 2016

SUBJECT:

Standards for Bridge Construction, BC-700M Series
September 2016 Edition

INFORMATION AND SPECIAL INSTRUCTIONS:

These standards may be used immediately and can be adopted as soon as practical on all new and existing designs without affecting letting schedules. All projects with T.S. & L. submissions after December 2, 2016 should incorporate these new standards.

The 2016 Edition incorporates Changes 1 through 3 issued for the 2010 Edition.

A description of the changes made to the 2010 Edition since Change 3 of Nov. 21, 2014 and additional revisions of each standard are listed in the attached multi-sheet Table. Note highlighted details and/or notes on each standard are revisions made since Change 3.

CANCEL AND DESTROY THE FOLLOWING:

Existing BC-700M Series standards need to be retained for projects under construction and for future rehabilitation work.

ADDITIONAL COPIES ARE AVAILABLE FROM:

- PennDOT SALES STORE
(717) 787-6746 phone
(717) 525-5180 fax
ra-penndotsalesstore@pa.gov
- PennDOT website - www.dot.state.pa.us
Click on Forms, Publications & Maps
- DGS warehouse (PennDOT employees ONLY)

APPROVED FOR ISSUANCE BY:

Leslie S. Richards - Secretary of Transportation

By:

Brian G. Thompson, P.E.,
Director of Bureau of Project Delivery,
Highway Administration

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-700M	1 sht.	Added BC-726M and revised Approval Dates for new Edition.
BC-701M	1 of 3	Added Note 13 which was previously displayed on Typical Fence Elevation. NOTE 6: added PERMIT after JOINTS. TYPICAL FENCE ELEVATION: added FABRIC after PROTECTIVE FENCE callouts.
	2 of 3	POST BRACKET DETAIL: added 3 3/4" vertical distance to horizontal shield pipe.
	3 of 3	ELEVATION: added FABRIC after to call-out for Mesh Diamond Chain Link Fence. Added 2" MAX. dimension for space between mesh and top of wall. SECTIONS D-D: removed 4" dimension for height of bottom rail above top of wall.
BC-703M	2 shts.	Re-issued with no changes.
BC-706M	1 of 2	Added (BEHIND W-BEAM) to callout for 5/8" Dia. Hex Head Bolt. TYPICAL SECTION - added DELINEATOR to steel post. Added TUBULAR BLOCKOUT to TSx7x3x1/4". Added ROUND HEAD for two bolt callouts. NOTES: added Notes 12 & 13. ELEVATION A-A: added 5/8" DIA. HEX HEAD BOLT (BEHIND RUBRAIL). PLAN - added ROADWAY ITEM to W-BEAM RAIL and OFFSET BRACKET. Added W6X9 STEEL POST (ROADWAY ITEM) callout. RAIL TUBE END CAP - added PJP GRIND TO CONTOUR (TYP.) to weld symbol.
		Added new sheet with nut and bolt details.
		2 of 2
BC-707M	1 of 5	GENERAL NOTES: NOTE 3 - added ASTM C834 OR C920 to end of note.
BC-708M	2 shts.	Section letters revised.
BC-709M	3 of 12	TYPICAL WELD AT MITERS - added BENDING OF 1/2" THICK PLATE IS PERMITTED INSTEAD OF WELDING to end of callout. RAIL TUBE CAP DETAIL - decreased size of cap plate from 4 3/4" to 4 5/8".
	4 of 12	RAIL SPLICE - added OR 1/4"x 3/4" x 3/16" PLATE ATTACHED WITH DUAL 3/16"x5/8" LONG FILLET WELDS to callout for pin/stud.
	10 of 12	PLAN - BARRIER MOMENT SLAB - added (ROADWAY) to tie bars/bolts callout.
	11 of 12	PRECAST BARRIER WITH BIT. SHOULDER - increase spacing of top transverse #5 reinforcement from 11" to 12".
BC-711M	2 of 4	ACCIDENT PREVENTION SIGN - added R = 1/2" (TYP.) callout to lower right corner of sign.
	4 of 4	PARTIAL INSIDE ELEVATION - removed GROUND CONNECTIONS TO BE MADE BY RAILROAD statement from tapped holes' callout.
BC-712M	1 of 2	PLAN VIEW FOR THRIE-BEAM TO PA BRIDGE BARRIER: Type C Inlet callout- replaced RC-34M with RC-45M and RC-46M.
BC-713M	1 of 13	NOTES: Note 9 - added THICK PLATE prior to LOCK WASHER and washer. REFERENCE DRAWINGS: Added BC-711M, BC-720M, BC-721M, BC-734M, BC-736M, BC-752M, BC-762M, BC-767M, BC-799M, RC-20M, and RC-50M.
	3 of 13	Added new PLATE WASHER DETAIL. SECTION A-A: added "AND PLATE WASHER DETAIL ON THIS SHEET" to end of slotted hole callout. Added plate washer beneath two lock washer/nut connections.
	5 of 13	TYPICAL RAIL TO POST DETAIL: added "AND PLATE WASHER DETAIL ON SHEET 3" to slotted hole callout. Added plate washer beneath two lock washer/nut connections.
	11 of 13	CAST-IN-PLACE PA BRIDGE BARRIER ON M.S.E. WALLS: changed STYROFOAM to PREFORMED CELLULAR POLYSTYRENE (P.C.P.) at two locations.
	12 of 13	PRECAST BARRIER WITH BITUMINOUS CONCRETE SHOULDER ON M.S.E. WALLS: changed STYROFOAM to PREFORMED CELLULAR POLYSTYRENE. PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER ON M.S.E. WALLS: changed STYROFOAM to PREFORMED CELLULAR POLYSTYRENE.
	BC-716M	1 of 2

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-716M	2 of 2	TYPICAL DETAIL AT POST: added RAILING HEIGHT to two heights.
BC-718M	1 sht.	Re-issued with no changes.
BC-719M	1 of 8	NOTES: added NOTE 17 -BOLT THROUGH ANCHORS ARE NOT PERMITTED IN RECENTLY Poured DECKS WITHOUT APPROVAL OF DISTRICT BRIDGE ENGINEER. NOTE 8, TYPE B: added STANDARD WIDTH prior to LANES OF TRAFFIC in first line. Added Reference Drawings.
	3 of 8	NOTES: added NOTE 3 - FOR SPACING AND MINIMUM REQUIRED ADHESIVE ANCHOR ULTIMATE CAPACITY SEE TABLE 1, SHEET 1.
	7 of 8	Added three Notes.
BC-720M	1 sht.	ELEVATION: added 1'-5" spacings for railing posts to center of light pole. SECTION A-A & SECTION C-C: added MIN. to wall thickness dimension.
BC-721M	1 of 2	EXPANSION AND DEFLECTION JOINT FITTINGS - added (SEE NOTE 2) to deflection fitting's ground connection callout.
	2 of 2	CONDUIT EXPANSION NOTES, Note 2: added ARTICLE prior to NEC314. EXPOSED CONDUIT CONNECTIONS AT EXPANSION JOINTS: added CONDUIT EXPANSION prior to NOTE 1 in conduit callout.
BC-722M	2 of 2	Barrier Pedestrian Fence Post to Light Pole spacing increased from 1'-0" to 1'-1". Added 3" space between end of Pedestrian Railing to light pole and removed 1'-6" dimension.
BC-723M	10 shts.	Minor notes changes made throughout.
BC-726M	5 shts.	Initial release.
BC-731M	1 sht.	Re-issued with no changes.
BC-732M	1 of 3	TYPICAL LONGITUDINAL SECTION: added note regarding deck top reinforcement mat orientation. NOTES: added Notes 14, 15 and 16.
BC-734M	3 shts.	Re-issued with no changes.
BC-735M	1 sht.	Re-issued with no changes.
BC-736M	3 shts.	Re-issued with no changes.
BC-739M	2 shts.	Re-issued with no changes.
BC-741M	1 of 6	NOTES TO FABRICATOR, 1st bullet point: reworded first sentence to recommend use of Center-mount structure types to carry DMS/VMS. Added mention of overhead sign structures not represented by BD-649M must be designed by PE. GENERAL NOTES: revised Note on bolt hole diameter for bolts. Added Note 13 to require checking the clear distance between bolt holes and to end of member.
	2 of 6	ALTERNATE FOUNDATION, Note: added , #13-602-BDTD AND #14-603-BDTD FOR SUPPORT OF CENTER-MOUNT DMS SIGN STRUCTURES.
	3 of 6	ALTERNATE FOUNDATION, Note: added , #13-602-BDTD AND #14-603-BDTD FOR SUPPORT OF CENTER-MOUNT DMS SIGN STRUCTURES. ALTERNATE CAISSON FOUNDATIONS table: caissons for unavailable larger wall thickness 24" and 26" pipe sizes were removed.
	4 of 6	PIPE CAPS table: pipe caps for unavailable larger wall thickness 24" and 26" pipe sizes were removed. COLUMN BASES: bases for unavailable larger wall thickness 24" and 26" pipe sizes were removed.
	5 of 6	NOTES, 3rd bullet point: removed TC-8716.
BC-743M	1 of 10	GENERAL NOTES: revised Note on bolt hole diameter for bolts. Added Note 13 to require checking the clear distance between bolt holes and to end of member.
	3 of 10	ALTERNATE CAISSON FOUNDATIONS table: caissons for unavailable larger wall thickness 24" and 26" pipe sizes were removed.
	4 of 10	COLUMN BASES table: column bases for unavailable larger wall thickness 24" and 26" pipe sizes were removed. PIPE CAPS table: pipe caps for unavailable larger wall thickness 24" and 26" pipe sizes were removed.
	5 of 10	CHORD SPLICE table; chord splices for unavailable larger wall thickness 24" and 26" pipe sizes were removed.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-743M (continued)	6 of 10	COPE HOLE DETAIL (TYP.): revised cope hole radius to be dependent on size of gusset plate. ALTERNATE PANEL POINT CONNECTION GUSSET PLATE DIMENSIONS table: chords sizes for unavailable larger wall thickness 24" and 26" pipe sizes were removed.
	7 of 10	SADDLE BLOCK DIMENSIONS table: saddle blocks for unavailable larger wall thickness 24" and 26" pipe sizes were removed. TRUSS SEAT table, truss seats for unavailable larger wall thickness 24" and 26" pipe sizes were removed.
BC-744M	1 of 12	GENERAL NOTES: revised Note on bolt hole diameter for bolts. Added Note 13 to require checking the clear distance between bolt holes and to end of member.
	4 of 12	ALTERNATE CAISSON FOUNDATIONS table: caissons for unavailable larger wall thickness 24" and 26" pipe sizes were removed.
	5 of 12	COLUMN BASES table; column bases for unavailable larger wall thickness 24" and 26" pipe sizes were removed.. PLAN OF COLUMN BASE TYPE Y: added 1/2" MIN. CLR. (TYP.) for space from 2" holes to inside of column.
	6 of 12	COLUMN BASES - 4 POST STRUCTURES table: column bases for unavailable larger wall thickness 24" and 26" pipe sizes were removed. PLAN OF COLUMN BASE TYPE W: added 1/2" MIN. CLR. (TYP.) for space from 2" holes to inside of column.
	8 of 12	SIGN SUPPORT BRACKET DETAIL: U-bolt dimension equation revised to 7/8" instead of 3/4". CHORD SPLICE table, removed splices
	9 of 12	TRUSS SEAT table: truss seats for unavailable larger wall thickness 24" and 26" pipe sizes were removed.
	11 of 12	SECTION C-C: added CHORD O.D. + 5/8" (TYP.)
	12 of 12	TYPICAL LIGHT FIXTURE SUPPORT DETAILS: U-bolt dimension equation revised to be CHORD O.D. plus 7/8" instead of 3/4". PIPE CAPS table: pipe caps for unavailable larger wall thickness 24" and 26" pipe sizes were removed.
	BC-745M	1 of 10
4 of 10		COLUMN BASES table: column bases for unavailable larger wall thickness 24" and 26" pipe sizes were removed. PLAN OF COLUMN BASE TYPE W: added 1/2" MIN. CLR. (TYP.) for space from 2" holes to inside of column.
5 of 10		PIPE CAPS table: pipe caps for unavailable larger wall thickness 24" and 26" pipe sizes were removed.
BC-747M	1 of 5	Drawing title: 200' changed to 160' and 38' changed to 27'. GENERAL NOTES: revised Note on bolt hole diameter for bolts. Added Note 11 to require checking the clear distance between bolt holes and to end of member. CAISSON BELL DIA. FOR SOFT COHESIVE SOIL FRAME STR table: bell diameters for 180' & 200' removed
	2 of 5	END CONNECTIONS - SECTION: changed Hole Diameter to be Bolt Diameter + 1/8". Component Selection Tables: 38' span designs were removed since larger pipe sizes are unavailable. Base Plate size for 27' 350 SF design case changed from 2 1/8" to 2 1/4".
	3 of 5	Base plate thicknesses increased to either 2 1/4" or 2 1/2" for seven entries in table. MAST ARM & SPLICE CONNECTION COMPONENT SELECTION, MAST & BASE CONNECTION COMPONENT SELECTION and END CONNECTION COMPONENT SELECTION TABLES: design selections removed since larger wall thickness 24" and 26" pipe sizes are unavailable.
	5 of 5	CAISSON COMPONENT SELECTION TABLE FRAME STRUCTURES: removed entries for 180' and 200' spans due to unavailability of larger pipe sizes.

STANDARD	SHEET	DESCRIPTION OF CHANGES
		CAISSON COMPONENT SELECTION - CANTILEVER STRUCTURES TABLE: remove 38' span selections. Also remove 27' span with a 460 SF panel area due to unavailability of larger pipe sizes.
BC-751M	1 of 7	NOTES, No. 3: added CONFORMING TO AASHTO prior to M270.
	2 of 7	SECTION C-C: pipe wall thickness changed from 3/4" to 3/8" at two places.
	3 of 7	DRAIN BOX PLAN & DETAIL F: added * EMBEDMENT LENGTH ACCORDING TO MANUFACTURER'S SPECIFICATIONS to adhesive anchor bolt callout.
	4 of 7	SPLASH BLOCK PLAN: added SPLASH BLOCK INCIDENTAL TO DOWNSPOUT to cement concrete slab callout. VIEW G-G: added INCIDENTAL TO DOWNSPOUT to SPLASH BLOCK callout.
BC-752M	2 of 2	ALTERNATE TRANSVERSE CONSTRUCTION AND CRACK CONTROL JOINT detail was added. HAUNCH REINFORCEMENT DETAILS: added Note 3 regarding orientation of top reinforcement mat. Construction Joint details moved to Sht. 2 from Sht. 1.
BC-753M	1 of 2	BEARING STIFFENER: replaced MILL with FINISHED- in callout for end of plate at flange. CORNER CHAMFER DETAIL: added 0" TO after X = and Y =.
	2 of 2	DETAIL A: revised to indicate web's longitudinal stiffener running continuously and vertical stiffener being disrupted. Added fillet weld symbol. Added reference to CORNER CHAMFER DETAIL on Sheet 1. ALTERNATE BOLTED SPLICE DETAIL AT MAIN MEMBER FIELD SPLICE: replaced 1 1/8" with 1 1/4" for O.D. of tubing. Corrected I.D. of tubing to be 0.688" instead of 0.668". ELEVATION: added 5/8" DIA. BAR callout
	2 of 2	Replaced STRINGER with BEAM at eight locations.
BC-754M	1 of 2	DETAIL A and DETAIL B: modified to match the changes made to the end diaphragm configuration. Note 20 was added. END DIAPHRAGM DETAIL: configuration of diagonal angles changed by attaching them at bottom flanges and mid-span of upper strut. Angle size increased from 3 1/2 x 3/8" to 5 x 1/2"
	2 of 2	Replaced STRINGER with BEAM at eight locations.
BC-755M	1 of 4	TABLE A ANCHOR BOLT CLEARANCE table: Dimension A values were decreased. PLAN VIEW: slot thickness and hole diameter in sole plate changed from D + 5/8" to D + 13/16". ELEVATION - EXPANSION BEARING: increased gap between hex nut and washer from 1/8" to 1/2".
	2 of 4	OPTION I - PLAN VIEW: slot thickness and hole diameter in sole plate changed from D + 5/8" to D + 13/16".
	3 of 4	LEGEND was added. EXPANSION BEARINGS IE and III E: increased gap between hex nut and washer from 1/8" to 1/2".
BC-756M	1 of 6	ANCHOR BOLT DETAIL 1: replaced 6" DIA. with 2" LARGER THAN ANCHOR BOLT for blockout. Changed to NONSHRINK grout. GENERAL NOTE 9: replaced MIL-S-8660 with SAE-AS8660.
BC-757M	3 shts.	Re-issued with no changes.
BC-762M	3 - 6 of 7	SECTIONS: added FOR DECK TOP REINFORCEMENT MAT: TRAVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.
BC-766M	1 of 2	SECTION AT BARRIER: replaced STANDARD CURB with TYPICAL BARRIER. GENERAL NOTES: In Note 7, replaced THE MATERIALS AND RESTING DIVISION, BOCM with CHIEF MATERIALS ENGINEER, LABORATORY TESTING SECTION, INNOVATION AND SUPPORT SERVICES DIVISION, BOPD.
	2 of 2	SECTION A-A: replaced preformed expansion joint MATERIAL with FILLER in callout. SECTION C-C: added WIDTH to Joint dimension.
BC-767M	1 of 6	GENERAL NOTES: In Note 11, replaced THE MATERIALS AND RESTING DIVISION, BOCM with CHIEF MATERIALS ENGINEER, LABORATORY TESTING SECTION, INNOVATION AND SUPPORT SERVICES DIVISION, BOPD.
	2 & 3 of 6	SECTIONS: added FOR DECK TOP REINFORCEMENT MAT: TRAVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.
	6 of 6	PLAN: added > 15 degrees to SKEW ANGLE callout.
BC-770M	4 shts.	Re-issued with no changes.
BC-772M	2 of 5	ELEVATION: added STEEL ANGLE (TYP.) to TOP FLANGE EDGE PROTECTION callout.
BC-775M	1 of 3	GENERAL NOTES: added Note 5 regarding recessing of strands at end of beam.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-775M (continued)		GROUTED RECESS FOR STRANDS AT BEAM ENDS: added Note 3 - PAINT BEAM ENDS PRIOR TO SHIPMENT OR STORAGE. DOWEL DETAIL: added STAINLESS STEEL to dowel callout. ACCEPTABLE DRIP NOTCH DETAILS: added Option D.
	2 of 3	SHEAR KEY DETAIL: added OR CCNS WITH DOUBLE SIDED ADHESIVE STRIP after backer rod in callout.
	3 of 3	Added VERTICAL ADJUSTMENT DEVICE details to be used in conjunction with BD-605M.
BC-776M	1 of 7	GENERAL NOTES: minor changes within the notes.
	4 of 7	PRECAST CONCRETE PANEL: added symbol to Panel Height which refers to the first note under LEGEND. LIFTING INSERT LOCATION & TWO POINT PICK-UP details: added symbol to Panel Length which refers to the first note under LEGEND.
	5 of 7	PRECAST CONCRETE PANEL: added symbol to Panel Height which refers to the first note under LEGEND.
	7 of 7	ACCESS DOOR DETAIL: added symbol to Panel Length which refers to the first note under LEGEND.
BC-777M	7 of 12	WWF VERTICAL SPLICE DETAIL FOR PRECAST CONCRETE POST detail relocated from Sht. 3 and was revised.
BC-778M	1 of 10	GENERAL NOTES: Note 16 - ENGINEER was replaced with REPRESENTATIVE. MATERIAL NOTES: Note 5 – SECTION 1105.02(c)3a replaced with SECTION 1105.02(c)2b. Note 8, 2 nd bullet point – added AND AFTER THE PANELS ARE INSTALLED to end of statement.
BC-779M	2 of 9	MATERIAL NOTES: Note 7, 1 st bullet point – replaced ASTM A325 with ASTM A307, GRADE A for bolt specification. In 4 th bullet point – removed AND PAINT after GALVANIZE.
	3 & 4 of 9	BARRIER MOUNTED/RETAINING WALL MOUNTED SOUND BARRIER ELEVATION: replaced SPECIFIED with REQUIRED in steel cable connection callout.
	5 of 9	PRECAST CONCRETE PANEL Elevations - replaced SPECIFIED with REQUIRED in steel cable connection callouts.
	9 of 9	ELEVATION, SECTION F-F and BOLT DETAIL: replaced A325 with ASTM A307, GRADE A in bolt callouts.
BC-780M	1 of 8	GENERAL NOTES: Note 20 - ENGINEER was replaced with REPRESENTATIVE.
	2 of 8	MATERIAL NOTES: Note 7, 1st bullet point - replaced A325 with A 307 for bolt specification.
	5 of 8	ELEVATION & SECTION E-E: added circle symbol to various footing dimensions which refers to the first note under LEGEND.
	7 of 8	LEGEND: added circle symbol which denotes AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS. TWO POINT & FOUR POINT PICK-UP details: added circle symbol to Panel Height dimensions.
BC-781M	1 sht.	Re-issued with no changes.
BC-782M	1 sht.	Note 4, which restricted use of slope walls in urban or suburban environments, was removed.
BC-783M	1 of 4	DECK REPAIRS AND LATEX MODIFIED CONCRETE OVERLAY: added FOR DECK TOP REINFORCEMENT MAT: TRAVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.
BC-788M	1 of 12	On three details, increased Closed Cell Neoprene Sponge thickness from 1/4" to 1/2" THICKER THAN BEARING PAD.
	2 of 12	In three details, increased Closed Cell Neoprene Sponge thickness from 1/4" to 1/2" THICKER THAN BEARING PAD at four callouts. DETAIL "B": increased Neoprene Sponge Washer thickness from 1/4" to 1/2" THICKER THAN BEARING PAD.
	3 of 12	In four details, increased Continuous Strip of Closed Cell Neoprene Sponge's thickness from 1" to 1 1/4".
	4 of 12	In three details, increased Closed Cell Neoprene Sponge thickness from 1/4" to 1/2" THICKER THAN BEARING PAD at four callouts. ABUTMENT PLANs & SECTION U-U: increased Neoprene Washer thickness from 1/4" to 1/2" THICKER THAN BEARING PAD.

STANDARD	SHEET	DESCRIPTION OF CHANGES
BC-788M (continued)	5 of 12	BOX BEAMS WITHOUT BACKWALL & P/S AND STEEL I-BEAM WITHOUT BACKWALL details: increased Closed Cell Neoprene Sponge thickness from 1/4" to 1/2" THICKER THAN BEARING PAD.
	8 of 12	In two details, increased Closed Cell Neoprene Sponge thickness from 1/4" to 1/2" THICKER THAN BEARING PAD at three callouts. WATERPROOFING DETAIL - * Note, 4th line - removed PIER prior to FOOTING.
	11 of 12	SECTION AT ABUTMENT & PANEL ANCHOR details: increased Closed Cell Neoprene Sponge thickness from 1/4" to 1/2" THICKER THAN BEARING PAD.
BC-794M	1 sht.	AT ABUTMENTS: replaced UTILITY with PIPE OR MAIN.
BC-798M	1 of 3	Removed solid triangle note regarding tendon placement in walls and slabs of culvert. TYPICAL STRAND & DETAILS: in dimension callout for strand extension length, replaced PRESTRESSING with TENSIONING.
	2 of 3	TIE BOLT DETAIL - PRECAST CHANNEL BEAM: washer specification revised from ASTM 436-86 to ASTM F436.
BC-799M	1 of 13	TYPICAL FILL SECTION: revised vertical dimension from ground line to weep hole from 1'-0" to 6". GENERAL NOTES: Note 6: removed 2nd bullet point regarding Traffic Barrier and Sidewalk Barrier design specifications.
	7 of 13	SIDEWALK BARRIER SECTION: added Railing on top of wall with callout regarding authorization. Increase rebar cover from 1 1/2" to 2". Wall plus Moment Slab height changed to 5'-7 1/2" from 5'-9 1/2". Added 3'-6" barrier wall height.
	10 of 13	SECTIONS M-M, N-N, P-P & Q-Q: revised shape of panel's horizontal joint.
	12 of 13	TYPICAL PANEL LAYOUT: removed Panel Dowels & Tapered Holes centerlines from square panels on right side of detail. NOTE 8: increased PVC Rod diameter from 5/8" to 3/4". Also changed length of 5/8" diameter galvanized steel to 12".

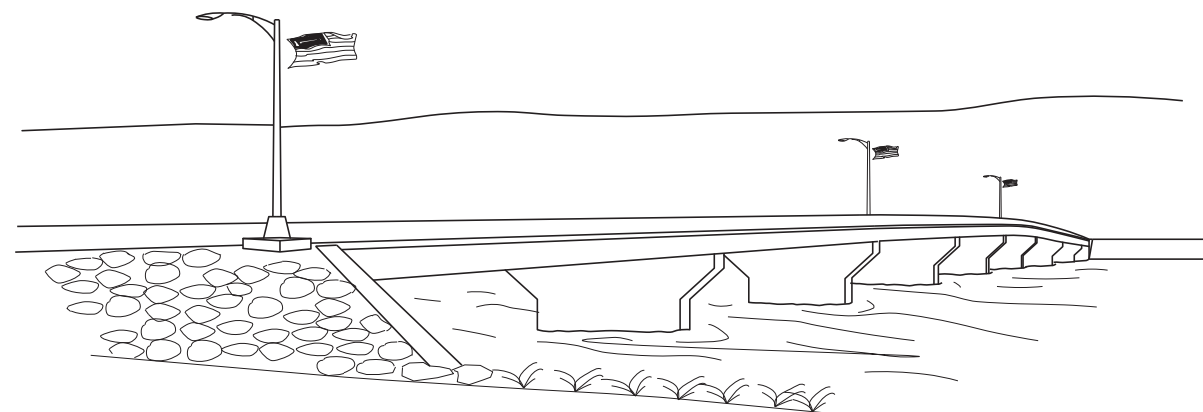
COMMONWEALTH OF PENNSYLVANIA



pennsylvania

DEPARTMENT OF TRANSPORTATION

**BUREAU OF PROJECT DELIVERY
STANDARDS FOR BRIDGE CONSTRUCTION**



BC-700M SERIES

SEPTEMBER 2016 EDITION

PUB. #219M

INDEX OF STANDARDS FOR BRIDGE CONSTRUCTION with Strike-Off Letters' red markups

THESE STANDARDS MAY BE REFERRED TO ON THE DESIGN DRAWINGS IN LIEU OF SHOWING SPECIFIC DETAILS PROVIDED COORDINATING INFORMATION IS SHOWN ON THE DESIGN DRAWINGS.

Click on the desired Standard to view.

Highlighting throughout the standards indicates revisions to the September 2016 Edition. The highlighting color indicates whether the most recent revision was part of Change #1, #2, #3, #4, #5, #6 or #7. Refer to the legend on this index sheet or on the first sheet of each standard.

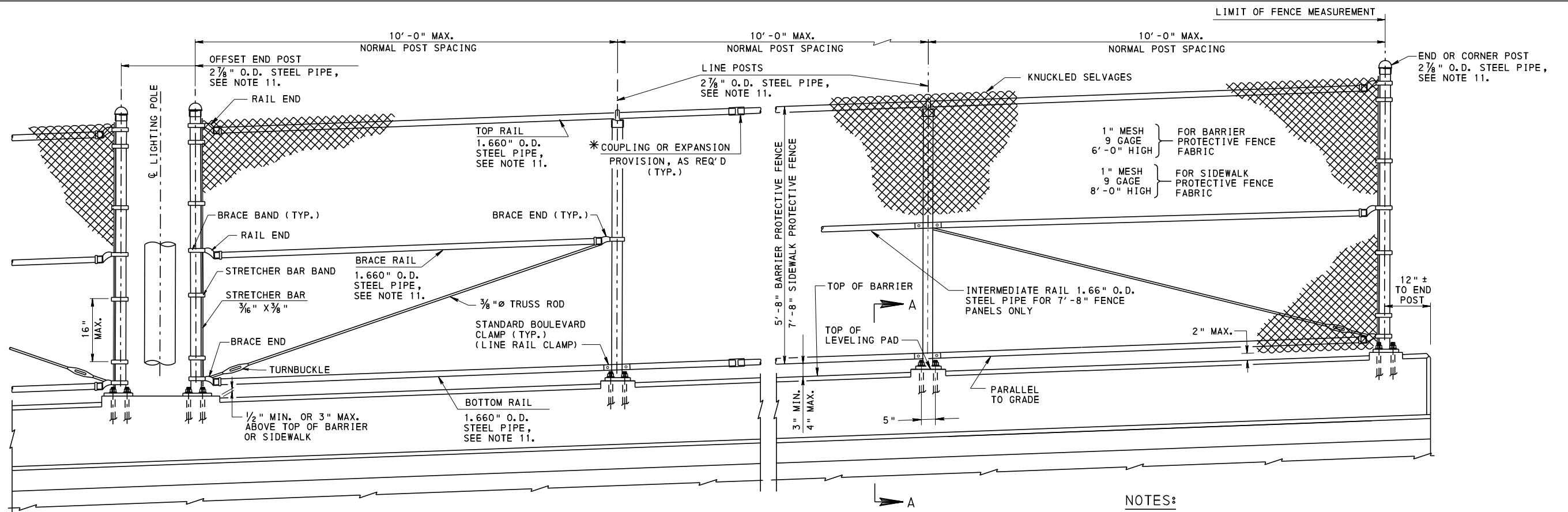
To obtain a clean printout without highlighting, select "Print" and in the dialogue box under "Comments and Forms" select "Document" from the pull-down menu.

STD. DWG. NO.	TITLE	NO. OF SHTS.	DATE
BC-700M	INDEX OF STANDARDS	1	OCT. 7, 2024
BC-701M	PROTECTIVE FENCE	3	NOV. 23, 2022
BC-703M	THREE BEAM TO VERTICAL WALL BRIDGE BARRIER TRANSITION CONNECTION		DISCONTINUED
BC-706M	PA 3-RAIL BRIDGE BARRIER	2	OCT. 7, 2024
BC-707M	PA HT BRIDGE BARRIER		DISCONTINUED
BC-708M	THREE BEAM TO PA TYPE 10M BRIDGE BARRIER TRANSITION CONNECTION		DISCONTINUED
BC-709M	PA TYPE 10M BRIDGE BARRIER	13	OCT. 7, 2024
BC-711M	ALUMINUM PROTECTIVE BARRIER	4	NOV. 23, 2022
BC-712M	THREE BEAM TO PA BRIDGE BARRIER TRANSITION CONNECTION		DISCONTINUED
BC-713M	PA BRIDGE BARRIER	16	OCT. 7, 2024
BC-716M	ALUMINUM PEDESTRIAN RAILING	2	NOV. 23, 2022
BC-718M	ALTERNATE RAILING DETAILS		DISCONTINUED
BC-719M	TEMPORARY CONCRETE BARRIER, STRUCTURE MOUNTED	7	MAR. 27, 2024
BC-720M	ALUMINUM OR STEEL BRIDGE HAND RAILING	1	FEB. 19, 2021
BC-721M	ELECTRICAL DETAILS	2	FEB. 19, 2021
BC-722M	LIGHTING POLE ANCHORAGE	2	FEB. 19, 2021
BC-723M	BRIDGE ANTI-ICING SYSTEM	10	SEPT. 30, 2016
BC-726M	STEEL GRID REINFORCED CONCRETE BRIDGE DECK FOR BEAM BRIDGES	5	JAN. 31, 2019
BC-731M	CEMENT CONCRETE SLOPE WALL	1	SEPT. 30, 2016
BC-732M	PERMANENT METAL DECK FORMS	3	NOV. 23, 2022
BC-734M	ANCHOR SYSTEMS	2	FEB. 19, 2021
BC-735M	WALL CONSTRUCTION AND EXPANSION JOINT DETAILS	1	SEPT. 30, 2016
BC-736M	REINFORCEMENT BAR FABRICATION DETAILS	3	NOV. 23, 2022
BC-739M	BRIDGE BARRIER TO GUIDE RAIL TRANSITION		DISCONTINUED
BC-741M	OVERHEAD SIGN STRUCTURES-CANTILEVER AND CENTER-MOUNT STRUCTURES STRUT LENGTHS UP TO 40'	6	AUG. 4, 2017
BC-743M	OVERHEAD SIGN STRUCTURES-2 POST PLANAR TRUSS SPANS FROM 30' TO 100'	10	AUG. 4, 2017
BC-744M	OVERHEAD SIGN STRUCTURES-2 POST AND 4 POST TRI-CHORD TRUSS SPANS FROM 60' TO 240'	12	AUG. 4, 2017
BC-745M	OVERHEAD SIGN STRUCTURES-4 POST 4 CHORD TRUSS SPANS FROM 100' TO 200'	10	AUG. 4, 2017
BC-747M	MONOPIPE SIGN STRUCTURES	5	AUG. 4, 2017
BC-751M	BRIDGE DRAINAGE	7	JAN. 31, 2019

STD. DWG. NO.	TITLE	NO. OF SHTS.	DATE
BC-752M	CONCRETE DECK SLAB DETAILS	3	NOV. 23, 2022
BC-753M	STEEL GIRDER DETAILS	3	JAN. 31, 2019
BC-754M	STEEL DIAPHRAGMS FOR STEEL BEAM/ GIRDER STRUCTURES (STRAIGHT GIRDERS ONLY)	2	NOV. 23, 2022
BC-755M	BEARINGS	4	JAN. 31, 2019
BC-756M	HIGH LOAD MUTI ROTATIONAL POT BEARINGS	6	NOV. 23, 2022
BC-757M	STEEL PILE TIP REINFORCEMENTS & SPLICES	3	SEPT. 30, 2016
BC-762M	TOOTH EXPANSION DAM FOR PRESTRESSED CONCRETE & STEEL BEAM BRIDGES	7	JAN. 31, 2019
BC-766M	PREFORMED NEOPRENE COMPRESSION SEAL JOINT FOR APPROACH SLABS	2	NOV. 23, 2022
BC-767M	NEOPRENE STRIP SEAL DAM FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES	7	NOV. 23, 2022
BC-770M	STEEL MID-SPAN DIAPHRAGMS FOR P/S CONCRETE AASHTO I-BEAM AND PA BULB-TEE BEAM BRIDGES	4	JAN. 31, 2019
BC-772M	PRESTRESSED CONCRETE BEAM BRACING	5	NOV. 23, 2022
BC-775M	MISCELLANEOUS PRESTRESS DETAILS	3	NOV. 23, 2022
BC-776M	GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE PANELS	7	JAN. 31, 2019
BC-777M	GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE POSTS	12	JAN. 31, 2019
BC-778M	GROUND MOUNTED SOUND BARRIERS STEEL POSTS	10	SEPT. 30, 2016
BC-779M	STRUCTURE MOUNTED SOUND BARRIER WALLS	9	FEB. 19, 2021
BC-780M	OFFSET SOUND BARRIER WALLS	8	JAN. 31, 2019
BC-781M	RANDOM STONE SLOPE WALL	1	SEPT. 30, 2016
BC-782M	GABION SLOPE WALL DETAILS	1	SEPT. 30, 2016
BC-783M	REINFORCED CONCRETE REPAIR	4	JAN. 31, 2019
BC-788M	TYPICAL WATERPROOFING AND EXPANSION DETAILS	12	NOV. 23, 2022
BC-790M	POST-TENSIONING OF CONCRETE GIRDERS GROUT SPECIFICATIONS	1	JAN. 31, 2019
BC-794M	UTILITY ATTACHMENT & SUPPORT DETAILS, PRESTRESSED BRIDGES	1	JAN. 31, 2019
BC-798M	MECHANICAL CONNECTION DETAILS	3	FEB. 14, 2023
BC-799M	MECHANICALLY STABILIZED EARTH RETAINING WALLS	13	NOV. 23, 2022

SEPTEMBER 2016 EDITION

- SEE CHANGE #1 FOR AUG. 4, 2017 STANDARD REVISIONS.
- SEE CHANGE #2 FOR JAN. 31, 2019 STANDARD REVISIONS.
- SEE CHANGE #3 FOR FEB. 19, 2021 STANDARD REVISIONS.
- SEE CHANGE #4 FOR NOV. 23, 2022 STANDARD REVISIONS.
- SEE CHANGE #5 FOR FEB. 14, 2023 STANDARD REVISIONS.
- SEE CHANGE #6 FOR MAR. 27, 2024 STANDARD REVISIONS.
- SEE CHANGE #7 FOR OCT. 7, 2024 STANDARD REVISIONS.

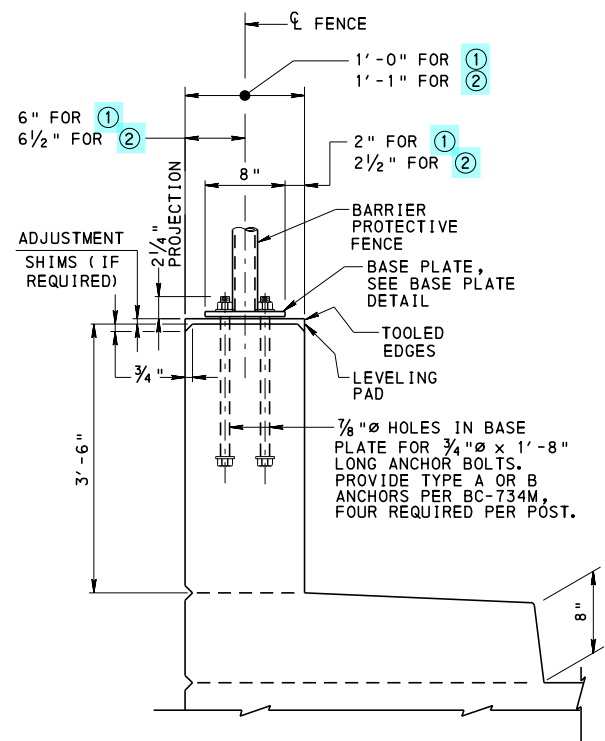


TYPICAL FENCE ELEVATION
 * 9" MIN. DISTANCE TO STRUCTURE EXPANSION JOINT.

NOTES:

1. PROVIDE MATERIALS AND **PERFORM WORK** IN ACCORDANCE WITH PUBLICATION 408.
2. PROVIDE SHIMS FROM APPROVED MATERIAL.
3. ONLY TOUCH-UP PAINTING OF MATERIAL IS PERMITTED.
4. PLACE FENCE POSTS AND ANCHOR BOLTS TRULY VERTICAL. PLACE RAILS PARALLEL TO GRADE.
5. IF LIGHTING POLES ARE NOT INSTALLED, CLOSE GAPS WITH SEPARATE PIECE OF FENCE FABRIC.
6. AT BRIDGE EXPANSION JOINTS, PERMIT THE FENCE FABRIC AND RAILS TO EXPAND OR CONTRACT.
7. CLIP THE TIE WIRE FASTENERS AND BEND AWAY FROM TRAFFIC.
8. COAT ALL SURFACES OF THE BASE PLATES IN CONTACT WITH CONCRETE WITH CAULKING COMPOUND PRIOR TO ERECTION AND ALIGNMENT. AFTER ERECTION AND ALIGNMENT, SEAL OPENINGS BETWEEN THE METAL SURFACES AND THE CONCRETE WITH CAULKING COMPOUND CONFORMING TO PUBLICATION 408, SECTION 705.7(b).
9. PLACE ANCHOR BOLTS WITH SIDEWALK OR BARRIER AND ACCURATELY SET AND BRACE AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED. LEVEL THE BASE PLATE AND THEN PLACE THE LEVELING PAD USING RAPID SET CONCRETE.
10. DESIGN DRAINAGE SYSTEM IN ACCORDANCE WITH DM4, SECTION PP 3.2.3.
11. USE POSTS AND RAIL MATERIAL PER PUBLICATION 408, SECTION 1016.2(d) 3.
12. REFER TO CONTRACT DOCUMENTS FOR POST SPACING.
13. PLACE CORNER POSTS AT ANGLE POINTS IN HORIZONTAL AND VERTICAL ALIGNMENT OF FENCE.

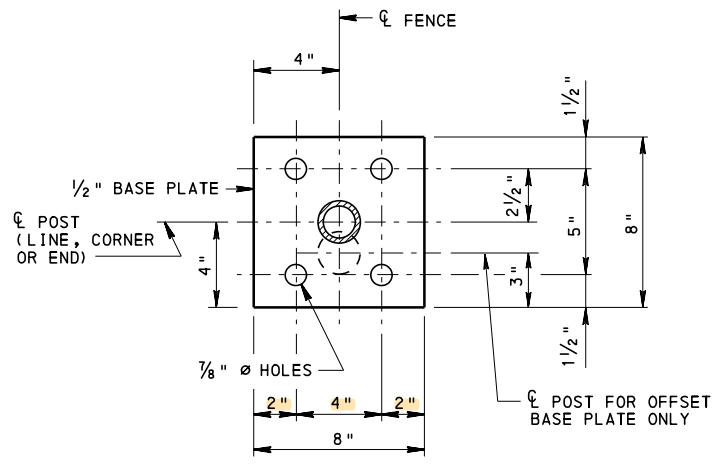
- CHANGE 2
- CHANGE 3
- CHANGE 4



SECTION A-A
 TYPICAL FENCE POST SECTION,
 ALTERNATE SIDEWALK WITH 42" VERTICAL WALL
 CONCRETE BARRIER SHOWN (45", 42" AND 32"
 F-SHAPE CONCRETE BARRIER SIMILAR)

LEGEND:

- ① 45" F-SHAPE, 42" F-SHAPE OR 42" VERTICAL WALL CONCRETE BARRIER.
- ② 32" F-SHAPE CONCRETE BARRIER.



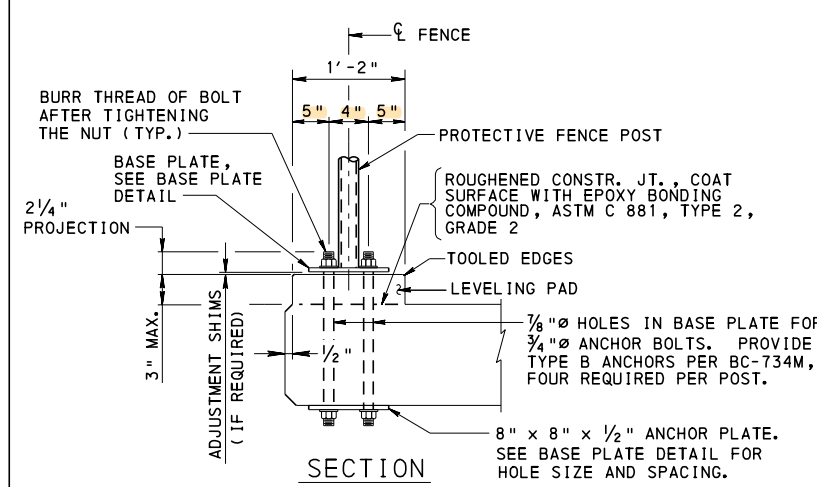
BASE PLATE DETAIL
 (ALL DIMENSIONS ARE TYPICAL
 UNLESS NOTED OTHERWISE)

BC-721M	ELECTRICAL DETAILS
BC-722M	LIGHTING POLE ANCHORAGE
BC-734M	ANCHOR SYSTEMS
REFERENCE DRAWINGS	

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

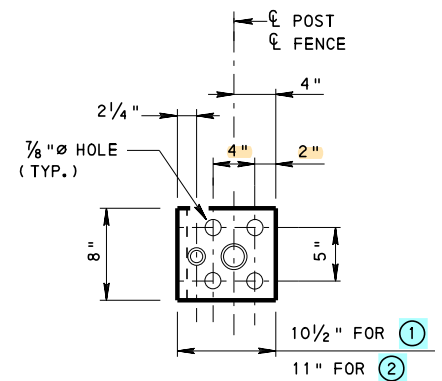
STANDARD
PROTECTIVE FENCE

RECOMMENDED NOV. 23, 2022 <i>L.W. Gray</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Grain E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 1 OF 3 BC-701M
--	---	--------------------------------

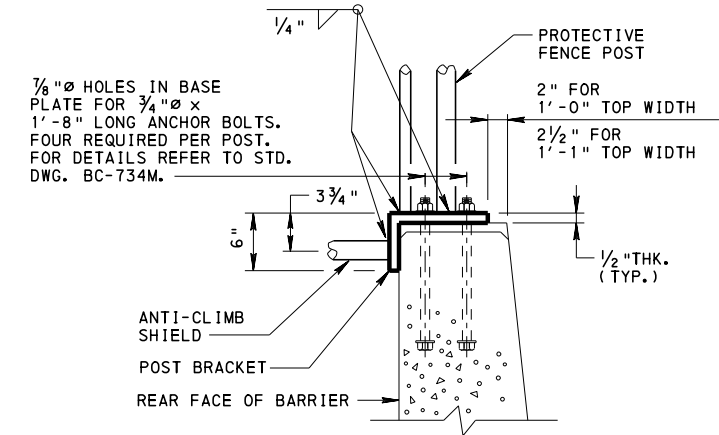


LEVELING PAD DETAIL

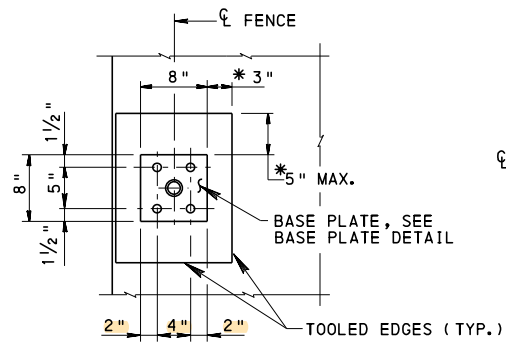
TYPICAL SIDEWALK SHOWN
(RAISED SIDEWALK SIMILAR)



PLAN

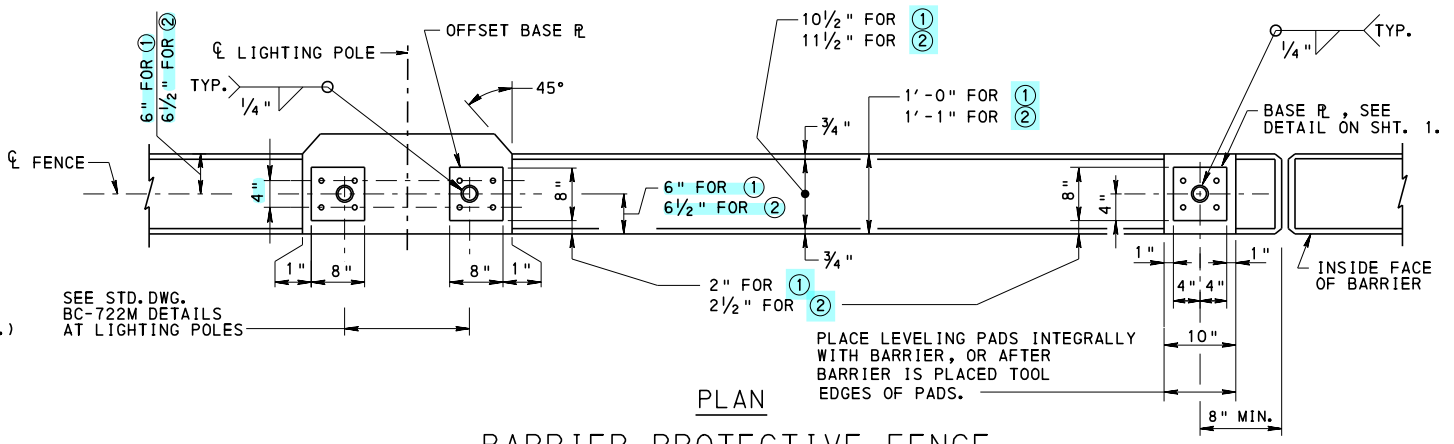


POST BRACKET DETAIL
AT ANTI-CLIMB SHIELD



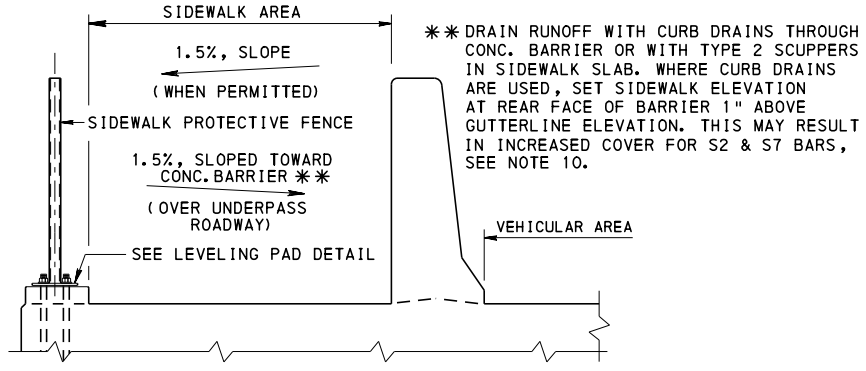
* CLEARANCE BETWEEN
BASE PLATE AND
FORMS NEEDED TO
PLACE CONCRETE.

PLAN



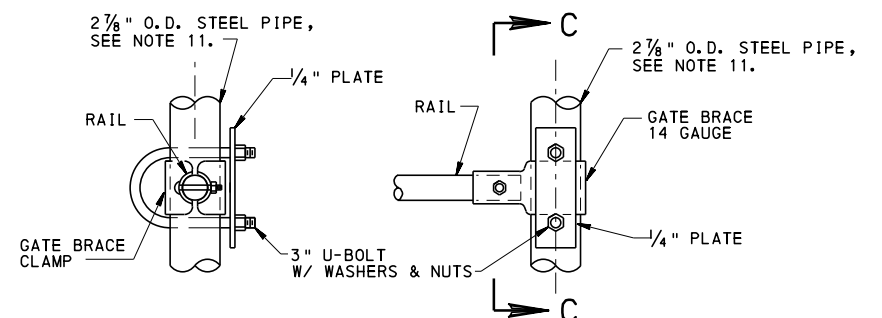
BARRIER PROTECTIVE FENCE

FOR BASE PLATE DETAIL, SEE SHEET 1.
ALTERNATE SIDEWALK WITH 42" VERTICAL WALL CONCRETE BARRIER SHOWN
(45", 42" AND 32" F-SHAPE CONCRETE BARRIER SIMILAR)



TYPICAL SIDEWALK DETAIL

(RAISED SIDEWALK DETAIL SIMILAR)



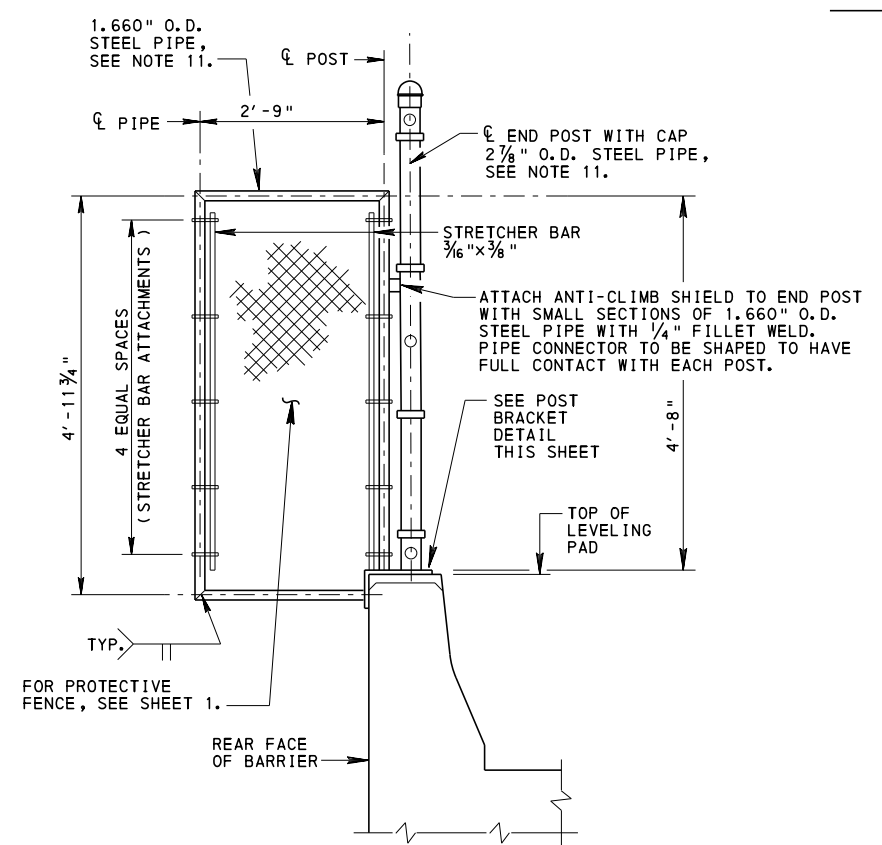
SECTION C-C

TYPICAL BRACE BAND

NOTES:
FOR OTHER DETAILS AND NOTES, SEE SHEETS 1 & 3.

LEGEND:

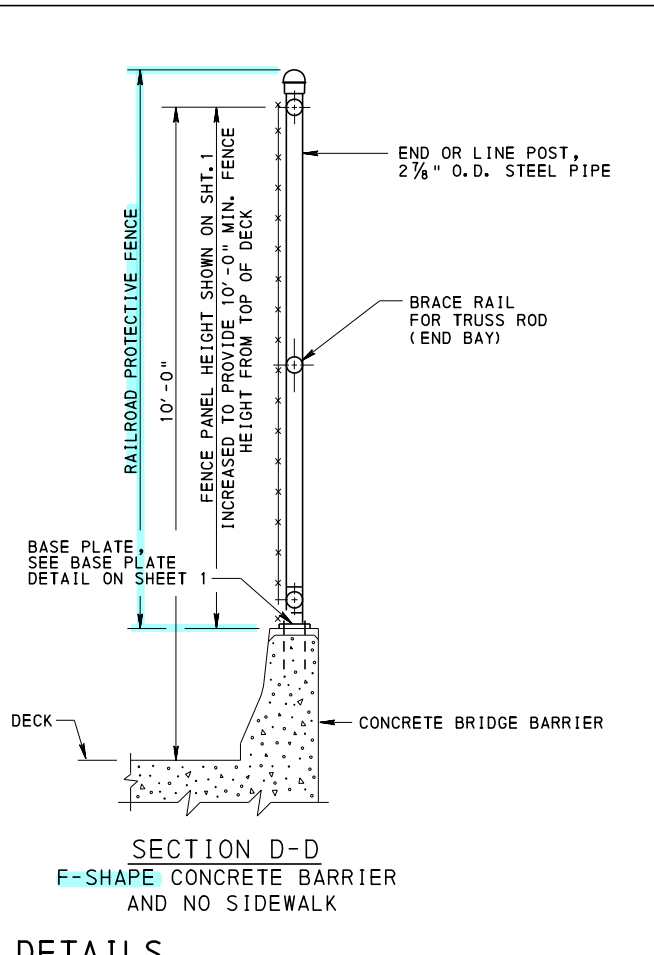
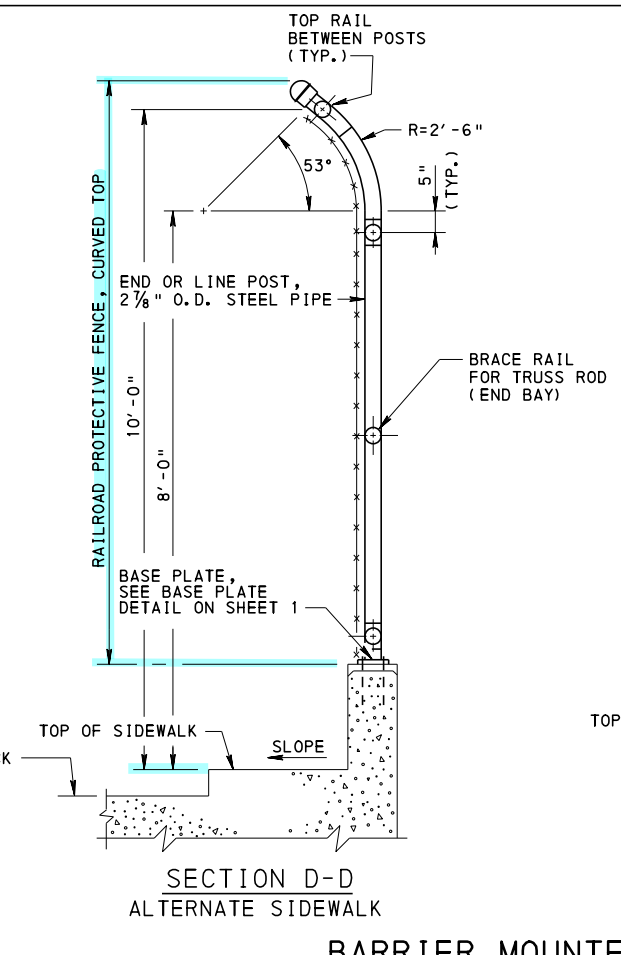
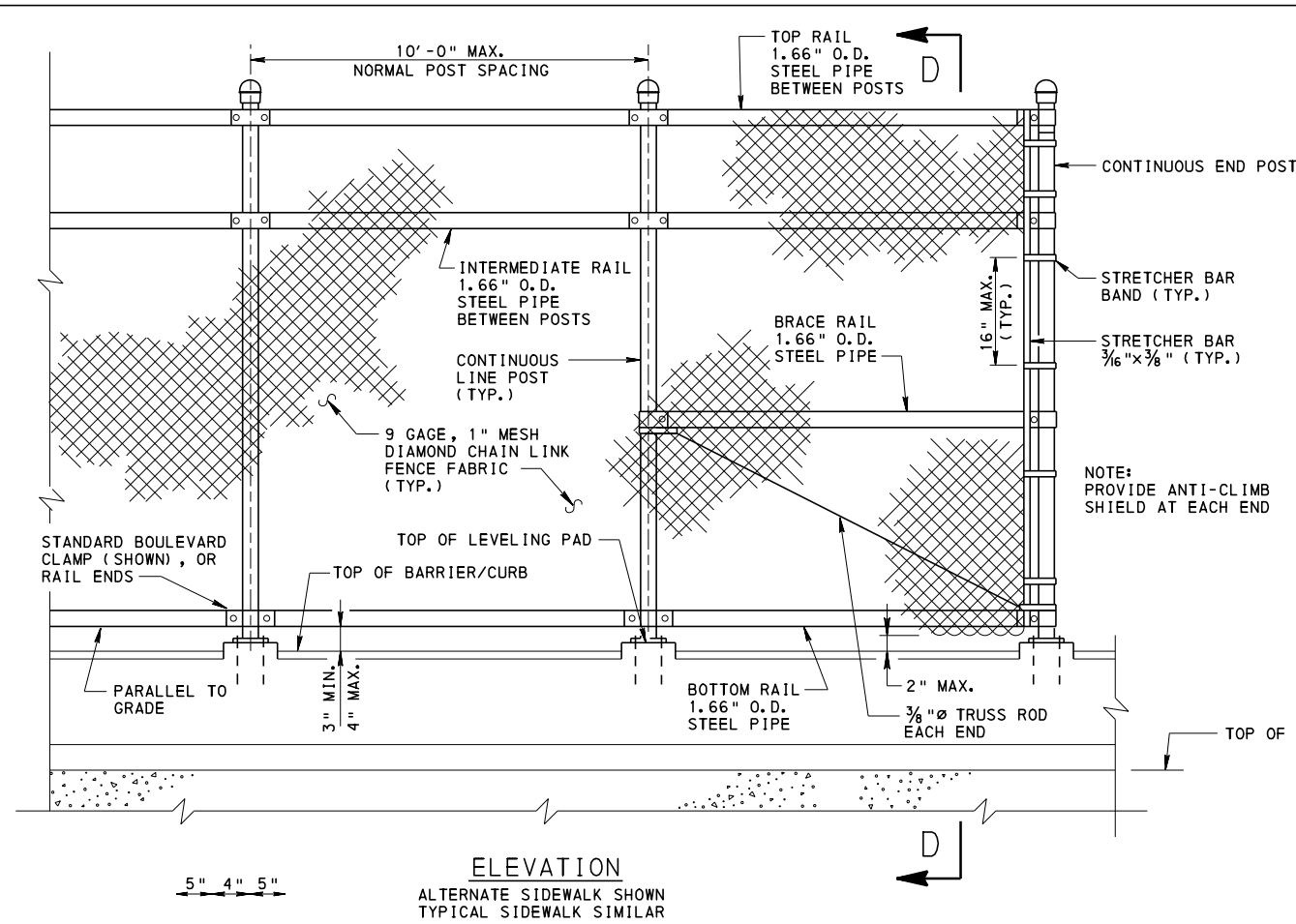
①	45" F-SHAPE, 42" F-SHAPE OR 42" VERTICAL WALL CONCRETE BARRIER.
②	32" F-SHAPE CONCRETE BARRIER.



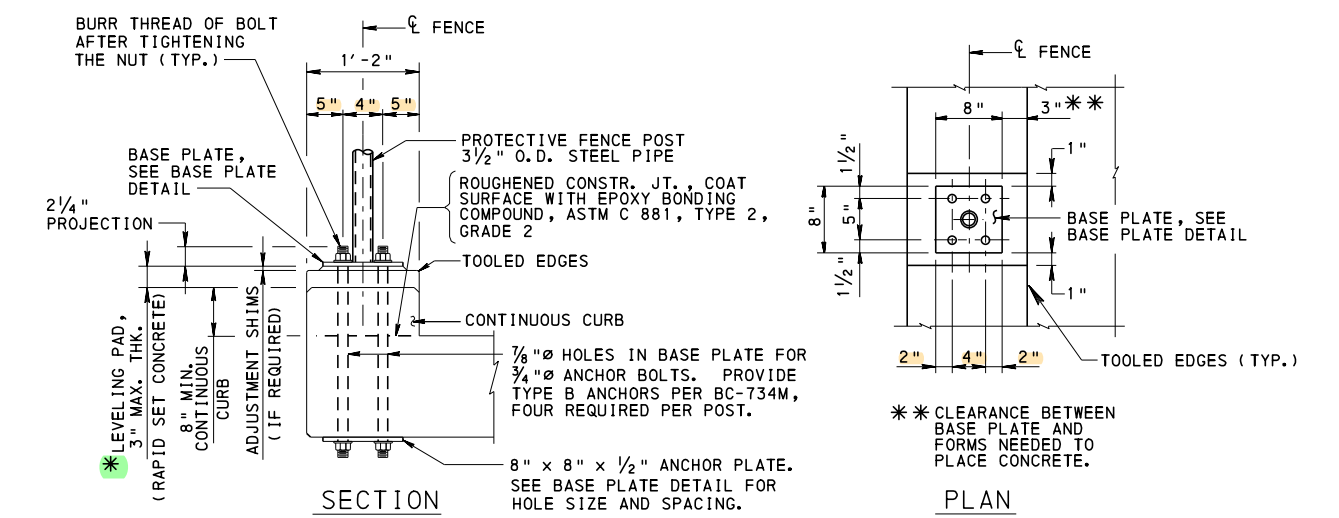
ANTI-CLIMB SHIELD DETAILS
(1 REQ'D. FOR EACH END OF FENCE)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

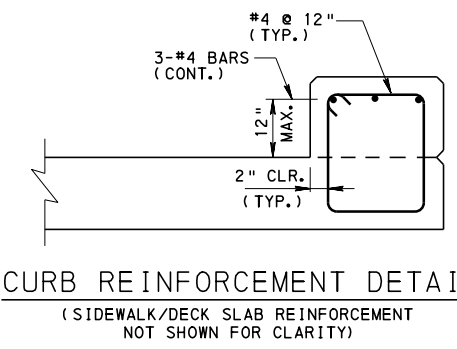
STANDARD
PROTECTIVE FENCE



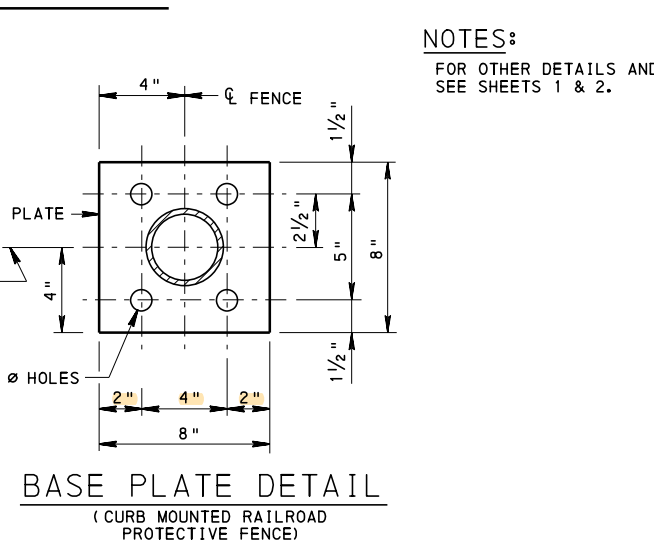
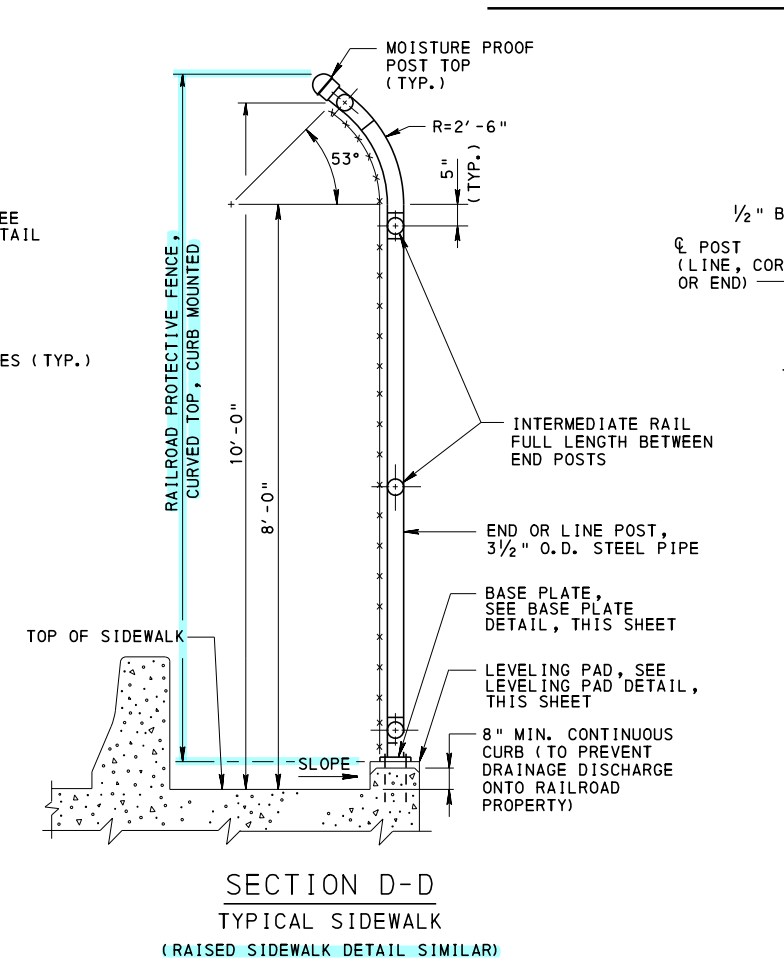
BARRIER MOUNTED DETAILS



LEVELING PAD DETAIL
(CURB MOUNTED RAILROAD PROTECTIVE FENCE)



CURB MOUNTED DETAILS



NOTES:
FOR OTHER DETAILS AND NOTES, SEE SHEETS 1 & 2.

* LEVELING PAD CAN BE CONTINUOUSLY POURED MONOLITHICALLY WITH CURB. LEVELING PAD CAN BE ELIMINATED IF SLOPE/GRADE ON TOP OF CURB IS LESS THAN 1%.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PROTECTIVE FENCE
BRIDGE OVER RAILROADS

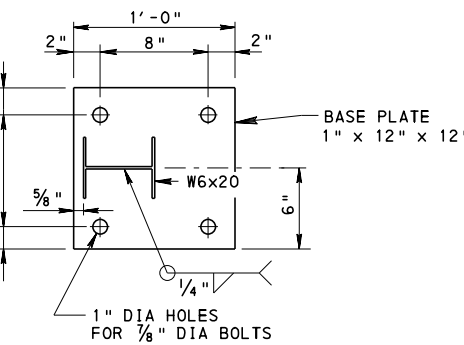
RECOMMENDED NOV. 23, 2022 <i>L. W. Gray</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Grain E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 3 OF 3 BC-701M
---	---	-------------------------

GENERAL NOTES:

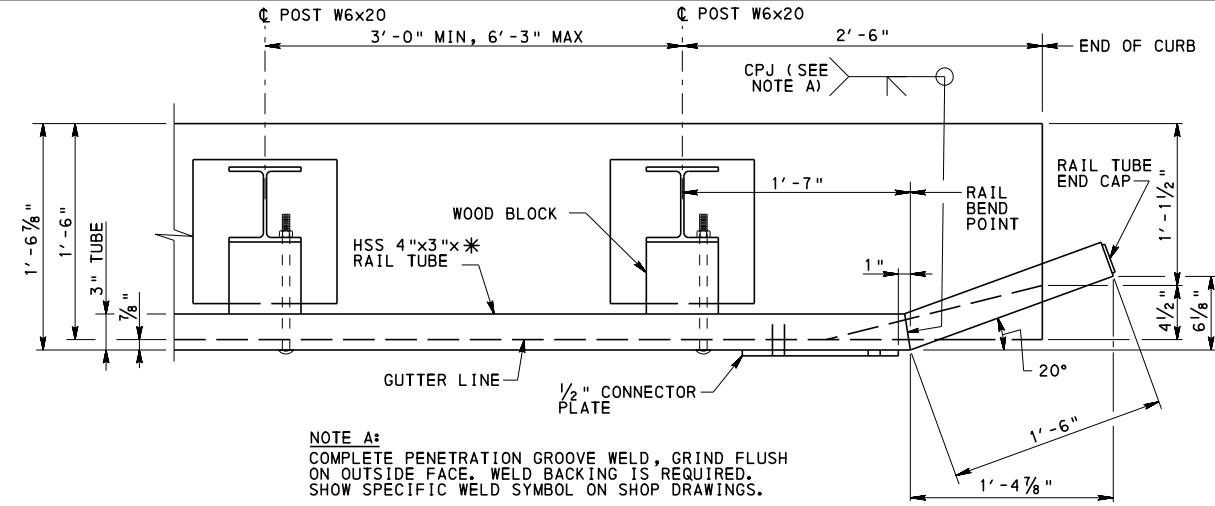
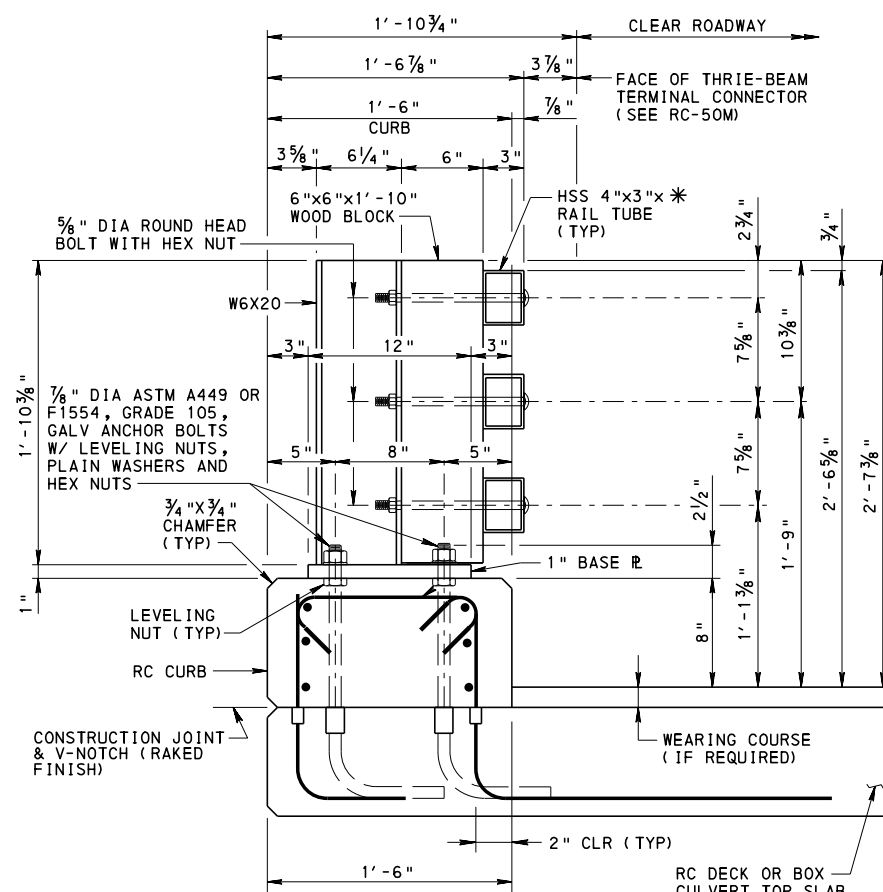
1. PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH PUBLICATION 408.
2. PROVIDE RAIL TUBES CONFORMING TO ASTM A500 OR A501, GRADE AS SPECIFIED BASED ON PROVIDED WALL THICKNESS.
3. PROVIDE POSTS CONFORMING TO AASHTO M270 (ASTM A709), GRADE 50 OR ASTM A992. PROVIDE BASE PLATES CONFORMING TO AASHTO M270 (ASTM A709), GRADE 50.
4. ALL RAILING COMPONENTS SHALL BE GALVANIZED (AFTER FABRICATION) AS SPECIFIED IN PUBLICATION 408, SECTION 1105.02(c), UNLESS OTHERWISE SHOWN ON THE PLANS. GALVANIZE RAIL TUBES, POSTS, AND BASE PLATES ACCORDING TO ASTM A123. GALVANIZE ALL HARDWARE ACCORDING TO ASTM A153 OR B695.
5. THE RAIL TUBES ARE SHOP BENT OR FABRICATED TO FIT HORIZONTAL CURVE WHEN RADIUS IS LESS THAN 1,500 FEET.
6. STEEL TUBE TOLERANCES:
 - A. STRAIGHTNESS: THE PERMISSIBLE VARIATION FOR STRAIGHTNESS SHALL BE $\frac{1}{8}$ " TIMES THE NUMBER OF FEET OF THE TOTAL LENGTH DIVIDED BY 5.
 - B. TWIST: SPECIFIED DIMENSION OF THE LONGEST SIDE IN INCHES FROM OVER 4" TO 6" INCLUSIVE: 0.087" MAX TWIST IN THE FIRST 3 FEET AND IN EACH ADDITIONAL 3 FEET.

NOTE: TWIST IS MEASURED BY HOLDING DOWN ONE END OF SQUARE OR RECTANGULAR TUBE ON A FLAT SURFACE PLATE WITH THE BOTTOM SIDE OF THE TUBE PARALLEL TO THE SURFACE PLATE AND NOTING THE HEIGHT DIFFERENCE BETWEEN THE TWO CORNERS AT THE OPPOSITE END OF THE BOTTOM SIDE OF THE TUBE.
7. ALL WELDING SHALL CONFORM TO THE PROVISIONS OF AASHTO/AWS BRIDGE WELDING CODE D1.5, EXCEPT USE AASHTO/AWS STRUCTURAL WELDING CODE D1.1 FOR WELDING NOT COVERED IN D1.5.
8. FOR ANCHOR BOLTS, USE $\frac{7}{8}$ " DIAMETER BOLTS CONFORMING TO ASTM A449 OR ASTM F1554, GRADE 105 KSI. USE ASTM A563, GRADE DH HEAVY HEX NUTS. USE ONE ASTM F436M WASHER AT THE TOP.
9. FOR RAIL TUBE TO POST CONNECTION, USE $\frac{5}{8}$ " DIAMETER ROUND HEAD BOLTS CONFORMING TO ASTM A307. USE ASTM A563, GRADE A HEX NUTS.
10. BOLT TIGHTENING PROCEDURES ARE AS FOLLOWS:
 - A. SNUG TIGHTEN ALL ANCHOR BOLTS. TIGHTEN THE NUTS AN ADDITIONAL 1/3 TURN USING A WRENCH.
 - B. SNUG TIGHTEN THE RAIL TO POST BOLT.
11. PROVIDE EPOXY COATED MECHANICAL SPLICES IN ACCORDANCE WITH PUBLICATION 408, SECTION 1002.2(c).
12. PROVIDE WOOD BLOCKS IN ACCORDANCE WITH PUBLICATION 408, SECTION 1109.04.
13. ONE OR MORE 6'-3" MAXIMUM POST SPACINGS MAY BE REDUCED TO 3'-0" MINIMUM IN ORDER TO MAINTAIN APPROPRIATE SPACING DIMENSIONS FROM THE END OF RAIL AND EXPANSION JOINTS.
14. LOCATE RAIL SPLICES AT EXPANSION JOINTS AND AT OTHER LOCATIONS WHERE NECESSARY. PROVIDE RAILS AS LONG AS PRACTICAL, WITH A MINIMUM OF THREE POSTS BETWEEN SPLICES, UNLESS OTHERWISE REQUIRED FOR EXPANSION.
15. PROVIDE RAIL TUBES CONTINUOUS OVER NOT LESS THAN TWO RAILING POSTS. NO WELDED BUTT SPLICES WILL BE ALLOWED IN THE RAIL TUBE SECTIONS.
16. PLACE POST AND POST ANCHOR BOLTS NORMAL TO GRADE AND RAILS PARALLEL TO GRADE.
17. COAT ALL SURFACES OF THE BASE PLATE IN CONTACT WITH CONCRETE WITH CAULKING COMPOUND PRIOR TO ERECTION. AFTER ERECTION AND ALIGNMENT, SEAL OPENINGS BETWEEN METAL SURFACES AND THE CONCRETE WITH CAULKING COMPOUND MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 705.7(b).
18. DO NOT USE DEFLECTION JOINTS WITH PA 3-RAIL BRIDGE BARRIERS.
19. PROVIDE POST SPACINGS ON THE PLANS.
20. THE PA 3-RAIL BRIDGE BARRIER IS DESIGNATED AS MASH TL-3.
21. FOR GUIDE RAIL TRANSITION TO PA 3-RAIL BRIDGE BARRIER, SEE RC-50M.

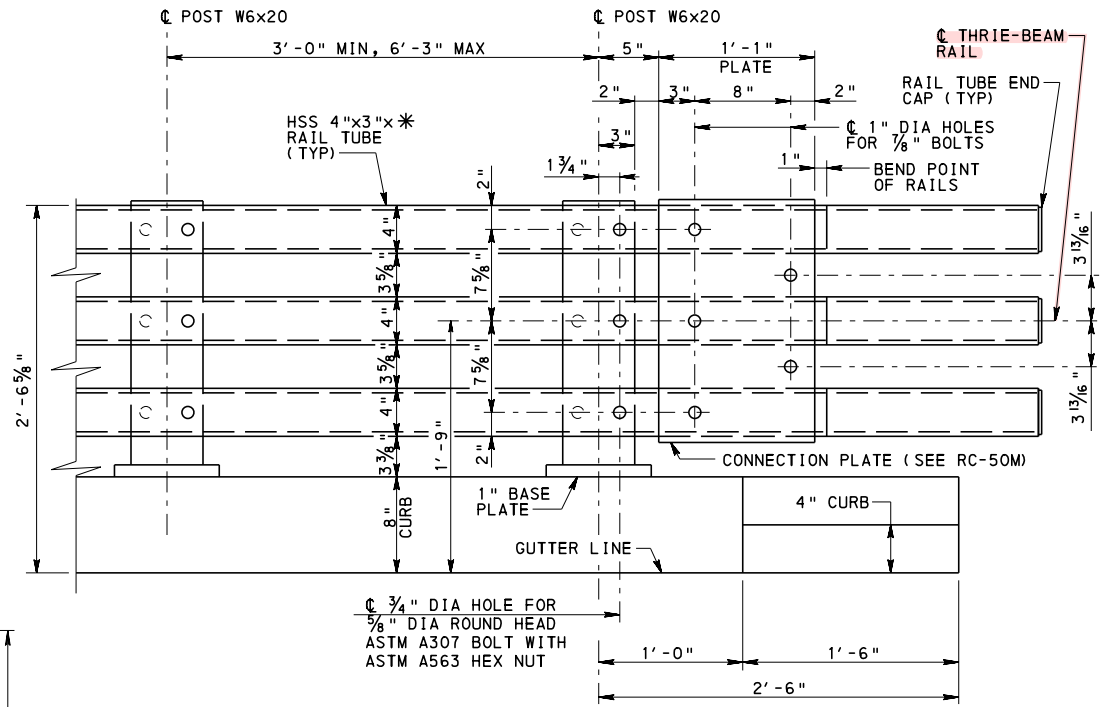
WOOD BLOCK DETAIL



BASE PLATE DETAIL



PLAN



ELEVATION

PA 3-RAIL BRIDGE BARRIER WITH THRIE-BEAM CONNECTION

(GUIDE RAIL AND ANCHOR BOLTS OMITTED FOR CLARITY) (WITH CURB SHOWN, WITHOUT CURB SIMILAR)

TUBE MEMBERS			
RAIL TUBE		SPlice TUBE	
MATERIAL	THICKNESS	MATERIAL	THICKNESS
A500 GR. C	0.188"	A500 GR. C	0.188"
A500 GR. B	0.25"	A500 GR. B	0.25"
A500 GR. A OR A501	0.313"	A500 GR. A OR A501	0.25"

TUBE RAIL SPECIFICATIONS

BARRIER SECTION

DECK / SLAB REINFORCEMENT NOT SHOWN FOR CLARITY

RC-50M	GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS
RC-51M	TYPE 31 STRONG POST GUIDE RAIL
BC-734M	ANCHOR SYSTEMS
REFERENCE DRAWINGS	

NOTE: PRIOR TO CONSTRUCTING CURB AND DECK, ANCHOR BOLTS SHALL BE INSTALLED WITH EITHER A TEMPLATE OR ACTUAL POST W/ BASEPLATE INSTALLED TO ENSURE PROPER ANCHOR BOLT ALIGNMENT AND PLACEMENT.

* FOR TUBE THICKNESS, SEE TUBE RAIL SPECIFICATIONS TABLE.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

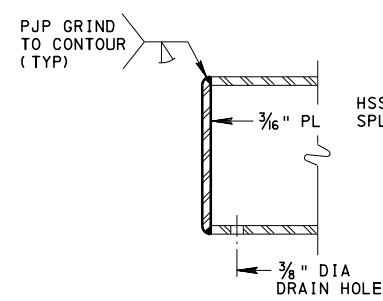
STANDARD

PA 3-RAIL BRIDGE BARRIER
MISCELLANEOUS DETAILS - 1

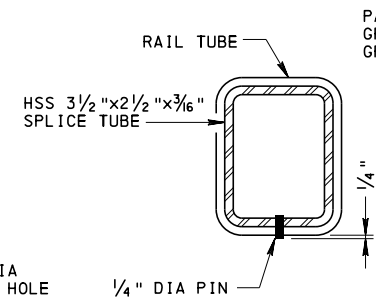
RECOMMENDED OCT. 7, 2024
Kevin J. Long
CHIEF BRIDGE ENGINEER

RECOMMENDED OCT. 7, 2024
Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 1 OF 2
BC-706M

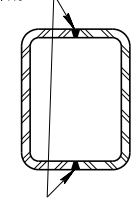


RAIL TUBE END CAP



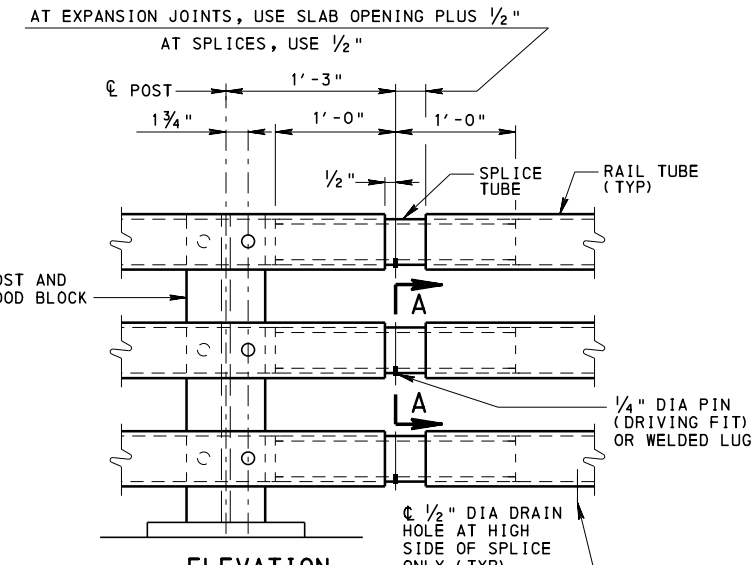
SECTION A-A

PARTIAL PEN WELD MAY BE SQUARE GROOVE OR SINGLE V-GROOVE. GRIND SMOOTH.



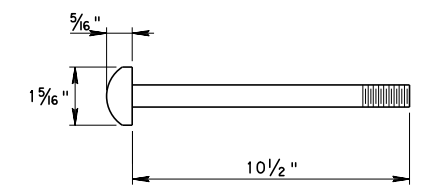
ALTERNATE SPLICE TUBE FABRICATION
REQUIRED IF RAIL THICKNESS IS 0.25\"/>

NOTE:
THE DIFFERENCE BETWEEN THE OUTSIDE DIMENSIONS OF THE SLEEVE AND THE INSIDE DIMENSIONS OF THE RAIL SHALL NOT EXCEED 1/8\"/>



ELEVATION

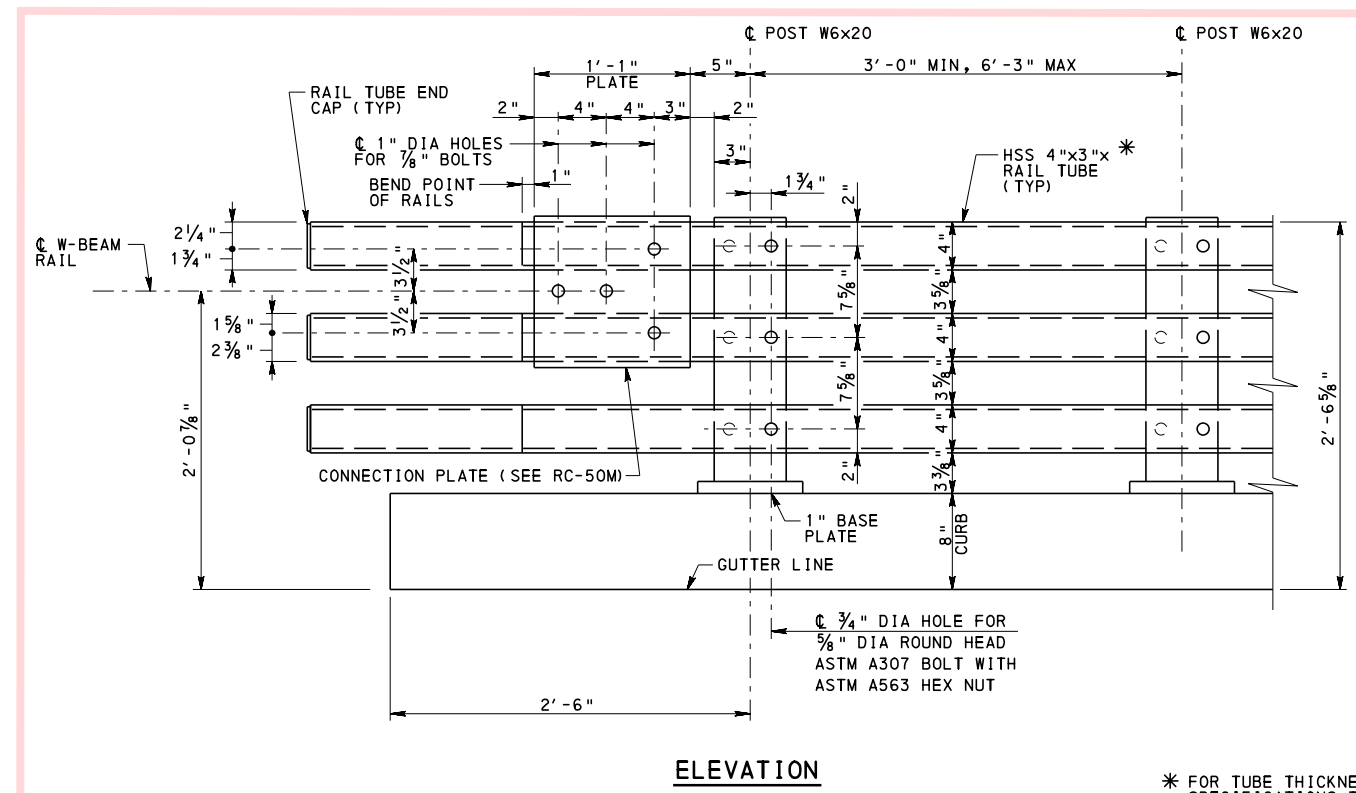
SHOWN WITHOUT ANCHOR BOLTS FOR CLARITY



RAIL TO POST BOLT

5/8\"/>

TUBE SPLICE DETAILS



ELEVATION

PA 3-RAIL BRIDGE BARRIER WITH W-BEAM CONNECTION

(GUIDE RAIL AND ANCHOR BOLTS OMITTED FOR CLARITY)

* FOR TUBE THICKNESS, SEE TUBE RAIL SPECIFICATIONS TABLE ON SHEET 1.

W-BEAM CONNECTION NOTES:

1. PROVIDE W-BEAM GUIDE RAIL CONNECTION ON THE TRAILING END OF THE BRIDGE BARRIER ON DIVIDED HIGHWAYS AND ONE-WAY ROADWAYS WHEN INDICATED ON THE CONTRACT DRAWINGS.
2. END CHAMFER ON THE CURB IS NOT REQUIRED ON THE TRAILING END OF THE CURB ON DIVIDED HIGHWAYS AND ONE-WAY ROADWAYS WHEN CONNECTING TO A W-BEAM GUIDE RAIL.
3. FOR THE W-BEAM GUIDE RAIL CONNECTION, THE COST OF THE CONNECTION PLATE, BOLTS, AND ASSOCIATED HARDWARE ARE INCLUDED WITH THE 3-RAIL BRIDGE BARRIER PAY ITEM.
4. FOR ADDITIONAL DETAILS AND NOTES, SEE SHEET 1.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

STANDARD

PA 3-RAIL BRIDGE BARRIER
MISCELLANEOUS DETAILS - 2

RECOMMENDED OCT. 7, 2024
Karin D. Lange
CHIEF BRIDGE ENGINEER

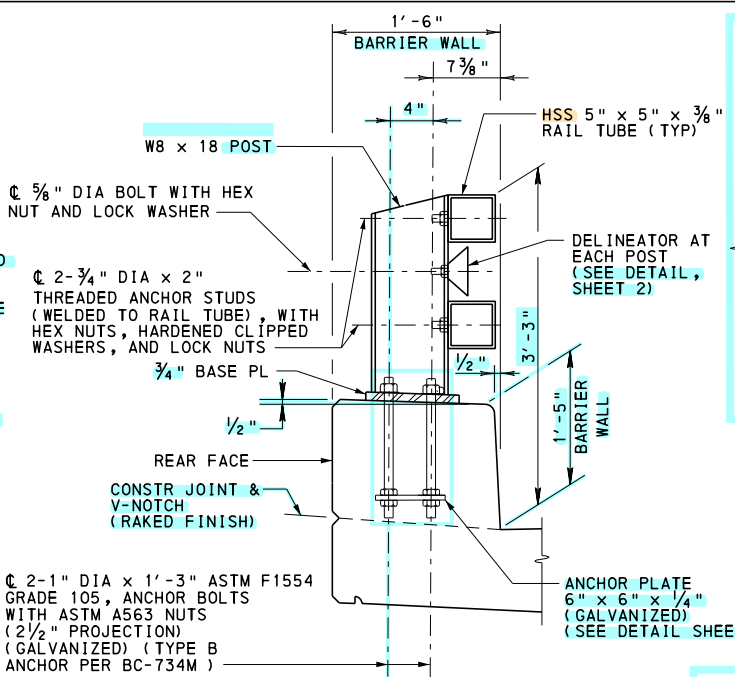
RECOMMENDED OCT. 7, 2024
Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 2 OF 2
BC-706M

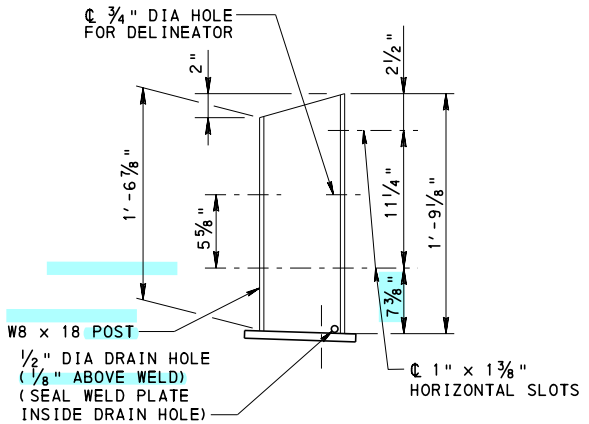
GENERAL NOTES:

1. PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH PUBLICATION 408.
2. PROVIDE RAIL TUBES CONFORMING TO ASTM A500, GRADE B OR C.
3. PROVIDE POSTS CONFORMING TO AASHTO M270 (ASTM A709), GRADE 50 OR ASTM A992. PROVIDE BASE PLATES CONFORMING TO AASHTO M270 (ASTM A709), GRADE 50. PROVIDE ANCHOR PLATES CONFORMING TO AASHTO M270 (ASTM A709), GRADE 36.
4. ALL RAILING COMPONENTS SHALL BE GALVANIZED (AFTER FABRICATION) AS SPECIFIED IN PUBLICATION 408, SECTION 1105.02(s), UNLESS OTHERWISE SHOWN ON PLANS. GALVANIZE POSTS, BASE PLATES, ANCHOR PLATES, AND SPLICE SLEEVES ACCORDING TO ASTM A123. GALVANIZE RAIL TUBES ACCORDING TO ASTM A123, EXCEPT COATING ON THREADED STUDS AND NUTS USED WITH THE STUDS SHALL MEET THE REQUIREMENTS OF ASTM A153 FOR CLASS C MATERIAL. GALVANIZE ALL ANCHOR HARDWARE ACCORDING TO ASTM A153 OR ASTM B695.
5. THE RAIL TUBES ARE SHOP BENT OR FABRICATED TO FIT HORIZONTAL CURVE WHEN RADIUS IS LESS THAN 1,500 FEET.
6. PROVIDE THREADED ANCHOR STUDS CONFORMING TO ASTM A108, TYPE B.
7. STEEL TUBE TOLERANCES:
 - A. STRAIGHTNESS: THE PERMISSIBLE VARIATION FOR STRAIGHTNESS SHALL BE 1/8" TIMES THE NUMBER OF FEET OF THE TOTAL LENGTH DIVIDED BY 5.
 - B. TWIST: SPECIFIED DIMENSION OF THE LONGEST SIDE IN INCHES FROM OVER 4" TO 6" INCLUSIVE: 0.087" MAXIMUM TWIST IN THE FIRST 3 FEET AND IN EACH ADDITIONAL 3 FEET.

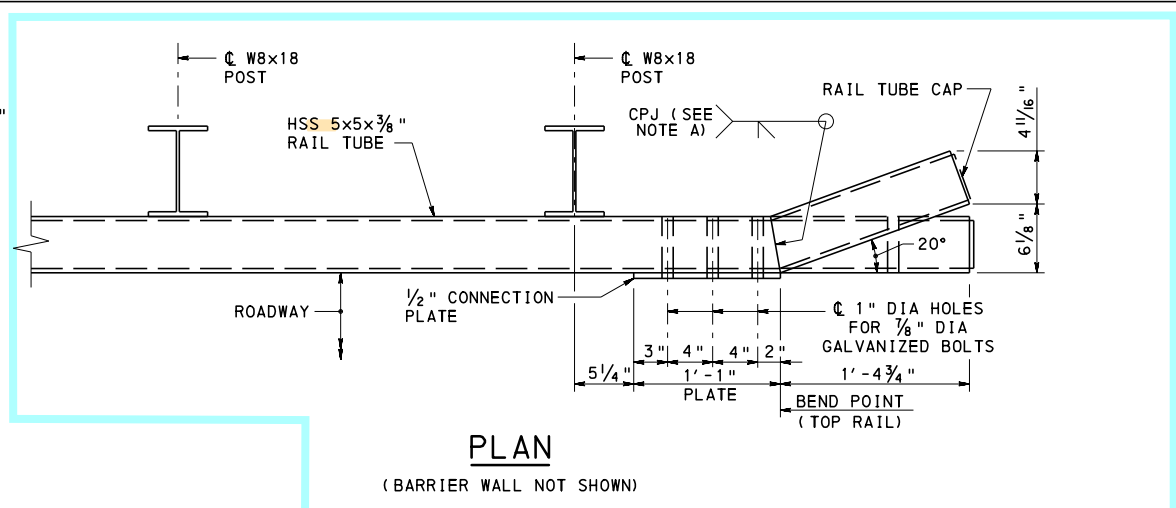
NOTE - TWIST IS MEASURED BY HOLDING DOWN ONE END OF SQUARE OR RECTANGULAR TUBE ON A FLAT SURFACE PLATE WITH THE BOTTOM SIDE OF THE TUBE PARALLEL TO THE SURFACE PLATE AND NOTING THE HEIGHT DIFFERENCE BETWEEN THE TWO CORNERS AT THE OPPOSITE END OF THE BOTTOM SIDE OF THE TUBE.
8. ALL WELDING SHALL CONFORM TO THE PROVISIONS OF AASHTO/AWS BRIDGE WELDING CODE D1.5, EXCEPT USE AASHTO/AWS STRUCTURAL WELDING CODE D1.1 FOR WELDING NOT COVERED IN D1.5.
9. IF FLAME CUTTING OR PLASMA CUTTING IS USED TO CREATE SLOTTED HOLES, GRIND SMOOTH TO PROVIDE VERTICAL AND FLAT SURFACES ALONG THE HOLE.
10. THE OUT OF FLATNESS TOLERANCE FOR THE POST BASE PLATES IS 1/8" CHECKED BETWEEN EDGES OF THE PLATE IN ANY DIRECTION AFTER WELDING IS COMPLETED. THE CONTRACTOR MAY ELECT TO USE THICKER PLATE MATERIAL AND MILL THE BASE PLATE TO A THICKNESS OF NO LESS THAN 5/8" TO MEET THIS TOLERANCE.
11. BOLT TIGHTENING PROCEDURES ARE AS FOLLOWS:
 - A. SNUG TIGHTEN ALL ANCHOR BOLTS. TIGHTEN THE NUTS AN ADDITIONAL 1/3 TURN USING A WRENCH.
 - B. SNUG TIGHTEN ALL THREADED ANCHOR STUDS.
12. MILL TO BEAR IS DEFINED AS FOLLOWS:
 - A. A MINIMUM OF 25% OF THE POST WEB AND COMPRESSION FLANGE END AREA MUST FIT WITHIN 1/32" OF THE BASE PLATE WITH NO GAP MORE THAN 0.040" FOR THE REMAINING 75% OF THE END AREA.
13. FOR RAIL TUBE TO POST CONNECTION AND SIDEWALK RAIL TUBE CONNECTION, USE AUTOMATIC WELDED THREADED ANCHOR STUDS MEETING THE REQUIREMENTS OF ASTM A108. USE HEX NUTS MEETING THE REQUIREMENTS OF ASTM A563. USE A 3/16" THICK PLATE LOCK WASHER ON EACH STUD AND A 3/8" THICK PLATE ASTM A709, GRADE 36 KSI WASHER. U-WASHERS SHALL MEET THE REQUIREMENTS OF ASTM A709, GRADE 36 KSI STEEL.
14. FOR ANCHOR BOLTS, USE 1" DIA BOLTS CONFORMING TO THE REQUIREMENTS OF ASTM F1554, GRADE 105 KSI, INCLUDING THE SUPPLEMENTARY REQUIREMENT, S5, FOR CHARPY IMPACT STRENGTH. USE ASTM A563, GRADE DH HEAVY HEX NUTS. USE ONE ASTM F436 WASHER AT THE TOP.
15. NO POST REQUIRED ADJACENT TO FLUSH JOINTS AT WINGWALL, IF POSTS LOCATED AT EXPANSION JOINT/ABUTMENT CORNER.
16. THE CENTERLINE OF THE RAIL TUBE SPLICE TO A POST IS TO BE 1'-8" MINIMUM AND 2'-6" MAXIMUM FROM THE CENTERLINE OF THE RAILING POST.
17. ONE OR MORE 10'-0" MAXIMUM POST SPACINGS MAY BE REDUCED TO 5'-0" MINIMUM IN ORDER TO MAINTAIN APPROPRIATE SPACING DIMENSIONS FROM THE END OF THE RAIL, EXPANSION JOINTS AND DRAINAGE SCUPPERS.
18. LOCATE RAIL SPLICES AT EXPANSION JOINTS AND AT OTHER LOCATIONS, WHERE NECESSARY PROVIDE RAILS AS LONG AS PRACTICAL, WITH MINIMUM OF THREE POSTS BETWEEN SPLICES, UNLESS OTHERWISE REQUIRED FOR EXPANSION.
19. PROVIDE RAIL TUBES CONTINUOUS OVER NOT LESS THAN TWO RAILING POSTS. NO WELDED BUTT SPLICES WILL BE ALLOWED IN THE RAIL TUBE SECTION.
20. PLACE POST AND POST ANCHOR BOLTS NORMAL TO GRADE AND RAILS PARALLEL TO GRADE.
21. COAT ALL SURFACES OF THE BASE PLATE IN CONTACT WITH CONCRETE WITH CAULKING COMPOUND PRIOR TO ERECTION. AFTER ERECTION AND ALIGNMENT, SEAL OPENINGS BETWEEN THE METAL SURFACES AND THE CONCRETE WITH CAULKING COMPOUND CONFORMING TO PUBLICATION 408, SECTION 705.7(b).
22. THE PA TYPE 10M BRIDGE BARRIER IS DESIGNATED AS MASH TL-4.
23. FOR GUIDE RAIL TRANSITION TO PA TYPE 10M BRIDGE BARRIER, SEE RC-50M.
24. PROVIDE VERTICAL V-NOTCHES ON BARRIER WALL FRONT AND REAR FACES AT ALL POST ANCHOR BOLT LOCATIONS. SEE DETAIL THIS SHEET.



BARRIER SECTION



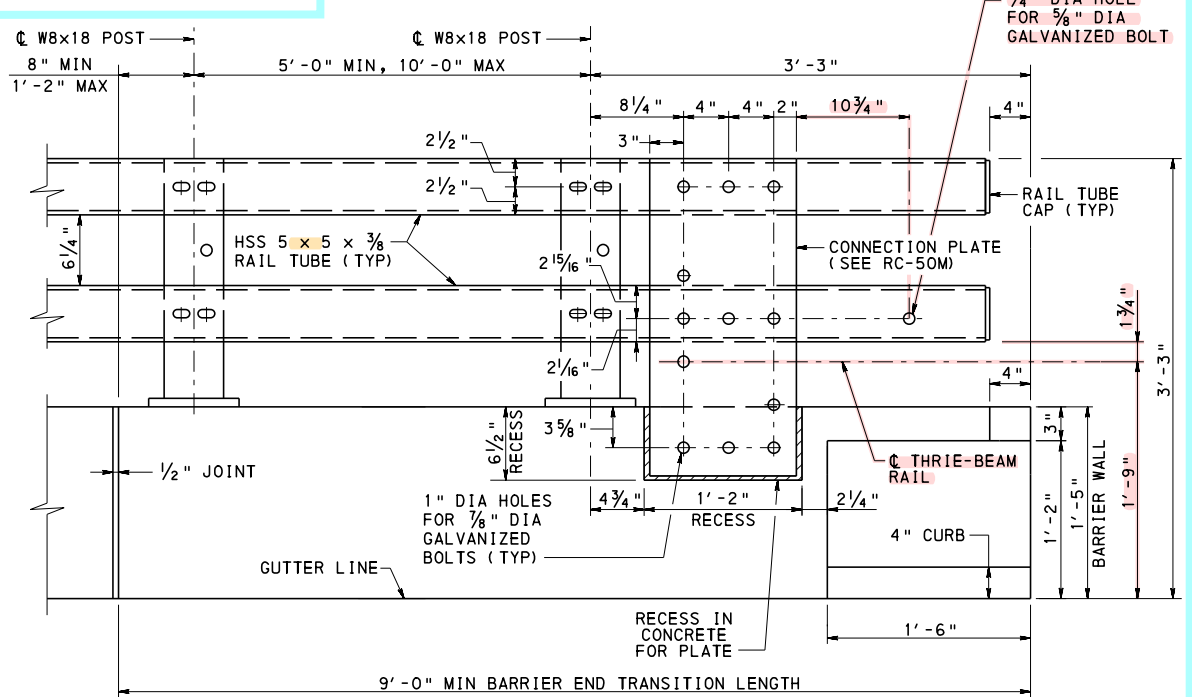
ELEVATION-POST



PLAN

(BARRIER WALL NOT SHOWN)

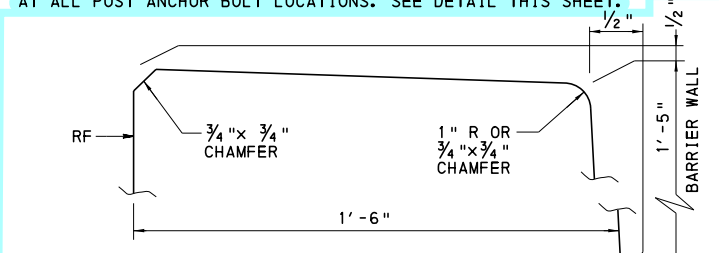
NOTE A: COMPLETE JOINT PENETRATION GROOVE WELD. GRIND FLUSH ON OUTSIDE FACE. SHOW SPECIFIC WELD SYMBOL ON SHOP DRAWINGS.



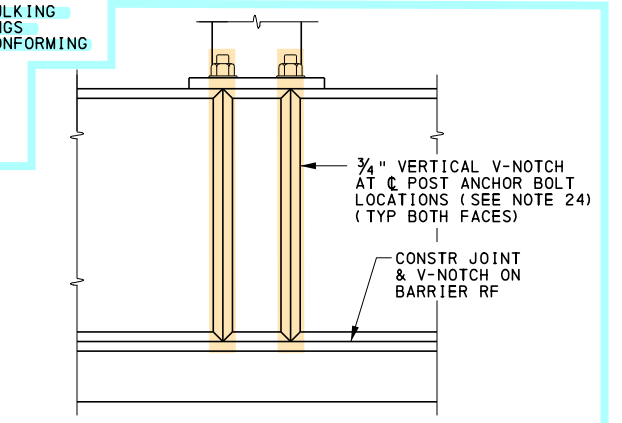
ELEVATION

PA TYPE 10M BRIDGE BARRIER WITH THRIE-BEAM CONNECTION

(GUIDE RAIL AND ANCHOR BOLTS OMITTED FOR CLARITY) (WITH CURB SHOWN, WITHOUT CURB SIMILAR)



BARRIER WALL GEOMETRY DETAIL
(BASE PLATE AND ANCHOR BOLTS NOT SHOWN FOR CLARITY)



VERTICAL V-NOTCH DETAIL
(BARRIER REAR FACE SHOWN, FRONT FACE SIMILAR)

BC-711M	ALUMINUM PROTECTIVE BARRIER
BC-720M	ALUMINUM OR STEEL BRIDGE HAND RAILING
BC-721M	ELECTRICAL DETAILS
BC-734M	ANCHOR SYSTEMS
BC-736M	REINFORCEMENT BAR FABRICATION DETAILS
BC-752M	CONCRETE DECK SLAB DETAILS
BC-762M	TOOTH EXPANSION DAM FOR PRESTRESSED CONCRETE AND STEEL BEAM BRIDGES
BC-767M	NEOPRENE STRIP SEAL DAM FOR PRESTRESSED CONCRETE AND STEEL I-BEAM BRIDGES
BC-799M	MECHANICALLY STABILIZED EARTH RETAINING WALLS
RC-20M	CONCRETE PAVEMENT JOINTS
RC-50M	GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS
RC-51M	TYPE 31 STRONG POST GUIDERAIL

REFERENCE DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

STANDARD

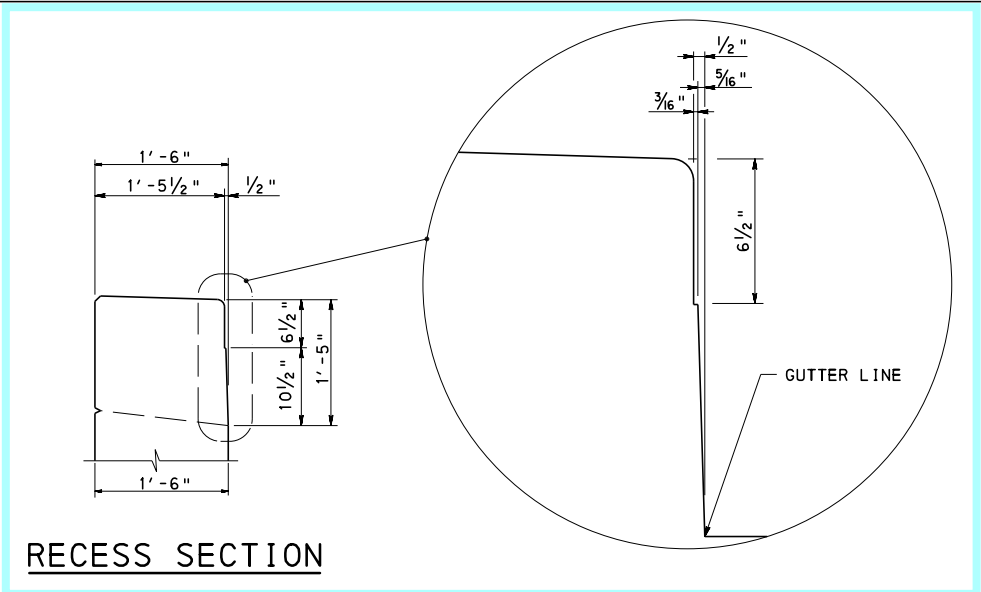
PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS - 1

RECOMMENDED OCT. 7, 2024
RECOMMENDED OCT. 7, 2024
SHEET 1 OF 13

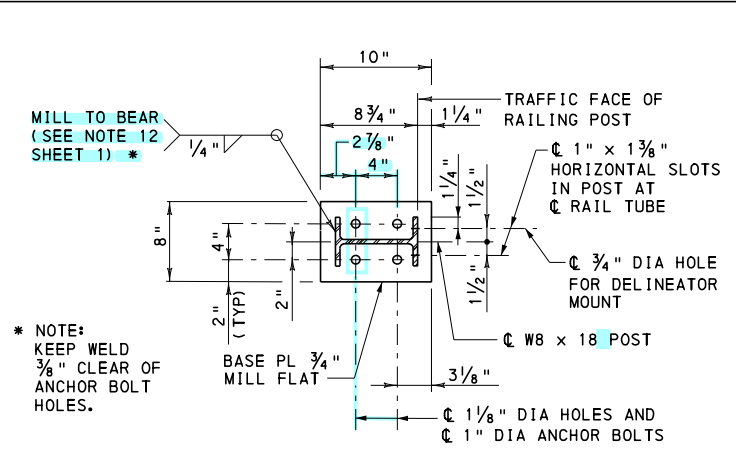
CHIEF BRIDGE ENGINEER
CHIEF ENGINEER, HIGHWAY ADMIN.

BC-709M

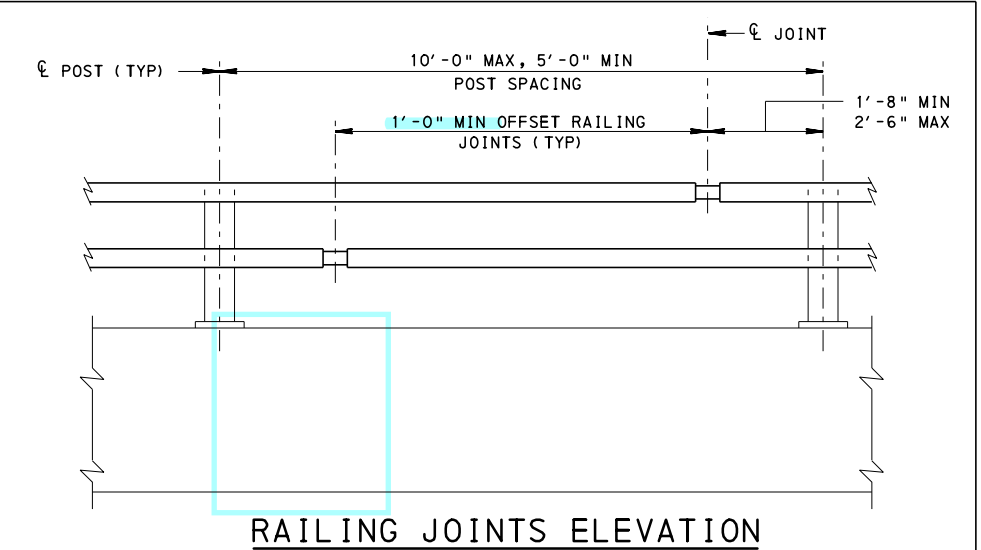
- CHANGE 2
- CHANGE 3
- CHANGE 4
- CHANGE 7



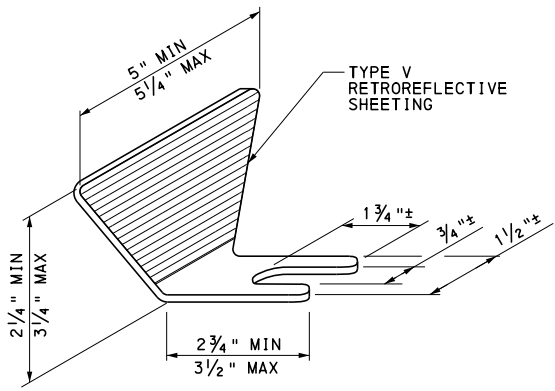
RECESS SECTION



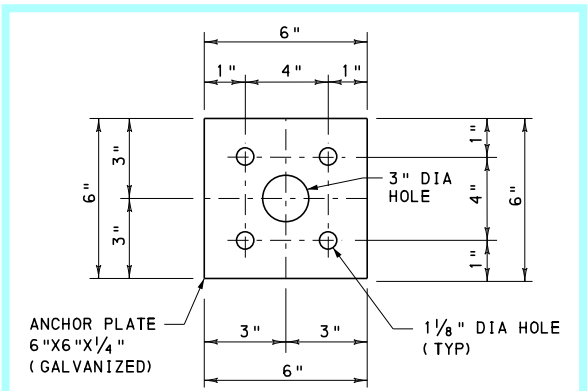
BASE PLATE DETAIL



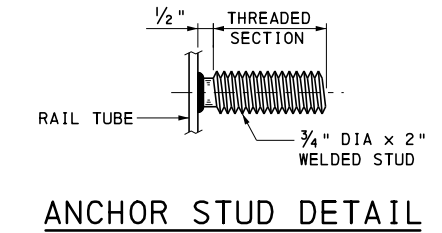
RAILING JOINTS ELEVATION



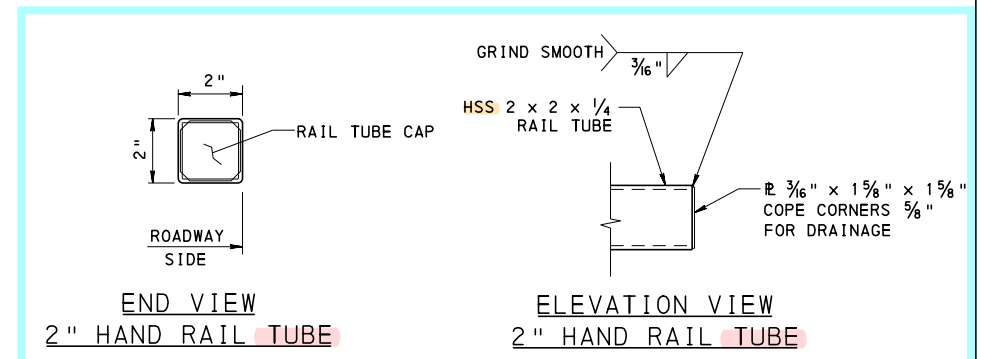
DELINEATOR DETAIL



ANCHOR PLATE DETAIL

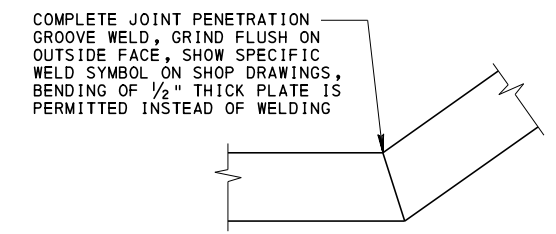


ANCHOR STUD DETAIL

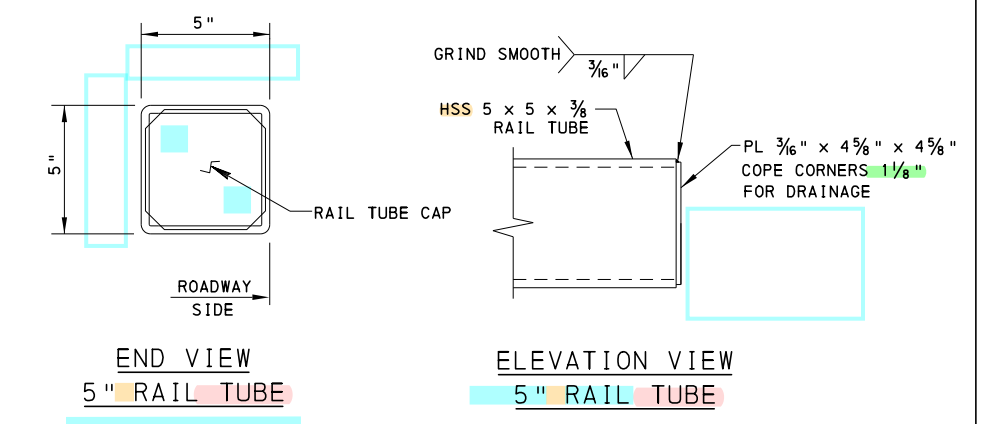


END VIEW
2" HAND RAIL TUBE

ELEVATION VIEW
2" HAND RAIL TUBE



TYPICAL WELD AT MITERS

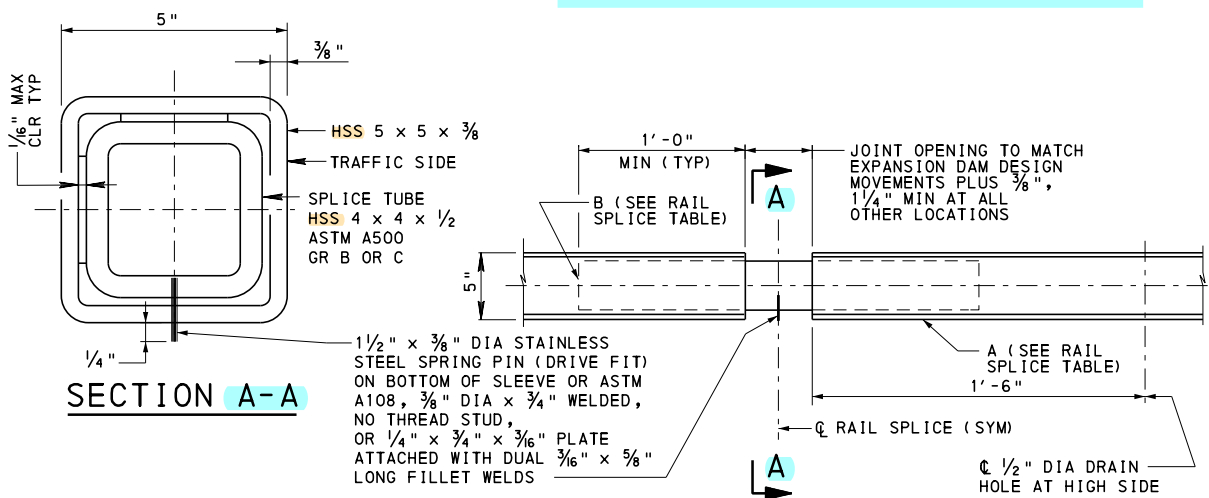


END VIEW
5" RAIL TUBE

ELEVATION VIEW
5" RAIL TUBE

RAIL TUBE CAP DETAILS

(CAP TO COMPLETELY COVER END OF TUBE EXCEPT FOR CLIPPED CORNERS)

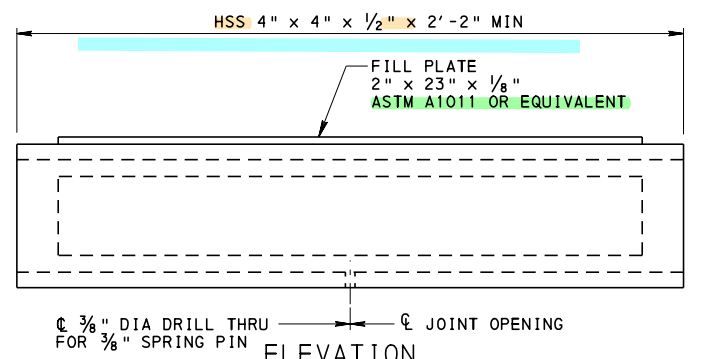


SECTION A-A

RAIL SPLICE

HSS 5 x 5 x 3/8 RAIL SPLICE SHOWN;
HSS 2 x 2 x 1/4 RAIL SPLICE SIMILAR WITHOUT FILL PLATE

RAIL SPLICE TABLE	
A (RAIL TUBE)	B (SPLICE TUBE)
HSS 5 x 5 x 3/8	HSS 4 x 4 x 1/2 ASTM A500, GR. B OR C
HSS 2 x 2 x 1/4	1 1/4" x 1 1/4" ROD ASTM A709, GR. 36 OR 50



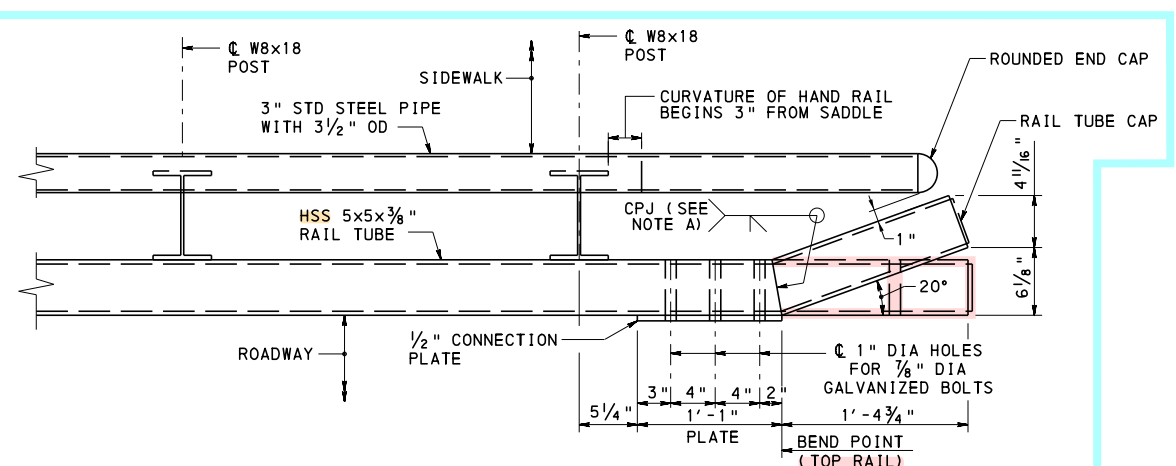
ELEVATION

SPLICE TUBE

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

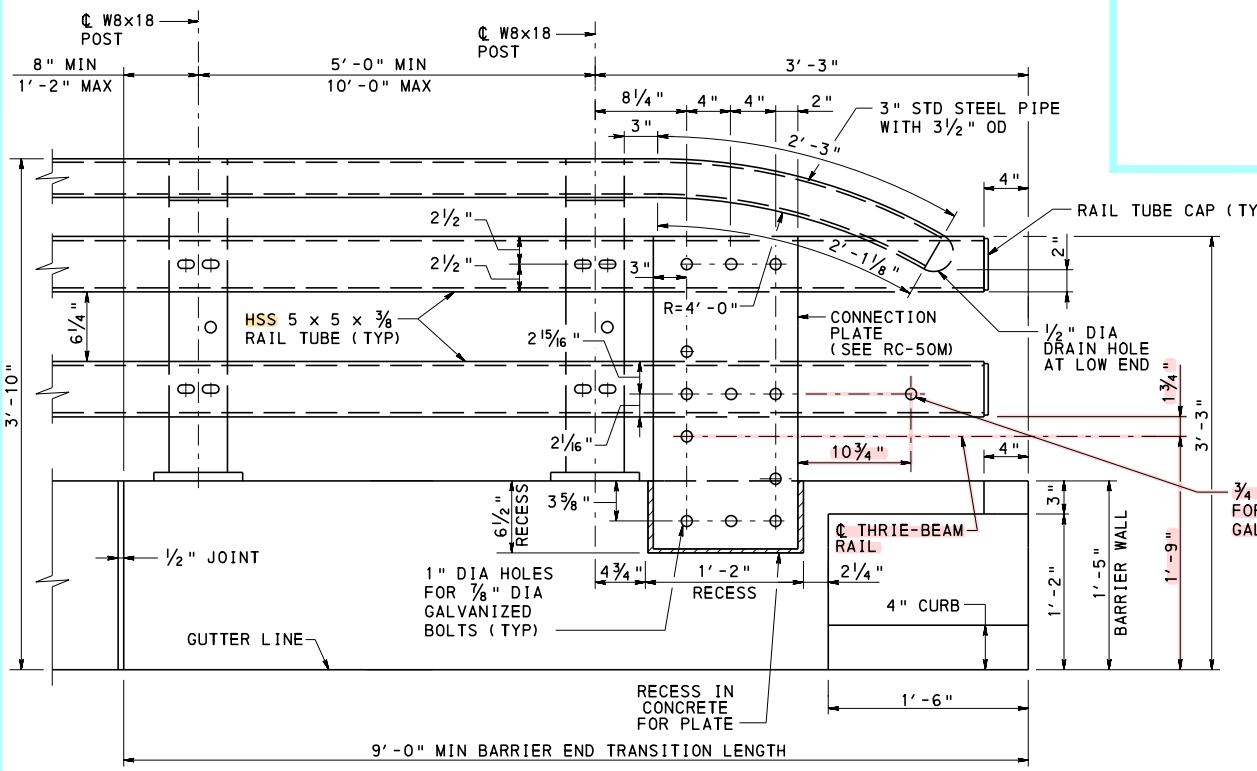
STANDARD
PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS - 2

RECOMMENDED OCT. 7, 2024 <i>Kevin S. Lange</i> CHIEF BRIDGE ENGINEER	RECOMMENDED OCT. 7, 2024 <i>Gavin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 2 OF 13 BC-709M
--	--	--------------------------



PLAN
(BARRIER WALL NOT SHOWN)

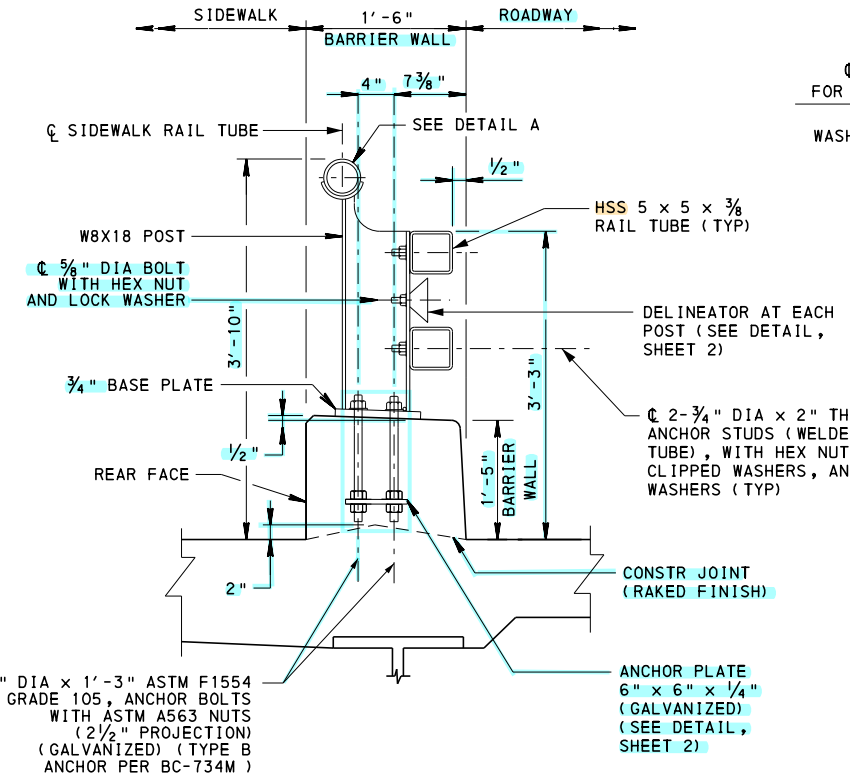
NOTE A:
COMPLETE JOINT PENETRATION GROOVE WELD. GRIND FLUSH ON OUTSIDE FACE. SHOW SPECIFIC WELD SYMBOL ON SHOP DRAWINGS.



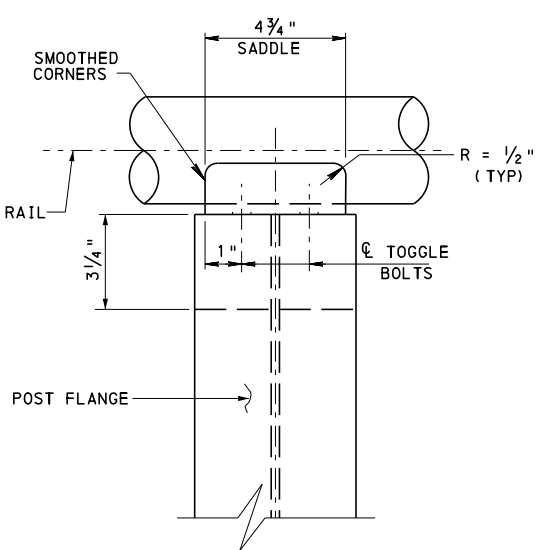
ELEVATION

**PA TYPE 10M BRIDGE BARRIER
TYPICAL SIDEWALK WITH THRIE-BEAM CONNECTION**

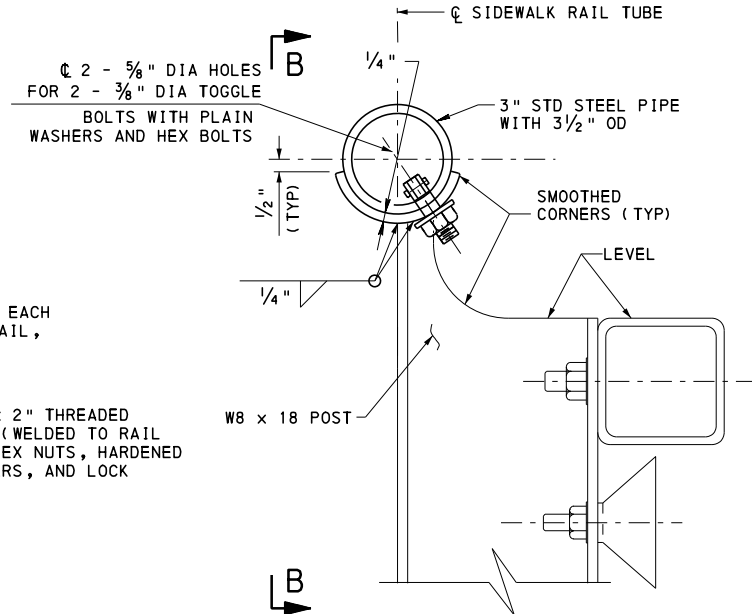
(GUIDE RAIL AND ANCHOR BOLTS OMITTED FOR CLARITY)
(WITH CURB SHOWN, WITHOUT CURB SIMILAR)



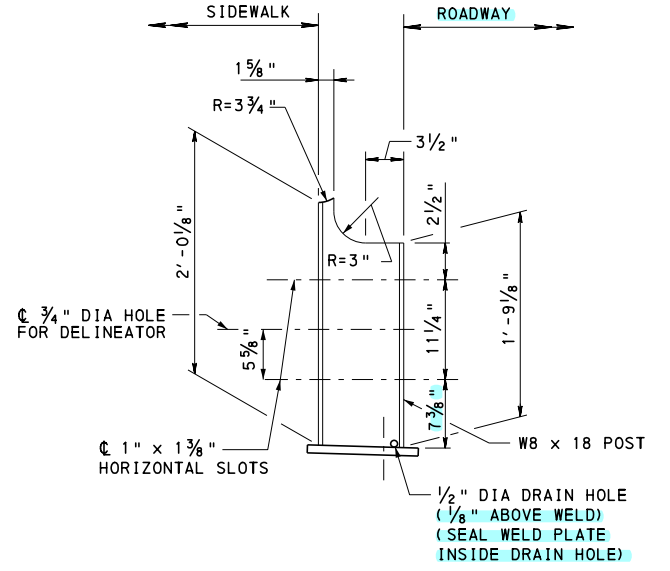
BARRIER SECTION



SECTION B-B



DETAIL A
(AT TYPICAL SIDEWALK)

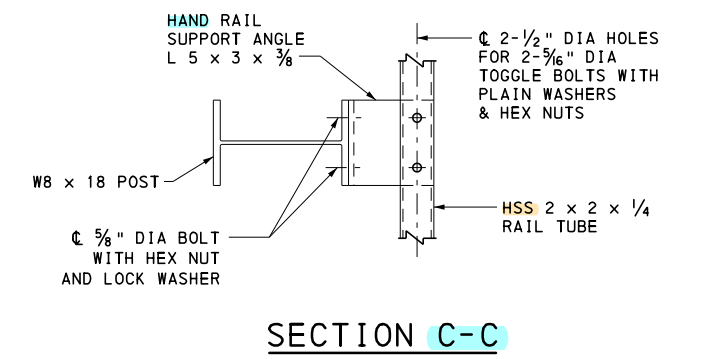
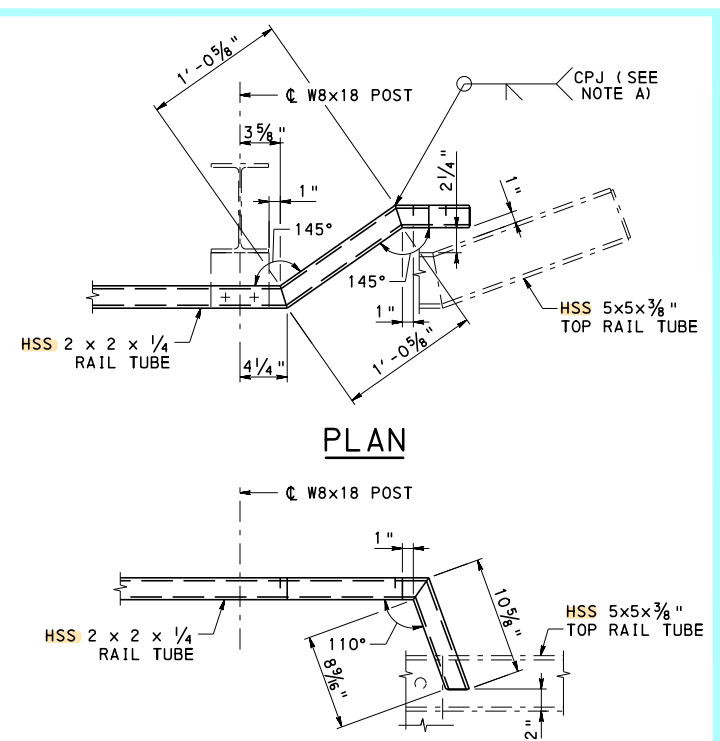
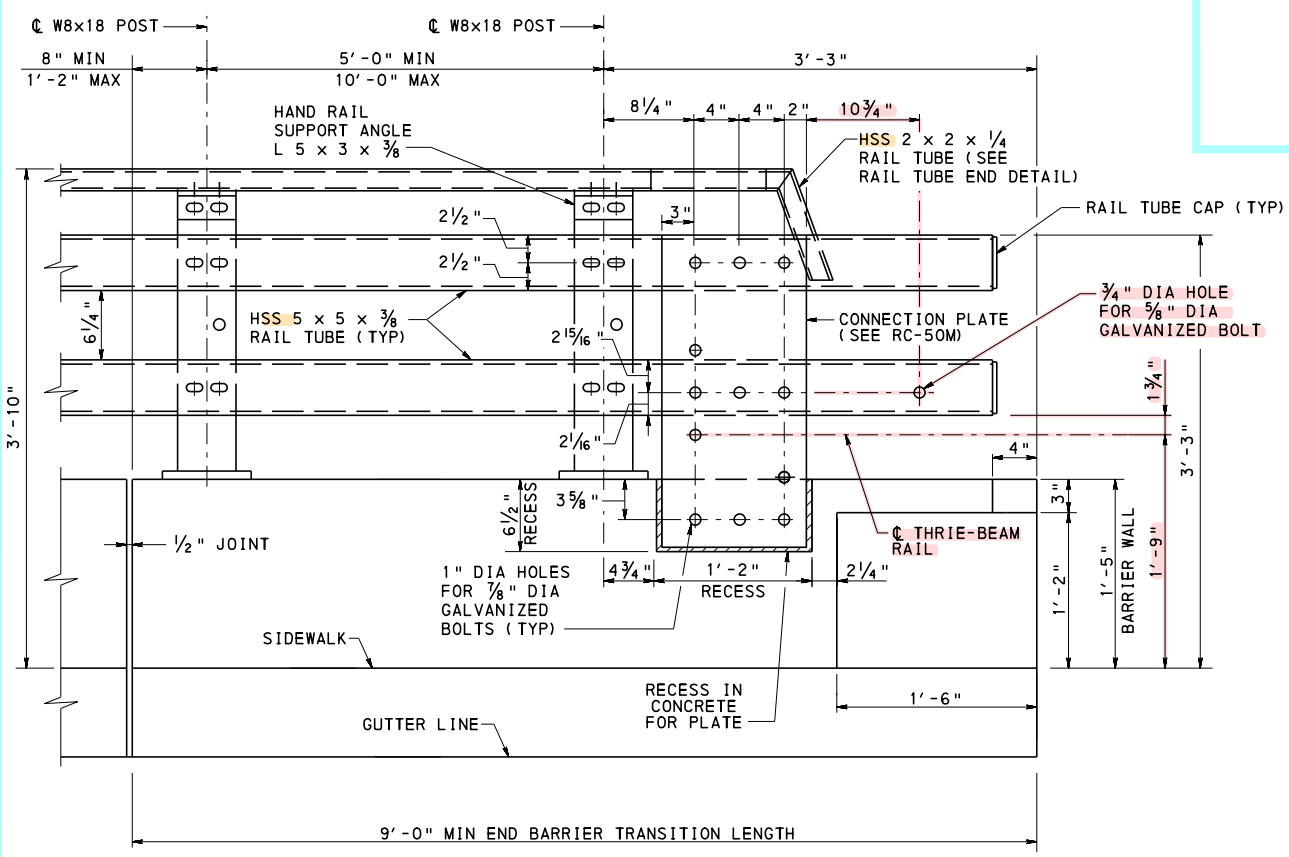
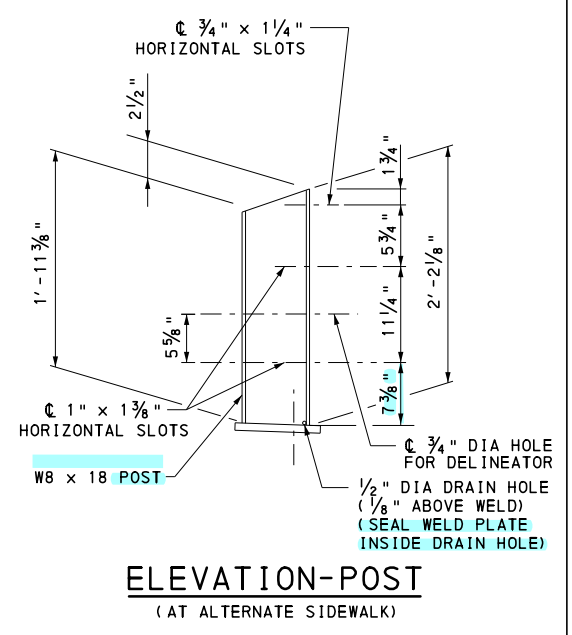
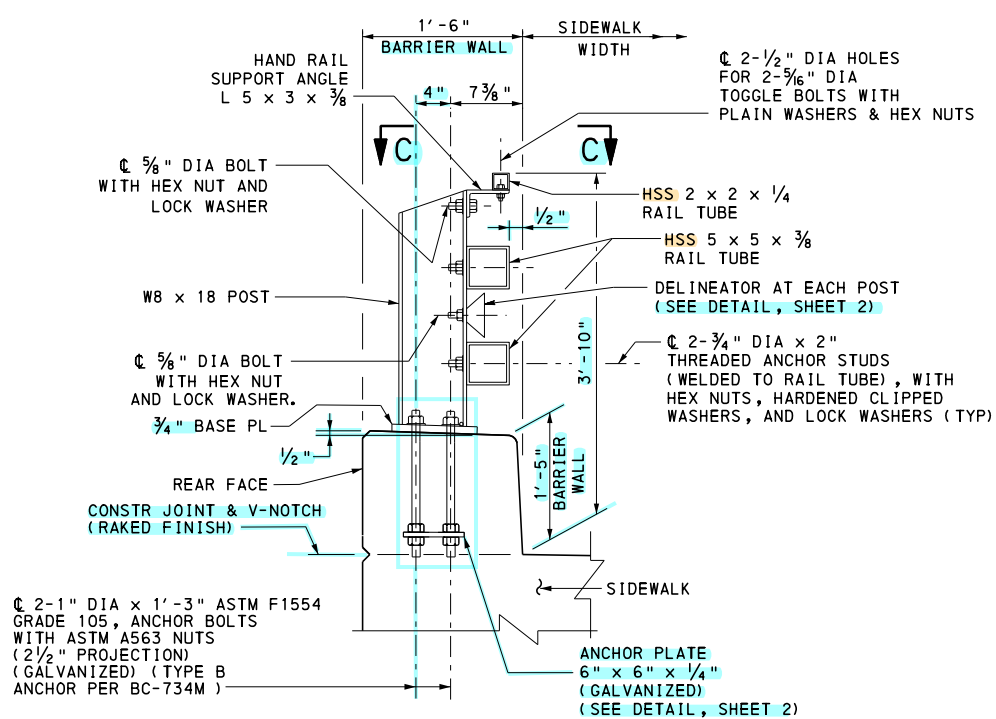
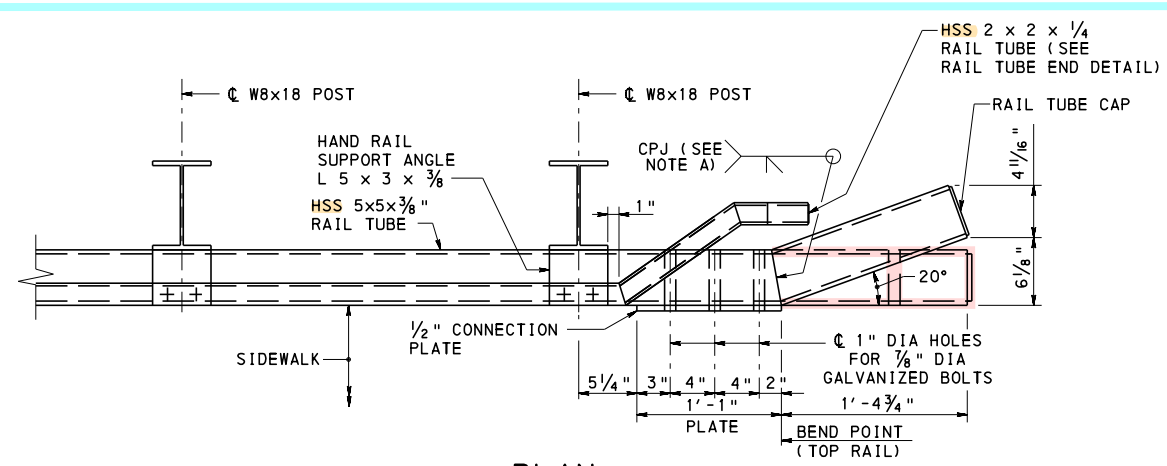


ELEVATION-POST
(AT TYPICAL SIDEWALK)

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE**

STANDARD

**PA TYPE 10M BRIDGE BARRIER
TYPICAL SIDEWALK DETAILS**

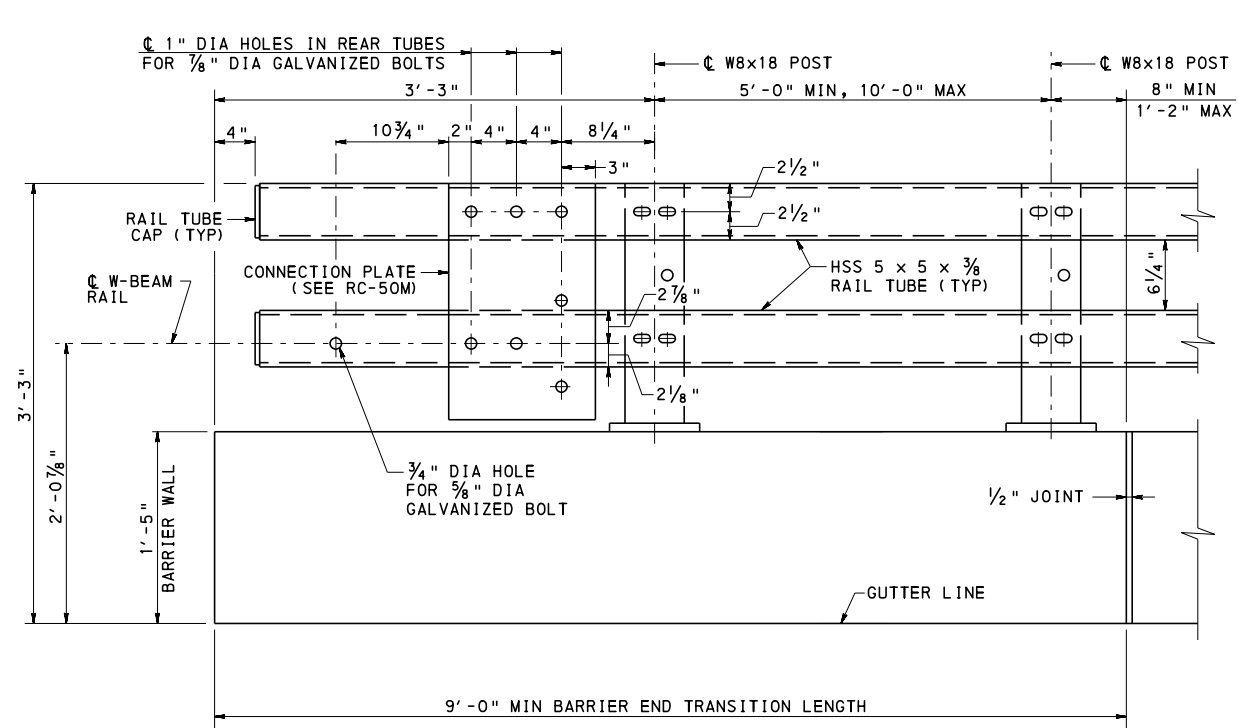


PA TYPE 10M BRIDGE BARRIER
ALTERNATE SIDEWALK WITH THRIE-BEAM CONNECTION
(GUIDE RAIL AND ANCHOR BOLTS OMITTED FOR CLARITY)
(WITHOUT CURB SHOWN, WITH CURB SIMILAR)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

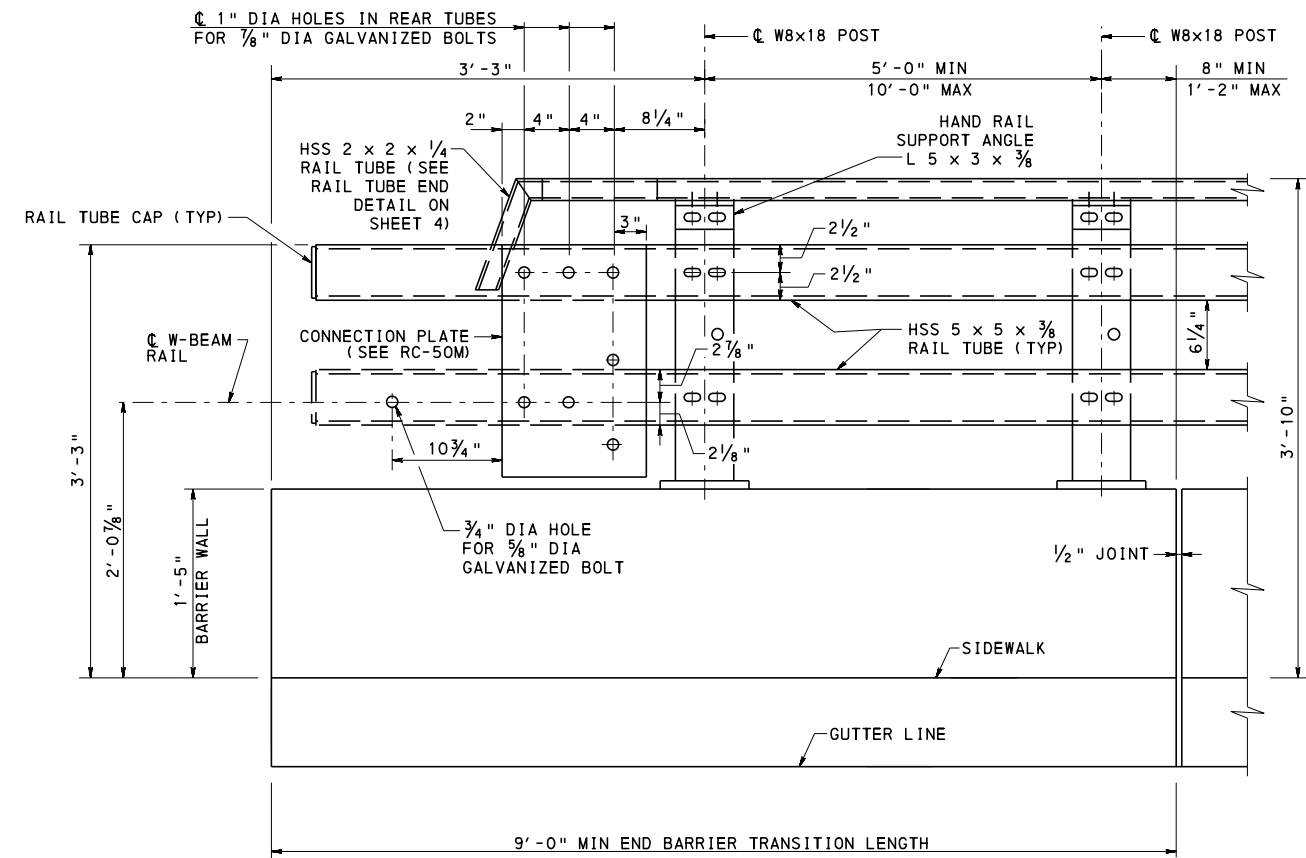
STANDARD

PA TYPE 10M BRIDGE BARRIER
ALTERNATE SIDEWALK DETAILS



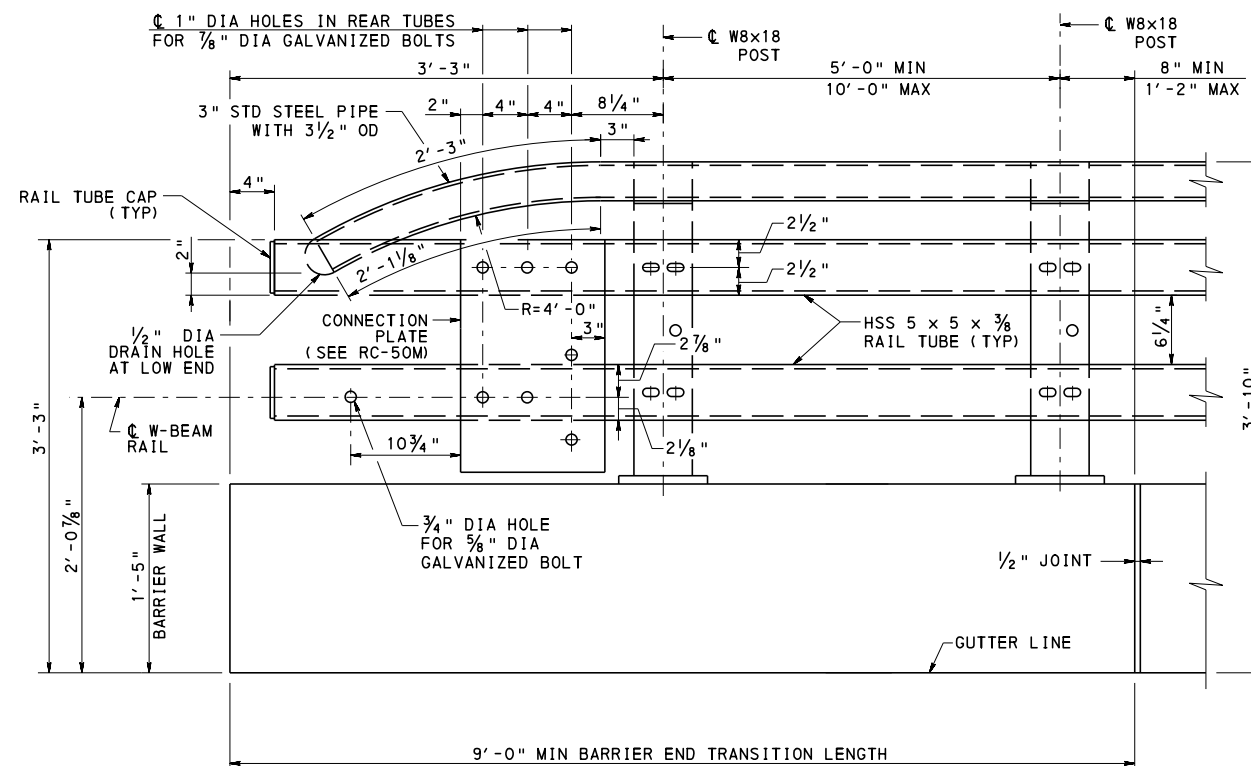
ELEVATION
PA TYPE 10M BRIDGE BARRIER
WITH W-BEAM CONNECTION

(GUIDE RAIL AND ANCHOR BOLTS OMITTED FOR CLARITY)



ELEVATION
PA TYPE 10M BRIDGE BARRIER
ALTERNATE SIDEWALK WITH W-BEAM CONNECTION

(GUIDE RAIL AND ANCHOR BOLTS OMITTED FOR CLARITY)



ELEVATION
PA TYPE 10M BRIDGE BARRIER
TYPICAL SIDEWALK WITH W-BEAM CONNECTION

(GUIDE RAIL AND ANCHOR BOLTS OMITTED FOR CLARITY)

W-BEAM CONNECTION NOTES:

1. PROVIDE W-BEAM GUIDE RAIL CONNECTION ON THE TRAILING END OF THE BRIDGE BARRIER ON DIVIDED HIGHWAYS AND ONE-WAY ROADWAYS WHEN INDICATED ON THE CONTRACT DRAWINGS.
2. END CHAMFERS ON THE BARRIER WALL ARE NOT REQUIRED ON THE TRAILING END OF THE BARRIER WALL ON DIVIDED HIGHWAYS AND ONE-WAY ROADWAYS WHEN CONNECTING TO A W-BEAM GUIDE RAIL.
3. FOR THE W-BEAM GUIDE RAIL CONNECTION, THE COST OF THE CONNECTION PLATE, BOLTS, AND ASSOCIATED HARDWARE ARE INCLUDED WITH THE PA TYPE 10M BRIDGE BARRIER PAY ITEM.
4. FOR ADDITIONAL DETAILS AND NOTES, SEE SHEETS 1-4.

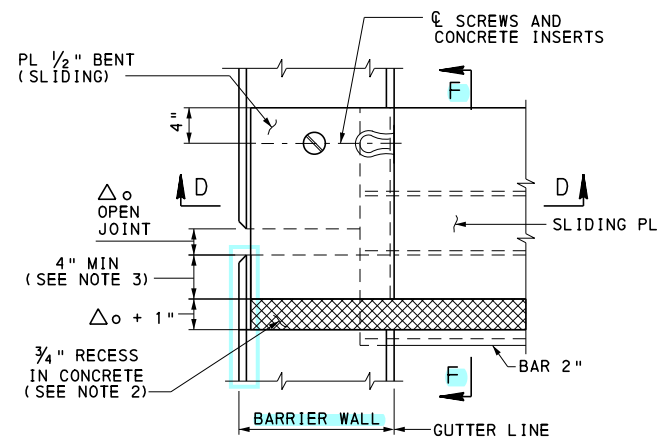
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF BRIDGE

STANDARD
 PA TYPE 10M BRIDGE BARRIER
 W-BEAM CONNECTION ELEVATIONS

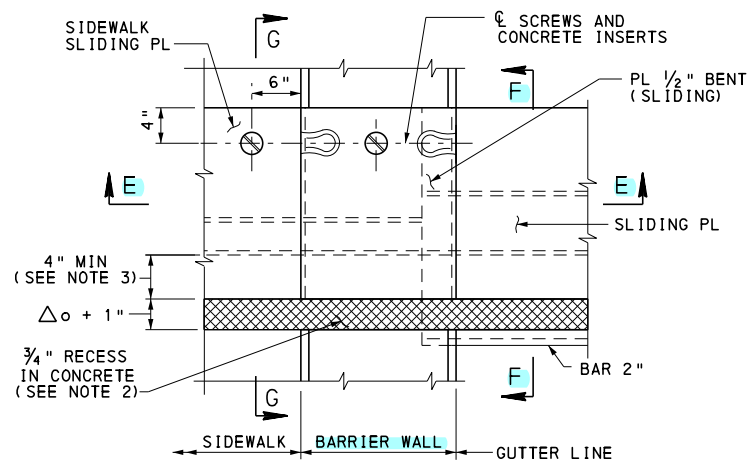
RECOMMENDED OCT. 7, 2024
Karin D. Lange
 CHIEF BRIDGE ENGINEER

RECOMMENDED OCT. 7, 2024
Gavin E. Gray
 CHIEF ENGINEER, HIGHWAY ADMIN.

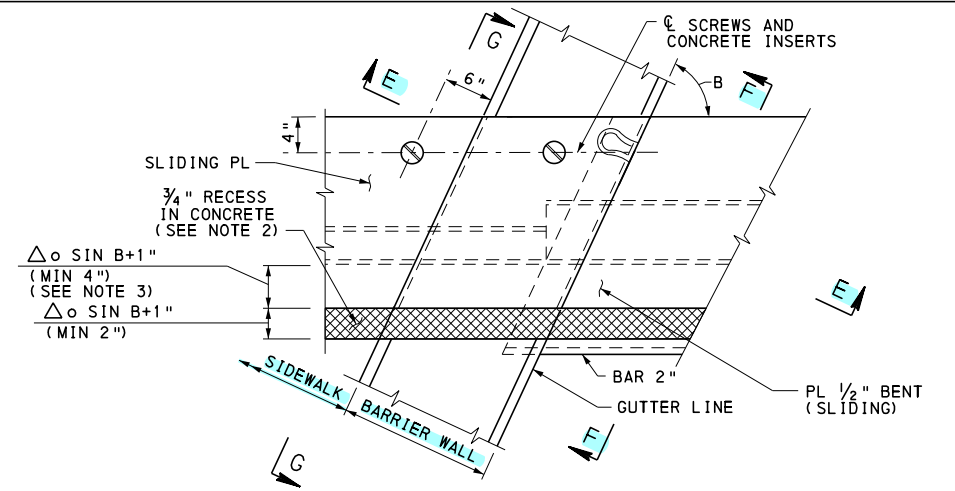
SHEET 5 OF 13
 BC-709M



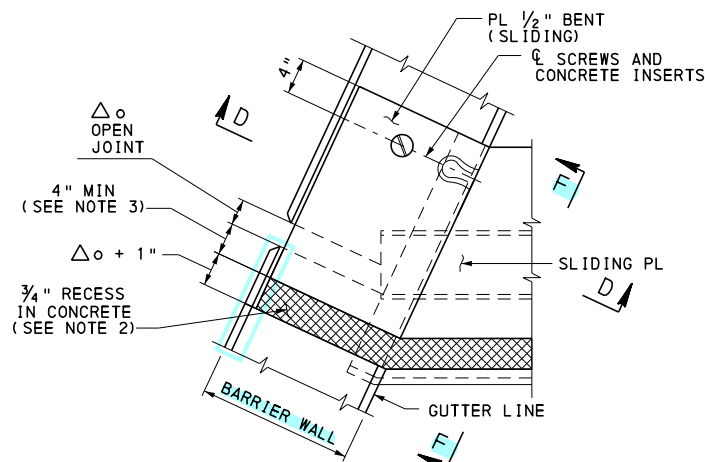
PLAN - SKEW ANGLE $\geq 75^\circ$
 (AT GUTTER LINE SHOWN;
 AT ALTERNATE SIDEWALK SIMILAR)



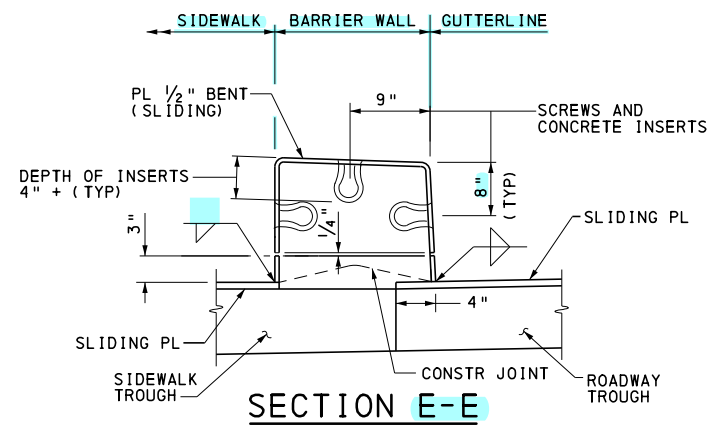
PLAN AT TYPICAL SIDEWALK - SKEW ANGLE $\geq 75^\circ$



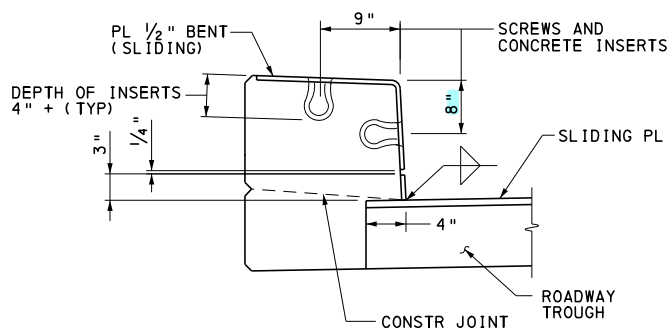
PLAN AT TYPICAL SIDEWALK - SKEW ANGLE $< 75^\circ$



PLAN - SKEW ANGLE $< 75^\circ$
 (AT GUTTER LINE SHOWN;
 AT ALTERNATE SIDEWALK SIMILAR)

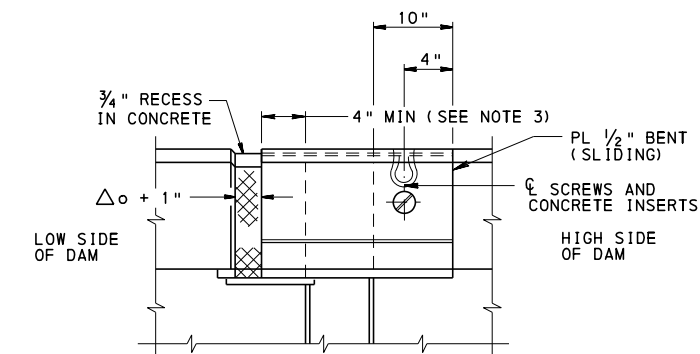


SECTION E-E



SECTION D-D

(NO SIDEWALK CONDITION SHOWN;
 ALTERNATE SIDEWALK SIMILAR)



SECTION F-F

(SECTION G-G IS OPPOSITE HAND)

PA TYPE 10M BRIDGE BARRIER AT TOOTH EXPANSION DAM

(RAILING POST AND TUBE RAILS NOT SHOWN)

NOTES:

- FOR Δ_o SEE BC-762M
- FORM CONCRETE RECESS AREA IN BARRIER WALL AND GRIND TO PROVIDE SMOOTH SURFACE. APPLY ONE COAT OF ASPHALT CEMENT PAINT WA-1 OR PERFORMANCE GRADED ASPHALT CEMENT PG 64-22 TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION.
- MAINTAIN 4" MINIMUM BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT TEMPERATURE OF -10°F FOR STEEL BRIDGES AND 10°F FOR PRESTRESSED (P/S) CONCRETE BRIDGES.
- MAXIMUM DISTANCE FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3".

COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF TRANSPORTATION
 BUREAU OF BRIDGE

STANDARD

PA TYPE 10M BRIDGE BARRIER
 DETAILS AT TOOTH EXPANSION DAM

RECOMMENDED OCT. 7, 2024

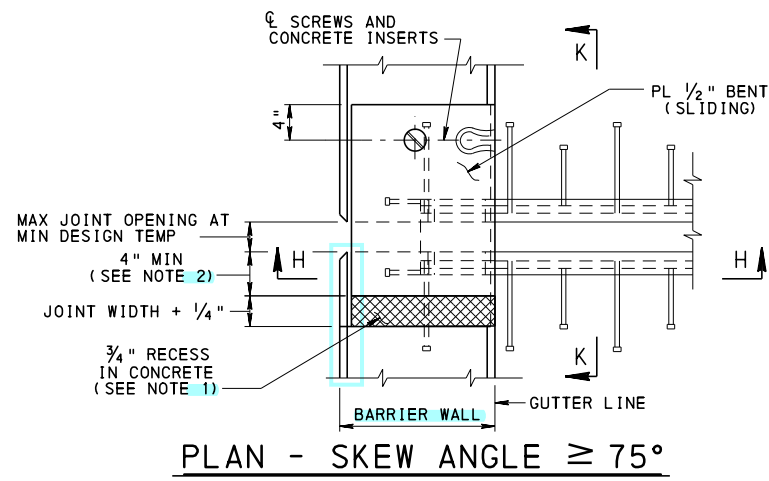
Kevin J. Sarge
 CHIEF BRIDGE ENGINEER

RECOMMENDED OCT. 7, 2024

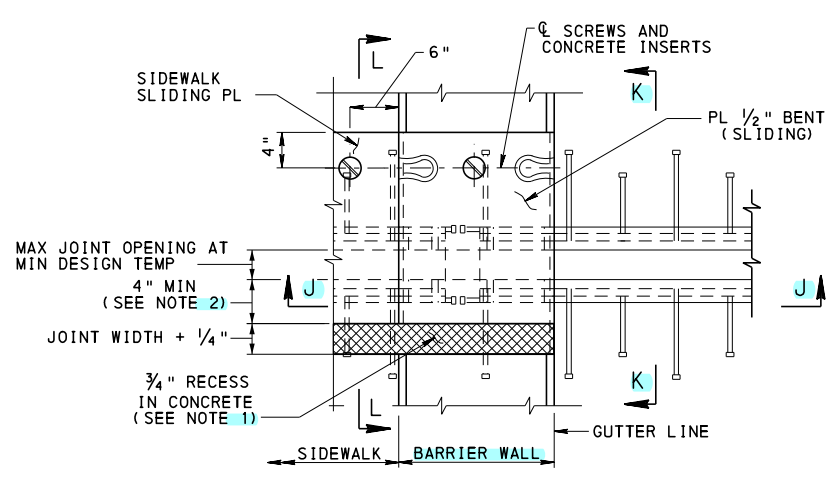
Gavin E. Gray
 CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 6 OF 13

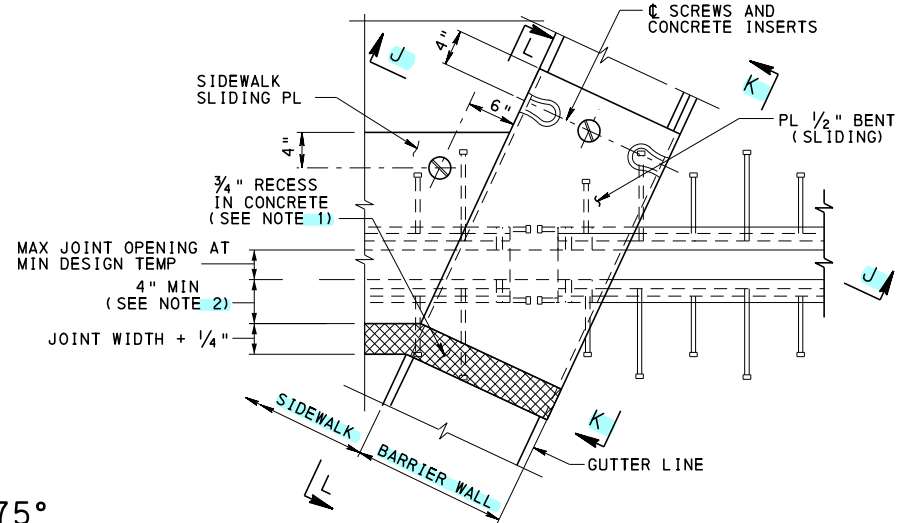
BC-709M



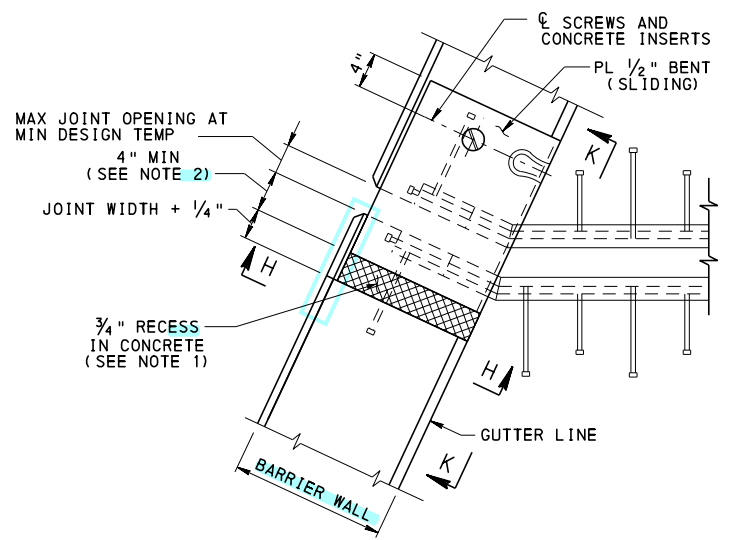
PLAN - SKEW ANGLE $\geq 75^\circ$



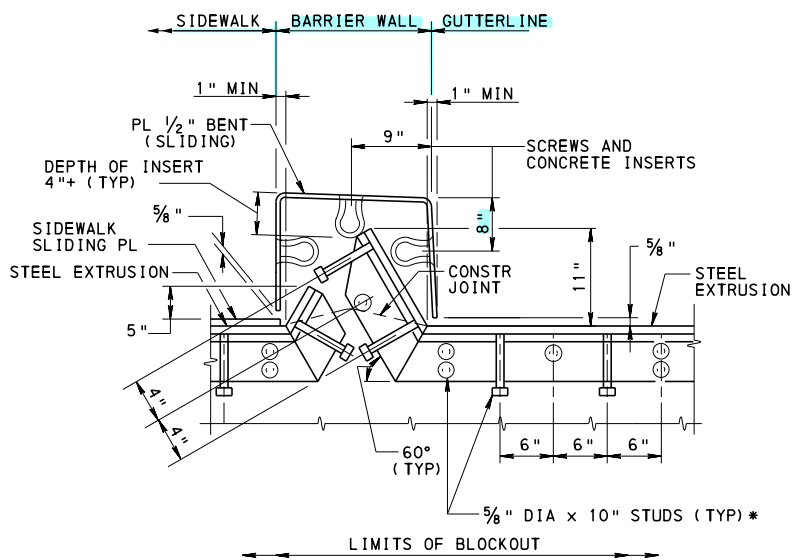
PLAN AT TYPICAL SIDEWALK- SKEW ANGLE $\geq 75^\circ$



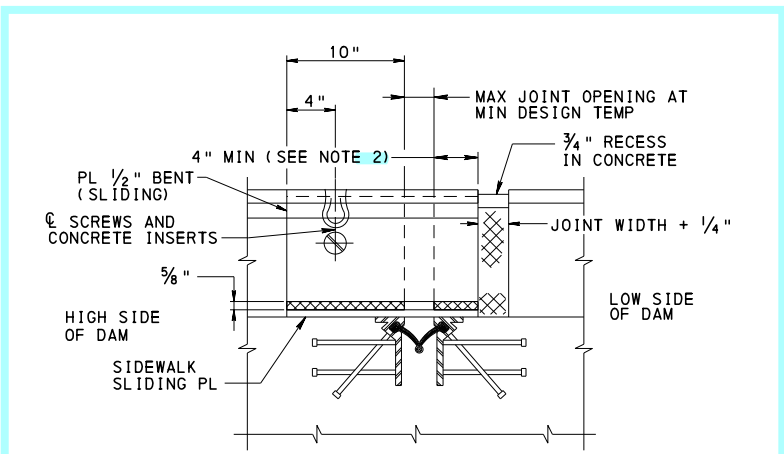
PLAN AT TYPICAL SIDEWALK- SKEW ANGLE $< 75^\circ$



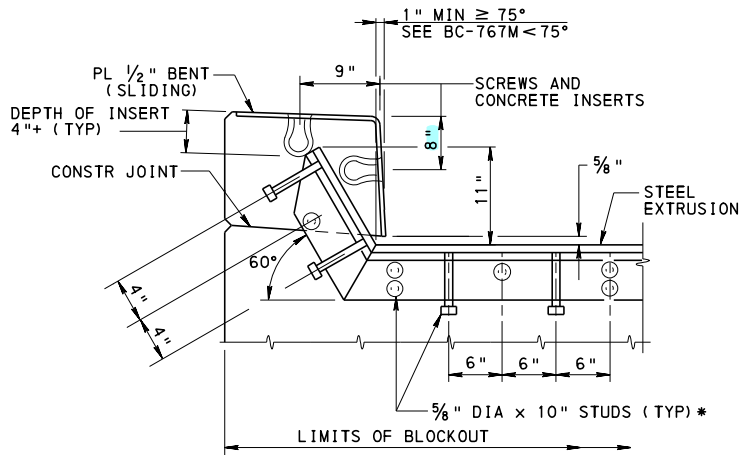
PLAN - SKEW ANGLE $< 75^\circ$



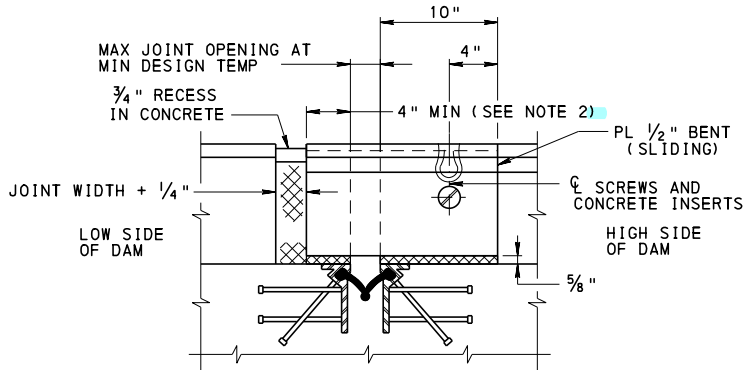
SECTION J-J



SECTION L-L



SECTION H-H



SECTION K-K

NOTES:

- FORM CONCRETE RECESS AREA IN BARRIER WALL AND GRIND TO PROVIDE SMOOTH SURFACE. APPLY ONE COAT OF ASPHALT CEMENT PAINT WA-1 OR PERFORMANCE GRADED ASPHALT CEMENT PG 64-22 TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION.
- MAINTAIN 4" MINIMUM BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT TEMPERATURE OF -10°F FOR STEEL BRIDGES AND 10°F FOR PRESTRESSED (P/S) CONCRETE BRIDGES.
- MAXIMUM DISTANCE ALONG THE EXTRUSION FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3".
- ALTERNATE STRIP SEAL DAM (NOT SHOWN) SIMILAR TO THAT ON BC-767M, SHEET 7, IS PERMITTED IF SHOWN ON THE CONTRACT PLANS.

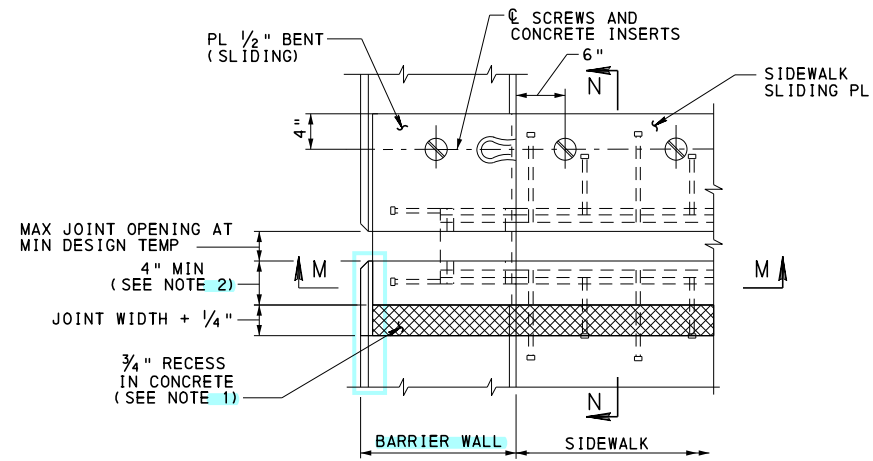
PA TYPE 10M BRIDGE BARRIER AT NEOPRENE STRIP SEAL DAM
(RAILING POST AND TUBE RAILS NOT SHOWN)

* IF 10" STUDS CANNOT BE ACCOMMODATED IN THE SPACE AVAILABLE, REQUEST SPECIFIC LENGTH APPROVAL FROM THE DISTRICT BRIDGE ENGINEER AT THE SHOP DRAWINGS APPROVAL STAGE.

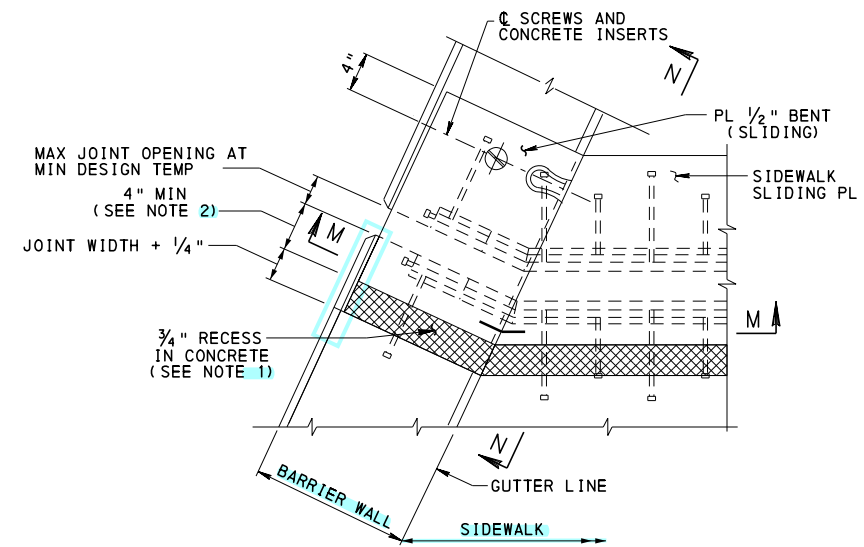
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

STANDARD
PA TYPE 10M BRIDGE BARRIER
DETAILS AT NEOPRENE
STRIP SEAL DAM - 1

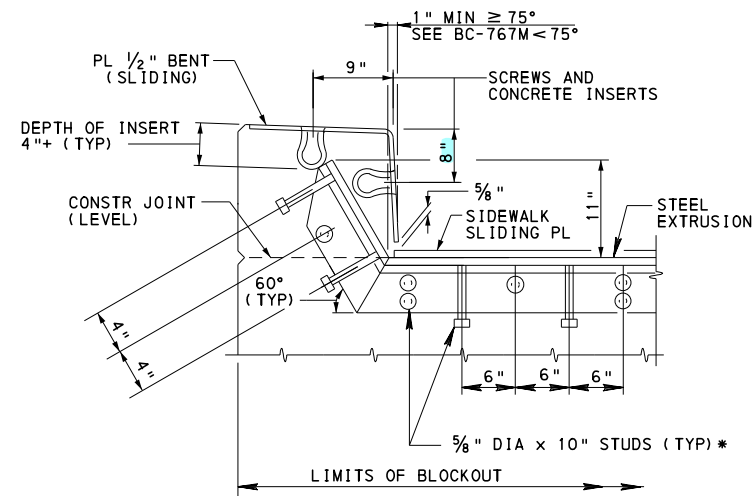
RECOMMENDED OCT. 7, 2024	RECOMMENDED OCT. 7, 2024	SHEET 7 OF 13
<i>Kevin J. Long</i> CHIEF BRIDGE ENGINEER	<i>Gavin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	BC-709M



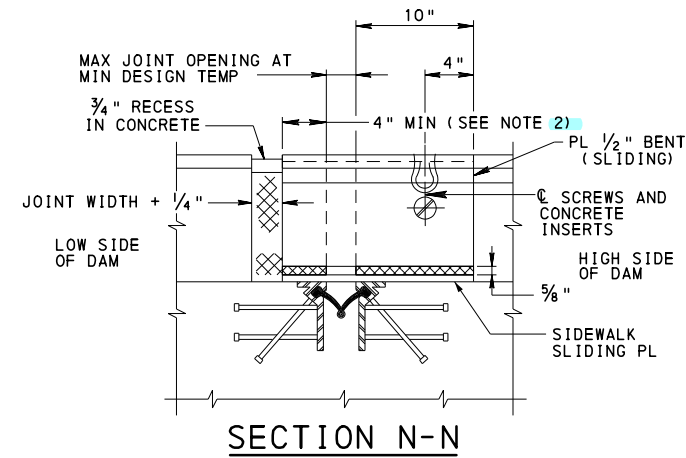
PLAN AT ALTERNATE SIDEWALK- SKEW ANGLE $\geq 75^\circ$



PLAN AT ALTERNATE SIDEWALK- SKEW ANGLE $< 75^\circ$



SECTION M-M



SECTION N-N

NOTES:

1. FORM CONCRETE RECESS AREA IN BARRIER WALL AND GRIND TO PROVIDE SMOOTH SURFACE. APPLY ONE COAT OF ASPHALT CEMENT PAINT WA-1 OR PERFORMANCE GRADED ASPHALT CEMENT PG 64-22 TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION.
2. MAINTAIN 4" MINIMUM BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT TEMPERATURE OF -10°F FOR STEEL BRIDGES AND 10°F FOR PRESTRESSED (P/S) CONCRETE BRIDGES.
3. MAXIMUM DISTANCE ALONG THE EXTRUSION FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3".
4. ALTERNATE STRIP SEAL DAM (NOT SHOWN) SIMILAR TO THAT ON BC-767M, SHEET 7, IS PERMITTED IF SHOWN ON THE CONTRACT PLANS.

PA TYPE 10M BRIDGE BARRIER AT NEOPRENE STRIP SEAL DAM
(RAILING POST AND TUBE RAILS NOT SHOWN)

* IF 10" STUDS CANNOT BE ACCOMMODATED IN THE SPACE AVAILABLE, REQUEST SPECIFIC LENGTH APPROVAL FROM THE DISTRICT BRIDGE ENGINEER AT THE SHOP DRAWINGS APPROVAL STAGE.

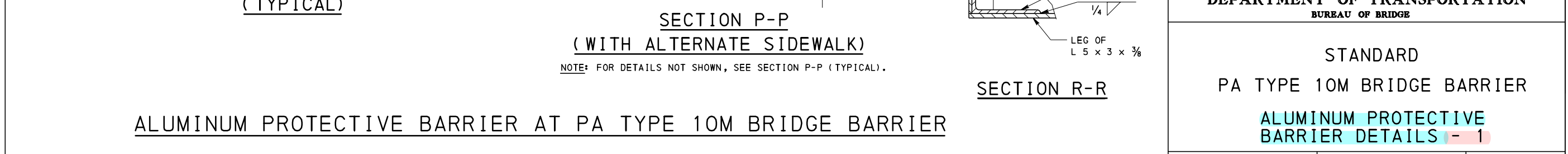
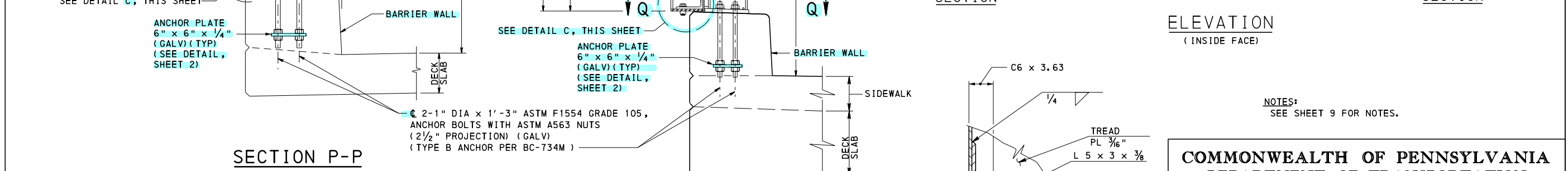
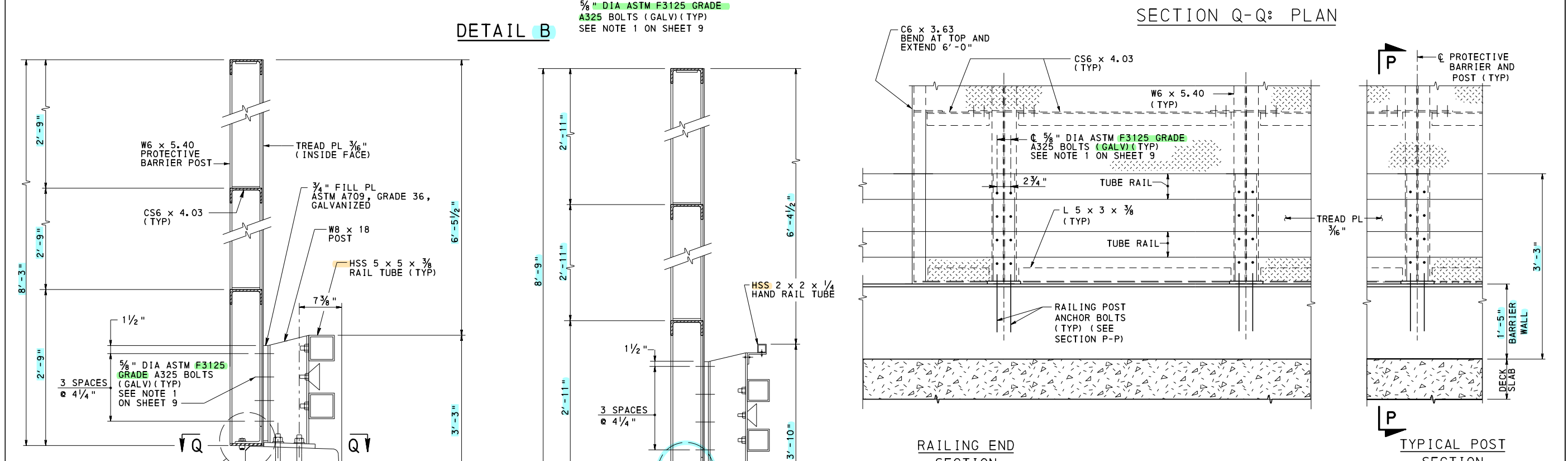
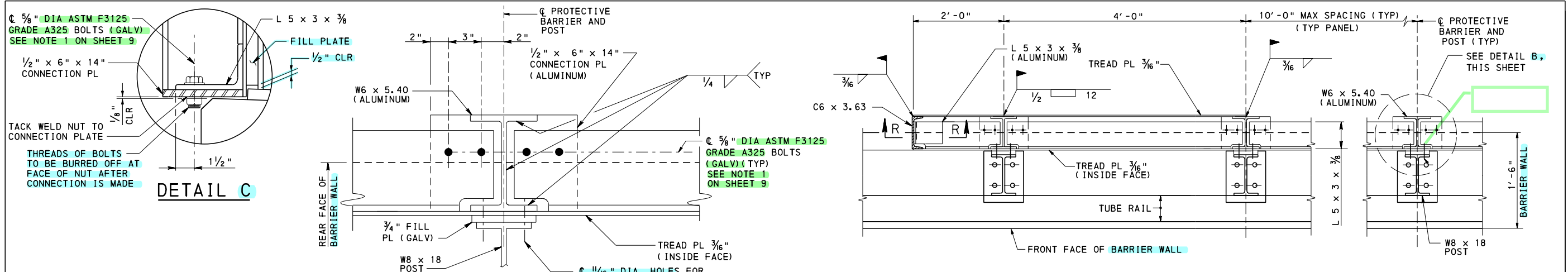
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

STANDARD
PA TYPE 10M BRIDGE BARRIER
DETAILS AT NEOPRENE
STRIP SEAL DAM - 2

RECOMMENDED OCT. 7, 2024
Karin D. Senger
CHIEF BRIDGE ENGINEER

RECOMMENDED OCT. 7, 2024
Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 8 OF 13
BC-709M



ALUMINUM PROTECTIVE BARRIER AT PA TYPE 10M BRIDGE BARRIER

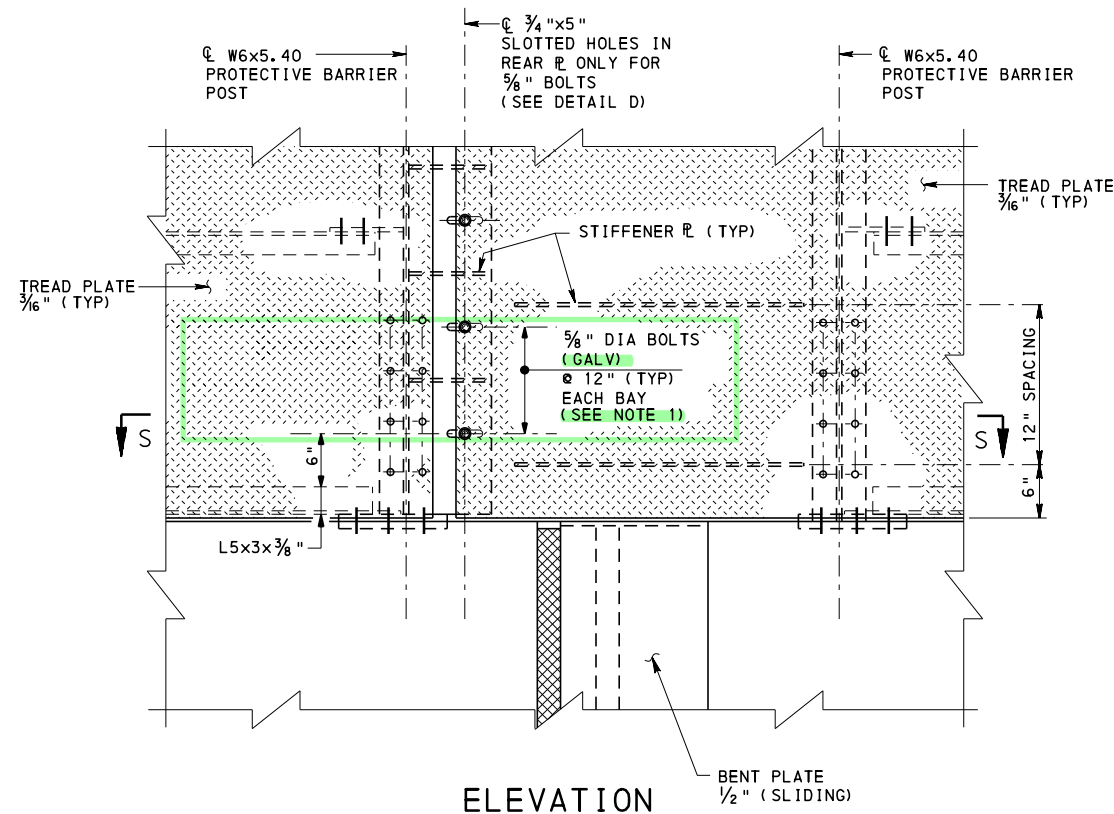
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE**

**STANDARD
PA TYPE 10M BRIDGE BARRIER
ALUMINUM PROTECTIVE
BARRIER DETAILS - 1**

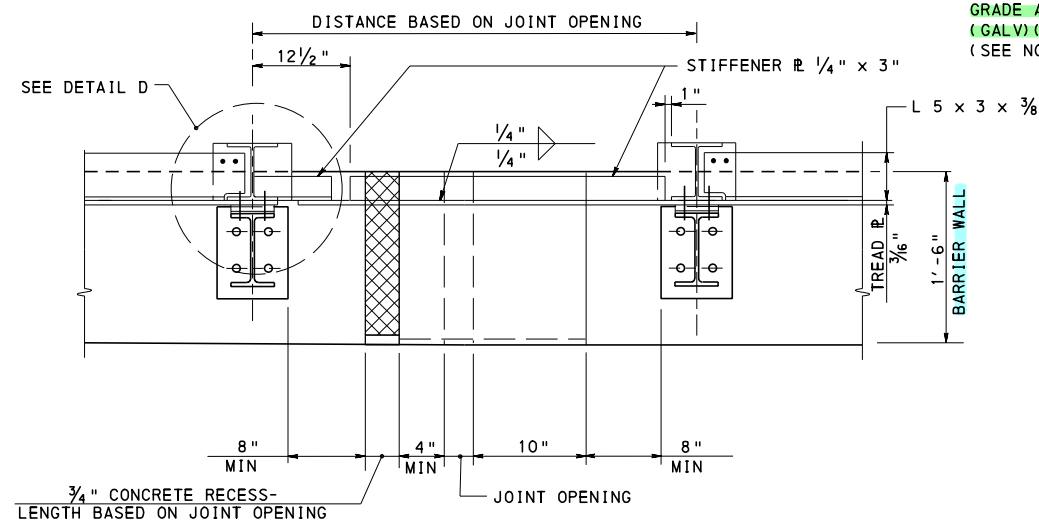
RECOMMENDED OCT. 7, 2024
Kevin J. Long
CHIEF BRIDGE ENGINEER

RECOMMENDED OCT. 7, 2024
Glenn E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

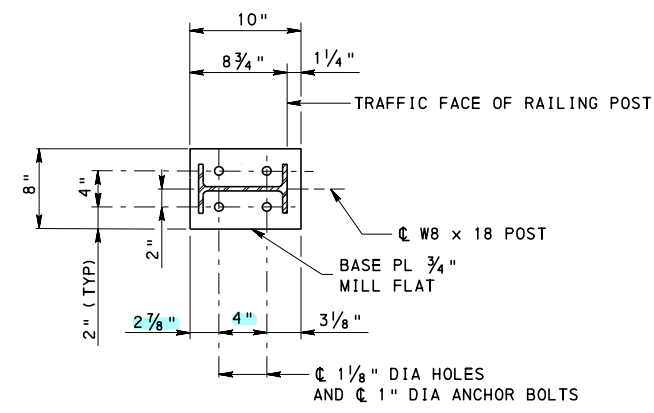
SHEET 9 OF 13
BC-709M



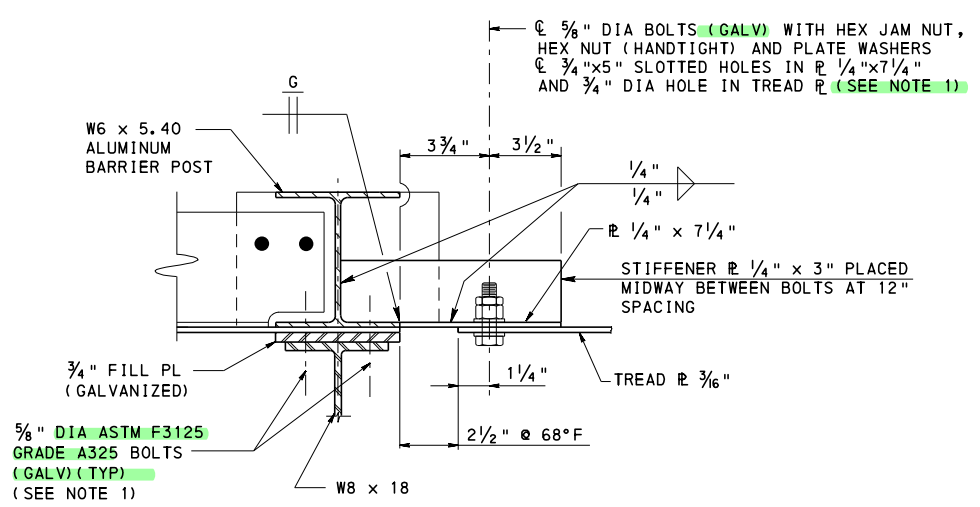
ELEVATION
 NOTE: FOR CLARITY, W8 x 18 RAILING POSTS, RAIL TUBES, AND BASE PLATES NOT SHOWN IN ELEVATION VIEW.



SECTION S-S
EXPANSION JOINT AT PIERS

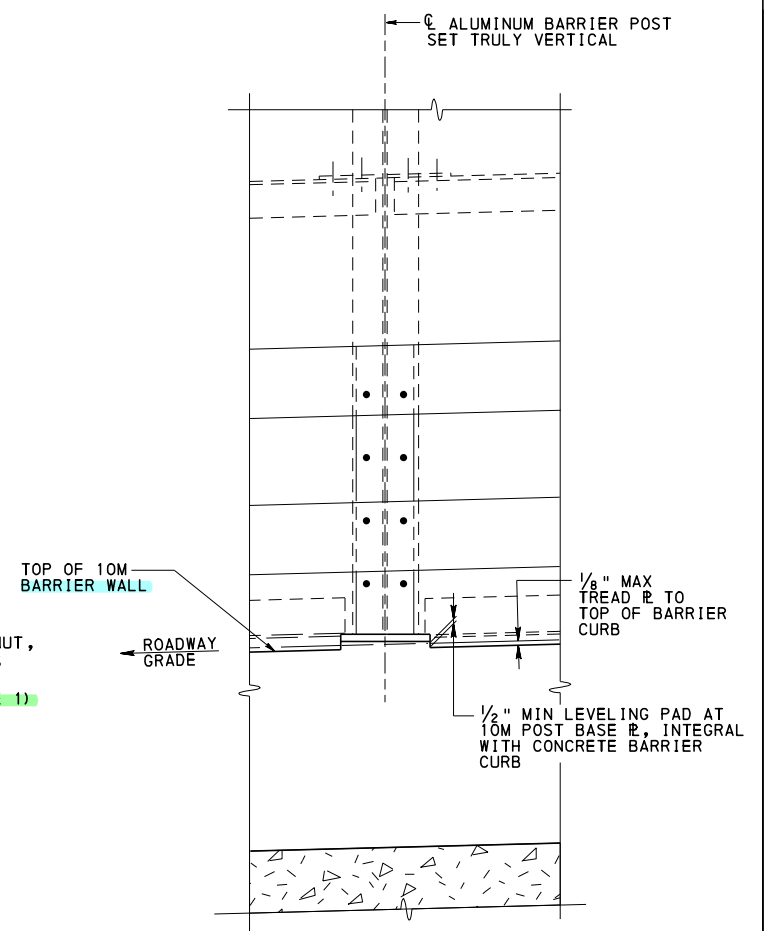


NOTE: SEE SHEET 2 FOR DETAILS NOT SHOWN HERE.
POST AND BASE PLATE
 (AT ALUMINUM BARRIER)



DETAIL D

- NOTES:
1. PROVIDE ELASTOMERIC PADS OR WASHERS $\frac{1}{8}$ " MINIMUM THICKNESS CONFORMING TO PUBLICATION 408, SECTION 1113.03 (h), TYPE I, BETWEEN CONTACT SURFACES WHEREVER ALUMINUM COMPONENTS COME IN CONTACT WITH GALVANIZED STEEL. ALSO PROVIDE FABRIC BUSHINGS WITH MATERIAL CONFORMING TO PUBLICATION 408, SECTION 1113.03(h), TYPE II, WHEREVER GALVANIZED STEEL BOLTS COME IN CONTACT WITH ALUMINUM.
 2. PROVIDE ALL COMPONENTS AND DETAILS OF ALUMINUM PROTECTIVE BARRIER AS SHOWN ON BC-711M, EXCEPT AS MODIFIED HERE.
 3. EXPANSION DETAILS, SLOTTED OPENINGS, AND CLEARANCES SHOWN ARE FOR MOVEMENTS UP TO 2" EXPANSION OR 2" CONTRACTION. ADJUST ALL EXPANSION JOINT DETAILS SHOWN AND PROVIDE SPECIAL DETAILS AS REQUIRED FOR LARGER MOVEMENTS.

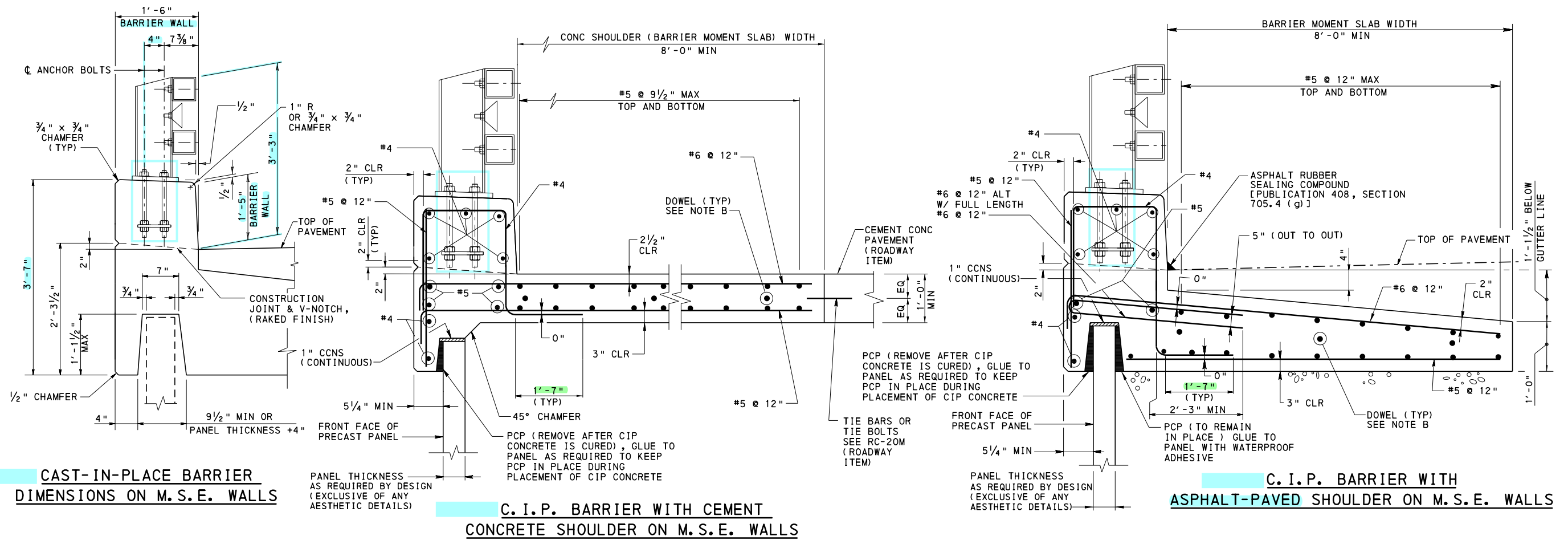


NOTE: SET 10M BARRIER POSTS AND ALUMINUM PROTECTIVE BARRIER POSTS TRULY VERTICAL. ADJUST WELDED STUDS OF 10M TUBE RAILS TO PERMIT RAILS TO BE PARALLEL TO ROADWAY GRADE. ALUMINUM BARRIER RAILS AND BOTTOM ANGLES TO RUN PARALLEL TO ROADWAY GRADE.

POST MOUNTING ON GRADE

ALUMINUM PROTECTIVE BARRIER AT PA TYPE 10M BRIDGE BARRIER

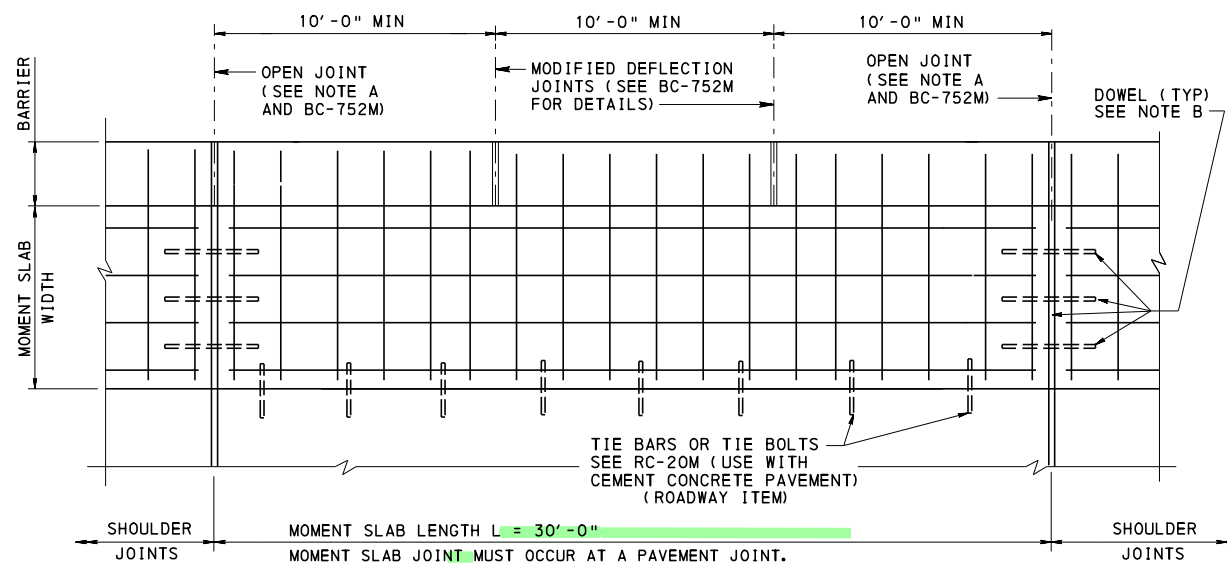
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF BRIDGE
 STANDARD
 PA TYPE 10M BRIDGE BARRIER
ALUMINUM PROTECTIVE BARRIER DETAILS - 2
 RECOMMENDED OCT. 7, 2024
 RECOMMENDED OCT. 7, 2024
 SHEET 10 OF 13
 CHIEF BRIDGE ENGINEER
 CHIEF ENGINEER, HIGHWAY ADMIN.
 BC-709M



**CAST-IN-PLACE BARRIER
DIMENSIONS ON M.S.E. WALLS**

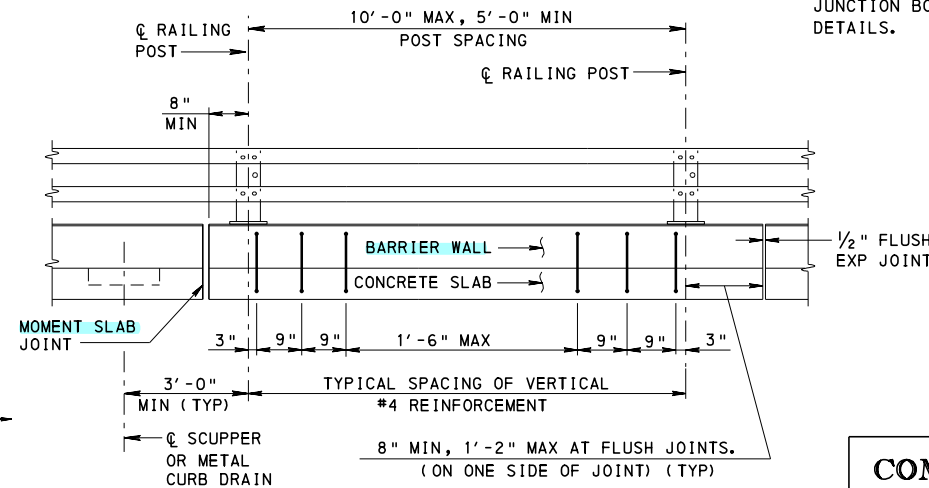
**C.I.P. BARRIER WITH CEMENT
CONCRETE SHOULDER ON M.S.E. WALLS**

**C.I.P. BARRIER WITH
ASPHALT-PAVED SHOULDER ON M.S.E. WALLS**



NOTE A: PROVIDE OPEN JOINTS IN BARRIER AT SAME LOCATIONS AS THOSE PROVIDED FOR THE MOMENT SLAB.
NOTE B: USE TYPE D OR E JOINT PER RC-27M. USE SAME JOINT AS PROVIDED IN PAVEMENT.

**PLAN - BARRIER MOMENT SLAB
(C.I.P. BARRIER)**



**BARRIER WALL ELEVATION
(RAILING POST AND VERTICAL REINFORCEMENT SPACING)**

NOTES:

- FOR GENERAL NOTES ON CONSTRUCTION OF PREFABRICATED WALLS, SEE BC-799M, SHEET 1.
- PLACE EXPANSION JOINTS IN BARRIER WALL TO MATCH PAVEMENT JOINTS. DO NOT LOCATE THE BARRIER WALL EXPANSION JOINT WITHIN 6'-0" FROM CENTERLINE OF LIGHT POLE OR 3'-6" FROM CENTERLINE OF JUNCTION BOX. SEE BC-799M, SHEET 8 AND 9, FOR INLET INSTALLATION DETAILS.

LEGEND:
CCNS = CLOSED CELL NEOPRENE SPONGE
PCP = PREFORMED CELLULAR POLYSTYRENE

PA TYPE 10M CAST-IN-PLACE BARRIER ON M.S.E. WALLS

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE**

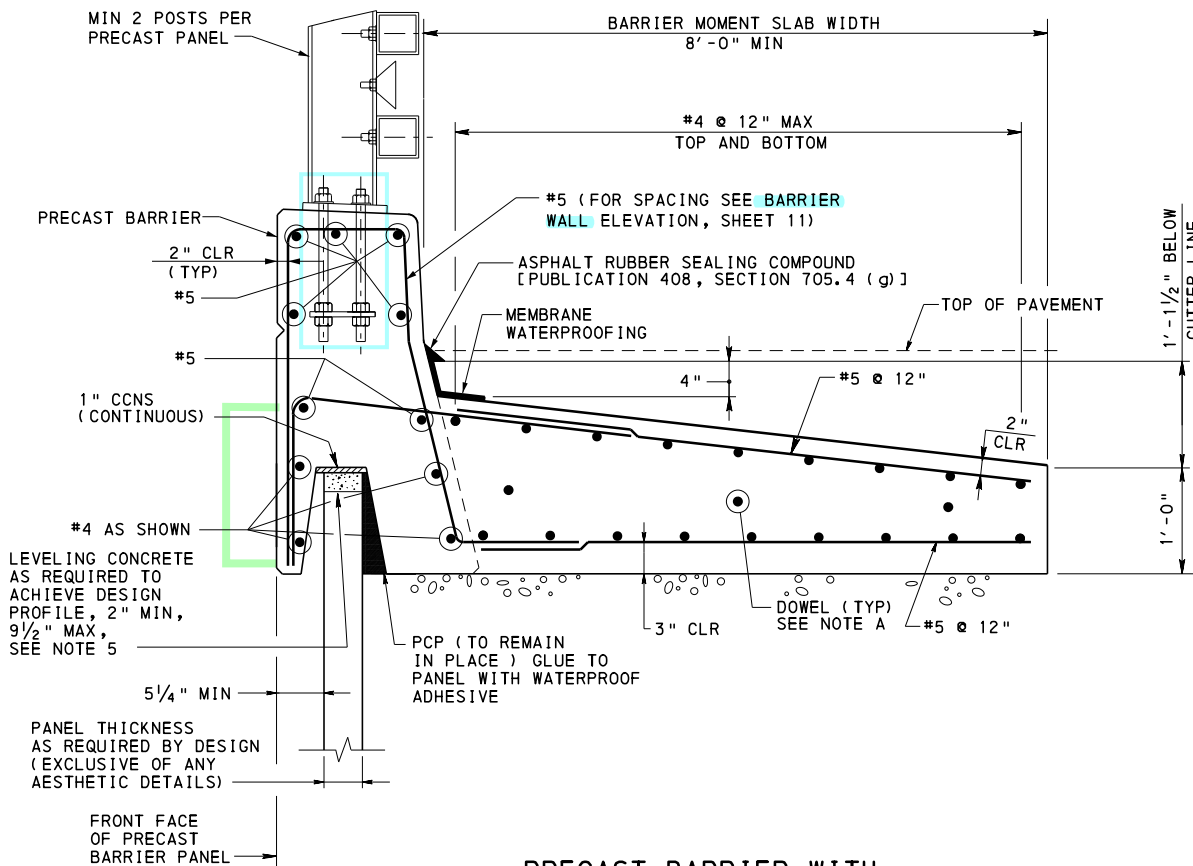
STANDARD

**PA TYPE 10M BRIDGE BARRIER
M.S.E. WALL DETAILS - 1**

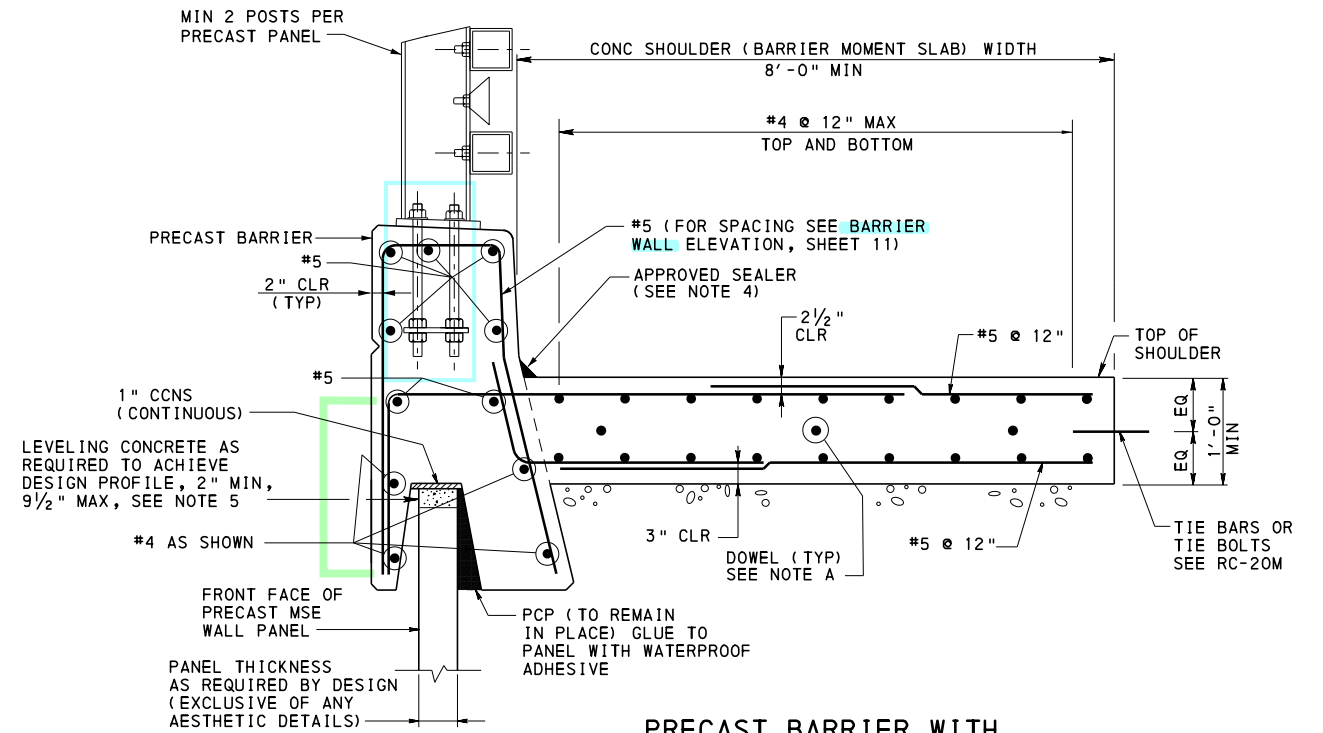
RECOMMENDED OCT. 7, 2024
Kevin J. Long
CHIEF BRIDGE ENGINEER

RECOMMENDED OCT. 7, 2024
Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 11 OF 13
BC-709M



PRECAST BARRIER WITH ASPHALT-PAVED SHOULDER ON M.S.E. WALLS



PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER ON M.S.E. WALLS

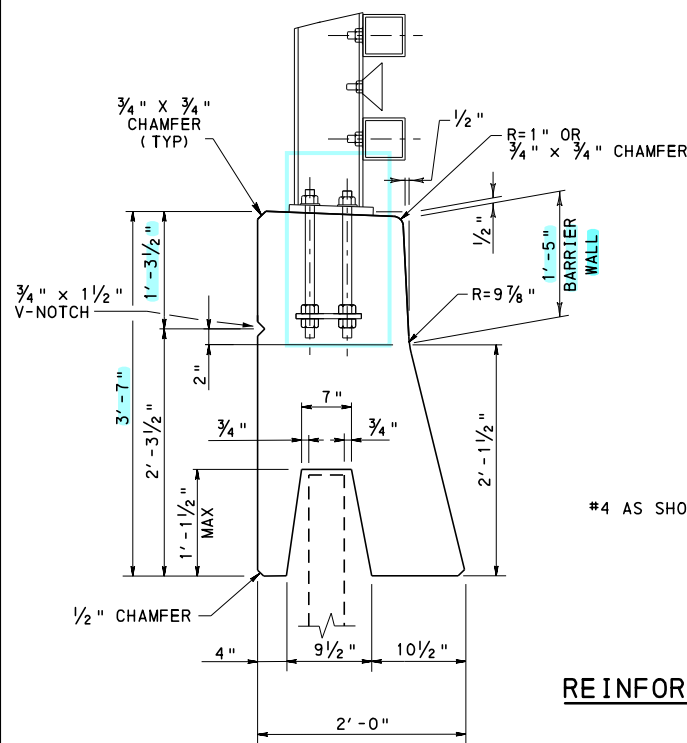
NOTE A:
USE TYPE D OR E JOINT PER RC-27M. USE SAME JOINT AS PROVIDED IN PAVEMENT.

TRAFFIC BARRIER AND MOMENT SLAB NOTES:

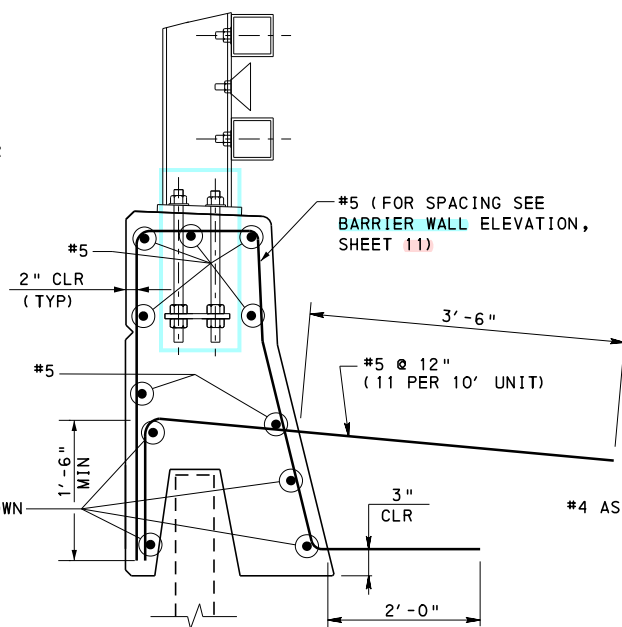
1. PLACE EXPANSION JOINTS IN BARRIER WALL TO MATCH PAVEMENT JOINTS. DO NOT LOCATE THE BARRIER WALL EXPANSION JOINT WITHIN 6'-0" FROM CENTERLINE OF LIGHT POLE OR 3'-6" FROM CENTERLINE OF JUNCTION BOX.
2. PROVIDE A MINIMUM PRECAST BARRIER LENGTH OF 10'-0".
3. PROVIDE SPECIAL DESIGN AND DETAILING OF THE MOMENT SLAB AND BARRIER FOR INLET INSTALLATIONS.
4. USE SILICONE JOINT SEALING MATERIAL AS SPECIFIED IN PUBLICATION 408, SECTION 705.4 (a).
5. PROVIDE LEVELING CONCRETE AS PER BC-799M, SHEET 3, DETAIL A.

NOTE:
1. FOR NOTES, SEE SHEET 10.

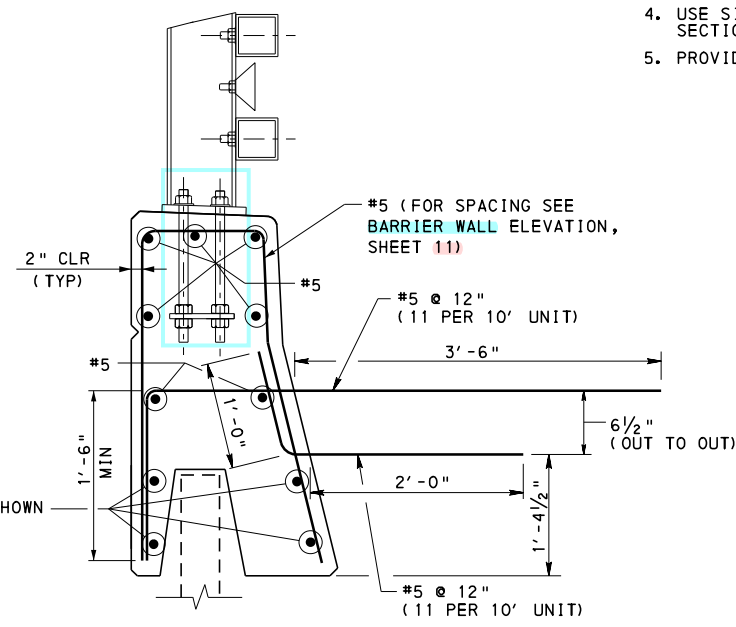
LEGEND:
CCNS = CLOSED CELL NEOPRENE SPONGE
PCP = PREFORMED CELLULAR POLYSTYRENE



DIMENSIONS



REINFORCEMENT FOR PRECAST BARRIER WITH ASPHALT-PAVED SHOULDER



REINFORCEMENT FOR PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER

PA TYPE 10M PRECAST BARRIER ON M.S.E. WALLS

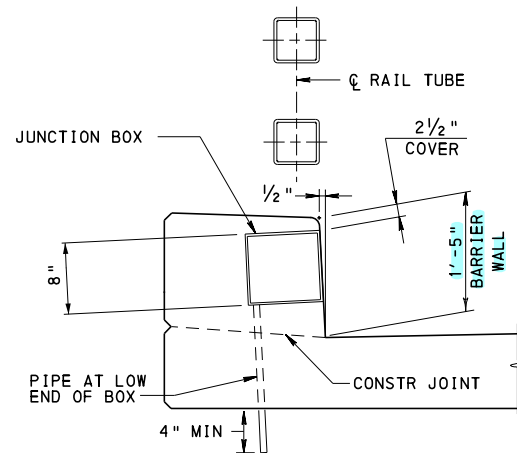
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE**

**STANDARD
PA TYPE 10M BRIDGE BARRIER
M.S.E. WALL DETAILS - 2**

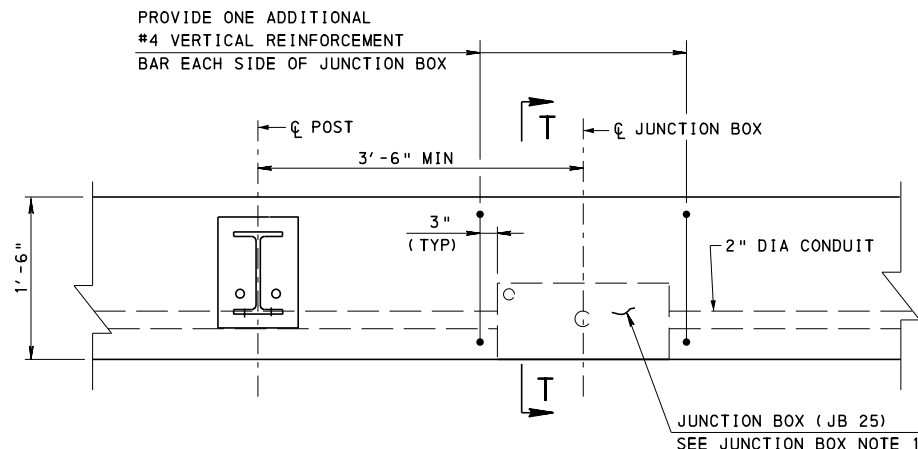
RECOMMENDED OCT. 7, 2024
Karin D. Longo
CHIEF BRIDGE ENGINEER

RECOMMENDED OCT. 7, 2024
Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 12 OF 13
BC-709M



SECTION T-T

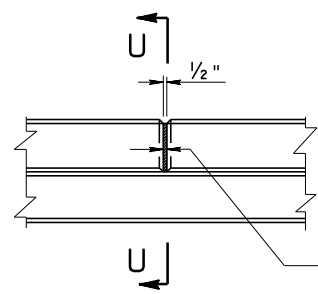


PLAN
(RAIL TUBE NOT SHOWN)

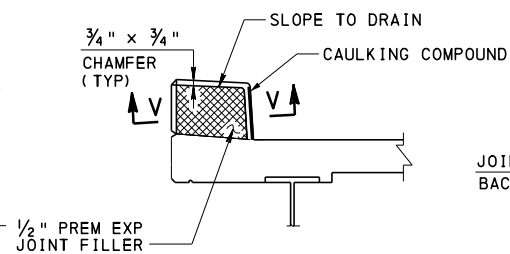
JUNCTION BOX NOTES:

1. JUNCTION BOX MAY BE LOCATED EITHER TO THE LEFT OR TO THE RIGHT OF THE LIGHTING POLE.
2. JUNCTION BOXES ARE ONLY REQUIRED, IF SPECIFIED ON THE CONTRACT DRAWINGS.
3. FOR **TYPICAL SIDEWALK**, PLACE JUNCTION BOX ON SIDEWALK SIDE.

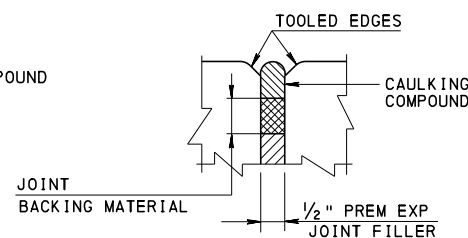
PA TYPE 10M BRIDGE BARRIER ALTERNATE JUNCTION BOX DETAIL



ELEVATION



SECTION U-U



SECTION V-V

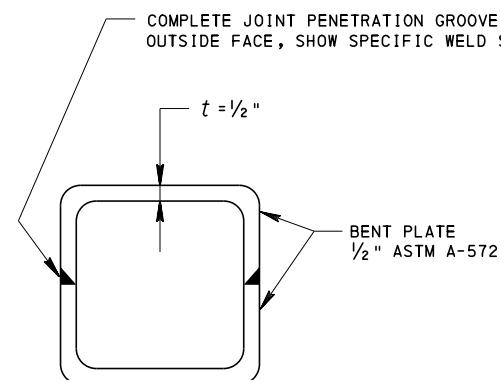
OPEN JOINT NOTES:

1. FOR LOCATION OF CONSTRUCTION JOINTS AND OPEN JOINTS, REFER TO DESIGN DRAWINGS.
2. PROVIDE CAULKING COMPOUND CONFORMING TO PUBLICATION 408, SECTION 705.7 (b).
3. PROVIDE JOINT BACKING MATERIAL CONFORMING TO PUBLICATION 408, SECTION 705.8.
4. PROVIDE PREMOLDED EXPANSION JOINT FILLER CONFORMING TO PUBLICATION 408, SECTION 705.1.
5. PROVIDE 2" CLEAR ON ALL REINFORCEMENT UNLESS NOTED.
6. FOR ADDITIONAL NOTES, SEE SHEET 1.

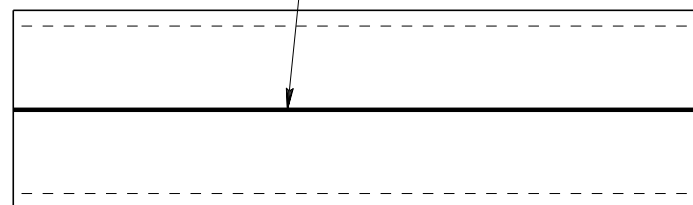
OPEN JOINT DETAIL

(RAILING POST AND TUBE NOT SHOWN)

PA TYPE 10M BRIDGE BARRIER AT OPEN JOINT



END VIEW



ELEVATION

**ALTERNATE
RAIL SPLICE SLEEVE**

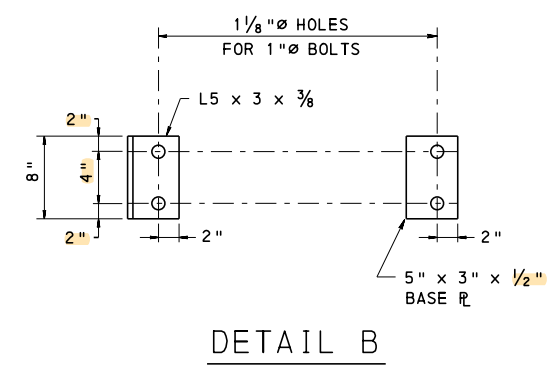
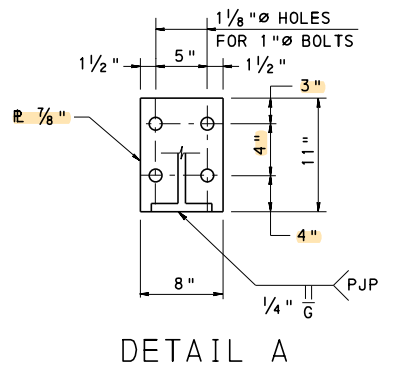
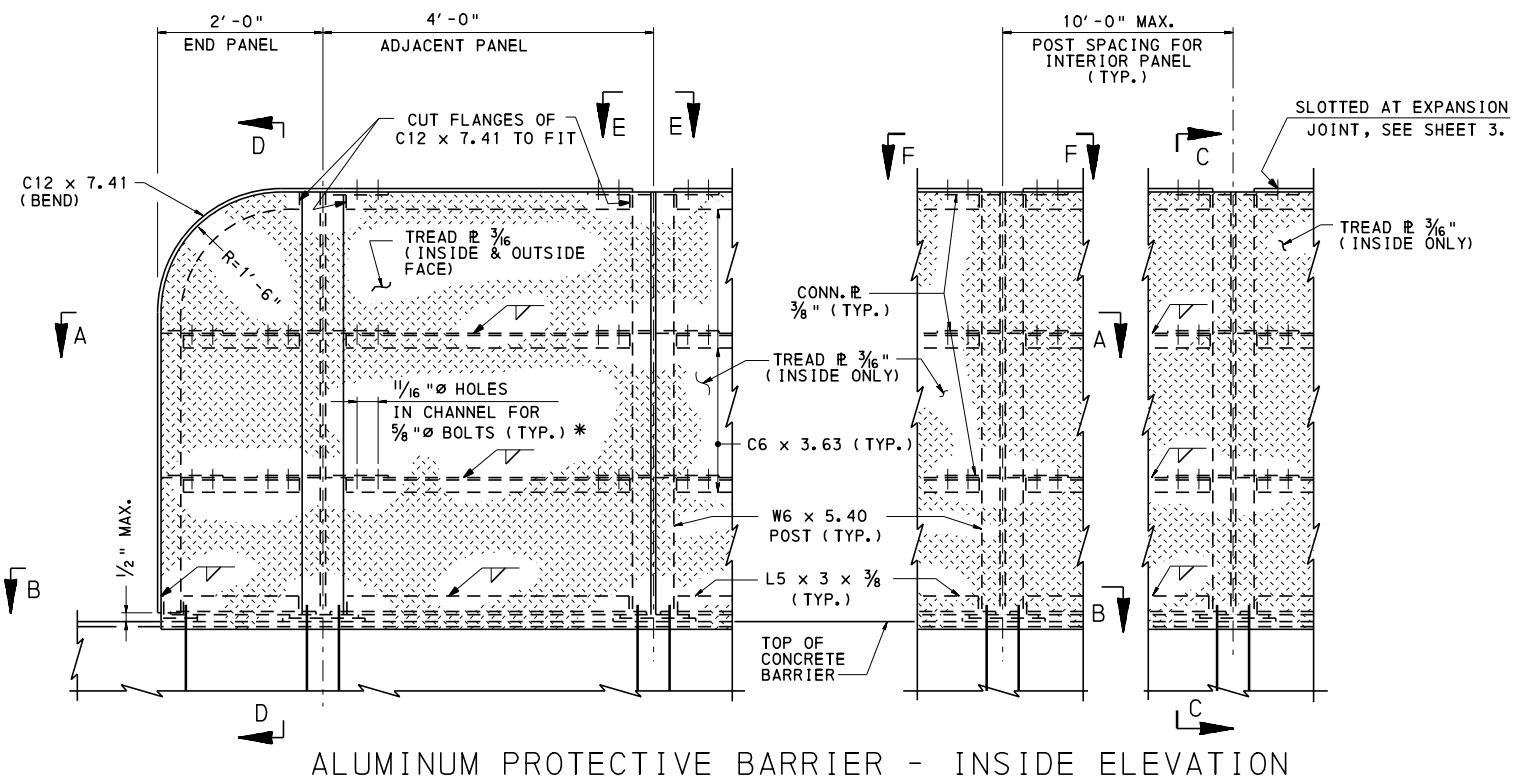
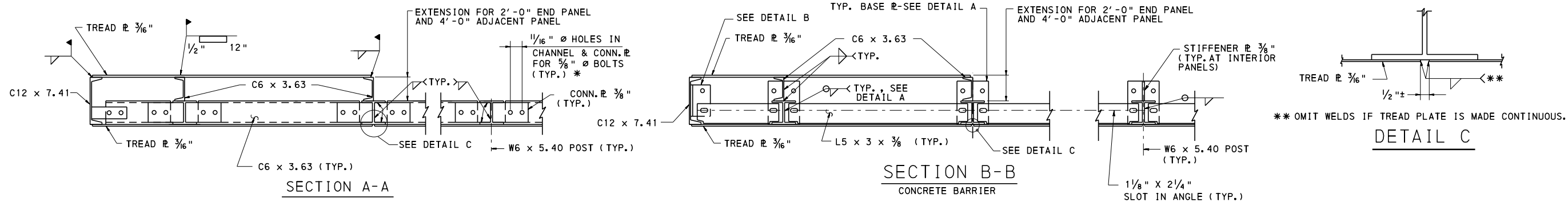
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

STANDARD
PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS

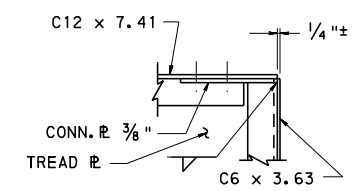
RECOMMENDED OCT. 7, 2024
Karin J. Long
CHIEF BRIDGE ENGINEER

RECOMMENDED OCT. 7, 2024
Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

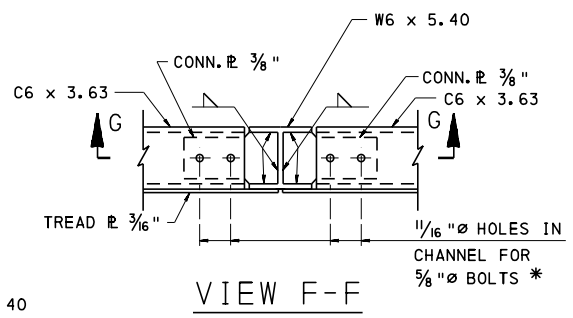
SHEET 13 OF 13
BC-709M



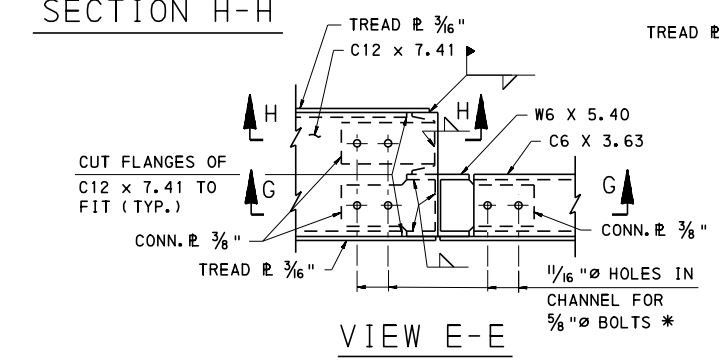
- NOTES:**
1. PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH PUBLICATION 408.
 2. PLACE POSTS AND ANCHOR BOLTS TRULY VERTICAL. PLACE RAILS PARALLEL TO GRADE.
 3. ALL MINIMUM SIZE OF FILLET WELDS 3/16".
 4. FOR SPACING OF POSTS, LOCATION OF EXPANSION JOINTS AND OPEN JOINTS IN CONCRETE BARRIER, REFER TO DESIGN DRAWINGS.
 5. DO NOT PAINT ANY MATERIALS.
 6. COAT ALL SURFACES OF THE BASE PLATES IN CONTACT WITH CONCRETE WITH CAULKING COMPOUND PRIOR TO ERECTION. AFTER ERECTION AND ALIGNMENT, SEAL OPENING BETWEEN THE METAL SURFACES AND THE CONCRETE WITH CAULKING COMPOUND CONFORMING TO PUBLICATION 408, SECTION 705.7(b).
 7. PLACE LEVELING PADS INTEGRALLY WITH CONCRETE BARRIER. TOOL ALL EDGES OF PADS.
 8. FOR SECTIONS C-C AND D-D, SEE SHEET 2.
 9. DESIGNATE ALL FABRICATION IN ACCORDANCE WITH ALUMINUM INDUSTRY STANDARDS.



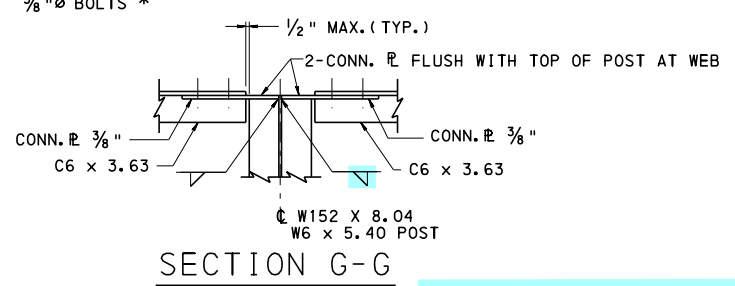
SECTION H-H



VIEW F-F



VIEW E-E



SECTION G-G

* SLOT HOLES IN CONN. PLATES 1/16" x 1 1/8" FOR ERECTION PURPOSES. SUBSTITUTE 5" - 3/16" FILLET WELD FOR EACH 5/8" BOLT.

CHANGE 3
CHANGE 4

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
ALUMINUM
PROTECTIVE BARRIER

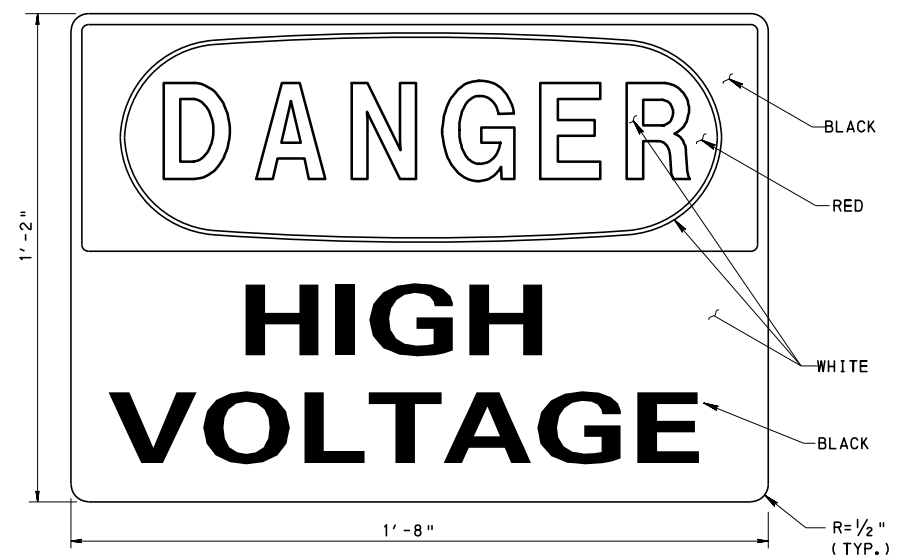
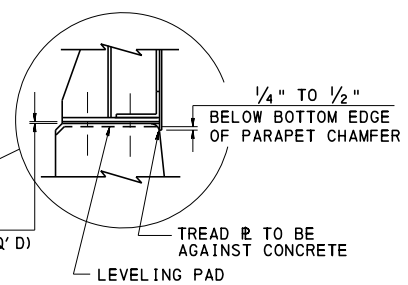
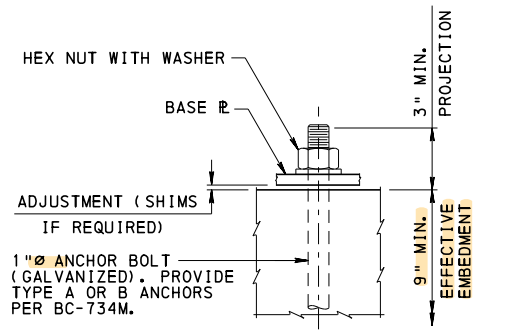
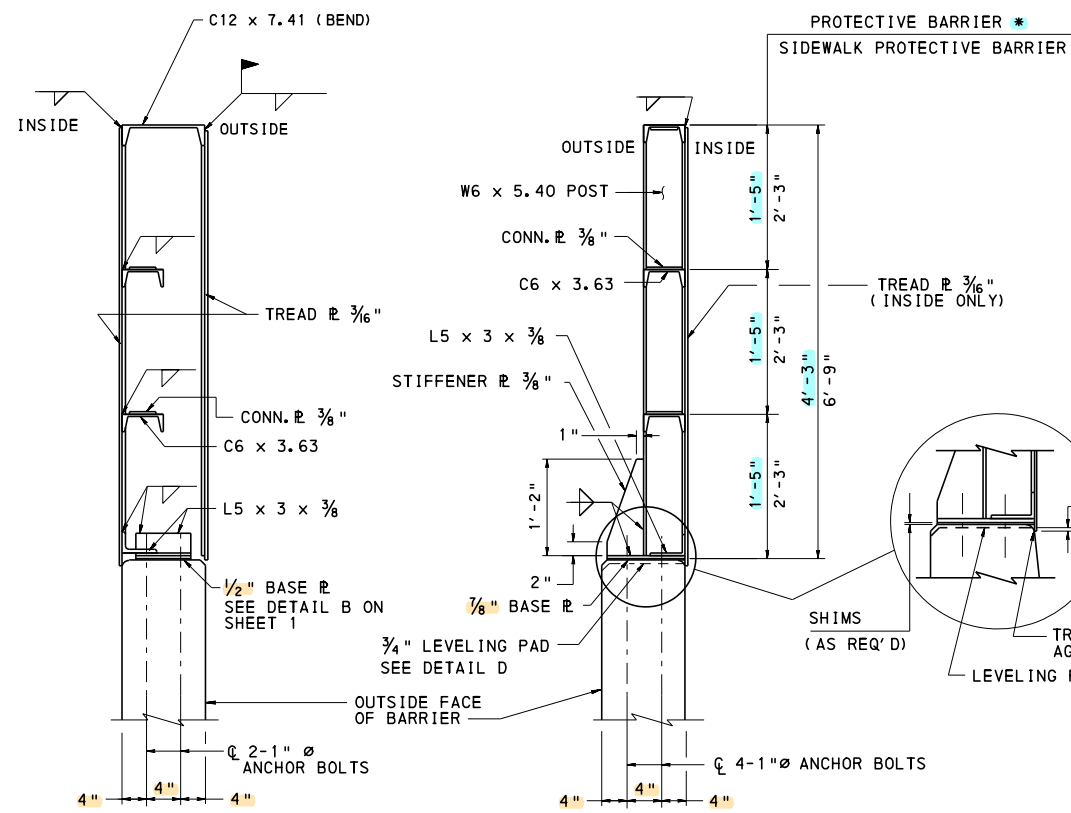
BC-734M	ANCHOR SYSTEMS	RECOMMENDED NOV. 23, 2022
BC-722M	LIGHTING POLE ANCHORAGE	RECOMMENDED NOV. 23, 2022
BC-720M	ALUMINUM OR STEEL BRIDGE HAND RAILING	SHEET 1 OF 4

REFERENCE DRAWINGS

CHIEF BRIDGE ENGINEER

CHIEF ENGINEER, HIGHWAY ADMIN.

BC-711M

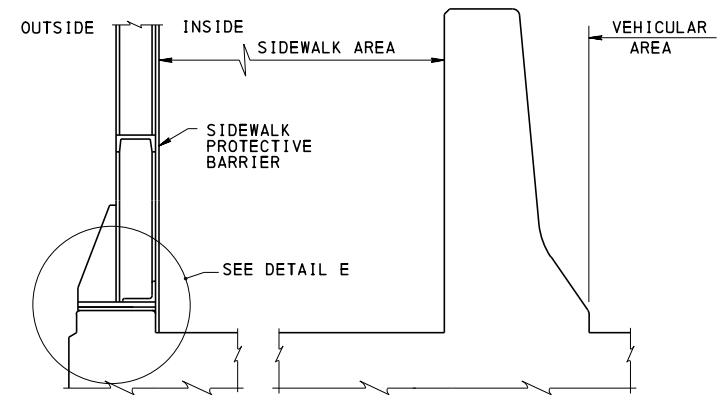
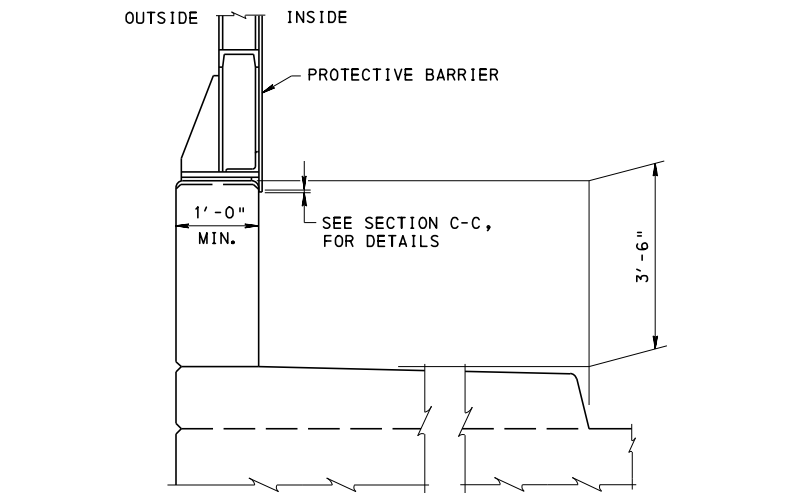
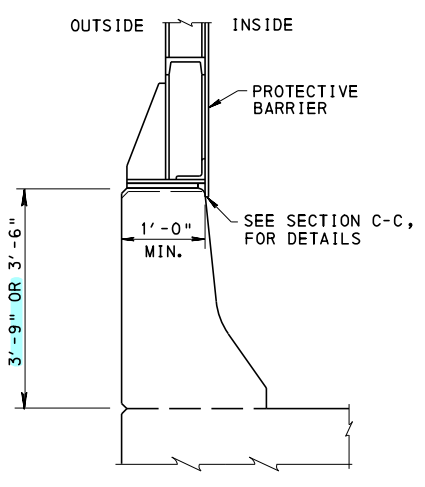
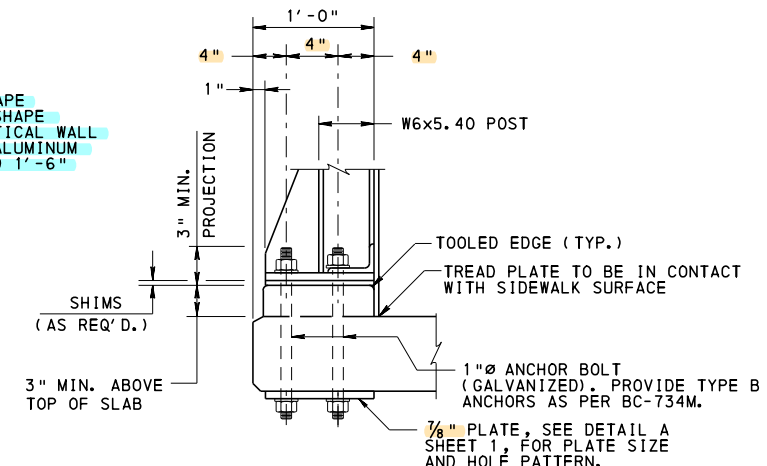
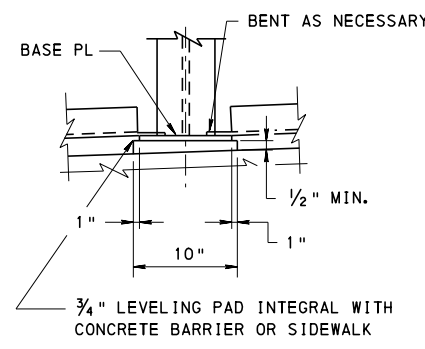


ACCIDENT PREVENTION SIGN

NOTES

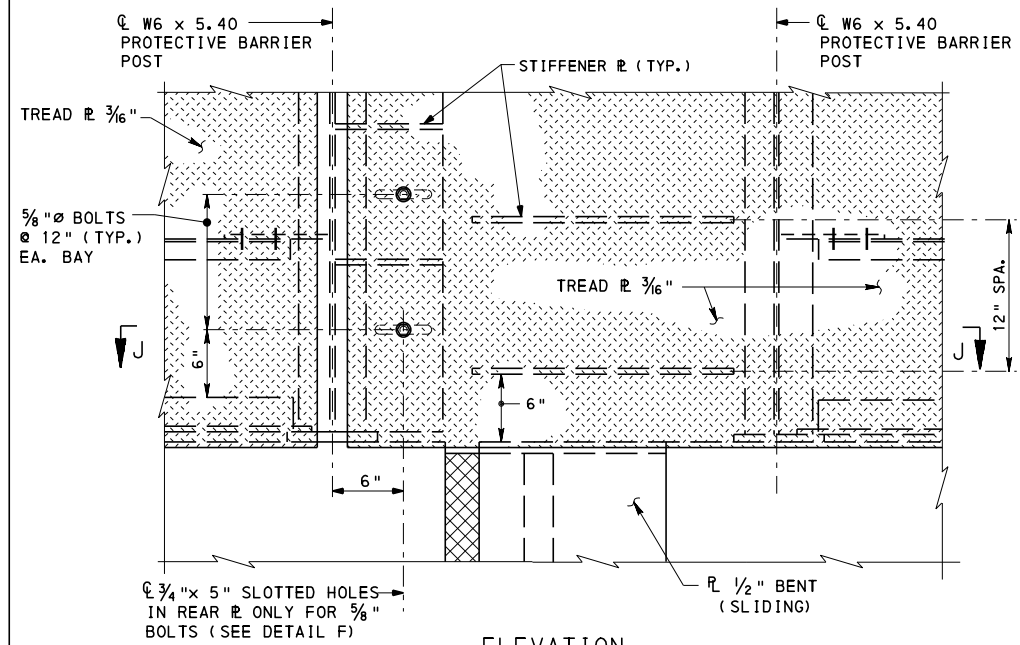
- FABRICATE SIGN FROM ALUMINUM CONFORMING TO PUBLICATION 408, SECTION 1103.
- MOUNT SIGN WITH ALUMINUM BOLTS, NUTS, AND WASHERS CONFORMING TO PUBLICATION 408, SECTION 1103.
- MOUNT SIGNS AS SHOWN ON SHEET 4, AND DO NOT SPACE MORE THAN 50' APART.
- SEE AMERICAN NATIONAL STANDARD SPECIFICATIONS FOR ACCIDENT PREVENTION SIGNS, ANSI Z535.1 THRU ANSI Z535.5.
- REFER TO SHEET 1 FOR OTHER NOTES.
- PROTECTIVE BARRIER CONNECTION DETAIL SHOWN FOR 42" AND 45" F-SHAPE CONCRETE BARRIER SECTION, TYPICAL SIDEWALK SECTION AND ALTERNATE SIDEWALK WITH 42" VERTICAL WALL CONCRETE BARRIER SECTION. FOR WIDER BARRIER WIDTHS, HOLD INSIDE FACE FLUSH.
- SEE SHEET 1 FOR LOCATION OF SECTION C-C AND SECTION D-D.

* DIMENSIONS BASED ON 45" F-SHAPE CONCRETE BARRIER. FOR 42" F-SHAPE CONCRETE BARRIER AND 42" VERTICAL WALL CONCRETE BARRIER, USE 4'-6" ALUMINUM PROTECTIVE BARRIER HEIGHT AND 1'-6" PANEL HEIGHTS.

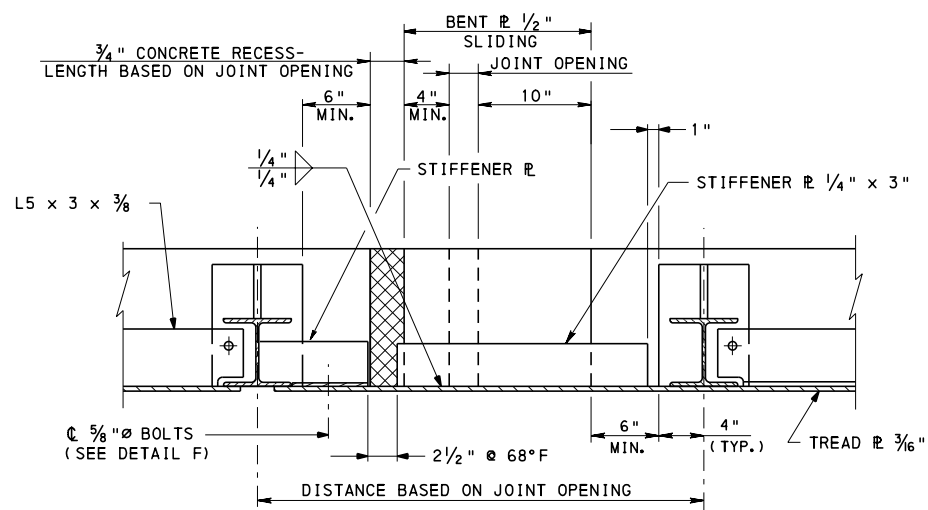


COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
ALUMINUM
PROTECTIVE BARRIER



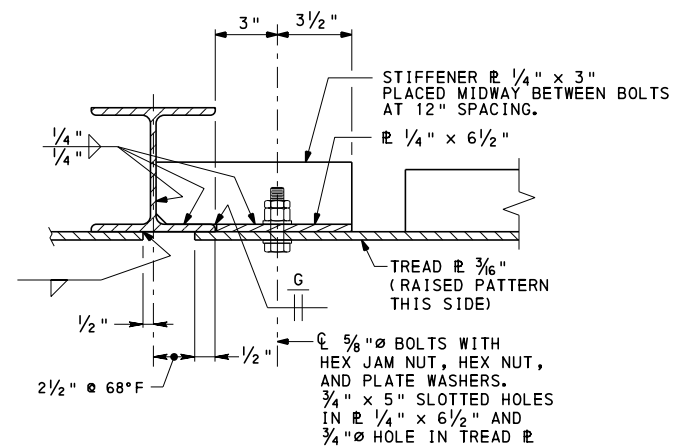
ELEVATION



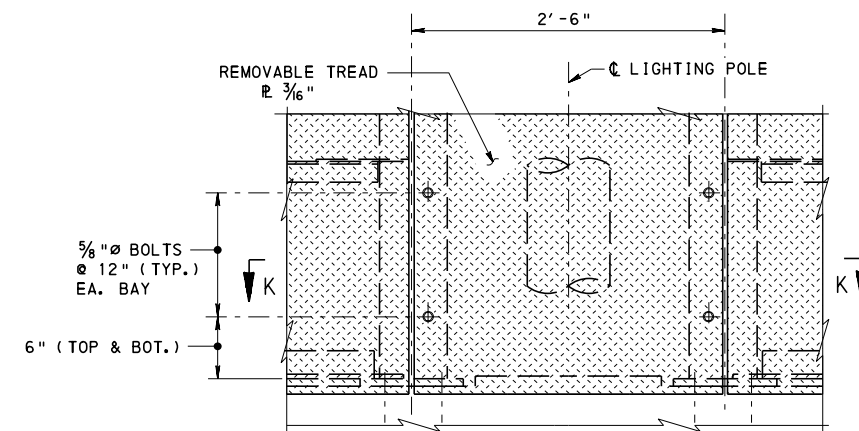
SECTION J-J

DETAIL OF EXPANSION JOINT AT PIERS

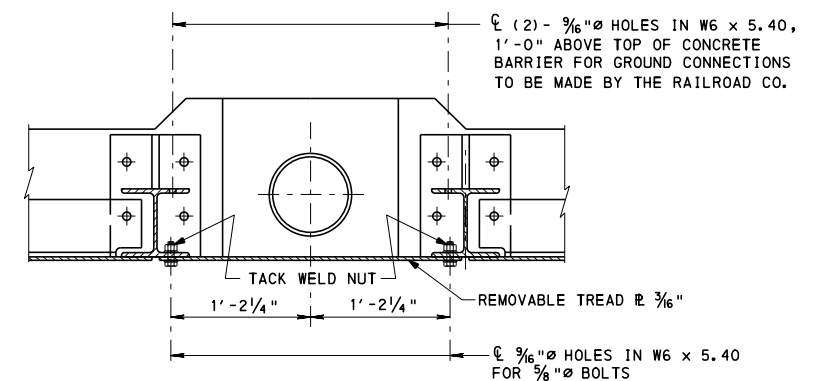
NOTE:
EXPANSION DETAILS, SLOTTED OPENINGS AND CLEARANCES SHOWN ARE FOR MOVEMENTS UP TO 2" EXPANSION OR 2" CONTRACTION. ADJUST ALL EXPANSION JOINT DETAILS SHOWN AND PROVIDE SPECIAL DETAILS AS REQUIRED FOR LARGER MOVEMENTS.



DETAIL F

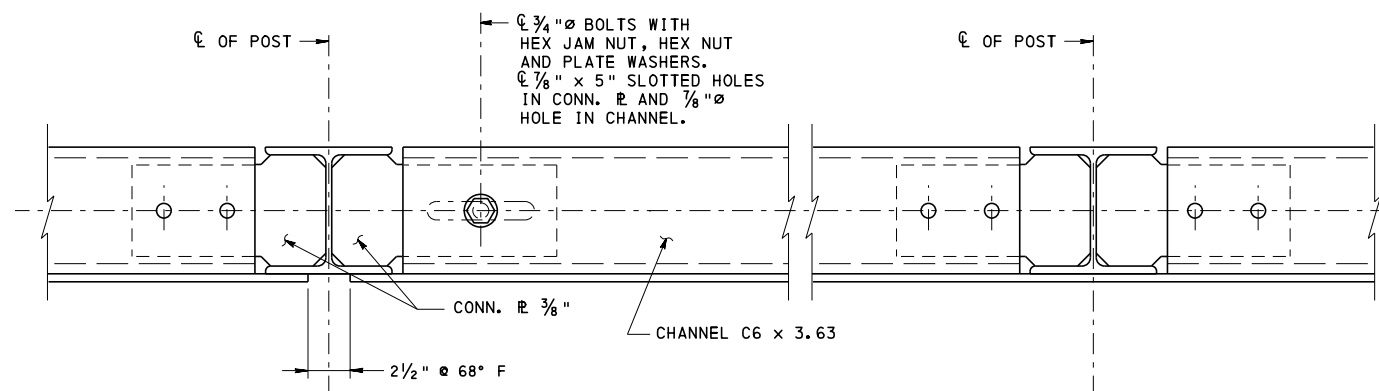


ELEVATION



SECTION K-K

DETAIL AT LIGHTING POLE
(FOR LIGHTING POLE ANCHORAGE DETAILS, REFER TO BC-722M)



TOP OF BARRIER AT EXPANSION JOINT

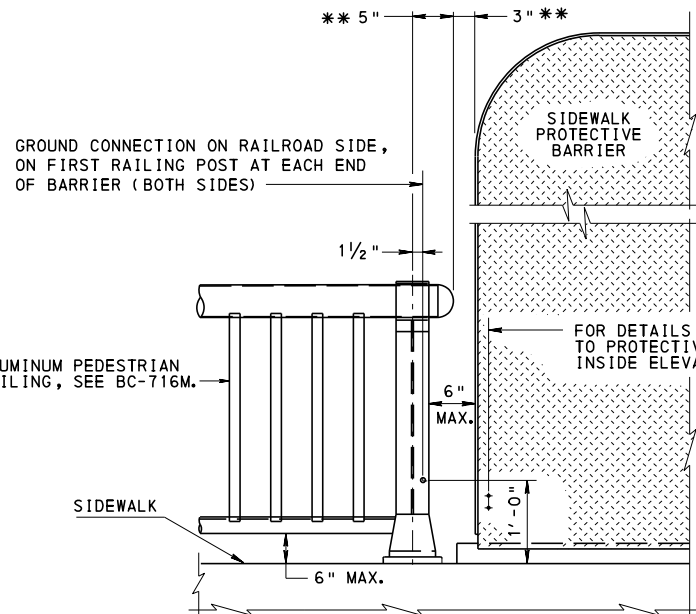
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
ALUMINUM
PROTECTIVE BARRIER

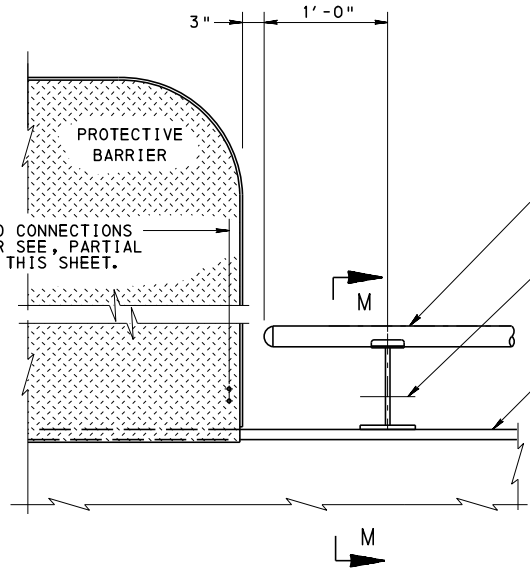
RECOMMENDED NOV. 23, 2022
L. W. [Signature]
CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022
Gavin E. Gray [Signature]
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 3 OF 4
BC-711M



** NOTE: USE THESE CLEARANCE DIMENSIONS FOR PROTECTIVE FENCE.

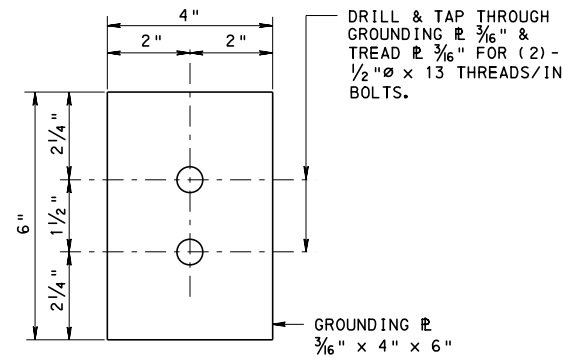
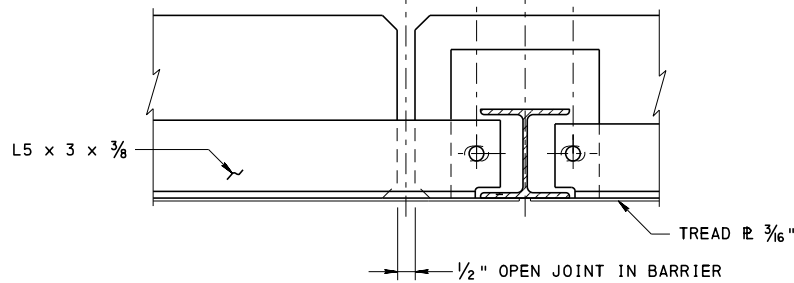


GROUND CONNECTIONS

SECTION M-M

Ø POST NEAREST TO 1/2" OPEN JOINT IN BARRIER

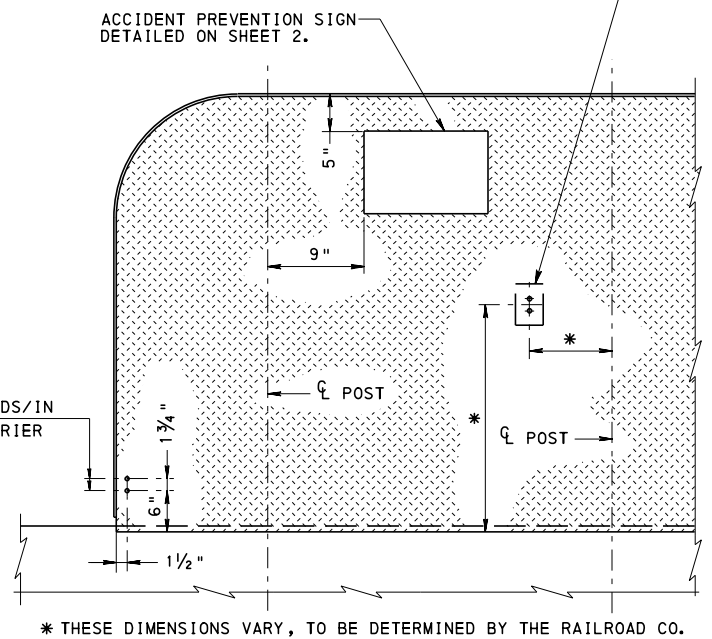
1/8" x 2/4" SLOTTED HOLES IN L5 x 3 x 3/8 FOR 1" Ø BOLTS



DETAIL G

DRILL & TAP FOR (2) - 1/2" Ø x 13 THREADS/IN BOLTS AT BOTH ENDS OF PROTECTIVE BARRIER ON THE RAILROAD SIDE ONLY.

WELD ALL AROUND GROUNDING PLATE. (SEE DETAIL G)

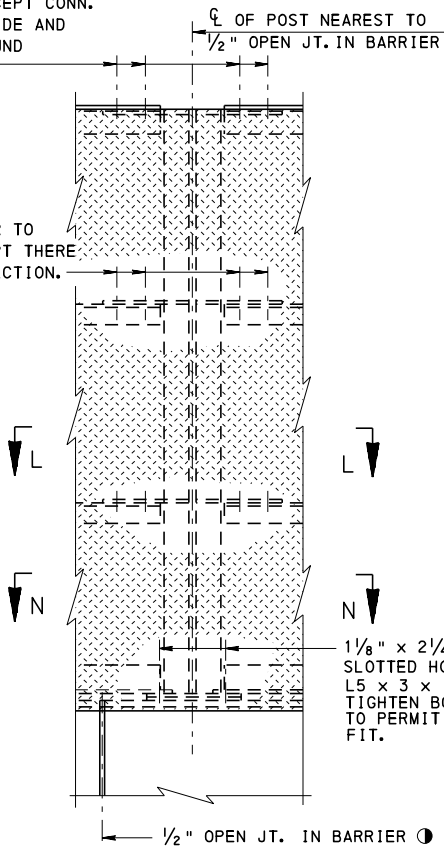


PARTIAL INSIDE ELEVATION

(TYPICAL FOR BARRIER ENDS)

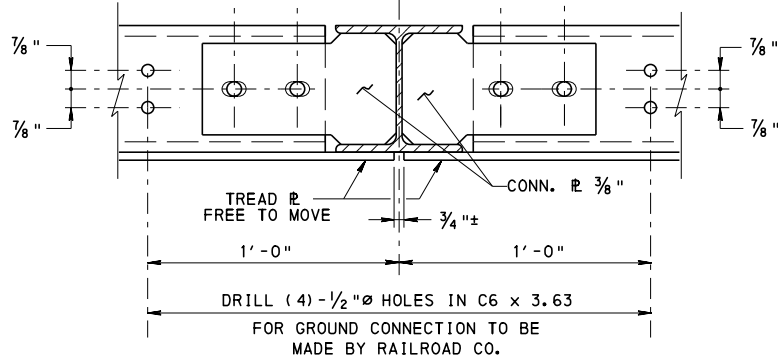
CONNECTION SIMILAR TO SECTION L-L, EXCEPT CONN. Ø ON OPPOSITE SIDE AND THERE IS NO GROUND CONNECTION.

CONNECTION SIMILAR TO SECTION L-L, EXCEPT THERE IS NO GROUND CONNECTION.



Ø OF POST NEAREST TO OPEN JT. IN BARRIER

3/4" x 1/4" SLOTTED HOLES IN CONN. & 3/4" Ø HOLE IN CHANNEL. TIGHTEN BOLTS TO PERMIT SLIDING FIT.



PROTECTIVE BARRIER DETAIL AT OPEN JOINT IN BARRIER

① SEAL ALL OPEN JOINTS IN THE BRIDGE BARRIER WITHIN THE LIMITS OF THE PROTECTIVE BARRIER WITH APPROVED JOINT SEALER.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
ALUMINUM
PROTECTIVE BARRIER

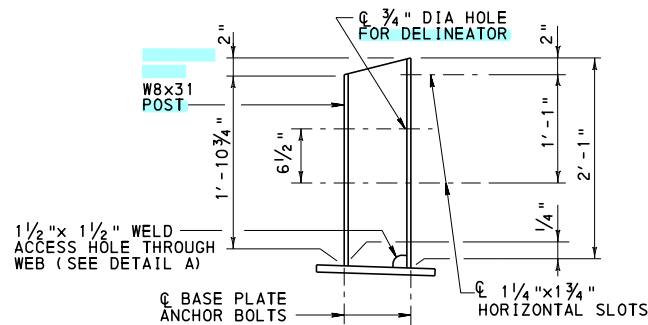
RECOMMENDED NOV. 23, 2022
L. W. Gray
CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022
Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

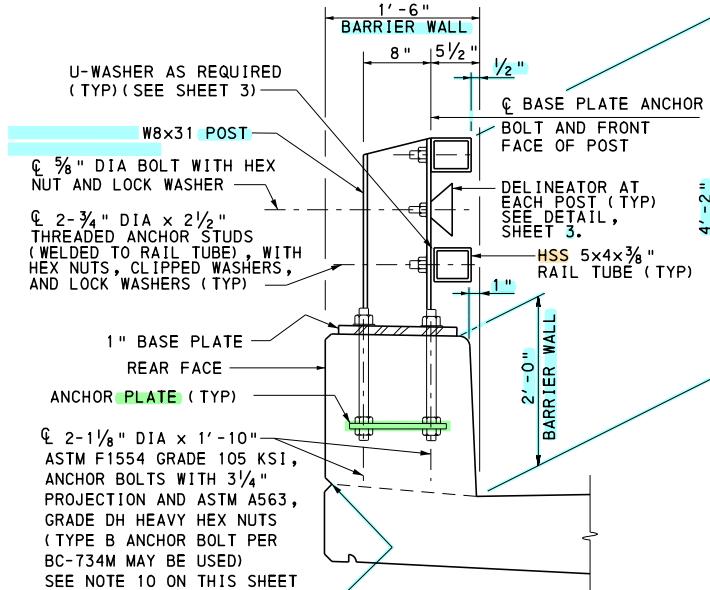
SHEET 4 OF 4
BC-711M

GENERAL NOTES:

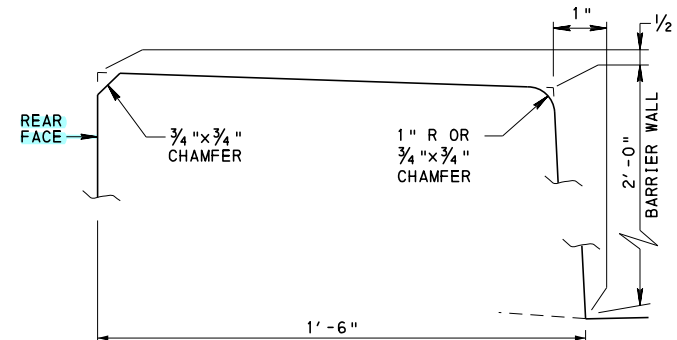
- PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH PUBLICATION 408.
- PROVIDE RAIL TUBES CONFORMING TO ASTM A500, GRADE B.
- PROVIDE POSTS CONFORMING TO AASHTO M270 (ASTM A709), GRADE 50 OR ASTM A992. PROVIDE BASE PLATES CONFORMING TO AASHTO M270 (ASTM A709), GRADE 50. PROVIDE ANCHOR PLATES CONFORMING TO AASHTO M270 (ASTM A709), GRADE 36.
- ALL RAILING COMPONENTS SHALL BE GALVANIZED (AFTER FABRICATION) AS SPECIFIED IN PUBLICATION 408, SECTION 1105.021(d). UNLESS OTHERWISE SHOWN ON THE PLANS, GALVANIZE POSTS, BASE PLATES, ANCHOR PLATES, CONNECTOR PLATES AND SPLICE SLEEVES ACCORDING TO ASTM A123. GALVANIZE RAIL TUBES ACCORDING TO ASTM A123, EXCEPT COATING ON THREADED STUDS AND NUTS USED WITH THE STUDS SHALL MEET THE REQUIREMENTS OF ASTM A153 FOR CLASS C MATERIAL. GALVANIZE ALL ANCHOR HARDWARE ACCORDING TO ASTM A153 OR ASTM B695.
- THE RAIL TUBES ARE SHOP BENT OR FABRICATED TO FIT HORIZONTAL CURVE WHEN RADIUS IS LESS THAN 1,500 FEET.
- STEEL TUBE TOLERANCES:
 - STRAIGHTNESS: THE PERMISSIBLE VARIATION FOR STRAIGHTNESS SHALL BE $\frac{1}{8}$ " TIMES THE NUMBER OF FEET OF THE TOTAL LENGTH DIVIDED BY 5.
 - TWIST: SPECIFIED DIMENSION OF THE LONGEST SIDE IN INCHES FROM OVER 4" TO 6" INCLUSIVE: 0.087" MAX TWIST IN THE FIRST 3 FEET AND IN EACH ADDITIONAL 3 FEET.
 NOTE - TWIST IS MEASURED BY HOLDING DOWN ONE END OF SQUARE OR RECTANGULAR TUBE ON A FLAT SURFACE PLATE WITH THE BOTTOM SIDE OF THE TUBE PARALLEL TO THE SURFACE PLATE AND NOTING THE HEIGHT DIFFERENCE BETWEEN THE TWO CORNERS AT THE OPPOSITE END OF THE BOTTOM SIDE OF THE TUBE.
- MILL TO BEAR IS DEFINED AS FOLLOWS: A MINIMUM OF 25% OF THE POST WEB AND COMPRESSION FLANGE END AREA MUST FIT WITHIN $\frac{1}{32}$ " OF THE BASE PLATE WITH NO GAP MORE THAN 0.040" FOR THE REMAINING 75% OF THE END AREA.
- ALL WELDING SHALL CONFORM TO THE PROVISIONS OF AASHTO/AWS BRIDGE WELDING CODE D1.5, EXCEPT USE AASHTO/AWS BRIDGE WELDING CODE D1.1 FOR WELDING NOT COVERED IN D1.5.
- FOR RAIL TUBE TO POST CONNECTION AND SIDEWALK RAIL TUBE CONNECTION, USE AUTOMATIC WELDED THREADED ANCHOR STUDS CONFORMING TO ASTM A108. USE HEX NUTS CONFORMING TO ASTM A563. USE A $\frac{3}{16}$ " THICK PLATE LOCK WASHER ON EACH STUD AND A $\frac{3}{16}$ " THICK PLATE ASTM A709, GRADE 36 KSI WASHER. U-WASHERS CONFORMING TO ASTM A709, GRADE 36 KSI STEEL.
- FOR ANCHOR BOLTS, USE $\frac{1}{2}$ " DIA BOLTS CONFORMING TO THE REQUIREMENTS OF ASTM F1554, GRADE 105 KSI, INCLUDING THE SUPPLEMENTARY REQUIREMENT, S5, FOR CHARPY IMPACT STRENGTH. USE ASTM A563, GRADE DH HEAVY HEX NUTS. USE ONE ASTM F436, $2\frac{1}{4}$ " O.D. CLIPPED WASHER AT THE TOP OR ALTERNATIVELY USE A RECTANGULAR $\frac{3}{8}$ "x2"x3", ASTM A709, GRADE 36 KSI WASHER WITH $\frac{1}{16}$ " DIA HOLE.
- BOLT TIGHTENING PROCEDURES ARE AS FOLLOWS:
 - SNUG TIGHTEN ALL ANCHOR BOLTS. TIGHTEN THE NUTS AN ADDITIONAL $\frac{1}{3}$ TURN USING A WRENCH.
 - INSTALL RAILING PROVIDING A SMOOTH FACE TO TRAFFIC. INSTALL U-SHAPE WASHERS PROVIDING A SNUG-FIT CONNECTION BETWEEN THE RAIL AND POST. SNUG-TIGHTEN ALL THREADED ANCHOR STUDS. REFER TO SHEET 5 FOR U-WASHER DETAIL.
- IF FLAME CUTTING OR PLASMA CUTTING IS USED TO CREATE SLOTTED HOLES, GRIND SMOOTH TO PROVIDE VERTICAL AND FLAT SURFACES ALONG THE HOLE.
- THE OUT OF FLATNESS TOLERANCE FOR THE POST BASE PLATES IS $\frac{1}{8}$ " CHECKED BETWEEN EDGES OF THE PLATE IN ANY DIRECTION AFTER WELDING IS COMPLETED. THE CONTRACTOR MAY ELECT TO USE THICKER PLATE MATERIAL AND MILL THE BASE PLATE TO A THICKNESS OF NO LESS THAN $\frac{1}{8}$ " TO MEET THIS TOLERANCE.
- THE CENTERLINE OF THE RAIL TUBE SPLICE TO A POST IS TO BE 1'-6" MINIMUM AND 2'-6" MAXIMUM FROM THE CENTERLINE OF THE RAILING POST.
- ONE OR MORE 7'-6" MAXIMUM POST SPACINGS MAY BE REDUCED TO 4'-0" MINIMUM IN ORDER TO MAINTAIN APPROPRIATE SPACING DIMENSIONS FROM THE END OF THE RAIL, EXPANSION JOINTS AND DRAINAGE SCUPPERS.
- LOCATE RAIL SPLICES AT EXPANSION JOINTS AND AT OTHER LOCATIONS WHERE NECESSARY. PROVIDE RAILS AS LONG AS PRACTICAL, WITH A MINIMUM OF THREE POSTS BETWEEN SPLICES, UNLESS OTHERWISE REQUIRED FOR EXPANSION.
- PROVIDE RAIL TUBES CONTINUOUS OVER NOT LESS THAN THREE RAILING POSTS. NO WELDED BUTT SPLICES WILL BE ALLOWED IN THE RAIL TUBE SECTIONS.
- PLACE POST AND POST ANCHOR BOLTS NORMAL TO GRADE AND RAILS PARALLEL TO GRADE.
- COAT ALL SURFACES OF THE BASE PLATE IN CONTACT WITH CONCRETE WITH CAULKING COMPOUND PRIOR TO ERECTION. AFTER ERECTION AND ALIGNMENT, SEAL OPENINGS BETWEEN THE METAL SURFACES AND THE CONCRETE WITH CAULKING COMPOUND CONFORMING TO PUBLICATION 408, SECTION 705.7(b).
- THE PA BRIDGE BARRIER IS DESIGNATED AS MASH TL-5. THE PA BRIDGE BARRIER ATTACHED TO A MOMENT SLAB IS DESIGNATED AS MASH TL-4.
- FOR GUIDE RAIL TRANSITION TO PA BRIDGE BARRIER, SEE RC-50M.
- PROVIDE VERTICAL V-NOTCHES ON BARRIER WALL FRONT AND REAR FACES AT ALL POST ANCHOR BOLT LOCATIONS. SEE DETAIL THIS SHEET.



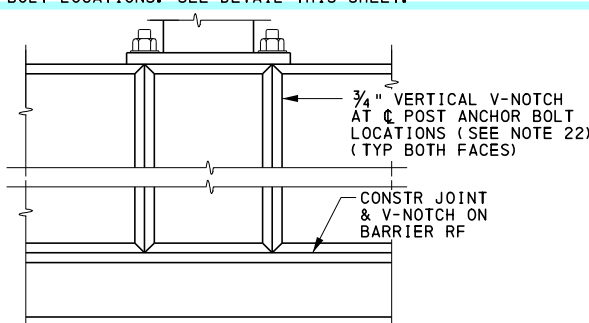
ELEVATION-POST



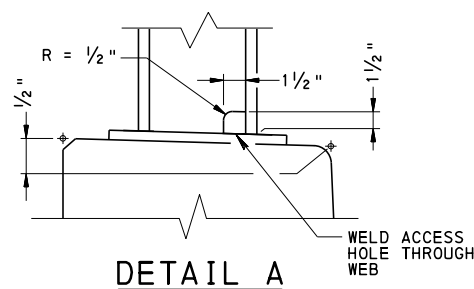
**SECTION A-A
BARRIER SECTION**



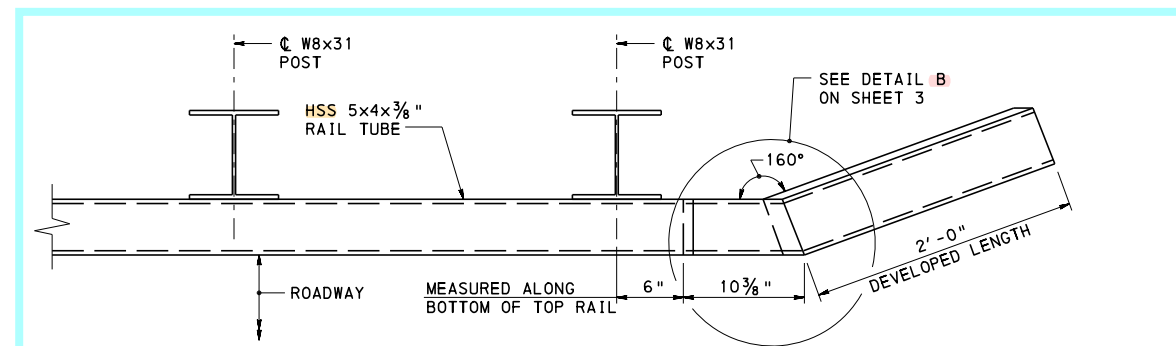
BARRIER WALL GEOMETRY DETAIL
(BASE PLATE AND ANCHOR BOLTS NOT SHOWN FOR CLARITY)



VERTICAL V-NOTCH DETAIL
(BARRIER REAR FACE SHOWN, FRONT FACE SIMILAR)

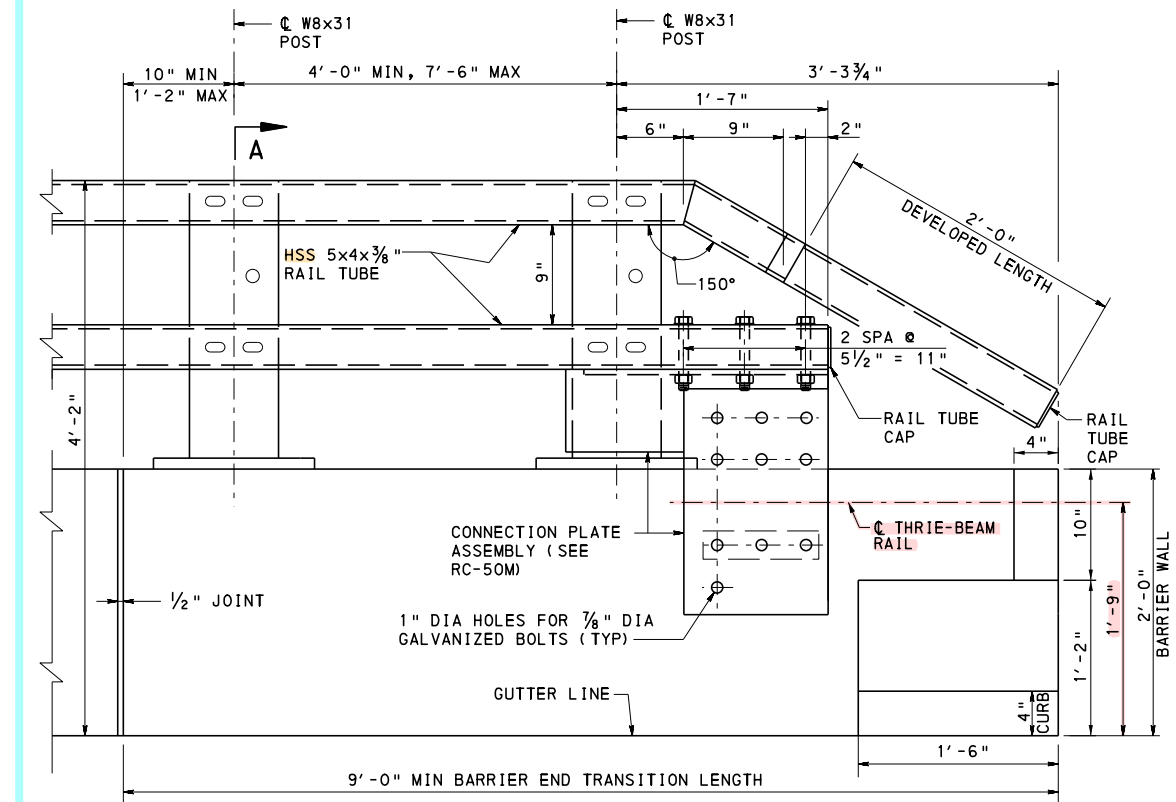


DETAIL A



PLAN

(BARRIER WALL NOT SHOWN)



ELEVATION

**PA BRIDGE BARRIER
WITH THRIE-BEAM CONNECTION**

(GUIDE RAIL AND ANCHOR BOLTS OMITTED FOR CLARITY)
(WITH CURB SHOWN, WITHOUT CURB SIMILAR)

BC-711M	ALUMINUM PROTECTIVE BARRIER
BC-720M	ALUMINUM OR STEEL BRIDGE HAND RAILING
BC-721M	ELECTRICAL DETAILS
BC-734M	ANCHOR SYSTEMS
BC-736M	REINFORCEMENT BAR FABRICATION DETAILS
BC-752M	CONCRETE DECK SLAB DETAILS
BC-762M	TOOTH EXPANSION DAM FOR PRESTRESSED CONCRETE & STEEL BEAM BRIDGES
BC-767M	NEOPRENE STRIP SEAL DAM FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES
BC-799M	MECHANICALLY STABILIZED EARTH RETAINING WALLS
RC-20M	CONCRETE PAVEMENT JOINTS
RC-50M	GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS
RC-51M	TYPE 31 STRONG POST GUIDE RAIL

REFERENCE DRAWINGS

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE**

STANDARD

PA BRIDGE BARRIER
MISCELLANEOUS DETAILS - 1

RECOMMENDED OCT. 7, 2024

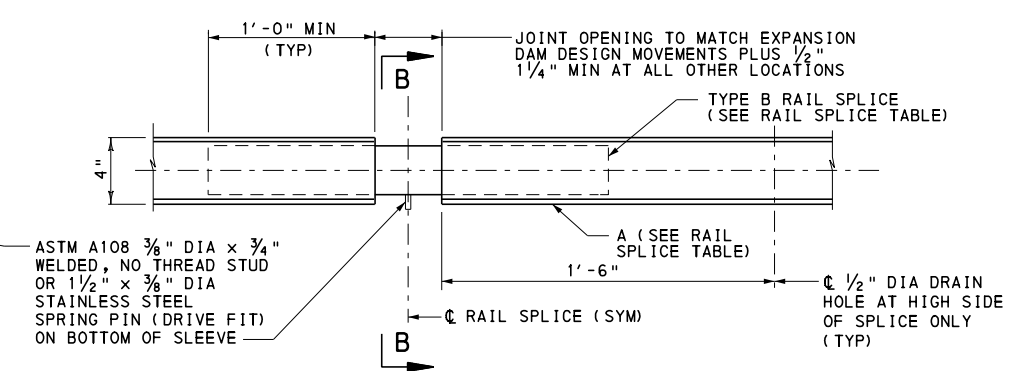
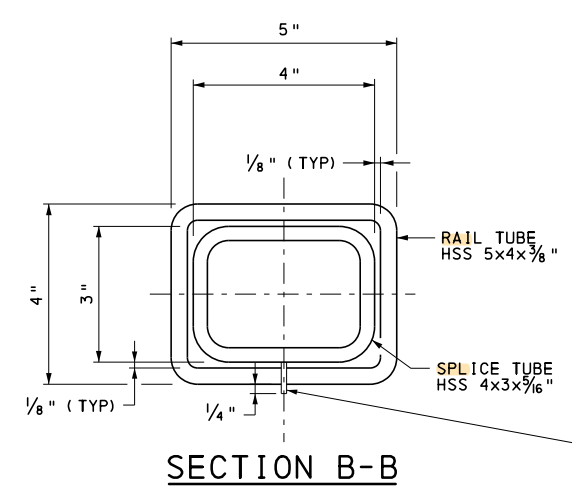
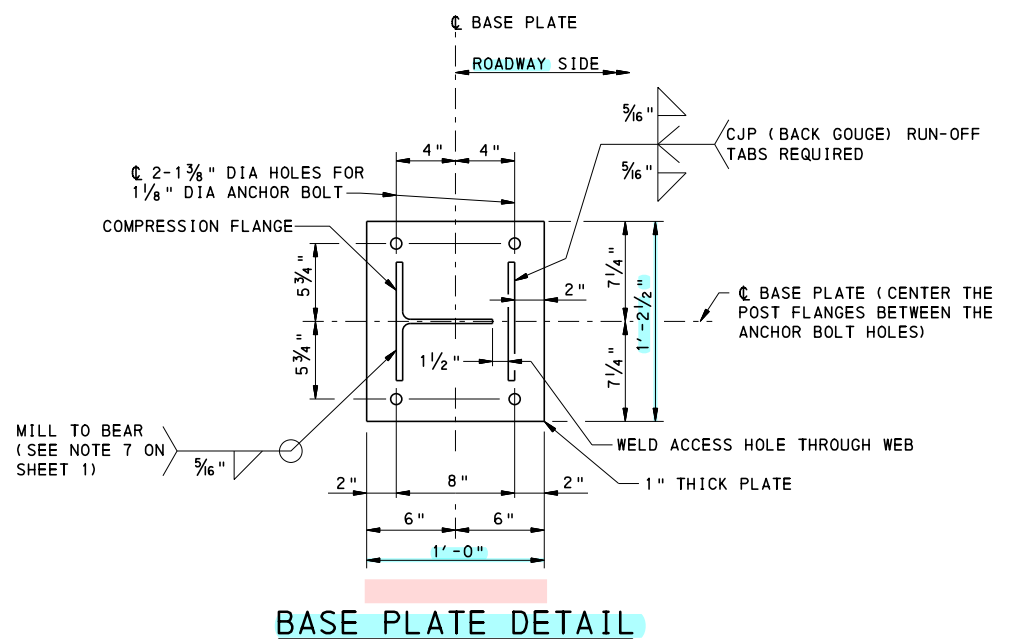
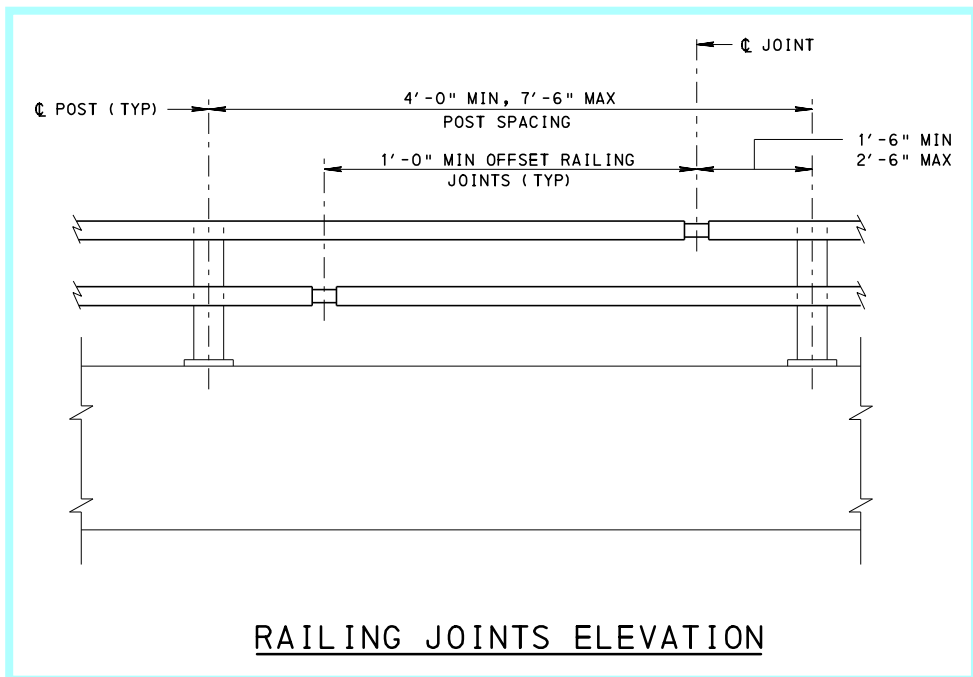
RECOMMENDED OCT. 7, 2024

SHEET 1 OF 16

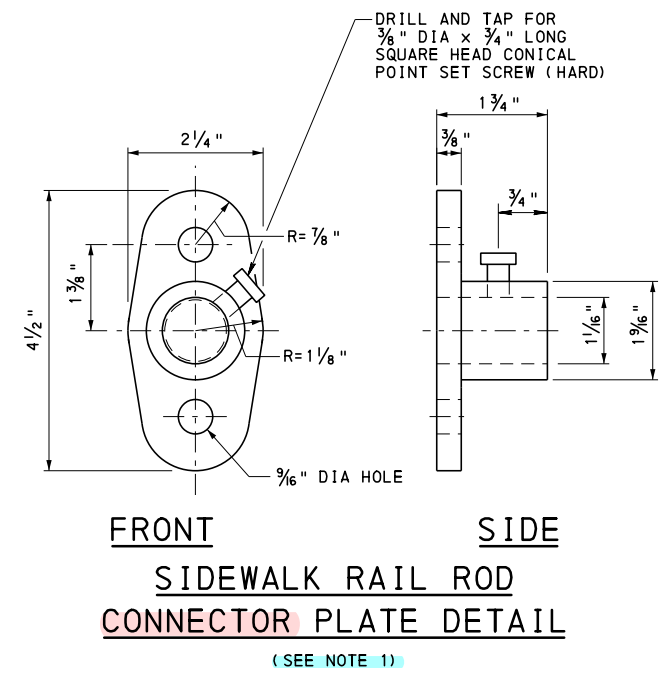
Kevin J. Long
CHIEF BRIDGE ENGINEER

Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

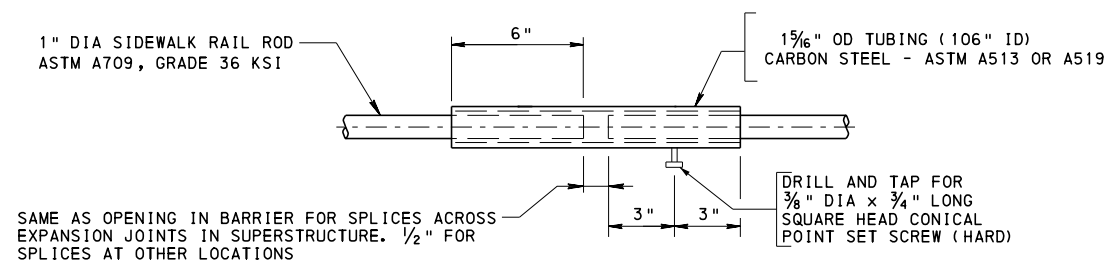
BC-713M



RAIL SPLICE TABLE		
TYPE	A (RAIL TUBE)	B (SPLICE TUBE)
MAIN RAIL	HSS 5x4x3/8"	HSS 4x3x7/16"
SIDEWALK RAIL	HSS 2x2x1/4"	1 1/4"x1 1/4" ROD, 36 KSI



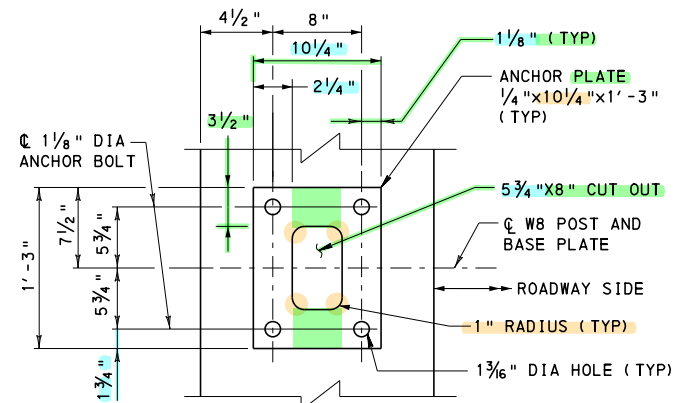
- NOTES:
- IN LIEU OF FABRICATED CONNECTOR PLATE, USE CAST OR OTHER TYPE OF CONNECTOR PLATE SUBJECT TO SHOP DRAWING APPROVAL.
 - FOR ADDITIONAL NOTES, SEE SHEET 1.



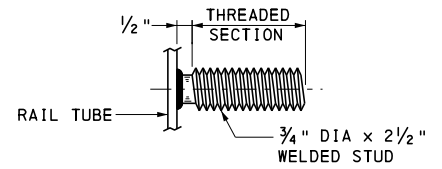
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

STANDARD
PA BRIDGE BARRIER
MISCELLANEOUS DETAILS - 2

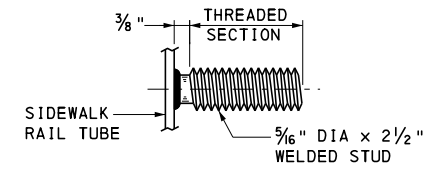
RECOMMENDED OCT. 7, 2024 <i>Kevin J. Lange</i> CHIEF BRIDGE ENGINEER	RECOMMENDED OCT. 7, 2024 <i>Gavin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 2 OF 16 BC-713M
--	--	--------------------------



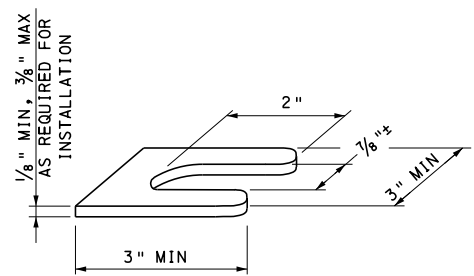
ANCHOR PLATE DETAIL



BARRIER RAIL ANCHOR STUD DETAIL



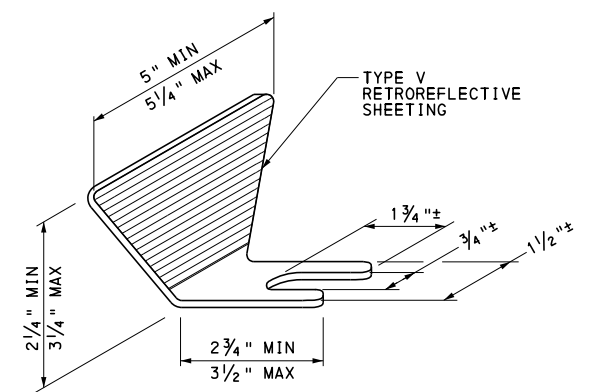
SIDEWALK RAIL ANCHOR STUD DETAIL



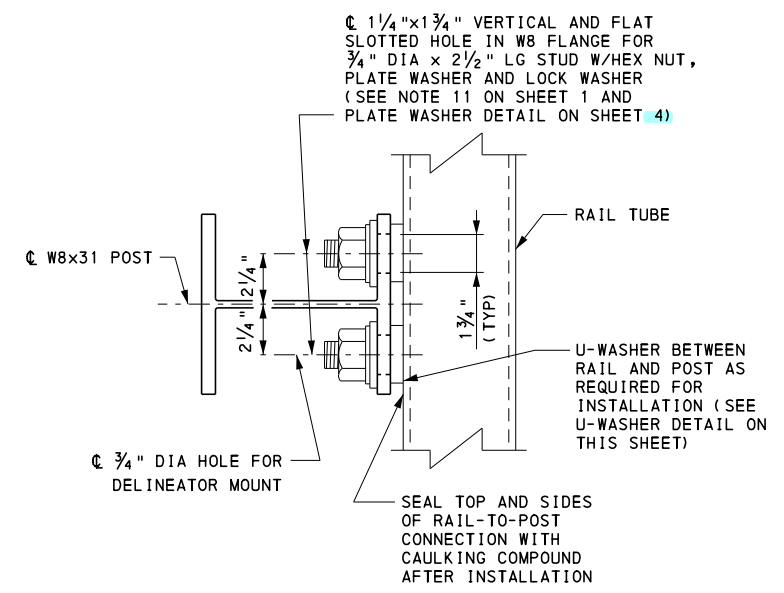
U-WASHER DETAIL

U-WASHER NOTES:

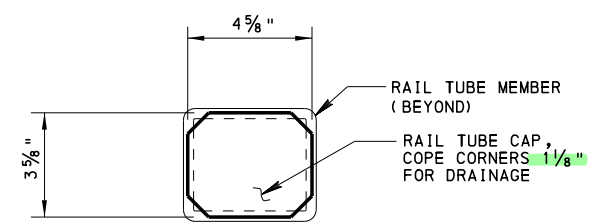
1. THIS U-WASHER IS PROVIDED TO ADJUST FOR "FIT" PROBLEMS IN THE FIELD.
2. PROVIDE ONE U-WASHER PER STUD AS REQUIRED.



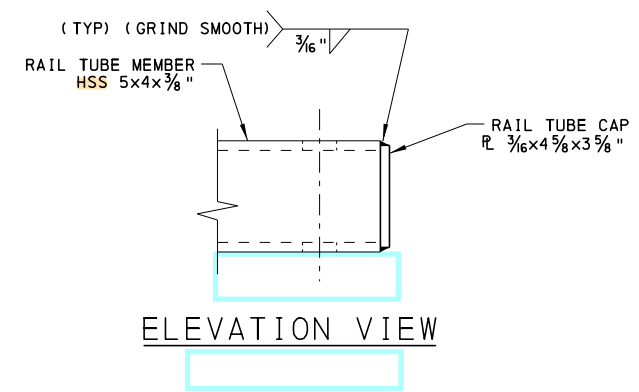
DELINEATOR DETAIL



TYPICAL RAIL TO POST DETAIL



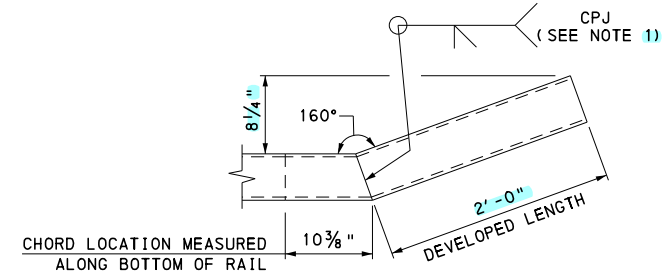
END VIEW



ELEVATION VIEW

TABLE 1 RAIL TUBE CAP SIZES FOR PA BRIDGE BARRIER		
TYPE	MEMBER	RAIL TUBE CAP (THKxHxW)
MAIN RAIL	HSS 5x4x3/8"	R 3/16"x3 5/8"x4 5/8"
SIDEWALK RAIL	HSS 2x2x1/4"	R 3/16"x1 5/8"x1 5/8"

RAIL TUBE CAP DETAIL



**DETAIL B
(TOP RAIL ONLY)**

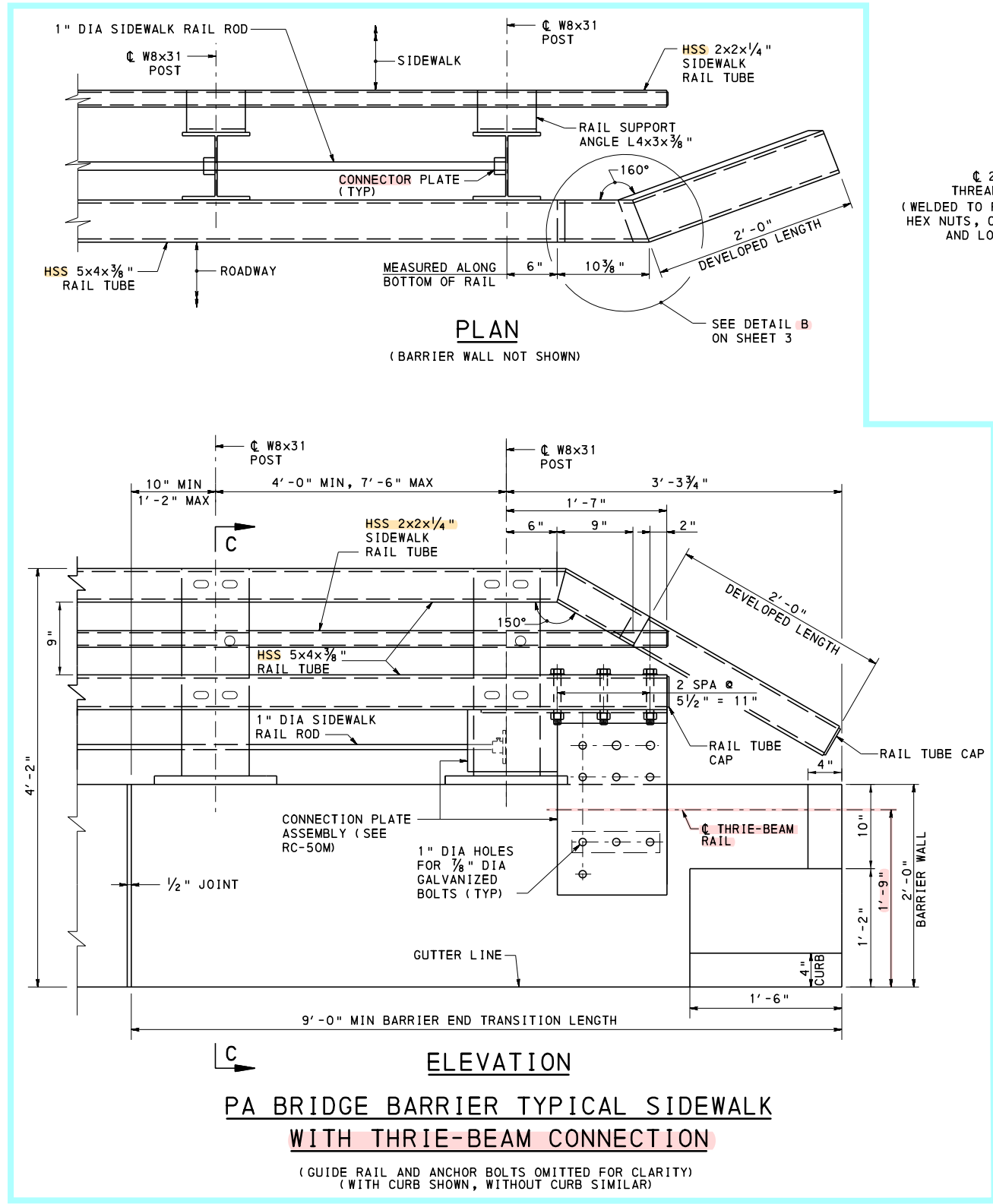
NOTES:

1. COMPLETE JOINT PENETRATION GROOVE WELD. GRIND FLUSH ON OUTSIDE FACE. SHOW SPECIFIC WELD SYMBOL ON SHOP DRAWINGS.
2. FOR ADDITIONAL NOTES, SEE SHEET 1.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE**

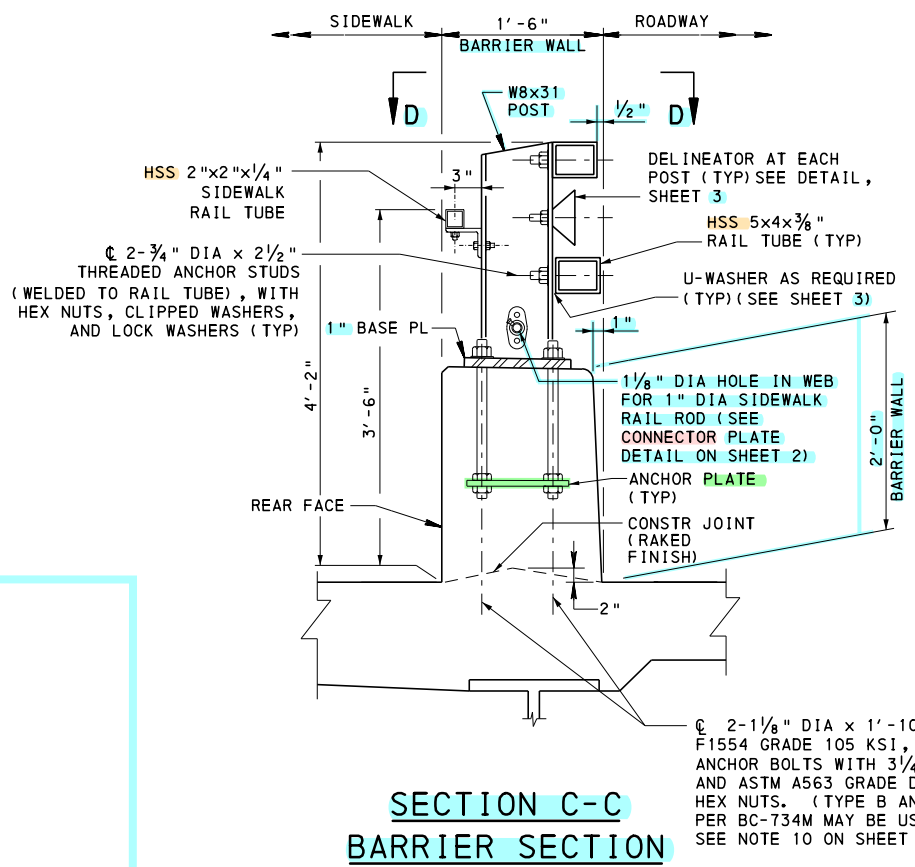
**STANDARD
PA BRIDGE BARRIER
MISCELLANEOUS DETAILS - 3**

RECOMMENDED OCT. 7, 2024 <i>Kristin D. Longo</i> CHIEF BRIDGE ENGINEER	RECOMMENDED OCT. 7, 2024 <i>Gavin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 3 OF 16 BC-713M
--	--	---------------------------------

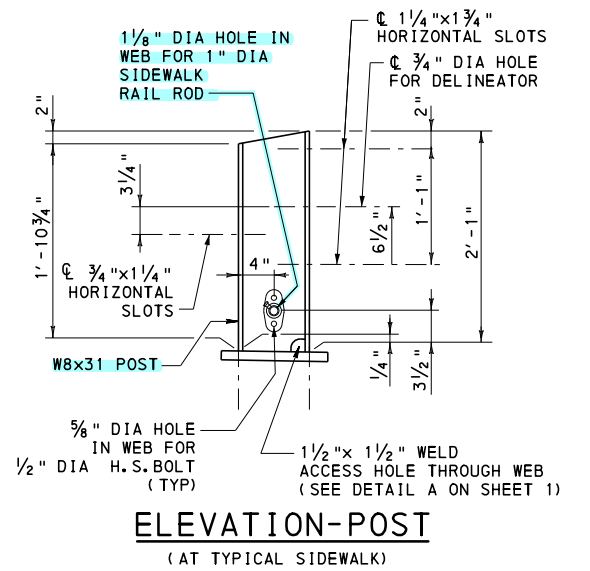


NOTES:

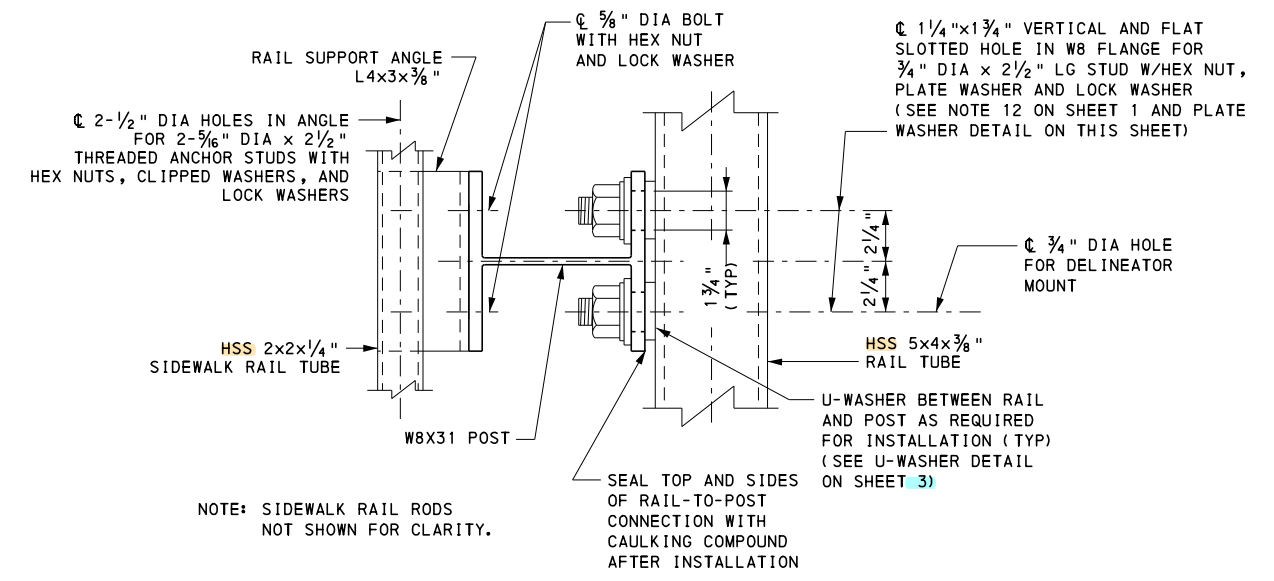
- 1. FOR NOTES, SEE SHEET 1.



**SECTION C-C
BARRIER SECTION**



**ELEVATION-POST
(AT TYPICAL SIDEWALK)**



SECTION D-D

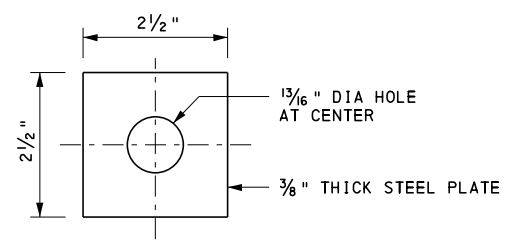
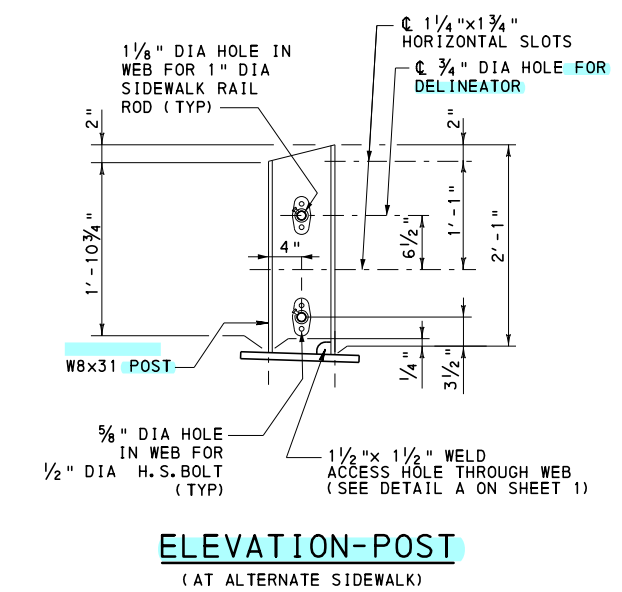
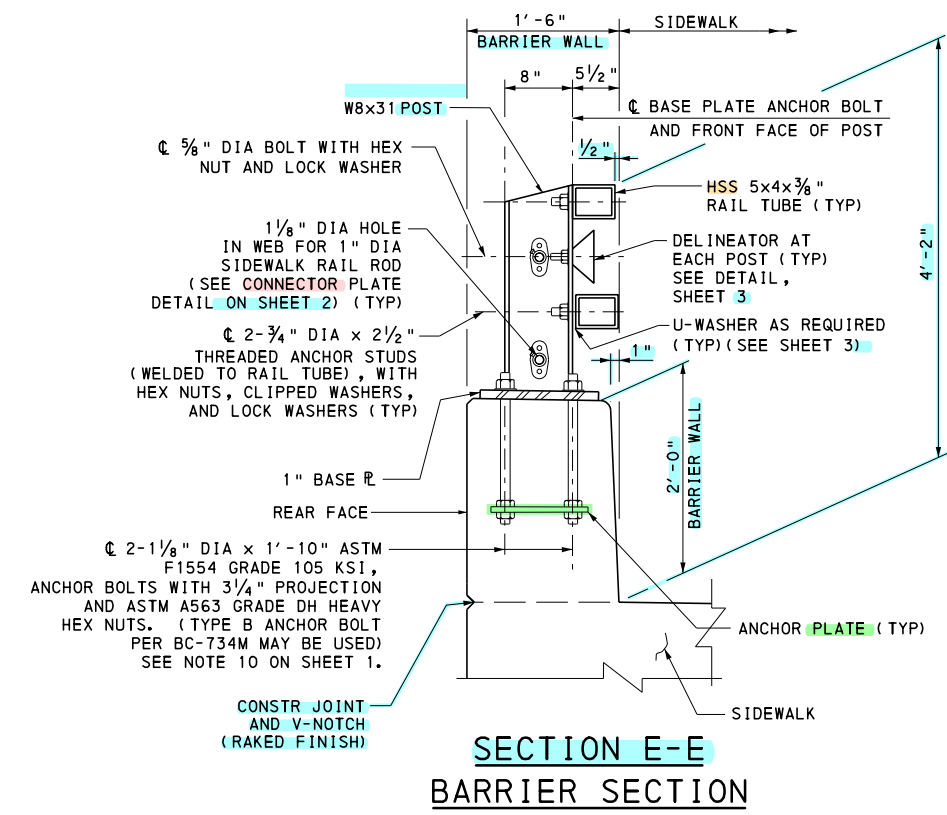
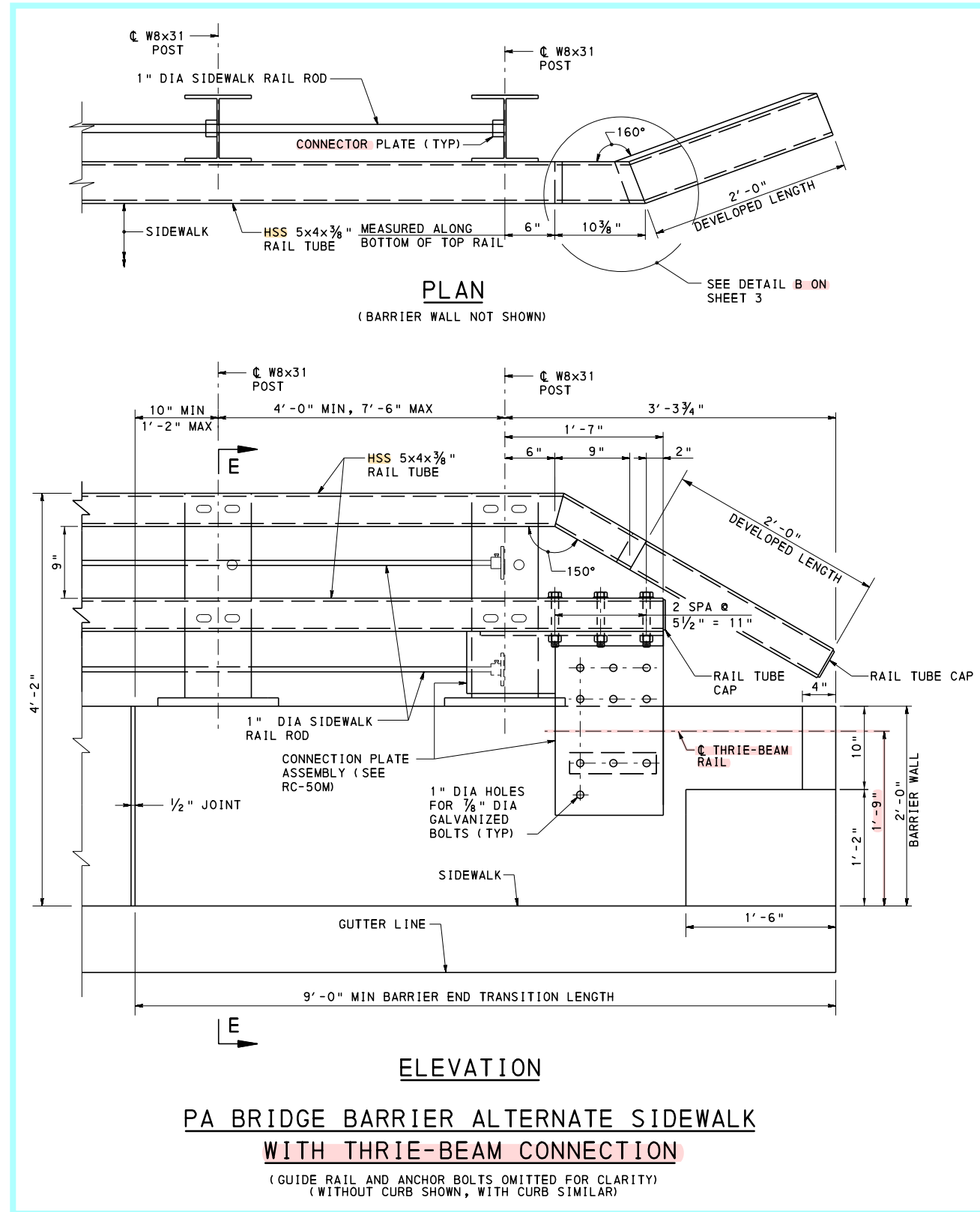


PLATE WASHER DETAIL

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE**

**STANDARD
PA BRIDGE BARRIER
TYPICAL SIDEWALK DETAILS**

RECOMMENDED OCT. 7, 2024 <i>Kevin J. Lange</i> CHIEF BRIDGE ENGINEER	RECOMMENDED OCT. 7, 2024 <i>Gavin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 4 OF 16 BC-713M
--	--	---------------------------------



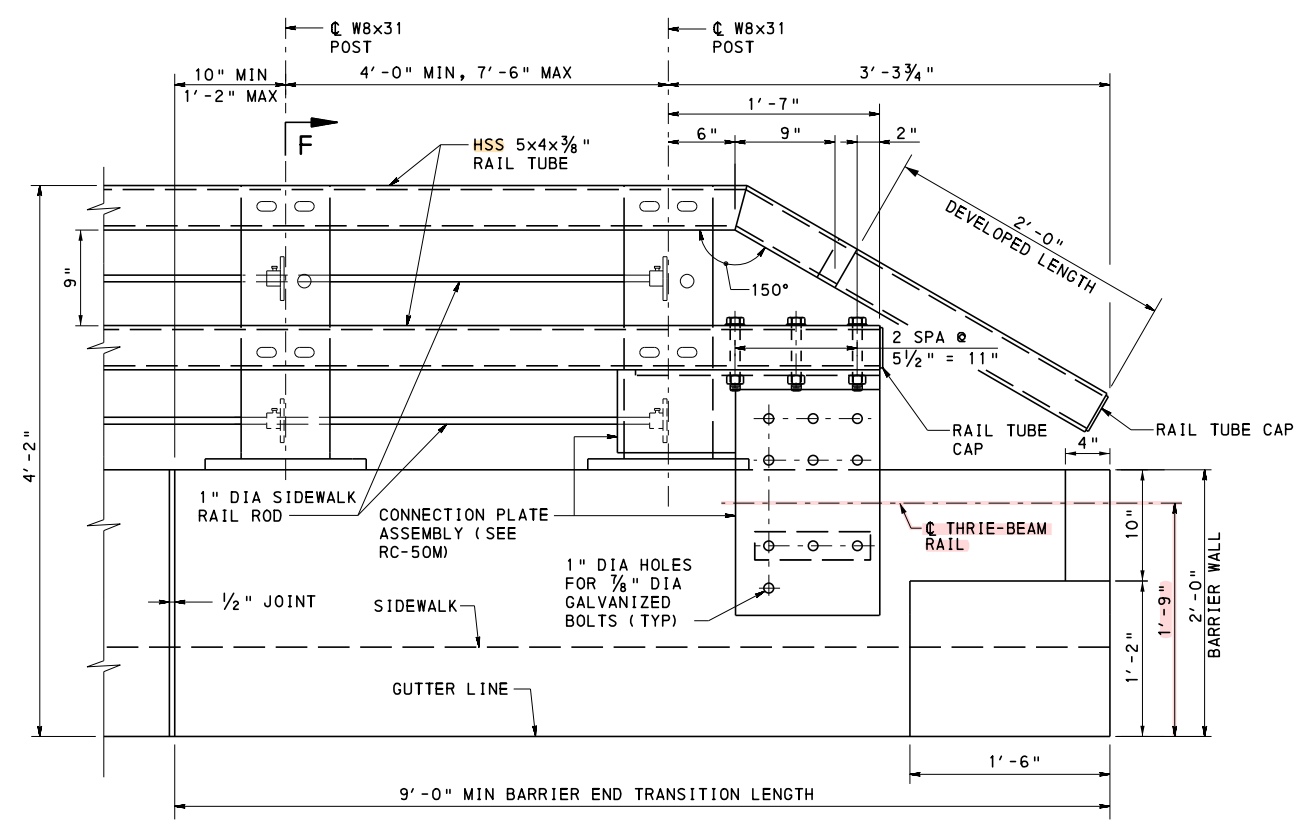
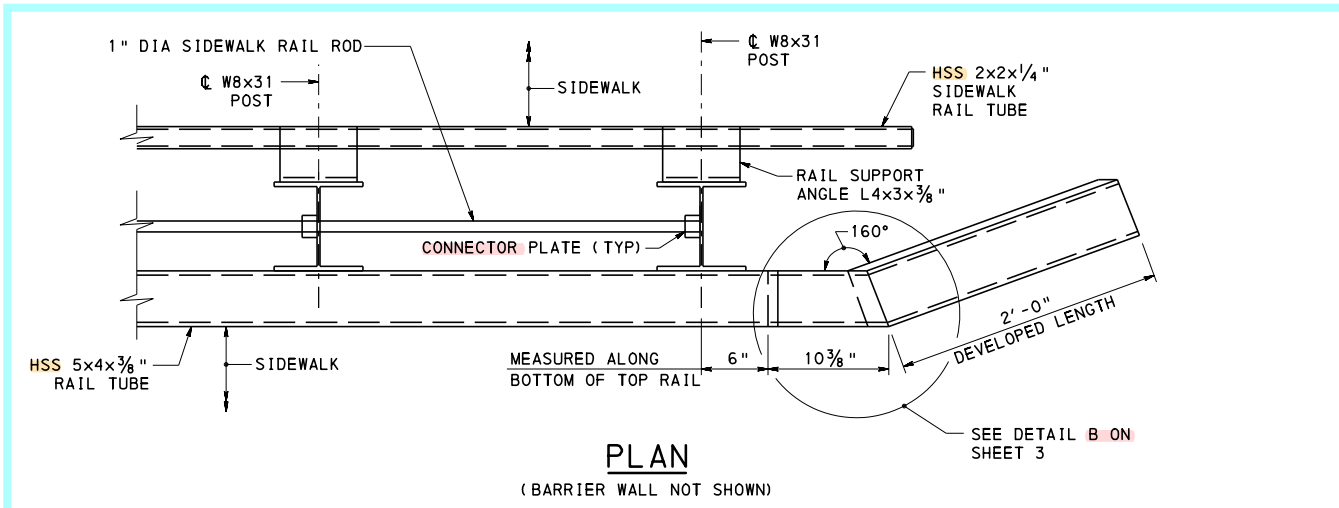
NOTES:
1. FOR NOTES, SEE SHEET 1.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

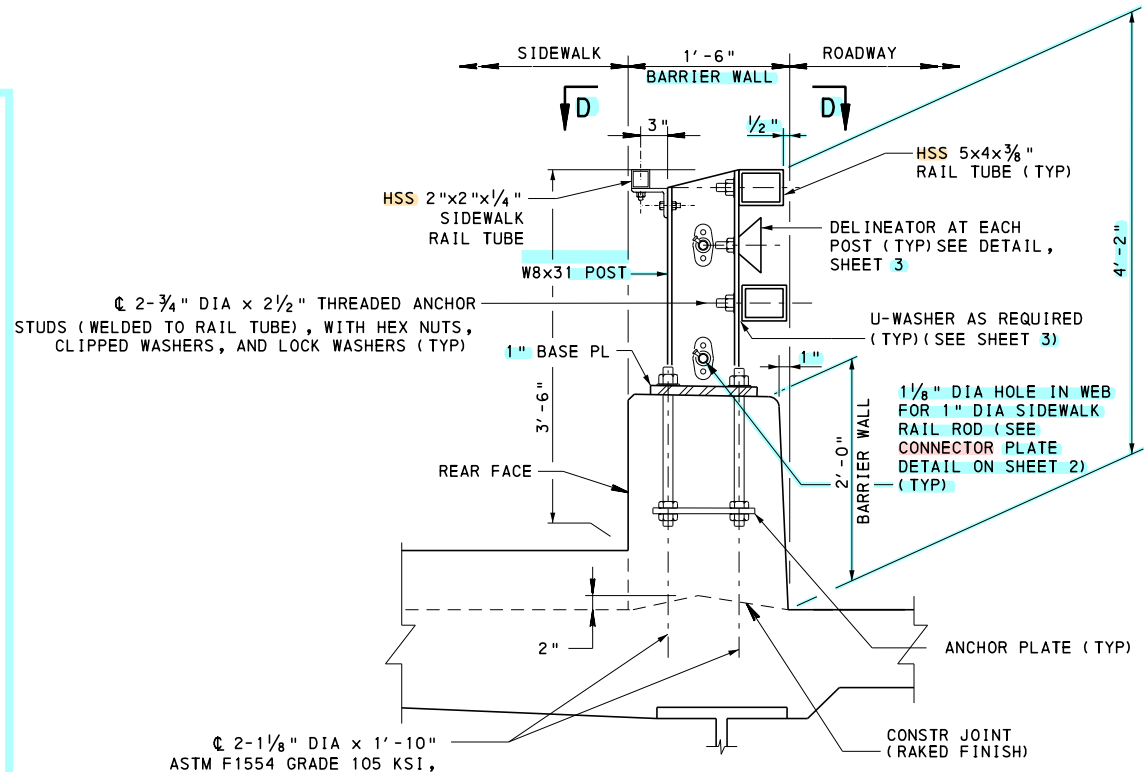
STANDARD

PA BRIDGE BARRIER
ALTERNATE SIDEWALK DETAILS

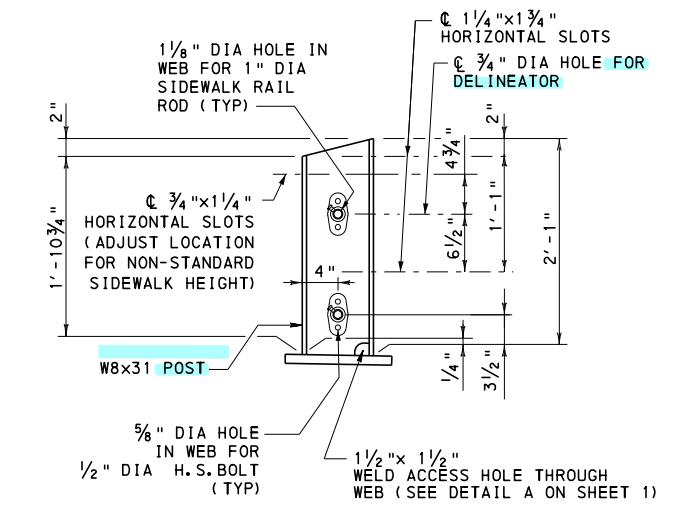
RECOMMENDED OCT. 7, 2024 <i>Kevin J. Lange</i> CHIEF BRIDGE ENGINEER	RECOMMENDED OCT. 7, 2024 <i>Gravin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 5 OF 16 BC-713M
--	---	--------------------------



ELEVATION
PA BRIDGE BARRIER RAISED SIDEWALK WITH THRIE-BEAM CONNECTION
 (GUIDE RAIL AND ANCHOR BOLTS OMITTED FOR CLARITY)
 (WITHOUT CURB SHOWN, WITH CURB SIMILAR)



SECTION F-F BARRIER SECTION
 2-3/4" DIA x 2 1/2" THREADED ANCHOR STUDS (WELDED TO RAIL TUBE), WITH HEX NUTS, CLIPPED WASHERS, AND LOCK WASHERS (TYP)
 2-1/8" DIA x 1'-10" ASTM F1554 GRADE 105 KSI, ANCHOR BOLTS WITH 3/4" PROJECTION AND ASTM A563, GRADE DH HEAVY HEX NUTS. (TYPE B ANCHOR BOLT PER BC-734M MAY BE USED) SEE NOTE 10 ON SHEET 1.



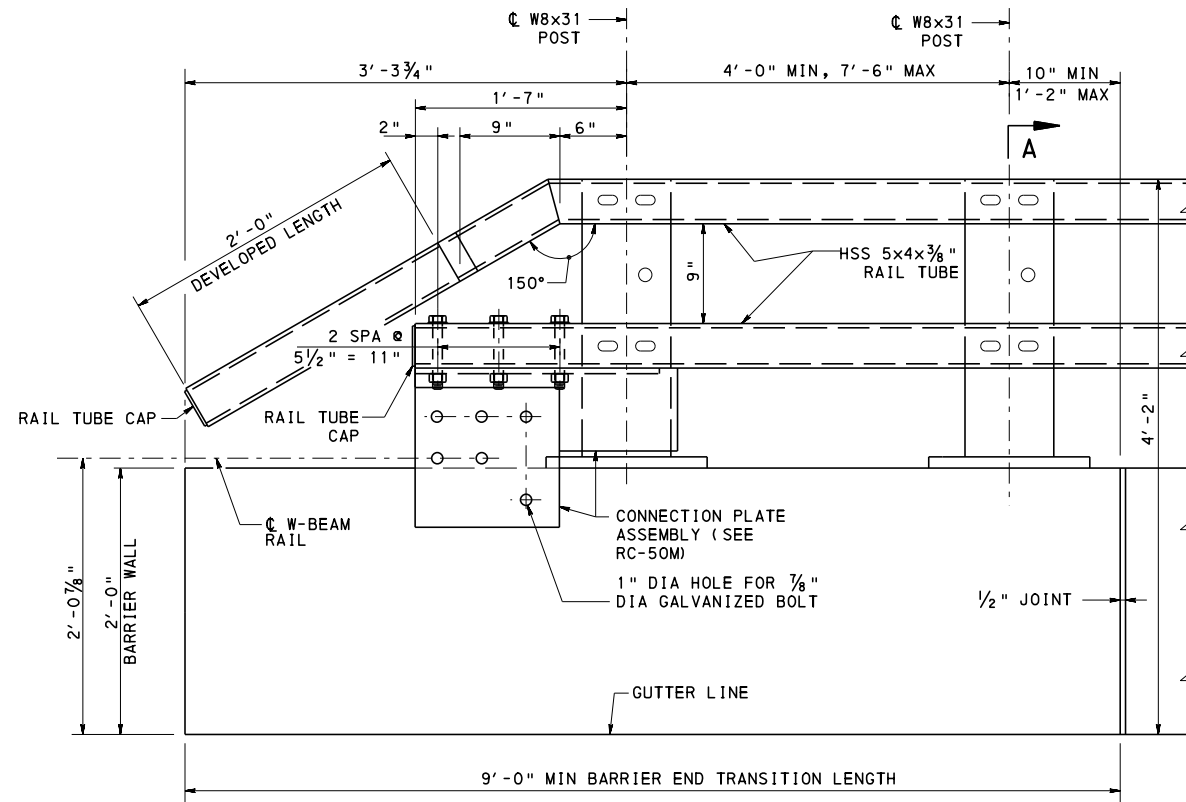
ELEVATION-POST
 (AT RAISED 8" SIDEWALK)

NOTES:
 1. FOR NOTES, SEE SHEET 1

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF BRIDGE

STANDARD
PA BRIDGE BARRIER
RAISED SIDEWALK DETAILS

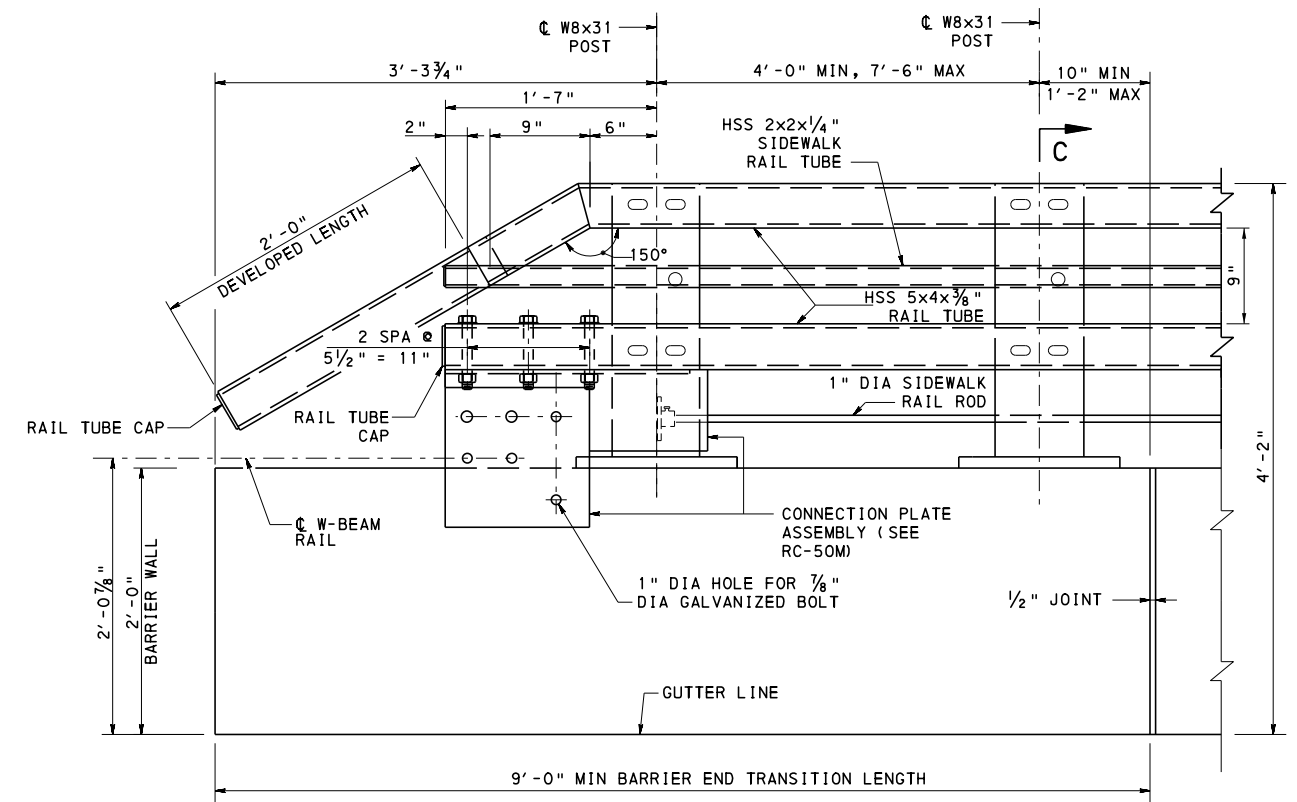
RECOMMENDED OCT. 7, 2024 <i>Kevin J. Long</i> CHIEF BRIDGE ENGINEER	RECOMMENDED OCT. 7, 2024 <i>Grain E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 6 OF 16 BC-713M
---	--	--------------------------



ELEVATION

**PA BRIDGE BARRIER
WITH W-BEAM CONNECTION**

(GUIDE RAIL AND ANCHOR BOLTS OMITTED FOR CLARITY)



ELEVATION

**PA BRIDGE BARRIER TYPICAL SIDEWALK
WITH W-BEAM CONNECTION**

(GUIDE RAIL AND ANCHOR BOLTS OMITTED FOR CLARITY)

NOTES:

1. PROVIDE W-BEAM GUIDE RAIL CONNECTION ON THE TRAILING END OF THE BRIDGE BARRIER ON DIVIDED HIGHWAYS AND ONE-WAY ROADWAYS WHEN INDICATED ON THE CONTRACT DRAWINGS.
2. END CHAMFERS, ON THE BARRIER WALL, ARE NOT REQUIRED ON THE TRAILING END OF THE BARRIER WALL ON DIVIDED HIGHWAYS AND ONE-WAY ROADWAYS WHEN CONNECTING TO A W-BEAM RAIL.
3. FOR THE W-BEAM GUIDE RAIL CONNECTION, THE COST OF THE CONNECTION PLATE, BOLTS, AND ASSOCIATED HARDWARE ARE INCLUDED WITH THE PA BRIDGE BARRIER PAY ITEM.
4. FOR ADDITIONAL DETAILS AND NOTES, SEE SHEETS 1-6.
5. FOR SECTION A-A, SEE SHEET 1.
6. FOR SECTION B-B, SEE SHEET 4.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE**

**STANDARD
W-BEAM CONNECTIONS
ELEVATIONS - 1**

RECOMMENDED OCT. 7, 2024

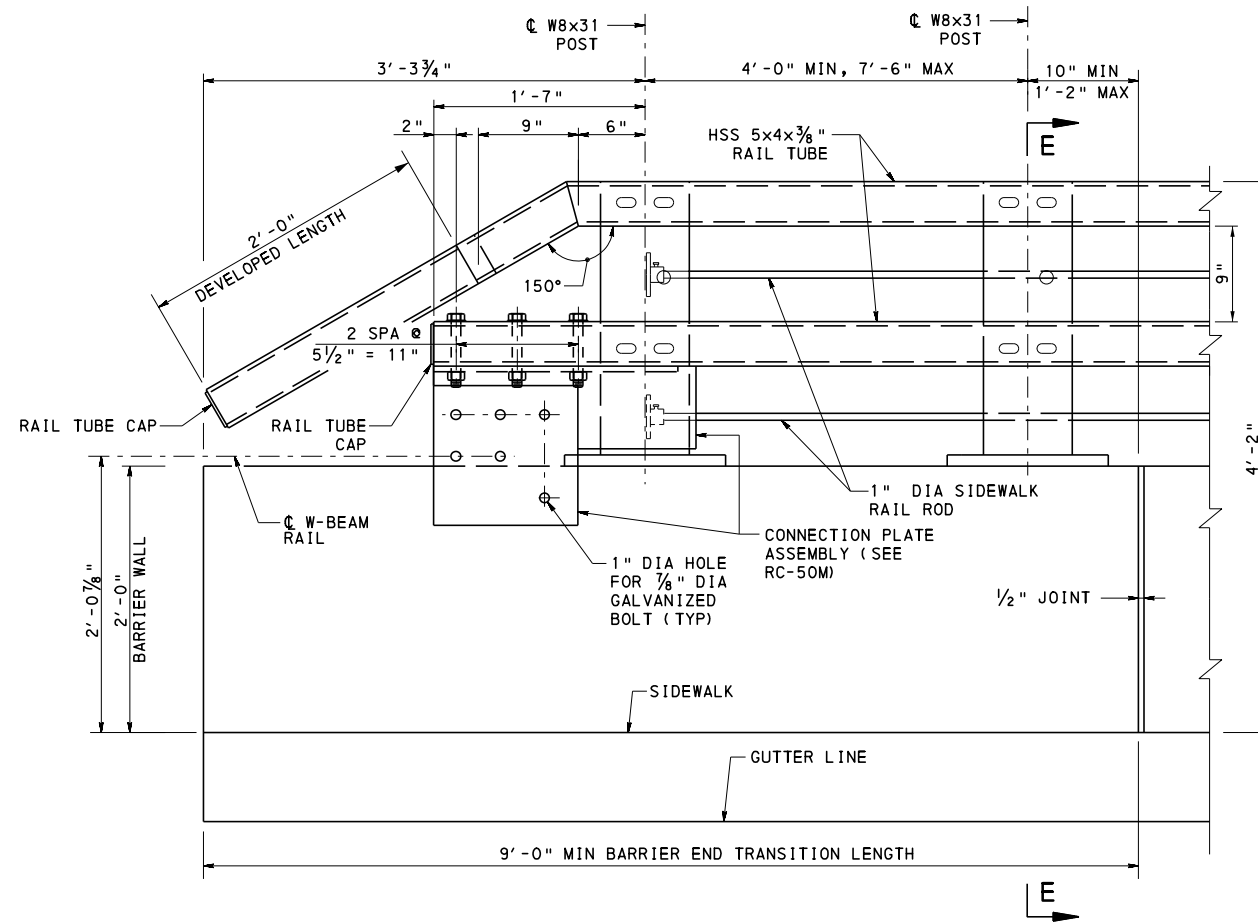
Karin D. Lange
CHIEF BRIDGE ENGINEER

RECOMMENDED OCT. 7, 2024

Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 7 OF 16

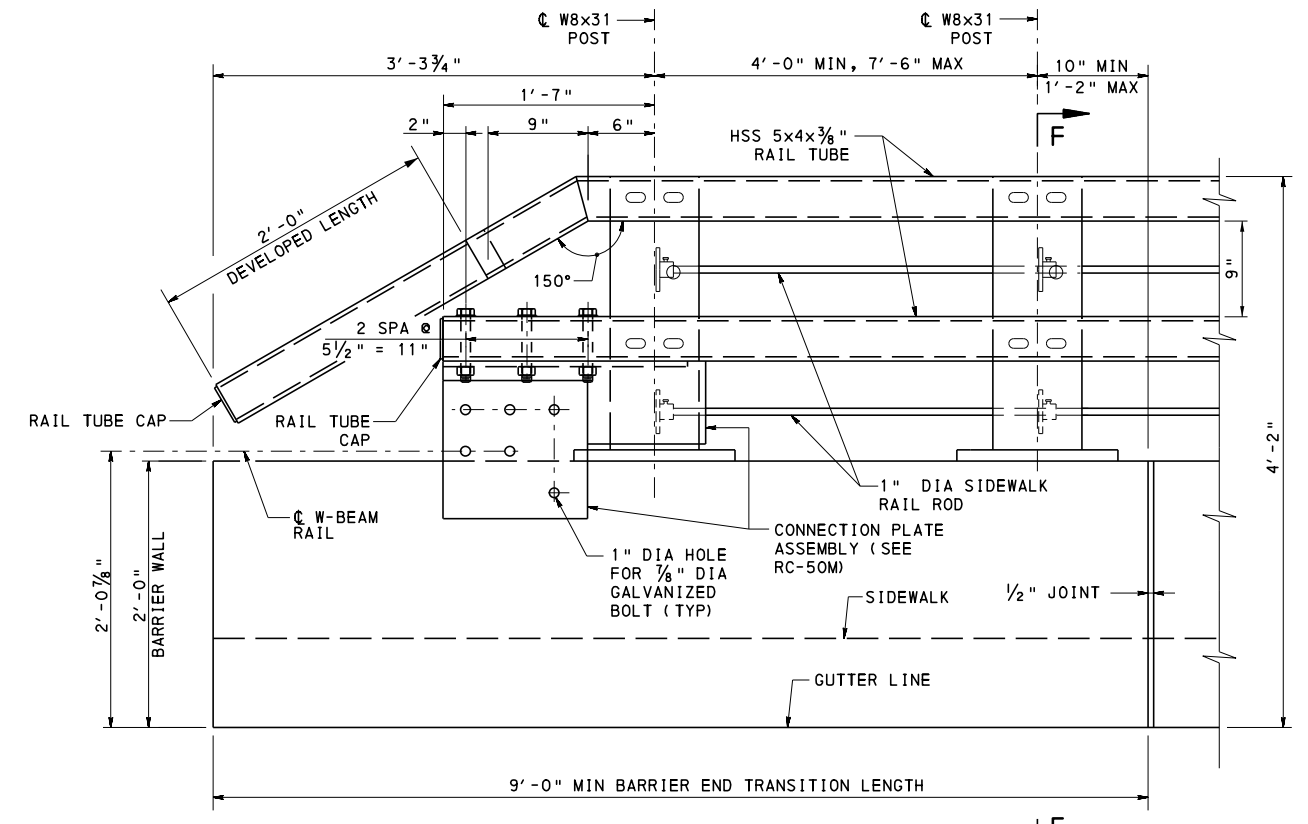
BC-713M



ELEVATION

**PA BRIDGE BARRIER ALTERNATE SIDEWALK
WITH W-BEAM CONNECTION**

(GUIDE RAIL AND ANCHOR BOLTS OMITTED FOR CLARITY)



ELEVATION

**PA BRIDGE BARRIER RAISED SIDEWALK
WITH W-BEAM CONNECTION**

(GUIDE RAIL AND ANCHOR BOLTS OMITTED FOR CLARITY)

NOTES:

1. PROVIDE W-BEAM GUIDE RAIL CONNECTION ON THE TRAILING END OF THE BRIDGE BARRIER ON DIVIDED HIGHWAYS AND ONE-WAY ROADWAYS WHEN INDICATED ON THE CONTRACT DRAWINGS.
2. END CHAMFERS, ON THE BARRIER WALL, ARE NOT REQUIRED ON THE TRAILING END OF THE BARRIER WALL ON DIVIDED HIGHWAYS AND ONE-WAY ROADWAYS WHEN CONNECTING TO A W-BEAM RAIL.
3. FOR THE W-BEAM GUIDE RAIL CONNECTION, THE COST OF THE CONNECTION PLATE, BOLTS, AND ASSOCIATED HARDWARE ARE INCLUDED WITH THE PA BRIDGE BARRIER PAY ITEM.
4. FOR ADDITIONAL DETAILS AND NOTES, SEE SHEETS 1-6.
5. FOR SECTION E-E, SEE SHEET 5.
6. FOR SECTION F-F, SEE SHEET 6.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE**

**STANDARD
W-BEAM CONNECTIONS
ELEVATIONS - 2**

RECOMMENDED OCT. 7, 2024

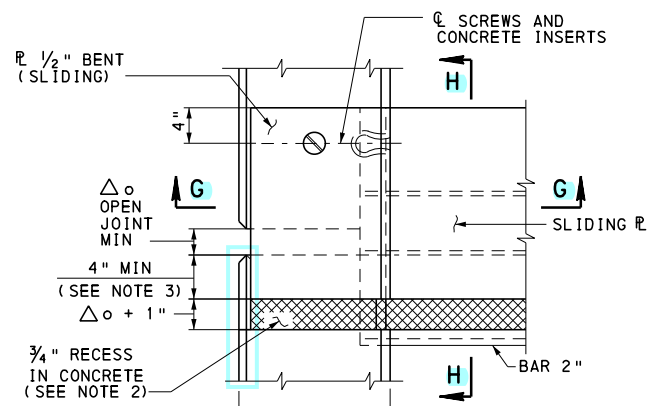
Kevin J. Long
CHIEF BRIDGE ENGINEER

RECOMMENDED OCT. 7, 2024

Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

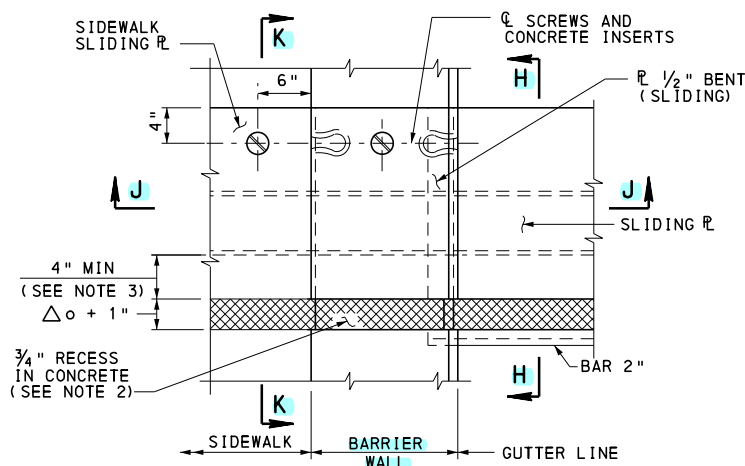
SHEET 8 OF 16

BC-713M



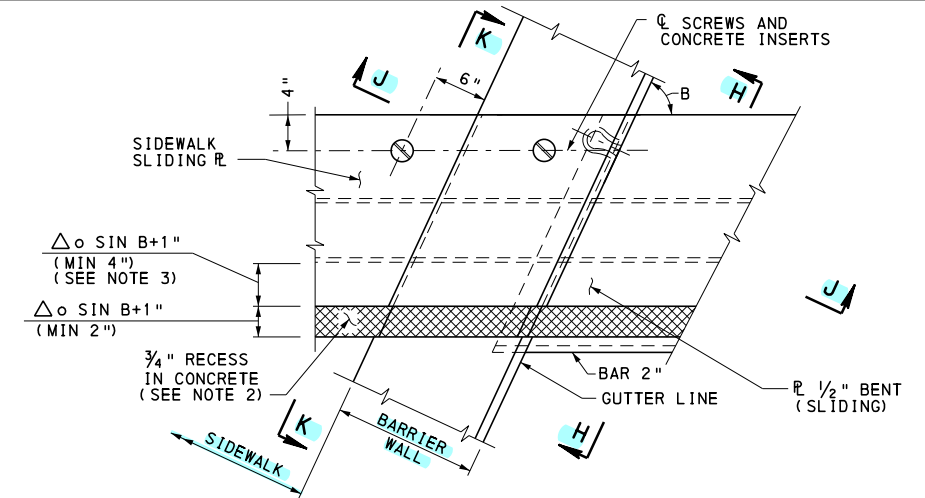
PLAN - SKEW ANGLE $\geq 75^\circ$

(AT GUTTER LINE SHOWN;
AT END OF ALTERNATE SIDEWALK SIMILAR)



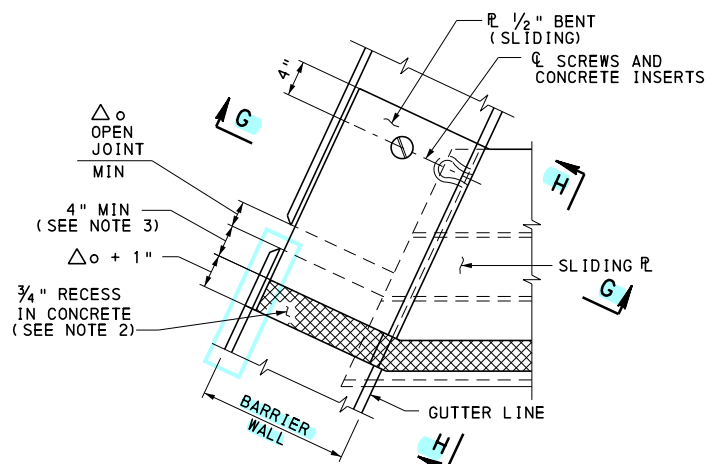
PLAN AT TYPICAL SIDEWALK- SKEW ANGLE $\geq 75^\circ$

(AT TYPICAL SIDEWALK SHOWN; RAISED SIDEWALK SIMILAR)



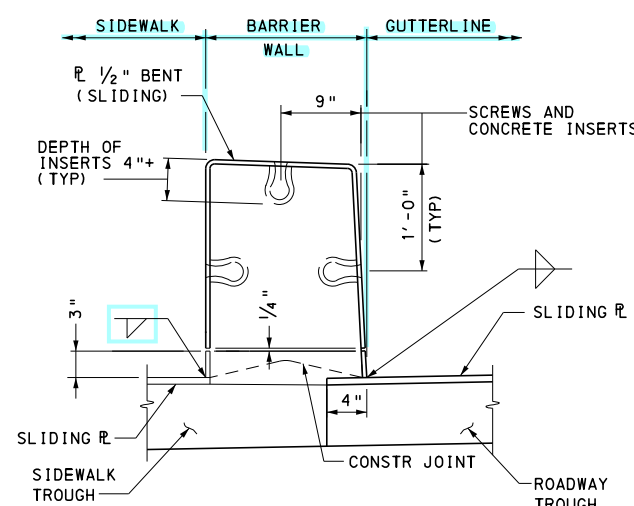
PLAN AT TYPICAL SIDEWALK- SKEW ANGLE $< 75^\circ$

(AT TYPICAL SIDEWALK SHOWN; RAISED SIDEWALK SIMILAR)



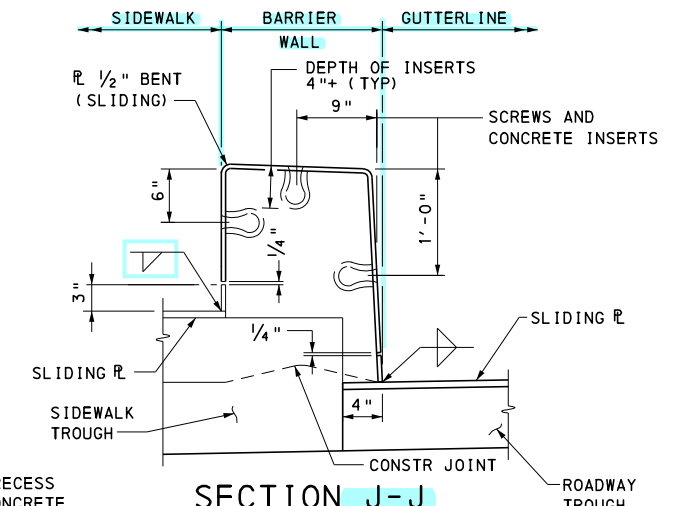
PLAN - SKEW ANGLE $< 75^\circ$

(AT GUTTER LINE SHOWN;
AT END OF ALTERNATE SIDEWALK SIMILAR)



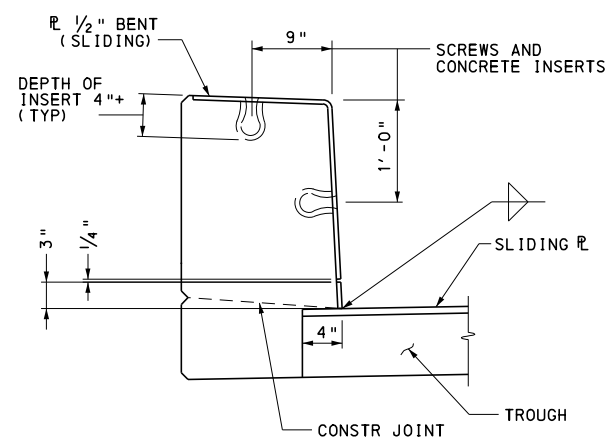
SECTION J-J

(AT TYPICAL SIDEWALK)

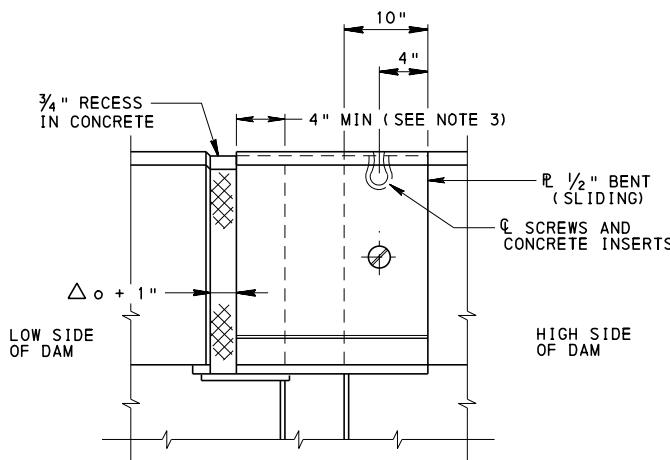


SECTION J-J

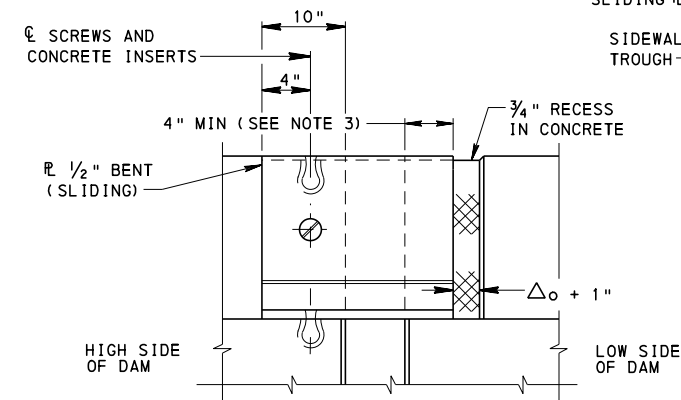
(AT RAISED SIDEWALK)



SECTION G-G



SECTION H-H



SECTION K-K

(AT TYPICAL SIDEWALK SHOWN; RAISED SIDEWALK SIMILAR)

NOTES:

- FOR Δ_o SEE BC-762M
- FORM CONCRETE RECESS AREA IN BARRIER WALL AND GRIND TO PROVIDE SMOOTH SURFACE. APPLY ONE COAT OF ASPHALT CEMENT PAINT WA-1 OR PERFORMANCE GRADED ASPHALT CEMENT PG 64-22 TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION.
- MAINTAIN 4" MINIMUM BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT TEMP. OF -10°F FOR STEEL BRIDGES AND 10°F FOR P/S CONCRETE BRIDGES.
- MAXIMUM DISTANCE FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3".

PA BRIDGE BARRIER AT TOOTH EXPANSION DAM

(RAILING POST AND TUBE RAILS NOT SHOWN)
(AT TYPICAL SIDEWALK SHOWN; RAISED SIDEWALK SIMILAR)

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE**

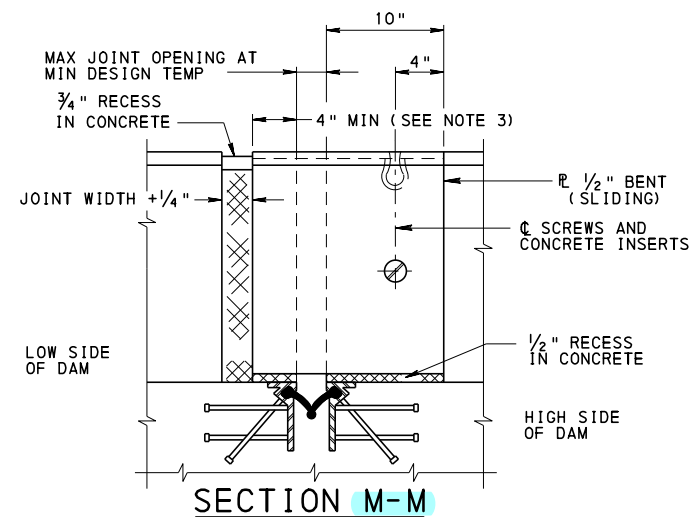
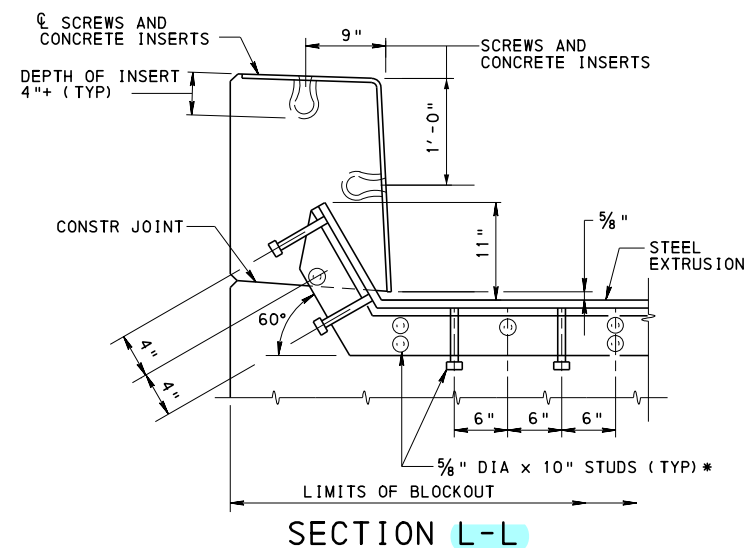
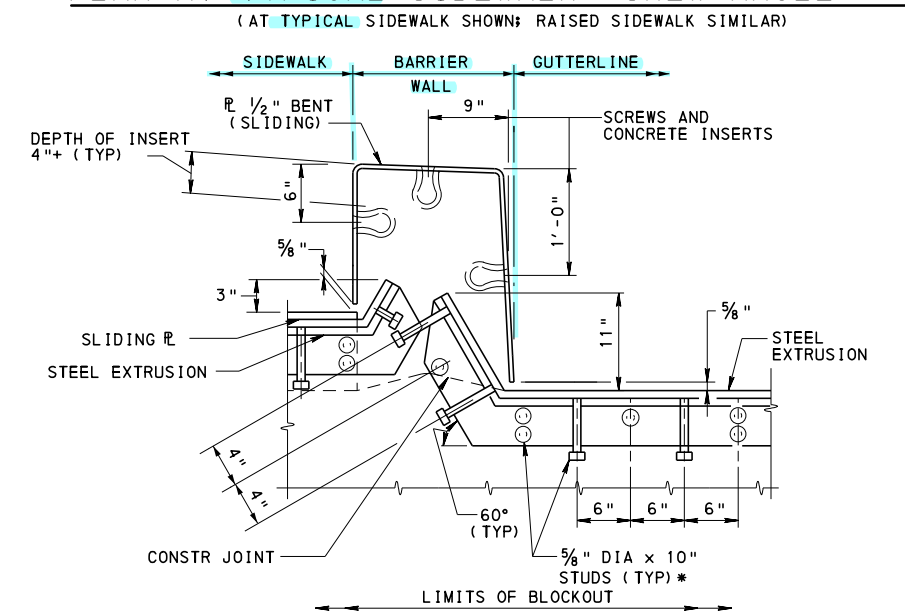
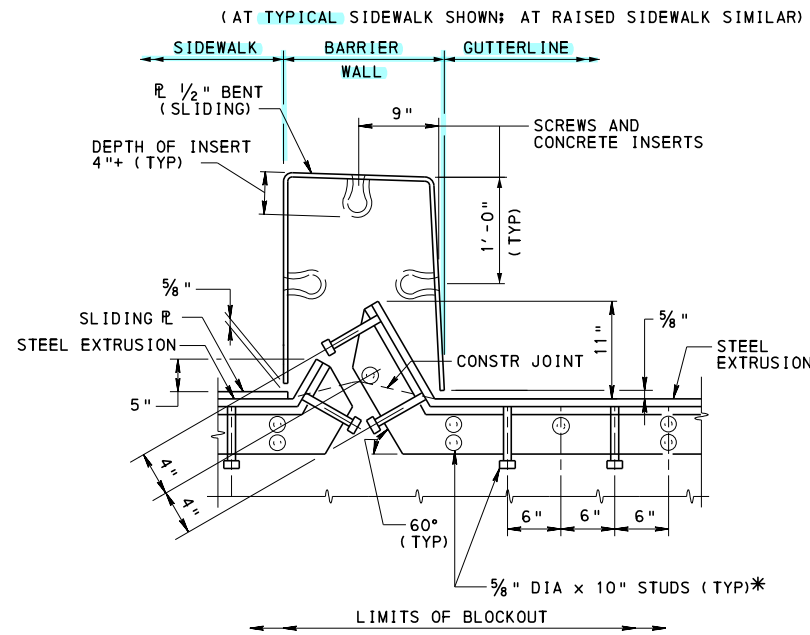
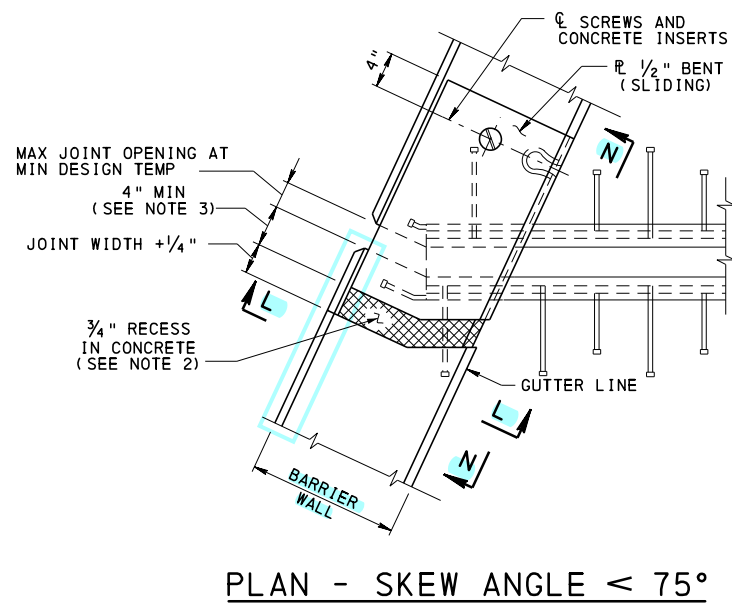
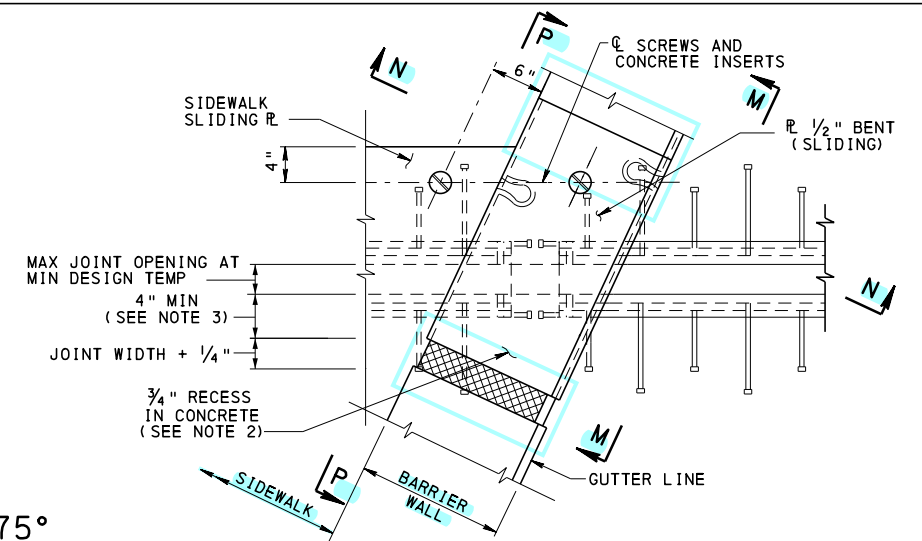
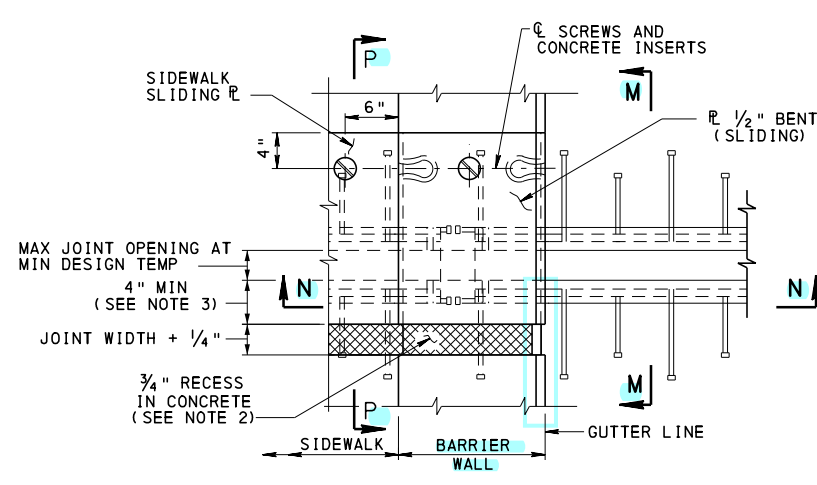
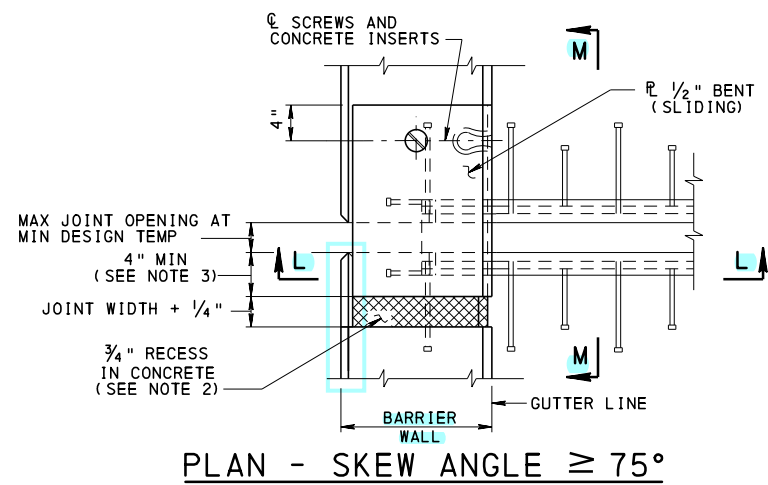
STANDARD

**PA BRIDGE BARRIER
DETAILS AT TOOTH EXPANSION DAM**

RECOMMENDED OCT. 7, 2024
Kevin J. Long
CHIEF BRIDGE ENGINEER

RECOMMENDED OCT. 7, 2024
Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 9 OF 16
BC-713M



NOTES:

- FOR SECTION P-P DETAILS, SEE SHEET 9.
- FORM CONCRETE RECESS AREA IN BARRIER WALL AND GRIND TO PROVIDE SMOOTH SURFACE. APPLY ONE COAT OF ASPHALT CEMENT PAINT WA-1 OR PERFORMANCE GRADED ASPHALT CEMENT PG 64-22 TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION.
- MAINTAIN 4" MINIMUM BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT TEMP. OF -10°F FOR STEEL BRIDGES AND 10°F FOR P/S CONCRETE BRIDGES.
- MAXIMUM DISTANCE ALONG THE EXTRUSION FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3".
- ALTERNATE STRIP SEAL DAM (NOT SHOWN) SIMILAR TO THAT SHOWN ON BC-767M, SHEET 7, IS PERMITTED IF SHOWN ON THE CONTRACT PLANS.

PA BRIDGE BARRIER AT NEOPRENE STRIP SEAL DAM
(RAILING POST AND TUBE RAILS NOT SHOWN)

* IF 10" STUDS CANNOT BE ACCOMMODATED IN THE SPACE AVAILABLE, REQUEST SPECIFIC LENGTH APPROVAL FROM THE DISTRICT BRIDGE ENGINEER AT THE SHOP DRAWINGS APPROVAL STAGE.

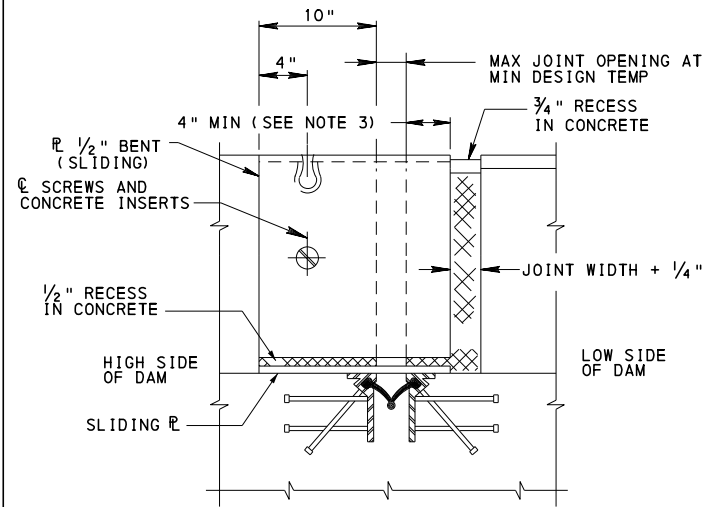
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

STANDARD
PA BRIDGE BARRIER
DETAILS AT NEOPRENE
STRIP SEAL DAM - 1

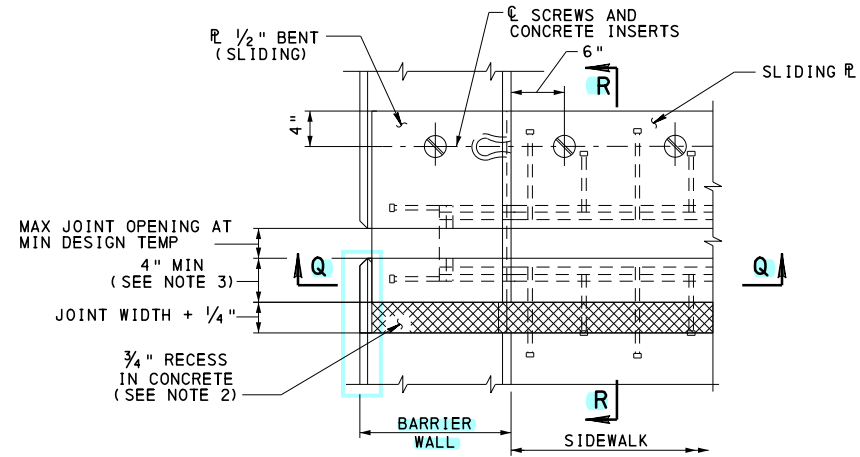
RECOMMENDED OCT. 7, 2024
Kevin J. Long
CHIEF BRIDGE ENGINEER

RECOMMENDED OCT. 7, 2024
Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

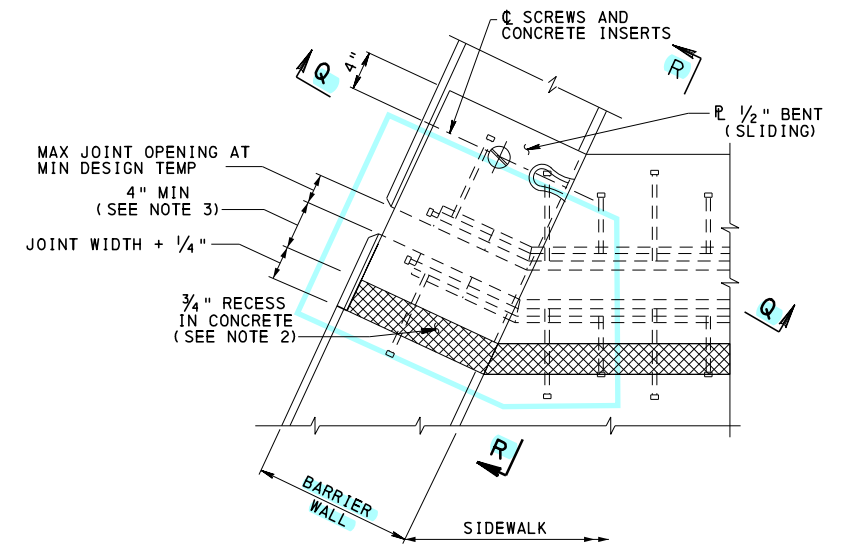
SHEET 10 OF 16
BC-713M



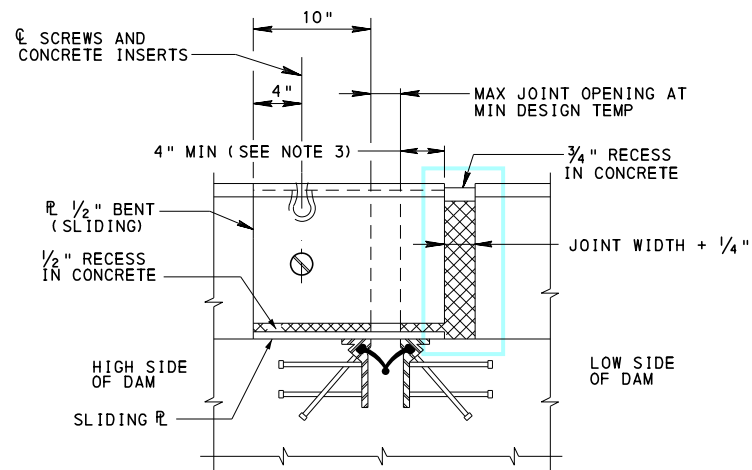
SECTION P-P
(AT TYPICAL SIDEWALK)



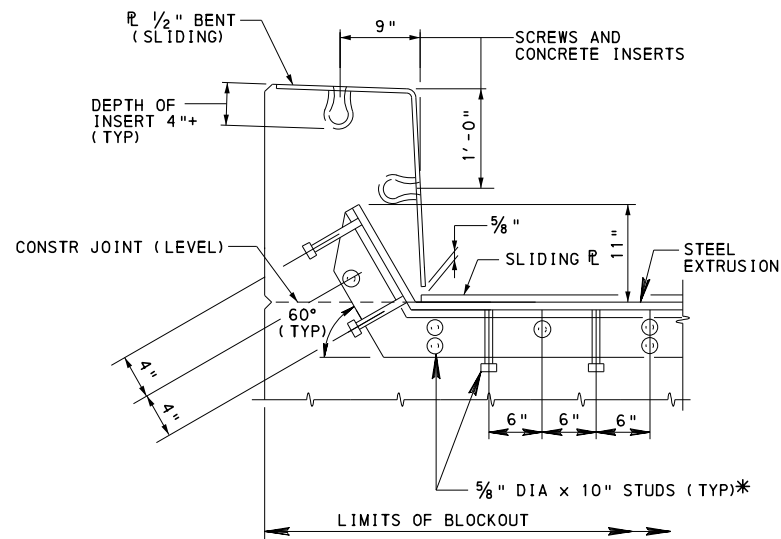
PLAN AT ALTERNATE SIDEWALK- SKEW ANGLE $\geq 75^\circ$



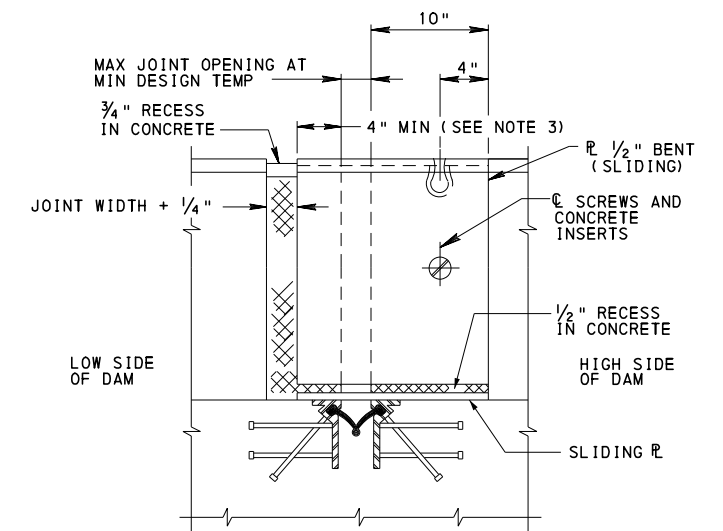
PLAN AT ALTERNATE SIDEWALK- SKEW ANGLE $< 75^\circ$



SECTION P-P
(AT RAISED SIDEWALK)



SECTION Q-Q



SECTION R-R

PA BRIDGE BARRIER AT NEOPRENE STRIP SEAL DAM
(RAILING POST AND TUBE RAILS NOT SHOWN)

* IF 10" STUDS CANNOT BE ACCOMMODATED IN THE SPACE AVAILABLE, REQUEST SPECIFIC LENGTH APPROVAL FROM THE DISTRICT BRIDGE ENGINEER AT THE SHOP DRAWINGS APPROVAL STAGE.

NOTES:

- FOR LOCATION OF SECTION P-P, SEE SHEET 8.
- FORM CONCRETE RECESS AREA IN BARRIER WALL AND GRIND TO PROVIDE SMOOTH SURFACE. APPLY ONE COAT OF ASPHALT CEMENT PAINT WA-1 OR PERFORMANCE GRADED ASPHALT CEMENT PG 64-22 TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION.
- MAINTAIN 4" MINIMUM BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT TEMP. OF -10°F FOR STEEL BRIDGES AND 10°F FOR P/S CONCRETE BRIDGES.
- MAXIMUM DISTANCE ALONG THE EXTRUSION FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3".
- ALTERNATE STRIP SEAL DAM (NOT SHOWN) SIMILAR TO THAT SHOWN ON BC-767M, SHEET 7, IS PERMITTED IF SHOWN ON THE CONTRACT PLANS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

STANDARD
PA BRIDGE BARRIER
DETAILS AT NEOPRENE
STRIP SEAL DAM - 2

RECOMMENDED OCT. 7, 2024

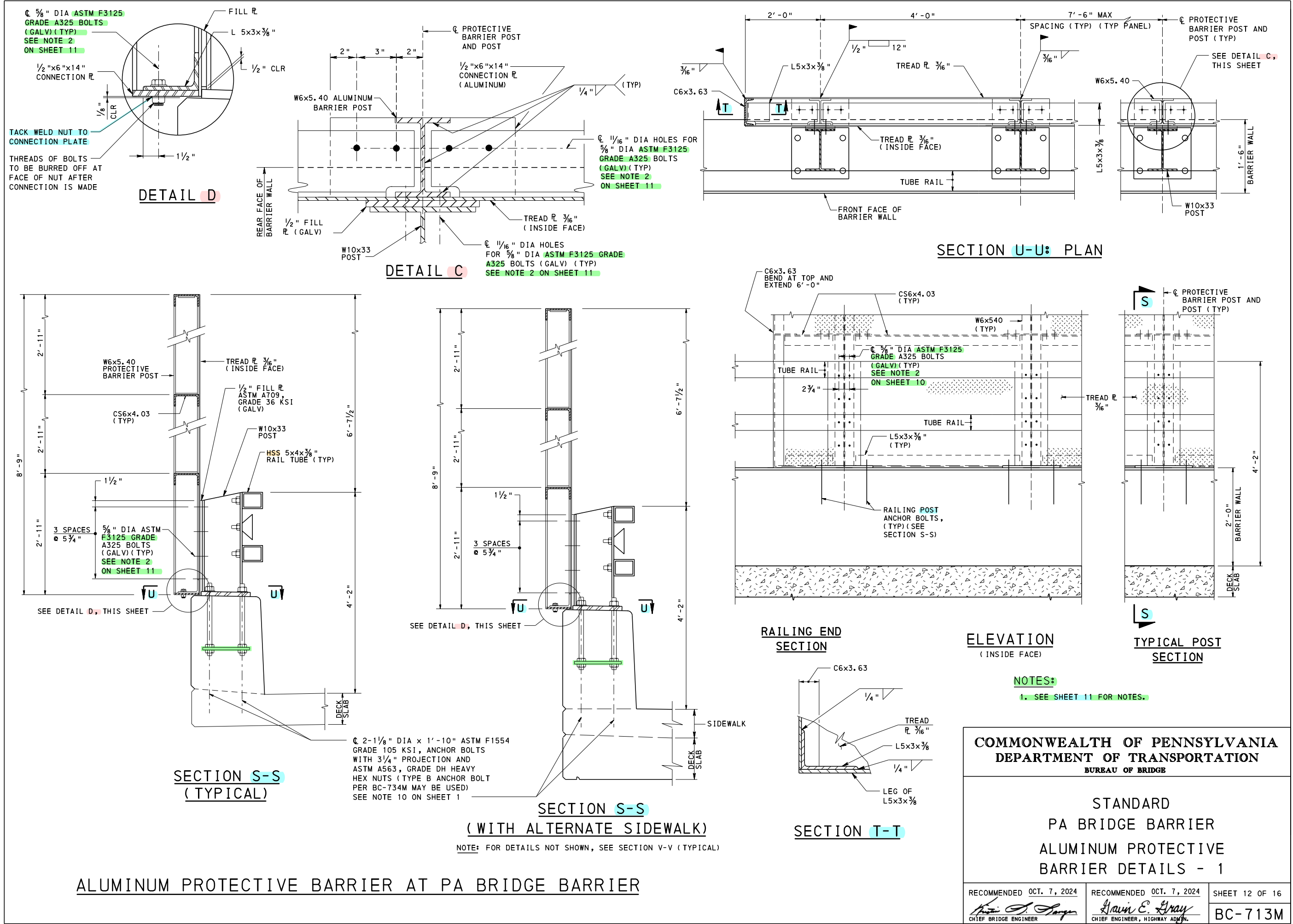
Kevin J. Long
CHIEF BRIDGE ENGINEER

RECOMMENDED OCT. 7, 2024

Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 11 OF 16

BC-713M



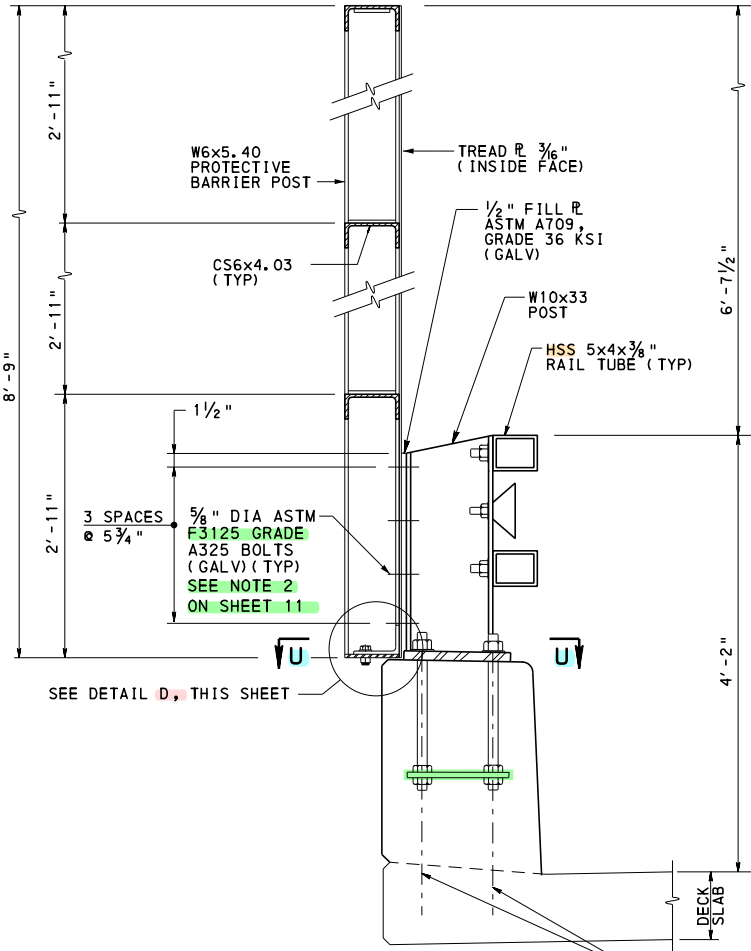
5/8" DIA ASTM F3125
 GRADE A325 BOLTS
 (GALV) (TYP)
 SEE NOTE 2
 ON SHEET 11

TACK WELD NUT TO
 CONNECTION PLATE
 THREADS OF BOLTS
 TO BE BURIED OFF AT
 FACE OF NUT AFTER
 CONNECTION IS MADE

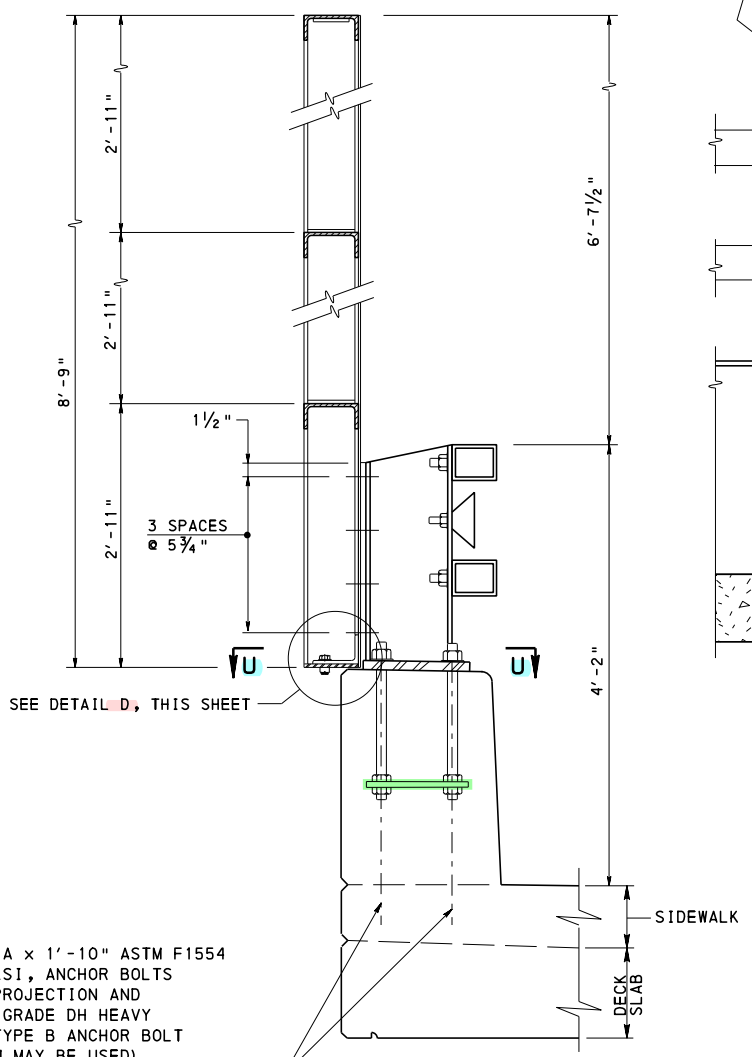
DETAIL D

DETAIL C

SECTION U-U: PLAN

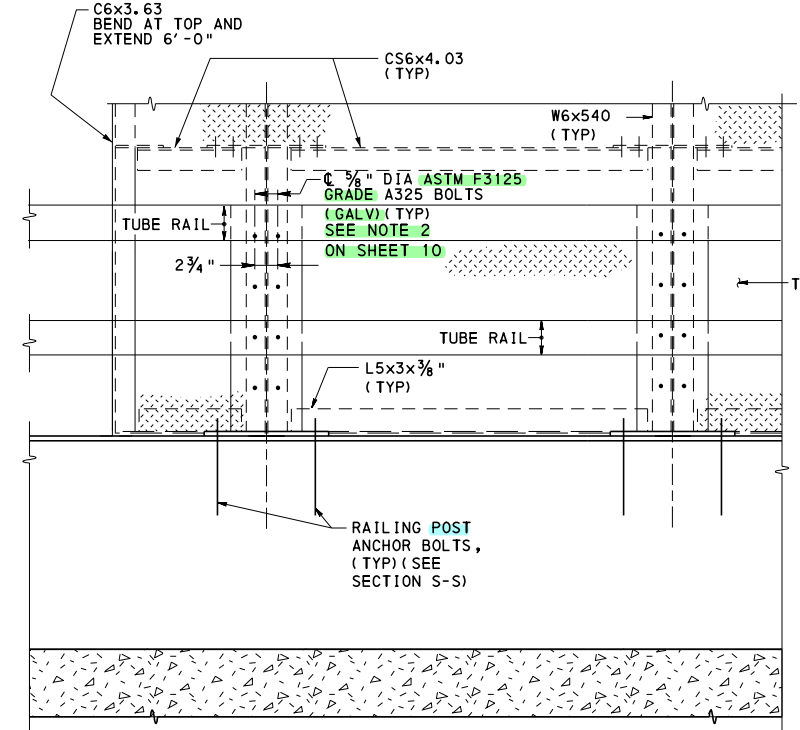


**SECTION S-S
(TYPICAL)**

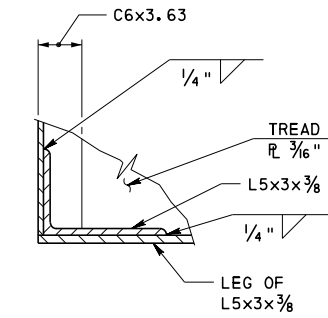


**SECTION S-S
(WITH ALTERNATE SIDEWALK)**

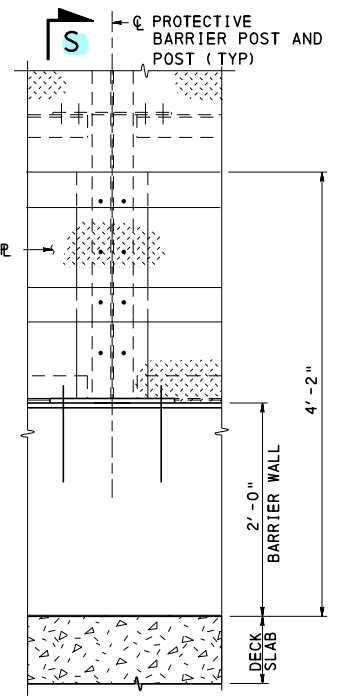
NOTE: FOR DETAILS NOT SHOWN, SEE SECTION V-V (TYPICAL)



RAILING END SECTION



SECTION T-T



TYPICAL POST SECTION

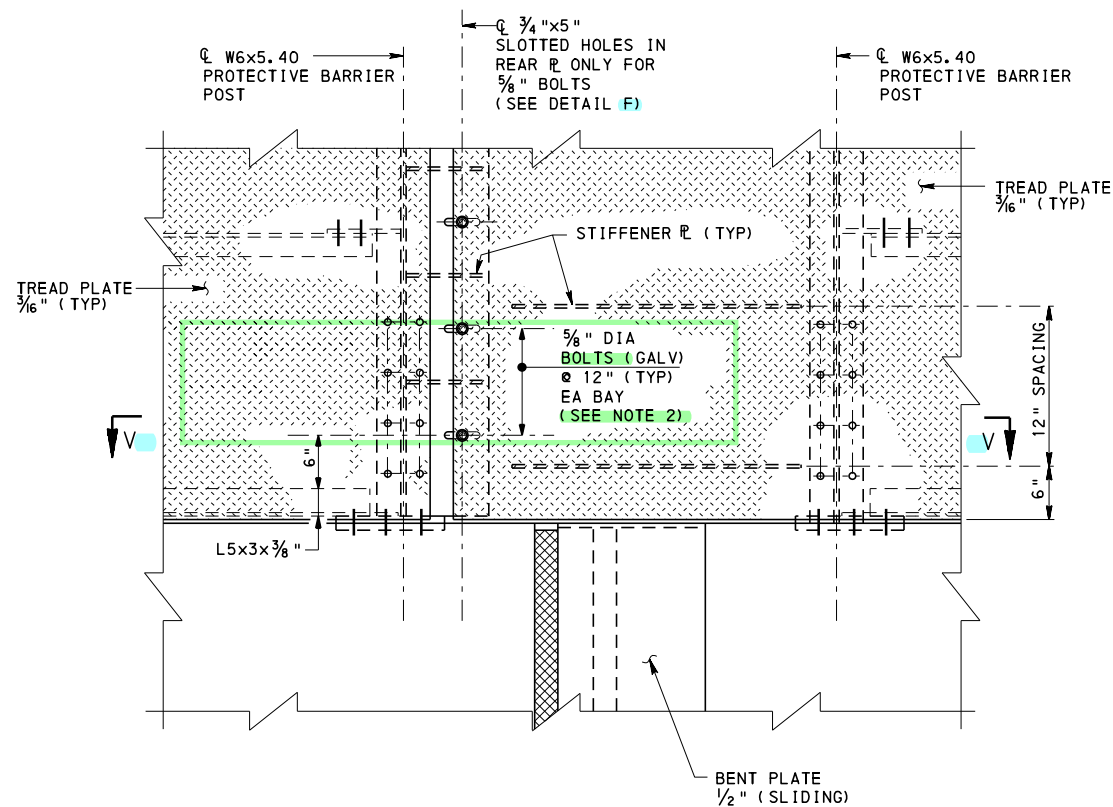
**ELEVATION
(INSIDE FACE)**

NOTES:
 1. SEE SHEET 11 FOR NOTES.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF BRIDGE

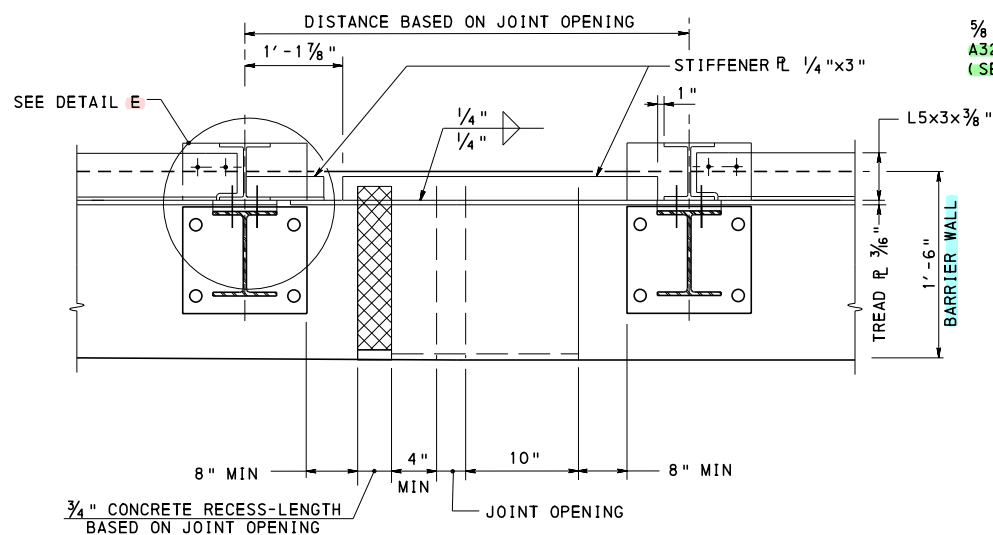
STANDARD
PA BRIDGE BARRIER
ALUMINUM PROTECTIVE
BARRIER DETAILS - 1

ALUMINUM PROTECTIVE BARRIER AT PA BRIDGE BARRIER



ELEVATION

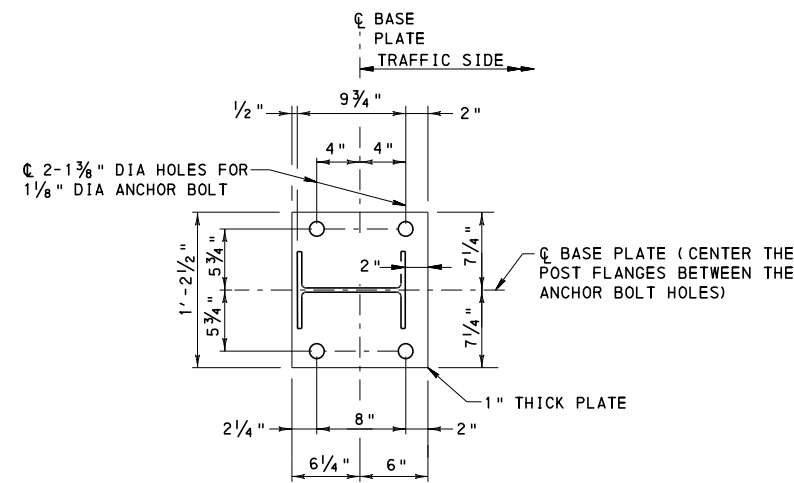
FOR CLARITY, W10x33 POSTS, RAIL TUBES, AND BASE PLATES NOT SHOWN IN ELEVATION VIEW.



SECTION V-V

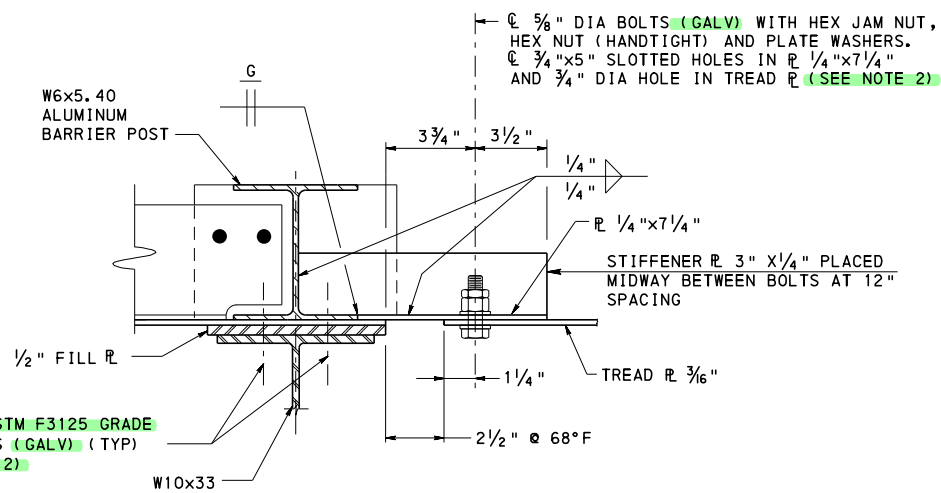
EXPANSION JOINT AT PIERS

ALUMINUM PROTECTIVE BARRIER AT PA BRIDGE BARRIER



NOTE: ATTACH POST TO BASEPLATE AS SHOWN ON THE BASE PLATE DETAIL ON SHEET 2

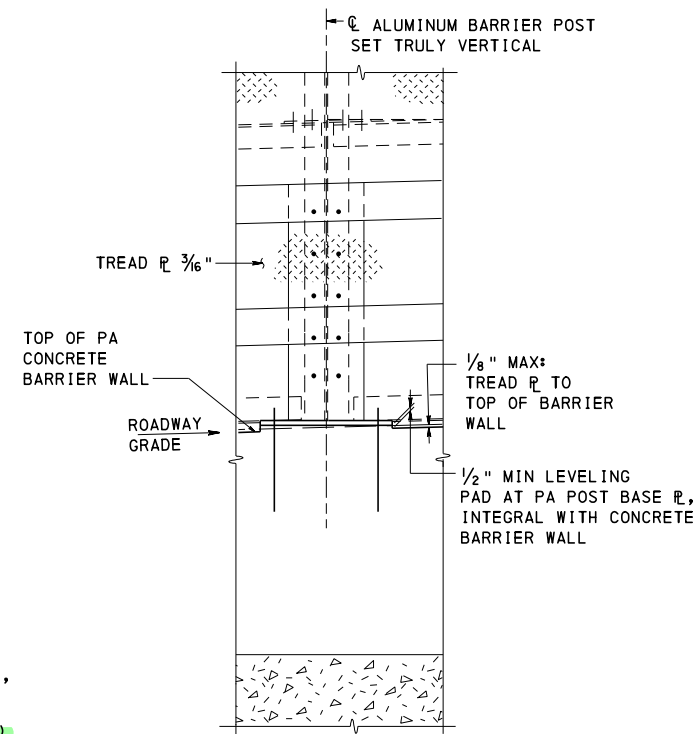
POST AND BASE PLATE
(AT ALUMINUM BARRIER)



DETAIL E

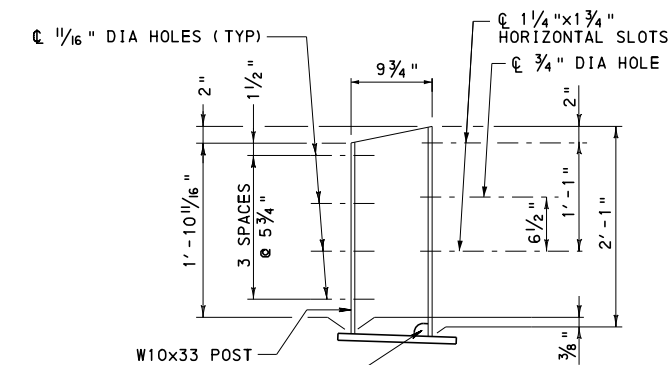
NOTES:

1. PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH PUBLICATION 408.
2. PROVIDE ELASTOMERIC PADS OR WASHERS 1/8" MINIMUM THICKNESS CONFORMING TO PUBLICATION 408, SECTION 1113.03 (h), TYPE I, BETWEEN CONTACT SURFACES WHEREVER ALUMINUM COMPONENTS COME IN CONTACT WITH GALVANIZED STEEL. ALSO PROVIDE FABRIC BUSHINGS WITH MATERIAL CONFORMING TO PUBLICATION 408 SECTION 1113.03(h), TYPE II, WHEREVER GALVANIZED STEEL BOLTS COME IN CONTACT WITH ALUMINUM.
3. PROVIDE ALL COMPONENTS AND DETAILS OF ALUMINUM PROTECTIVE BARRIER AS SHOWN ON BC-711M, EXCEPT AS MODIFIED HERE.
4. EXPANSION DETAILS, SLOTTED OPENINGS, AND CLEARANCES SHOWN ARE FOR MOVEMENTS UP TO 2" EXPANSION OR 2" CONTRACTION. ADJUST ALL EXPANSION JOINT DETAILS SHOWN AND PROVIDE SPECIAL DETAILS AS REQUIRED FOR LARGER MOVEMENTS.



NOTE: SET PA BRIDGE BARRIER POSTS AND ALUMINUM PROTECTIVE BARRIER POSTS TRULY VERTICAL. ADJUST WELDED STUDS OF PA TUBE RAILS TO PERMIT RAILS TO BE PARALLEL TO ROADWAY GRADE. ALUMINUM BARRIER RAILS AND BOTTOM ANGLES TO RUN PARALLEL TO ROADWAY GRADE.

POST MOUNTING ON GRADE



1 1/2" x 1/2" WELD ACCESS HOLE THROUGH WEB (SEE DETAIL A ON SHEET 1)

ELEVATION-POST

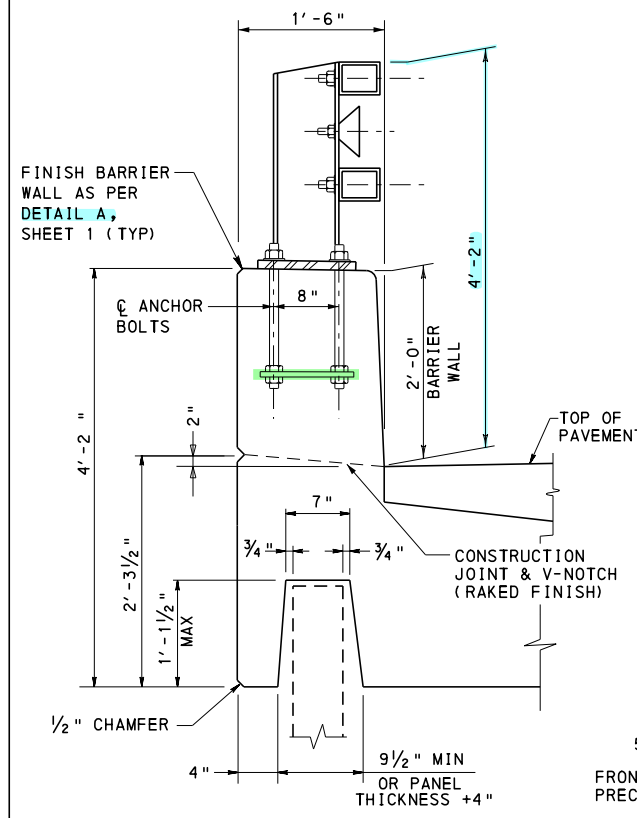
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

STANDARD
PA BRIDGE BARRIER
ALUMINUM PROTECTIVE
BARRIER DETAILS - 2

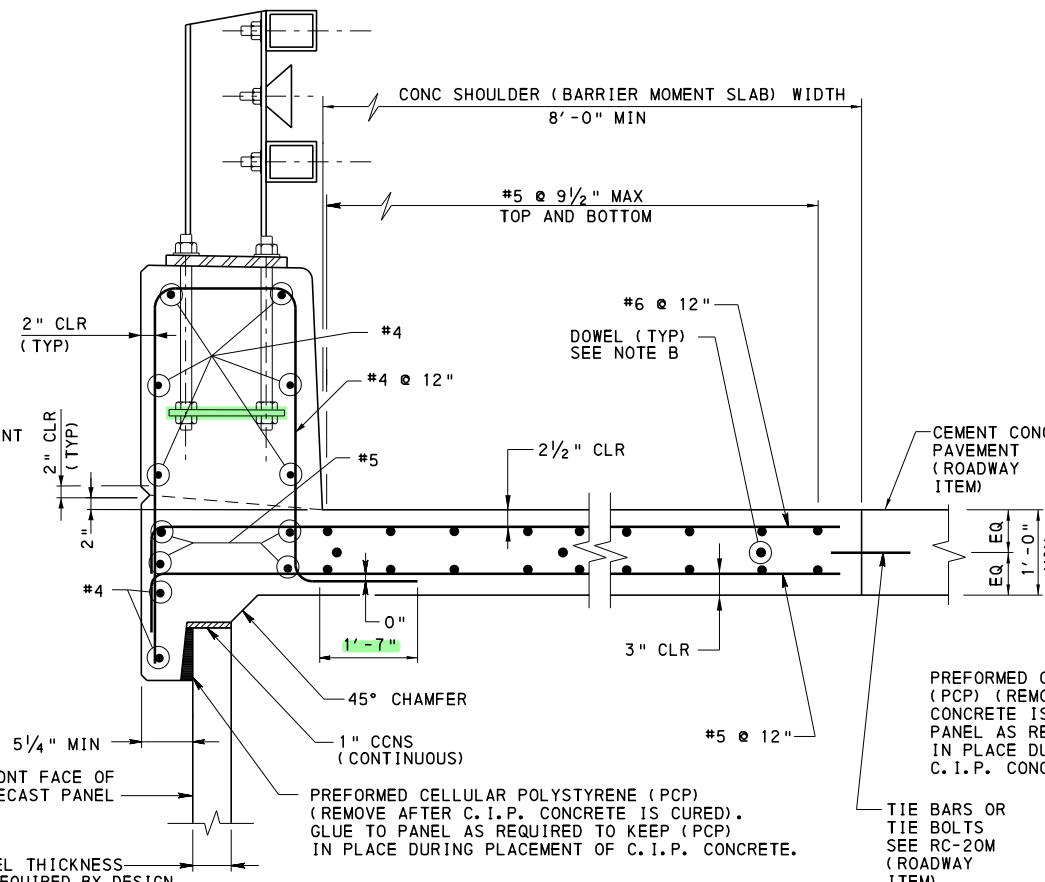
RECOMMENDED OCT. 7, 2024
Kevin J. Long
CHIEF BRIDGE ENGINEER

RECOMMENDED OCT. 7, 2024
Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

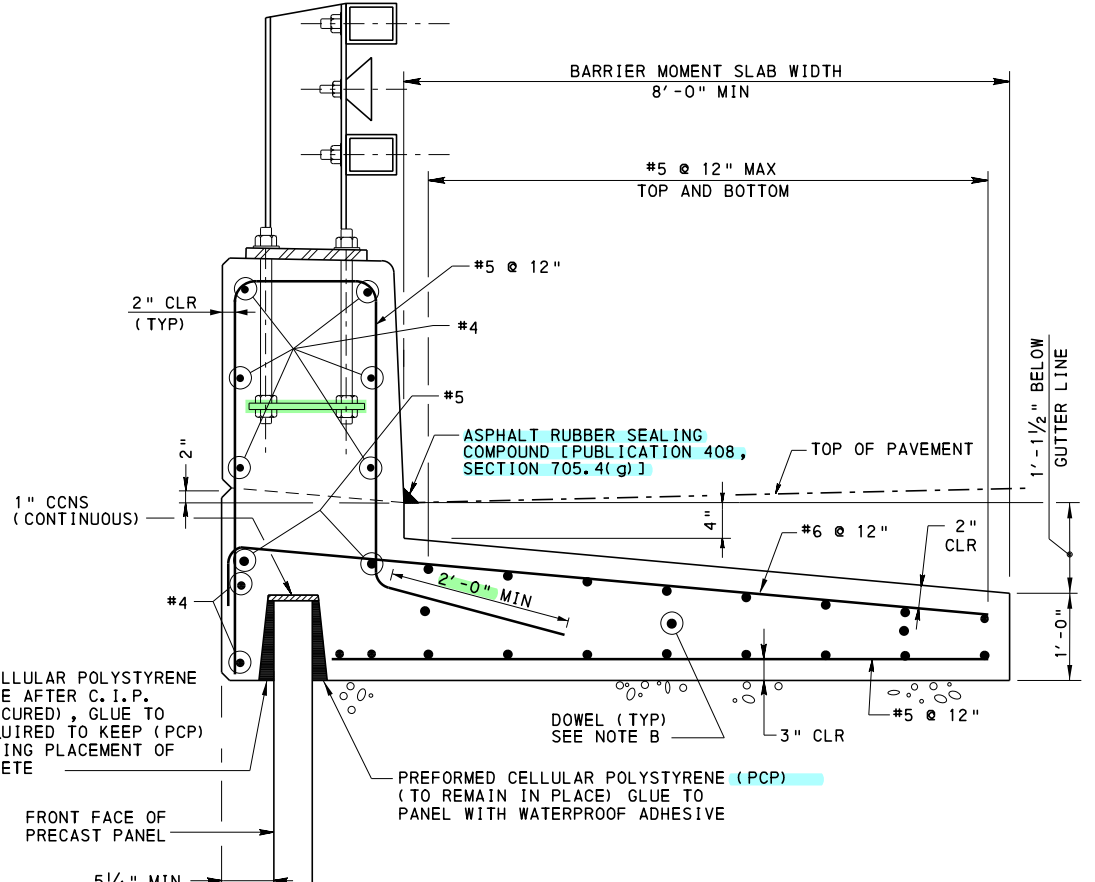
SHEET 13 OF 16
BC-713M



CAST-IN-PLACE BARRIER DIMENSIONS ON M.S.E. WALLS

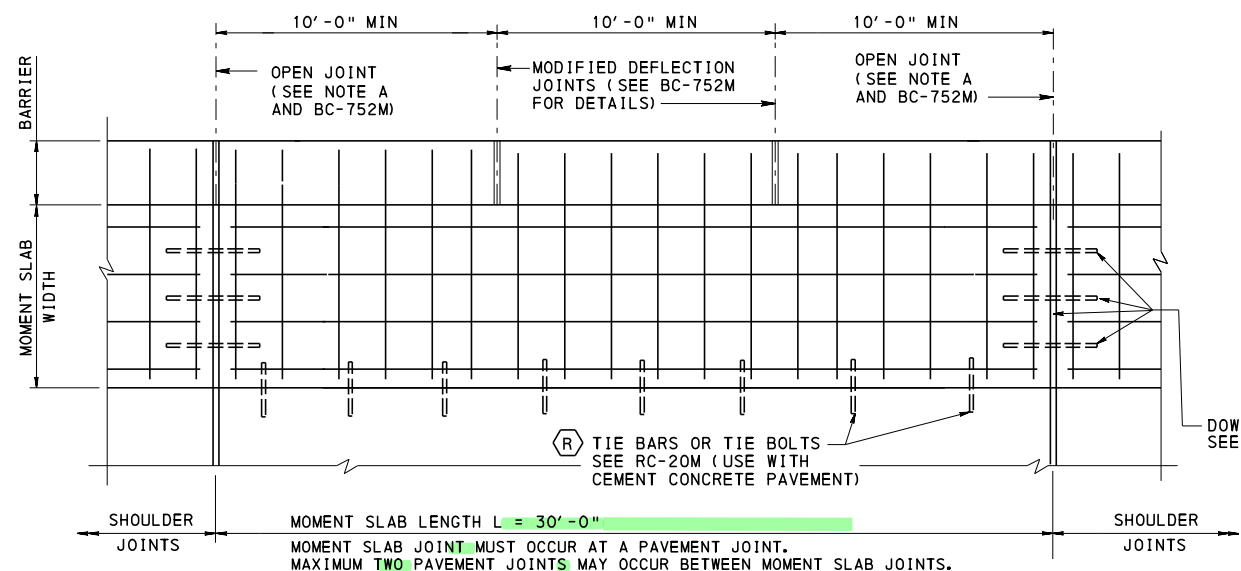


C.I.P. BARRIER WITH CEMENT CONCRETE SHOULDER ON M.S.E. WALLS



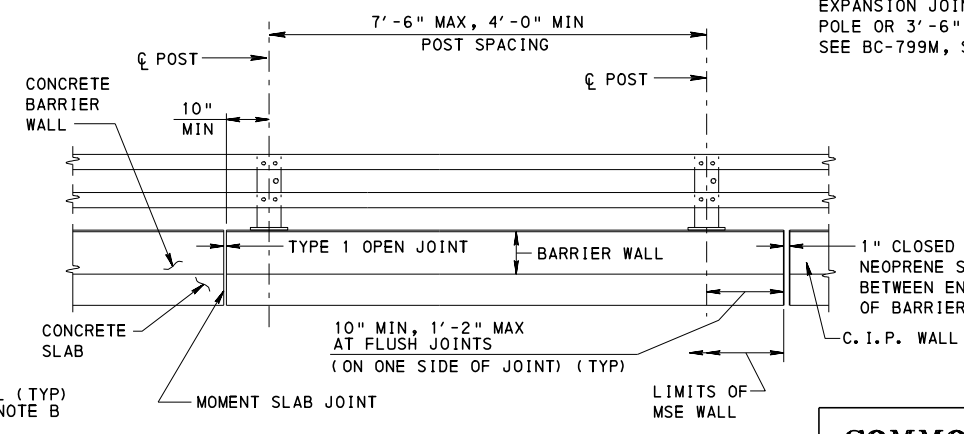
C.I.P. BARRIER WITH ASPHALT-PAVED SHOULDER ON M.S.E. WALLS

CAST-IN-PLACE PA BRIDGE BARRIER ON M.S.E. WALLS



PLAN - BARRIER MOMENT SLAB (C.I.P. BARRIER)

NOTE A: PROVIDE OPEN JOINTS IN BARRIER AT SAME LOCATIONS AS THOSE PROVIDED FOR THE MOMENT SLAB.
NOTE B: USE TYPE D OR E JOINT PER RC-27M. USE SAME JOINT AS PROVIDED IN PAVEMENT.



CONCRETE BARRIER WALL ELEVATION ON M.S.E. WALL (RAILING POST SPACING)

NOTES:
 1. FOR GENERAL NOTES ON CONSTRUCTION OF PREFABRICATED WALLS, SEE BC-799M, SHEET 1.
 2. PLACE EXPANSION JOINTS IN CONCRETE BARRIER WALL TO MATCH PAVEMENT JOINTS. DO NOT LOCATE THE CONCRETE BARRIER WALL EXPANSION JOINT WITHIN 6'-0" FROM CENTERLINE OF LIGHT POLE OR 3'-6" FROM CENTERLINE OF JUNCTION BOX. SEE BC-799M, SHEETS 8 AND 9, FOR INLET INSTALLATION DETAILS.

LEGEND:
 CCNS CLOSED CELL NEOPRENE SPONGE

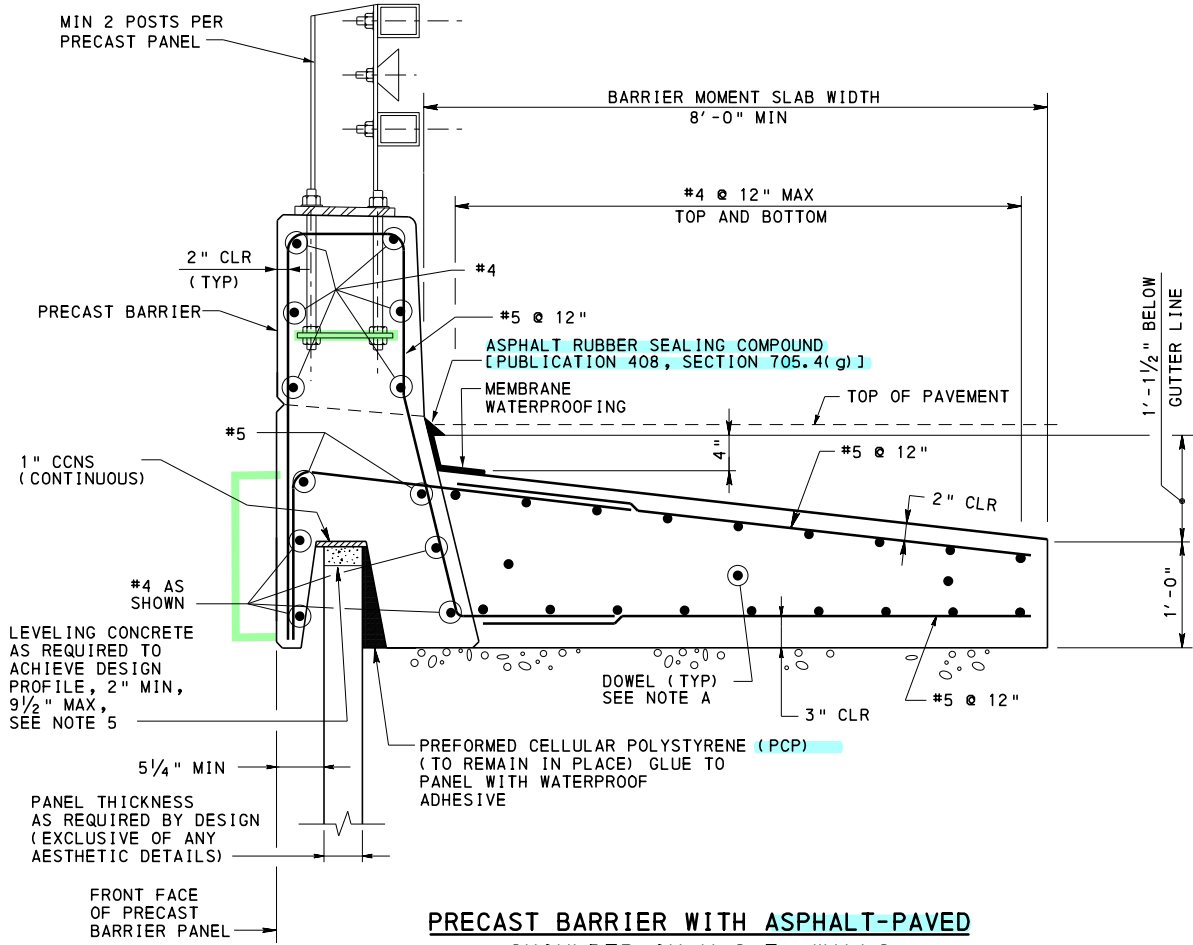
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF BRIDGE

STANDARD
PA BRIDGE BARRIER
M.S.E. WALL DETAILS - 1

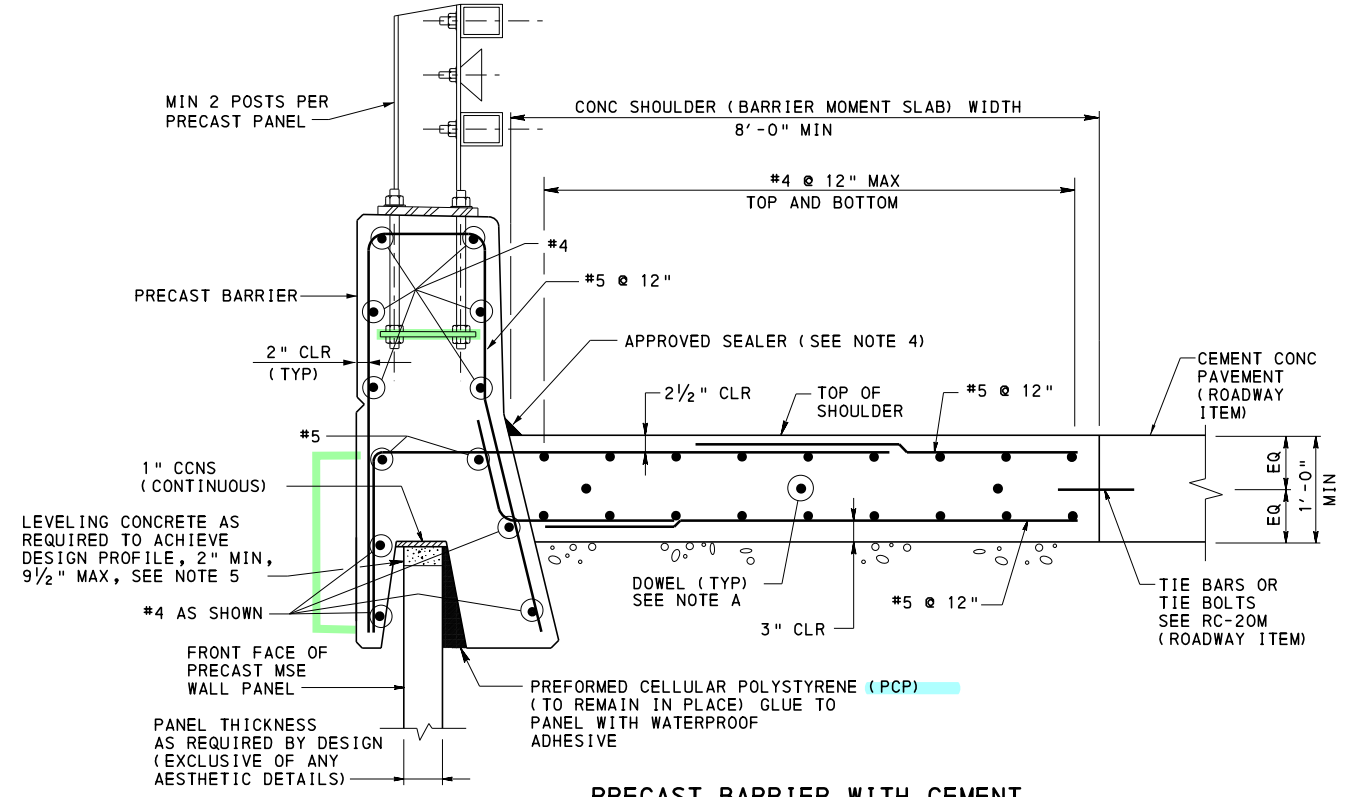
RECOMMENDED OCT. 7, 2024
 RECOMMENDED OCT. 7, 2024
 SHEET 14 OF 16

CHIEF BRIDGE ENGINEER
 CHIEF ENGINEER, HIGHWAY ADMIN.

BC-713M



PRECAST BARRIER WITH ASPHALT-PAVED SHOULDER ON M.S.E. WALLS



PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER ON M.S.E. WALLS

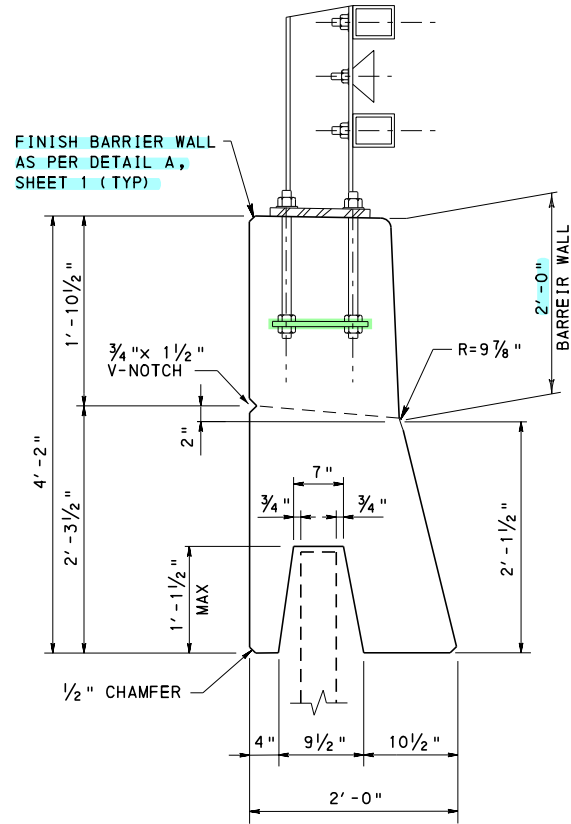
NOTE A:
USE TYPE D OR E JOINT PER RC-27M. USE SAME JOINT AS PROVIDED IN PAVEMENT.

NOTES:

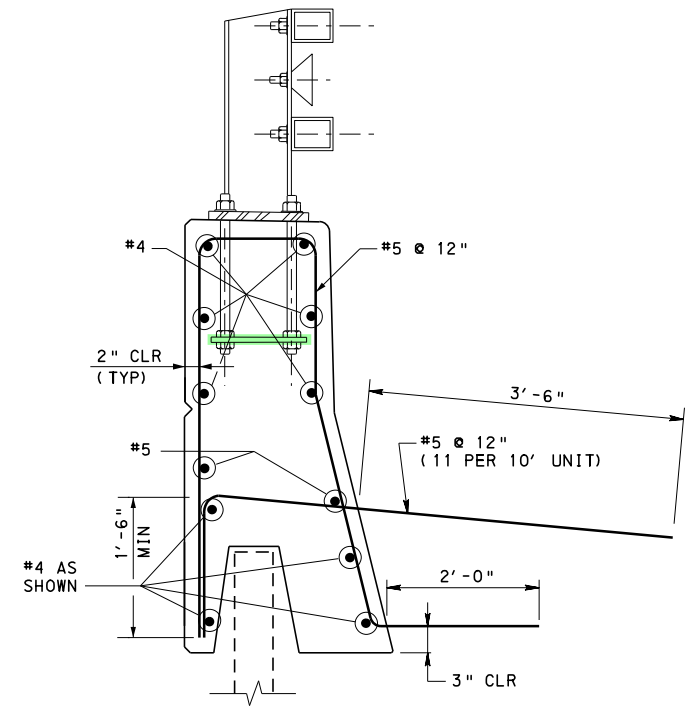
1. PLACE EXPANSION JOINTS IN CONCRETE BARRIER WALL TO MATCH PAVEMENT JOINTS. DO NOT LOCATE THE CONCRETE BARRIER WALL EXPANSION JOINT WITHIN 6'-0" FROM CENTERLINE OF LIGHT POLE OR 3'-6" FROM CENTERLINE OF JUNCTION BOX.
2. PROVIDE A MINIMUM PRECAST BARRIER LENGTH OF 10'-0".
3. PROVIDE SPECIAL DESIGN AND DETAILING OF THE MOMENT SLAB AND BARRIER FOR INLET INSTALLATIONS.
4. USE SILICONE JOINT SEALING MATERIAL AS SPECIFIED IN PUBLICATION 408, SECTION 705.4 (g).
5. PROVIDE LEVELING CONCRETE IN ACCORDANCE WITH BC-799M, SHEET 3, DETAIL A.
6. FOR ADDITIONAL NOTES, SEE SHEET 12.

LEGEND:

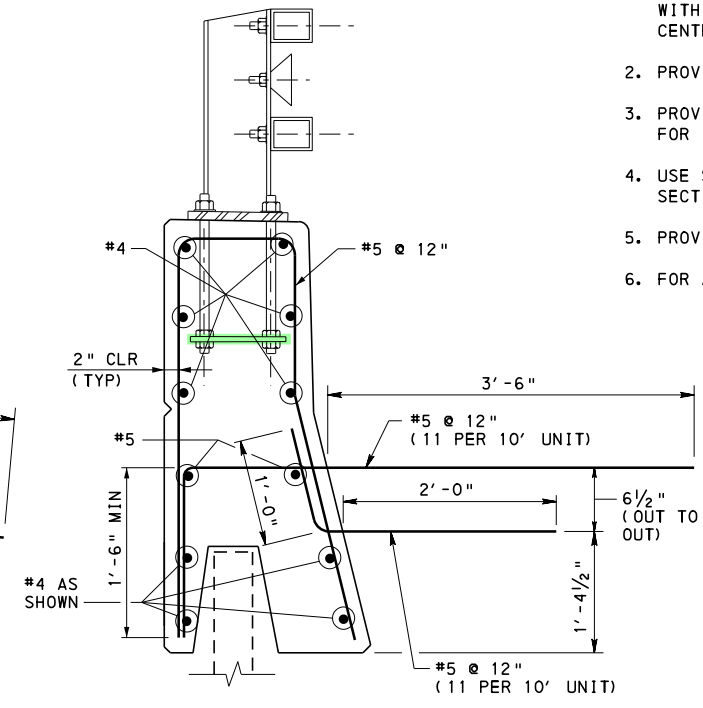
CCNS CLOSED CELL NEOPRENE SPONGE



PRECAST BARRIER DIMENSIONS ON M.S.E. WALLS



REINFORCEMENT FOR PRECAST BARRIER WITH ASPHALT-PAVED SHOULDER



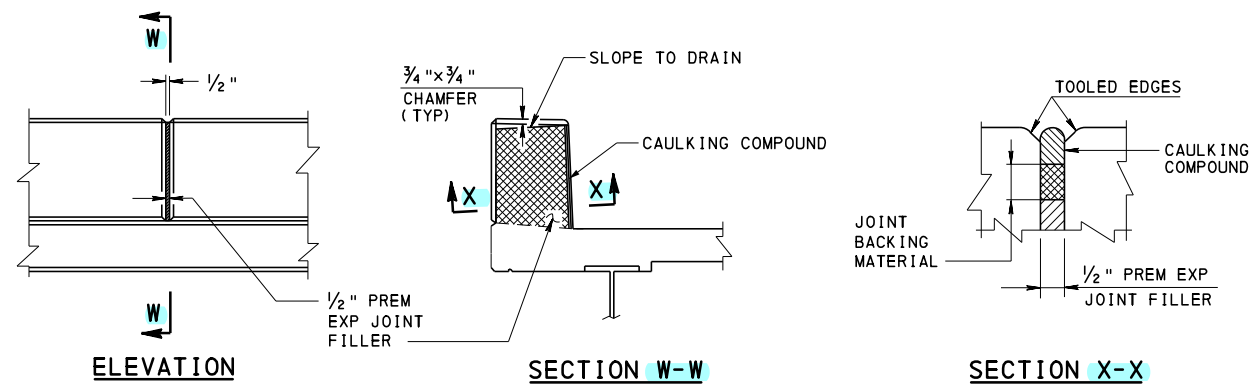
REINFORCEMENT FOR PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER

PRECAST PA BRIDGE BARRIER ON M.S.E. WALLS

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE**

**STANDARD
PA BRIDGE BARRIER
M.S.E. WALL DETAILS - 2**

RECOMMENDED OCT. 7, 2024 <i>Kevin J. Longo</i> CHIEF BRIDGE ENGINEER	RECOMMENDED OCT. 7, 2024 <i>Glavin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 15 OF 16 BC-713M
--	---	----------------------------------



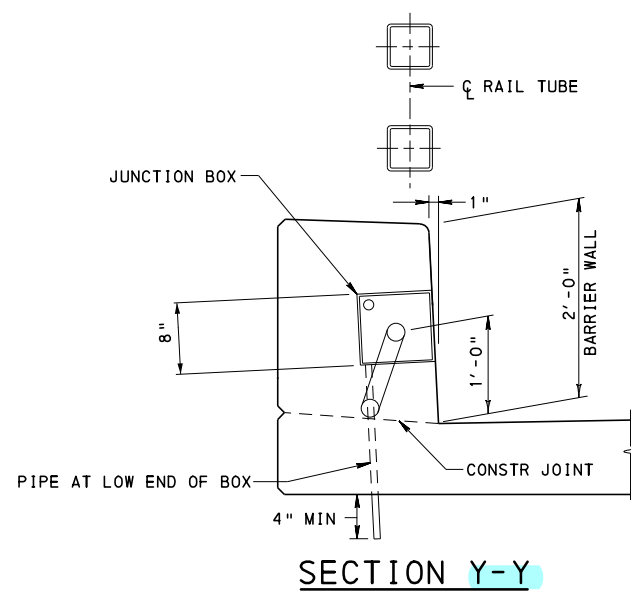
PA BRIDGE BARRIER AT OPEN JOINT
(RAILING POST AND TUBE NOT SHOWN)

OPEN JOINT NOTES:

1. FOR LOCATION OF CONSTRUCTION JOINTS AND OPEN JOINTS, REFER TO DESIGN DRAWINGS.
2. PROVIDE CAULKING COMPOUND CONFORMING TO PUBLICATION 408, SECTION 705.7 (b).
3. PROVIDE JOINT BACKING MATERIAL CONFORMING TO PUBLICATION 408, SECTION 705.8.
4. PROVIDE PREMOLDED EXPANSION JOINT FILLER CONFORMING TO PUBLICATION 408, SECTION 705.1.
5. PROVIDE 2" CLEAR ON ALL REINFORCEMENT UNLESS NOTED.
6. FOR ADDITIONAL NOTES, SEE SHEET 1.

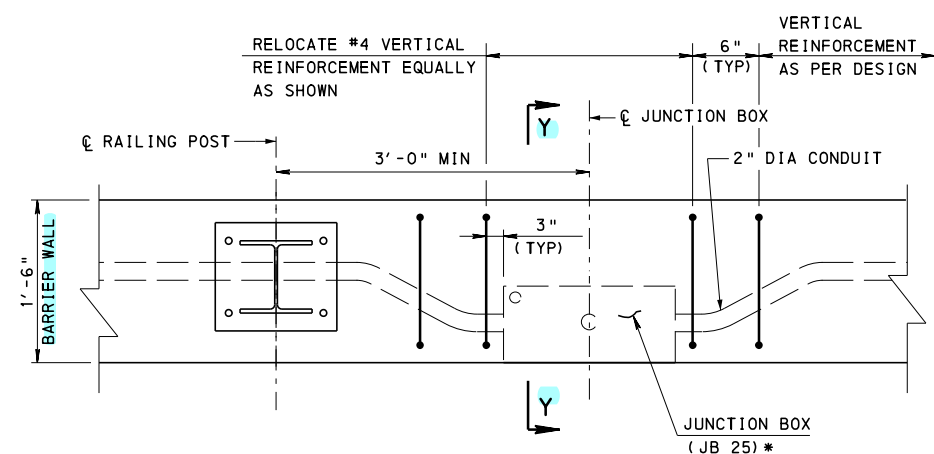
JUNCTION BOX NOTES:

1. JUNCTION BOXES ARE ONLY REQUIRED, IF SPECIFIED ON THE CONTRACT DRAWINGS.
2. FOR TYPICAL SIDEWALK, PLACE JUNCTION BOX ON SIDEWALK SIDE.
3. FOR RAISED SIDEWALK, PLACE JUNCTION BOX ON SIDEWALK SIDE ABOVE THE RAISED SIDEWALK.



SECTION Y-Y

PA BRIDGE BARRIER ALTERNATE JUNCTION BOX DETAIL



PLAN

(RAIL TUBE NOT SHOWN)
* JUNCTION BOX MAY BE LOCATED EITHER TO THE LEFT OR TO THE RIGHT OF THE LIGHTING POLE.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

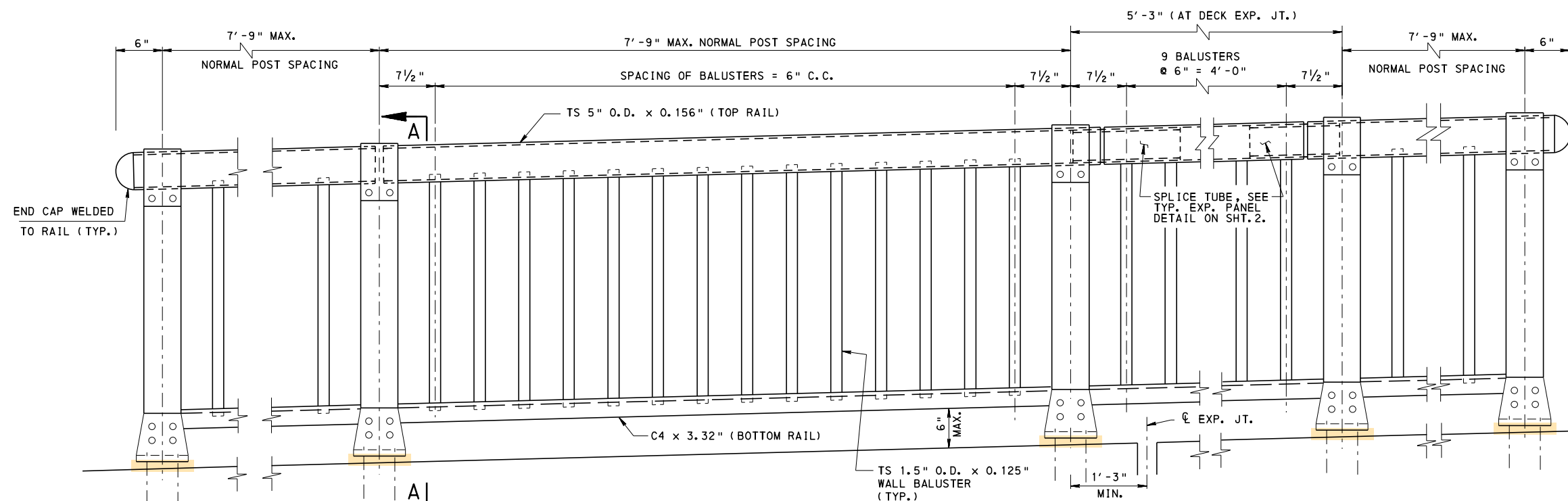
STANDARD

PA BRIDGE BARRIER
MISCELLANEOUS DETAILS

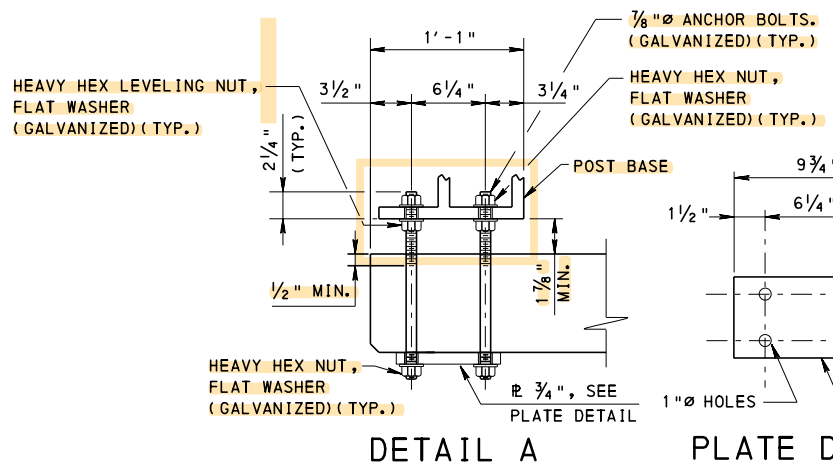
RECOMMENDED OCT. 7, 2024
Kevin J. Sauer
CHIEF BRIDGE ENGINEER

RECOMMENDED OCT. 7, 2024
Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 16 OF 16
BC-713M

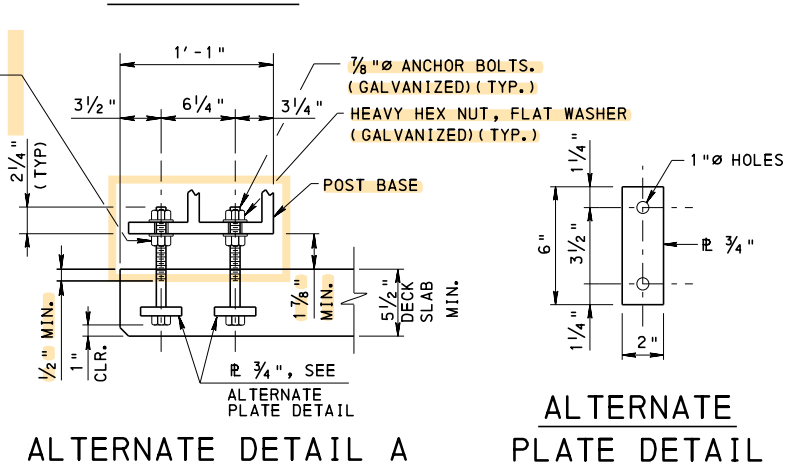


ELEVATION



DETAIL A

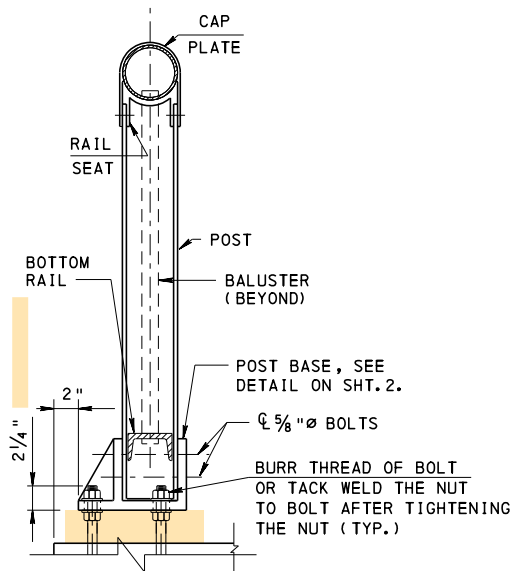
PLATE DETAIL



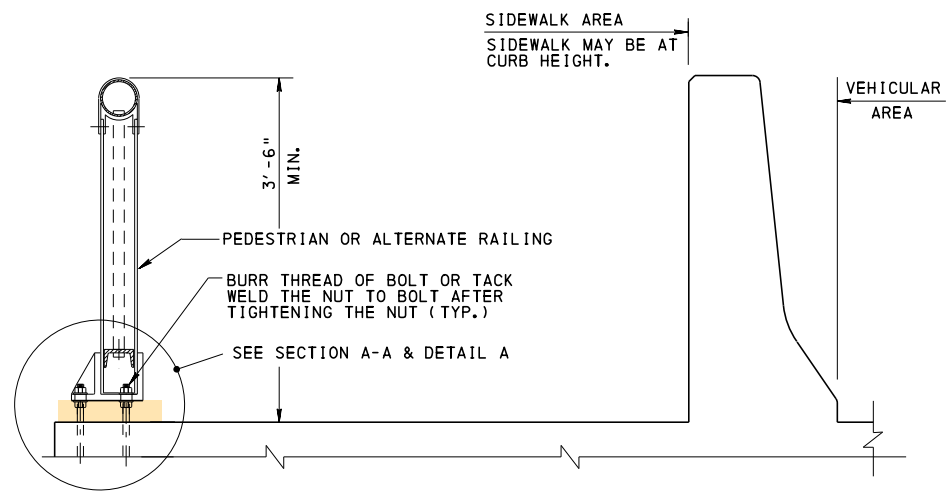
ALTERNATE DETAIL A

ALTERNATE PLATE DETAIL

- NOTES:
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
 2. DO NOT PAINT ANY MATERIALS.
 3. PLACE POST, BALUSTERS AND ANCHOR BOLTS TRULY VERTICAL. PLACE RAILS PARALLEL TO GRADE.
 4. PLACE END CAPS FLUSH WITH RAILS.
 5. PROVIDE UNIFORM SPACING OF BALUSTERS IN EACH PANEL. IF POST SPACING SHOWN ON DESIGN DRAWINGS DOES NOT RESULT IN 6" SPACING FOR THE BALUSTERS, ADJUST THE DIFFERENCE BY INCREASING OR DECREASING BALUSTERS SPACING AND END DISTANCE BY NOT MORE THAN 1/4".
 6. IN LIEU OF CAST "POST BASE AND RAIL SEAT", USE FABRICATED "POST BASE AND RAIL SEAT" IF APPROVED BY THE DISTRICT BRIDGE ENGINEER.



SECTION A-A



TYPICAL SIDEWALK SECTION

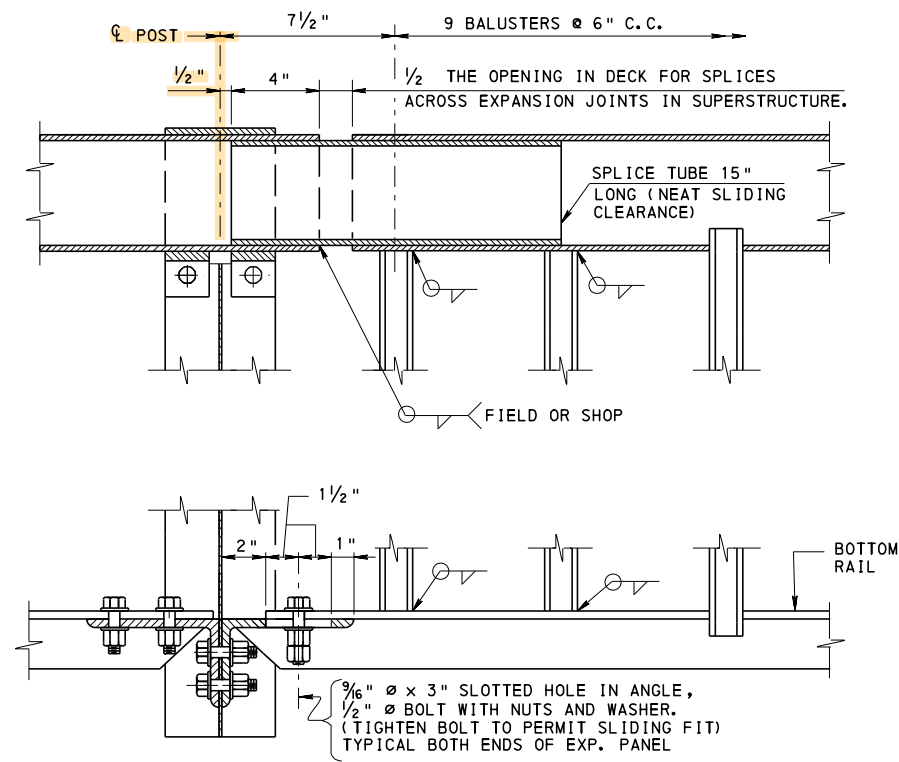
BC-734M	ANCHOR SYSTEMS
	REFERENCE DRAWINGS

RECOMMENDED NOV. 23, 2022 <i>L.L.W.</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Grain E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 1 OF 2 BC-716M
---	---	-------------------------

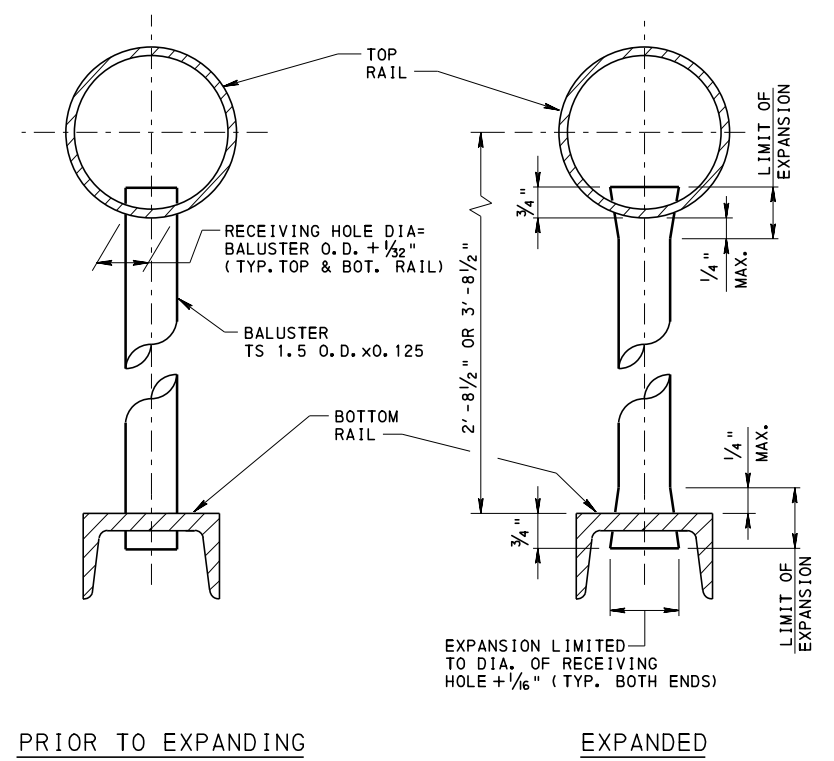
CHANGE 4

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

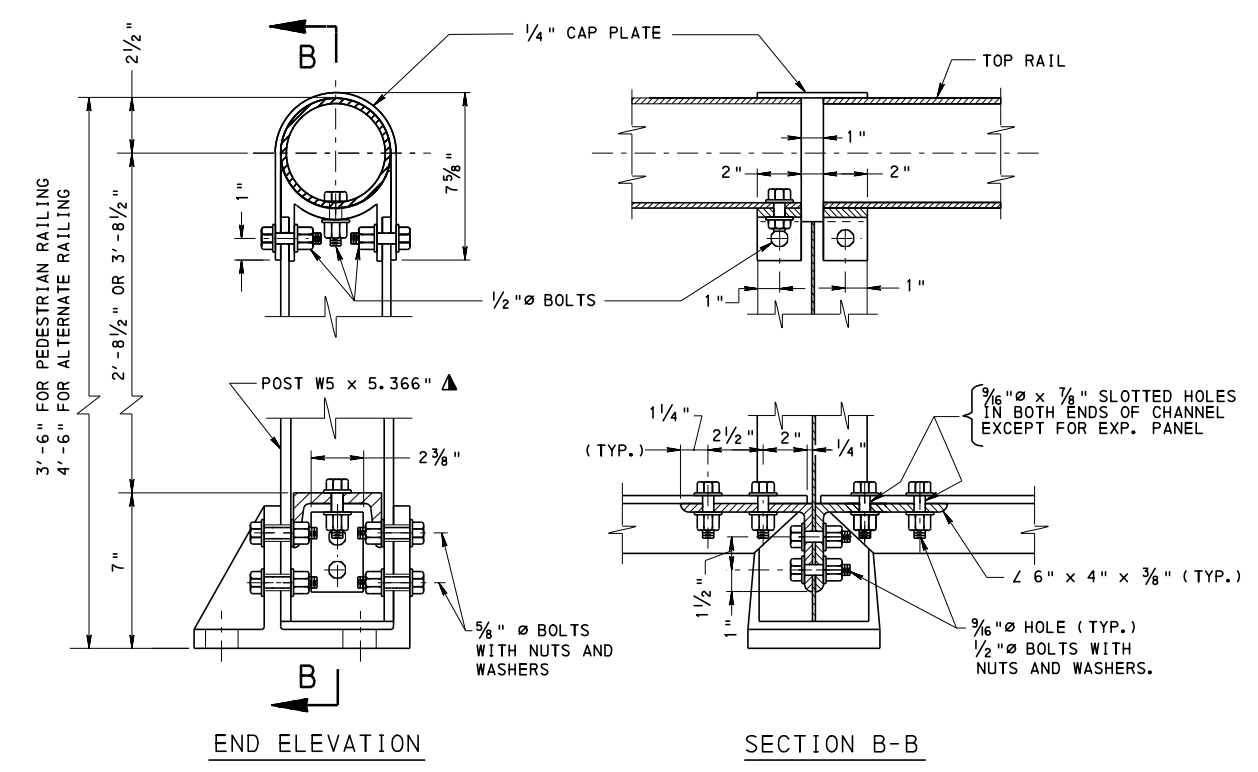
STANDARD
ALUMINUM
PEDESTRIAN RAILING



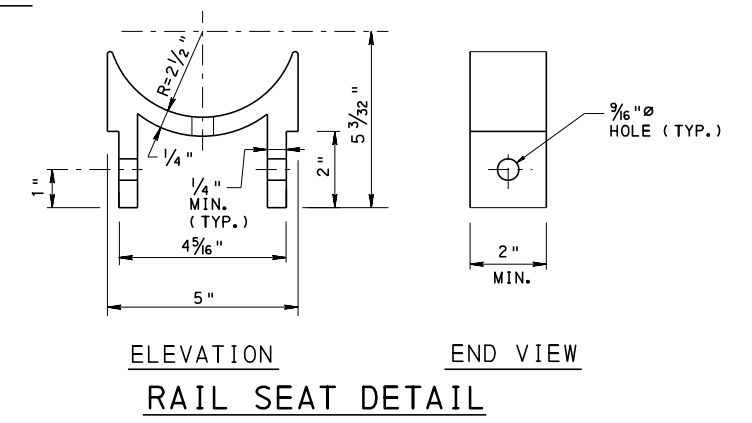
(POST BASE NOT SHOWN)
TYPICAL EXPANSION PANEL DETAIL



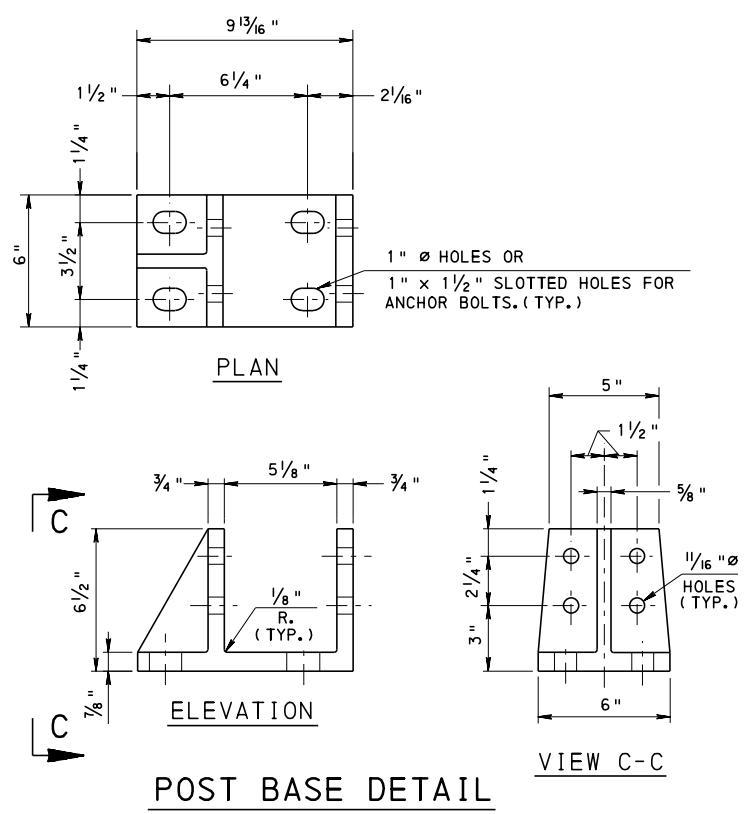
BALUSTER DETAILS
 EXPAND FULL CIRCUMFERENCE OF BALUSTER WITHIN THE LIMIT OF EXPANSION.



TYPICAL DETAIL AT POST
 ▲ 2'-11 1/8" LONG FOR 3'-6" RAILING HEIGHT
 3'-11 1/8" LONG FOR 4'-6" RAILING HEIGHT



RAIL SEAT DETAIL



POST BASE DETAIL

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BRIDGE OFFICE		
STANDARD ALUMINUM PEDESTRIAN RAILING		
RECOMMENDED NOV. 23, 2022 <i>L. W. Gray</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Grain E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 2 OF 2 BC-716M

GENERAL NOTES:

1. PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH PUBLICATION 408 AND APPLICABLE SPECIAL PROVISIONS.
2. MATERIAL STRENGTH: REINFORCEMENT STEEL $f_y = 60$ KSI
CONCRETE FOR BARRIERS $f'_c = 3.5$ KSI
(CLASS AA CONCRETE)
3. PROVIDE STRUCTURAL STEEL CONFORMING TO AASHTO M270, GRADE 50, (ASTM A 709, GRADE 50) UNLESS OTHERWISE NOTED.
4. PROVIDE 1" DIA. ASTM F 1554 GRADE 105 OR ASTM A 193 GRADE B7 (105 KSI YIELD) ANCHOR BOLT, HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153 FOR ALL BOLT THROUGH ANCHORS. ADDITIONAL REQUIREMENTS FOR ASTM F 1554 AND ASTM A 193 INCLUDES ASTM F 1554 SUPPLEMENT S5 GRADE 105 CHARPY IMPACT REQUIREMENTS AT -20°F.
5. PROVIDE 1" DIA. ASTM A 193 GRADE B7 (105 KSI YIELD), HOT-DIPPED GALVANIZED ANCHOR BOLT IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153 FOR ALL ADHESIVE ANCHORS. ADDITIONAL REQUIREMENT FOR ASTM A 193 INCLUDES ASTM F 1554 SUPPLEMENT S5 GRADE 105 CHARPY IMPACT REQUIREMENTS AT -20°F.
6. PROVIDE HEAVY HEX NUTS IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02 (c)3. OR ASTM A 194 GRADE 7, SUPPLEMENT 3 AT -20°F, HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153. ZINC COATING, OVERTAPPING OF THE NUT, AND LUBRICATION REQUIREMENTS SHALL BE IN ACCORDANCE WITH ASTM A 563.
7. PROVIDE 3" DIAMETER x 1/4" THICK PLATE WASHER (ASTM A709, GRADE 36) WITH A 1 1/8" DIAMETER HOLE IN THE MIDDLE. ALL OTHER WASHERS ARE IN ACCORDANCE WITH ASTM F 436 TYPE 1. WASHERS ARE TO BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153.
8. THE FOLLOWING TWO TYPES OF INSTALLATIONS ARE PERMITTED:
 - TYPE 1: TRAFFIC PRESENT ON ONE SIDE OF THE TEMPORARY BARRIER. PROVIDE ANCHORS ON THE TRAFFIC SIDE OF THE TEMPORARY BARRIER.
 - TYPE 2: TRAFFIC PRESENT ON BOTH SIDES OF THE TEMPORARY BARRIER. PROVIDE ANCHORS ON BOTH SIDES OF THE TEMPORARY BARRIER. THE 42" TEMPORARY SINGLE FACE CONCRETE BARRIER IS NOT PERMITTED FOR TYPE 2 INSTALLATIONS.
9. MASH DESIGNATIONS:
 - THE 32" TEMPORARY CONCRETE MEDIAN BARRIER WITH 4'-0" (MAXIMUM) ANCHOR SPACINGS IS DESIGNATED AS MASH TL-3.
 - THE 50" TEMPORARY CONCRETE MEDIAN BARRIER WITH 2'-0" (MAXIMUM) ANCHOR SPACING IS DESIGNATED AS MASH TL-4.
 - THE 42" TEMPORARY SINGLE FACE CONCRETE BARRIER WITH 2'-0" (MAXIMUM) ANCHOR SPACINGS IS DESIGNATED AS MASH TL-4.
10. INDICATE INSTALLATION TYPE ON THE CONTRACT DRAWINGS.
11. ANCHORS MUST BE INSTALLED IN THE END HOLES OF EACH BARRIER SEGMENT. KEEP ANCHOR SPACING UNIFORM ALONG THE FULL LENGTH OF THE BRIDGE TO THE EXTENT POSSIBLE.
12. WHEN USING ADHESIVE ANCHORS FOR THE FACE(S) OF BARRIERS ADJACENT TO TRAFFIC, INSTALL ANCHORS TO SATISFY THE SPACING AND STRENGTH REQUIREMENTS OF TABLE 1.
13. ADHESIVE ANCHORS MAY BE USED FOR ALL INSTALLATIONS EXCEPT WHERE THE DECK HAS CONCRETE STRENGTHS LESS THAN 3000 PSI, IS IN POOR CONDITION AND/OR ADEQUATE PULL OUT CANNOT BE ACHIEVED AS PER TABLE 2 ON SHEET 2. BOLT THROUGH ANCHORS MUST BE USED IF SPECIFICALLY INDICATED ON CONTRACT DRAWINGS. BOLT THROUGH ANCHORS MUST ALSO BE USED IF THE DECK IS PENETRATED DURING THE DRILLING PROCESS.
14. ADHESIVE ANCHORS FOR TEMPORARY BARRIERS ARE PERMITTED ON BRIDGE CONSTRUCTION PROJECTS THAT EXTEND CONTINUOUSLY FOR A MAXIMUM OF THREE YEARS.
15. IDENTIFY THE PLAN LOCATION OF THE BARRIER ON THE BRIDGE DECK. POSITION BARRIER SEGMENTS TO LOGICALLY ACCOMMODATE THE ENDS OF THE STRUCTURE, EXPANSION DAMS AND OTHER OBSTACLES.
16. TRAFFIC TRANSITIONS AND LANE MERGING MUST BE OFF THE BRIDGE.
17. BOLT THROUGH ANCHORS ARE NOT PERMITTED IN RECENTLY POURED DECKS WITHOUT APPROVAL OF DISTRICT BRIDGE ENGINEER.
18. FOR DEAD LOAD CALCULATIONS, THE WEIGHT OF THE BARRIERS ARE AS FOLLOWS:
 - 32" TEMPORARY CONCRETE MEDIAN BARRIER = 490 LB/FT
 - 50" TEMPORARY CONCRETE MEDIAN BARRIER = 840 LB/FT
 - 42" TEMPORARY SINGLE FACE CONCRETE BARRIER = 690 LB/FT
19. THE TEMPORARY BARRIER WEIGHT DOES NOT COUNT AGAINST THE CONSTRUCTION LOADING LIMITS AS SPECIFIED IN PUBLICATION 408, SECTION 105.17. HOWEVER, THE TEMPORARY BARRIER WEIGHT IS TO BE INCLUDED WITH THE FACTORED DEAD LOAD IN DETERMINING THE CONSTRUCTION LOAD CAPACITIES.
20. FOR DELINEATION AND BARRIER LINE PAINTING, SEE PUBLICATION 111, STANDARD DRAWING TC-8604.

BARRIER TYPE	ANCHOR SPACING	ANCHOR LOADS (KIPS)	
		SHEAR	TENSION
32" MEDIAN BARRIER	4'-0"	8	14
50" MEDIAN BARRIER	2'-0"	11	22
42" SINGLE-FACE BARRIER	2'-0"	10	21

NOTE:
SHEAR AND TENSION VALUES ARE MINIMUM CAPACITIES REQUIRED. IF BOTH VALUES ARE NOT MET OR EXCEEDED BY THE ANCHOR PROVIDED, A CLOSER SPACING MUST BE PROVIDED.

CHANGE 2
CHANGE 6

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

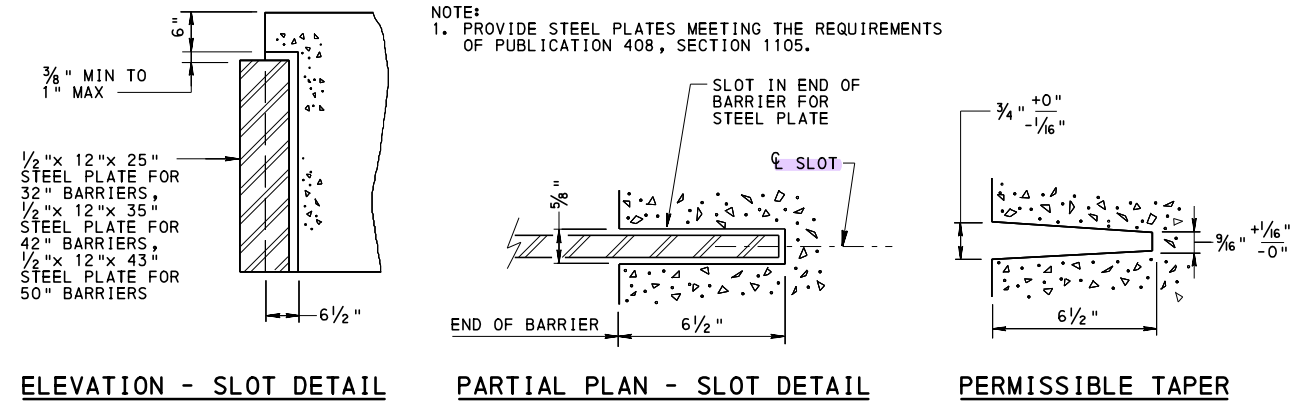
STANDARD
TEMPORARY CONCRETE BARRIER,
STRUCTURE MOUNTED
GENERAL NOTES

RECOMMENDED MAR. 27, 2024 <i>[Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED MAR. 27, 2024 <i>[Signature]</i> ACTING CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 1 OF 7 BC-719M
--	--	--------------------------------

CONSTRUCTION NOTES:

1. DRILL BY MEANS WHICH WILL NOT DAMAGE THE ADJACENT CONCRETE. SUPPORT BENEATH THE DECK AS NECESSARY TO AVOID SPALLING OF CONCRETE FOR BOLT THROUGH AND ADHESIVE ANCHORS HOLES.
2. DRILL INTO THE DECK USING THE HOLES IN THE TEMPORARY BARRIER AS A TEMPLATE. THE DRILL MAY BE LOCATED ANYWHERE WITHIN THE 2" SLOT, BUT MUST BE MAINTAINED VERTICALLY $\pm 1^\circ$.
3. THE BARRIERS MAY BE REPOSITIONED TO AVOID DAMAGING THE DECK REINFORCEMENT DURING DRILLING. MOVE THE BARRIER PARALLEL TO THE DIRECTION OF TRAFFIC UP TO 2" AND PERPENDICULAR TO TRAFFIC UP TO 1". HOWEVER, A SMOOTH BARRIER FACE MUST ALWAYS BE PRESENTED TO TRAFFIC. IF BARRIERS CANNOT BE REPOSITIONED AND REBAR IS ENCOUNTERED, MOVE TO ALTERNATE BOLT POCKETS. FOR EXISTING DECKS, DRILLING THROUGH DECK REINFORCEMENT STEEL IS PERMITTED ONLY IF THE DECK IS DEMOLISHED IN A LATER STAGE OF CONSTRUCTION. FOR NEW DECKS, PROPERLY PLAN AND PLACE DECK REINFORCEMENT STEEL TO AVOID DAMAGE DURING DRILLING.
4. MATCH THE ENDS OF THE SEGMENTS WITH THE LOCATION OF THE EXPANSION DAMS AS CLOSELY AS POSSIBLE. BOLTING OF A SEGMENT ON EACH SIDE OF AN EXPANSION DAM IS NOT PERMITTED. FOR OTHER OBSTACLES THAT DO NOT INVOLVE MOVEMENT, SUCH AS SCUPPERS, BOLTING A SEGMENT ON EACH SIDE OF THE OBSTACLE IS PERMITTED.
5. THE END SEGMENT OF THE TEMPORARY BARRIER AT THE END OF THE BRIDGE MAY EXTEND PARTIALLY OFF THE BRIDGE. CONNECT THE END OF THE SEGMENT OFF THE BRIDGE TO THE ADJACENT SEGMENT OF THE ROADWAY BARRIER. POSITION BARRIER SEGMENTS SUCH THAT THE LARGEST POSSIBLE PORTION OF THE END SEGMENT IS PLACED ON THE BRIDGE. INSTALL ANCHORS AT THE SAME SPACING USED ON THE BRIDGE.
6. TREATMENT OF ANCHOR HOLES AFTER REMOVAL OF TEMPORARY BARRIERS:
 - FOR ADHESIVE ANCHORS MOUNTED ON NEW DECKS AND EXISTING DECKS THAT WILL NOT BE DEMOLISHED IN A LATER STAGE OF CONSTRUCTION, CORE THE ANCHORS TO COMPLETELY REMOVE THE ANCHOR AFTER THE REMOVAL OF THE TEMPORARY BARRIER AND FILL THE HOLE WITH GROUT IN ACCORDANCE WITH PUBLICATION 408, SECTION 1080.2 (c).
 - FOR ADHESIVE ANCHORS INSTALLED USING A MANUFACTURERS RELEASING AGENT, THE CONTRACTOR MAY REMOVE THE ANCHOR. REDRILL THE HOLE TO REMOVE THE EPOXY USING THE SAME SIZE HOLE WHEN INSTALLING THE ADHESIVE ANCHOR AND FILL THE HOLE WITH GROUT IN ACCORDANCE WITH PUBLICATION 408, SECTION 1080.2 (c).
 - FOR ADHESIVE ANCHORS MOUNTED ON EXISTING DECKS THAT WILL BE DEMOLISHED IN A LATER STAGE OF CONSTRUCTION, CUT THE PROJECTION OF THE ANCHOR ABOVE THE DECK AND GRIND SMOOTH AND FLUSH WITH THE TOP SURFACE OF THE DECK IMMEDIATELY AFTER TEMPORARY BARRIER REMOVAL.
 - FOR BOLT THROUGH ANCHORS MOUNTED ON NEW DECKS OR MOUNTED ON EXISTING DECKS THAT WILL BE REOPENED TO TRAFFIC AFTER TEMPORARY BARRIER REMOVAL, FILL THE HOLES WITH RAPID SET CONCRETE PATCHING MATERIAL (TYPE C) AS LISTED IN BULLETIN 15, SECTION 679.2 (d) 5, AFTER THE REMOVAL OF THE TEMPORARY BARRIER.
7. THE MINIMUM DECK WIDTH BEHIND A TEMPORARY BARRIER MOUNTED SUCH THAT TRAFFIC EXISTS ALONG ONE FACE IS 2" FOR DECKS WITHOUT OVERLAYS AND 12" FOR DECKS WITH AN OVERLAY. ADDITIONAL OFFSET MAY BE IDENTIFIED ON THE CONTRACT DRAWINGS, IF PRACTICAL, TO ALLOW CONTRACTOR ACCESS FOR PARTIAL WIDTH CONSTRUCTION.
8. ANCHORS ARE REQUIRED ON THE TRAFFIC SIDE OF THE TEMPORARY BARRIER.
9. FIELD TEST LOADING VALUES ARE 85% OF THE ADHESIVE ANCHOR TENSILE CAPACITY.

BARRIER TYPE	ANCHOR SPACING	TENSION (KIPS)
32" MEDIAN BARRIER	4'-0"	12
50" MEDIAN BARRIER	2'-0"	19
42" SINGLE-FACE BARRIER	2'-0"	18

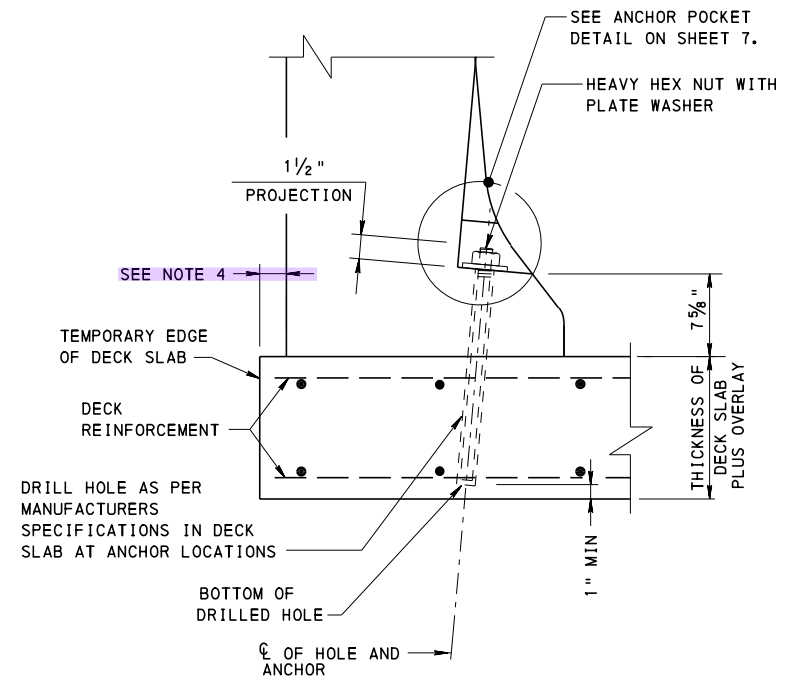


SLOTTED PLATE CONNECTION

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE**

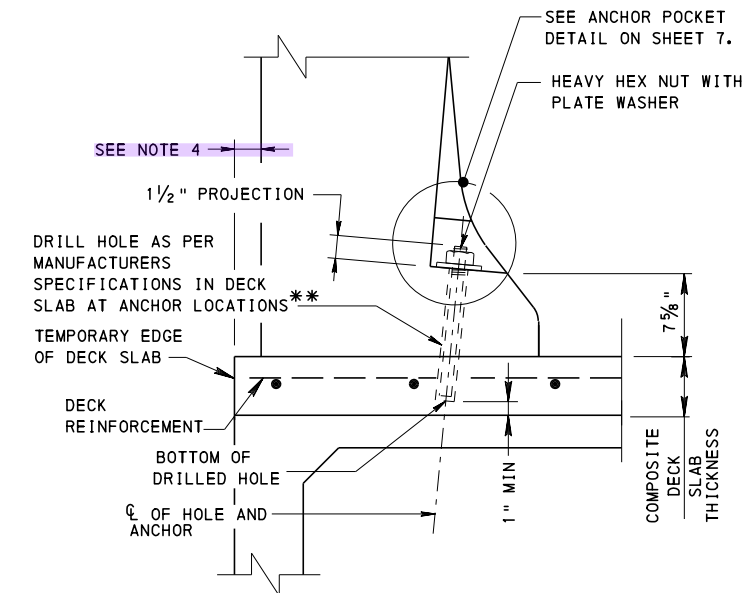
**STANDARD
TEMPORARY CONCRETE BARRIER,
STRUCTURE MOUNTED
CONSTRUCTION NOTES AND
SLOTTED PLATE CONNECTION**

RECOMMENDED MAR. 27, 2024 <i>[Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED MAR. 27, 2024 <i>[Signature]</i> ACTING CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 2 OF 7 BC-719M
--	--	--------------------------------



ADHESIVE ANCHOR

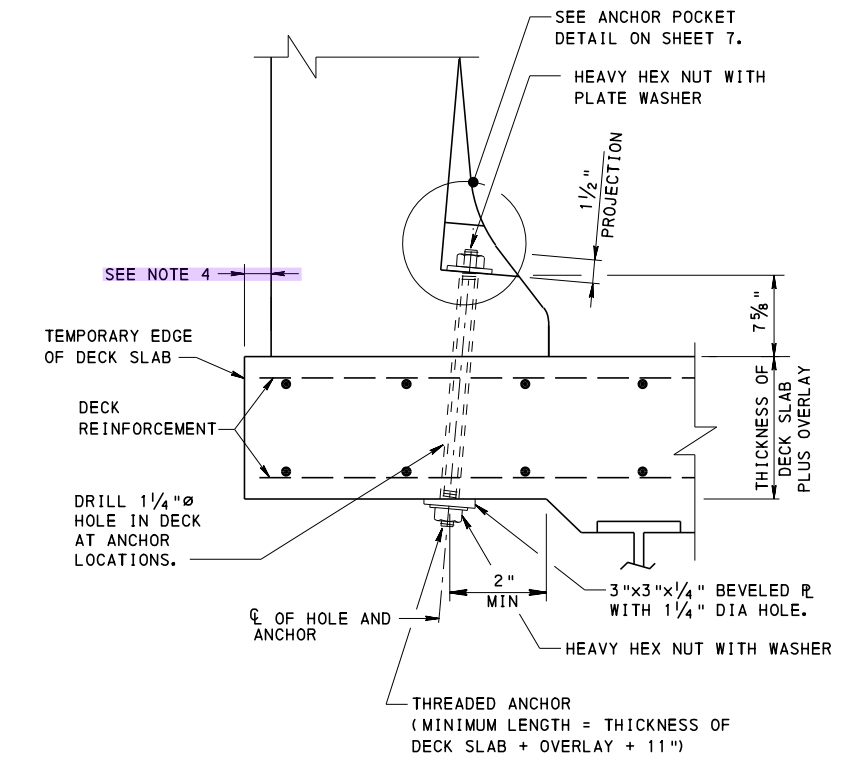
(TEMPORARY SINGLE FACE BARRIER SHOWN;
TEMPORARY MEDIAN BARRIER SIMILAR AT FACE(S)
ADJACENT TO TRAFFIC)



**ADHESIVE ANCHOR ON
COMPOSITE ADJACENT BOX BEAMS**

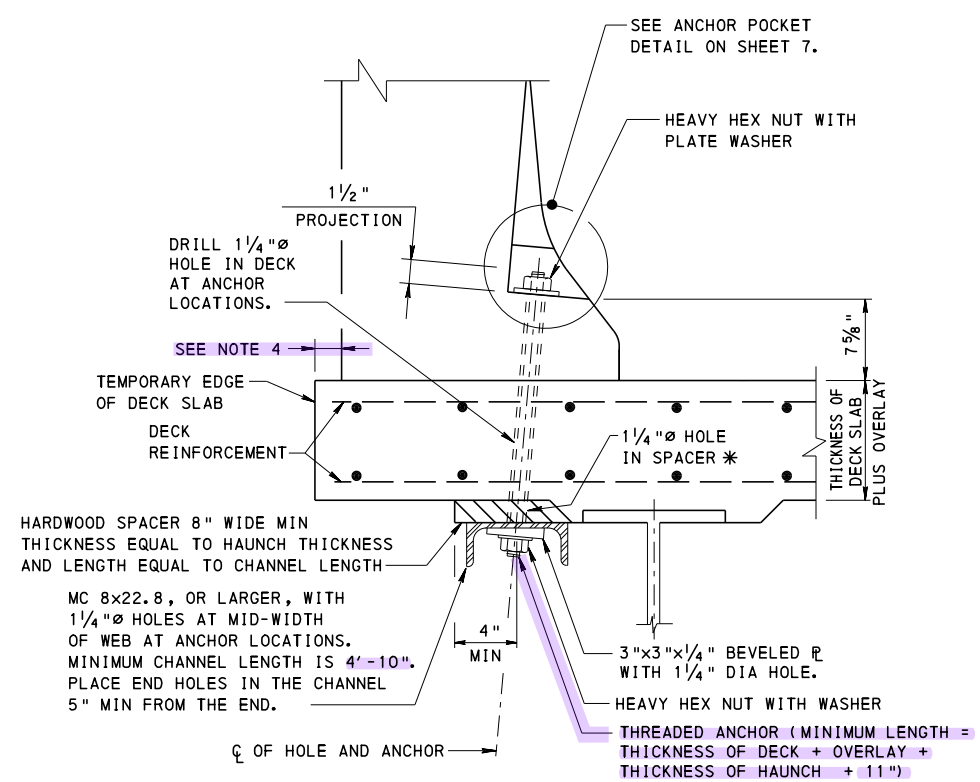
(TEMPORARY SINGLE FACE BARRIER SHOWN;
TEMPORARY MEDIAN BARRIER SIMILAR AT FACE(S) ADJACENT TO TRAFFIC)

** ANCHOR HOLE MAY NOT PENETRATE TOP SLAB OF BOX BEAM. FOR 5" DECK SLAB THICKNESS, USE 1'-0" BOLT SPACINGS. FOR NEW DECKS, SLAB THICKNESS MUST BE INCREASED TO 7" TO BE ABLE TO USE ALL INSTALLATION OPTIONS LISTED IN TABLE 1, ON SHEET 1.



TYPICAL BOLT THROUGH ANCHOR

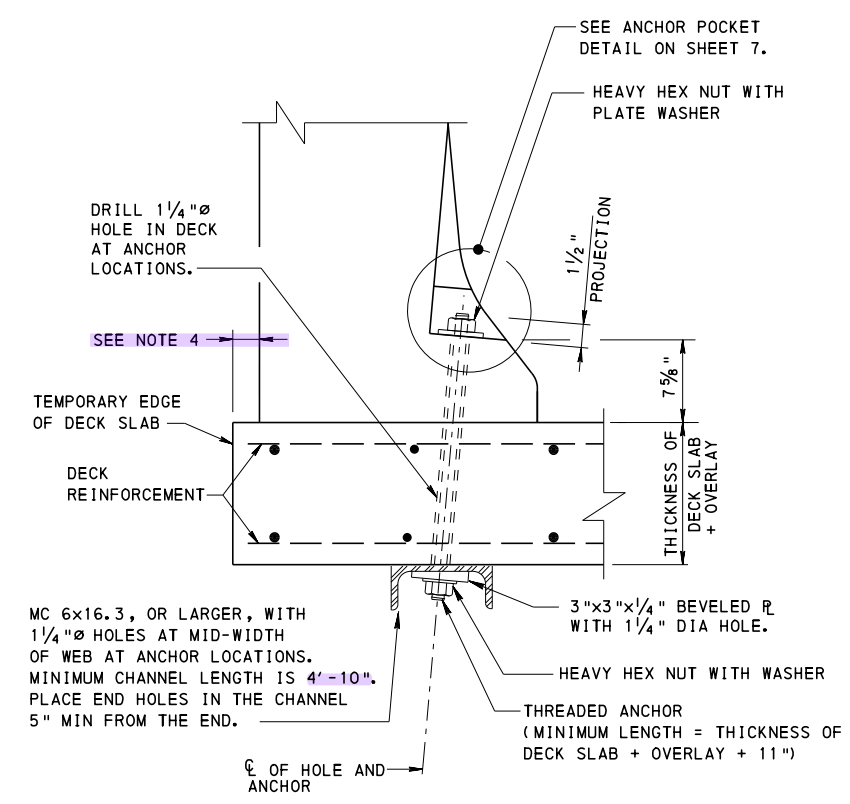
(TEMPORARY SINGLE FACE BARRIER SHOWN;
TEMPORARY MEDIAN BARRIER SIMILAR AT FACE(S) ADJACENT TO TRAFFIC)



**ALTERNATE CONNECTION DETAIL WITH SPACER
FOR HAUNCH CLEARANCE LESS THAN 2"**

(TEMPORARY SINGLE FACE BARRIER SHOWN;
TEMPORARY MEDIAN BARRIER SIMILAR AT FACE NEAR HAUNCH)

* THE ENTIRE CIRCUMFERENCE OF THE HOLE IN THE HARDWOOD SPACER MUST BE 1/2" MIN FROM THE EDGES OF THE SPACER.



ALTERNATE BOLT THROUGH ANCHOR

(TEMPORARY SINGLE FACE BARRIER SHOWN;
TEMPORARY MEDIAN BARRIER SIMILAR AT FACE(S) ADJACENT TO TRAFFIC)

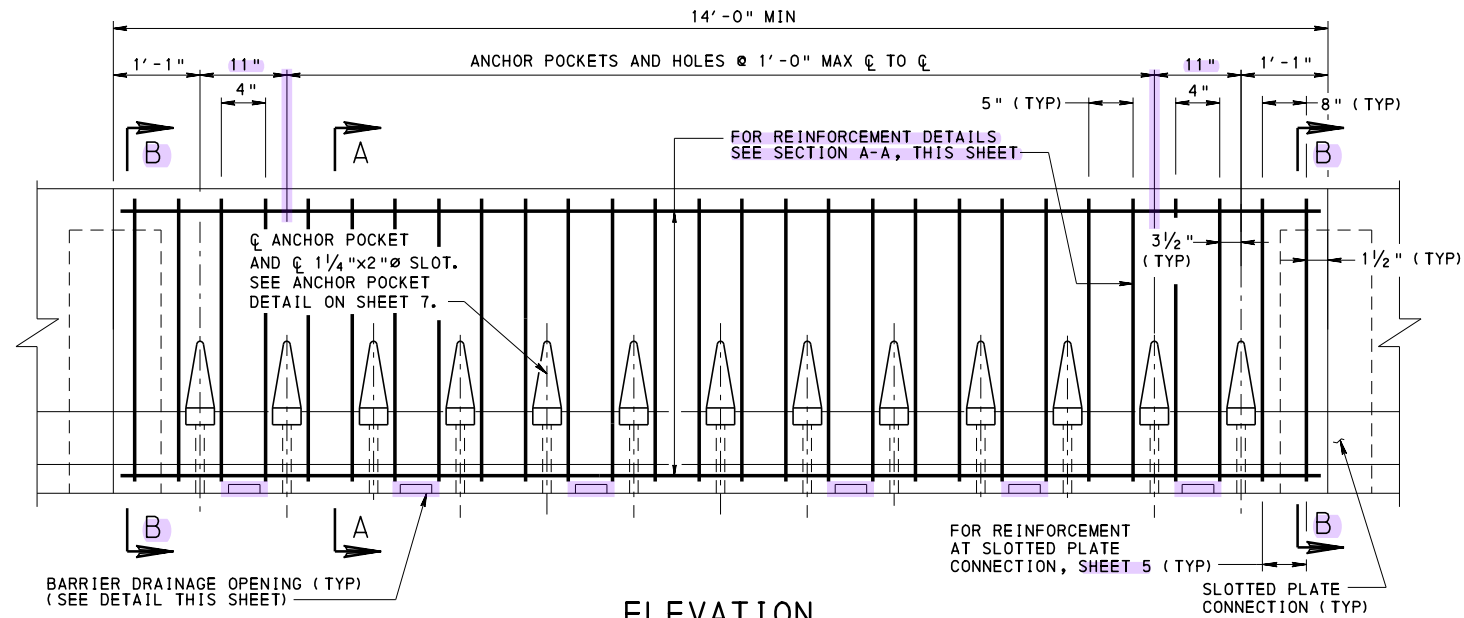
NOTE: USE THE ALTERNATE BOLT THROUGH ANCHOR INSTALLATION FOR DECKS WITH METAL DECK PANS AND WHEN THE EXISTING DECK IS DETERIORATED OR THE ALTERNATE INSTALLATION IS REQUIRED BY THE DISTRICT BRIDGE ENGINEER.

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. FOR CONSTRUCTION NOTES, SEE SHEET 2.
3. FOR SPACING AND MINIMUM REQUIRED ADHESIVE ANCHOR ULTIMATE CAPACITY SEE TABLE 1, SHEET 1.
4. REFER TO CONSTRUCTION NOTE 7 ON SHEET 2.

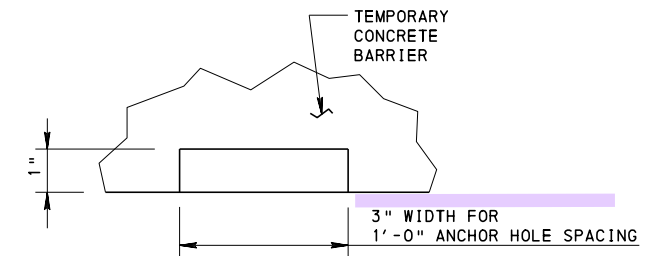
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE**

**STANDARD
TEMPORARY CONCRETE BARRIER,
STRUCTURE MOUNTED
ADHESIVE AND BOLT THROUGH
ANCHOR DETAILS**



ELEVATION

TRAFFIC FACE OF SINGLE FACE TEMPORARY CONCRETE BARRIER AND BOTH FACES OF TEMPORARY CONCRETE MEDIAN BARRIER

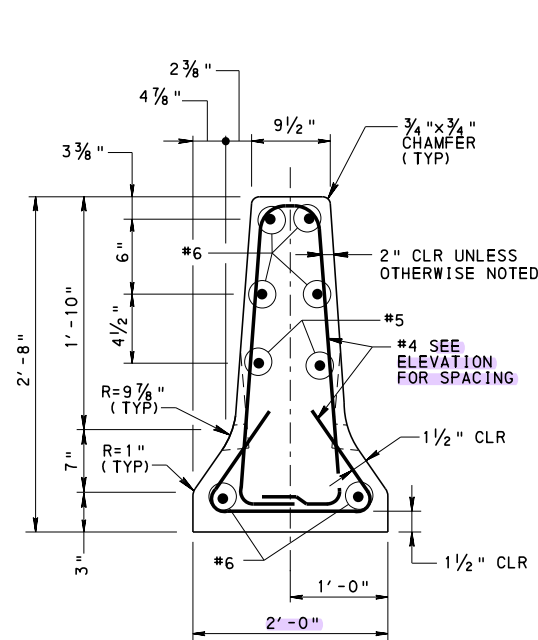


BARRIER DRAINAGE OPENING DETAIL

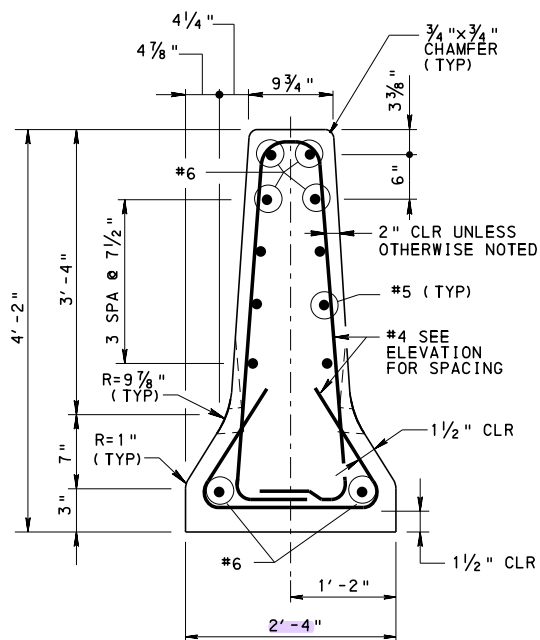
NOTE: USE BARRIER DRAINAGE OPENINGS FOR ALL TEMPORARY CONCRETE BARRIERS.

BARRIER DRAINAGE NOTES:

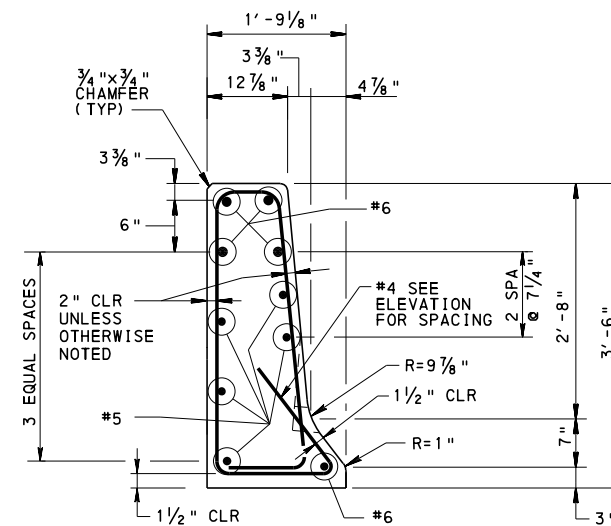
1. LOCATE OPENINGS MID-WAY BETWEEN ANCHOR POCKETS.
2. PROVIDE A MINIMUM OF SIX (6) OPENINGS PER 14'-0" SEGMENT LENGTH.



32" TEMPORARY CONCRETE MEDIAN BARRIER



50" TEMPORARY CONCRETE MEDIAN BARRIER



42" TEMPORARY SINGLE FACE CONCRETE BARRIER

SECTION A-A

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. FOR CONSTRUCTION NOTES, SEE SHEET 2.
3. FOR SECTION B-B, SEE SHEET 5.

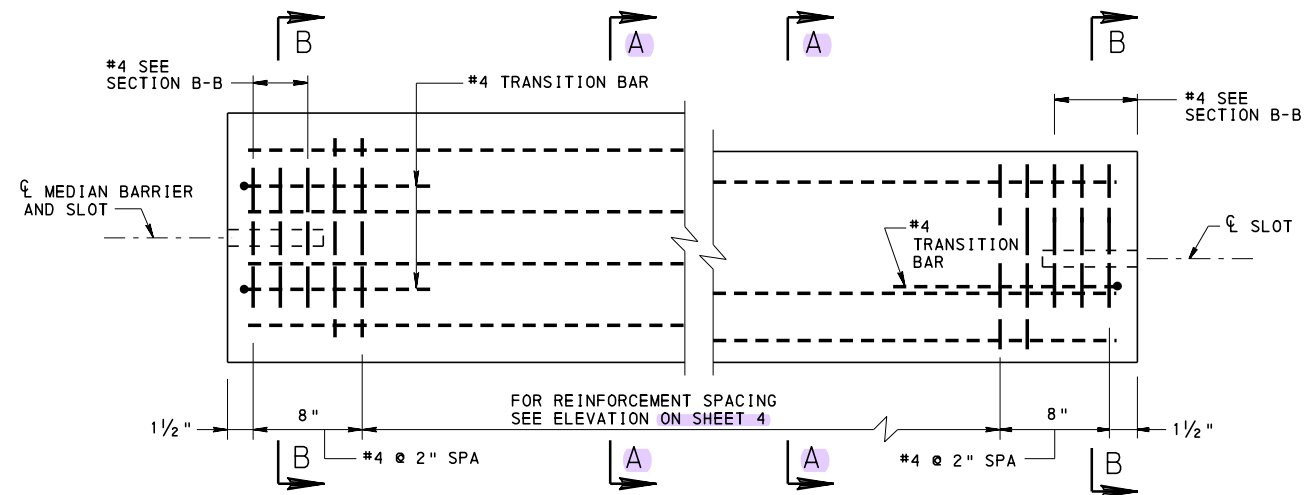
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

STANDARD
TEMPORARY CONCRETE BARRIER,
STRUCTURE MOUNTED
REINFORCEMENT DETAILS - 1

RECOMMENDED MAR. 27, 2024
[Signature]
CHIEF BRIDGE ENGINEER

RECOMMENDED MAR. 27, 2024
[Signature]
ACTING CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 4 OF 7
BC-719M

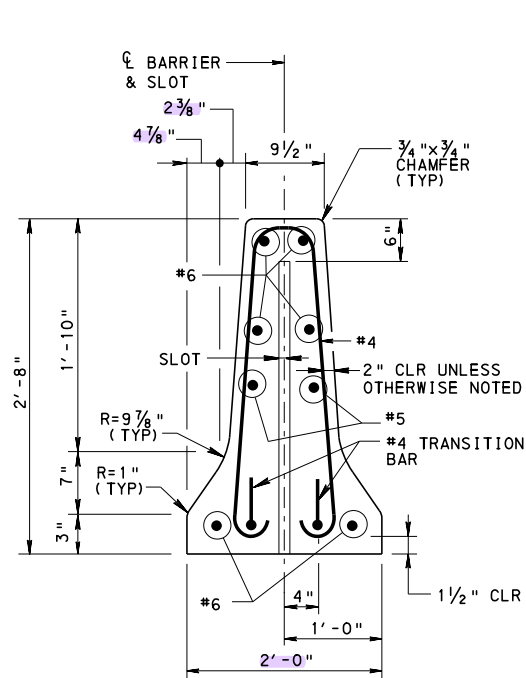


**32" AND 50"
TEMPORARY CONCRETE
MEDIAN BARRIERS**
BOTH ENDS OF BARRIER ARE TYPICAL

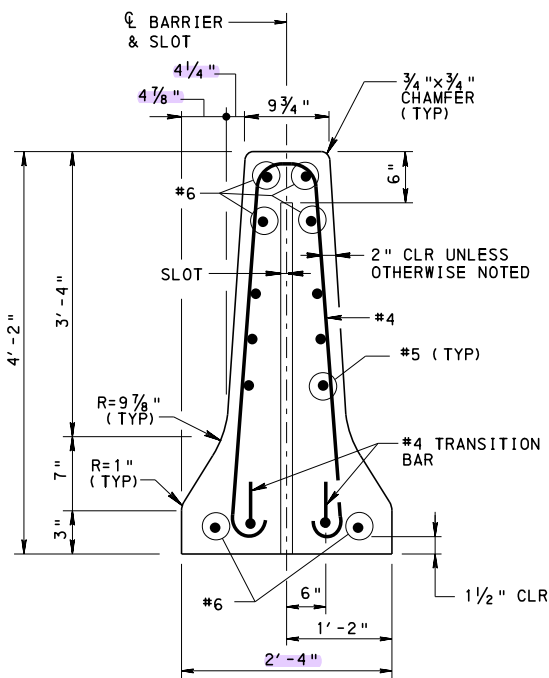
**42" TEMPORARY
SINGLE FACE
CONCRETE BARRIER**
BOTH ENDS OF BARRIER ARE TYPICAL

REINFORCEMENT AT SLOTTED PLATE CONNECTION - PLAN

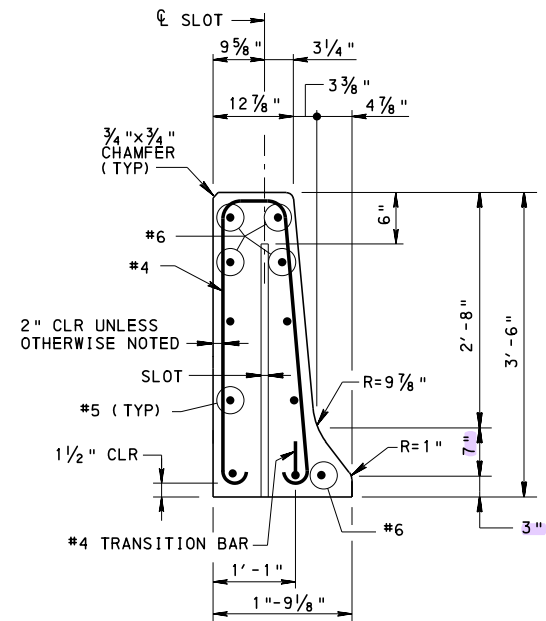
(ANCHOR POCKETS NOT SHOWN)



**32" TEMPORARY CONCRETE
MEDIAN BARRIER**



**50" TEMPORARY CONCRETE
MEDIAN BARRIER**



**42" TEMPORARY SINGLE FACE
CONCRETE BARRIER**

SECTION B-B

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. FOR CONSTRUCTION NOTES, SEE SHEET 2.
3. FOR BARRIER ELEVATION AND SECTION A-A, SEE SHEET 4.

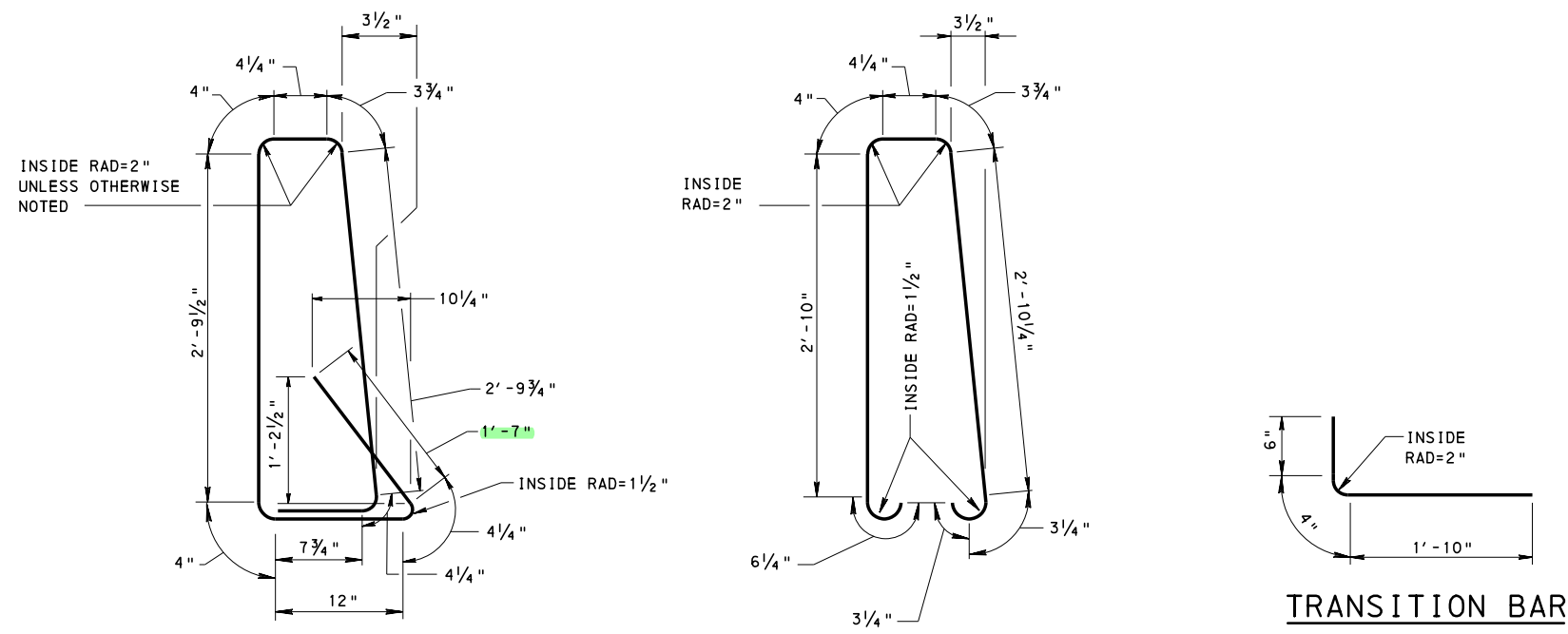
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE**

**STANDARD
TEMPORARY CONCRETE BARRIER,
STRUCTURE MOUNTED
REINFORCEMENT DETAILS - 2**

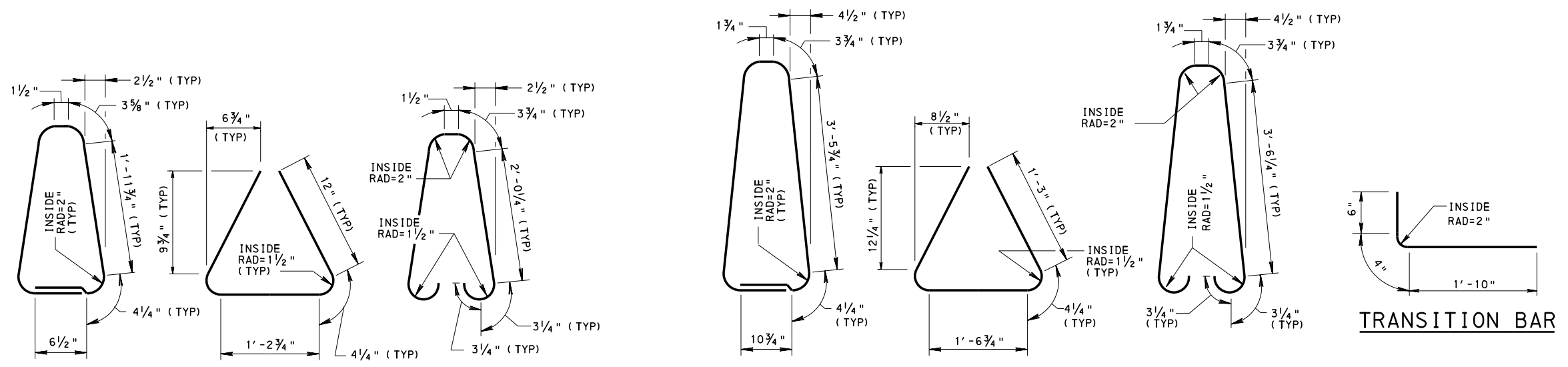
RECOMMENDED MAR. 27, 2024
[Signature]
CHIEF BRIDGE ENGINEER

RECOMMENDED MAR. 27, 2024
[Signature]
ACTING CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 5 OF 7
BC-719M



**42" TEMPORARY SINGLE FACE BARRIER
REINFORCEMENT BARS**



32" TEMPORARY MEDIAN BARRIER

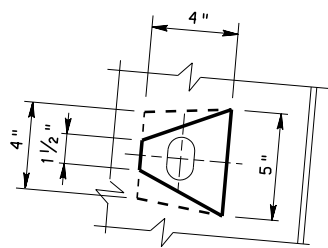
50" TEMPORARY MEDIAN BARRIER

**TEMPORARY MEDIAN BARRIER
REINFORCEMENT BARS**

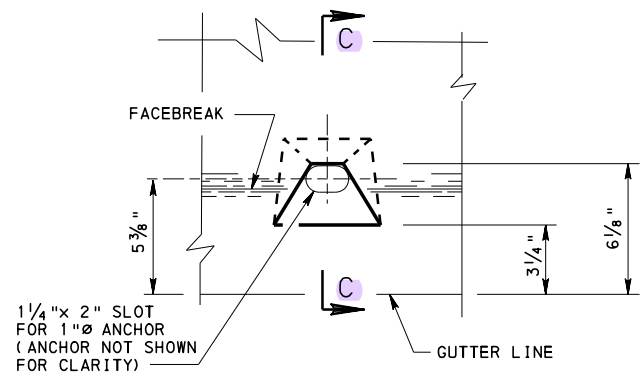
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE**

**STANDARD
TEMPORARY CONCRETE BARRIER,
STRUCTURE MOUNTED
BAR BENDING DIAGRAMS**

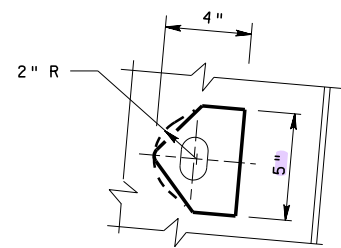
RECOMMENDED MAR. 27, 2024 <i>[Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED MAR. 27, 2024 <i>[Signature]</i> ACTING CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 6 OF 7 BC-719M
--	--	--------------------------------



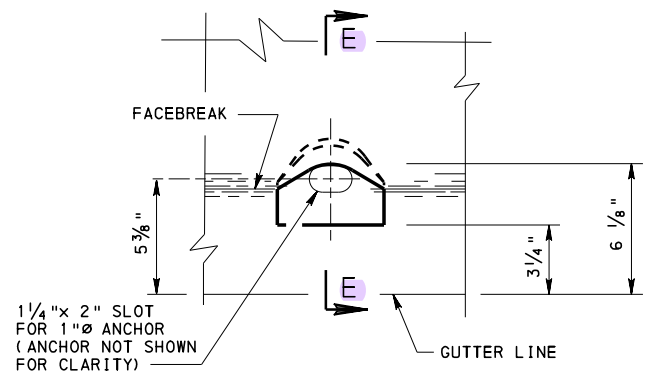
PARTIAL PLAN D-D



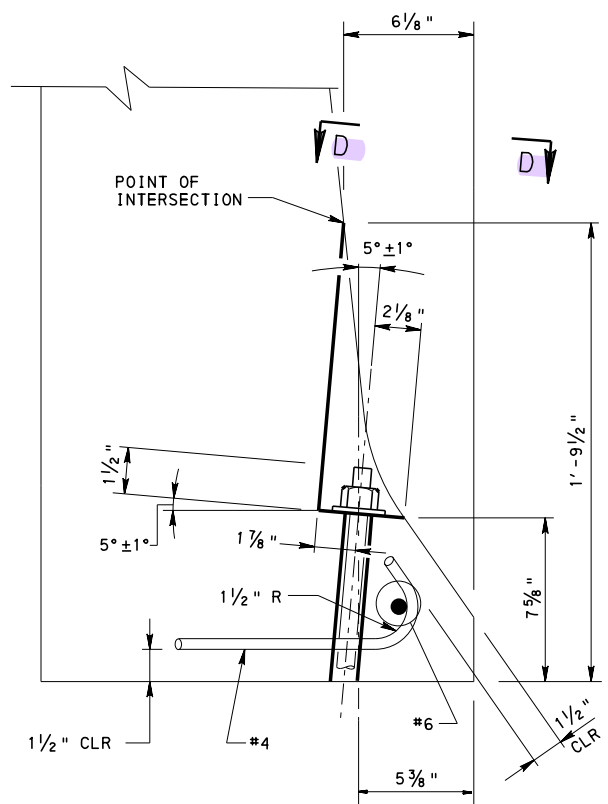
PLAN



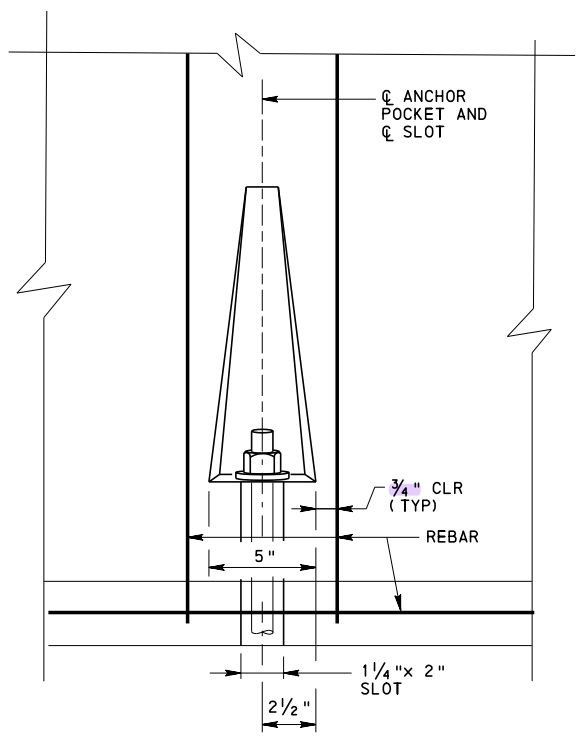
PARTIAL PLAN F-F



PLAN

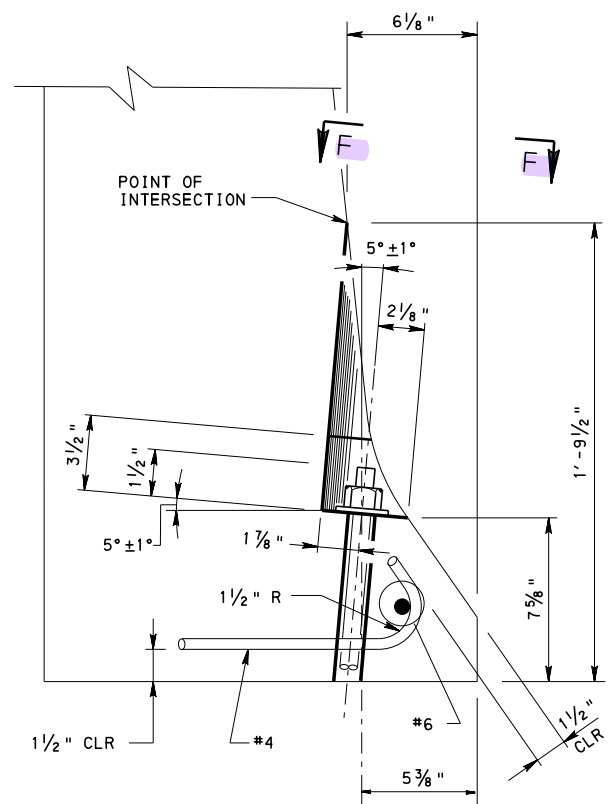


BARRIER SECTION C-C

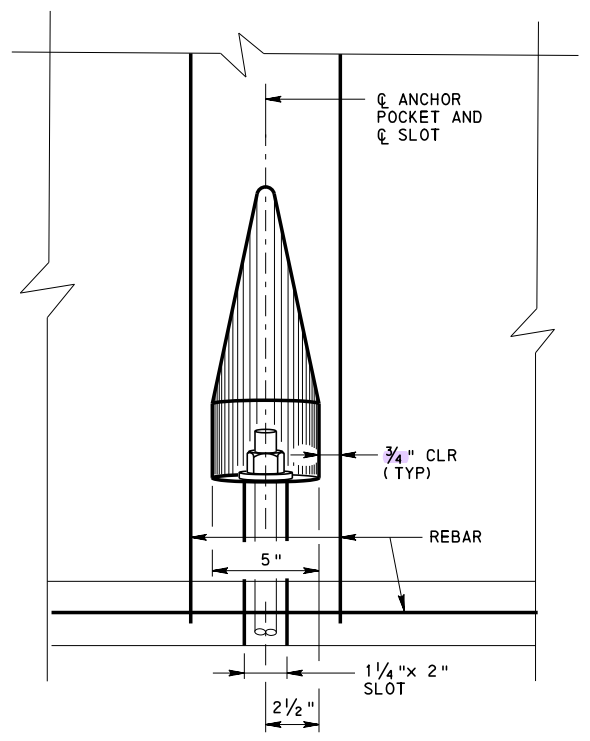


BARRIER ELEVATION

ALTERNATE ANCHOR POCKET DETAIL



BARRIER SECTION E-E



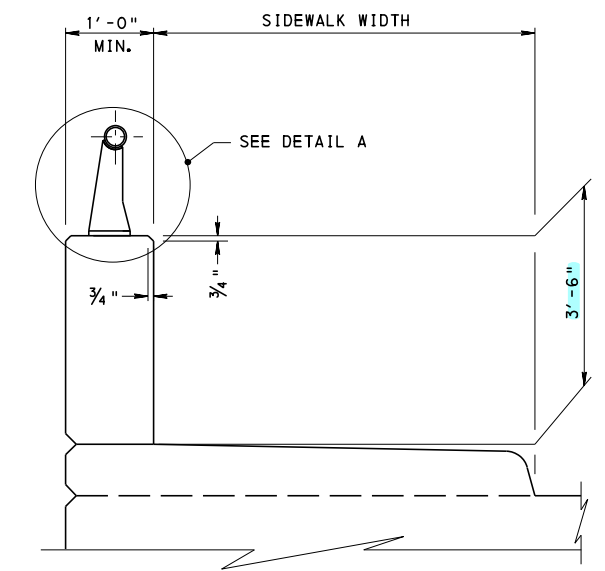
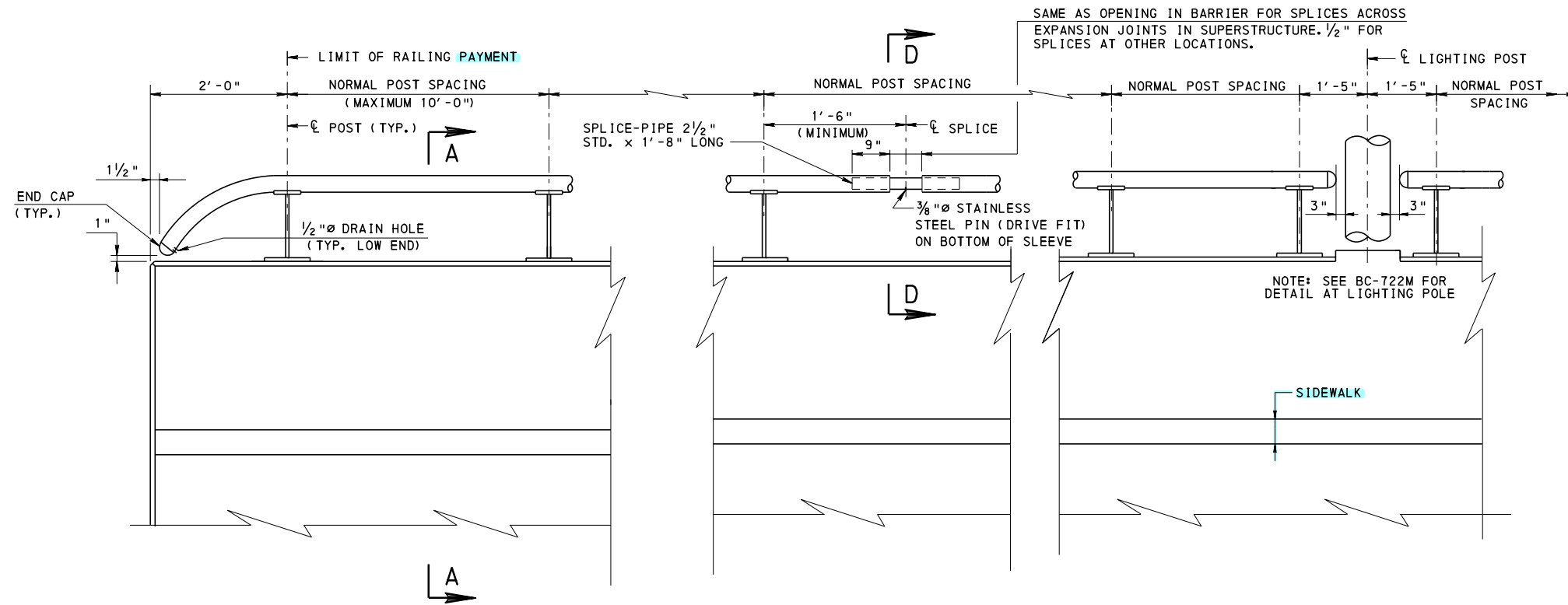
BARRIER ELEVATION

ANCHOR POCKET DETAIL

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. FOR CONSTRUCTION NOTES, SEE SHEET 2.
3. FOR LOCATION OF ANCHOR POCKET, SEE SHEET 4.

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF BRIDGE		
STANDARD TEMPORARY CONCRETE BARRIER, STRUCTURE MOUNTED ANCHOR POCKET DETAILS		
RECOMMENDED MAR. 27, 2024 <i>[Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED MAR. 27, 2024 <i>[Signature]</i> ACTING CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 7 OF 7 BC-719M



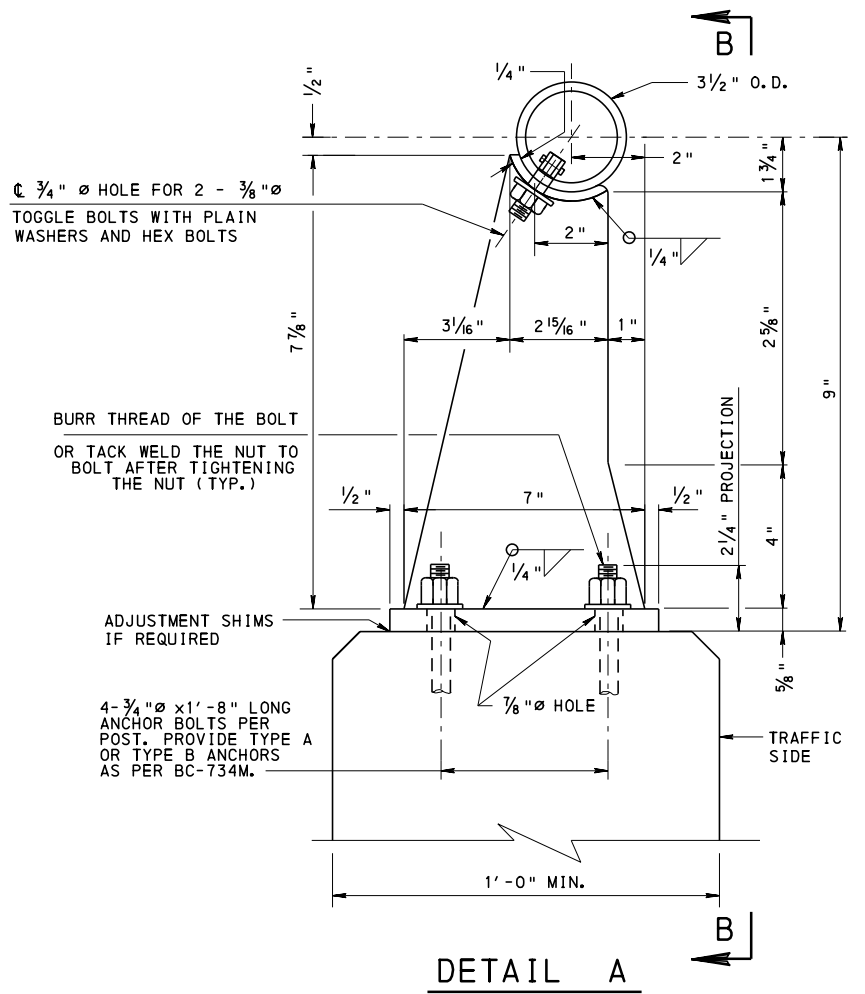
ELEVATION

BRIDGE HAND RAILING ON ALTERNATE SIDEWALK WITH 42" VERTICAL WALL CONCRETE BARRIER SHOWN, BRIDGE HAND RAILING ON 32", 42", OR 45" F-SHAPE CONCRETE BARRIER AND 32" OR 42" VERTICAL WALL CONCRETE BARRIER SIMILAR, SEE NOTE 8.

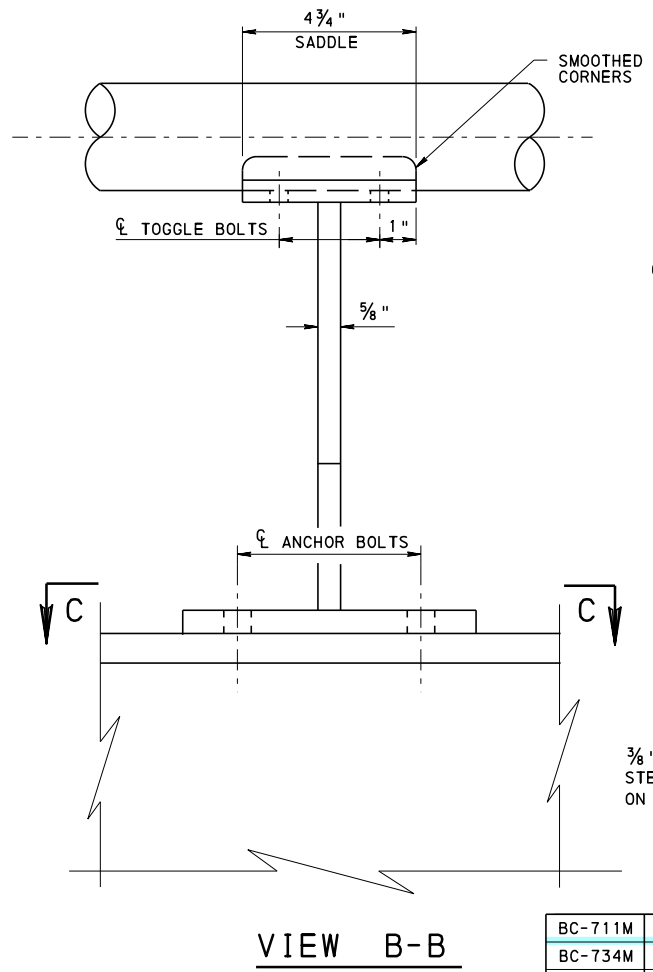
NOTES:

1. PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH PUBLICATION 408.
2. IN LIEU OF FABRICATED POST, USE CAST OR OTHER TYPE POST IF APPROVED BY THE CHIEF BRIDGE ENGINEER.
3. DO NOT PAINT ANY MATERIALS.
4. PLACE POST AND POST ANCHOR BOLTS NORMAL TO GRADE AND RAILS PARALLEL TO GRADE.
5. LOCATE RAIL SPLICES BETWEEN EXPANSION JOINTS AND AT OTHER LOCATIONS WHERE NECESSARY. PROVIDE RAILS AS LONG AS PRACTICAL, WITH A MINIMUM OF THREE POSTS BETWEEN SPLICES, UNLESS OTHERWISE REQUIRED FOR EXPANSION. LOCATE \bar{C} RAIL SPLICE 1'-6" FROM \bar{Q} OF POSTS.
6. DRILL HOLES IN RAILS AS REQUIRED IN THE FIELD.
7. COAT ALL SURFACES OF THE BASE PLATE IN CONTACT WITH CONCRETE WITH CAULKING COMPOUND PRIOR TO ERECTION. AFTER ERECTION AND ALIGNMENT, SEAL OPENINGS BETWEEN THE METAL SURFACES AND THE CONCRETE WITH CAULKING COMPOUND CONFORMING TO PUBLICATION 408, SECTION 705.7(b).
8. FOR BRIDGE HAND RAILING ON 42" OR 45" F-SHAPE CONCRETE BARRIER OR 42" VERTICAL WALL CONCRETE BARRIER TO BE USED ONLY WHEN AUTHORIZED BY THE DISTRICT TRAFFIC ENGINEER.

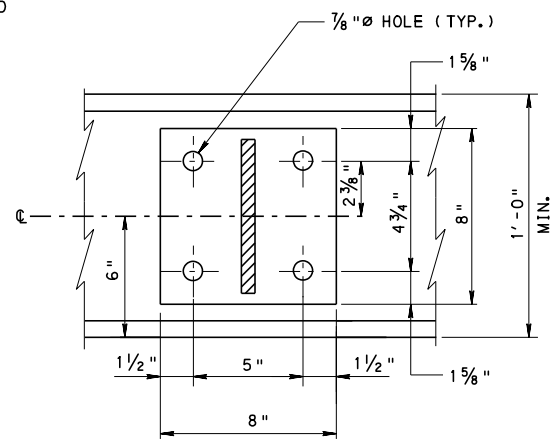
CHANGE 3



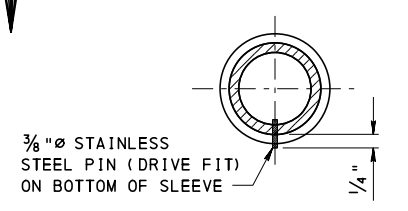
DETAIL A



VIEW B-B



SECTION C-C



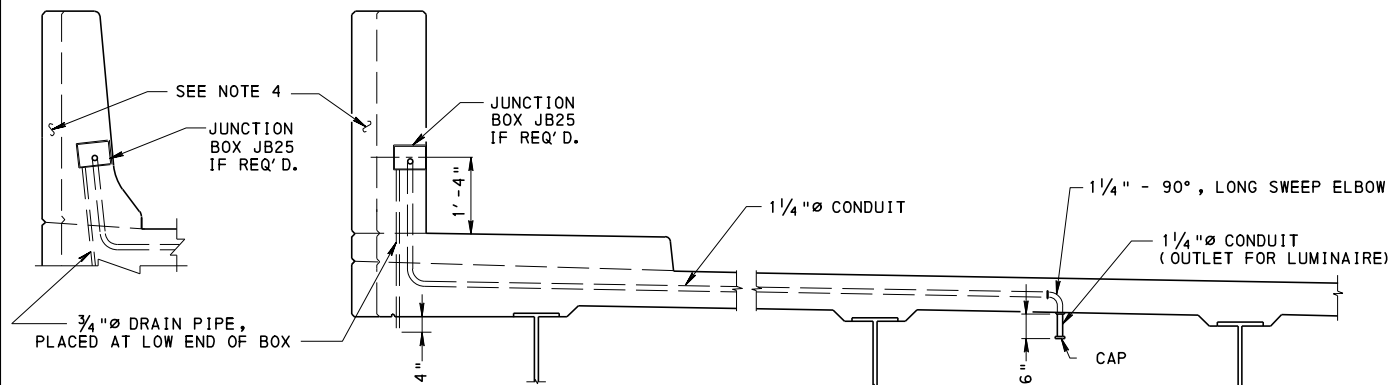
SECTION D-D

BC-711M	ALUMINUM PROTECTIVE BARRIER
BC-734M	ANCHOR SYSTEMS
BC-722M	LIGHTING POLE ANCHORAGE
RC-50M	GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS
REFERENCE DRAWINGS	

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

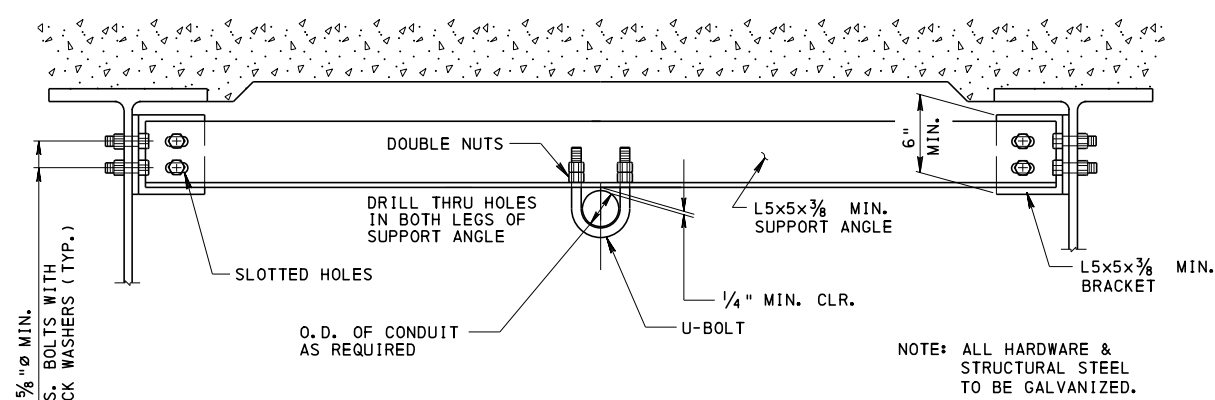
STANDARD
ALUMINUM OR STEEL
BRIDGE HAND RAILING

RECOMMENDED FEB. 19, 2021	RECOMMENDED FEB. 19, 2021	SHEET 1 OF 1
<i>Thomas P. Mociore</i> CHIEF BRIDGE ENGINEER	<i>Brenda Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	BC-720M



TYPICAL INSTALLATION OF JUNCTION BOX JB25
CONDUITS & FITTINGS FOR UNDERBRIDGE LIGHTING

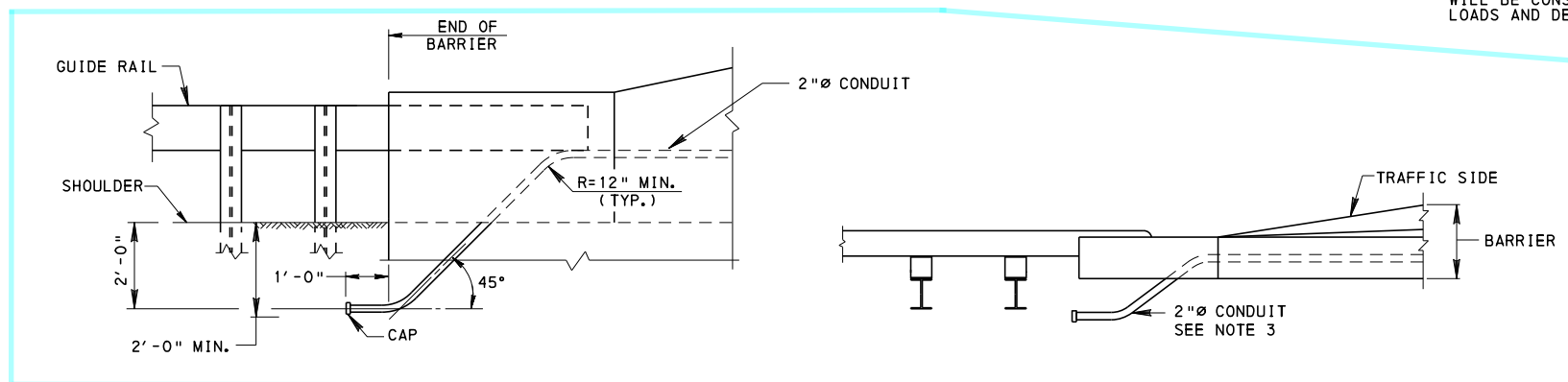
REFER TO DESIGN DRAWINGS FOR LOCATION OF OUTLETS FOR LUMINAIRES



CONDUIT HANGER*

(FOR STEEL CONDUIT ONLY)

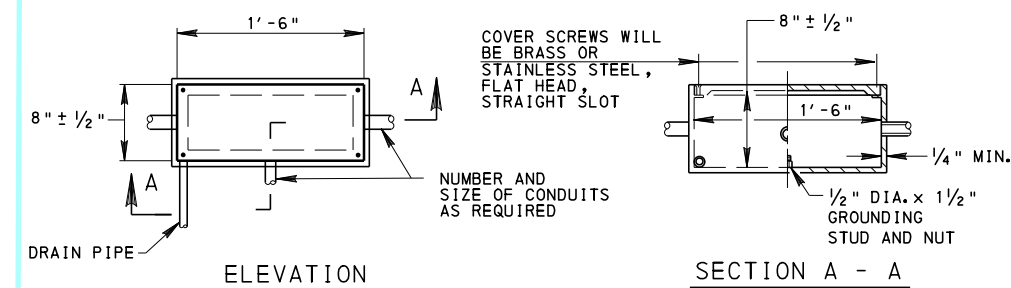
* MOUNTING DETAIL FOR CONDUIT HANGER AS SHOWN IS A SUGGESTED METHOD FOR STEEL STRUCTURES. DETAILS FOR PRESTRESSED BEAMS WOULD BE SIMILAR. ALTERNATIVE DETAILS WILL BE CONSIDERED ON A CASE BY CASE BASIS. ALL DETAILS MUST BE DESIGNED FOR SPECIFIC LOADS AND DETAILED ON SHOP DRAWINGS. DO NOT MAKE ANY ATTACHMENT TO THE UNDERSIDE OF THE DECK.



ELEVATION

PLAN VIEW

CONDUIT DETAILS AT ENDS OF BRIDGE

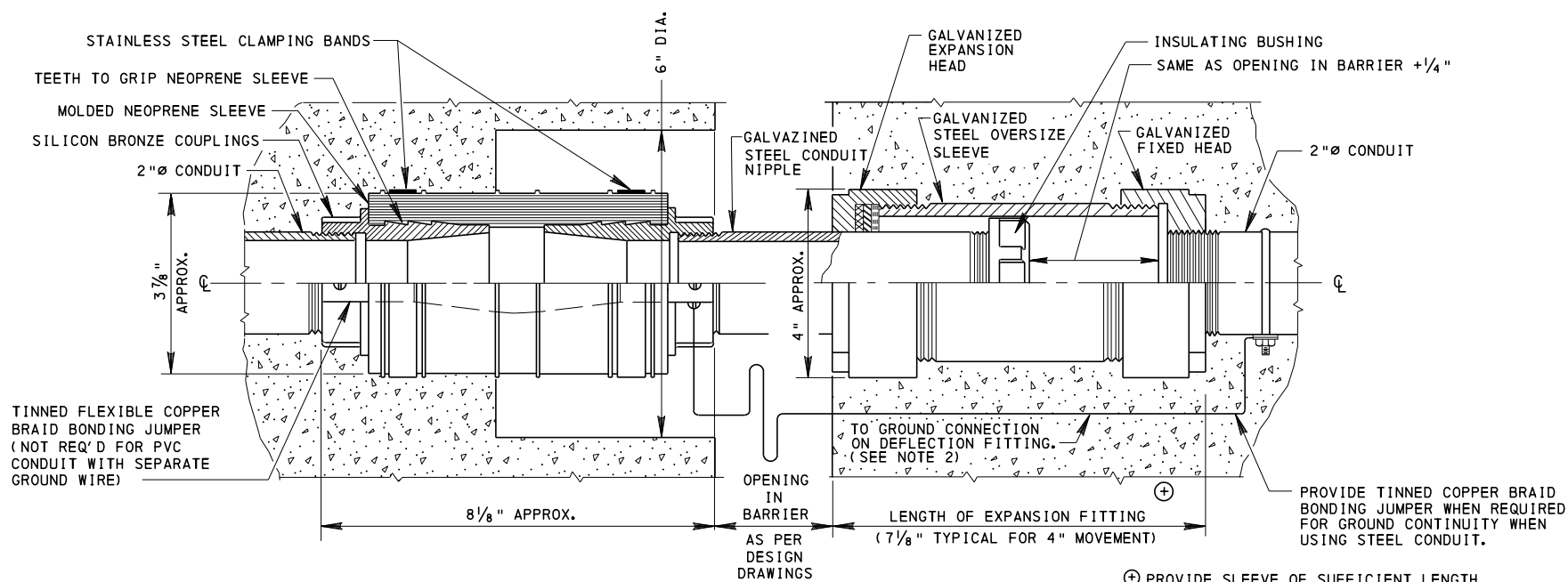


JUNCTION BOX JB25

(PUBLICATION 408, SECTION 1101)

NOTES:

1. PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH PUBLICATION 408.
2. GROUND LIGHTING POLES, UNDERPASS LUMINAIRES, AND METAL JUNCTION BOXES ON STRUCTURES IN ACCORDANCE WITH PUBLICATION 408, SECTION 910.3(q).
3. CONDUIT TO EXIT BARRIER ON OUTSIDE OF GUIDE RAIL POST LINE TO AVOID DAMAGE TO CONDUIT.
4. BLISTER IS NOT REQUIRED FOR JUNCTION BOX JB25 WHERE BARRIER WIDTH PROVIDES MINIMUM CONCRETE COVER OF 3".
5. MINIMUM CENTER TO CENTER SPACING OF JUNCTION BOXES IN BRIDGE BARRIERS TO BE 10'-0". BOXES TO BE A MINIMUM OF 10'-0" FROM OPEN JOINT.
6. MAXIMUM NUMBER OF CONDUITS PERMITTED TO BE PLACED IN BRIDGE BARRIER IS FOUR. CONDUITS MUST BE STAGGERED AND AS WIDELY SPACED AS PRACTICAL.



⊕ PROVIDE SLEEVE OF SUFFICIENT LENGTH TO ACCOMMODATE MAXIMUM EXPANSION AND CONTRACTION OF EXPANSION JOINT.

CONDUIT EXPANSION AND DEFLECTION JOINT FITTINGS

BC-722M	LIGHTING POLE ANCHORAGE
RC-50M	GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS
REFERENCE DRAWINGS	

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

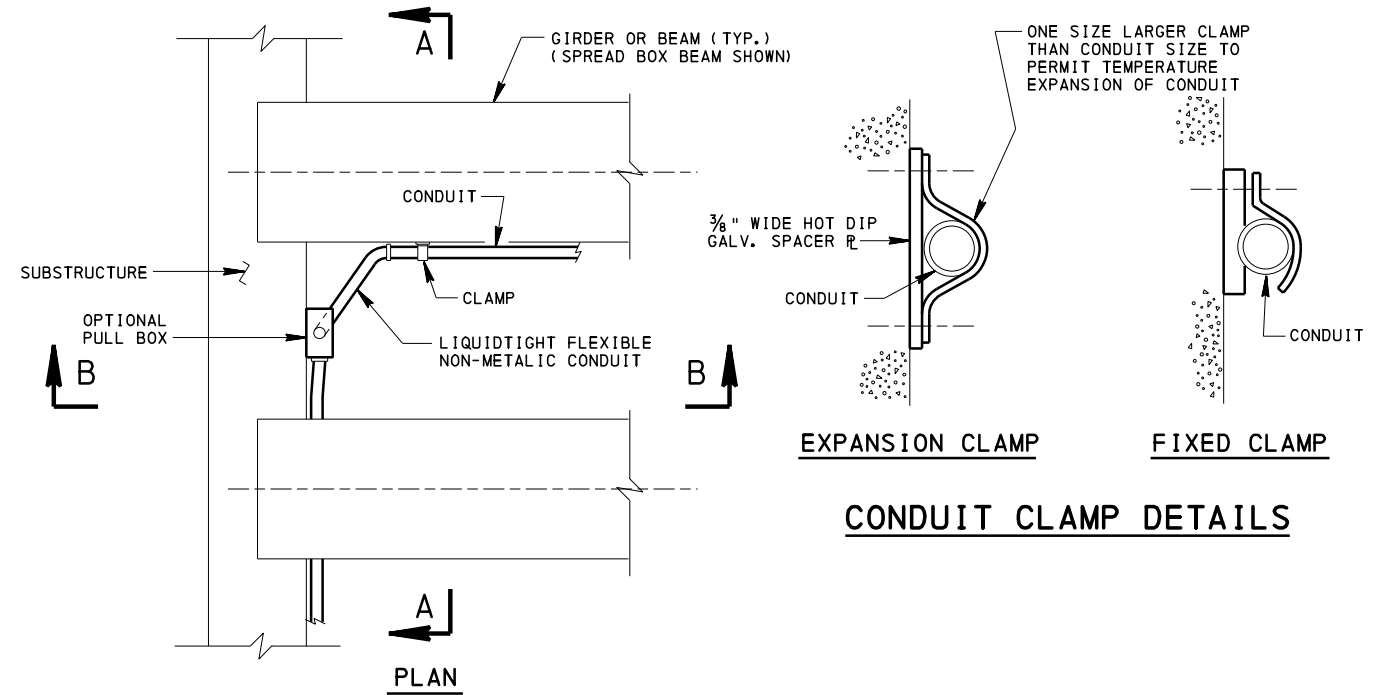
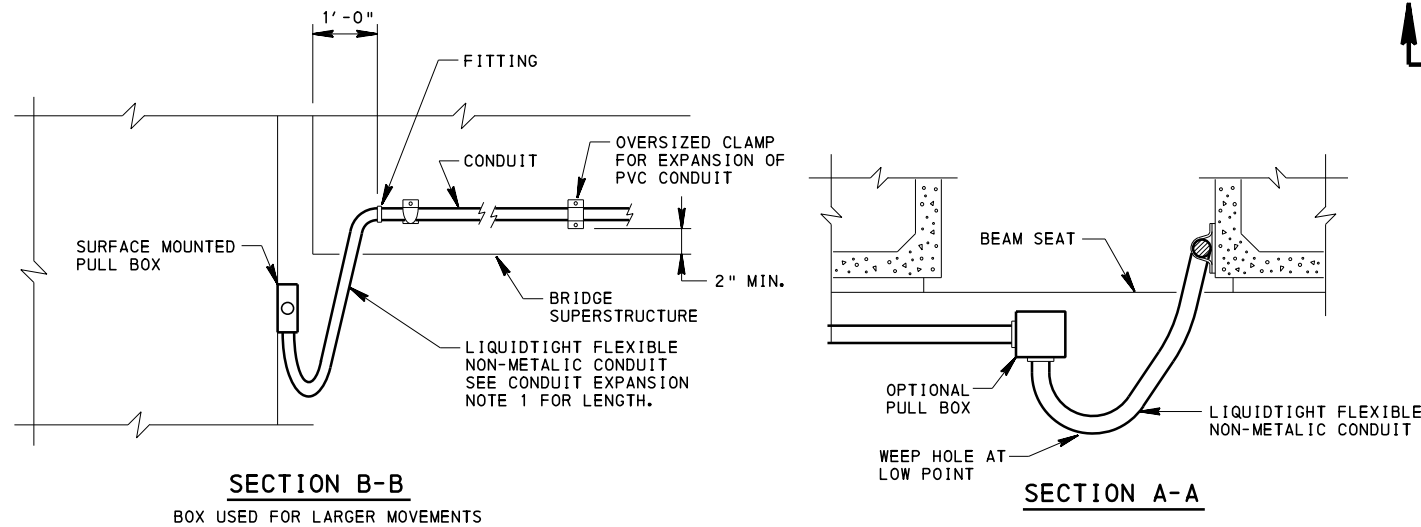
STANDARD
ELECTRICAL DETAILS

RECOMMENDED FEB. 19, 2021 <i>Thomas P. Mociore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED FEB. 19, 2021 <i>Bruce S. Thayer</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 1 OF 2 BC-721M
--	---	--------------------------------

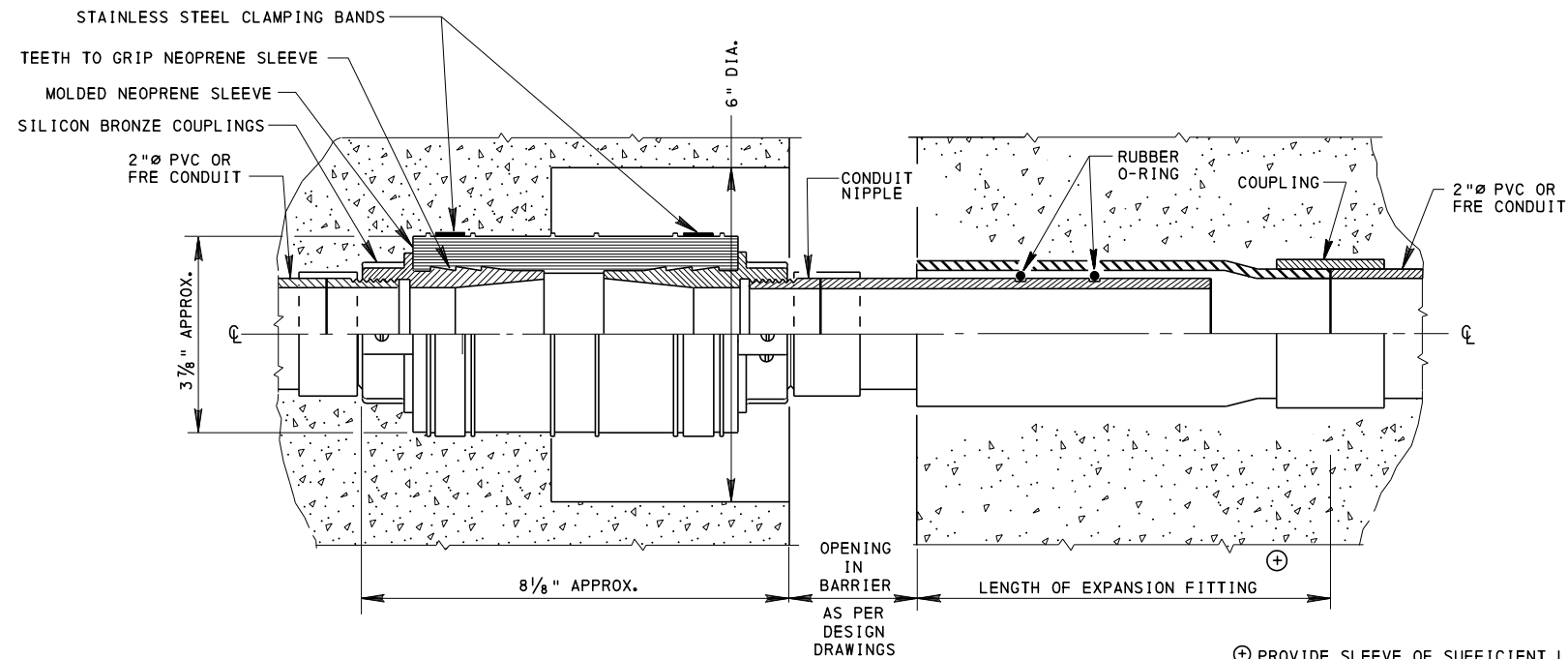
CHANGE 3

CONDUIT EXPANSION NOTES

1. APPROXIMATE LENGTH OF FLEXIBLE CONDUIT IS 2 TIMES ANTICIPATED MOVEMENT OR 1'-0" MIN. PLUS 3'-0".
2. SIZE BOX ACCORDING TO ARTICLE NEC314.
3. FOR UNDERBRIDGE LOCATIONS, BOXES CAN BE USED IF KEPT INACCESSIBLE FROM GENERAL PUBLIC AND PLACED A MIN. 10'-0" ABOVE SURROUNDING GROUND.
4. PULL BOX USE IS OPTIONAL, IF NEEDED, USE CAST IRON OR WELDED STEEL WHICH IS HOT DIPPED GALVANIZED IN ACCORDANCE WITH PUBLICATION 408, SECTION 1101.10.



EXPOSED CONDUIT CONNECTIONS AT EXPANSION JOINTS

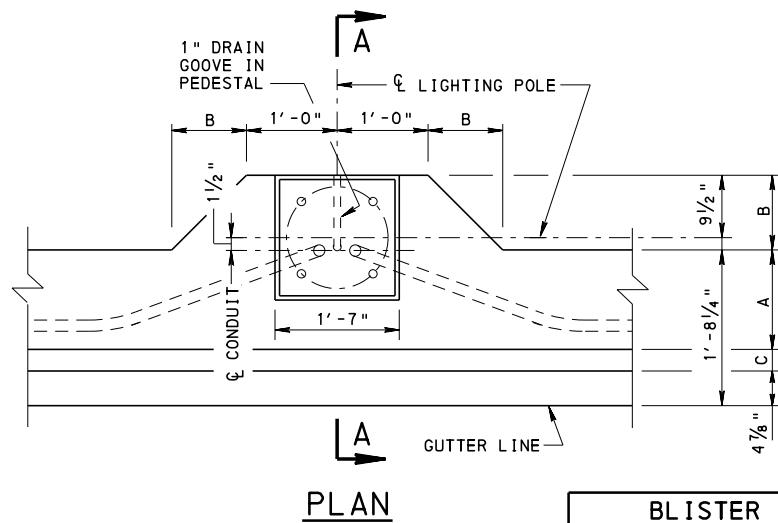


OPTIONAL PVC CONDUIT EXPANSION AND DEFLECTION JOINT FITTINGS

⊕ PROVIDE SLEEVE OF SUFFICIENT LENGTH TO ACCOMMODATE MAXIMUM EXPANSION AND CONTRACTION OF EXPANSION JOINT.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

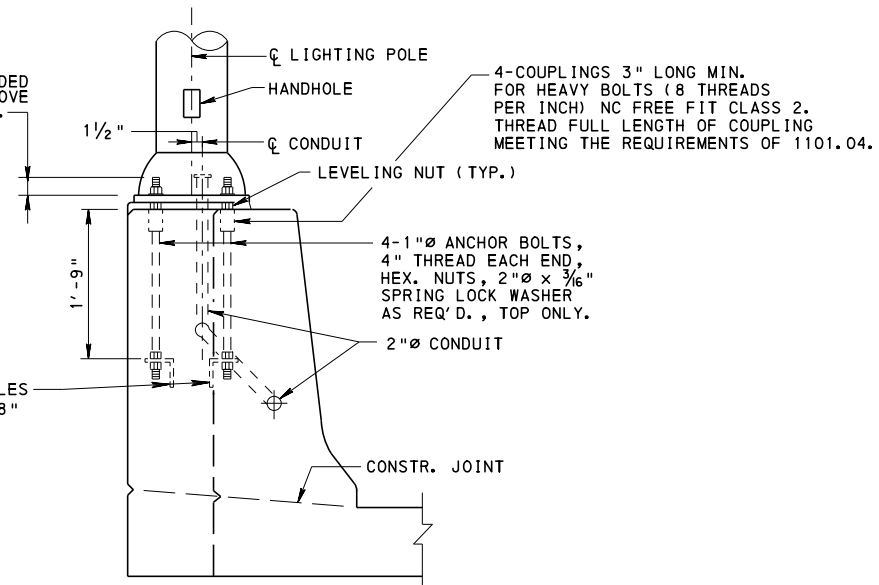
**STANDARD
ELECTRICAL DETAILS**



BLISTER DIMENSIONS			
F-SHAPE BARRIER	"A"	"B"	"C"
42" & 45"	1'-0"	11"	3 3/8"
32"	1'-1"	10"	2 3/8"

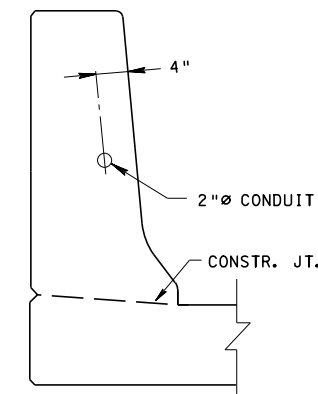
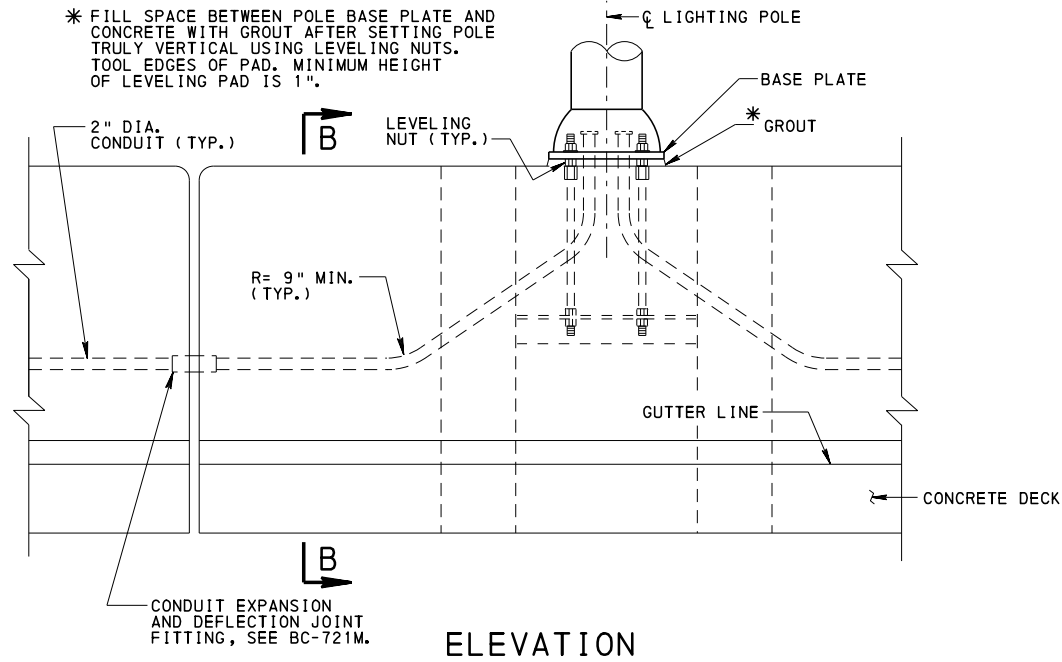
2" PROJECTION FOR ANCHOR BOLT THREADED ROD EXTENSIONS ABOVE TOP OF BASE PLATE.

ANCHOR ANGLES 4x4x1/2x1'-8"

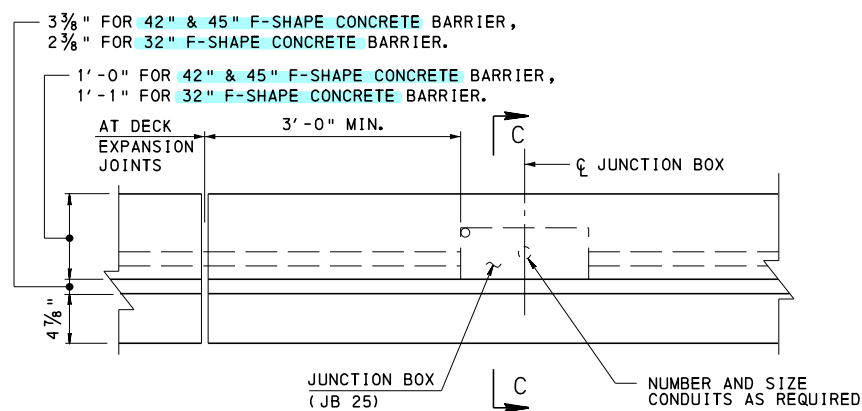


SECTION A-A

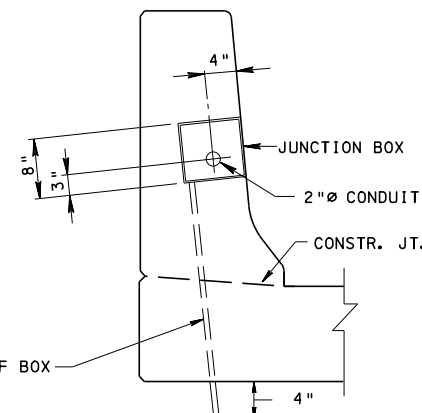
* FILL SPACE BETWEEN POLE BASE PLATE AND CONCRETE WITH GROUT AFTER SETTING POLE TRULY VERTICAL USING LEVELING NUTS. TOOL EDGES OF PAD. MINIMUM HEIGHT OF LEVELING PAD IS 1".



SECTION B-B



3/4" DIA DRAIN PIPE AT LOW END OF BOX



SECTION C-C

NOTES:

1. PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH PUBLICATION 408.
2. SET ANCHOR BOLTS ACCURATELY BY THE TEMPLATE FURNISHED BY THE MANUFACTURER, TO THE CORRECT ELEVATION AND ALIGNMENT AND SECURELY BRACE AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED. ANCHOR BOLT DIAMETER AS REQUIRED BY LIGHTING POLE MANUFACTURER. (FOR FUTURE LIGHTING PROVISIONS, SEE CHART ON THIS SHEET.)
3. LOCATE JUNCTION BOX ON SIDEWALK SIDE OF BARRIER WHEN APPLICABLE AND PROVIDE TAMPER RESISTANT SCREWS.
4. ORIENT HAND HOLES FOR BARRIER MOUNTED POLES TOWARD THE ROADWAY; EXCEPT WHEN THERE IS SIDEWALK ACCESS, ORIENT TOWARD SIDEWALK.
5. SEAL CONDUIT AND PROTECT THREADS FOR FUTURE LIGHTING INSTALLATIONS.
6. CONFORM ANCHOR MATERIALS TO SECTION 1104.04 OF PUB. 408. ANCHOR ANGLES ARE PERMITTED TO BE GALVANIZED.
7. SET LIGHTING POLES TRULY VERTICAL WITH BASES LEVEL USING LEVELING NUTS.
8. PROVIDE 2" CLEAR ON ALL REINFORCEMENT UNLESS NOTED.
9. PROVIDE A MINIMUM OF 2 1/2" CONCRETE COVER FOR CONDUIT.

PROVISIONS FOR FUTURE LIGHTING

MOUNTING HEIGHT	ANCHOR BOLT CIRCLE DIA.	ANCHOR BOLT DIAMETER
50'-0" MAX.	15"	1"

COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

STANDARD
 LIGHTING POLE ANCHORAGE

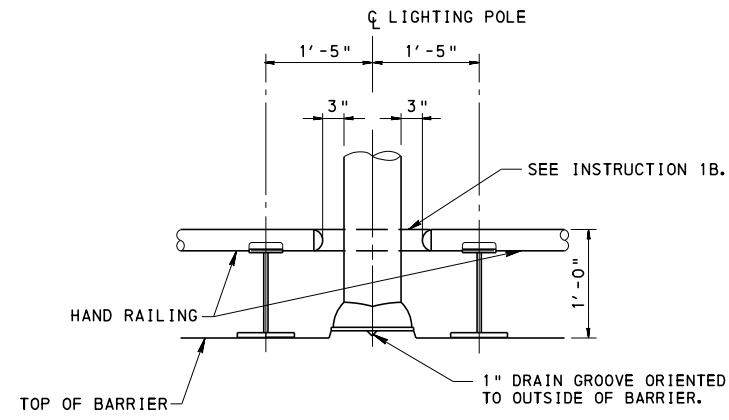
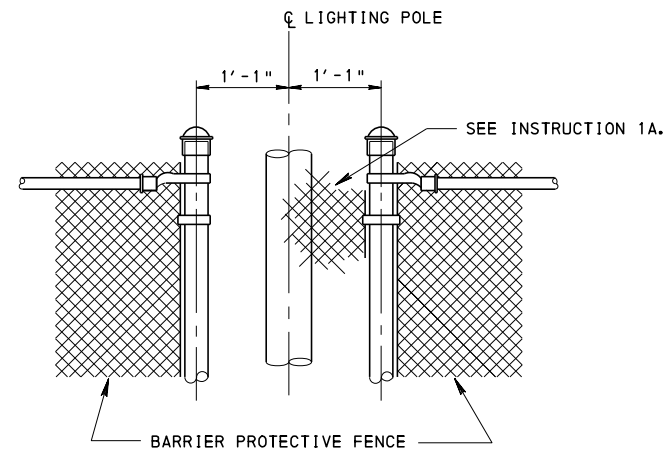
CHANGE 3

INSTRUCTIONS FOR FUTURE LIGHTING

1. IF LIGHTING POLES ARE TO BE INSTALLED AT A FUTURE TIME.
 - A. PLACE RAILING POSTS AS SHOWN AND CLOSE GAPS WITH A SEPARATE PIECE OF FABRIC.
OR
 - B. PLACE RAILING POSTS AS SHOWN BUT DO NOT INTERRUPT RAILING.

NOTE:

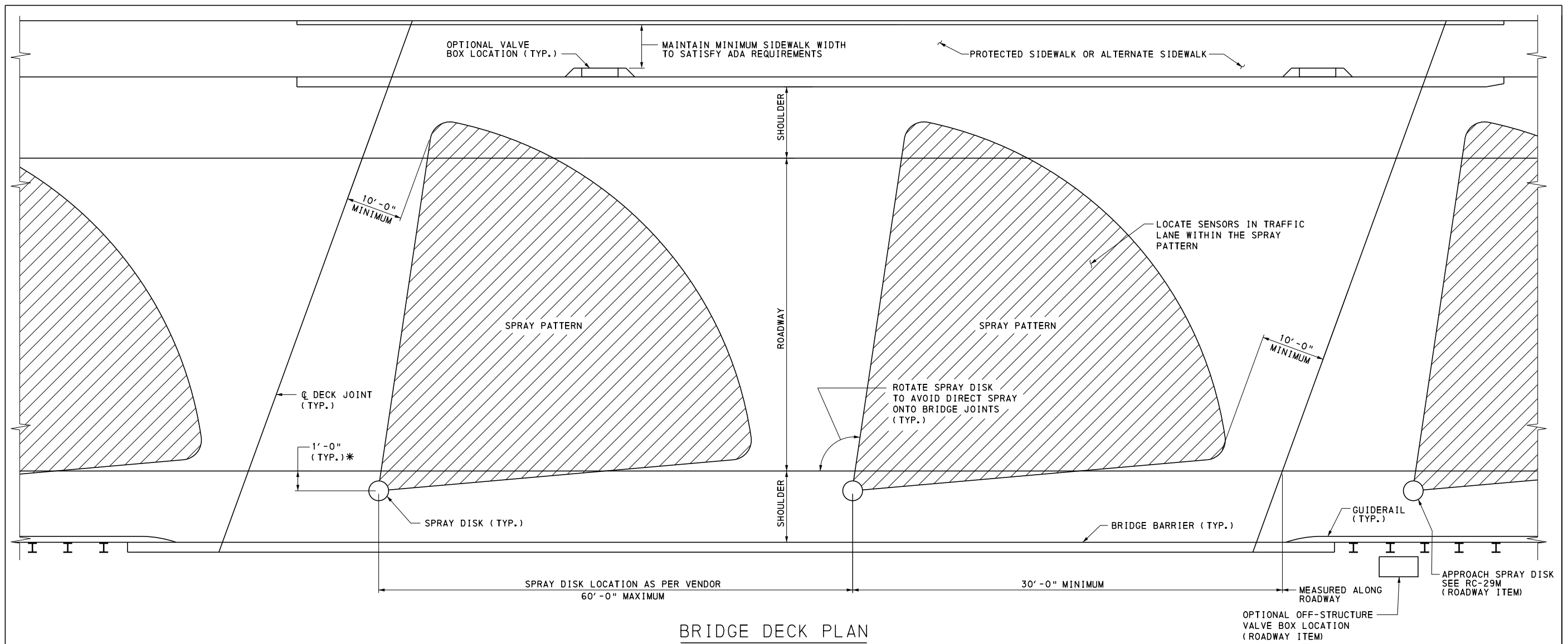
SEE SHEET 1 FOR NOTES.



PEDESTRIAN RAILING / FENCE / HAND RAILING AT LIGHTING POLE

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
LIGHTING POLE ANCHORAGE

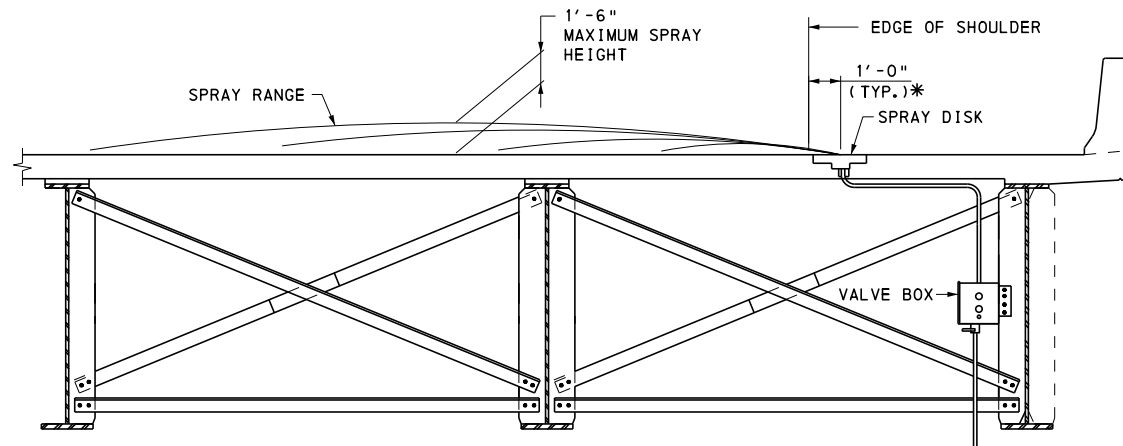


BRIDGE DECK PLAN

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 2.
2. THESE STANDARDS ARE PRESENTED TO FACILITATE THE INSTALLATION OF AN ANTI-ICING SYSTEM. THE SYSTEM CONSISTS OF DECK-MOUNTED SPRAY DISKS THAT AUTOMATICALLY DISPENSE A SOLUTION TO INHIBIT THE FORMATION OF ICE ON A BRIDGE DECK. THE SYSTEM ALSO INCLUDES DECK-MOUNTED SENSORS THAT WORK IN CONJUNCTION WITH A ROADWAY WEATHER INFORMATION SYSTEM (RWIS).
3. THESE STANDARDS APPLY TO A NUMBER OF BRIDGE TYPES WITH MULTIPLE SPAN ARRANGEMENTS, BUT SOME BRIDGES ARE UNSUITABLE FOR AN ANTI-ICING SYSTEM.
4. THE DISTRICT BRIDGE ENGINEER MUST APPROVE FINAL INSTALLATION PLANS AND ALL MODIFICATIONS TO THE DETAILS SHOWN ON THESE STANDARDS.
5. ADJUST SPRAY DISKS SO SPRAY PATTERN MATCHES GENERAL PATTERN AS INDICATED IN THESE STANDARDS. DO NOT SPRAY DIRECTLY ONTO SIDEWALK.
6. FOR INSTALLATION PROCEDURES, SEE SHEET 3.

* PREFERRED LOCATION FOR SPRAY DISKS IS AS SHOWN ON SHOULDER, WHICH MINIMIZES TRAFFIC DISRUPTIONS WHEN SPRAY DISKS REQUIRE MAINTENANCE. THE ADE OF MAINTENANCE MUST APPROVE ALL OTHER LOCATIONS. ANOTHER ACCEPTABLE LOCATION INCLUDES THE CENTER OF THE TRAVEL LANE.



BRIDGE DECK SECTION

(STEEL SUPERSTRUCTURE SHOWN
CONCRETE SIMILAR)

BC-721M	ELECTRICAL DETAILS
BC-732M	PERMANENT METAL DECK FORMS
BC-783M	REINFORCED CONCRETE REPAIR
BC-788M	TYP. WATERPROOFING AND EXPANSION DETAILS
BC-794M	UTILITY ATTACHMENT & SUPPORT DETAILS, PRESTRESSED BRIDGES

REFERENCE DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
BRIDGE ANTI-ICING SYSTEM
GENERAL PLAN

RECOMMENDED SEPT.30, 2016 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT.30, 2016 <i>Brenda S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 1 OF 10 BC-723M
---	--	--------------------------

GENERAL NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408 AND AASHTO/AWS D1.5 SPECIFICATIONS.
2. IT IS THE RESPONSIBILITY OF THE DESIGNER TO VERIFY THAT THE BRIDGE MEETS ALL CLEARANCE AND COVER REQUIREMENTS STATED IN THESE STANDARDS PRIOR TO DESIGNING THE SYSTEM. IF THE REQUIRED COVER TO THE TOP MAT OF DECK REINFORCEMENT IS NOT AVAILABLE, ADDITIONAL COVER CAN BE ACHIEVED WITH AN OVERLAY. IF THE BRIDGE CANNOT BE OVERLAPPED, THE BRIDGE IS NOT SUITABLE FOR AN ANTI-ICING SYSTEM INSTALLATION.
3. PROVIDE SUPPORT HARDWARE IN ACCORDANCE WITH AASHTO M 270 (ASTM A 709) GRADE 50. PROVIDE 5/8" DIAMETER OR LARGER AASHTO M 164 (ASTM A 325) H.S. BOLTS FOR ALL ATTACHMENTS TO STRUCTURAL STEEL. DO NOT EXCEED BOLT SPACING OF 5 1/2". PROVIDE A MINIMUM OF TWO FASTENERS PER ATTACHMENT UNLESS INDICATED OTHERWISE AND APPROVED BY THE DISTRICT BRIDGE ENGINEER. PROVIDE MINIMUM EDGE DISTANCES IN ACCORDANCE WITH DESIGN MANUAL, PART 4, SECTION 6.13.3.10P.
4. GALVANIZE ALL SUPPORT HARDWARE (AFTER FABRICATION) IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s). GALVANIZE SUPPORT ANGLES IN ACCORDANCE WITH ASTM A 123. GALVANIZE THREADED RODS AND BOLTS IN ACCORDANCE WITH ASTM A 153 OR ASTM A 695. PAINT ALL HANGERS, SUPPORTS, AND ASSOCIATED ATTACHMENT HARDWARE IN ACCORDANCE WITH PUBLICATION 408. PROVIDE TOP COAT OF PAINT TO MATCH THE BRIDGE SUPERSTRUCTURE.
5. SUBMIT SHOP DRAWINGS /INSTALLATION PLANS SHOWING ALL CONDUIT, VALVE BOX, SPRAY DISKS AND SENSOR LOCATIONS; HARDWARE DETAILS; AND ATTACHMENT METHODS.
6. PROVIDE DRAINS FOR VALVE BOXES AND CARRIER CONDUIT/PIPE CONTAINING LEVER OPERATED BRASS BALL VALVES WITH STAINLESS STEEL (AISI-410) BALL AND TEFLON (P.T.F.E.) BODY SEAT RINGS AND SEALS. OMIT LEVERS AT LOCATIONS THAT ARE EASILY ACCESSIBLE TO PREVENT TAMPERING. MINIMUM DRAIN VALVE SIZE IS 1/2".
7. LOCATE ALL SOLUTION CONDUIT AND VALVE BOX DRAINS SUCH THAT THEY ARE NOT DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.
8. PROVIDE DESIGN DRAWINGS THAT IDENTIFY REQUIRED PLACEMENT LOCATIONS AND ANY LIMITATIONS ON PLACEMENT OF ALL SYSTEM COMPONENTS.
9. WHEN ANTI-ICING SYSTEMS ARE INSTALLED WITH A NEW CONCRETE DECK SLAB, SEAL THE DECK WITH SILANE SEALER IN LIEU OF CONCRETE SEALANT.

VALVE BOX NOTES:

1. ATTACH VALVE BOXES ON ABUTMENTS OR UTILIZE INSPECTION WALKWAYS AND OTHER NON-STRUCTURAL COMPONENTS. WHEN NON-STRUCTURAL COMPONENTS ARE NOT AVAILABLE, UTILIZE SECONDARY MEMBERS (STIFFENERS AND CROSS FRAMES) TO MINIMIZE ADDITIONAL ATTACHMENTS TO THE BRIDGE WHERE POSSIBLE.
2. INSTALL VALVE BOX DRAINS SO ANY ERRANT ACCUMULATED SOLUTION CAN BE DRAINED PRIOR TO OPENING THE VALVE BOX DOOR.
3. CONSTRUCT VALVE BOXES, PULL BOXES, AND ANY OTHER BOXES IN ACCORDANCE WITH NEMA 4X REQUIREMENTS. CONSTRUCT ALL BOXES WITH AISI 316 STAINLESS STEEL (MINIMUM THICKNESS = 14 GAGE) WITH WATERTIGHT GASKETS ON THE BOX DOOR.
4. THE DISTANCE BETWEEN VALVE BOXES AND SPRAY DISKS IS LIMITED TO 50'-0" TO 150'-0". MULTIPLE VALVE BOX LOCATIONS ARE REQUIRED FOR MOST BRIDGES. APPROVED LOCATIONS FOR ATTACHING VALVE BOXES ARE AS FOLLOWS:
 - A.) PREFERRED LOCATION IS AT ABUTMENTS FOR BRIDGES WITH SHORT SPANS.
 - B.) LONGER SPANS MAY REQUIRE VALVE BOXES AT PIERS AND AT BRIDGE DIAPHRAGMS.
5. LOCATE VALVE BOXES TO ALLOW FOR SIMPLIFIED ACCESS BY DEPARTMENT MAINTENANCE STAFF, BUT ALSO TO DETER VANDALISM AND PUBLIC ACCESS. CONSIDER LOCATIONS THAT ARE AWAY FROM ACTIVE TRAFFIC (RAIL AND VEHICLE) AND ARE ACCESSIBLE USING EXISTING CATWALKS OR LADDERS RATHER THAN SPECIAL EQUIPMENT. PROVIDE VALVE BOXES WITH LOCKS TO PREVENT VANDALISM PER DIRECTION FROM THE ASSISTANT DISTRICT ENGINEER OF MAINTENANCE. KEY ALL LOCKS THE SAME.
6. ATTACH VALVE BOXES NO MORE THAN 10'-0" BELOW THE SPRAY DISKS THAT ARE CONTROLLED BY THAT VALVE BOX. THIS IS TO LIMIT THE PRESSURE HEAD DIFFERENTIAL TO 10'-0".

SPRAY DISK AND SENSOR NOTES:

1. CONSTRUCT SPRAY DISKS AND SENSOR USING STAINLESS STEEL OR OTHER DURABLE MATERIALS THAT ARE UV RESISTANT. PROVIDE SPRAY DISKS THAT WILL ACCOMMODATE ADJUSTMENTS TO THE SPRAY PATTERN AFTER INSTALLATION. ADJUSTMENT CHOICES INCLUDE NOZZLE ROTATION AND NOZZLE REPLACEMENT.
2. THE LAYOUT AND SPACING OF DISKS IS SITE SPECIFIC AND ANTI-ICING SOLUTION SPECIFIC. DESIGN DISK LAYOUT FOR BRINE SOLUTION.
3. MANUFACTURE SPRAY DISKS AND SENSORS TO SUSTAIN A PHL-93 LOADING.
4. INSTALL SPRAY DISKS SO THE TOP SURFACE IS 1/8" BELOW THE ROADWAY SURFACE. INSTALL SENSORS SO THE TOP SURFACE IS FLUSH WITH THE ROADWAY SURFACE. PROVIDE SPRAY DISKS AND SENSORS THAT ARE A MAXIMUM OF 2" THICK SO THAT INSTALLATION DOES NOT INTERFERE WITH THE BRIDGE DECK REINFORCING STEEL AND SUCH THAT MINIMUM GROUT THICKNESSES ARE SATISFIED.
5. LOCATE SPRAY DISKS AND SENSORS SUCH THAT NO TOP MAT REINFORCEMENT BAR LIES TANGENT TO THE PERIMETER OF THE CORE HOLES, SEE DETAIL THIS SHEET.

CARRIER CONDUIT/PIPE NOTES:

1. CONTAIN CONCRETE ENCASED SOLUTION SUPPLY LINES AND ELECTRICAL WIRING IN EITHER RIGID STEEL CONDUIT OR PVC CONDUIT (SCHEDULE 40) IN ACCORDANCE WITH PUBLICATION 408, SECTION 1101.09(c). CONTAIN SOLUTION SUPPLY LINES AND ELECTRICAL WIRING THAT ARE NOT ENCASED IN CONCRETE, IN EITHER RIGID STEEL CONDUIT OR GALVANIZED STEEL PIPE IN ACCORDANCE WITH PUBLICATION 408, SECTIONS 1101.09(c) AND 1105.02(j AND s).
2. PROVIDE SEPARATE CARRIER CONDUIT/PIPE FOR ELECTRICAL WIRING AND SOLUTION SUPPLY LINES. INSTALL DRAINS ON ALL CARRIER CONDUIT/PIPE AT THE LOW POINT TO CHECK FOR SOLUTION LEAKS.
3. PROPERLY GROUND ALL ELECTRICAL CONDUIT IN ACCORDANCE WITH PUBLICATION 408, SECTION 910.3(g) "GROUNDING ON STRUCTURES". SIZE AND INSTALL ALL WIRING AND CARRIER CONDUIT/PIPE PER THE NATIONAL ELECTRICAL CODE (NEC).
4. THE FOLLOWING ARE MAXIMUM UNSUPPORTED LENGTH OF CARRIER CONDUIT/PIPE:
 - " L " = DISTANCE BETWEEN POINTS OF SUPPORT
 - L = 30'-0" FOR 3" GALVANIZED STEEL PIPE
 - L = 22'-0" FOR 2" GALVANIZED STEEL PIPE
 - L = 17'-0" FOR 1" GALVANIZED STEEL PIPE
 - L = 10'-0" FOR ALL RIGID STEEL CONDUIT (NOTE: FOR BENT CONDUIT, MAXIMUM UNSUPPORTED LENGTH IS MEASURED ALONG CONDUIT BETWEEN SUPPORTS).
5. THE FOLLOWING ARE MINIMUM BEND RADII FOR CARRIER/CONDUIT PIPE:
 - 13" FOR 3" A53 STEEL PIPE
 - 9 1/2" FOR 2" A53 STEEL PIPE
 - 5 3/4" FOR 1" A53 STEEL PIPE OR STEEL CONDUIT
6. PROVIDE THREADED COUPLERS FOR ALL CARRIER CONDUIT/PIPES THAT REQUIRE SPLICING. LOCATE COUPLINGS APPROXIMATELY 0.25*L AWAY FROM A SUPPORT POINT, WHERE "L" IS THE SPAN LENGTH OF THE CONDUIT/PIPE.
7. INSTALL ALL CARRIER CONDUIT/PIPE BETWEEN BEAMS AT LEAST 15" ABOVE THE BOTTOM OF THE BEAM. LOCATE ALL OTHER HARDWARE (VALVE BOXES, ETC.) AT LEAST 3" ABOVE THE BOTTOM OF THE BEAM.
8. INSTALL ANTI-ICING SYSTEM COMPONENTS SUCH THAT LOADING ON THE BRIDGE FASCIA BEAMS IS NOT INCREASED WHENEVER POSSIBLE.
9. NOTE THAT DIAPHRAGMS AND OTHER BRIDGE COMPONENTS MAY RESULT IN LIMITED ACCEPTABLE "BETWEEN THE BEAM" LOCATIONS FOR CARRIER CONDUIT/PIPE. THIS SITUATION MAY RESULT IN EITHER NON-STANDARD SPRAY DISK LOCATIONS, OR, THE BRIDGE MAY BE UNSUITABLE FOR AN ANTI-ICING SYSTEM INSTALLATION. ALL NON STANDARD APPLICATIONS ARE SUBJECT TO APPROVAL BY THE DISTRICT BRIDGE ENGINEER.

STEEL BRIDGE COMPONENT NOTES:

1. THESE ANTI-ICING STANDARDS ARE NOT APPLICABLE FOR USE WITH EXISTING OR NEW UNPAINTED WEATHERING STEEL BRIDGES.
2. CARRIER CONDUIT/PIPE HANGER SHOWN ON BC-721M IS PERMITTED ON NEW CONSTRUCTION ONLY WHEN INCLUDED IN THE DESIGN OF THE GIRDER.
3. FOR EXISTING BRIDGES, DRILLING HOLES FOR BOLTS IN STIFFENERS AND DIAPHRAGM MEMBERS IS PERMITTED ONLY AS SHOWN IN STANDARD DRAWINGS. NO OTHER DRILLING, CORING, CUTTING, OR WELDING IS PERMITTED UNLESS DETAILED ON THE SHOP DRAWINGS AND INSTALLATION PLANS, AND APPROVED BY THE DISTRICT BRIDGE ENGINEER.

CONCRETE BRIDGE COMPONENT NOTES:

1. PROVIDE ALL ATTACHMENTS TO CONCRETE USING THREADED ROD IN ACCORDANCE WITH AASHTO M 270 (ASTM A 709) GRADE 50. FOR ATTACHMENT TO CONCRETE STRUCTURES WHERE A BOLT-THROUGH OR CAST-IN-PLACE THREADED INSERT CONNECTION IS NOT FEASIBLE, GROUTED ANCHORS MAY BE USED WITH THE APPROVAL OF THE DISTRICT BRIDGE ENGINEER. GROUTED ANCHORS ARE PROHIBITED FOR USE IN VERTICAL OVERHEAD APPLICATIONS.
2. FOR EXISTING BRIDGES, INSTALLING SUPPORT BRACKETS BETWEEN THE TOP FLANGES OF ADJACENT BEAMS AS SHOWN ON THE CONCRETE DETAILS IS ONLY VALID FOR P/S I-BEAMS WITH TOP FLANGES THAT ARE 5" OR GREATER IN DEPTH. THIS REQUIREMENT WILL ELIMINATE INSTALLATION ON THE PENNSYLVANIA BULB TEE BEAMS. NO OTHER BRACKETS OR INSTALLATIONS WILL BE PERMITTED UNLESS APPROVED BY THE DISTRICT BRIDGE ENGINEER.
3. FOR EXISTING CONCRETE BRIDGE SUPERSTRUCTURES, IT IS PREFERRED TO ATTACH VALVE BOXES ON THE SUBSTRUCTURE UNITS. HOWEVER, IT IS PERMISSIBLE TO LOCATE VALVE BOXES ON INTERMEDIATE DIAPHRAGMS AS SHOWN ON THE CONCRETE BEAM DETAILS, AND OVER PIERS ON FULL DEPTH DIAPHRAGMS AS SHOWN ON THE DIAPHRAGM ATTACHMENT DETAILS.
4. CORING IS NOT PERMITTED IN CONTINUITY DIAPHRAGMS OVER THE BRIDGE PIERS.
5. FOR NEW CONCRETE SUPERSTRUCTURES, VALVE BOXES AS WELL AS CARRIER CONDUIT/PIPE CAN BE INSTALLED DIRECTLY ON THE P/S BEAMS, PROVIDED THAT ADEQUATE THREADED INSERTS ARE INCLUDED AT THE TIME OF BEAM FABRICATION AND DETAILED AND APPROVED IN BEAM SHOP DRAWINGS. NO DRILLING WILL BE PERMITTED ON NEW P/S BEAMS. ADHESIVE ANCHORS ARE ONLY PERMITTED IN THE TOP FLANGE ON EXISTING BRIDGES AS SHOWN ON THE CONCRETE BEAM DETAILS.

ROADWAY WEATHER INFORMATION SYSTEM (RWIS)

(ROADWAY ITEM):

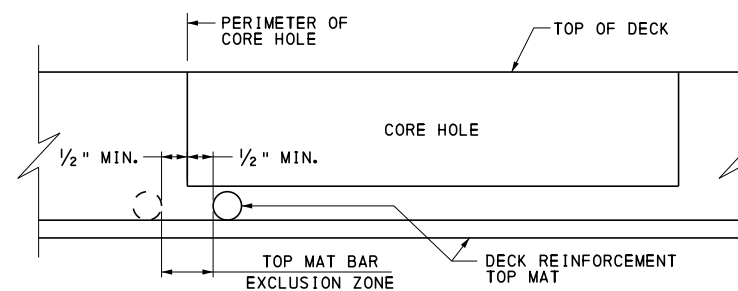
1. LOCATE RWIS WITHIN 100' OF THE PAVEMENT SENSORS THAT ARE EMBEDDED IN THE BRIDGE DECK.
2. MOUNT RWIS EITHER BEHIND THE TRAFFIC BARRIER OR ADJACENT TO THE BRIDGE. ENCASE ALL WIRING FOR THE BRIDGE MOUNTED RWIS IN EITHER BARRIER OR DECK CONDUIT, OR BURY IF OFF OF THE BRIDGE. NO EXPOSED CONDUIT IS PERMITTED ON THE BRIDGE FOR THE RWIS.
3. DESIGN ALL RWIS TOWERS LOCATED ON THE BRIDGE SUPERSTRUCTURE TO CONFORM TO THE VIBRATION REQUIREMENTS OF DESIGN MANUAL, PART 4, A.3.6.1. PREFERRED LOCATIONS FOR RWIS TOWERS ARE OFF OF THE STRUCTURE. THE RWIS TOWER CAN BE LOCATED ON THE SUBSTRUCTURE UNITS WITH ADEQUATE SET BACK SO COLLISION DAMAGE IS MINIMIZED.
4. LOCATION AND ATTACHMENT METHODS (IF STRUCTURE MOUNTED) OF THE RWIS SYSTEM COMPONENTS MUST BE DETAILED ON THE SHOP DRAWINGS AND INSTALLATION PLANS AND ARE SUBJECT TO THE APPROVAL OF THE DISTRICT BRIDGE ENGINEER.

DEAD LOAD CALCULATIONS:

USE THE FOLLOWING VALUES TO CALCULATE DESIGN LOADS:

1" STEEL CARRIER CONDUIT/PIPE	2.1 LB./FT.
2" STEEL CARRIER CONDUIT/PIPE	5.2 LB./FT.
3" STEEL CARRIER CONDUIT/PIPE	10.8 LB./FT.
TYPICAL VALVE BOX	150 LB.

(ALL CARRIER CONDUIT/PIPE LOADS ASSUME 100% FLUID CARRIER IN CONDUIT/PIPE)



EXCLUSION ZONE DETAIL

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
BRIDGE ANTI-ICING SYSTEM
GENERAL NOTES**

RECOMMENDED SEPT.30, 2016 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT.30, 2016 <i>Brian S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 2 OF 10 BC-723M
---	---	---------------------------------

PROCEDURE FOR INSTALLING ANTI-ICING SYSTEM IN A NEW BRIDGE:

1. PROVIDE DESIGN PLANS THAT SHOW ALL PROPOSED LOCATIONS FOR VALVE BOXES, CONDUIT/PIPE HANGERS, SPRAY DISKS, SENSORS, ETC. AS WELL AS LOCATIONS WHERE ATTACHMENTS FOR THE ANTI-ICING SYSTEM COMPONENTS ARE PROHIBITED. THE FINAL LOCATIONS WILL BE APPROVED BY THE DISTRICT BRIDGE ENGINEER.
2. INSTALL BLOCKOUTS IN NEW CONCRETE DECKS WITH SHAPES THAT MATCH THE PROPOSED SENSOR OR SPRAY DISK AND PROVIDE AN ACCESS HOLE FOR CONNECTION TO THE SOLUTION SUPPLY LINE. PROVIDE BLOCKOUTS MANUFACTURED OF SOFT WOOD OR SIMILAR MATERIAL.
3. INSTALL BLOCKOUTS 1/2" BELOW FINAL DECK ELEVATION TO PREVENT CONTACT WITH DECK PLACEMENT MACHINERY. CABLE TIES ARE PERMITTED TO MARK THE BLOCKOUT LOCATION.
4. LOCATE ALL CONDUIT AND BLOCKOUTS FOR SPRAY DISKS AND SENSORS TO PROVIDE INDICATED CLEARANCES TO REINFORCEMENT AND SUCH THAT MINIMUM GROUT THICKNESSES ARE SATISFIED. SECURELY FASTEN BLOCKOUTS TO ENSURE POSITION AND ALIGNMENT IS MAINTAINED DURING DECK PLACEMENT OPERATIONS.
5. PROVIDE REMOVABLE DECK FORMS AT ALL CONDUIT DECK PENETRATIONS SUCH THAT MINIMUM DISTANCE FROM CONDUIT TO STAY-IN-PLACE FORMS IS 3'-0".
6. AFTER THE DECK IS CURED AND ANY GRINDING OR GROOVING IS COMPLETED, REMOVE THE BLOCKOUTS AND INSTALL THE ANTI-ICING SYSTEM.
7. SUSPEND SPRAY DISKS AND SENSORS OVER BLOCKOUT VOID DURING CEMENTING/GROUTING OPERATIONS SO FINAL EMBEDMENT RELATIVE TO THE FINISHED DECK IS AS INDICATED.
8. AFTER SPRAY DISK/SENSOR IS PROPERLY LOCATED, SEAL UNIT IN DECK WITH A PREMIXED FLOWABLE NON-SHRINK GROUT IDENTIFIED IN BULLETIN 15.
9. SEAL THE CONCRETE DECK WITH SILANE SEALER.

PROCEDURE FOR INSTALLING ANTI-ICING SYSTEM IN AN EXISTING BRIDGE DECK WITH OR WITHOUT EXISTING OVERLAYS:

1. PROVIDE SHOP DRAWINGS THAT SHOW ALL PROPOSED LOCATIONS FOR VALVE BOXES, CONDUIT/PIPE HANGERS, SPRAY DISKS, SENSORS, ETC. AS WELL AS LOCATIONS WHERE ATTACHMENTS FOR THE ANTI-ICING SYSTEM COMPONENTS ARE PROHIBITED. THE FINAL LOCATIONS WILL BE APPROVED BY THE DISTRICT BRIDGE ENGINEER.
2. LOCATE ALL REINFORCEMENT PRIOR TO CORING, CUTTING, OR DRILLING INTO THE DECK. VERIFY THAT A MINIMUM 3 3/8" SQUARE SPACE EXISTS BETWEEN REINFORCEMENT STEEL FOR THE 2 3/8" DIAMETER HOLE.
3. LOCATE REBARS USING A NON-DESTRUCTIVE MAGNETIC DEVICE WITH THE CAPABILITY TO "AUTOMATICALLY" MEASURE COVER AND REBAR SIZE. PERFORM ALL TESTING, CORING, CUTTING, AND DRILLING OF CONCRETE UNDER THE SUPERVISION OF THE ENGINEER.
4. MAKE ALL NEW HOLES IN CONCRETE USING CONCRETE-CORING BITS. HAMMER DRILLS ARE NOT ALLOWED. SAW CUTTING IS PERMITTED FOR FORMING RECTANGULAR RECESSES.
5. CORE INTO DECK USING METHODS THAT WILL NOT SHATTER/DAMAGE THE CONCRETE SURFACE ADJACENT TO THE HOLES OR RESULT IN SPALLING AT THE UNDERSIDE OF THE DECK. NOTIFY THE ENGINEER IF SPALLING OCCURS AND PATCH THE SPALLED DECK IMMEDIATELY IN ACCORDANCE WITH THE ENGINEER'S DIRECTION. PERFORM ALL PATCHING IN ACCORDANCE WITH BC-783M.
6. INSTALL 1" CONDUIT THROUGH DECK AND CEMENT WITH PREMIXED FLOWABLE NON-SHRINK GROUT USING AN ELASTOMERIC GASKET AT THE BOTTOM OF THE PENETRATION TO PREVENT GROUT LEAKAGE.
7. AFTER NON-SHRINK GROUT HARDENS, SEAL BOTTOM OF DECK PENETRATION WITH SILICONE CAULKING.
8. SUSPEND SPRAY DISKS AND SENSORS OVER BLOCKOUT VOID DURING CEMENTING/GROUTING OPERATIONS SO FINAL EMBEDMENT RELATIVE TO THE FINISHED DECK IS AS INDICATED. (ALTERNATIVELY, DISKS AND SENSORS MAY BE PLACED INTO WET GROUT PROVIDED MINIMUM GROUT THICKNESSES ARE SATISFIED AND FINAL EMBEDMENT IS AS INDICATED.)
9. FOR INSTALLATIONS IN AN EXISTING ASPHALT OVERLAY, INSTALL TEMPORARY NEOPRENE SPONGE AROUND VOID PERIMETER, AS INDICATED.
10. AFTER SPRAY DISK/SENSOR IS PROPERLY LOCATED, SEAL UNIT IN DECK WITH A PREMIXED FLOWABLE NON-SHRINK GROUT IDENTIFIED IN BULLETIN 15 TO THE TOP OF THE EXISTING CONCRETE DECK OR TO THE TOP OF ASPHALT, FOR ASPHALT OVERLAYS. INSTALL SO THAT THE FINAL SURFACE IS AS INDICATED ON THE DRAWINGS. FOR EXISTING ASPHALT OVERLAY APPLICATIONS, REMOVE TEMPORARY NEOPRENE SPONGE AND INSTALL PERMANENT BACKER ROD AND JOINT SEALING MATERIAL AS INDICATED.

PROCEDURE FOR INSTALLING AN ASPHALT OVERLAY ON A BRIDGE WITH AN EXISTING ANTI-ICING SYSTEM:

1. PROVIDE SHOP DRAWINGS THAT SHOW ALL PROPOSED LOCATIONS FOR NEW VALVE BOXES, CONDUIT/PIPE HANGERS, SPRAY DISKS, SENSORS, ETC. AS WELL AS LOCATIONS WHERE NEW ATTACHMENTS FOR THE ANTI-ICING SYSTEM COMPONENTS ARE PROHIBITED. THE FINAL LOCATIONS WILL BE APPROVED BY THE DISTRICT BRIDGE ENGINEER.
2. THE FOLLOWING COMPONENTS OF THE ANTI-ICING SYSTEM ARE ANTICIPATED TO BE SALVAGEABLE: NOZZLES, INSIDE COMPONENTS OF THE SPRAY DISKS, AND SOLUTION/ELECTRICAL SUPPLY LINES.
3. REMOVE ALL SALVAGEABLE PARTS OF THE ANTI-ICING SYSTEM.
4. REMOVE EXISTING SPRAY DISK SHELL AND SENSOR BY EITHER MILLING OR CORING AROUND ITS PERIMETER AND THEN BY USING A PNEUMATIC HAMMER WITH MAXIMUM NOMINAL MASS OF 30-LB. DO NOT OPERATE PNEUMATIC HAMMERS OR MECHANICAL CHIPPING TOOLS AT AN ANGLE IN EXCESS OF 45 DEGREES RELATIVE TO THE SURFACE OF THE SLAB. ENTIRELY REMOVE EXISTING GROUT.
5. INSTALL BLOCKOUTS IN DECK, AND/OR OVERLAY. PROVIDE BLOCKOUTS IN SHAPES THAT ACCOMMODATE AND PROTECT THE EXISTING COMPONENTS AS WELL AS MATCH THE PROPOSED SENSOR OR SPRAY DISK AND PROVIDE AN ACCESS HOLE FOR CONNECTION TO THE SOLUTION/ELECTRICAL SUPPLY LINE. PROVIDE BLOCKOUTS MANUFACTURED OF SOFT WOOD OR SIMILAR MATERIAL.
6. INSTALL BLOCKOUTS 1/2" BELOW FINAL DECK ELEVATION TO PREVENT CONTACT WITH PAVER. CABLE TIES ARE PERMITTED TO MARK THE BLOCKOUT LOCATION.
7. INSTALL NEW OVERLAY.
8. REMOVE BLOCKOUTS AND INSTALL TEMPORARY NEOPRENE SPONGE AROUND VOID PERIMETER, AS INDICATED.
9. AFTER OVERLAY IS PLACED, SUSPEND SPRAY DISKS AND SENSORS OVER BLOCKOUT DURING CEMENTING/GROUTING OPERATIONS SO FINAL EMBEDMENT RELATIVE TO THE FINISHED DECK IS AS INDICATED. (ALTERNATIVELY, DISKS AND SENSORS MAY BE PLACED INTO WET GROUT PROVIDED MINIMUM GROUT THICKNESSES ARE SATISFIED AND FINAL EMBEDMENT IS AS INDICATED.)
10. AFTER SPRAY DISK/SENSOR IS PROPERLY LOCATED, SEAL UNIT IN DECK WITH A PREMIXED FLOWABLE NON-SHRINK GROUT IDENTIFIED IN BULLETIN 15 TO THE TOP OF THE ASPHALT OVERLAY. INSTALL SO THAT THE FINAL SURFACE IS AS INDICATED ON THE DRAWINGS.
11. REMOVE TEMPORARY NEOPRENE SPONGE AND INSTALL PERMANENT BACKER ROD AND JOINT SEALING MATERIAL AS INDICATED.

PROCEDURE FOR INSTALLING A LATEX MODIFIED CONCRETE OVERLAY ON A BRIDGE WITH AN EXISTING ANTI-ICING SYSTEM:

1. PROVIDE SHOP DRAWINGS THAT SHOW ALL PROPOSED LOCATIONS FOR NEW VALVE BOXES, CONDUIT/PIPE HANGERS, SPRAY DISKS, SENSORS, ETC. AS WELL AS LOCATIONS WHERE NEW ATTACHMENTS FOR THE ANTI-ICING SYSTEM COMPONENTS ARE PROHIBITED. THE FINAL LOCATIONS WILL BE APPROVED BY THE DISTRICT BRIDGE ENGINEER.
2. THE FOLLOWING COMPONENTS OF THE ANTI-ICING SYSTEM ARE ANTICIPATED TO BE SALVAGEABLE: NOZZLES, INSIDE COMPONENTS OF THE SPRAY DISKS, AND SOLUTION/ELECTRICAL SUPPLY LINES.
3. REMOVE ALL SALVAGEABLE PARTS OF THE ANTI-ICING SYSTEM.
4. REMOVE EXISTING SPRAY DISK SHELL AND SENSOR BY EITHER MILLING OR CORING AROUND ITS PERIMETER AND THEN BY USING A PNEUMATIC HAMMER WITH MAXIMUM NOMINAL MASS OF 30-LB. DO NOT OPERATE PNEUMATIC HAMMERS OR MECHANICAL CHIPPING TOOLS AT AN ANGLE IN EXCESS OF 45 DEGREES RELATIVE TO THE SURFACE OF THE SLAB. ENTIRELY REMOVE EXISTING GROUT.
5. SCARIFY DECK IN ACCORDANCE WITH BC-783M.
6. INSTALL BLOCKOUTS IN DECK, AND/OR OVERLAY. PROVIDE BLOCKOUTS IN SHAPES THAT ACCOMMODATE AND PROTECT THE EXISTING COMPONENTS AS WELL AS MATCH THE PROPOSED SENSOR OR SPRAY DISK AND PROVIDE AN ACCESS HOLE FOR CONNECTION TO THE SOLUTION/ELECTRICAL SUPPLY LINE. PROVIDE BLOCKOUTS MANUFACTURED OF SOFT WOOD OR SIMILAR MATERIAL.
7. INSTALL BLOCKOUTS 1/2" BELOW FINAL DECK ELEVATION TO PREVENT CONTACT WITH DECK FINISHING MACHINE. CABLE TIES ARE PERMITTED TO MARK THE BLOCKOUT LOCATION.
8. INSTALL NEW OVERLAY.
9. AFTER OVERLAY IS CURED AND ANY GRINDING OR GROOVING IS COMPLETED, REMOVE THE BLOCKOUTS.
10. SUSPEND SPRAY DISKS AND SENSORS OVER BLOCKOUT DURING CEMENTING/GROUTING OPERATIONS SO FINAL EMBEDMENT RELATIVE TO THE FINISHED DECK IS AS INDICATED. (ALTERNATIVELY, DISKS AND SENSORS MAY BE PLACED INTO WET GROUT PROVIDED MINIMUM GROUT THICKNESSES ARE SATISFIED AND FINAL EMBEDMENT IS AS INDICATED.)
11. AFTER SPRAY DISK/SENSOR IS PROPERLY LOCATED, SEAL UNIT IN DECK WITH A PREMIXED FLOWABLE NON-SHRINK GROUT IDENTIFIED IN BULLETIN 15 TO THE TOP OF THE OVERLAY.

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 2.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
BRIDGE ANTI-ICING SYSTEM
INSTALLATION PROCEDURES**

RECOMMENDED SEPT.30, 2016

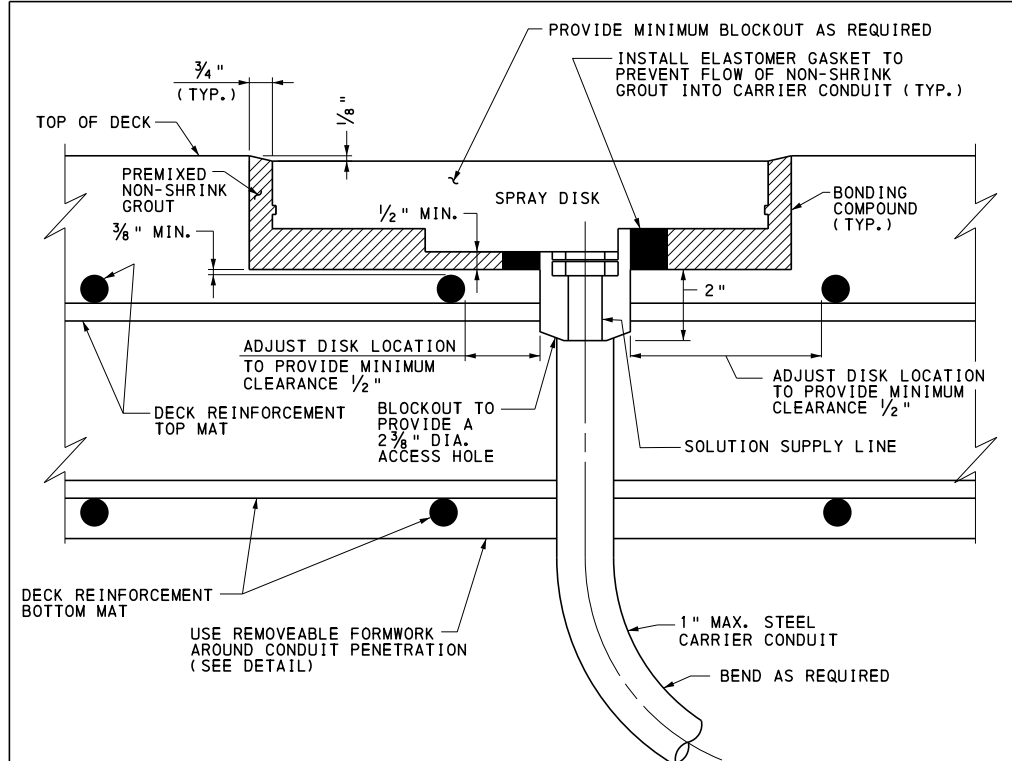
Thomas P. Maiore
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT.30, 2016

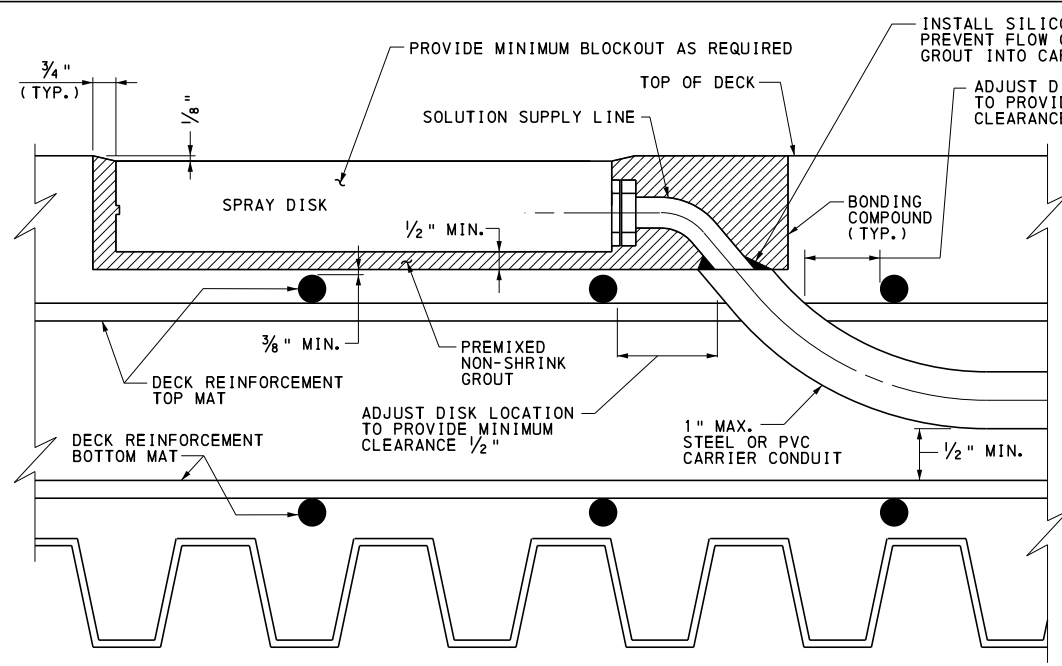
Brian S. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 3 OF 10

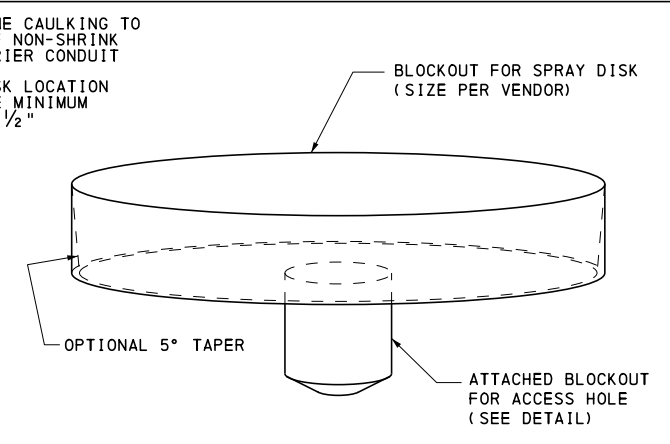
BC-723M



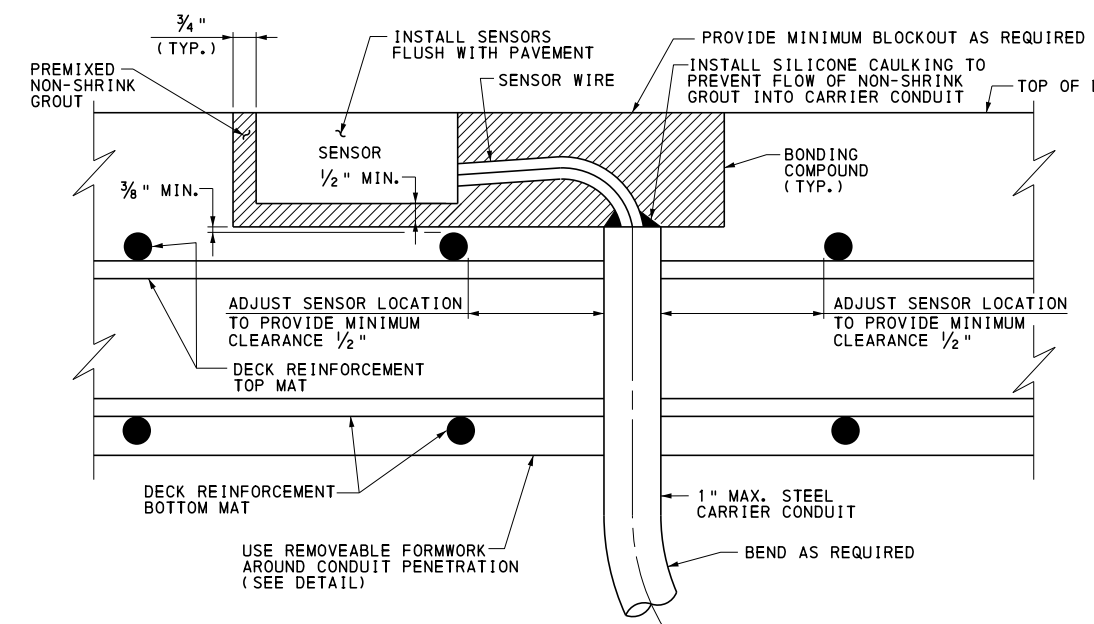
TYPICAL SPRAY DISK SECTION - CONDUIT THROUGH DECK



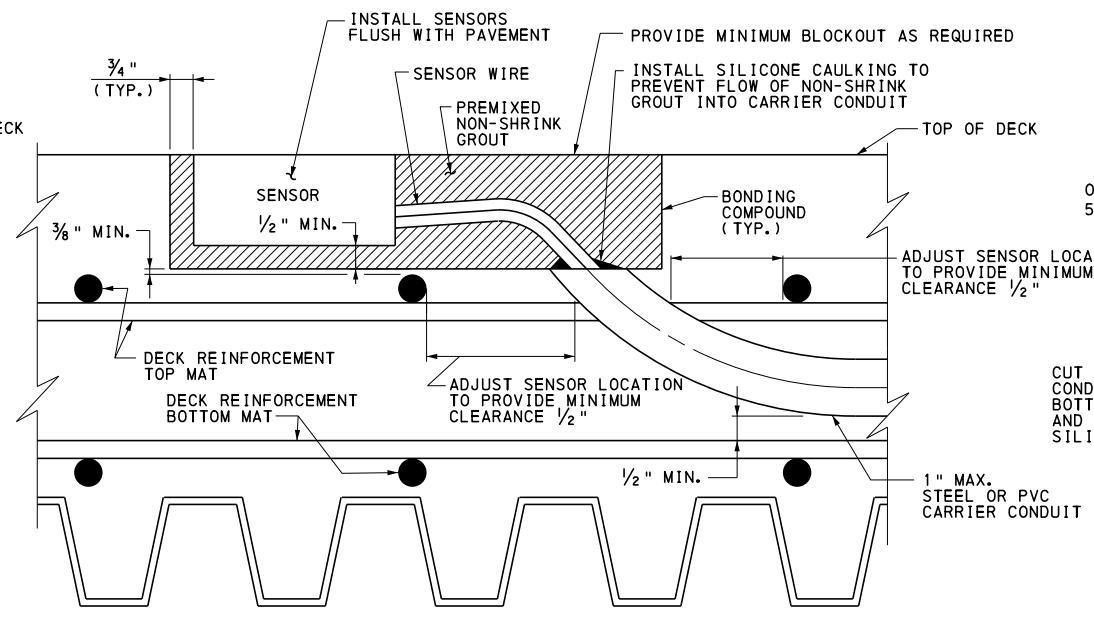
TYPICAL SPRAY DISK SECTION - CONDUIT IN DECK



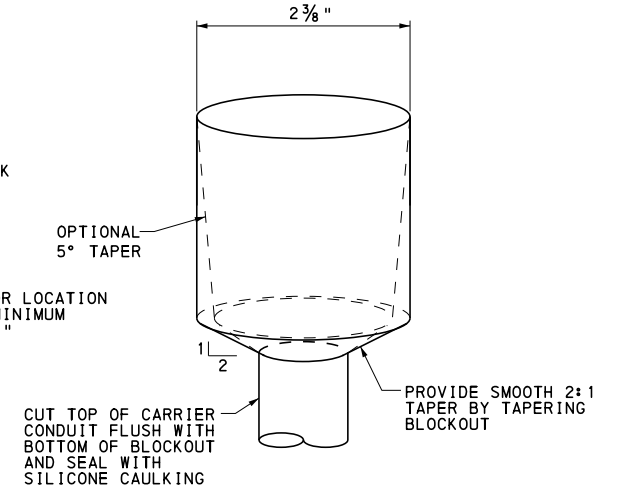
BLOCKOUT FOR SPRAY DISK



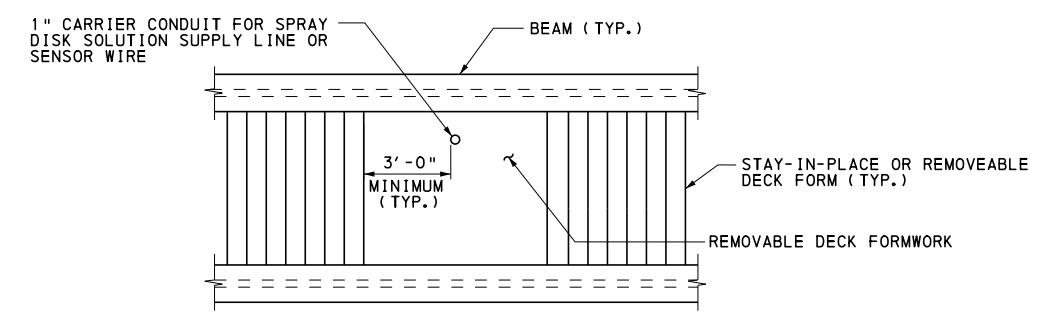
TYPICAL SENSOR SECTION - CONDUIT THROUGH DECK



TYPICAL SENSOR SECTION - CONDUIT IN DECK



DETAIL OF BLOCKOUT FOR ACCESS HOLE



REMOVABLE DECK FORMWORK PLAN AT CARRIER CONDUIT PENETRATION

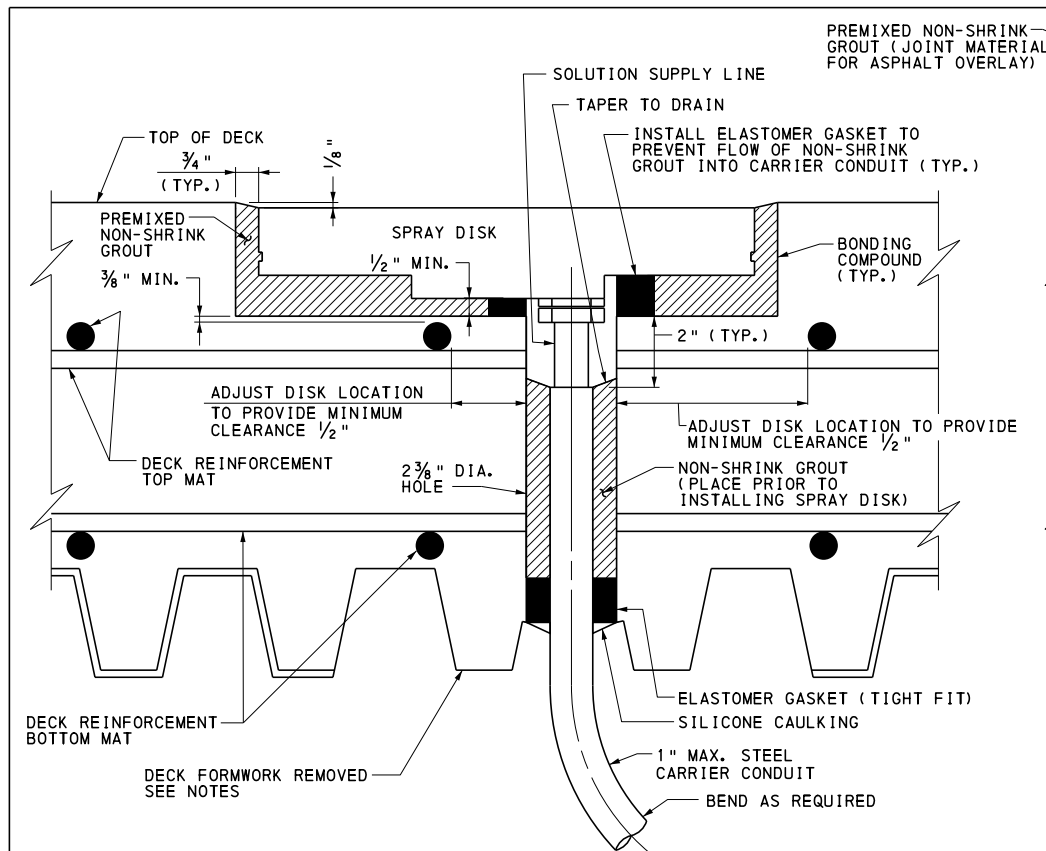
NOTES:

1. FOR GENERAL NOTES, SEE SHEET 2.
2. SEAL DISK/SENSOR USING A PREMIXED FLOWABLE NON-SHRINK GROUT IN ACCORDANCE WITH PUB. 408, SECTION 1080.2 (c).
3. FOR BRIDGE DECKS WITH A GROOVED SURFACE, MEASURE DISK/SENSOR LOCATION FROM THE TOP OF THE GROOVES.
4. PROVIDE REMOVABLE DECK FORMWORK WITHIN 3'-0" OF THE CARRIER CONDUIT PENETRATION INTO DECK.
5. FOR PLAN VIEW, SEE SHEET 1.
6. FOR INSTALLATION PROCEDURES, SEE SHEET 3.
7. FOR ADDITIONAL BLOCKOUT DETAILS, SEE SHEET 5.

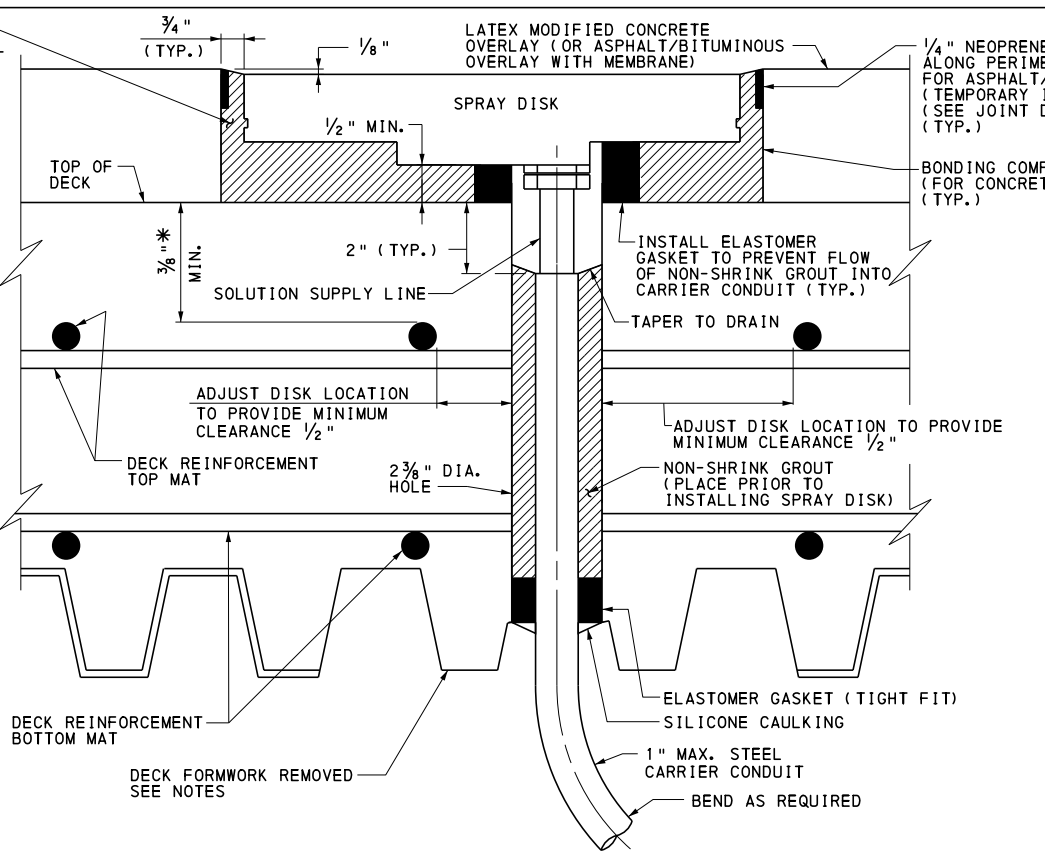
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

STANDARD
 BRIDGE ANTI-ICING SYSTEM
 DISK AND SENSOR
 INSTALLATION IN NEW BRIDGE DECK

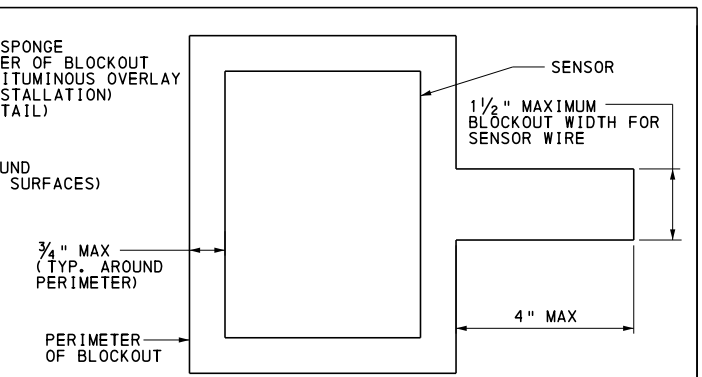
RECOMMENDED SEPT. 30, 2016 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 <i>Brenda Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 4 OF 10 BC-723M
--	--	---------------------------------



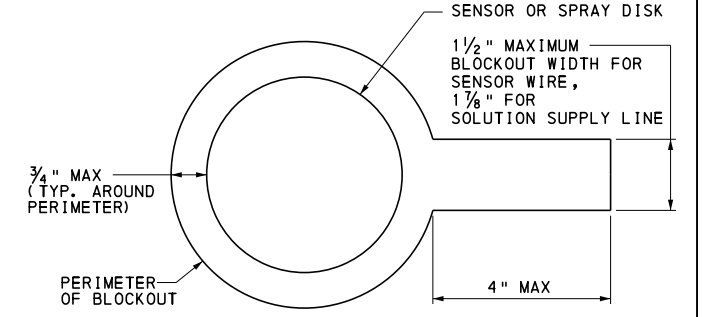
TYPICAL SPRAY DISK SECTION - DECK WITHOUT OVERLAY



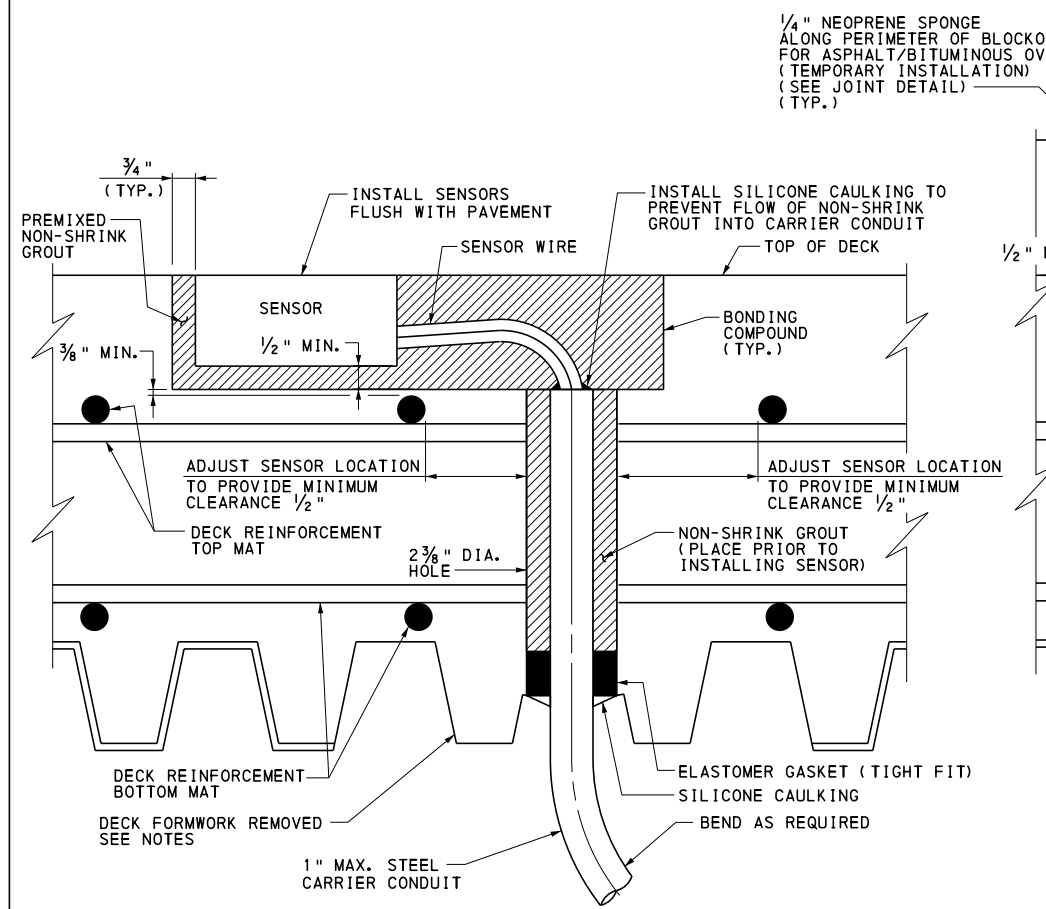
TYPICAL SPRAY DISK SECTION - DECK WITH OVERLAY



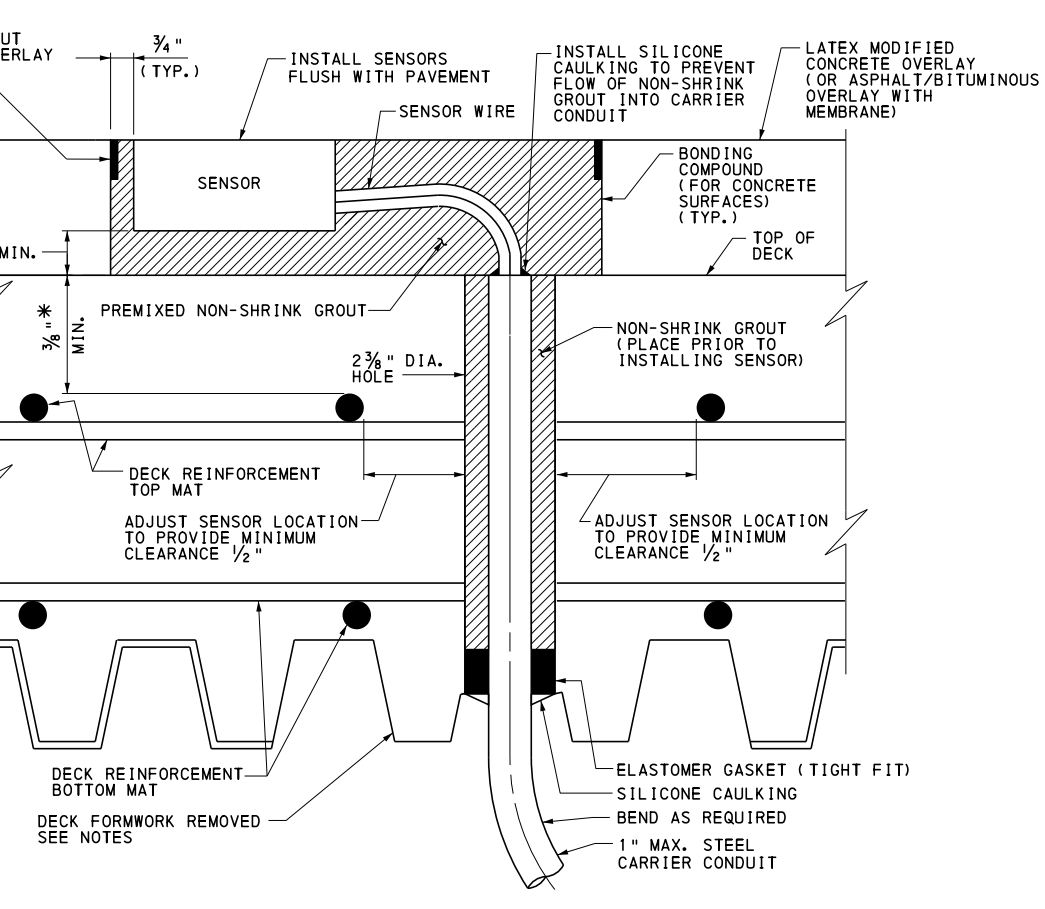
PLAN VIEW FOR RECTANGULAR SHAPED SENSOR



PLAN VIEW FOR CIRCULAR SHAPED SENSOR OR SPRAY DISK WITH IN-DECK CONDUIT



TYPICAL SENSOR SECTION - DECK WITHOUT OVERLAY



TYPICAL SENSOR SECTION - DECK WITH OVERLAY

NOTES:

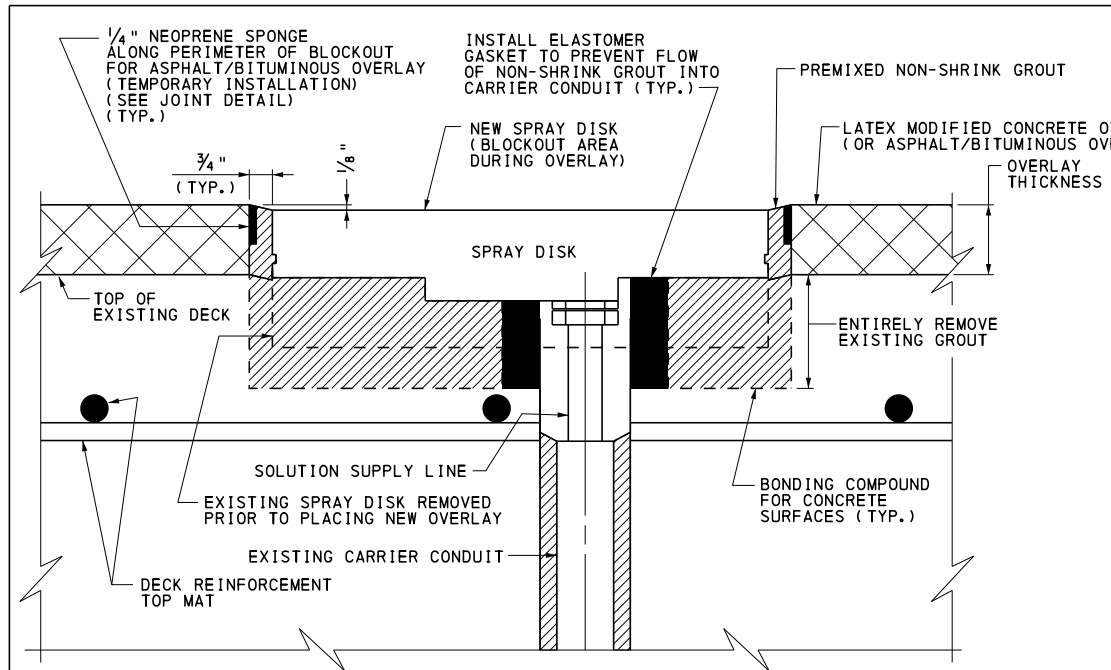
1. FOR GENERAL NOTES, SEE SHEET 2.
2. FOR BRIDGE DECKS WITH A GROOVED SURFACE, MEASURE DISK/SENSOR LOCATION FROM THE TOP OF THE GROOVES.
3. IF CORING OR DRILLING OPERATIONS RESULT IN DAMAGE TO EXISTING DECK, REPAIR SPALLED AREAS OF BRIDGE DECK AND DAMAGED REINFORCING STEEL IN ACCORDANCE WITH BC-783M.
4. EXISTING BRIDGES MUST HAVE FULLY FUNCTIONAL DRAINAGE SYSTEMS INCLUDING SATISFACTORY EXPANSION DAMS, WORKING SCUPPERS, AND ADEQUATE APPROACH INLET BOXES. ANY DEFICIENCIES IN THE DRAINAGE SYSTEM MUST BE CORRECTED PRIOR TO INSTALLATION OF AN ANTI-ICING SYSTEM.
5. FOR JOINT DETAIL, SEE SHEET 6.
6. REMOVE EXISTING DECK FORMWORK WITHIN 12" OF THE CARRIER CONDUIT PENETRATING DECK.
7. FOR INSTALLATION PROCEDURES, SEE SHEET 3.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

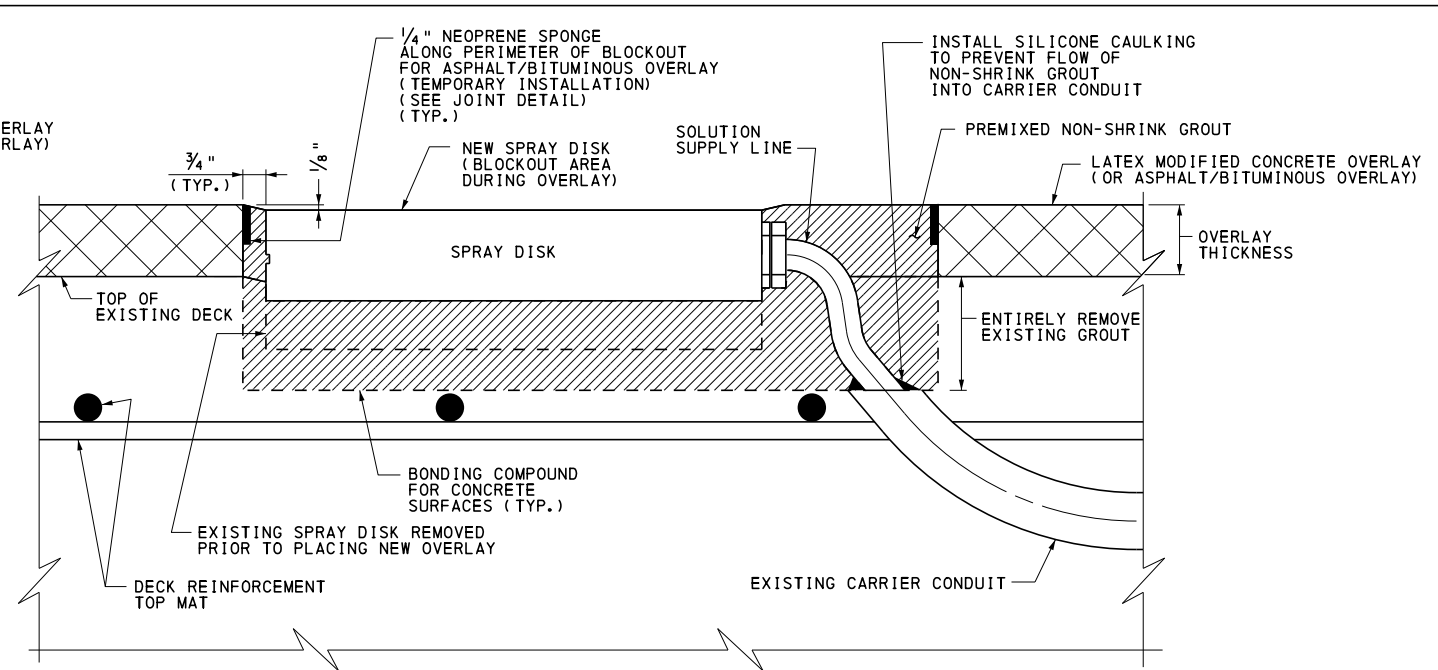
STANDARD
BRIDGE ANTI-ICING SYSTEM
DISK AND SENSOR
INSTALLATION IN EXISTING BRIDGE DECK

RECOMMENDED SEPT. 30, 2016 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 <i>Brenda Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 5 OF 10 BC-723M
--	--	---------------------------------

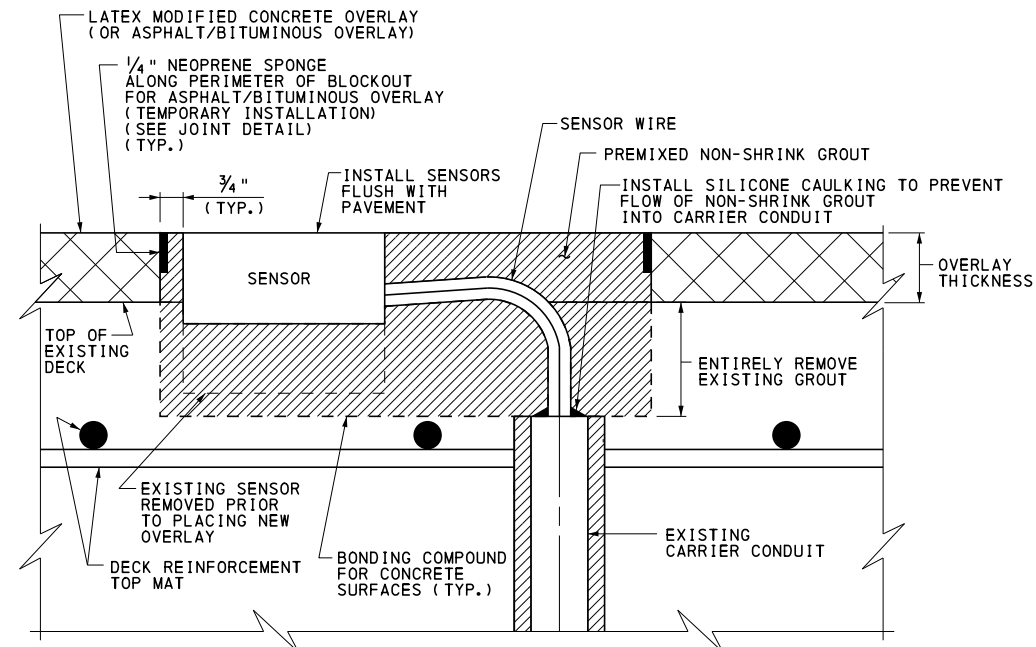
* WHEN CORE EXTENDS INTO EXISTING DECK, BACKFILL WITH PREMIXED NON-SHRINK GROUT TO TOP OF EXISTING DECK.



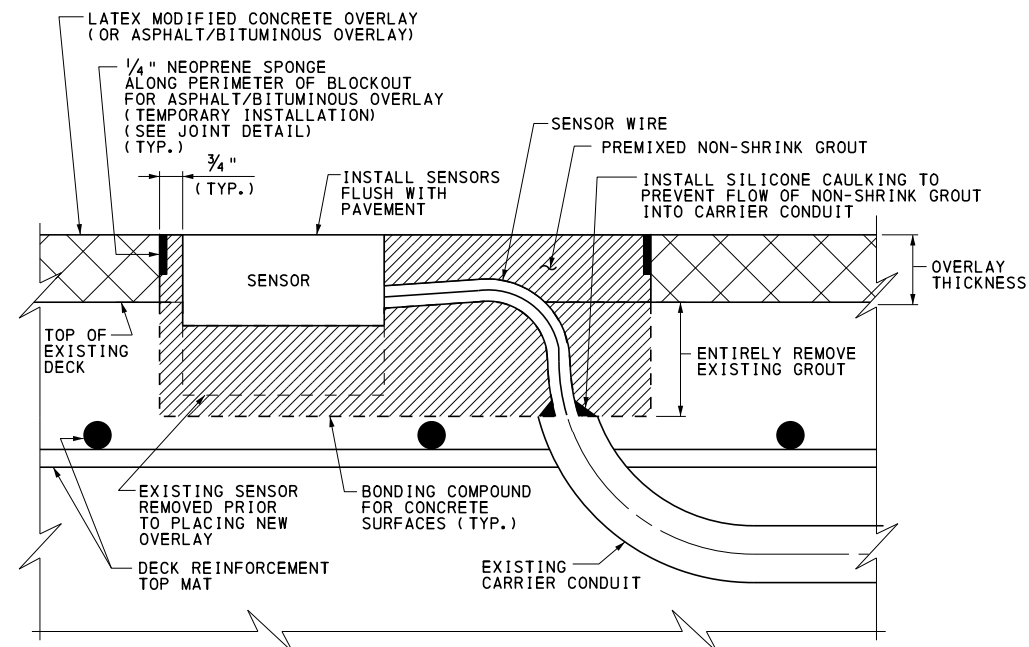
TYPICAL SPRAY DISK SECTION - CONDUIT THROUGH DECK



TYPICAL SPRAY DISK SECTION - CONDUIT IN DECK



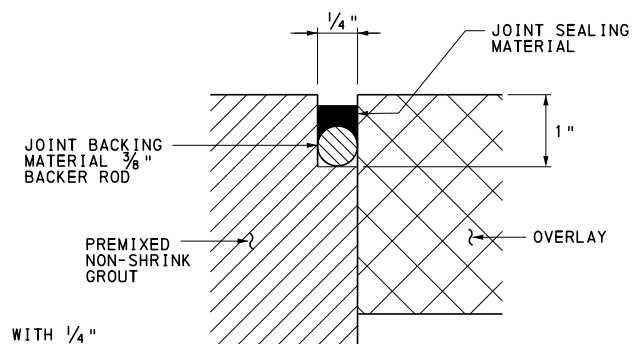
TYPICAL SENSOR SECTION - CONDUIT THROUGH DECK



TYPICAL SENSOR SECTION - CONDUIT IN DECK

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 2.
2. ENTIRELY REMOVE EXISTING GROUT.
3. SEAL DISKS/SENSOR USING A PREMIXED NON-SHRINK GROUT.
4. FOR BRIDGE DECKS WITH A GROOVED SURFACE, MEASURE DISK/SENSOR LOCATION FROM THE TOP OF THE GROOVES.
5. SOME PARTS OF THE ANTI-ICING SYSTEM WILL BE DISCARDED WHEN THE OVERLAY IS INSTALLED. THEREFORE, IT MAY BE COST-EFFECTIVE TO DELAY THE INSTALLATION OF THE ANTI-ICING SYSTEM UNTIL THE OVERLAY IS COMPLETED.
6. EXISTING BRIDGES MUST HAVE FULLY FUNCTIONAL DRAINAGE SYSTEMS INCLUDING SATISFACTORY EXPANSION DAMS, WORKING SCUPPERS, AND ADEQUATE APPROACH INLET BOXES. ANY DEFICIENCIES IN THE DRAINAGE SYSTEM MUST BE CORRECTED PRIOR TO INSTALLATION OF AN ANTI-ICING SYSTEM.
7. FOR INSTALLATION PROCEDURES, SEE SHEET 3.

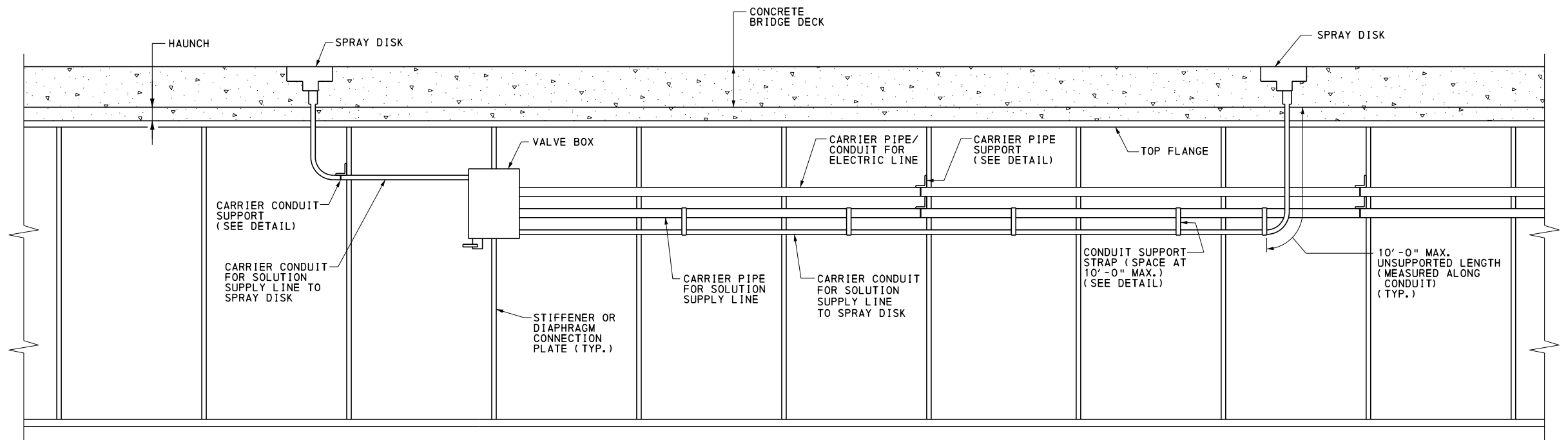


JOINT DETAIL

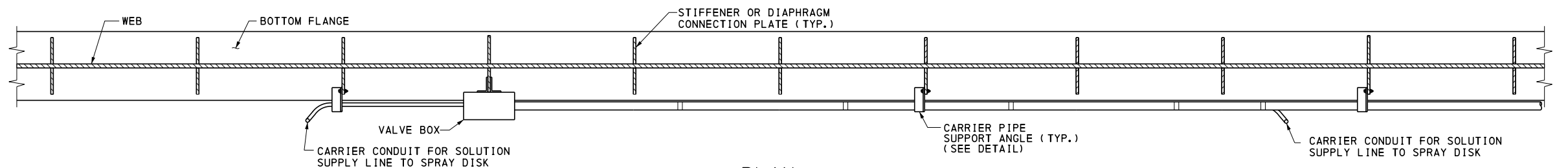
NOTE: INSTALL JOINT MATERIAL WITH 1/4" NEOPRENE SPONGE AROUND PERIMETER OF BLOCKOUT/CUTOUT IN THE OVERLAY LAYER ONLY. AFTER PREMIXED NON-SHRINK GROUT HARDENS, REMOVE SPONGE AND INSTALL 3/8" BACKER ROD AND SEAL WITH JOINT SEALING MATERIAL.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

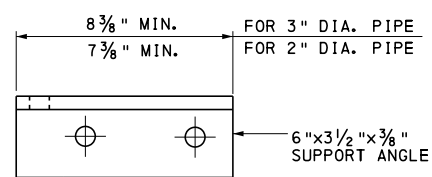
STANDARD
BRIDGE ANTI-ICING SYSTEM
DISK AND SENSOR
ADJUSTMENT FOR OVERLAYS



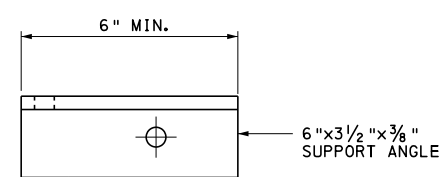
GIRDER ELEVATION



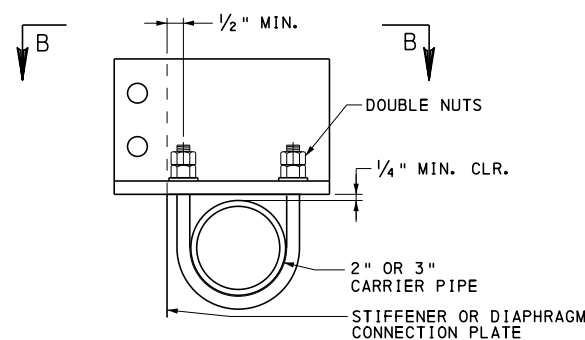
PLAN



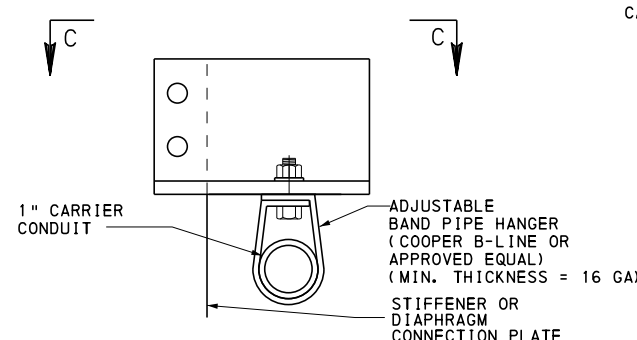
VIEW B-B



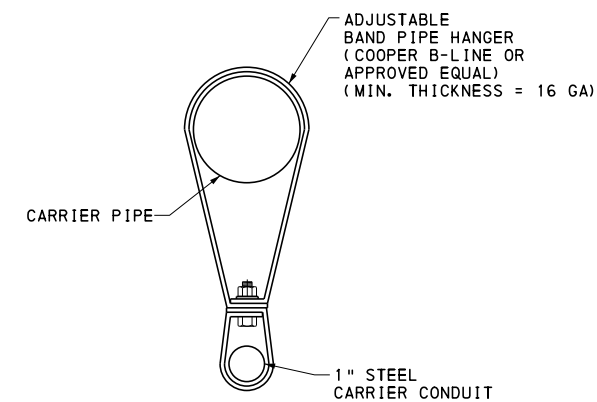
VIEW C-C



CARRIER PIPE SUPPORT DETAIL



CARRIER CONDUIT SUPPORT DETAIL



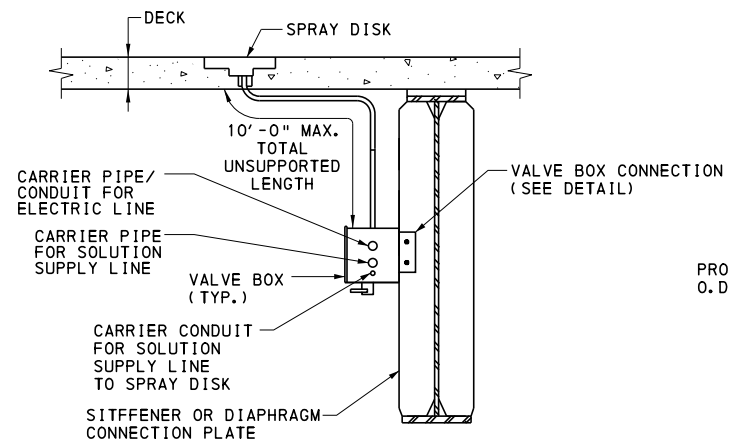
CONDUIT SUPPORT STRAP DETAIL

NOTES:

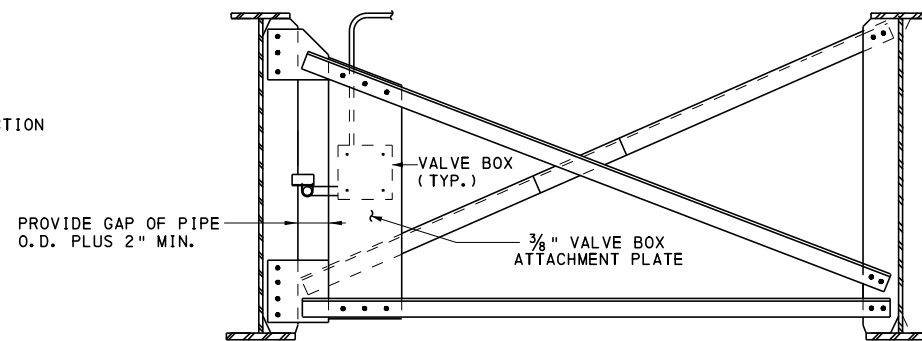
1. FOR GENERAL NOTES, SEE SHEET 2.
2. FOR VALVE BOX CONNECTION DETAILS, SEE SHEET 8.
3. FOR INSTALLATION PROCEDURES, SEE SHEET 3.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

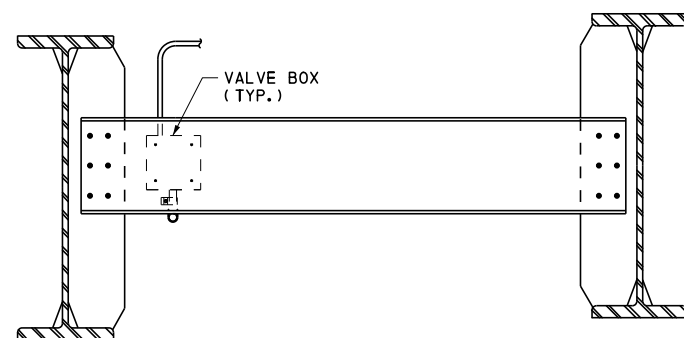
STANDARD
BRIDGE ANTI-ICING SYSTEM
CARRIER PIPE/CONDUIT ATTACHMENT
FOR STEEL BRIDGES



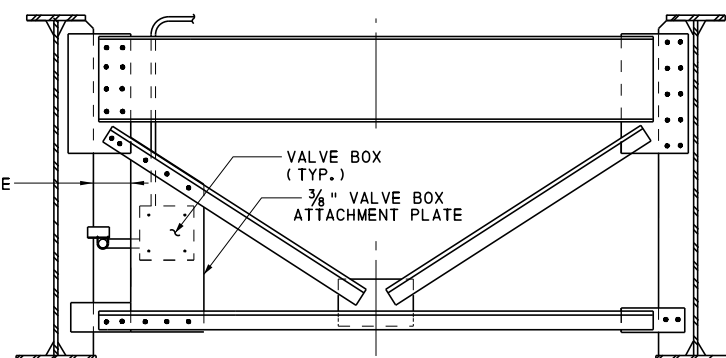
PREFERRED VALVE BOX ATTACHMENT DETAIL
AT STIFFENER OR DIAPHRAGM CONNECTION PLATE



ALTERNATE VALVE BOX ATTACHMENT DETAIL
AT INTERMEDIATE DIAPHRAGM

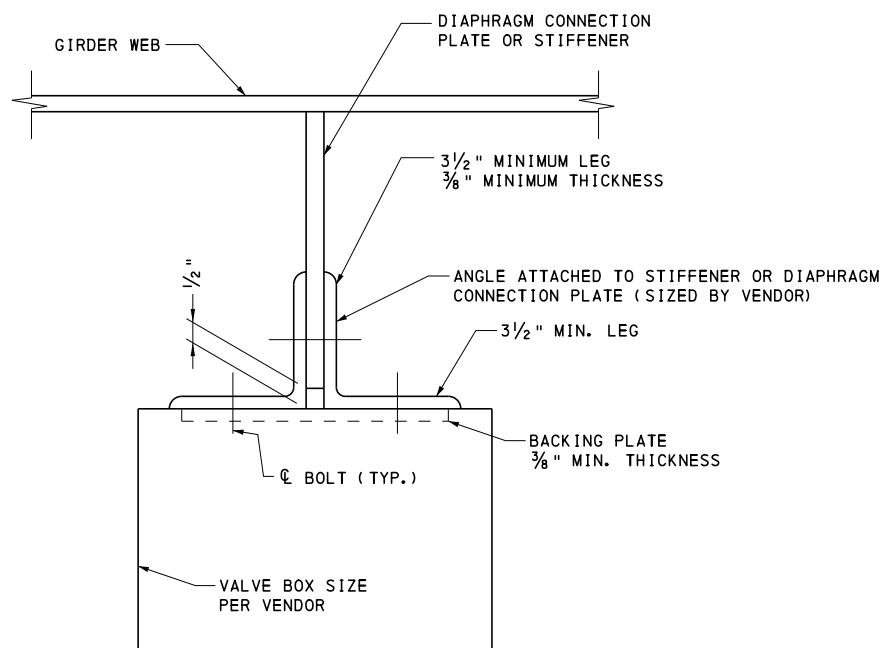


ALTERNATE VALVE BOX ATTACHMENT DETAIL
AT CHANNEL DIAPHRAGM



NOTE: DO NOT PLACE VALVE BOX ON JACKING DIAPHRAGM

ALTERNATE VALVE BOX ATTACHMENT DETAIL
AT END DIAPHRAGM



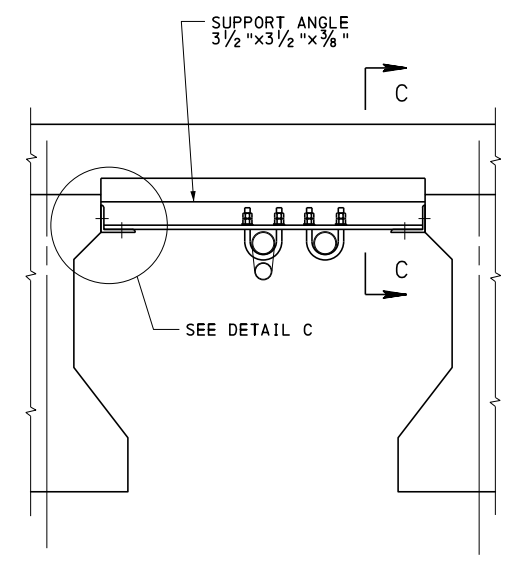
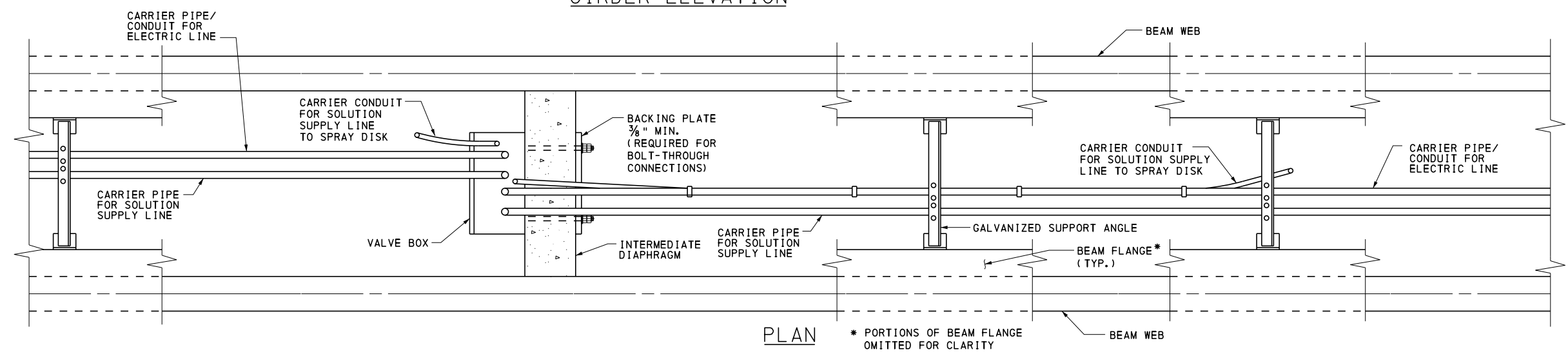
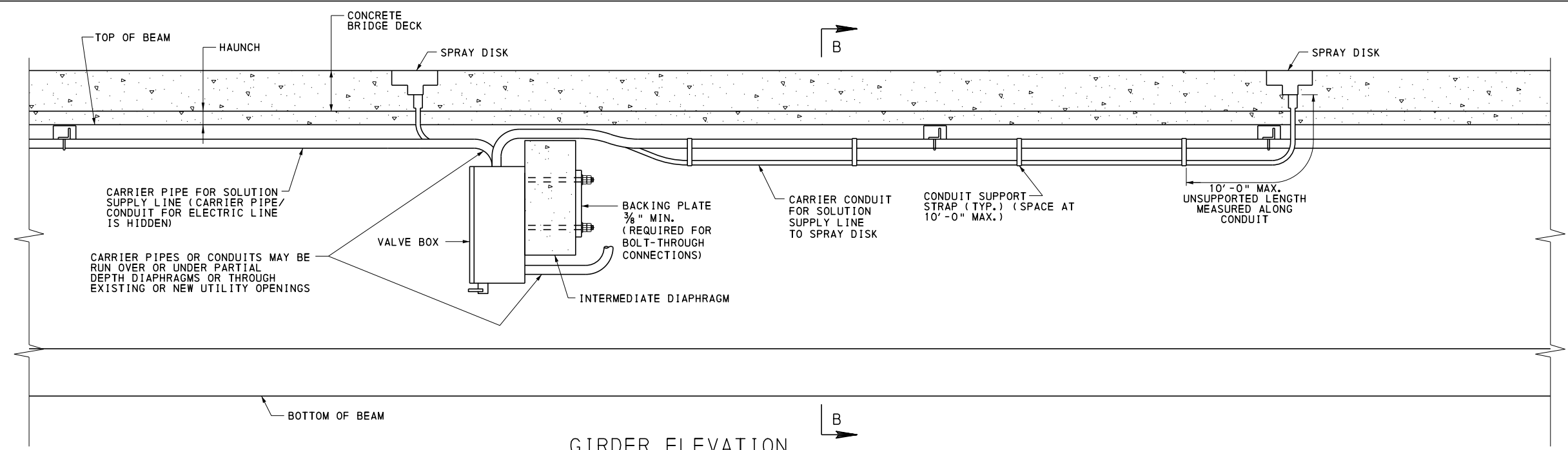
PREFERRED VALVE BOX CONNECTION DETAIL - PLAN

NOTES:

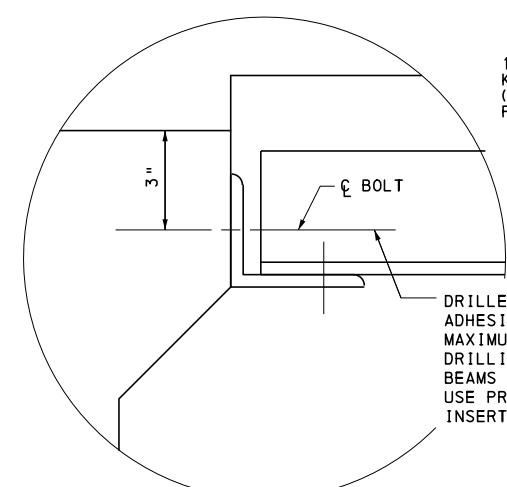
1. FOR GENERAL NOTES, SEE SHEET 2.
2. FOR INSTALLATION PROCEDURES, SEE SHEET 3.
3. PREFERRED VALVE BOX MOUNTING METHOD IS USING THE DOUBLE ANGLE ATTACHMENT ON THE STIFFENERS OR DIAPHRAGM CONNECTION PLATES. USE THE ALTERNATE DIAPHRAGM CONNECTION ON BRIDGES THAT USE TANGENT BEAM ALIGNMENTS IF BRACING OR OTHER ATTACHMENTS INTERFERE WITH THE VALVE BOX DOORS. THE ALTERNATE DIAPHRAGM CONNECTION IS NOT PERMITTED ON BRIDGES WITH CURVED GIRDERS OR CHORDED STRAIGHT GIRDERS THAT MIMIC A CURVE UNLESS APPROVED BY THE DISTRICT BRIDGE ENGINEER.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

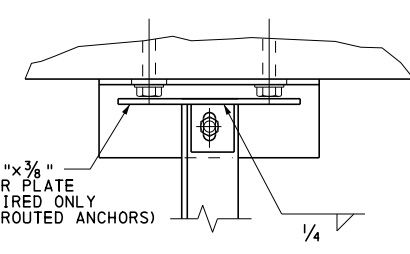
STANDARD
BRIDGE ANTI-ICING SYSTEM
VALVE BOX ATTACHMENT
FOR STEEL BRIDGES



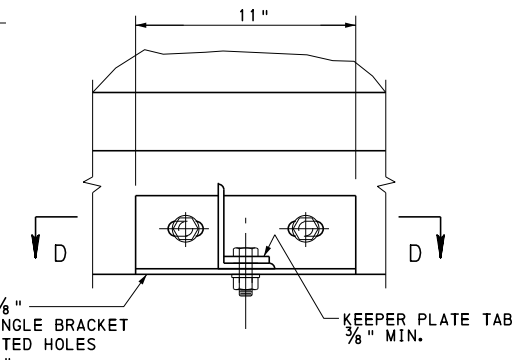
SECTION B-B
NOTE: I-BEAM SHOWN, BOX BEAM SIMILAR



DETAIL C
KEEPER PLATE NOT SHOWN (REQUIRED ONLY FOR GROUTED ANCHORS)
NOTE: I-BEAM SHOWN, BOX BEAM SIMILAR



SECTION D-D



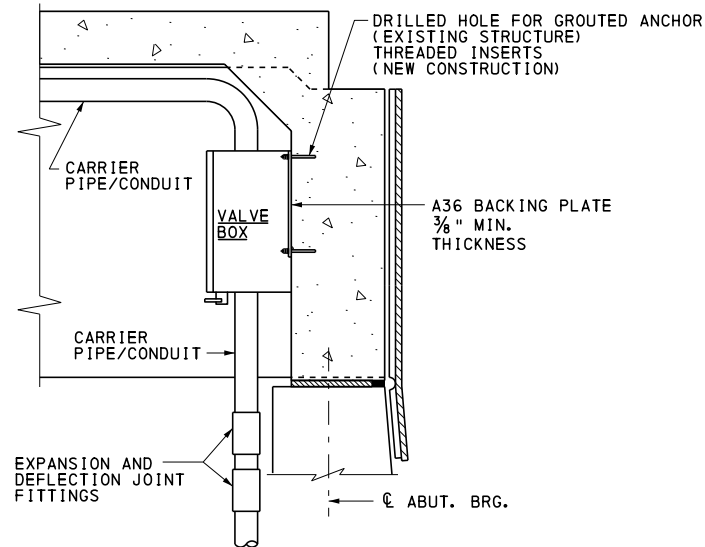
SECTION C-C
KEEPER PLATE NOT SHOWN (REQUIRED ONLY FOR GROUTED ANCHORS)

- NOTES:
1. FOR GENERAL NOTES, SEE SHEET 2.
 2. FOR CONDUIT AND PIPE SUPPORT DETAILS, SEE SHEET 7.
 3. FOR INSTALLATION PROCEDURES, SEE SHEET 3.

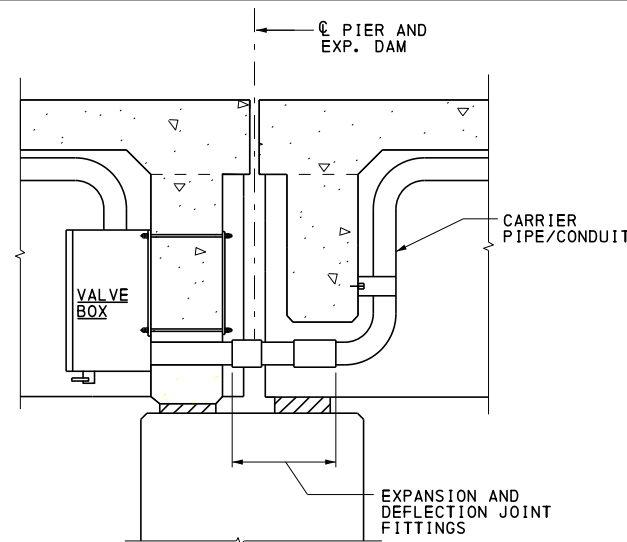
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
BRIDGE ANTI-ICING SYSTEM
CARRIER PIPE/CONDUIT ATTACHMENT
FOR CONCRETE BRIDGES

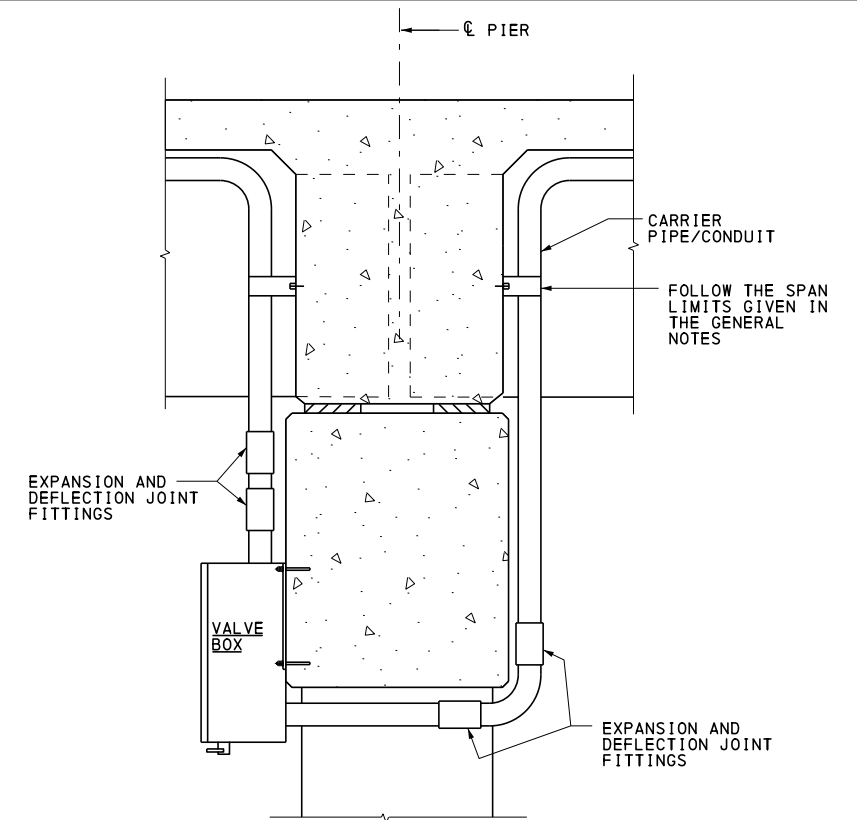
RECOMMENDED SEPT.30, 2016 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT.30, 2016 <i>Brenda Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 9 OF 10 BC-723M
---	---	---------------------------------



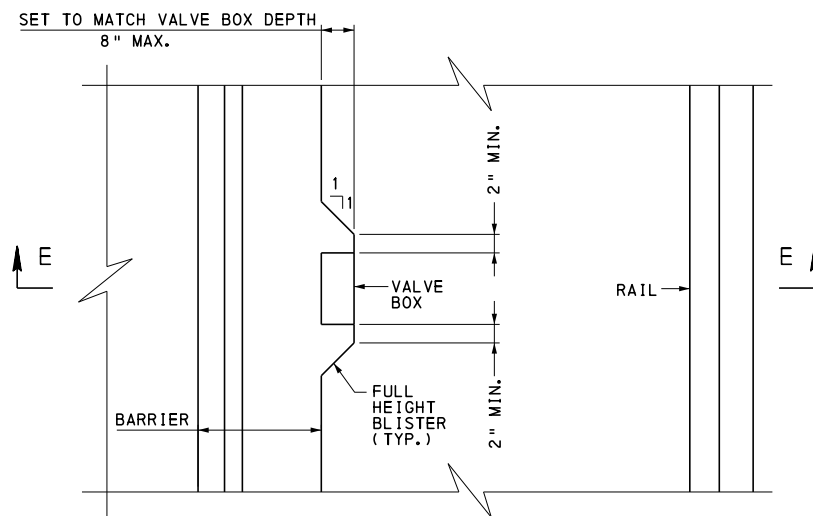
VALVE BOX ATTACHMENT AT END DIAPHRAGM



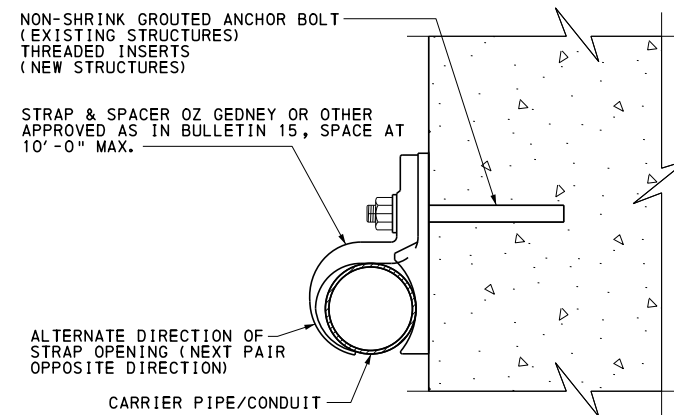
VALVE BOX ATTACHMENT AT FULL AND PARTIAL DEPTH DIAPHRAGM AT PIER (FIXED AND EXP.)



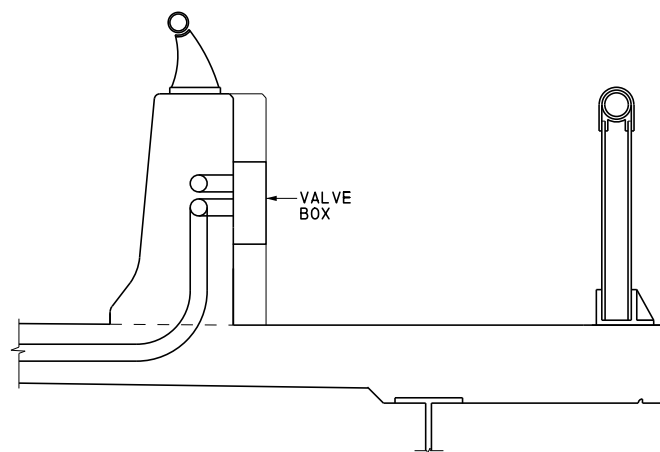
VALVE BOX ATTACHMENT AT CONTINUITY DIAPHRAGM AT PIER (FIXED AND EXP.)
 WHERE CROSSING AN EXISTING CONTINUITY DIAPHRAGM (WITHOUT UTILITY OPENINGS) IS REQUIRED, ATTACH VALVE BOXES TO PIER, AND RUN CONDUIT BELOW PIER CAPS.



BARRIER MOUNTED VALVE BOX DETAIL
 (NEW CONSTRUCTION ONLY)



CARRIER PIPE / CONDUIT ATTACHMENT TO CONCRETE SUBSTRUCTURES AND DIAPHRAGMS



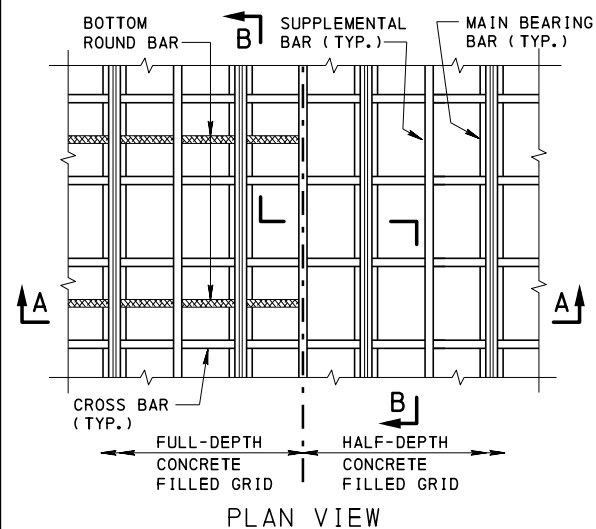
SECTION E-E

NOTES:

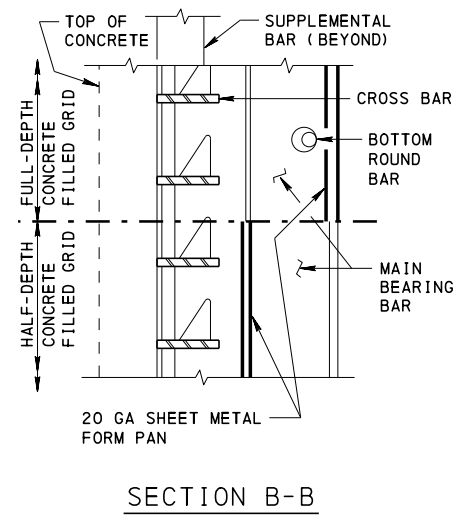
1. FOR GENERAL NOTES, SEE SHEET 2.
2. FOR INSTALLATION PROCEDURES, SEE SHEET 3.
3. THE USE OF BARRIER BLISTERS IS STRONGLY DISCOURAGED AND SUBJECT TO DEPARTMENT APPROVAL. OTHER LOCATIONS MUST BE USED IF POSSIBLE.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

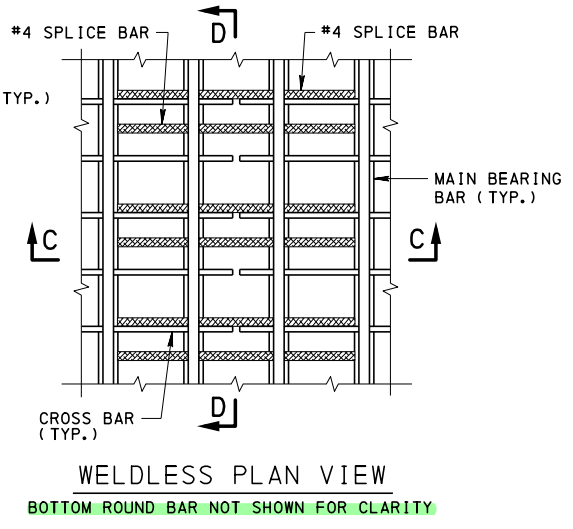
STANDARD
BRIDGE ANTI-ICING SYSTEM
 GENERAL DETAILS



PLAN VIEW

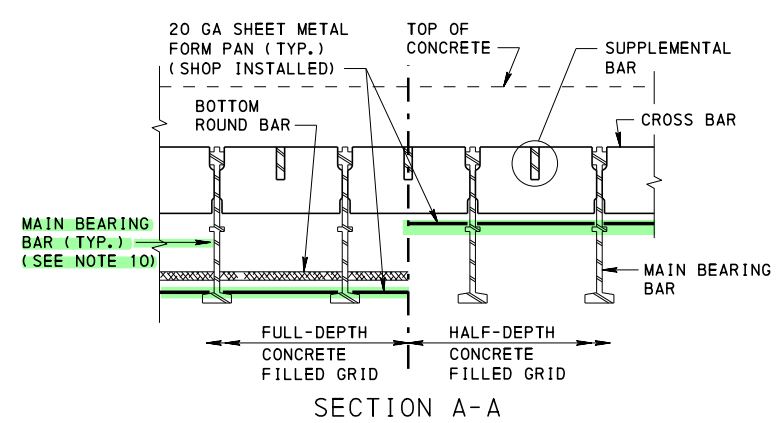


SECTION B-B



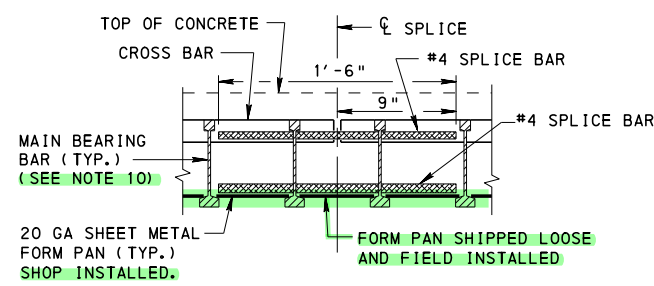
WELDLESS PLAN VIEW

BOTTOM ROUND BAR NOT SHOWN FOR CLARITY

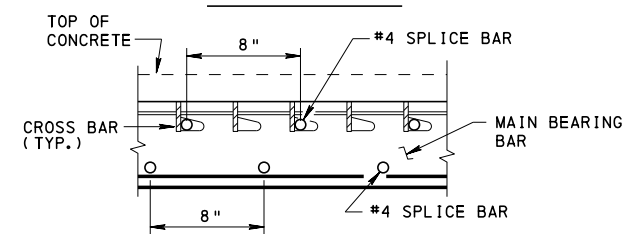


SECTION A-A

TYPICAL GRID DECK DETAILS

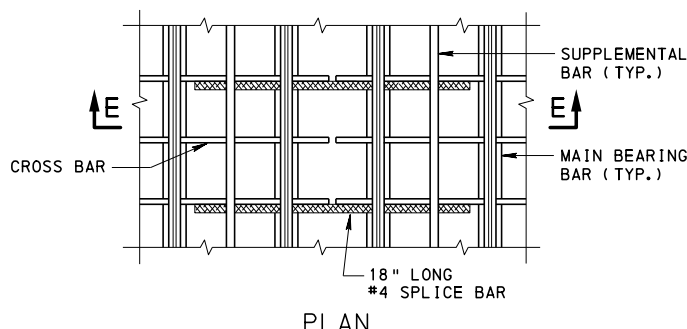


SECTION C-C

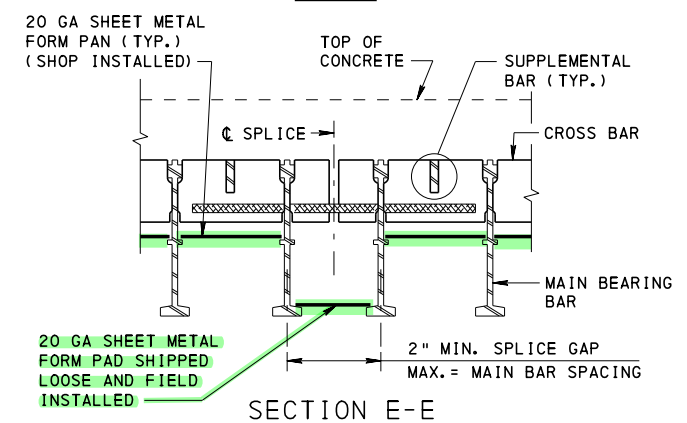


SECTION D-D

FULL DEPTH CONCRETE GRID
TRANSVERSE SPLICE BETWEEN PANELS



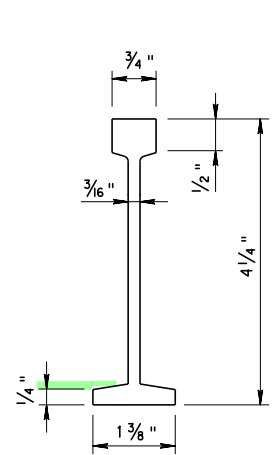
PLAN



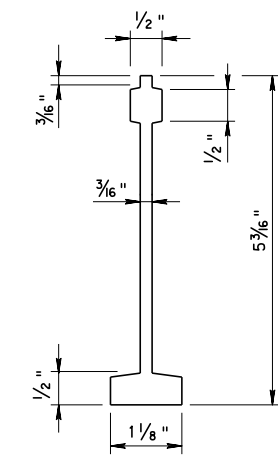
SECTION E-E

HALF DEPTH CONCRETE GRID

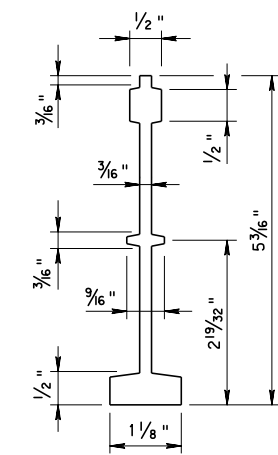
TRANSVERSE SPLICE BETWEEN PANELS



4 1/4" BAR WITHOUT MIDDLE RIB



5 3/16" BAR WITHOUT MIDDLE RIB



5 3/16" BAR WITH MIDDLE RIB

MAIN BEARING BAR
SUBJECT TO MILL TOLERANCE

GENERAL NOTES:

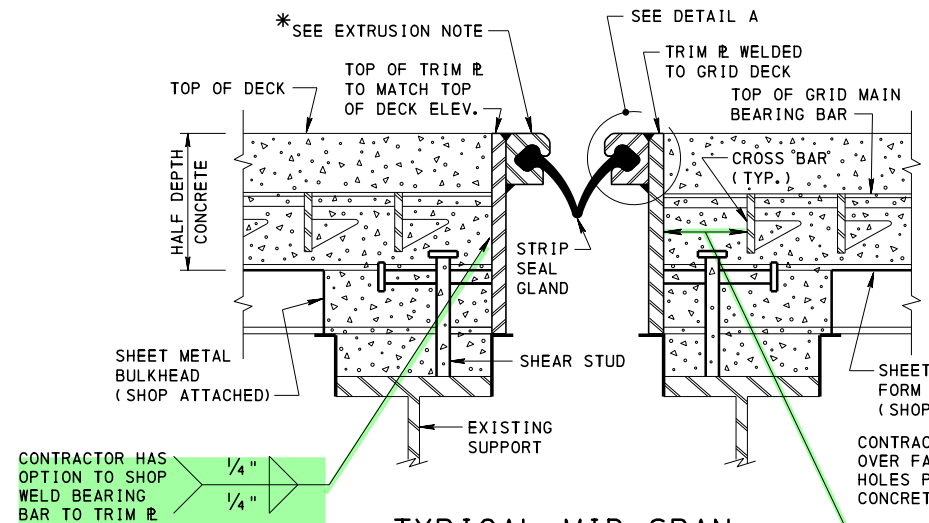
- ALL REINFORCEMENT BARS TO MEET THE REQUIREMENTS OF PUB. 408 SECTION 709.1.
- DESIGN SPECIFICATION:
 - AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND COMMENTARY
 - PENNDOT DESIGN MANUAL PART 4
- FABRICATION ACCORDING TO AASHTO/AWS D1.5 (DATE AS NOTED IN PUB. 408 SECTION 1105), BRIDGE GRID FLOORING MANUFACTURERS ASSOCIATION AND APPROVED SHOP DRAWINGS.
- MATERIAL STRENGTH:
 - STEEL BARS AND SHAPES:
 - PUB. 408 SECTION 1105.2
 - CONCRETE:
 - PUB. 408 SECTION 704.1 (b), CLASS AAAP
- PROVIDE 1 1/2" CONCRETE COVER ON REINFORCEMENT BARS UNLESS OTHERWISE NOTED.
- PROVIDE 1 1/2" COVER OVER GRID. THE TOP 1/2" OF OVERFILL/OVERLAY IS CONSIDERED SACRIFICIAL WEARING SURFACE.
- ALL SHEET METAL AND FORM PANS TO MEET PUB. 408, SECTION 1001.2 GALVANIZING REQUIREMENTS. PROVIDE FORM PANS ACCORDING TO PUB. 408, SECTION 1001.2(h)2.
- PROVIDE AN ERECTION DETAIL COMPLETE WITH PIECE MARKS WITH THE SHOP DRAWING SUBMISSION.
- PROVIDE A 3/4" DIAMETER LEVELING BOLT THAT IS EITHER:
 - ASTM A307 GRADE A HEADED BOLT OR EQUIVALENT.
 - OR
 - A WELDED ASSEMBLY CONSISTING OF THREADED ROD AND HEX NUT.
 - THREADED ROD: ASTM A307, ASTM F1554 GRADE 36, OR EQUIVALENT
 - HEX NUT: ASTM A194 OR ASTM A563.
- FURNISH LEVELING BOLTS UNCOATED UNLESS REQUIRED TO BE GALVANIZED
- SEE SHEET 4 FOR DETAILS
- USE THE 5 3/16" MAIN BEARING BAR WITH OR WITHOUT THE MIDDLE RIB FOR FULL DEPTH CONCRETE DECKS.
- HOT DIP GALVANIZE PANELS PER PUB. 408, SECTION 1105.02(S).

CHANGE 2

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

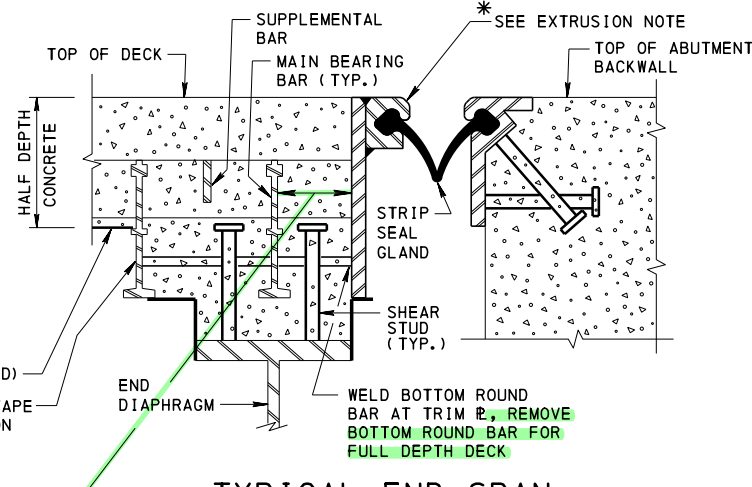
STANDARD
STEEL GRID REINFORCED
CONCRETE BRIDGE DECK DETAILS
FOR BEAM BRIDGES
CAST-IN-PLACE OR PRECAST DECKS

RECOMMENDED JAN. 31, 2019 <i>T. Ross P. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. ...</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 1 OF 5 BC-726M
---	--	--------------------------------



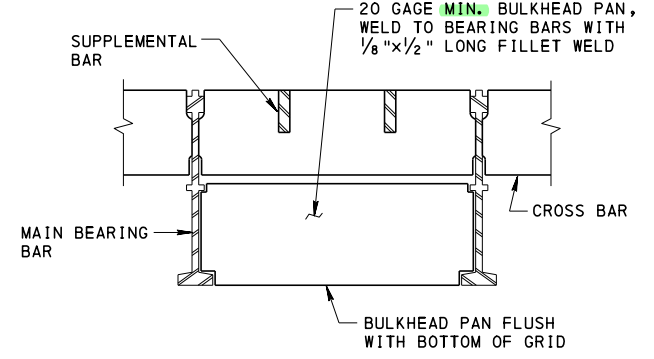
TYPICAL MID-SPAN EXPANSION JOINT DETAIL

WITH MAIN BEARING BARS PARALLEL TO STRUCTURE, HALF DEPTH CONCRETE GRID IS SHOWN. FULL DEPTH CONCRETE GRID SIMILAR WITH FORM PANS LOCATED AT BOTTOM FLANGE OF MAIN BEARING BAR.



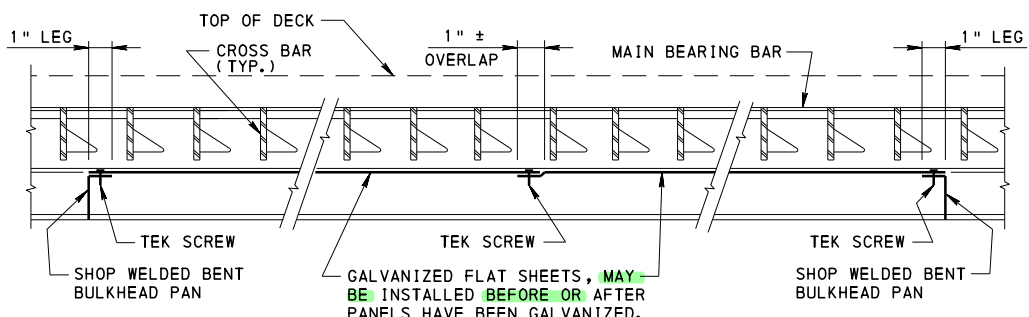
TYPICAL END SPAN EXPANSION JOINT DETAIL

WITH MAIN BEARING BARS PERPENDICULAR TO STRUCTURE, HALF DEPTH CONCRETE GRID IS SHOWN. FULL DEPTH CONCRETE GRID SIMILAR WITH FORM PANS LOCATED AT BOTTOM FLANGE OF MAIN BEARING BAR.



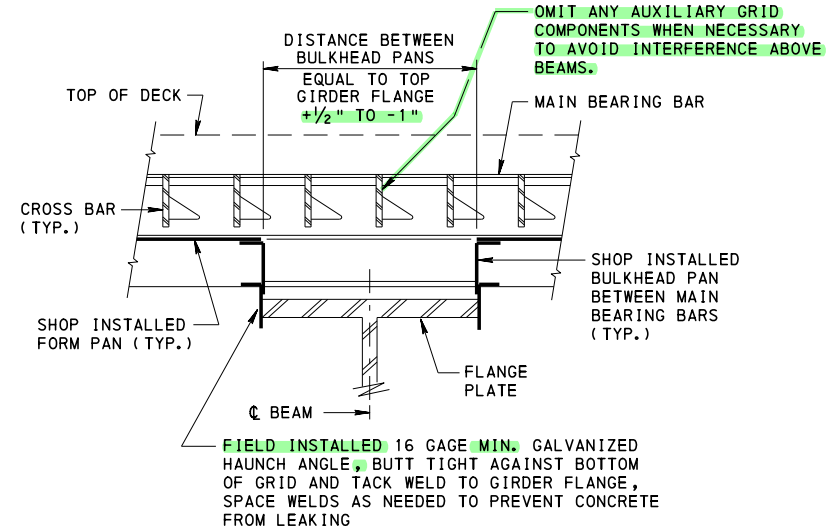
BULKHEAD PAN FIT-UP DETAIL
HALF DEPTH ONLY

* ONE PIECE EXTRUSION IN LIEU OF TWO PIECE MEMBER (EXTRUSION AND PLATE COMBINATION) IS PERMITTED. WELD IN ACCORDANCE WITH AASHTO/AWS D1.5M SPECIFICATIONS. (FULL PENETRATION WELD AND N.D.T. REQUIRED)



SECTION VIEW
HALF DEPTH CONCRETE GRID FORM PAN INSTALLATION DETAIL

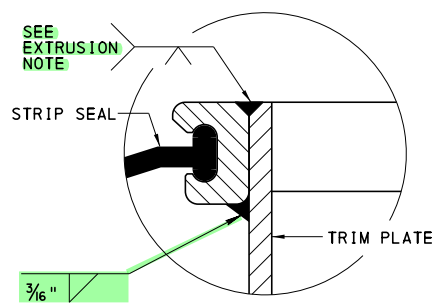
FULL DEPTH GRID SIMILAR BUT WITHOUT THE BULKHEADS



SECTION VIEW
TYPICAL HAUNCH FORM DETAIL

INSTALLATION NOTES:

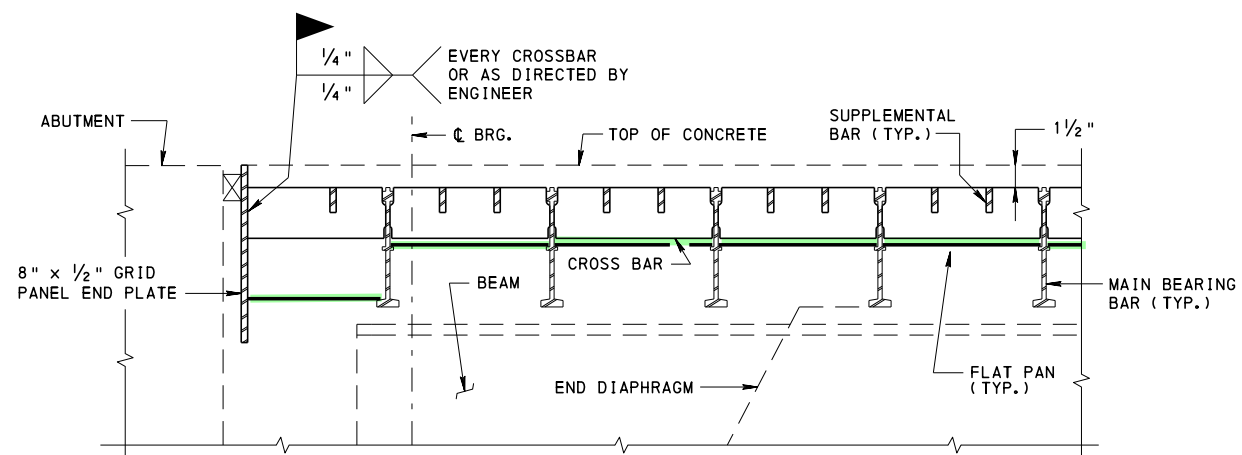
1. DURING PLACEMENT OF THE GRID PANELS THE CONTRACTOR MUST PLACE EACH PANEL IN ITS PROPER POSITION AND VERIFY ITS LOCATION FROM A COMMON FIXED POINT. DOING SO WILL MINIMIZE CUMULATIVE PLACEMENT ERRORS. CUMULATIVE ERRORS CAN RESULT IN A TOTAL DECK AREA LARGER OR SMALLER THAN THE ACTUAL AREA TO BE FILLED.
2. PANELS WITH THE SAME ERECTION MARK ARE INTERCHANGEABLE.
3. AS WITH OTHER DECKS THIS IS NOT A LEAK PROOF BRIDGE DECK SYSTEM AND MINOR CONCRETE AND GROUT SEEPAGE MAY OCCUR. FIELD CAULKING BY THE DECK ERECTOR MAY BE REQUIRED TO PREVENT EXCESSIVE CONCRETE AND GROUT LEAKAGE.
4. PANEL WIDTHS SHOWN ARE NOMINAL. ADJUST DIMENSION BETWEEN BEARING BARS AT FIELD JOINT TO ACCOUNT FOR TEMPERATURE AND ANY OTHER CONDITIONS AT THE TIME OF INSTALLATION.
5. FIELD INSTALL SHEAR STUDS AFTER PANELS ARE PLACED TO AVOID INTERFERENCE WITH GRID COMPONENTS.
6. HAVE AN EXPERIENCED REPRESENTATIVE OF MANUFACTURER PRESENT DURING INITIAL INSTALLATION OF GRID DECKING AND AT SUCH OTHER TIMES AS THE ENGINEER MAY REQUEST.



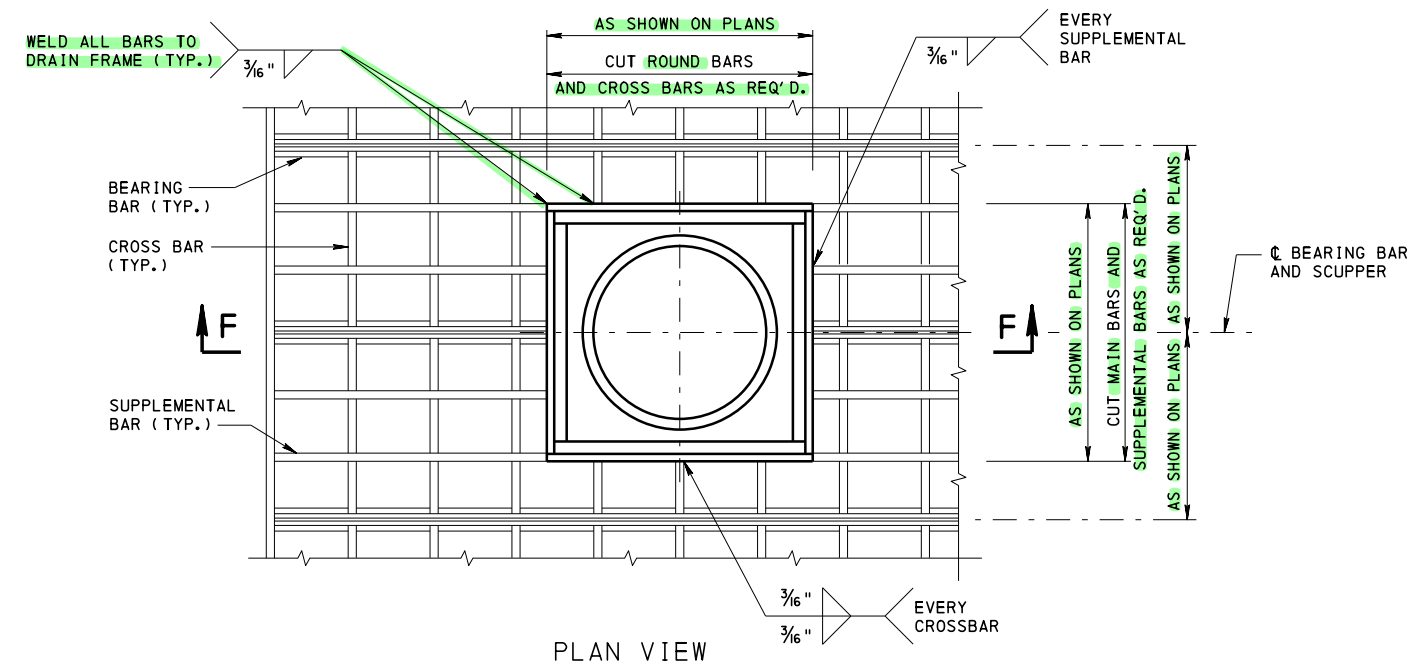
DETAIL A
EXTRUSION NOTE: ONE PIECE EXTRUSION IN LIEU OF TWO PIECE MEMBER (EXTRUSION AND PLATE COMBINATION) IS PERMITTED. WELD IN ACCORDANCE WITH AASHTO/AWS D1.5M SPECIFICATIONS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

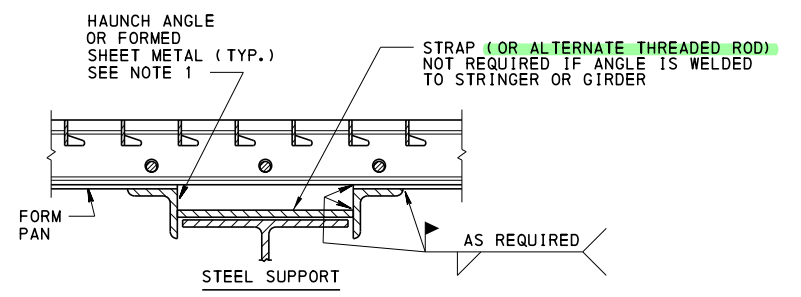
STANDARD
STEEL GRID REINFORCED
CONCRETE BRIDGE DECK DETAILS
FOR BEAM BRIDGES
CAST-IN-PLACE OR PRECAST DECKS



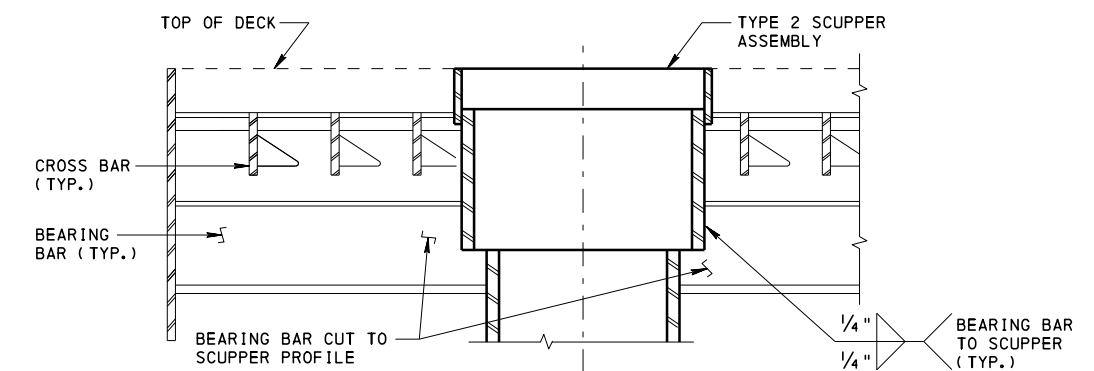
END SECTION DETAIL



PLAN VIEW

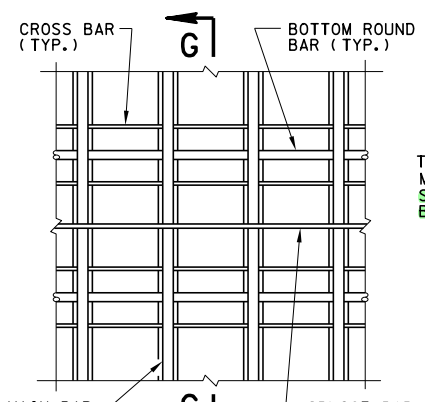


FORMED ANGLE - WELDED STRAP

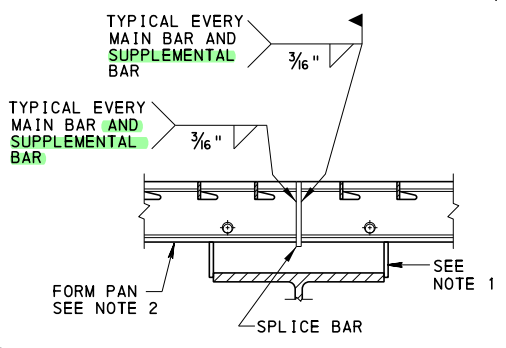


SECTION F-F

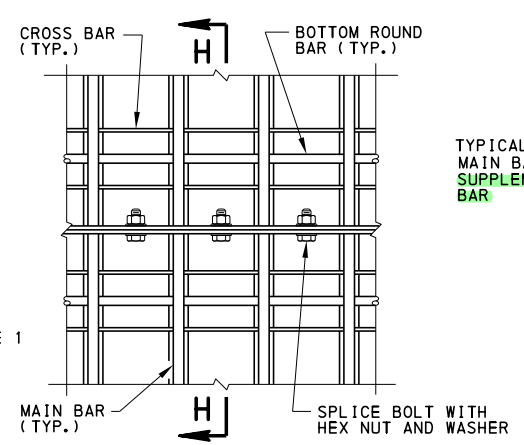
SCUPPER INSTALLATION DETAILS



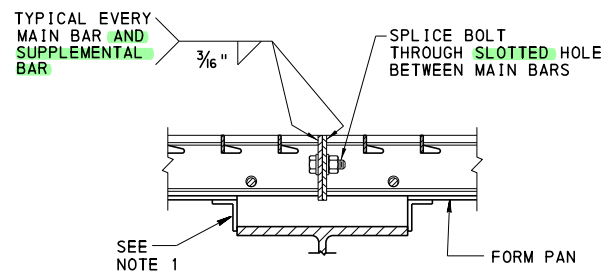
SPlice BAR PLAN VIEW



SECTION G-G



BOLTED PLAN VIEW



SECTION H-H

NOTE: ALL HARDWARE MUST BE IN ACCORDANCE WITH PUB. 408, SECTION 1105.02

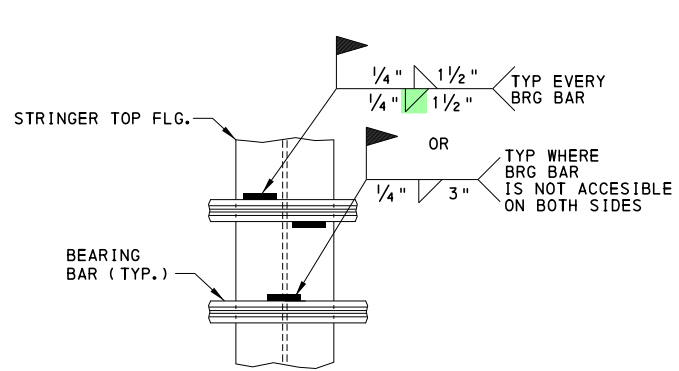
MAIN BAR SPLICE AT PANEL ENDS

- HAUNCH NOTES:
1. HAUNCH ANGLES NOT TO BE WELDED TO TENSION MEMBERS. USE TIE STRAPS WELDED BETWEEN HAUNCH ANGLES.
 2. OMIT CONCRETE FORM PAN OVER SUPPORT MEMBERS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

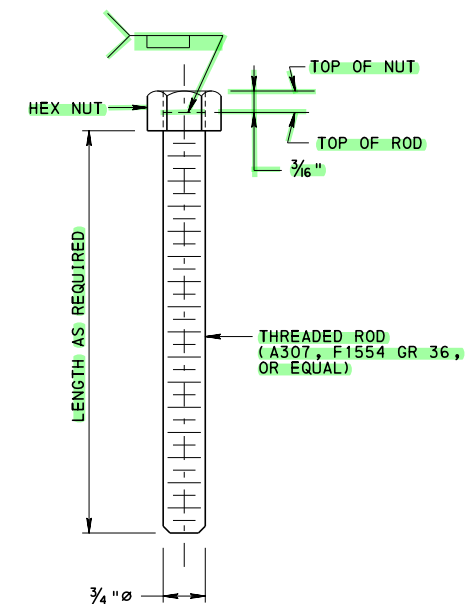
STANDARD
 STEEL GRID REINFORCED
 CONCRETE BRIDGE DECK DETAILS
 FOR BEAM BRIDGES
 CAST-IN-PLACE OR PRECAST DECKS

RECOMMENDED JAN. 31, 2019 <i>T. Ross P. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. ...</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 3 OF 5 BC-726M
---	--	--------------------------------



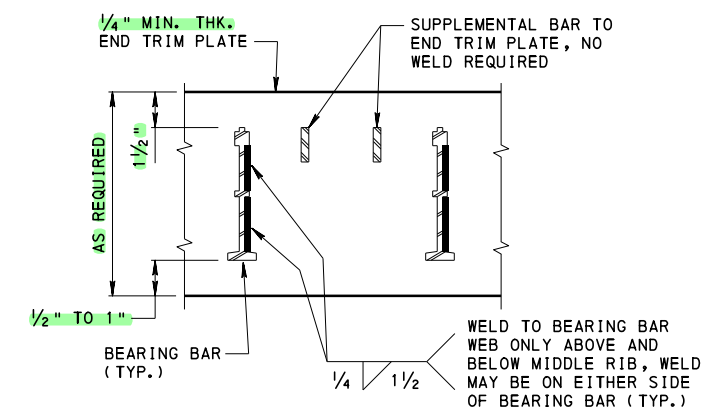
**OPTIONAL FIELD WELD DETAIL
WITHOUT HAUNCH**

FIELD NOTE: AFTER FIELD WELDING OF DECK, REPAIR ANY DAMAGE TO GALVANIZING. BY APPLYING A ZINC RICH COLD APPLIED COATING TO DAMAGE AREA.

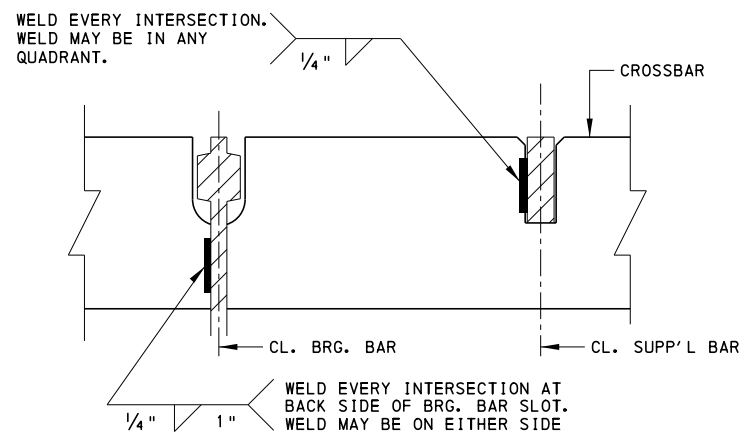


LEVELING BOLT DETAIL

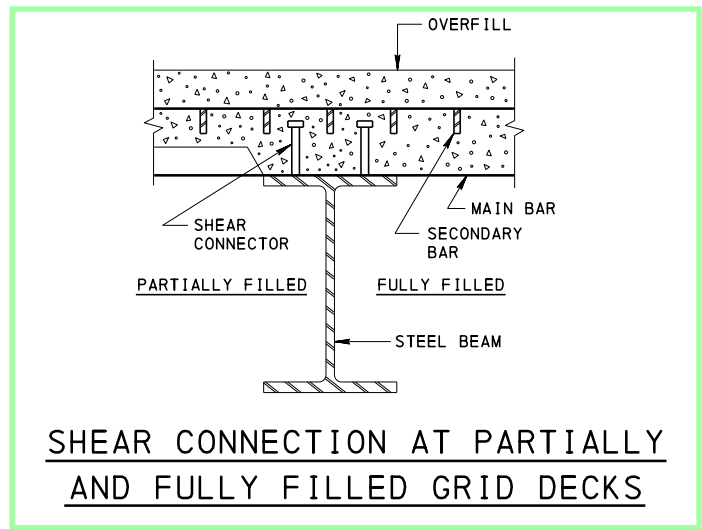
- HEADED BOLT IS PERMITTED IN LIEU OF NUT TO THREADED ROD WELDED ASSEMBLY.
- LEVELING BOLTS MAY BE FURNISHED UNCOATED.



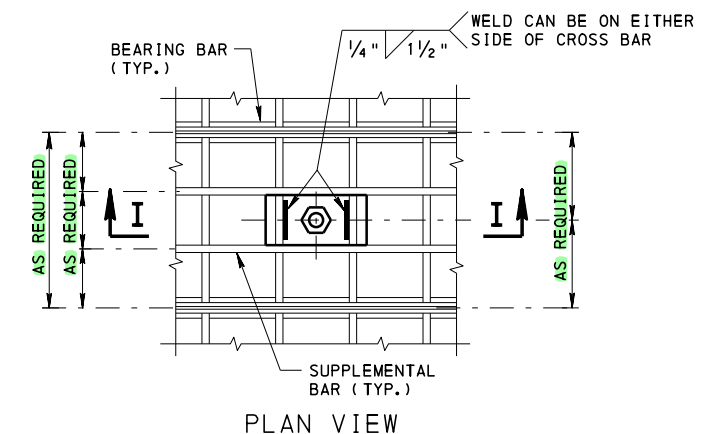
END TRIM PLATE WELD DETAIL



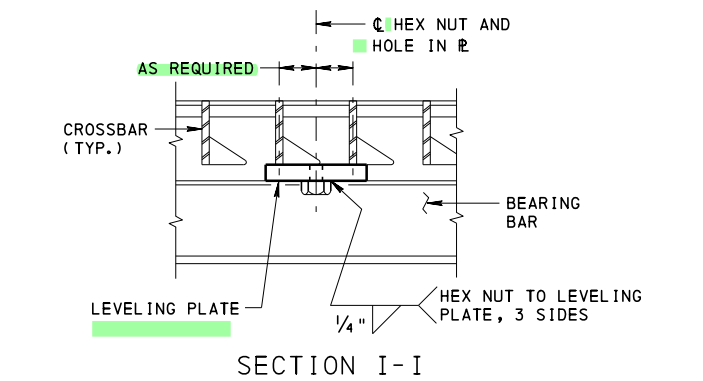
GRID COMPONENT WELD DETAILS



SHEAR CONNECTION AT PARTIALLY AND FULLY FILLED GRID DECKS



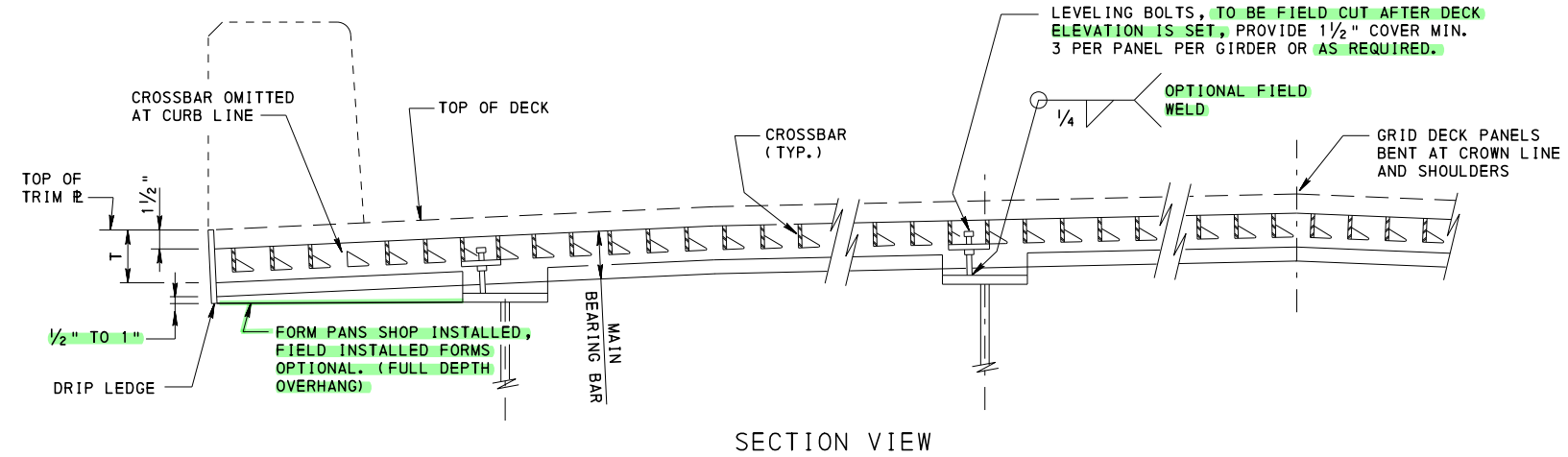
PLAN VIEW



SECTION I-I

LEVELING PLATE WELD DETAIL

- HEX NUT CAN BE TAPPED OVERSIZE FOR GALVANIZING.
- THE LEVELING NUT MAY BE PLACED UNDER THE MAIN BAR WHEN CONDITIONS PERMIT. ALTERNATE LEVELING DETAILS PERMITTED AS APPROVED BY THE DISTRICT BRIDGE ENGINEER.



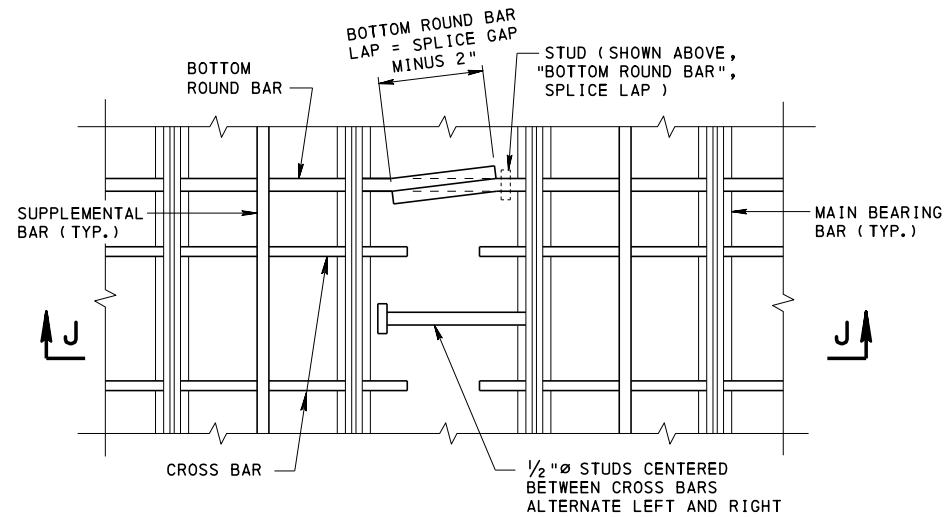
PARTIAL TRANSVERSE SECTION THRU GRID DECK

MAIN BAR CAMBERING AS PERMITTED BY AWS D1.5 PUB. 408

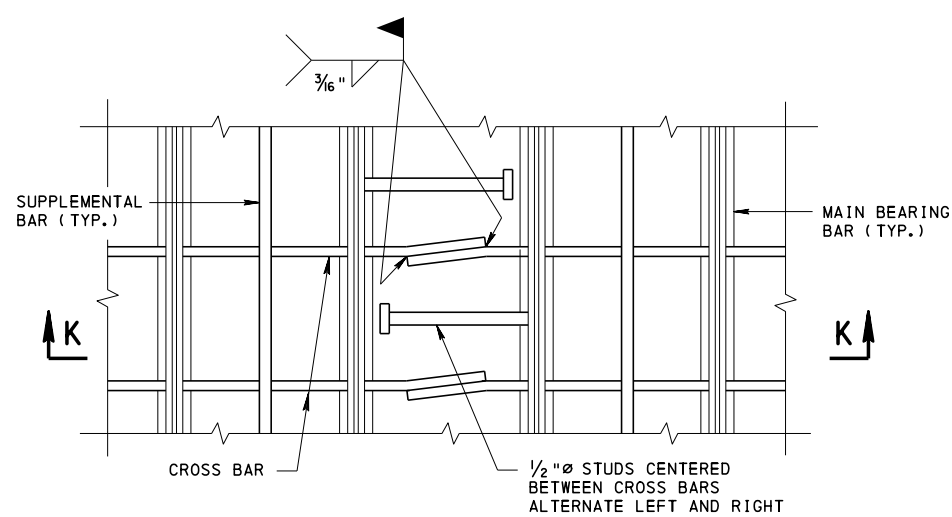
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
STEEL GRID REINFORCED
CONCRETE BRIDGE DECK DETAILS
FOR BEAM BRIDGES
CAST-IN-PLACE OR PRECAST DECKS**

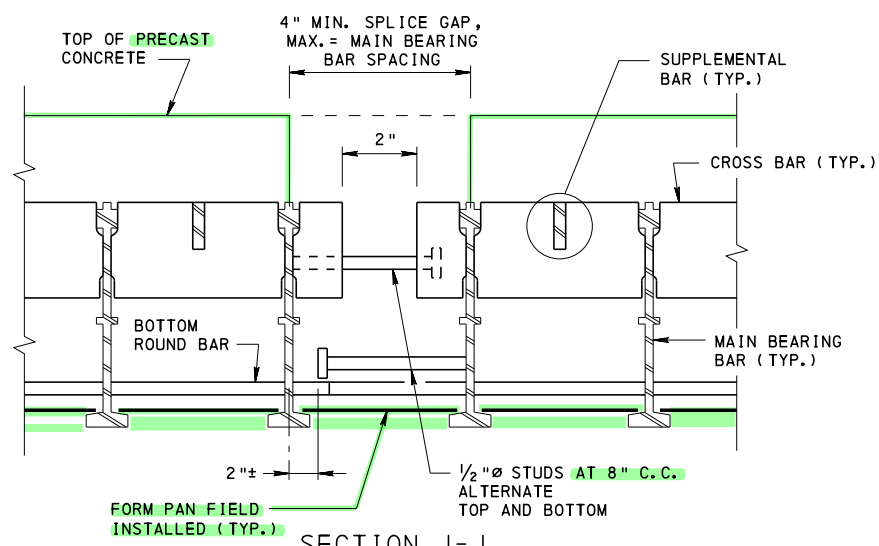
RECOMMENDED JAN. 31, 2019 <i>T. Ross P. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. ...</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 4 OF 5 BC-726M
---	--	--------------------------------



PLAN VIEW



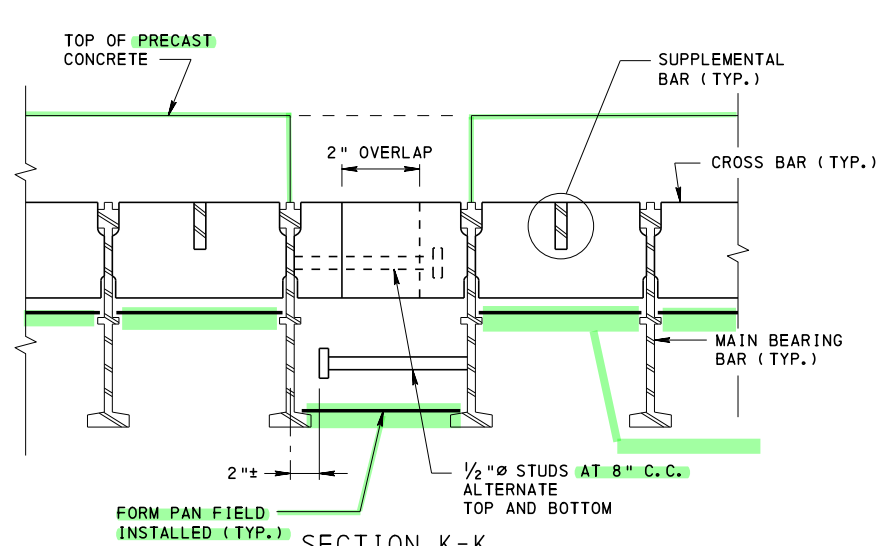
PLAN VIEW



SECTION J-J

**FULL DEPTH CONCRETE GRID
TRANSVERSE SPLICE BETWEEN PANELS**

OPTIONAL BOLTED SPLICE PERMITTED AS APPROVED
BY THE DISTRICT BRIDGE ENGINEER



SECTION K-K

**HALF DEPTH CONCRETE GRID
TRANSVERSE SPLICE BETWEEN PANELS**

OPTIONAL BOLTED SPLICE PERMITTED AS APPROVED
BY THE DISTRICT BRIDGE ENGINEER

NOTE: SPLICE DETAILS CAN ALSO BE USED FOR CAST-IN-PLACE
WITHOUT BLOCKOUT CLOSURE POURS.

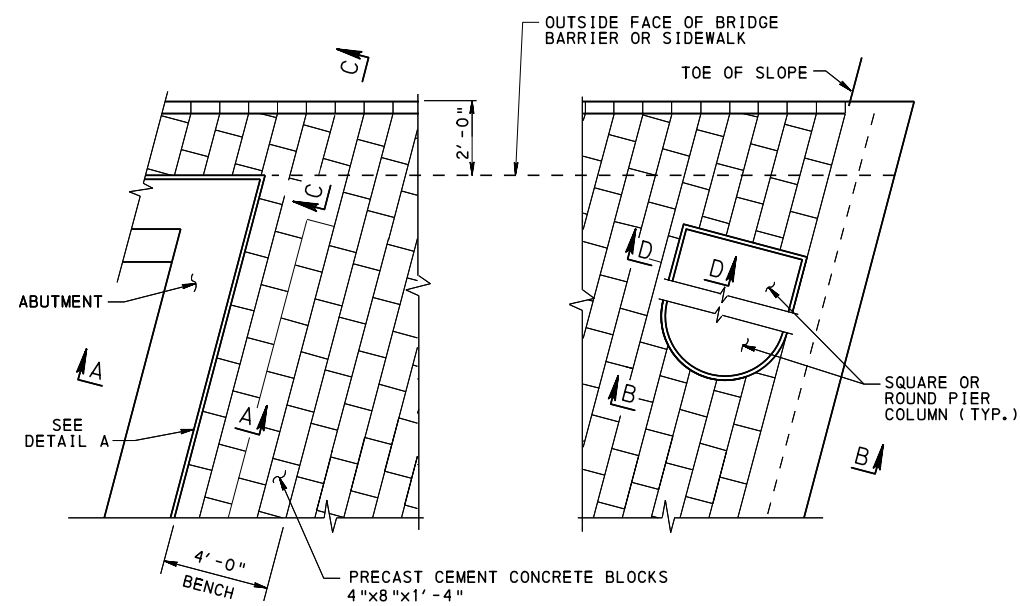
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STEEL GRID REINFORCED
CONCRETE BRIDGE DECK DETAILS
FOR BEAM BRIDGES
PRECAST DETAILS

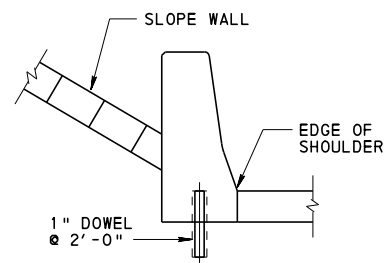
RECOMMENDED JAN. 31, 2019
T. Ross P. Maciora
CHIEF BRIDGE ENGINEER

RECOMMENDED JAN. 31, 2019
Alvin J. ...
ACTING DIR. BUR. OF PROJECT DELIVERY

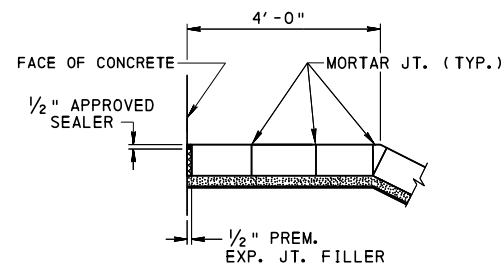
SHEET 5 OF 5
BC-726M



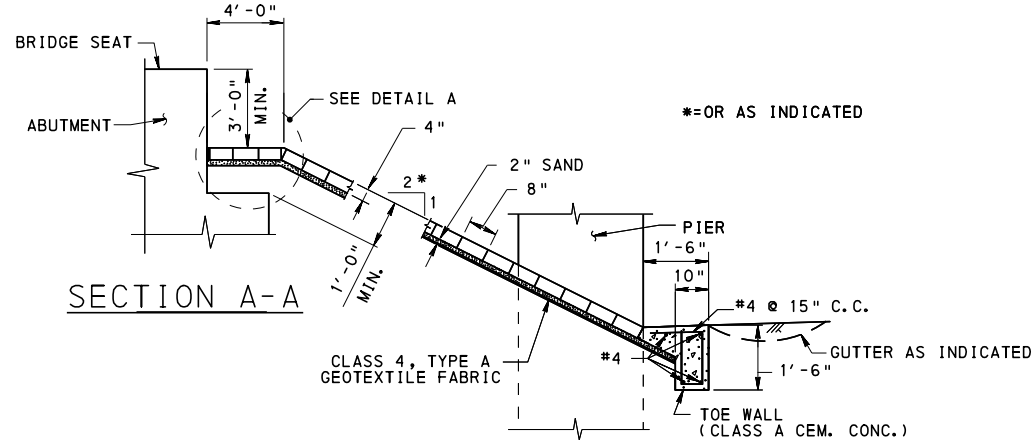
PLAN



PRECAST BARRIER TOE WALL



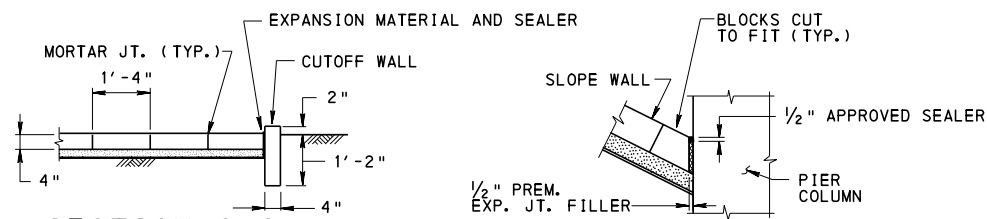
DETAIL A



SECTION A-A

SECTION B-B

(SEE DETAIL J FOR SPECIAL CASES)

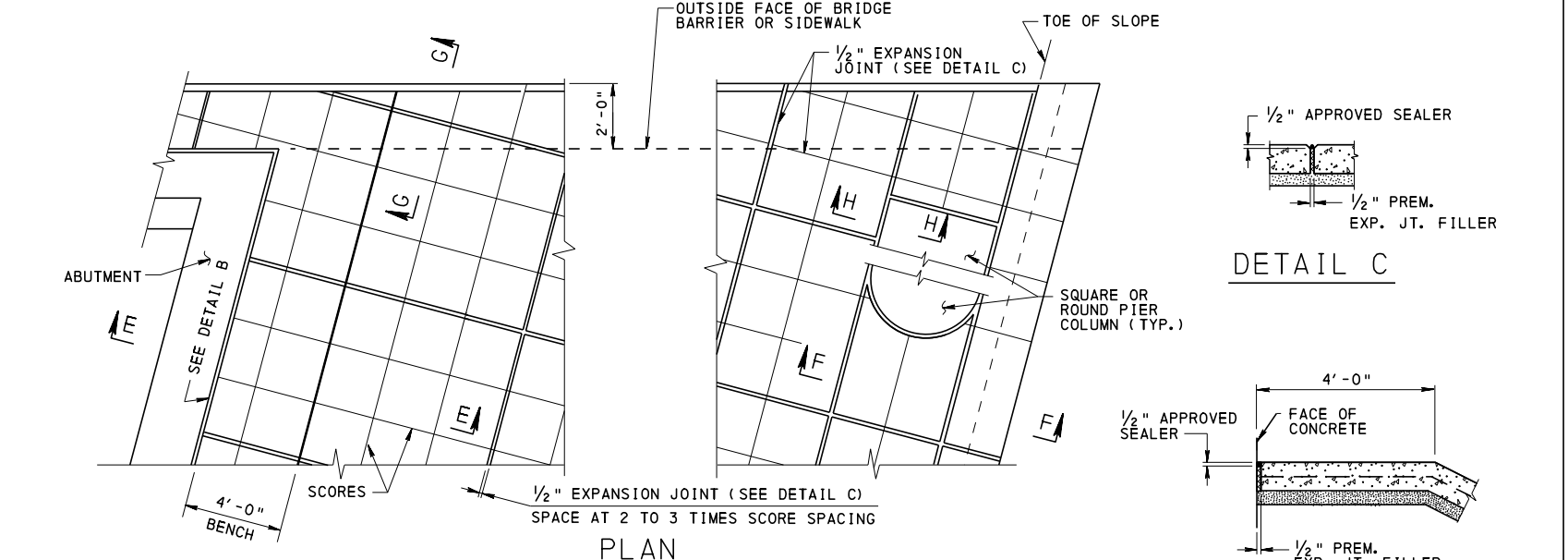


SECTION C-C

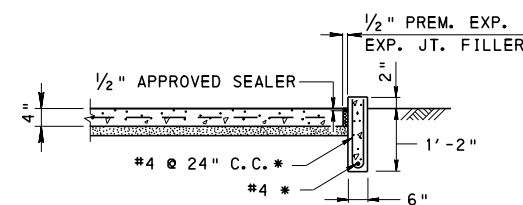
SECTION D-D

DIMENSIONS SHOWN FOR PRECAST CEMENT CONCRETE BLOCKS ARE NOMINAL

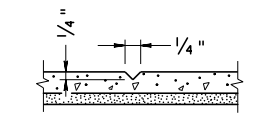
PRECAST CEMENT CONCRETE BLOCKS



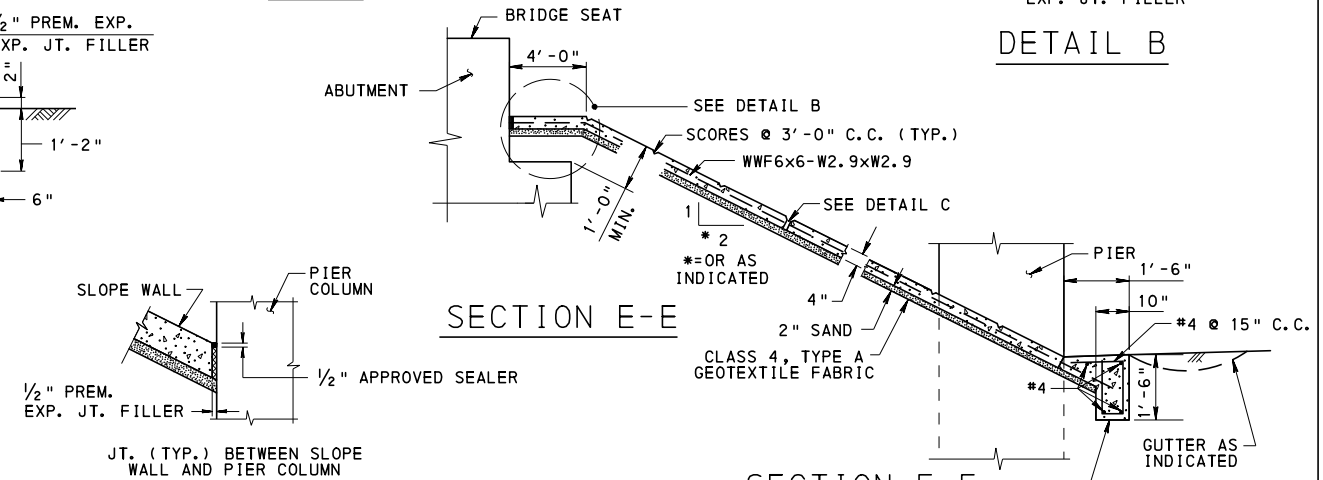
PLAN



SECTION G-G



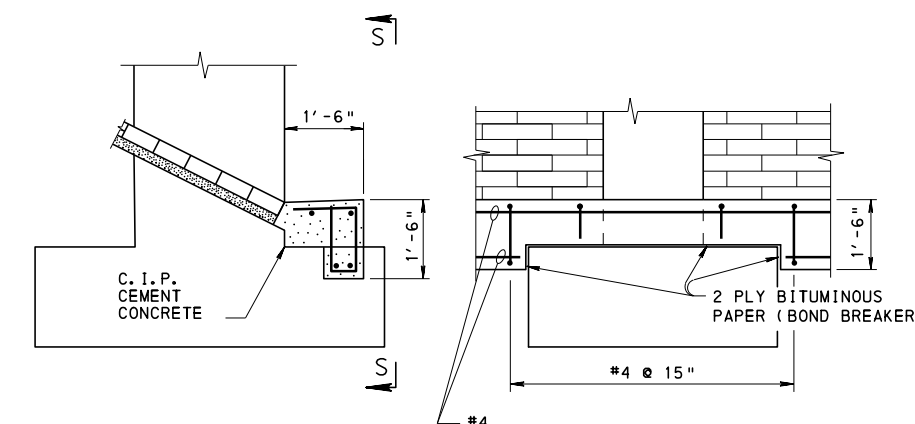
SCORE DETAIL



SECTION E-E

SECTION H-H

CAST-IN-PLACE CEMENT CONCRETE SLABS



SECTION B-B OR F-F

VIEW S-S

DETAIL J

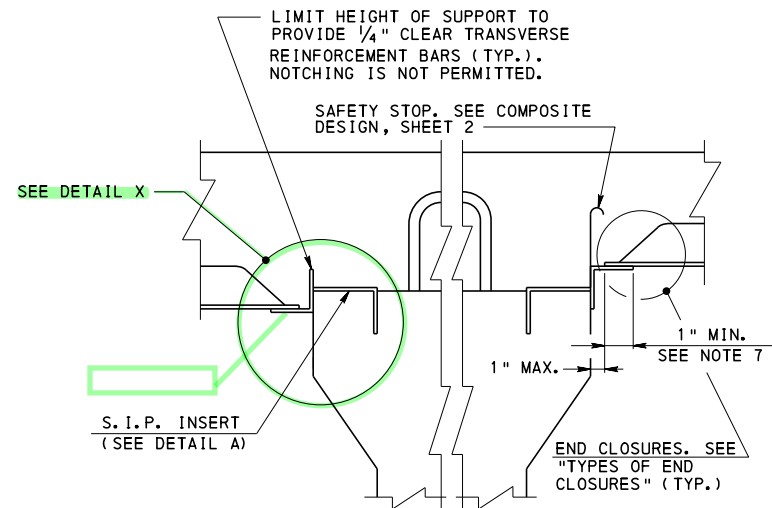
(WHEN THE COVER ON THE FOOTING IS LESS THAN 1'-6") (PRECAST CEMENT CONCRETE BLOCKS SHOWN; C.I.P. CEMENT CONCRETE SLABS SIMILAR)

NOTES:

1. ALL REINFORCEMENT STEEL BARS SHOWN MEET THE REQUIREMENTS OF ASTM A 615, A 996 OR A 706.
2. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
3. CONSTRUCT SLOPE WALL OF EITHER PRECAST CEMENT CONCRETE BLOCKS OR CAST-IN-PLACE CEMENT CONCRETE SLABS IN ACCORDANCE WITH SECTION 673 OF PUBLICATION 408.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

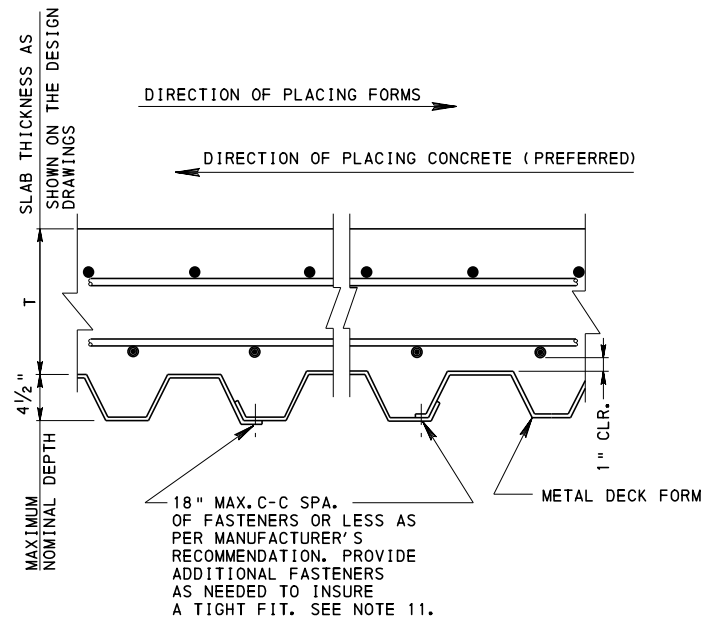
STANDARD
CEMENT CONCRETE
SLOPE WALL



SUPPORT AT P/S CONCRETE BEAM

DETAIL SHOWN FOR P/S I-BEAM BRIDGE, DETAIL SIMILAR FOR P/S BOX BEAM BRIDGE

NOTE:
THE REQUIREMENT FOR SAFETY STOPS CAN BE WAIVED IF IT IS SPECIFIED ON THE SHOP DETAIL DRAWINGS THAT EACH SHEET BE SCREWED DOWN IMMEDIATELY UPON PLACEMENT. THIS SPECIFICATION SHOULD BE MADE HIGHLY VISIBLE ON THE DRAWINGS.



TYPICAL LONGITUDINAL SECTION

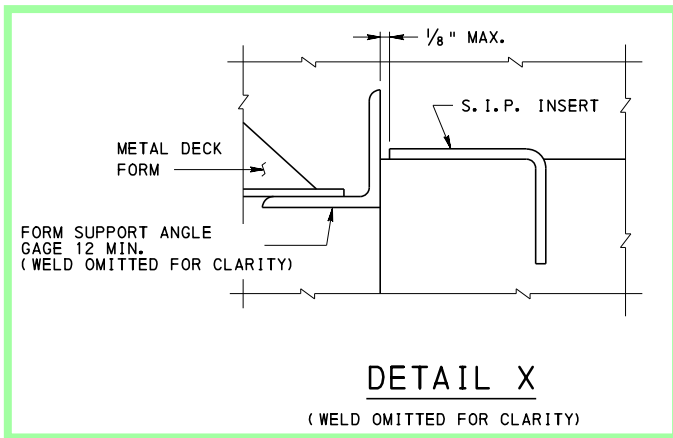
- THE MAXIMUM CORRUGATION DEPTH AND WIDTH SHALL BE SUCH THAT THE TOTAL DEAD LOAD OF THE FORM AND THE CONCRETE IN THE FORM DOES NOT EXCEED 15 LB/FT²
- FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408.
2. USE THIS STANDARD AS A GUIDE IN THE PREPARATION OF SHOP DETAIL DRAWINGS.
3. SHOW THICKNESS AND SIZE OF SUPPORTING ELEMENTS AND METAL DECK FORMS ON THE SHOP DRAWINGS ALONG WITH LENGTH, SIZE AND SPACING OF WELDS.
4. METAL DECK FORM CLOSURES AND STYROFOAM FILLERS MAY BE USED AS SHOWN ON DESIGN DRAWINGS TO REDUCE DEAD LOAD. SEAL END CLOSURES TO ENSURE THAT BLEED WATER DOES NOT DRAIN OUT.
5. DESIGN ALL METAL DECK FORM SUPPORTS AND THEIR ATTACHMENTS TO CARRY DEAD LOAD OF DECK SLAB (INCLUDES CONCRETE IN CORRUGATIONS) PLUS 50 LBS./SQ. FT. FOR CONSTRUCTION LOADS.
6. ALSO INCLUDE ALL RESULTANT HORIZONTAL LOADS DUE TO FORMING OF CANTILEVER OVERHANGS IN THE DESIGN OF METAL DECK FORM SUPPORTS AND ATTACHMENT DETAILS.
7. SECURELY FASTEN ALL METAL DECK FORMS TO FORM SUPPORT ANGLES AND PROVIDE A MINIMUM BEARING LENGTH OF 1" AT EACH END.
8. ATTACH METAL DECK FORM SHEETS PROPERLY TO AVOID HAZARDS THAT CAN RESULT FROM LATERAL MOVEMENT OR SUDDEN UPLIFT. PROVIDE SAFETY STOPS WHERE NECESSARY.
9. CONNECT ADJOINING HAUNCH ANGLE OR CHANNEL BY WELDING.
10. ALL METAL DECK FORMS MUST HAVE FACTORY CLOSED ENDS.
11. USE 3/8" HWH x 1/4"- 14 THREADS/INCH SCREW FASTENER TO CONNECT METAL DECK FORMS.
12. METAL DECK FORMS TO BE DESIGNED FOR MAXIMUM DEPTH OF CONCRETE IN THE BAY TO ACCOUNT FOR A SUPERELEVATION CROWN FALLING BETWEEN BEAMS ADDING SIGNIFICANT ADDITIONAL DECK THICKNESS.
13. FOR WELD DETAILS SEE SHEET 2.
14. FOR STAGED CONSTRUCTION, DETAIL DECK FORMS SPANNING BETWEEN BEAMS OF DIFFERENT STAGES TO ACCOMMODATE THE VERTICAL AND LATERAL MOVEMENTS DURING CONSTRUCTION INCLUDING DECK PLACEMENT.
15. DURING STAGED CONSTRUCTION, DO NOT USE DECK FORMS SPANNING BETWEEN GIRDERS OF DIFFERENT STAGES AS A WORK PLATFORM.
16. DESIGN COMPUTATIONS AND SHOP DRAWINGS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE ARE REQUIRED TO BE SUBMITTED FOR CONDITIONS THAT EXCEED THE LIMITATIONS PROVIDED IN THE TABLES.

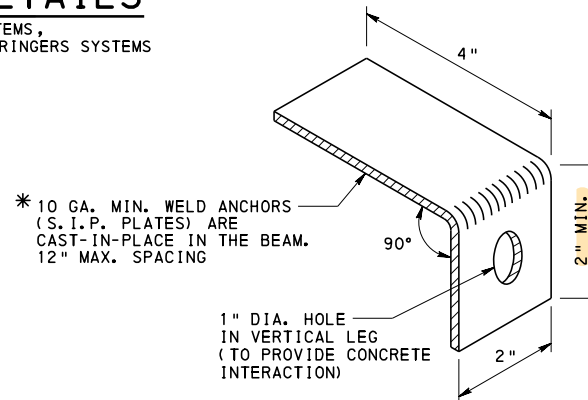
SUGGESTED SUPPORT DETAILS

FOR STEEL BEAM SYSTEMS, STEEL GIRDER SYSTEMS, GIRDER-FLOOR BEAM SYSTEMS AND GIRDER-FLOOR BEAM-STRINGERS SYSTEMS



DETAIL X

(WELD OMITTED FOR CLARITY)

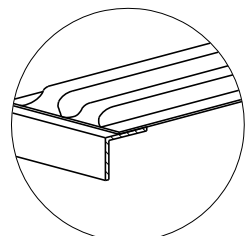


S. I. P. INSERT

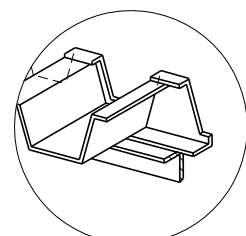
DETAIL A

* FOR LARGE BEAM SPACINGS THE DESIGN OF THE INSERT MAY REQUIRE THAT THE GAGE BE INCREASED AND/OR THE SPACING BE DECREASED

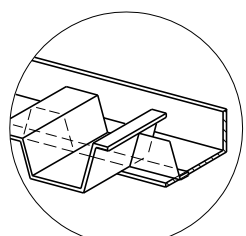
- CHANGE 2
- CHANGE 4



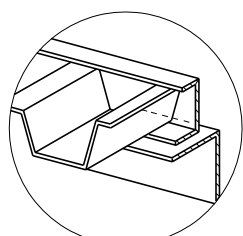
PRECLOSED
**DECK FORM
END CLOSURE**



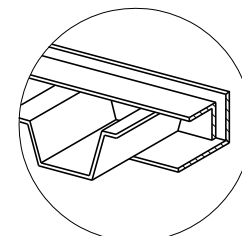
BUTT
ALTERNATE DECK FORM END CLOSURES



UNDERFORM



CHANNEL OR ANGLE



ANGLE OR CHANNEL
**THIS DETAIL
NOT PERMITTED**

TYPES OF END CLOSURES

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

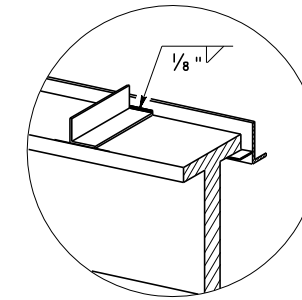
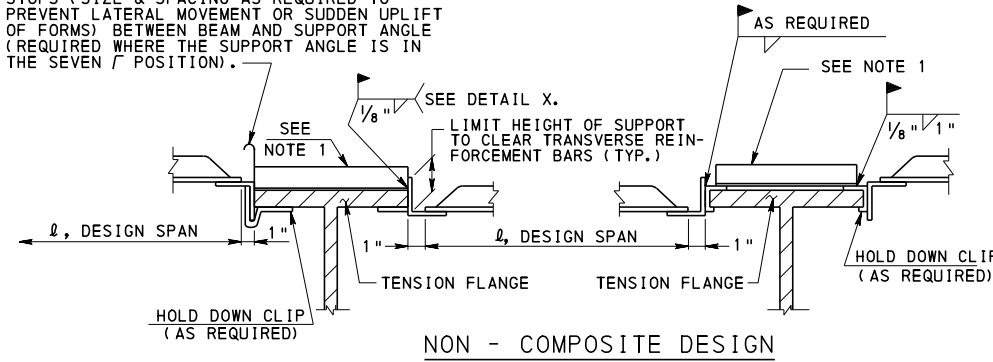
**STANDARD
PERMANENT METAL
DECK FORMS**

RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 1 OF 3
BC-732M

PRIOR TO PLACING FORMS, HAMMER SAFETY STOPS (SIZE & SPACING AS REQUIRED TO PREVENT LATERAL MOVEMENT OR SUDDEN UPLIFT OF FORMS) BETWEEN BEAM AND SUPPORT ANGLE (REQUIRED WHERE THE SUPPORT ANGLE IS IN THE SEVEN / POSITION).



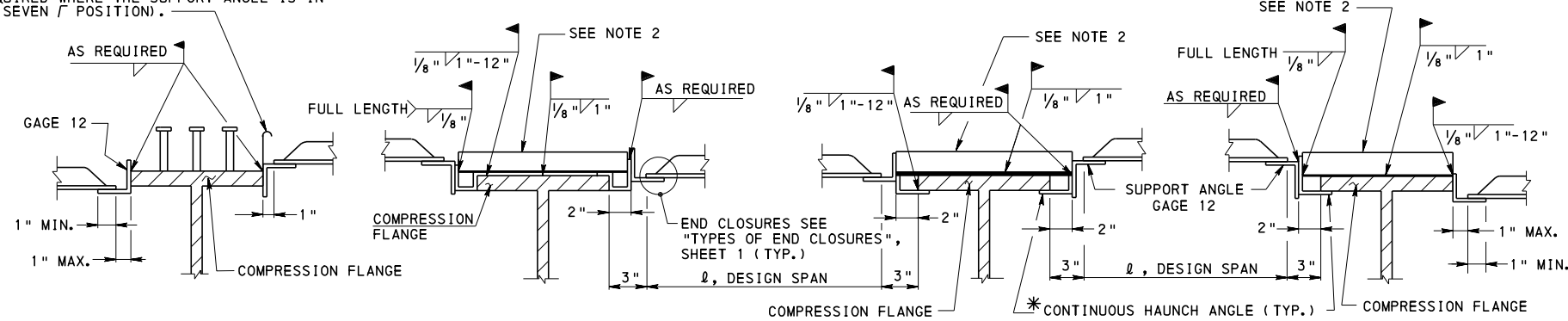
DETAIL X

TOP FLANGE - TENSION

NOTE 1:

TENSION BAR, ANGLE OR CHANNEL, SIZE/SPACING AS REQUIRED. MINIMUM BAR GALVANIZED 2" x 8 GAGE MAX. SPACING 1'-3", ANGLE OR CHANNEL GAGE 12, WITH MAXIMUM SPACING 24". WELDING TYPICAL EACH SIDE, UNLESS NOTED.

PRIOR TO PLACING FORMS, HAMMER SAFETY STOPS (SIZE & SPACING AS REQUIRED TO PREVENT LATERAL MOVEMENT OR SUDDEN UPLIFT OF FORMS) BETWEEN BEAM AND SUPPORT ANGLE (REQUIRED WHERE THE SUPPORT ANGLE IS IN THE SEVEN / POSITION).



**COMPOSITE DESIGN
CONDITION 1**

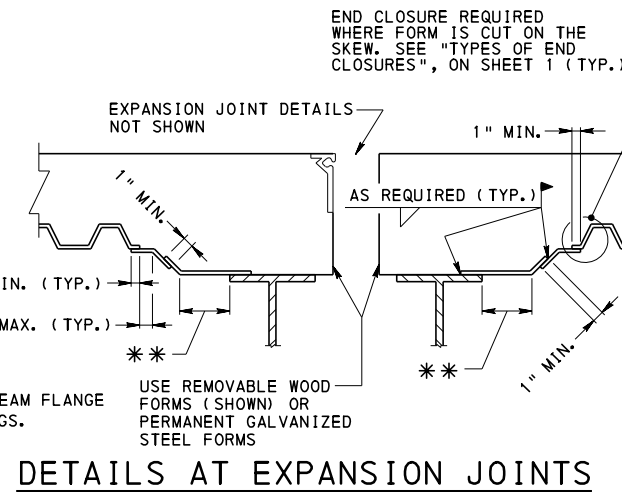
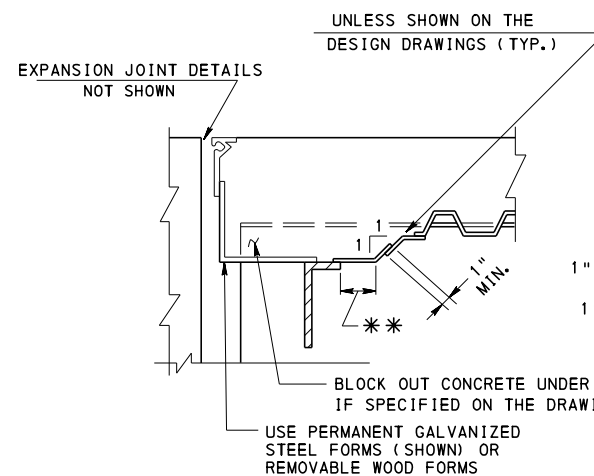
**NON - COMPOSITE DESIGN
CONDITION 2**

* FOR REHABILITATIONS, STEEL MUST BE PREPAINTED.

IN NON-COMPOSITE COMPRESSION FLANGES THE HAUNCH ANGLE MAY BE ELIMINATED WHENEVER THE BOTTOM OF THE METAL DECK FORM IS AT OR BELOW THE BOTTOM OF THE TOP FLANGE.

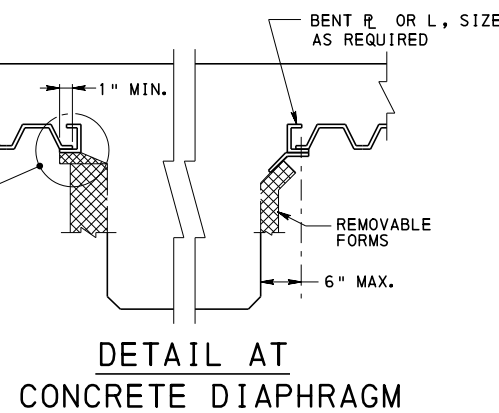
NOTE 2:

HAUNCH ANGLE OR CHANNEL, SIZE/SPACING AS REQUIRED. MINIMUM GAGE 12, WITH MAXIMUM SPACING 24". WELDING TYPICAL EACH SIDE, UNLESS NOTED.



DETAILS AT EXPANSION JOINTS

** AS SHOWN ON THE DESIGN DRAWINGS. 6" MAX.



**DETAIL AT
CONCRETE DIAPHRAGM**

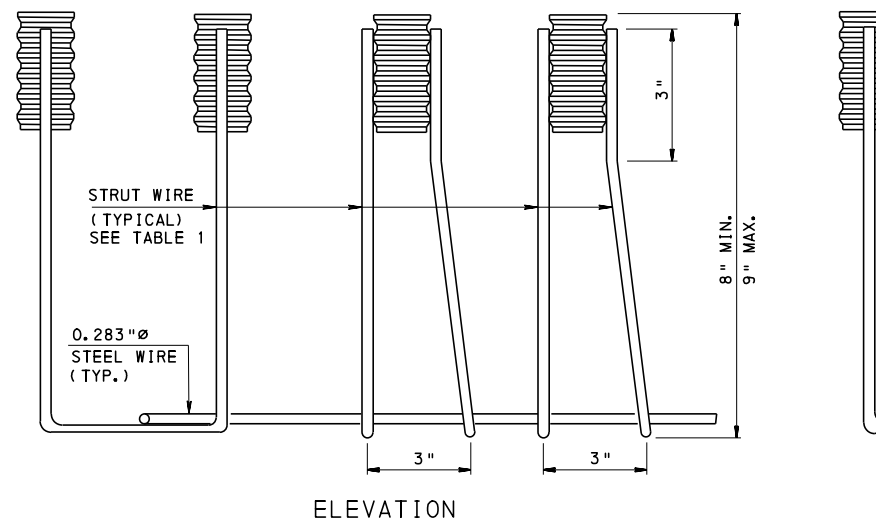
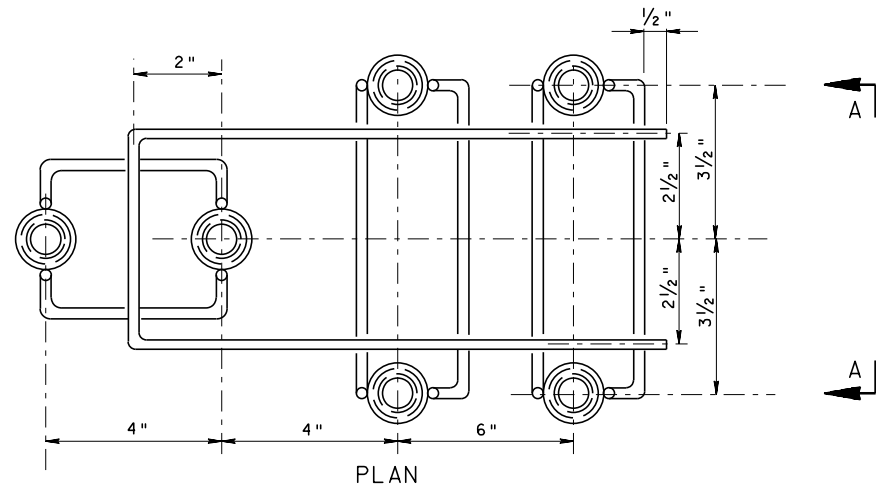
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

**STANDARD
PERMANENT METAL
DECK FORMS**

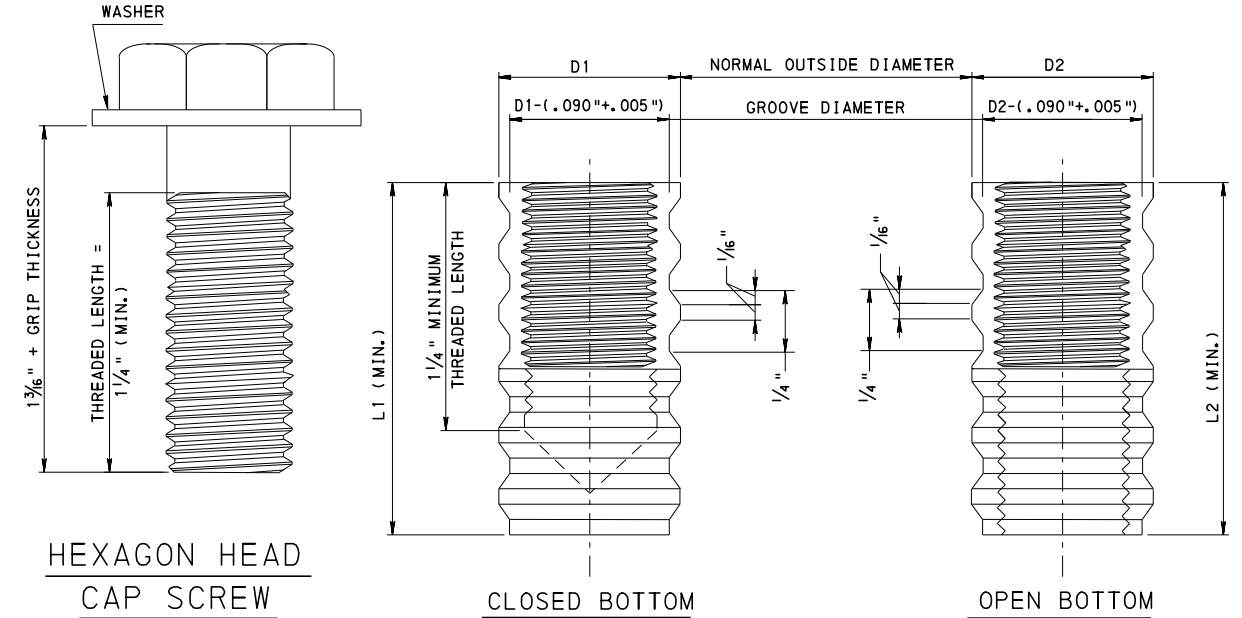
RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF ENGINEER, HIGHWAY ADMIN.

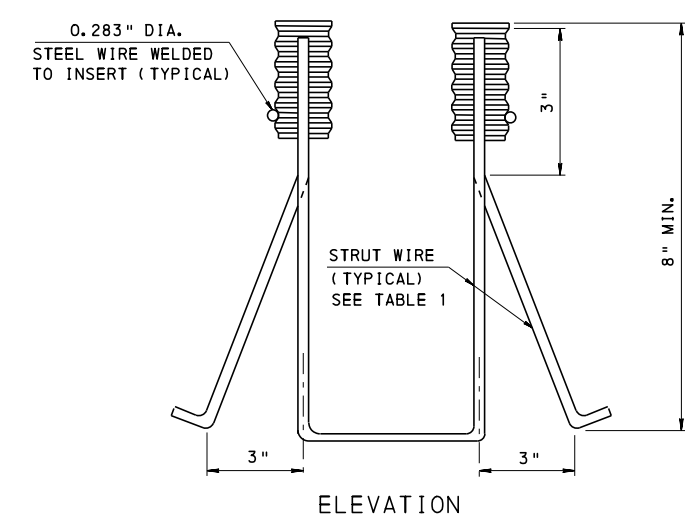
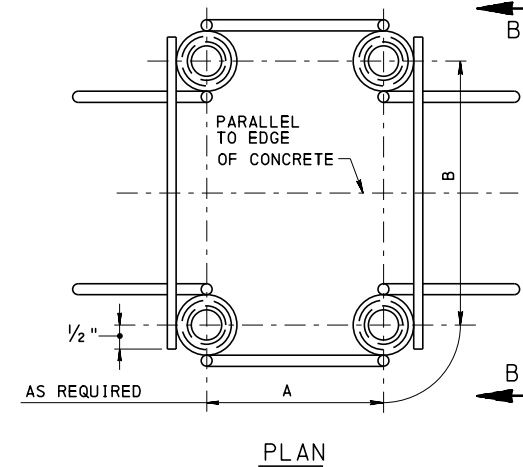
SHEET 2 OF 3
BC-732M



TYPE A INSERT ASSEMBLY
(INCLUDES CAP SCREWS AND WASHERS)



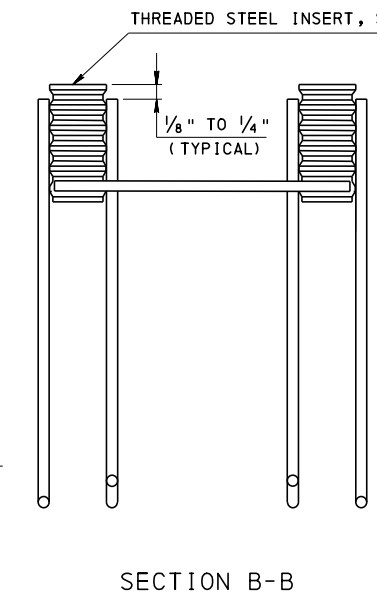
THREADED STEEL INSERTS DETAIL
FOR DIMENSIONS, SEE TABLE 2



TYPE B INSERT ASSEMBLY
(INCLUDES CAP SCREWS AND WASHERS)

CAP SCREW DIAMETER	DIA. OF STRUT WIRE (MIN.)
3/4"	0.344"
7/8"	0.375"
1"	0.438"

CAP SCREW DIAMETER	TYPE OF INSERTS			
	CLOSED BOTTOM		OPEN BOTTOM	
	D1	L1	D2	L2
3/4"	1"	1 5/8"	1 1/8"	1 1/4"
7/8"	1 1/8"	1 3/4"	1 1/4"	1 3/8"
1"	1 1/4"	1 7/8"	1 3/8"	1 1/2"



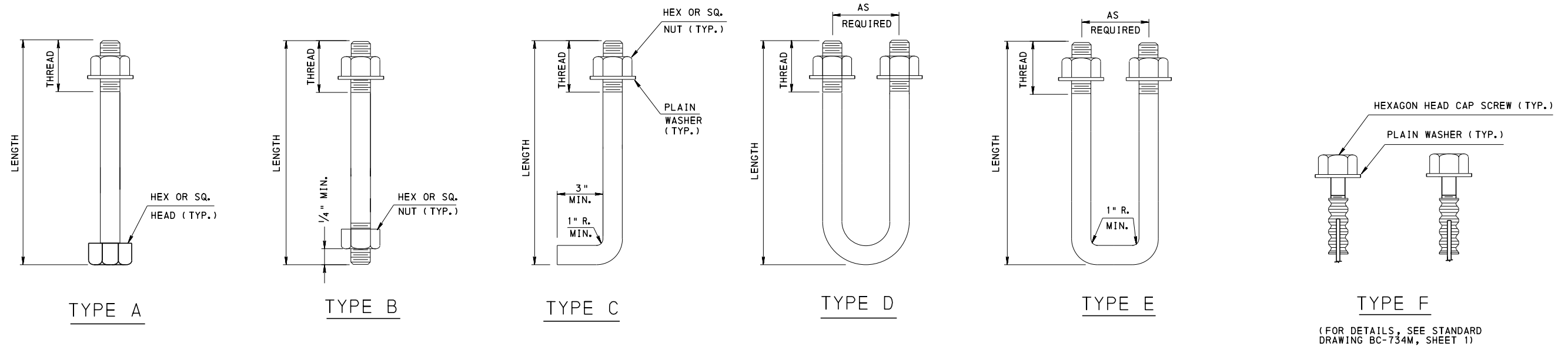
- CHANGE 1
- CHANGE 2
- CHANGE 3

NOTES

- PROVIDE MATERIALS AND **PERFORM WORK** IN ACCORDANCE WITH SPECIFICATIONS PUBLICATION 408.
- PROVIDE THREADED STEEL INSERTS IN ACCORDANCE WITH ASTM DESIGNATION A29, GRADE 12L14. PROVIDE STRUT WIRE OF EITHER ASTM DESIGNATION A510 GRADE 1018 WITH A MINIMUM TENSILE STRENGTH OF 80 KSI OR ASTM A82 (TABLE 1 TENSILE STRENGTH REQUIREMENTS, 80 KSI), BOTH WITH A CARBON RANGE OF 0.15 - 0.20%.
- PROVIDE GALVANIZED ASTM A307 GRADE A CAP SCREWS AND WASHERS CONFORMING TO SECTION 1105 OF PUBLICATION 408.
- PROVIDE WELDED CONNECTION BETWEEN STEEL INSERTS AND STRUTS EQUAL TO OR GREATER THAN THE STRENGTH OF THE ASTM A307 GRADE A CAP SCREW.
- ACCURATELY SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE SECURELY AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED. USE THE INSTALLATION PROCEDURE AND TYPE OF INSERTS, WHETHER CLOSED BOTTOM OR OPEN BOTTOM, IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. TAKE CARE TO KEEP THE INSIDE OF THE INSERT CLEAN.
- PROVIDE EPOXY COATED INSERT ASSEMBLIES.
- PROVIDE THREAD FOR SCREWS AND STEEL INSERTS CONFORMING TO SECTION 1105 OF PUBLICATION 408.
- USE THE ANCHOR ASSEMBLIES AS AN ALTERNATE TO CAST-IN-PLACE ANCHOR BOLTS OR SLEEVE ANCHOR ASSEMBLIES FOR THE FOLLOWING LOCATIONS, AT NO ADDITIONAL COST TO THE DEPARTMENT.
 - (1) ATTACHING BASE PLATES FOR GUIDE RAIL **TRANSITION** TO CONCRETE.
- USE NYLON BUSHINGS OR OTHER APPROVED METHOD, WHEN ATTACHING ALUMINUM BASE PLATE OR POST TO CONCRETE, TO PREVENT ELECTROLYTIC REACTION BETWEEN THE TWO TYPES OF METAL BEING USED.
- SHOW DIAMETER, PROJECTION, THREAD LENGTH AND LENGTH OF ANCHOR BOLTS ON DESIGN DRAWINGS.
- BOLT DIAMETER INDICATED ON THE DRAWINGS IS NOMINAL OR BASIC BOLT DIAMETER.

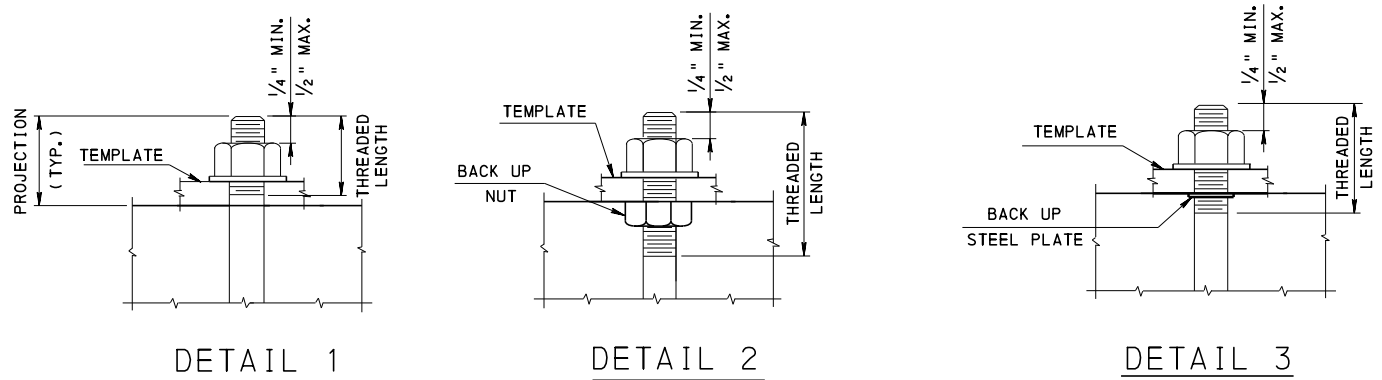
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
ANCHOR SYSTEMS



(FOR DETAILS, SEE STANDARD DRAWING BC-734M, SHEET 1)

TYPES OF ANCHORS



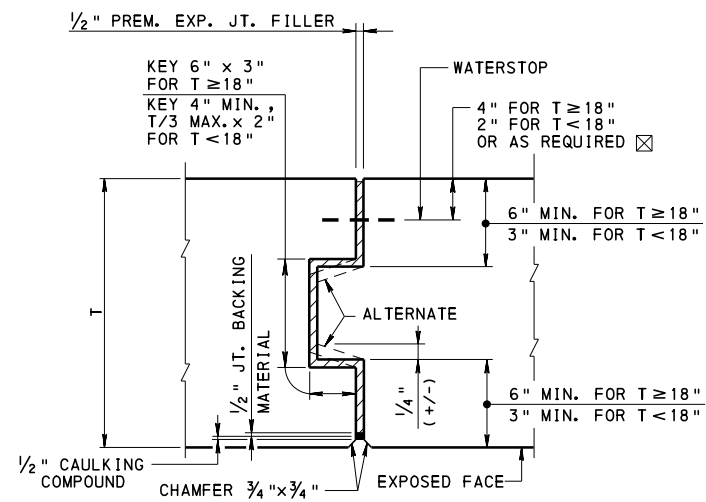
CONSTRUCTION NOTES

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE **SECURELY** AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED.
2. THE USE OF A BACK UP NUT OR PLATE, AS SHOWN IN DETAIL 2 OR 3, WILL FACILITATE SETTING OF ANCHOR BOLTS TO THEIR CORRECT ELEVATION AND ALIGNMENT. THREADED LENGTH OF ANCHOR BOLTS DEPENDS ON THE METHOD OF INSTALLATION CHOSEN BY THE CONTRACTOR.
3. TEMPLATE THICKNESS = BASE OR BASE PLATE THICKNESS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

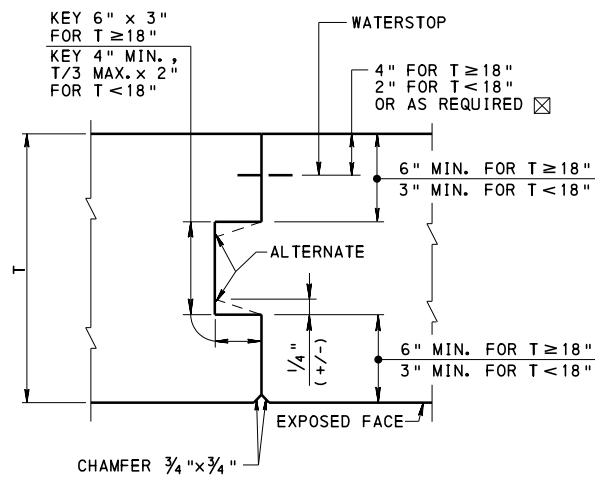
STANDARD
ANCHOR SYSTEMS

RECOMMENDED FEB. 19, 2021 <i>Thomas P. Mociore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED FEB. 19, 2021 <i>Burt Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 2 OF 2 BC-734M
--	---	-------------------------



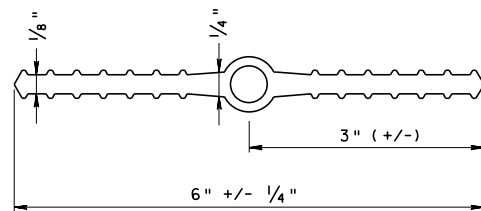
KEYED EXPANSION JOINT

(FLUSH EXPANSION JOINT SIMILAR EXCEPT OMIT KEY)
CHAMFER DIMENSIONS ARE NOMINAL AND MAY VARY 1/4" (+/-).



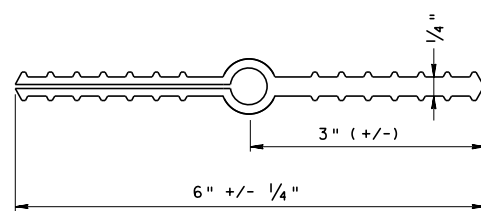
CONSTRUCTION JOINTS

- NOTES:**
1. KEY DIMENSIONS ARE NOMINAL AND MAY VARY 1/2" (+/-).
 2. STOP KEYED JOINTS IN TOP OF EXPOSED WALL FLUSH TO A DEPTH OF 12".
 3. STOP WATERSTOP 12" FROM TOP OF WALL.



POLYVINYL CHLORIDE

TYPE C1

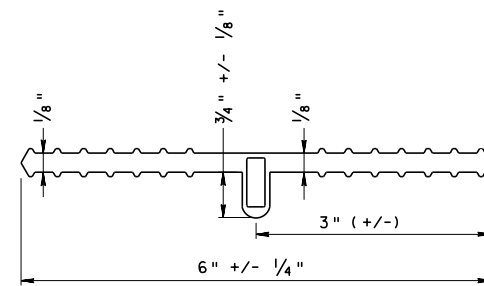


POLYVINYL CHLORIDE

TYPE C2

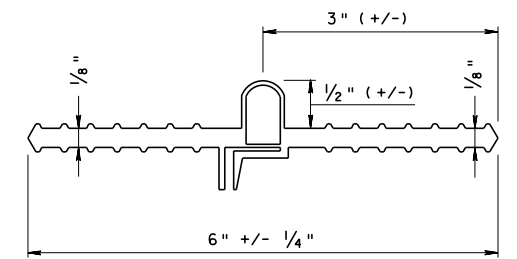
WATERSTOPS FOR CONSTRUCTION JOINTS

NOTE:
PROVIDE HOLES OR SLOTS IN WATERSTOP, AS REQUIRED, WHEN NECESSARY TO ACCOMMODATE REINFORCEMENT BARS, BUT DO NOT COMPROMISE SEAL.



POLYVINYL CHLORIDE

TYPE E1

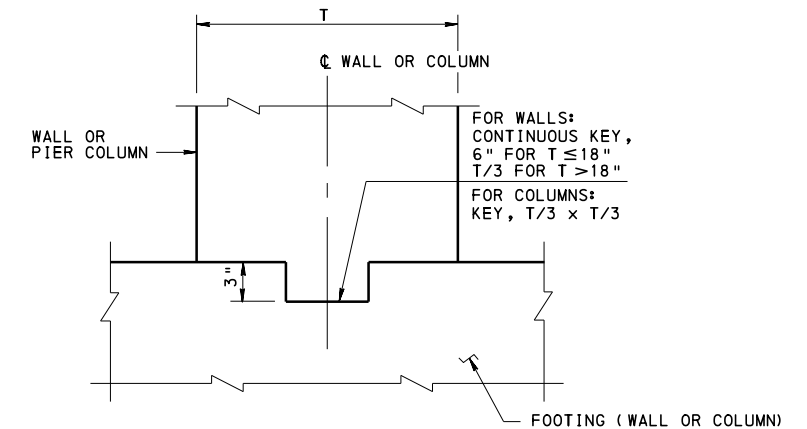
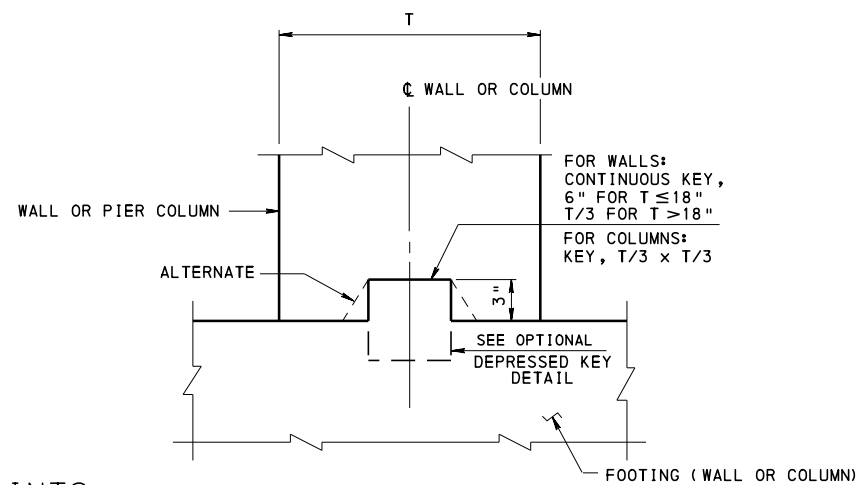


POLYVINYL CHLORIDE

TYPE E2

WATERSTOPS FOR EXPANSION JOINTS

NOTE:
PROVIDE HOLES OR SLOTS IN WATERSTOP, AS REQUIRED, WHEN NECESSARY TO ACCOMMODATE REINFORCEMENT BARS, BUT DO NOT COMPROMISE SEAL.



OPTIONAL DEPRESSED KEY DETAIL

NOTE: OPTIONAL DEPRESSED KEY DETAIL IS TO BE USED ONLY WHEN SHOWN ON CONTRACT DRAWINGS. SURFACES OF DEPRESSED KEY MUST BE ROUGHENED TO ENSURE ADEQUATE BOND WITH NEW CONCRETE.

GENERAL NOTES:

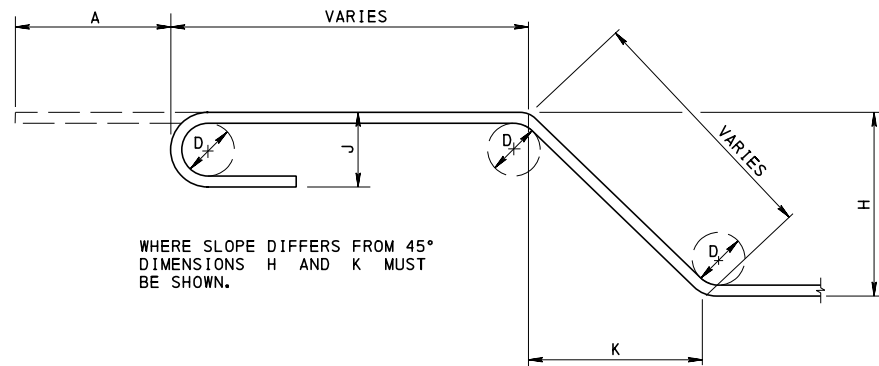
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408.
2. WHEN TYPE C2 WATERSTOP IS USED TO FACILITATE INSTALLATION, JOIN THE SPLIT-FLANGE TOGETHER USING PVC SOLVENT CEMENT MEETING THE REQUIREMENTS OF ASTM D 2564, AFTER THE FORMS FOR THE FIRST PLACEMENT OF CONCRETE ARE REMOVED.
3. CONTRACTOR HAS THE OPTION TO SELECT ANY OF THE WATERSTOPS SHOWN.

LEGEND:

- ☒ = PLACE WATERSTOP INSIDE OF REINFORCEMENT BARS.
- T = THICKNESS OF WALL OR DIAMETER OF COLUMN, AND IS THE LEAST DIMENSION.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
WALL CONSTRUCTION & EXPANSION
JOINT DETAILS**



BAR BENDING DETAILS

UNLESS OTHERWISE NOTED, DIAMETER D IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.

STANDARD REINFORCEMENT BARS

BAR SIZE	WEIGHT (LBS./FT.)	NOMINAL DIAMETER (INCHES)	NOMINAL CROSS SECTIONS AREA (SQ. IN.)	NOMINAL PERIMETER (INCHES)
#3	.376	.375	.11	1.178
#4	.668	.500	.20	1.571
#5	1.043	.625	.31	1.963
#6	1.502	.750	.44	2.356
#7	2.044	.875	.60	2.749
#8	2.670	1.000	.79	3.142
#9	3.400	1.128	1.00	3.544
#10	4.303	1.270	1.27	3.990
#11	5.313	1.410	1.56	4.430
#14	7.650	1.693	2.25	5.320
#18	13.600	2.257	4.00	7.090

GENERAL NOTES:

- PROVIDE MATERIAL AND WORKMANSHIP IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATIONS AS OUTLINED IN THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408 SECTION 1002.
- DESIGNATE REINFORCEMENT BARS AS FOLLOWS TO AVOID ANY MISINTERPRETATION.
 - (A) REFER DEFORMED REINFORCEMENT BAR SIZES BY NUMBER, FOR EXAMPLE, #3, #4, #5, ETC.
 - (B) INDICATE PLAIN REINFORCEMENT BAR SIZES BY DIAMETER IN FRACTIONS OF AN INCH, FOR EXAMPLE, 3/8"Ø, 1/2"Ø, 5/8"Ø, ETC.
 - (C) INDICATE STEEL WIRE FABRIC BY A LETTER (W FOR SMOOTH WIRE, D FOR DEFORMED WIRE) FOLLOWED BY A NUMBER WHICH INDICATES THE AREA OF THE WIRE IN HUNDRETHS OF A SQUARE INCH, FOR EXAMPLE, W16 OR D16.
 - (D) INDICATE SMOOTH STEEL WIRE FABRIC THUS: WWF6x9-W10xW12 (DENOTES LONGITUDINAL WIRES ARE 6 INCHES ON CENTERS, TRANSVERSE WIRES ARE 9 INCHES ON CENTERS). THE AREA OF THE LONGITUDINAL WIRE IS 0.10 SQUARE INCHES AND THE AREA OF THE TRANSVERSE WIRE IS 0.12 SQUARE INCHES.) FOR DEFORMED WELDED WIRE FABRIC, DESIGNATE WWF6x9-D10xD12.
 - (E) ALL REINFORCEMENT DIMENSIONS ARE MEASURED OUT-TO-OUT OF THE BAR EXCEPT THE "A" DIMENSION ON STANDARD 180° AND 135° HOOKS.
- SPLICING & LAPPING:
 - (A) SPLICE BARS ONLY AS SHOWN ON THE DESIGN DRAWINGS OR AS AUTHORIZED BY THE ENGINEER. WHEN LAP SPlicing IS SHOWN ON THE DESIGN DRAWINGS, LAP THE REINFORCEMENT BARS FOR A LENGTH ACCORDING TO AASHTO LRFD ARTICLE 5.10.8.4 AND SECURELY WIRE TOGETHER.
 - (B) SPLICE WELDED WIRE FABRIC IN ACCORDANCE WITH AASHTO LRFD ARTICLE 5.10.8.5.
 - (C) INCREASE THE BAR LAPS BY 20% FOR A THREE BAR BUNDLE. ADD 33% FOR A FOUR BAR BUNDLE. DO NOT OVERLAP INDIVIDUAL BAR SPLICES WITHIN THE BUNDLE.
- CONFORM REINFORCEMENT BARS TO THE DIMENSIONS SHOWN ON THE DRAWINGS AND WITHIN THE FABRICATION TOLERANCES AS SHOWN IN THE CURRENT "MANUAL OF STANDARD PRACTICE FOR REINFORCED CONCRETE CONSTRUCTION" AS PUBLISHED BY THE CONCRETE REINFORCING STEEL

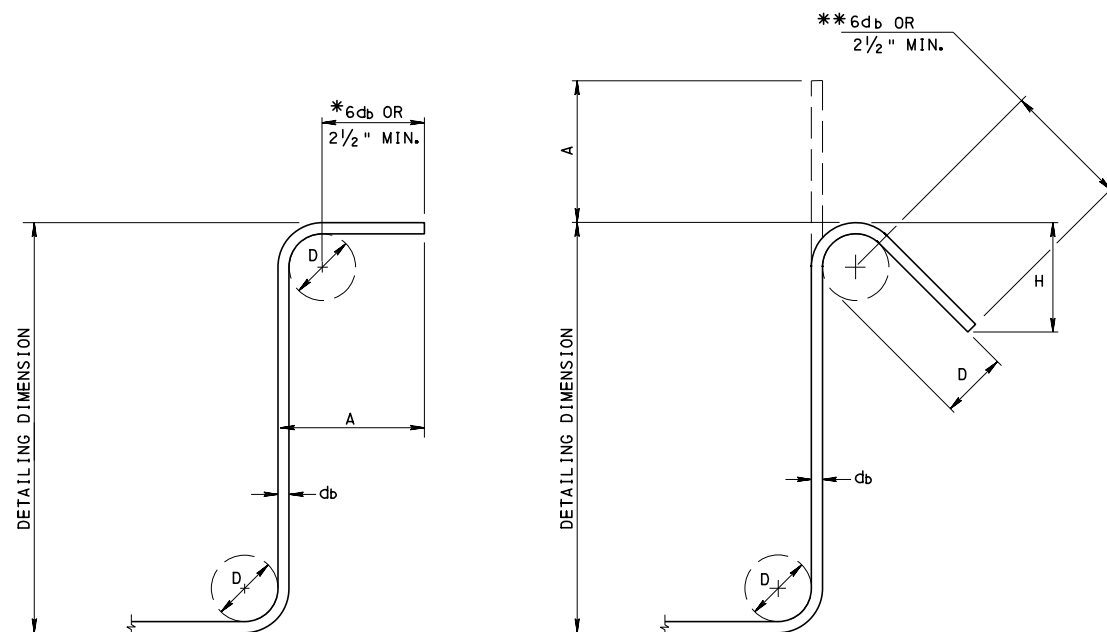
RECOMMENDED END HOOK DIMENSIONS

GRADE 60

BAR SIZE	90° HOOKS		180° HOOKS		
	D	A	D	A	J
#3	2 1/4"	6"	2 1/4"	5"	3"
#4	3"	8"	3"	6"	4"
#5	3 3/4"	10"	3 3/4"	7"	5"
#6	4 1/2"	1'-0"	4 1/2"	8"	6"
#7	5 1/4"	1'-2"	5 1/4"	10"	7"
#8	6"	1'-4"	6"	11"	8"
#9	9 1/2"	1'-7"	9 1/2"	1'-3"	11 3/4"
#10	10 3/4"	1'-10"	10 3/4"	1'-5"	1'-1 1/4"
#11	12"	2'-0"	12"	1'-7"	1'-2 3/4"
#14	18 1/4"	2'-7"	18 1/4"	2'-3"	1'-9 3/4"
#18	24"	3'-5"	24"	3'-0"	2'-4 1/2"

COMMON STOCK STYLES OF WELDED WIRE FABRIC

STYLE DESIGNATION	STEEL AREA SQ. IN. PER FT.		WEIGHT APPROX. LBS. PER 100 S.F.
	LONGIT.	TRANS.	
ROLLS			
6x6-W1.4xW1.4	.028	.028	21
6x6-W2.1xW2.1	.040	.040	29
6x6-W2.9xW2.9	.058	.058	42
6x6-W4.0xW4.0	.080	.080	58
4x4-W1.4xW1.4	.042	.042	31
4x4-W2.1xW2.1	.060	.060	43
4x4-W2.9xW2.9	.087	.087	62
4x4-W4.0xW4.0	.120	.120	85
SHEETS			
6x6-W2.9xW2.9	.058	.058	42
6x6-W4.0xW4.0	.080	.080	58
6x6-W5.5xW5.5	.110	.110	80
4x4-W4.0xW4.0	.120	.120	85



90° HOOKS

135° HOOKS

STIRRUPS (TIES SIMILAR)

D = 4db FOR #3 THROUGH #5 BARS
D = 6db FOR #6 BARS

RECOMMENDED STIRRUP AND TIE HOOK DIMENSIONS

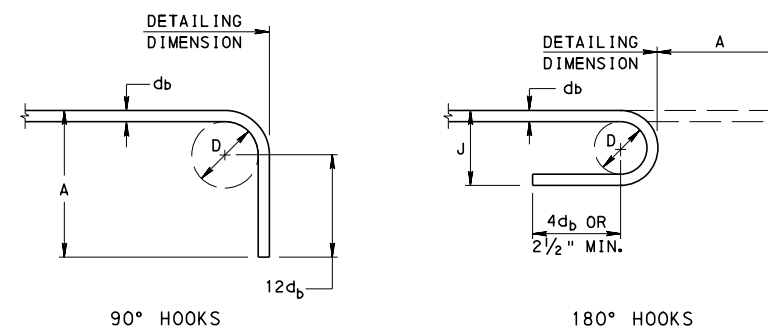
* 6db FOR #3, #4, AND #5
12db FOR #6.
** FOR SEISMIC HOOKS USE 6db OR 3" MIN.

GRADE 60

BAR SIZE	D	90° HOOK		135° HOOK
		A	A	APPROXIMATE H
#3	1 1/2"	4"	4"	2 1/2"
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	1'-0"	8"	4 1/2"

GRADE 60 SEISMIC STIRRUP AND TIE

BAR SIZE	D	135° HOOK	
		A	APPROXIMATE H
#3	1 1/2"	4 1/4"	3"
#4	2"	4 1/2"	3"
#5	2 1/2"	5 1/2"	3 3/4"
#6	4 1/2"	8"	4 1/2"



90° HOOKS

180° HOOKS

D = 6db FOR #3 THROUGH #8
D = 8db FOR #9, #10, AND #11
D = 10db FOR #14 AND #18

BARS THAT ARE REQUIRED TO BE BENT TO A LARGER RADIUS THAN SHOWN IN THE FOLLOWING TABLE MAY BE BENT IN THE FIELD.

#4	15 FT.	#8	80 FT.
#5	25 FT.	#9	110 FT.
#6	40 FT.	#10	130 FT.
#7	60 FT.	#11	150 FT.

#14 & #18 - ALL BENDING PREFABRICATED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD REINFORCEMENT BAR FABRICATION DETAILS

RECOMMENDED NOV. 23, 2022
L. W. Gray
CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022
Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 1 OF 3
BC-736M

CHANGE 2
CHANGE 4

DEVELOPMENT LENGTH AND LAP SPLICE LENGTH OF DEFORMED BARS IN COMPRESSION

FOR REINFORCING STEEL GRADE 60
AASHTO LRFD SPECIFICATIONS, ARTICLES 5.10.8.2.2a AND 5.10.8.4.5a

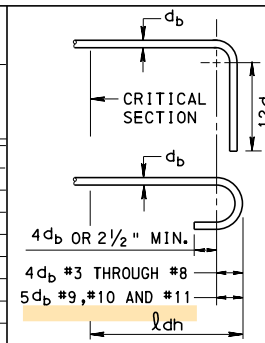
BAR SIZE	DIA. OF BAR d_b (IN.)	$f'_c = 3,000$ PSI (CLASS A)		$f'_c = 3,500$ PSI (CLASS AA)		$f'_c = 4,000$ PSI (CLASS AAA OR AAAP)		$f'_c = 4,500$ PSI	
		DEVELOP. LENGTH (IN.)	SPLICE LENGTH (IN.)	DEVELOP. LENGTH (IN.)	SPLICE LENGTH (IN.)	DEVELOP. LENGTH (IN.)	SPLICE LENGTH (IN.)	DEVELOP. LENGTH (IN.)	SPLICE LENGTH (IN.)
#3	0.375	9	12	8	12	8	12	8	12
#4	0.500	11	15	11	15	10	15	9	15
#5	0.625	14	19	13	19	12	19	12	19
#6	0.750	17	23	16	23	15	23	14	23
#7	0.875	20	27	18	27	17	27	16	27
#8	1.000	22	30	21	30	19	30	18	30
#9	1.128	25	34	23	34	22	34	21	34
#10	1.270	28	39	26	39	24	39	23	39
#11	1.410	31	43	29	43	27	43	26	43
#14	1.693	37	51	35	51	32	51	31	51
#18	2.257	50	68	46	68	43	68	41	68

NOTE: A FACTOR OF 0.75 CAN BE APPLIED IF THE REINFORCEMENT IS ENCLOSED WITHIN A SPIRAL COMPOSED OF BARS NOT LESS THAN 1/4" IN DIAMETER AND SPACED AT NOT MORE THAN 4" PITCH. BUT THE DEVELOPMENT LENGTH CANNOT BE LESS THAN 8" AND SPLICE LENGTH CANNOT BE LESS THAN 12".

DEVELOPMENT LENGTH OF STANDARD HOOKS IN TENSION

FOR REINFORCING STEEL GRADE 60
AASHTO LRFD SPECIFICATION, ARTICLE 5.10.8.2.4a

BAR SIZE	DIA. OF BAR d_b (IN.)	$f'_c = 3,000$ PSI	$f'_c = 3,500$ PSI	$f'_c = 4,000$ PSI	$f'_c = 4,500$ PSI
		l_{dh} (IN.)	l_{dh} (IN.)	l_{dh} (IN.)	l_{dh} (IN.)
#3	0.375	9	8	8	7
#4	0.500	11	11	10	9
#5	0.625	14	13	12	12
#6	0.750	17	16	15	14
#7	0.875	20	18	17	16
#8	1.000	22	21	19	18
#9	1.128	25	23	22	21
#10	1.270	28	26	25	23
#11	1.410	31	29	27	26



- NOTE:
- A FACTOR OF 0.8 CAN BE APPLIED, IF THE SIDE COVER (NORMAL TO PLANE OF HOOK) IS NOT LESS THAN 2 1/2", AND FOR 90° HOOK, COVER ON BAR EXTENSION BEYOND HOOK IS NOT LESS THAN 2".
 - INCREASE THE DEVELOPMENT LENGTH, l_{dh} , BY 1.2 FOR EPOXY COATED HOOKS IN TENSION.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
REINFORCEMENT BAR
FABRICATION DETAILS

RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 2 OF 3
BC-736M

INFORMATION CONTAINED IN THE BD-641M DESIGN TABLES

- DESIGN TABLES ON STANDARD DRAWING BD-641M WERE DEVELOPED USING A COMPUTER PROGRAM AND ARE BASED ON THE DESIGN CRITERIA SHOWN ON THIS SHEET.
- THE MEMBER SIZES INDICATED IN THE DESIGN TABLES MEET THE FATIGUE REQUIREMENTS FOR FATIGUE CATEGORY II. THE DESIGNER MUST CHECK THE ADEQUACY OF THE MEMBER SIZES INDICATED WHEN THE FATIGUE CATEGORY IS SPECIFIED TO BE I FOR THE PROJECT.
- THE SPAN RANGE INCLUDED ON STANDARD DRAWING BD-641M IS AS FOLLOWS:
BD-641M: CANTILEVER AND CENTER-MOUNT STRUCTURES, STRUT LENGTHS UP TO 40'
- THE DESIGN TABLES INCLUDE MEMBER SIZES FOR THE STRUCTURES FOR VARIOUS COMBINATIONS OF COLUMN HEIGHT, SPAN LENGTH, AND SIGN AREA. THEY ALSO INCLUDE SPREAD FOOTING DESIGNS. ALTERNATE CAISSON FOUNDATIONS ARE PERMITTED, HOWEVER, THE REQUIRED CAISSON EMBEDMENT AND REINFORCEMENT MUST BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF PENNSYLVANIA. THE DESIGN COMPUTATIONS MUST BE SUBMITTED TO THE DISTRICT BRIDGE ENGINEER FOR REVIEW AND APPROVAL. THE CORRESPONDING FABRICATION AND CONSTRUCTION DETAILS ARE CONTAINED IN THIS STANDARD.

GENERAL NOTES

- PROVIDE 3-INCH CONCRETE COVER ON REINFORCEMENT BARS, EXCEPT AS NOTED.
- USE CLASS A CEMENT CONCRETE $f'c = 3000$ PSI IN PEDESTALS, FOOTINGS AND CAISSONS.
- PROVIDE GRADE 60 REINFORCING STEEL BARS THAT MEET THE REQUIREMENTS OF ASTM A615 FOR CONCRETE REINFORCEMENT. DO NOT WELD REINFORCING STEEL BARS.
- RAKE-FINISH ALL HORIZONTAL CONSTRUCTION JOINTS, EXCEPT AS INDICATED.
- VERIFY ALL DIMENSIONS AND GEOMETRY OF THE EXISTING STRUCTURES IN THE FIELD AS NECESSARY FOR PROPER FIT OF THE PROPOSED CONSTRUCTION.
- CHAMFER EXPOSED CONCRETE EDGES 1 INCH BY 1 INCH.
- ALL DIMENSIONS SHOWN ARE HORIZONTAL, EXCEPT AS NOTED.
- DIMENSIONS ARE BASED ON A NORMAL TEMPERATURE OF 68 DEGREES F.
- SPREAD FOOTINGS MAY BE ORDERED BY THE ENGINEER TO BE AT ANY ELEVATION OR OF ANY DIMENSIONS NECESSARY TO PROVIDE A PROPER FOUNDATION.
- GALVANIZE ALL STRUCTURAL STEEL, BOLTS, NUTS & WASHERS IN ACCORDANCE WITH PUB. 408, UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
- PIPE DIAMETERS SHOWN UP TO AND INCLUDING 12 INCHES ARE NOMINAL DIAMETERS. PIPE DIAMETERS SHOWN FROM 14 INCHES AND UP ARE ACTUAL DIAMETERS.
- USE STANDARD SIZE HOLE. THE STANDARD HOLE DIAMETER FOR BOLTS SMALLER THAN 1" DIAMETER SHALL BE THE NOMINAL DIAMETER OF THE BOLT PLUS 1/16". FOR BOLTS 1" DIAMETER AND LARGER, THE WIDTH OF EACH STANDARD HOLE SHALL BE THE NOMINAL DIAMETER OF THE BOLT PLUS 1/8".
- CLEAR DISTANCE BETWEEN BOLT HOLES OR BETWEEN THE BOLT HOLE AND THE END OF THE MEMBER IN THE DIRECTION OF THE APPLIED BEARING FORCE SHALL BE CHECKED.
- PROVIDE ANCHOR BOLT HOLES 1/4" LARGER THAN BOLT DIAMETER.
- PROVIDE A MINIMUM ANCHOR BOLT EMBEDMENT LENGTH OF 20 ANCHOR BOLT DIAMETERS.
- PROVIDE DOUBLE NUTS AND WASHER FOR EACH ANCHOR BOLT.
- STEEL MEMBER COMPONENTS REQUIRING CHARPY V-NOTCH TESTING ARE DESIGNATED ON THE PLANS BY (CVN), PROVIDE STEEL CONFORMING TO THE CVN REQUIREMENTS FOR ZONE 2, NON FRACTURE CRITICAL AS GIVEN IN THE AASHTO MATERIAL SPECIFICATIONS.

DESIGN CRITERIA FOR PENNDOT SIGN STRUCTURES

- DEAD LOADS** PENNDOT STD. DWGS. (U.N.O.)*
SIGN PANELS TC-8701E OR TC-8701S
LIGHT FIXTURES BC-741M, SHT. 6
SIGN SUPPORT BEAM BC-741M, SHT. 6
COLUMNS, STRUTS CALCULATED INTERNALLY WITHIN PROGRAM
- EXTERNAL LOADS** AASHTO SIGN SPECS.
ICE LOAD 3.7
WIND LOAD APPENDIX C, SECTION C.3, EQ. C-1, WITH 80 MPH WIND AND 30% GUST FACTOR
- GROUP LOADS** AASHTO SIGN SPECS. 3.4
- STEEL CRITERIA** AASHTO SIGN SPECS.
SECTION PROPERTIES FOR TUBULAR SHAPES APPENDIX B, TABLE B-1
MAXIMUM STRESSES FOR TUBULAR SHAPES APPENDIX B, TABLE B-2
ALLOWABLE STRESSES FOR TUBULAR SHAPES 5.6 (TABLE 5-3) & 5.11
ALLOWABLE STRESSES FOR SIGN SUPPORTS 5.12
ALLOWABLE STRESSES FOR BASE PLATES 5.8
ALLOWABLE STRESSES FOR COMBINED STEEL STRESS 5.12
FATIGUE REQUIREMENTS (FATIGUE CATEGORY II) SECTION 11
ALLOWABLE DEFLECTION 10.4
PERMANENT CAMBER 10.5
ALLOWABLE STRESSES FOR STRUCTURAL STEEL SECTION 5
- BOLT CRITERIA** AASHTO HIGHWAY BRIDGES (U.N.O.)
ALLOWABLE BOLT STRESSES TABLE 10.32.3B
SLIP-CRITICAL BOLT ALLOWABLE 10.32.3.2.1
BOLT PRYING ACTION 10.32.3.3.2
COMBINED BOLT SHEAR AND TENSION 10.32.3.3.3
BOLT DESIGN CRITERIA AASHTO SIGN SPECS. 5.16
ALLOWABLE ANCHOR BOLT STRESSES AASHTO SIGN SPECS. 5.17
- CONCRETE CRITERIA** AASHTO HIGHWAY BRIDGES (U.N.O.)
ALLOWABLE BEARING STRESS 8.15.2.1.3
REINFORCEMENT TENSILE STRESS 8.15.2.2
SHEAR CAPACITY OF FOOTINGS 8.15.5.6.1
SHEAR STRESS IN FOOTINGS 8.15.5.6.2
ALLOWABLE SHEAR STRESS 8.15.5.6.4
SLENDERNESS OF COLUMNS 8.16.5.2
MINIMUM REINF. OF FLEXURAL MEMBERS 8.17.1
SPACING LIMITS FOR REINFORCEMENT 8.21
MINIMUM CONCRETE COVER DM4 D8, 22.1*
PRESSURES FOR ECCENTRICALLY LOADED FOOTINGS FIG. 4.4.7.1.1.1C
DISTRIBUTION OF REINFORCEMENT 4.4.11.2.2
FOOTING STABILITY REQUIREMENTS DM4 D5, 5.5
TORSION ACI SECTION A.7.3*
COLUMN DESIGN (PEDESTALS) 8.15.4
- SPREAD FOOTINGS**
MAXIMUM DESIGN PRESSURE 1.5 TONS PER SQUARE FOOT
MINIMUM AREA IN BEARING 95%
UNIT WEIGHT OF SOIL 100 POUNDS PER CUBIC FOOT
- DRILLED SHAFTS (CAISSONS) DM4 SEC.4.6, PENNDOT COM624 COMPUTER PROGRAM**
MAXIMUM DESIGN PRESSURE 1.5 TONS PER SQUARE FOOT
MAXIMUM DESIGN LATERAL DISPLACEMENT 0.5"
MODULUS OF SUBGRADE REACTION 10.0 POUNDS PER CUBIC INCH
UNIT WEIGHT OF SOIL 100 POUNDS PER CUBIC FOOT
ANGLE OF INTERNAL FRICTION 25°
COHESION 0 KIPS PER SQUARE FOOT
- SEISMIC DESIGN CRITERIA**
STRUCTURES ARE DESIGNED FOR A SEISMIC ACCELERATION COEFFICIENT = 0.15

CONSTRUCTION GENERAL NOTES

- MATERIALS AND WORKMANSHIP:**
PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CURRENT VERSIONS OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, AASHTO/AWS WELDING CODE D1.5, CONTRACT SPECIAL PROVISIONS, AND AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS". USE AASHTO/AWS D1.1 FOR WELDING NOT COVERED IN AASHTO/AWS D1.5.
- PROVIDE STRUCTURAL STEEL CONFORMING TO THE FOLLOWING:**
COLUMNS & PIPE STRUTS: SEE PUBLICATION 408, SECTION 948.2.
ANGLES, SHAPES, AND PLATES: AASHTO M270, GRADE 36
ASTM A709, GRADE 36
- ALTERNATE PRESS-BREAK MEMBERS:**
ALTERNATE PRESS-BREAK MEMBERS MUST HAVE THE EQUIVALENT STRENGTH OF THE MEMBER THEY ARE REPLACING. EQUIVALENT RADIUS FOR PRESS-BREAK MEMBERS IS MEASURED FROM THE CENTER OF THE MEMBER TO THE MID-POINT OF ANY CHORD OF THE MEMBER. MINIMUM THICKNESS OF PRESS-BREAK MEMBERS TO BE 3/16". PENNDOT SIGN STRUCTURE COMPUTER PROGRAM OR AN APPROVED FINITE ELEMENT ANALYSIS COMPUTER PROGRAM MUST BE RUN TO VERIFY THE ADEQUACY OF PRESS-BREAK MEMBERS FOR STRENGTH AND FATIGUE. ALTERNATE PRESS-BREAK MEMBERS ARE ONLY PERMITTED FOR COLUMNS. PRESS-BREAK MEMBERS ARE NOT PERMITTED FOR STRUTS.
- PROVIDE BOLTS CONFORMING TO THE FOLLOWING:**
ANCHOR BOLTS: ASTM, F1554 GRADE 55 PER PUBLICATION 408 SECTION 1105.02(c)3.
BOLTS: AASHTO M164 (ASTM A325) H.S. BOLTS EXCEPT AS NOTED
- DESIGN SPECIFICATIONS:**
AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", 2001 WITH CURRENT INTERIMS (UNLESS NOTED OTHERWISE); AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1996 WITH INTERIMS THROUGH AND INCLUDING 2000; PENNDOT DESIGN MANUAL - PART 4, AUGUST 1993 EDITION (INCLUDING AUGUST 1995 REVISIONS)
- ALL FILLET WELDS SHOWN ARE MINIMUM SIZE UNLESS NOTED OTHERWISE.

NOTES TO FABRICATOR

- CENTER-MOUNT STRUCTURE TYPES AS PRESENTED IN THESE STANDARDS ARE RECOMMENDED TO CARRY DYNAMIC/VARIABLE MESSAGE SIGNS (DMS/VMS). DMS/VMS ARE PROHIBITED ON OVERHEAD CANTILEVER STRUCTURE TYPES AS PRESENTED IN THESE STANDARDS. OVERHEAD SIGN STRUCTURES INTENDED TO CARRY DMS/VMS, NOT REPRESENTED BY BD-649M, MUST BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF PENNSYLVANIA AND SUBMITTED TO THE CHIEF BRIDGE ENGINEER FOR REVIEW AND APPROVAL.
- DESIGN COMPUTATIONS ARE REQUIRED FOR ANY PORTION OF A STRUCTURE FOR WHICH THE INFORMATION IS NOT TAKEN DIRECTLY FROM THE CONTRACT DRAWINGS OR THE DETAILS CONTAINED IN THIS STANDARD. DO NOT VIOLATE CRITERIA USED FOR THE DEVELOPMENT OF THE DESIGN TABLES ON STANDARD DRAWING BD-641M AND THE DETAILS IN THIS STANDARD.

*** LEGEND:**

- AASHTO SIGN SPEC: AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS"
- AASHTO HIGHWAY BRIDGES: AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES"
- DM4: PENNSYLVANIA DEPARTMENT OF TRANSPORTATION, DESIGN MANUAL PART 4, STRUCTURES
- U.N.O.: UNLESS NOTED OTHERWISE
- ACI: AMERICAN CONCRETE INSTITUTE - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE WITH COMMENTARY (ACI 318-99).
- CVN: CHARPY V-NOTCH.

CHANGE 1

TC-8700C	SPACING CHARTS/DIRECT APPLIED LETTERS, NUMERALS, & ARROWS
TC-8701D	SIGN DETAILS/FREEWAY AND EXPRESSWAY GUIDE SIGNS
TC-8701E	EXTRUDED ALUMINUM CHANNEL SIGN
TC-8701S	FLAT SHEET ALUMINUM SIGNS WITH EXTRUDED ALUMINUM STIFFENERS
TC-8715	SIGN LIGHTING
BC-736M	REINFORCEMENT BAR FABRICATION DETAILS
RC-11M	CLASSIFICATION OF EARTHWORK FOR STRUCTURES
RC-51M	TYPE 31 STRONG POST GUIDE RAIL
RC-53M	TYPE 2 WEAK POST GUIDE RAIL
RC-54M	BARRIER PLACEMENT AT OBSTRUCTIONS
RC-58M	SINGLE FACE CONCRETE BARRIER PLACEMENT AT MEDIAN PIERS

REFERENCE DRAWINGS

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

OVERHEAD SIGN STRUCTURES
CANTILEVER AND CENTER-MOUNT STRUCTURES
STRUT LENGTHS UP TO 40'

NOTES AND DESIGN CRITERIA

RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Brian S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 1 OF 6 BC-741M
--	--	-------------------------------

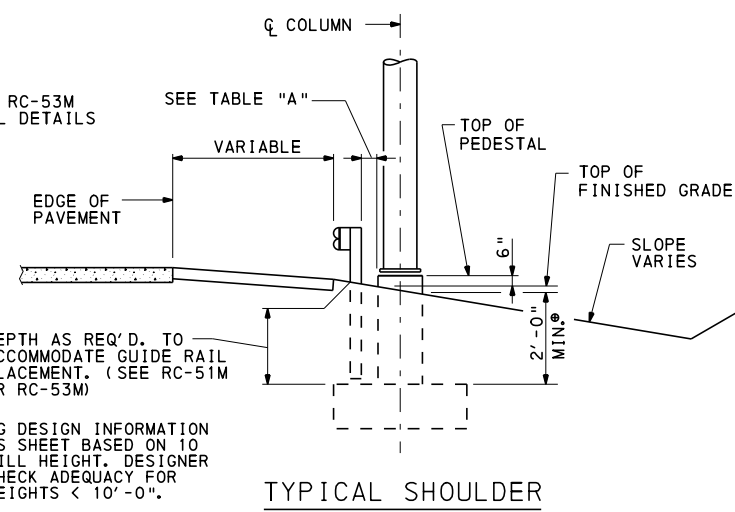
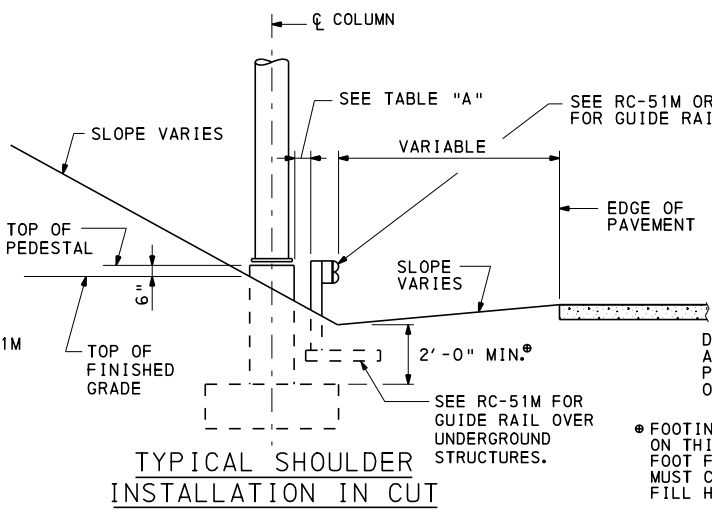
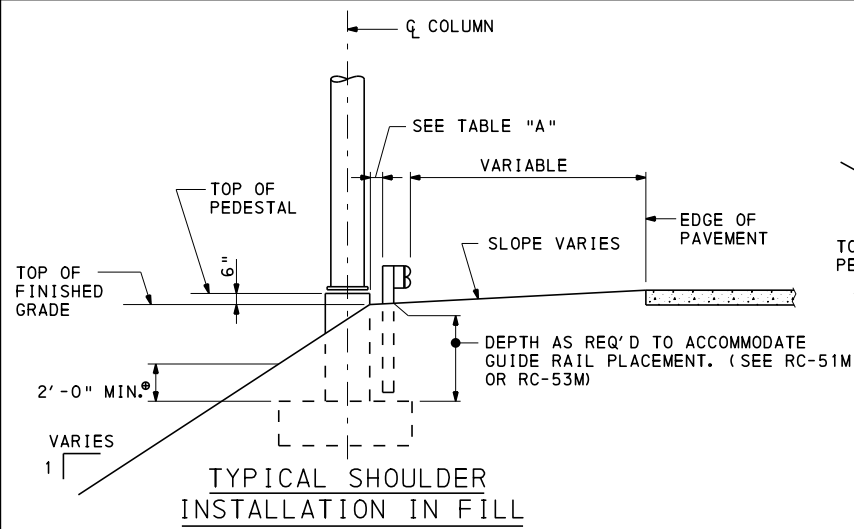


TABLE "P"			
BAR SIZE	WEIGHT LBS./FT.	A	LENGTH
6	1.502	8"	K + 2'-1"
8	2.670	11"	K + 2'-4"
9	3.400	1'-3"	K + 2'-8"
10	4.303	1'-5"	K + 2'-10"
11	5.313	1'-7"	K + 3'-0"

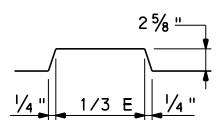
PROVIDE HOOK ON ALL "P" BARS. "P" BARS MAY BE DOWELED TO FOOTING USING CLASS C MIN. LAP SPICE, HOWEVER NO COMPENSATION WILL BE ALLOWED FOR ADDITIONAL STEEL INVOLVED.

FOOTING		FOOTING REINFORCEMENT											
TYPE	DIMENSION		CU. YDS. CONC.	"L" BARS					"T" BARS				
	G	F		L ₁ NO.	L ₁ SIZE	L ₂ NO.	L ₂ SIZE	LENGTH	T ₁ NO.	T ₁ SIZE	T ₂ NO.	T ₂ SIZE	LENGTH
609	6'-0"	9'-0"	4.0	10	4	5	5	8'-6"	7	4	7	5	5'-6"
710	7'-0"	10'-0"	5.2	14	4	6	5	9'-6"	9	4	8	5	6'-6"
711	7'-0"	11'-0"	5.7	12	5	7	5	10'-6"	10	4	9	5	6'-6"
713	7'-0"	13'-0"	6.7	13	6	12	5	12'-6"	13	4	10	5	6'-6"
811	8'-0"	11'-0"	6.5	12	5	7	5	10'-6"	12	4	9	5	7'-6"
812	8'-0"	12'-0"	7.1	15	5	8	5	11'-6"	14	4	9	5	7'-6"
814	8'-0"	14'-0"	8.3	16	6	13	5	13'-6"	18	4	11	5	7'-6"
815	8'-0"	15'-0"	8.9	15	7	16	5	14'-6"	19	4	11	5	7'-6"
817	8'-0"	17'-0"	10.1	13	8	13	6	16'-6"	19	4	14	5	7'-6"
906	9'-0"	6'-0"	4.0	7	4	7	5	5'-6"	9	4	5	5	8'-6"
912	9'-0"	12'-0"	8.0	14	5	9	5	11'-6"	14	4	9	5	8'-6"
913	9'-0"	13'-0"	8.7	17	5	10	5	12'-6"	15	4	10	5	8'-6"
915	9'-0"	15'-0"	10.0	14	7	15	5	14'-6"	18	4	11	5	8'-6"
916	9'-0"	16'-0"	10.7	17	7	14	6	15'-6"	19	4	12	5	8'-6"
917	9'-0"	17'-0"	11.3	14	8	17	5	16'-6"	24	4	14	5	8'-6"
918	9'-0"	18'-0"	12.0	15	8	18	6	17'-6"	22	4	14	5	8'-6"
921	9'-0"	21'-0"	14.0	15	9	14	8	20'-6"	29	4	15	5	8'-6"
922	9'-0"	22'-0"	14.7	18	9	16	8	21'-6"	31	4	16	5	8'-6"
1007	10'-0"	7'-0"	5.2	9	4	8	5	6'-6"	13	4	6	5	9'-6"
1008	10'-0"	8'-0"	5.9	12	4	8	5	7'-6"	14	4	7	5	9'-6"
1010	10'-0"	10'-0"	7.4	20	4	8	5	9'-6"	18	4	8	5	9'-6"
1015	10'-0"	15'-0"	11.1	15	7	14	5	14'-6"	25	4	11	5	9'-6"
1016	10'-0"	16'-0"	11.9	17	7	16	5	15'-6"	24	4	12	5	9'-6"
1017	10'-0"	17'-0"	12.6	19	7	19	5	16'-6"	26	4	14	5	9'-6"
1018	10'-0"	18'-0"	13.3	17	8	16	6	17'-6"	29	4	14	5	9'-6"
1019	10'-0"	19'-0"	14.1	17	8	19	6	18'-6"	31	4	14	5	9'-6"
1020	10'-0"	20'-0"	14.8	18	8	16	7	19'-6"	34	4	15	5	9'-6"
1022	10'-0"	22'-0"	16.3	18	9	17	8	21'-6"	41	4	16	5	9'-6"
1024	10'-0"	24'-0"	17.8	18	10	17	8	23'-6"	44	4	17	5	9'-6"
1026	10'-0"	26'-0"	19.3	20	10	17	8	25'-6"	47	4	20	5	9'-6"
1107	11'-0"	7'-0"	5.7	10	4	9	5	6'-6"	11	5	6	5	10'-6"

FOR CONTINUATION OF TABLE SEE SHEET 3.

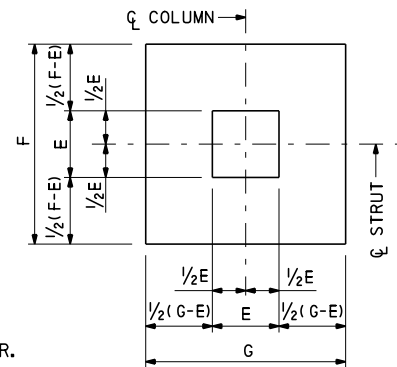
NOTES:

- PROVIDE 90° OR 180° HOOKS ON ALL "L" AND "T" BARS.
- LENGTH FOR "L" AND "T" BARS DOES NOT INCLUDE 90° OR 180° HOOK LENGTHS.
- COUNT AND SIZE OF PEDESTAL DETAIL "P" BARS TO BE SPECIFIED ON THE CONTRACT DRAWINGS, BASED ON INFORMATION OBTAINED FROM DESIGN TABLES ON BD-641M, SHEETS 6, 7, AND 8.



CONSTRUCTION JOINT KEY DETAIL

ELEVATION SHOWN, SECTION A-A SIMILAR.

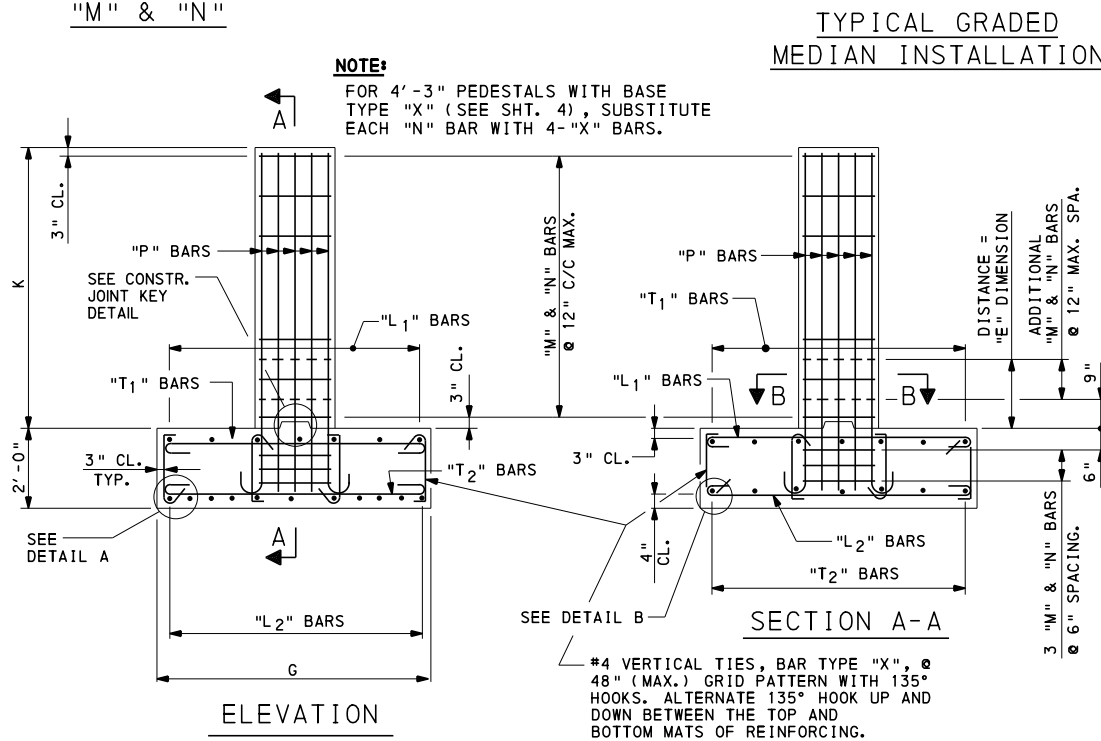
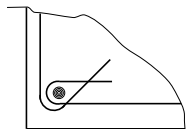
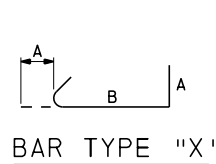
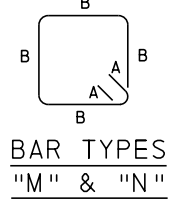
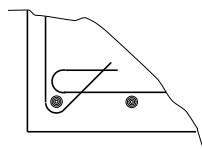


PLAN OF FOUNDATION

PEDESTAL		PEDESTAL REINFORCEMENT										
E	CU. YDS. CONC. (▲)	#4 BARS TYPE "M"					#4 BARS TYPE "N"					WEIGHT LBS. (*)
		LENGTH	A	B	LENGTH	A	B	LENGTH	A	B		
2'-6"	0.23	8'-10"	5"	2'-0"	6'-9 1/2"	5"	1'-5 1/8"	---	---	---	---	11
2'-9"	0.28	9'-10"	5"	2'-3"	7'-6"	5"	1'-8"	---	---	---	---	12
3'-0"	0.33	10'-10"	5"	2'-6"	8'-2 1/2"	5"	1'-10 1/8"	---	---	---	---	13
3'-3"	0.39	11'-10"	5"	2'-9"	8'-11"	5"	2'-0 1/4"	---	---	---	---	14
3'-9"	0.52	13'-10"	5"	3'-3"	10'-4"	5"	2'-4 1/2"	---	---	---	---	16
4'-3"	0.67	15'-10"	5"	3'-9"	11'-9"	5"	2'-8 3/4"	---	---	---	---	19
4'-3"	0.67	15'-10"	5"	3'-9"	---	---	---	4'-7"	5"	3'-9"	---	23

(▲) CUBIC YARDS OF CONCRETE PER 1 FOOT HEIGHT OF PEDESTAL.

(*) WEIGHT OF 1 TYPE "M" BAR PLUS 1 TYPE "N" BAR (WHERE INDICATED) OR 1 TYPE "M" BAR PLUS 4 TYPE "X" BARS (BASE TYPE "X" ONLY)



ALTERNATE FOUNDATION

METAL FINNED PIPE FOUNDATION IS PERMITTED AS AN ALTERNATE FOUNDATION TO SPREAD FOOTING PER PENNDOT APPROVED PRODUCT DRAWINGS #95-290 PE REV.1, #13-602-BDTD AND #14-603-BDTD FOR SUPPORT OF CENTER-MOUNT DMS SIGN STRUCTURES.

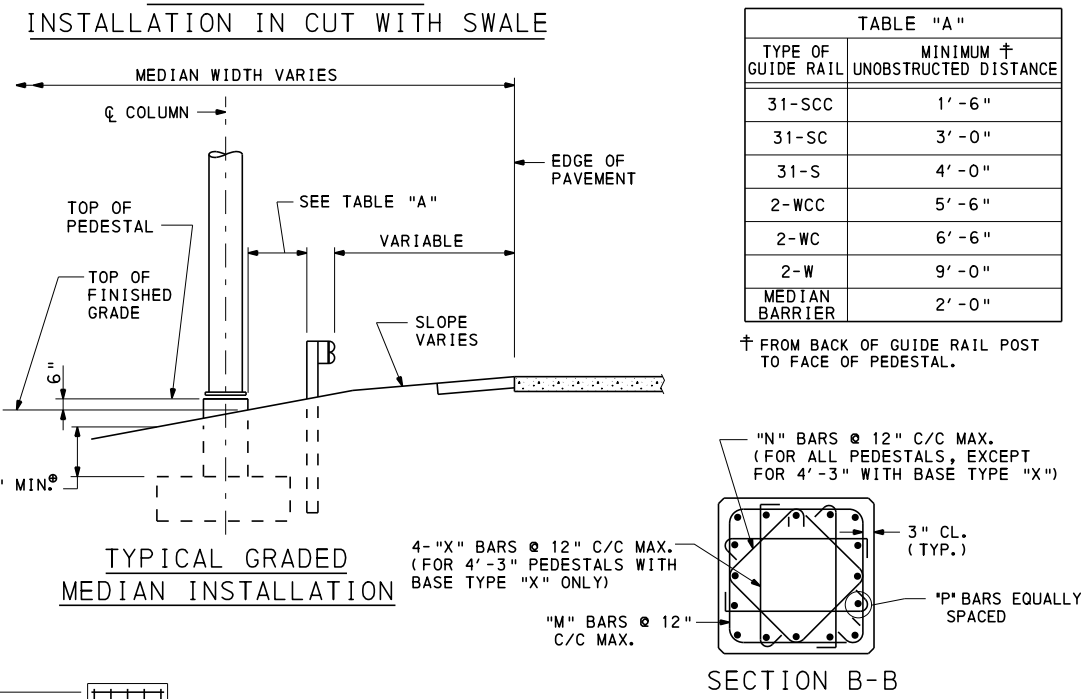
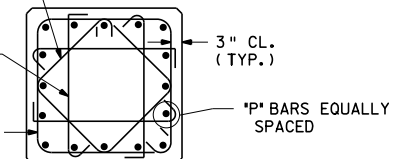


TABLE "A"	
TYPE OF GUIDE RAIL	MINIMUM † UNOBSTRUCTED DISTANCE
31-SCC	1'-6"
31-SC	3'-0"
31-S	4'-0"
2-WCC	5'-6"
2-WC	6'-6"
2-W	9'-0"
MEDIAN BARRIER	2'-0"

† FROM BACK OF GUIDE RAIL POST TO FACE OF PEDESTAL.

"N" BARS @ 12" C/C MAX. (FOR ALL PEDESTALS, EXCEPT FOR 4'-3" WITH BASE TYPE "X")



NOTES:

- SEE STANDARD DRAWING BC-736M FOR REINFORCEMENT BAR FABRICATION DETAILS.
- SEE STANDARD DRAWING RC-11M FOR LIMITS OF CLASS 3 EXCAVATION.

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES CANTILEVER AND CENTER-MOUNT STRUCTURES STRUT LENGTHS UP TO 40'

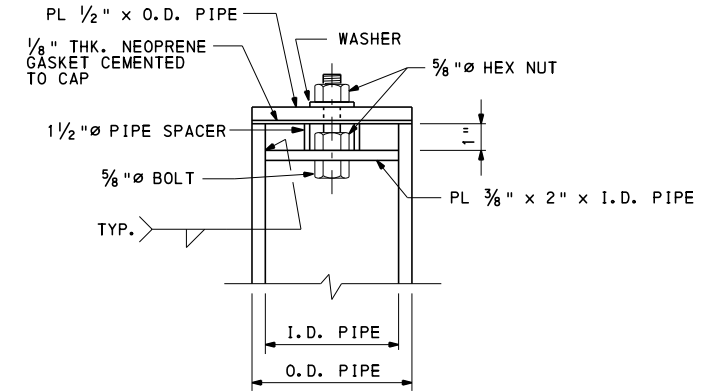
FOUNDATION DETAILS

FOOTING TYPE	DIMENSION		CU. YDS. CONC.	FOOTING REINFORCEMENT									
				"L" BARS				"T" BARS					
				L1 NO.	L1 SIZE	L2 NO.	L2 SIZE	LENGTH	T1 NO.	T1 SIZE	T2 NO.	T2 SIZE	LENGTH
1108	11'-0"	8'-0"	6.5	13	4	9	5	7'-6"	12	5	7	5	10'-6"
1109	11'-0"	9'-0"	7.3	16	4	9	5	8'-6"	13	5	7	5	10'-6"
1111	11'-0"	11'-0"	9.0	15	5	9	5	10'-6"	22	4	9	5	10'-6"
1112	11'-0"	12'-0"	9.8	22	5	11	5	11'-6"	17	5	9	5	10'-6"
1114	11'-0"	14'-0"	11.4	21	6	15	5	13'-6"	21	5	11	5	10'-6"
1210	12'-0"	10'-0"	8.9	17	4	9	5	9'-6"	14	5	8	5	11'-6"
1212	12'-0"	12'-0"	10.7	19	5	11	5	11'-6"	19	5	9	5	11'-6"
1213	12'-0"	13'-0"	11.6	24	5	14	5	12'-6"	21	5	10	5	11'-6"
1215	12'-0"	15'-0"	13.3	19	7	21	5	14'-6"	26	5	12	5	11'-6"
1218	12'-0"	18'-0"	16.0	20	8	19	7	17'-6"	36	5	18	5	11'-6"
1219	12'-0"	19'-0"	16.9	20	8	19	7	18'-6"	35	5	18	5	11'-6"
1221	12'-0"	21'-0"	18.7	20	9	19	8	20'-6"	39	5	20	5	11'-6"
1314	13'-0"	14'-0"	13.5	21	6	16	5	13'-6"	26	5	11	5	12'-6"
1315	13'-0"	15'-0"	14.4	24	6	18	5	14'-6"	28	5	11	5	12'-6"
1316	13'-0"	16'-0"	15.4	24	7	26	5	16'-6"	24	6	12	5	12'-6"
1317	13'-0"	17'-0"	16.4	21	8	21	6	16'-6"	26	6	14	5	12'-6"
1320	13'-0"	20'-0"	19.3	26	8	25	7	19'-6"	35	6	23	5	12'-6"
1321	13'-0"	21'-0"	20.2	21	9	26	7	20'-6"	35	6	15	5	12'-6"
1323	13'-0"	23'-0"	22.1	26	9	23	8	22'-6"	38	6	21	5	12'-6"
1414	14'-0"	14'-0"	14.5	25	6	21	5	13'-6"	23	6	16	5	13'-6"
1418	14'-0"	18'-0"	18.7	23	8	27	6	17'-6"	34	6	23	5	13'-6"
1420	14'-0"	20'-0"	20.7	27	8	26	7	19'-6"	38	6	27	5	13'-6"
1422	14'-0"	22'-0"	22.8	26	9	28	7	21'-6"	44	6	26	5	13'-6"
1516	15'-0"	16'-0"	17.8	27	7	30	5	15'-6"	32	6	14	5	14'-6"
1520	15'-0"	20'-0"	22.2	27	8	26	7	19'-6"	32	7	19	5	14'-6"
1522	15'-0"	22'-0"	24.4	26	9	30	7	21'-6"	36	7	17	5	14'-6"

- NOTES:**
- PROVIDE 90° OR 180° HOOKS ON ALL "L" AND "T" BARS.
 - LENGTH FOR "L" AND "T" BARS DOES NOT INCLUDE 90° OR 180° HOOK LENGTHS.
 - COUNT AND SIZE OF PEDESTAL DETAIL "P" BARS TO BE SPECIFIED ON THE CONTRACT DRAWINGS, BASED ON INFORMATION OBTAINED FROM DESIGN TABLES ON BD-641M, SHEETS 6, 7, AND 8.
 - FOR ADDITIONAL FOUNDATION NOTES, SEE SHEET 2.

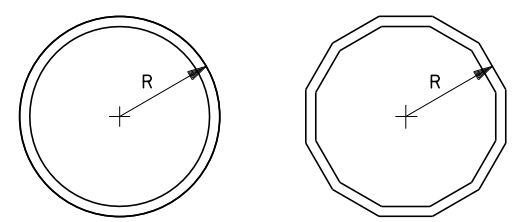
ALTERNATE CAISSON FOUNDATIONS			
COLUMN NOMINAL SIZE X WALL THK.	MINIMUM CAISSON DIAMETER "D"	CAISSON EMBEDMENT LENGTH "L"	CAISSON REINFORCEMENT QUANTITY AND BAR SIZE "N"
8"x.322"	3'-6"	EMBEDMENT LENGTH "L" AS REQUIRED BY DESIGN	QUANTITY AND BAR SIZE "N" AS REQUIRED BY DESIGN
10"x.365"	3'-6"		
12"x.375"	3'-9"		
14"x.375"	3'-9"		
16"x.375"	4'-0"		
18"x.375"	4'-3"		
20"x.375"	4'-9"		
24"x.375"	5'-3"		
26"x.375"	5'-6"		
24"x.500"	5'-3"		

- NOTES:**
- ALTERNATE CAISSON FOUNDATIONS ARE PERMITTED IN PLACE OF THE SPREAD FOOTING SIZE SHOWN ON THE CONTRACT DRAWINGS.
 - ALTERNATE CAISSON FOUNDATIONS MUST BE DESIGNED IN ACCORDANCE WITH DESIGN CRITERIA GIVEN ON SHEET 1.
 - DESIGN COMPUTATIONS FOR THE REQUIRED CAISSON EMBEDMENT AND REINFORCEMENT MUST BE SUBMITTED TO THE DISTRICT BRIDGE ENGINEER FOR REVIEW AND APPROVAL.
 - IN PLACE OF #4 TIES AT 12", A #4 BAR SPIRAL WITH A 3" PITCH MAY BE USED. THE #4 TIES AT 12" ARE THE MINIMUM OR AS REQUIRED BY DESIGN.

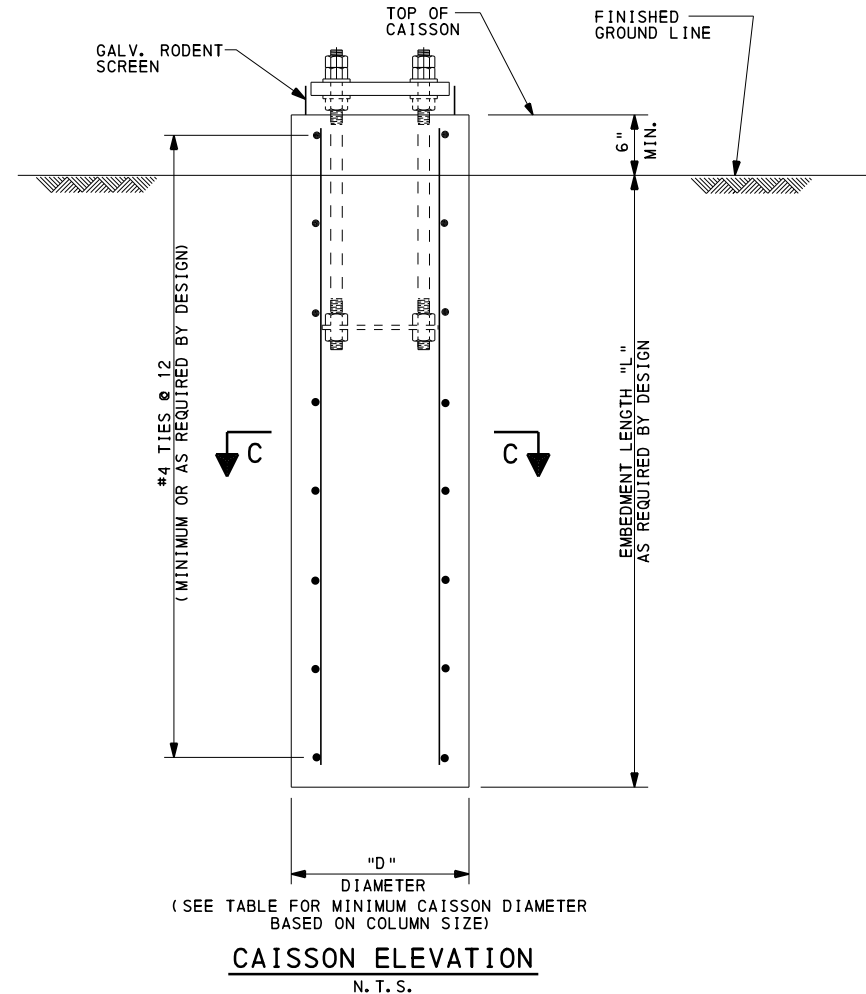


ALTERNATE PIPE CAP DETAIL

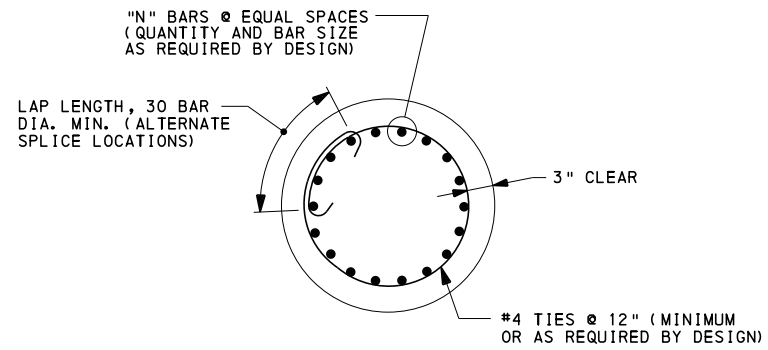
ILLUSTRATION OF DIMENSION "R" FOR CIRCULAR MEMBERS AND EQUIVALENT "PRESS-BREAK" MEMBERS



"PRESS-BREAK" NOTE:
 ALTERNATE "PRESS-BREAK" MEMBERS ARE PERMITTED FOR COLUMNS. "PRESS-BREAK" MEMBERS MUST HAVE THE EQUIVALENT STRENGTH AND FATIGUE RESISTANCE OF THE CIRCULAR MEMBER BEING REPLACED. A MINIMUM NUMBER OF 12 BREAKS IS REQUIRED. A CHANGE IN STEEL MATERIAL OR WALL THICKNESS REQUIRES A SPECIAL DESIGN TO BE SUBMITTED FOR REVIEW. CONTRACTOR MUST SUBMIT DESIGN CALCULATIONS AND DESIGN DRAWINGS FOR REVIEW AND ACCEPTANCE FOR LONGITUDINAL SEAM WELDS INDICATING TYPE OF WELD, WELD PENETRATION, EFFECTIVE DEPTH AND LENGTH OF EACH WELD TYPE. LONGITUDINAL SEAM WELDS SHALL HAVE 60 PERCENT MINIMUM PENETRATION, EXCEPT LONGITUDINAL SEAM WELDS WITHIN 6" OF THE ENDS OF THE PRESS BREAK MEMBER OR LENGTH SHOWN ON DETAILS SHALL BE COMPLETE PENETRATION WELDS. COMPLETE PENETRATION LONGITUDINAL SEAM WELDS MUST BE 100% RADIOGRAPHICALLY INSPECTED. FOR THE COLUMN CONNECTION TO BASE PLATE, AND AT COLUMN CONNECTION SPLICE PLATE LOCATIONS, WELD SHALL START AND STOP IN THE MIDDLE THIRD REGION OF FLAT SECTIONS BETWEEN BREAK POINTS.



CAISSON ELEVATION
N. T. S.



SECTION C-C
N. T. S.

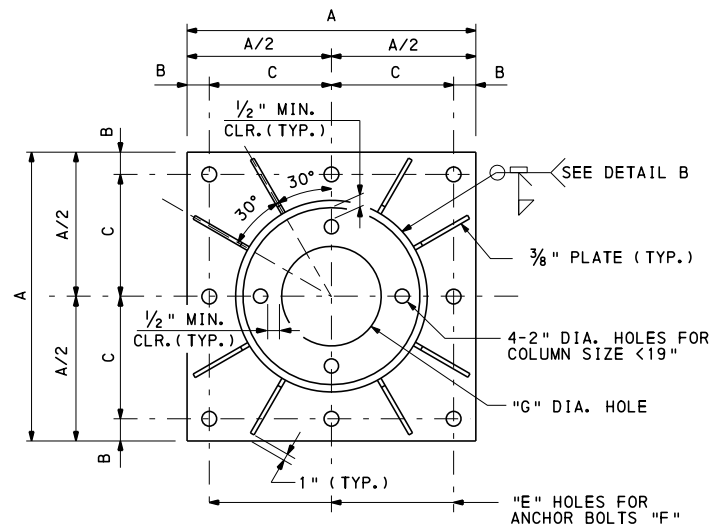
ALTERNATE FOUNDATION
 METAL FINNED PIPE FOUNDATION IS PERMITTED AS AN ALTERNATE FOUNDATION TO CAISSON PER PENNDOT APPROVED PRODUCT DRAWINGS #35-290 PE REV. 1, #13-602-BDTD AND #14-603-BDTD FOR SUPPORT OF CENTER-MOUNT DMS SIGN STRUCTURES.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

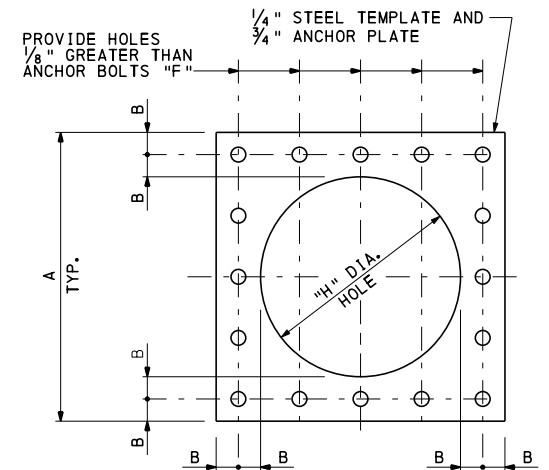
OVERHEAD SIGN STRUCTURES
 CANTILEVER AND CENTER-MOUNT STRUCTURES
 STRUT LENGTHS UP TO 40'

FOUNDATION DETAILS AND
 ALTERNATE CAISSON FOUNDATION

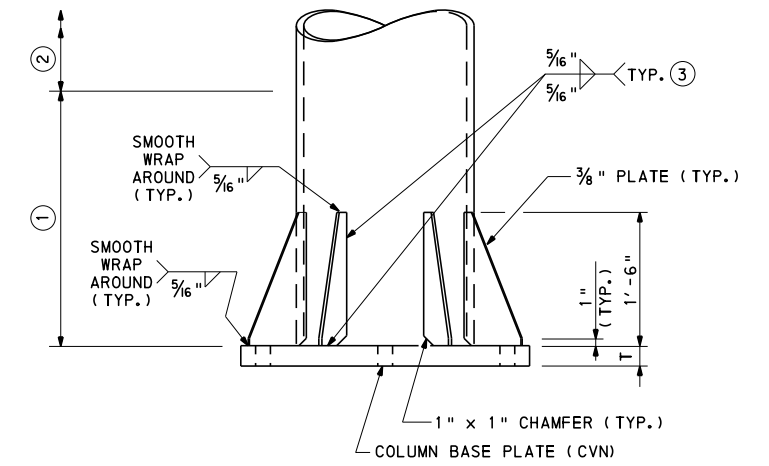
RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Brenda S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 3 OF 6 BC-741M
--	---	-------------------------------



PLAN OF COLUMN BASE TYPE 'Y'

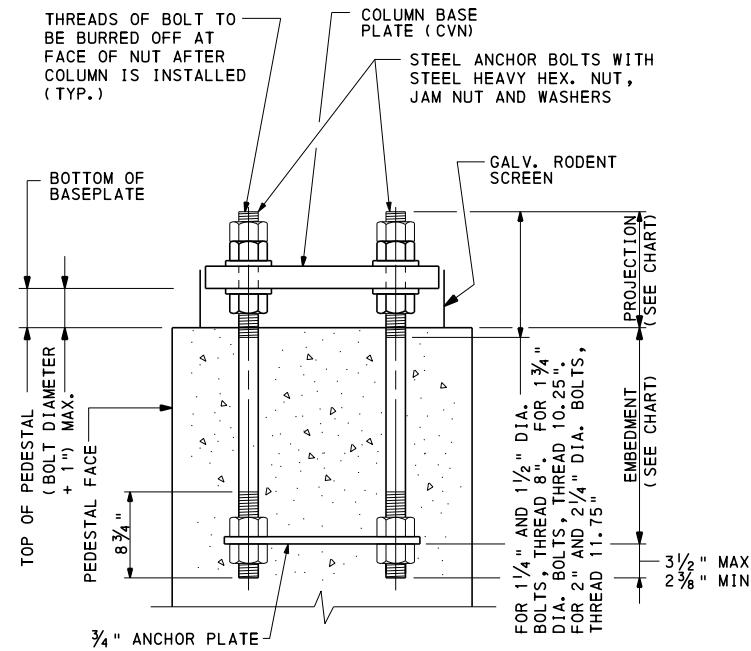


ANCHOR PLATE AND STEEL TEMPLATE DETAIL



ELEVATION - TYPE Y
(TYPE - X SIMILAR)

- ① FOR PRESS BREAK COLUMN, 2'-6" LENGTH OF SEAM WELD TO BE COMPLETE PENETRATION GROOVE WELD.
- ② SEAM WELD TO HAVE 60% MIN. PENETRATION.
- ③ TERMINATE WELDS 1/4" SHORT OF STIFFENER CHAMFER.

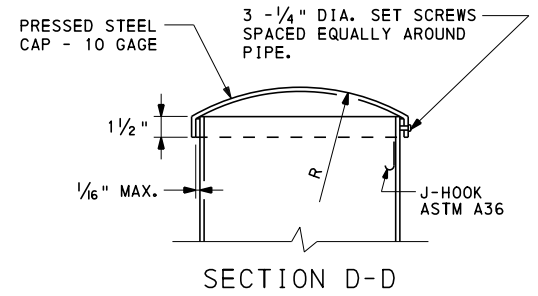


ANCHOR BOLT DETAIL

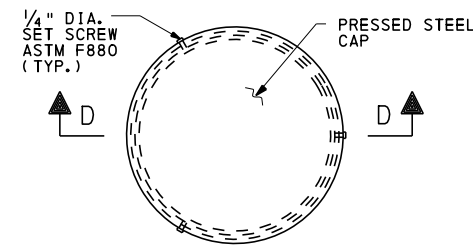
COLUMN, STIFFENERS, AND REINF. OMITTED FOR CLARITY

NOTES:

- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEXAGON NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE GALVANIZED AFTER THREADING.
- USE STEEL TEMPLATE TO SET ANCHOR BOLTS IN ACCORDANCE WITH PUBLICATION 408, SECTION 948.3(b).
- STEEL TEMPLATE AND ANCHOR PLATE TO BE PROVIDED BY SIGN FABRICATOR.
- STEEL TEMPLATE PLATE WITH NUTS ON BOTH SIDES SHALL BE USED TO MAINTAIN THE SPACING AND ALIGNMENT OF ANCHOR BOLTS.
- FOR EQUIVALENT "PRESS BREAK" MEMBER DETAILS AND NOTES, SEE SHEET 3.
- FOR ALTERNATE PIPE CAP DETAIL, SEE SHEET 3.
- SEAL BASE PLATE TO FOUNDATION GAP WITH GALVANIZED STEEL SCREEN, 1/2" BY 1/2" MESH AND 0.063" DIAMETER WIRES. SCREEN IS TO PREVENT ENTRY OF RODENTS WHILE PERMITTING DRAINAGE. SCREEN IS TO BE REMOVABLE AND ATTACHED TO BASEPLATE WITH STAINLESS STEEL HARDWARE.



SECTION D-D

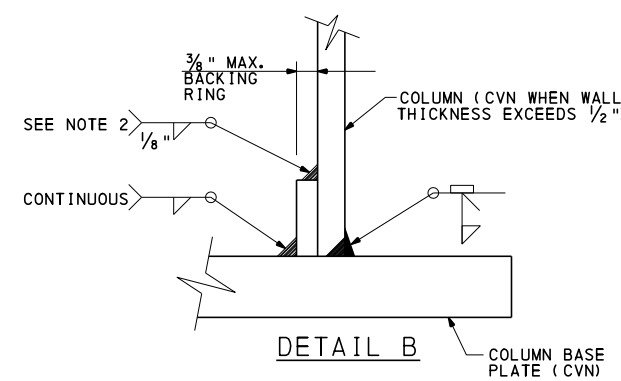


PIPE CAP DETAILS

PIPE CAPS	
PIPE SIZE (NOMINAL)	R
2" DIA.	9"
3" DIA.	9"
3 1/2" DIA.	9"
4" DIA.	9"
5" DIA.	9"
6" DIA.	9"
8" DIA.	9"
10" DIA.	9"
12" DIA.	1'-6"
14" DIA.	1'-6"
16" DIA.	1'-6"
18" DIA.	1'-6"
20" DIA.	2'-6"
24" DIA.	2'-6"

COLUMN BASES													
COLUMN NOMINAL SIZE X WALL THK.*	BASE TYPE	A	B	C	E	F	G	H	T	WASHER SIZE	PROJECTION	EMBEDMENT	
8"x.322"	Y	1'-8"	2 1/2"	7 1/2"	1 1/2"D	1 1/4"D	2"	10"	2"	3 1/2"Dx3/8"	7 3/4"	2'-1"	
10"x.365"	Y	1'-8"	2 1/2"	7 1/2"	1 1/2"D	1 1/4"D	3 1/4"	10"	2"	3 1/2"Dx3/8"	7 3/4"	2'-1"	
12"x.375"	Y	1'-10"	2 1/2"	8 1/2"	1 3/4"D	1 1/2"D	5 1/4"	1'-0"	2"	3 1/2"Dx3/8"	8 1/2"	2'-6"	
14"x.375"	Y	2'-0"	2 1/2"	9 1/2"	1 3/4"D	1 1/2"D	6 1/2"	1'-2"	2"	3 1/2"Dx3/8"	8 1/2"	2'-6"	
16"x.375"	Y	2'-2"	2 1/2"	10 1/2"	2"D	1 3/4"D	8"	1'-4"	2"	4"Dx3/8"	9 1/4"	2'-11"	
18"x.375"	Y	2'-4"	2 1/2"	11 1/2"	2"D	1 3/4"D	9 1/4"	1'-6"	2"	4"Dx3/8"	9 1/4"	2'-11"	
20"x.375"	Y	2'-7"	3"	1'-0 1/2"	2 1/4"D	2"D	1'-5"	1'-7"	3"	5"Dx3/8"	11"	3'-4"	
24"x.375"	Y	2'-11"	3"	1'-2 1/2"	2 1/4"D	2"D	1'-6"	1'-11"	3"	5"Dx3/8"	11"	3'-4"	
24"x.500"	Y	3'-0"	3 1/2"	1'-2 1/2"	2 1/2"D	2 1/4"D	1'-6"	1'-10"	3"	5"Dx3/8"	11 3/4"	3'-9"	

NOTE: D DENOTES DIAMETER
* CVN REQUIRED FOR WALL THICKNESSES EXCEEDING 1/2" (0.500").



DETAIL B

DETAIL B NOTES:

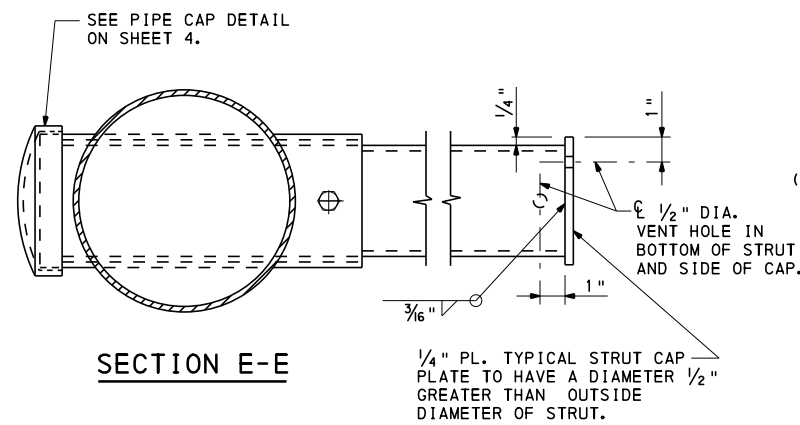
1. BACKING RING MUST BE FITTED/SIZED TO THE PIPE COLUMN AND CONTINUOUSLY FILLET WELDED TO THE BASE PLATE BEFORE THE FULL PENETRATION GROOVE WELD IS MADE. BACKING RING MUST BE FABRICATED AS A CONTINUOUS RING.
2. FOR COLUMNS LESS THAN 19" DIA., THIS FILLET WELD IS NOT REQUIRED BUT SHOP IS TO APPLY SILICON CAULKING TO THIS LOCATION AFTER POLE ASSEMBLY IS GALVANIZED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

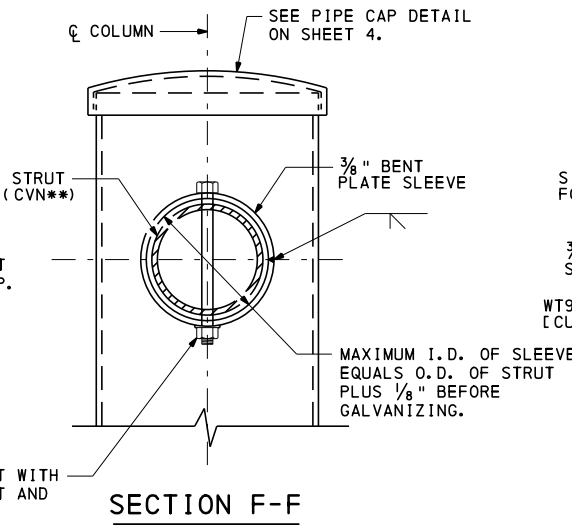
OVERHEAD SIGN STRUCTURES
CANTILEVER AND CENTER-MOUNT STRUCTURES
STRUT LENGTHS UP TO 40'

COLUMN BASE

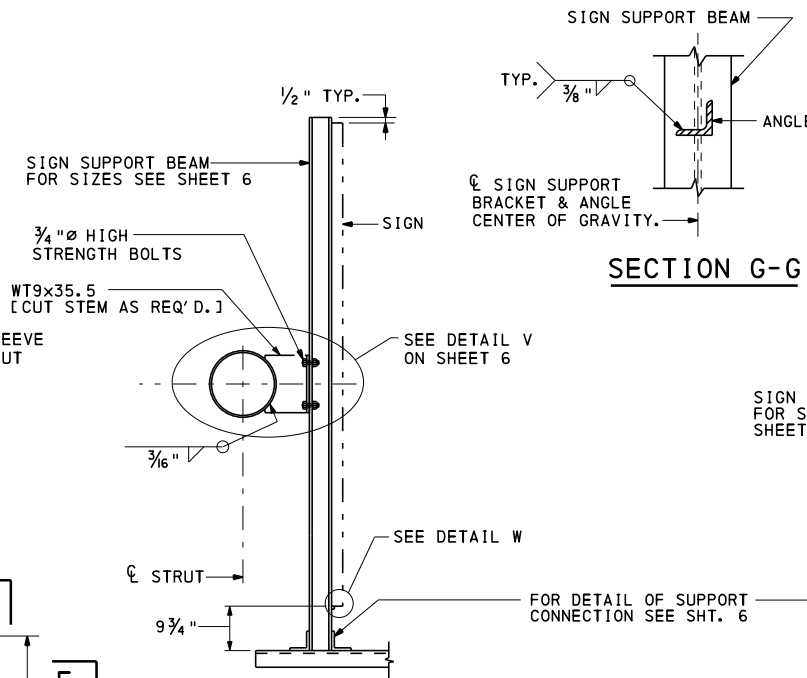
RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Brenda S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 4 OF 6 BC-741M
--	---	-------------------------------



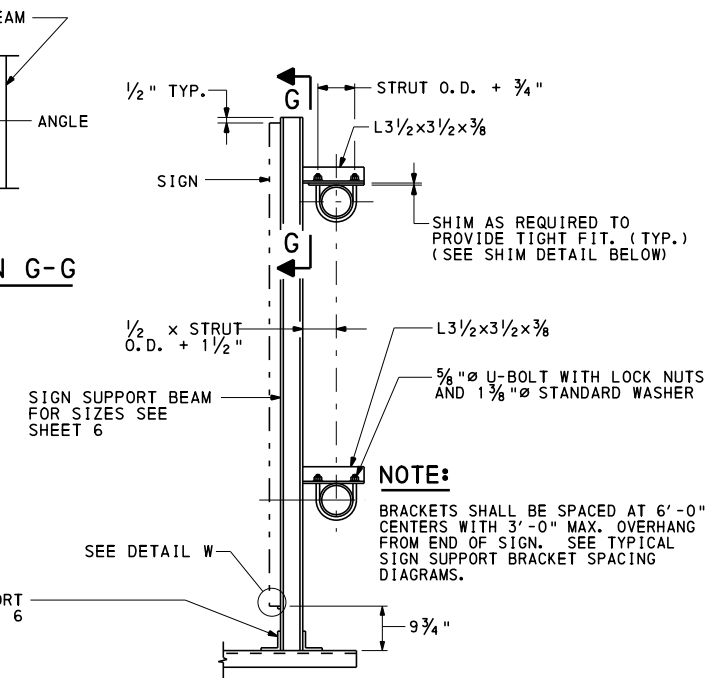
SECTION E-E



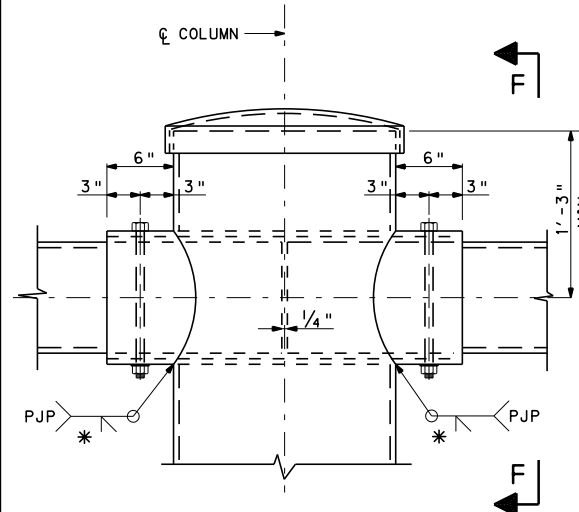
SECTION F-F



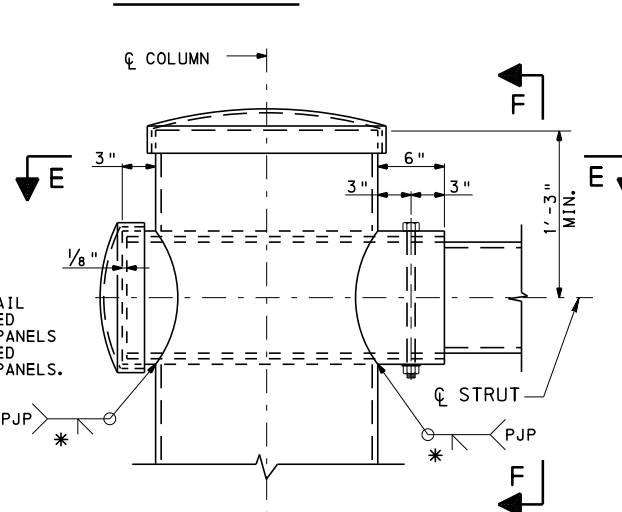
SECTION G-G



TWO STRUT SIGN SUPPORT BRACKET DETAIL

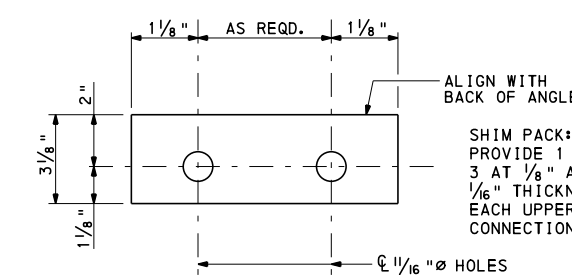


STRUT CONNECTION TYPE B
FOR TYPE B CANTILEVERS (SEE NOTE 1) AND CENTER MOUNTS

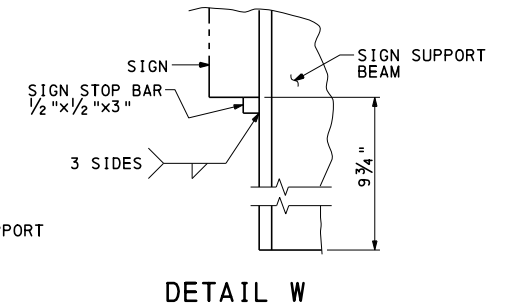


STRUT CONNECTION TYPE A
FOR TYPE A CANTILEVERS (SEE NOTE 1)

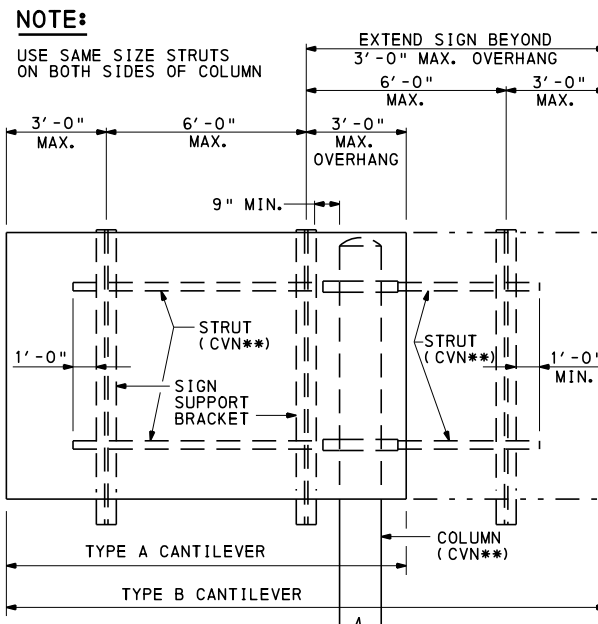
SINGLE STRUT SIGN SUPPORT BRACKET DETAIL



SHIM DETAIL

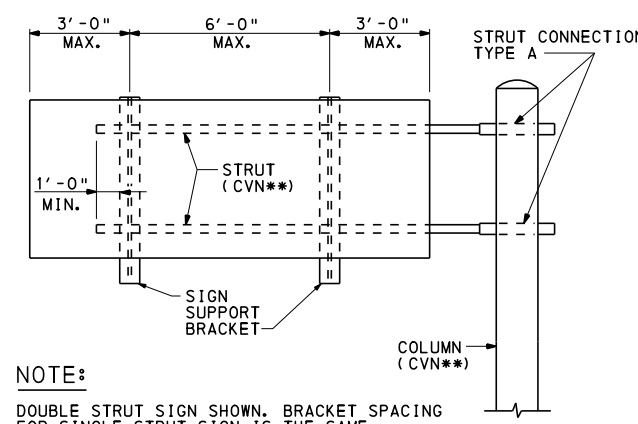


DETAIL W



TYPICAL SIGN SUPPORT BRACKET SPACING DIAGRAMS FOR CANTILEVERS

PROVIDE ADDITIONAL BRACKETS AS REQUIRED AT 6'-0" MAX. SPACING.



TYPICAL SIGN SUPPORT BRACKET SPACING DIAGRAM FOR CENTER MOUNTS

PROVIDE ADDITIONAL BRACKETS AS REQUIRED AT 6'-0" MAX. SPACING.

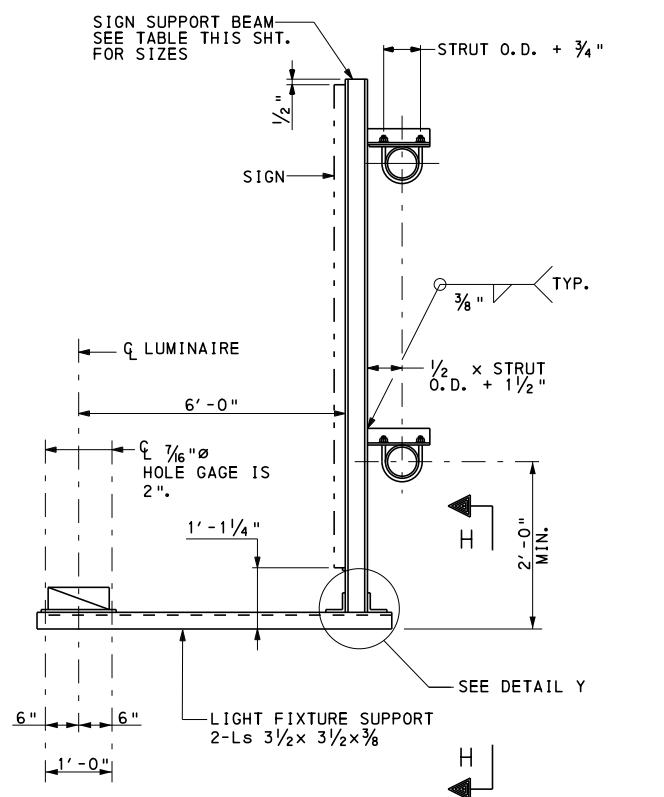
- NOTES:**
- ALL BOLTS TO BE ASTM A325 AND GALVANIZED IN ACCORDANCE WITH PUB.408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
 - U-BOLTS PER PUBLICATION 408, SECTION 948.2.
 - FOR SIGN PANEL DETAILS AND LIGHTING DETAILS, SEE STANDARD DRAWINGS TC-8700C, TC-8701D, TC-8701E, TC-8701S AND TC-8715.
 - ALL MATERIAL FOR SIGN SUPPORT BRACKETS TO BE STRUCTURAL STEEL AASHTO M270, GRADE 36.
 - ** CVN REQUIRED FOR WALL THICKNESSES EXCEEDING 1/2" (0.500").

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

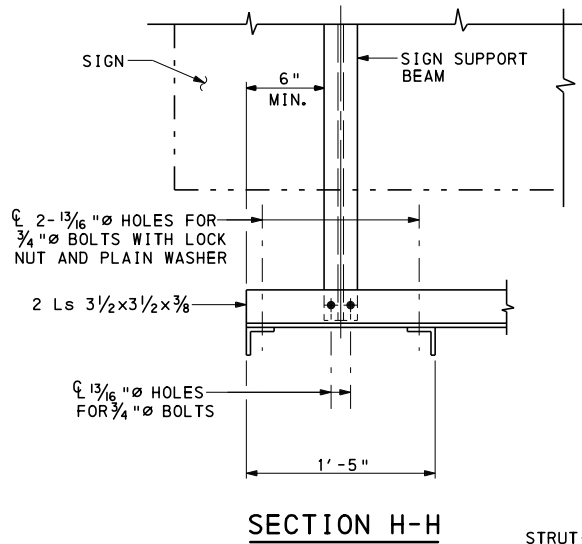
OVERHEAD SIGN STRUCTURES
CANTILEVER AND CENTER-MOUNT STRUCTURES
STRUT LENGTHS UP TO 40'

STRUCTURAL DETAILS

RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Brenda S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 5 OF 6 BC-741M
--	---	-------------------------------

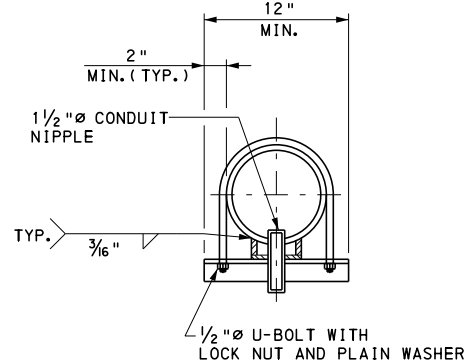


TYPICAL LIGHT FIXTURE SUPPORT DETAILS

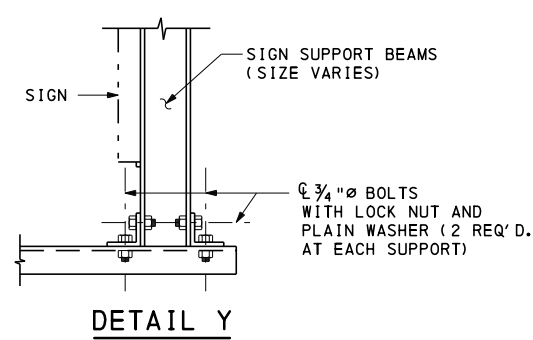


SECTION H-H

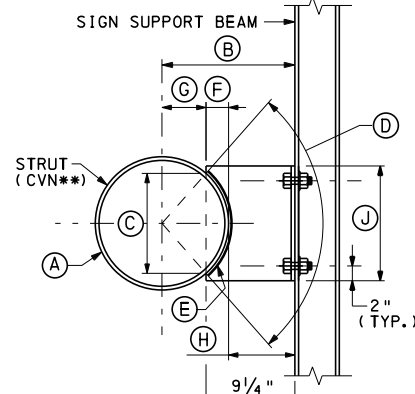
NOTE:
WEIGHT OF LUMINAIRE AND SUPPORT BRACKETS IS 400 lbs. BASED ON 10'-0" LUMINAIRE SPACING.



SECTION J-J



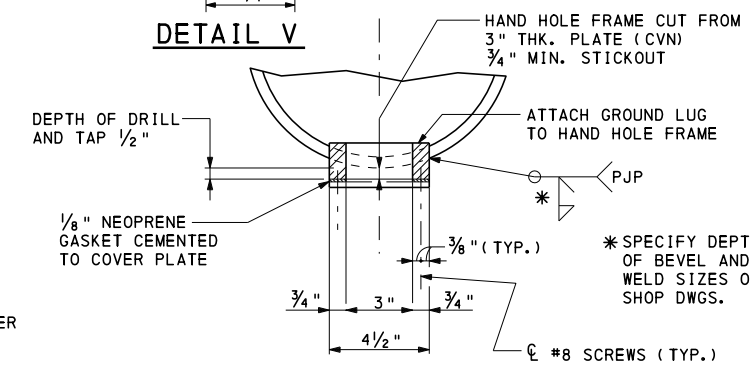
DETAIL Y



DETAIL V

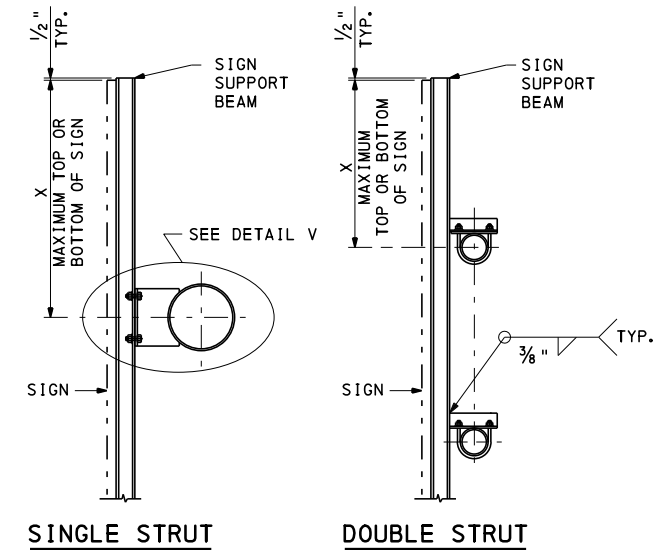
LEGEND (FOR DETAIL V):

- A = (O.D. OF STRUT)
- B = (CL STRUT TO SIGN SUPPORT BEAM) = C + [9.25"]
- C = (NOTCH HEIGHT) = 0.75 x A
- D = (INTERIOR ANGLE IN DEGREES) = 2 [SIN⁻¹ (0.75)]
- E = (WELD LENGTH) = A x D x P1/360
- F = (NOTCH DEPTH) = C / 2 x [TAN (D / 4)]
- G = A / 2 - F
- H = [9.25"] - F
- J = (LENGTH OF WT) = C + [2"] OR [9" MINIMUM]

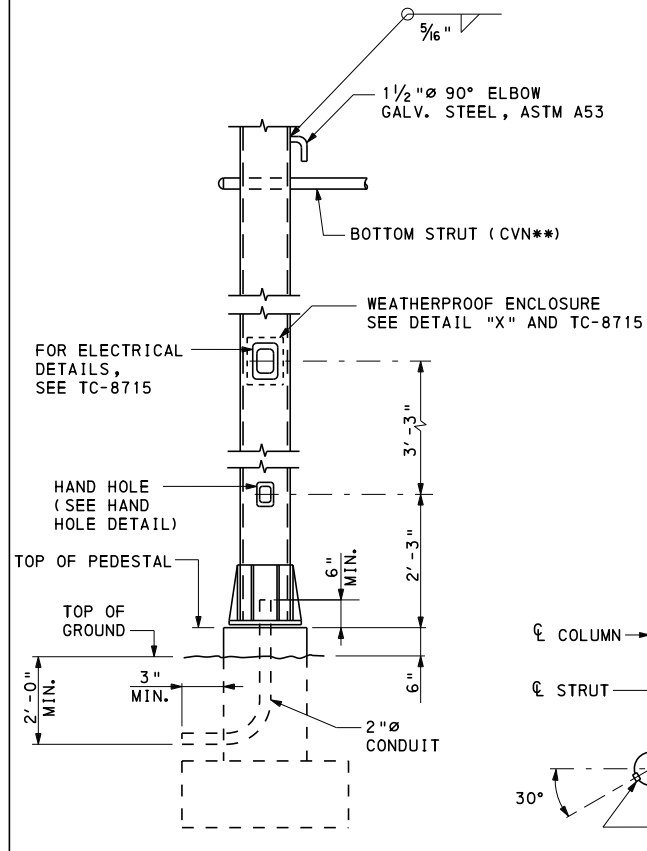


SECTION K-K

SIGN SUPPORT BEAM	
X	SIZE
0 TO 5'-6"	W6x15
5'-6" TO 6'-6"	W6x20
6'-6" TO 7'-6"	W6x25
7'-6" TO 8'-6"	W8x28
8'-6" TO 9'-6"	W8x31

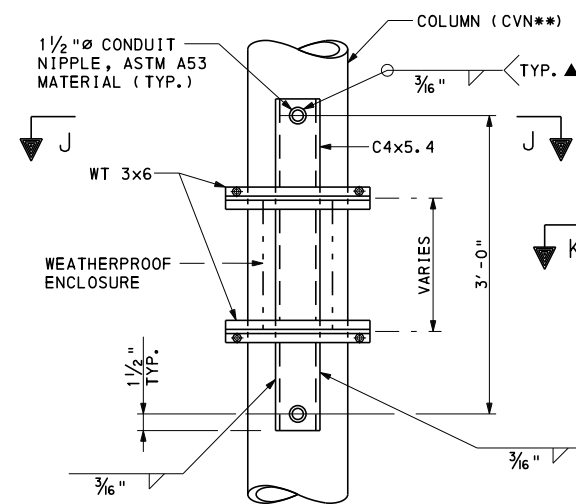


SIGN SUPPORT BEAM SIZES



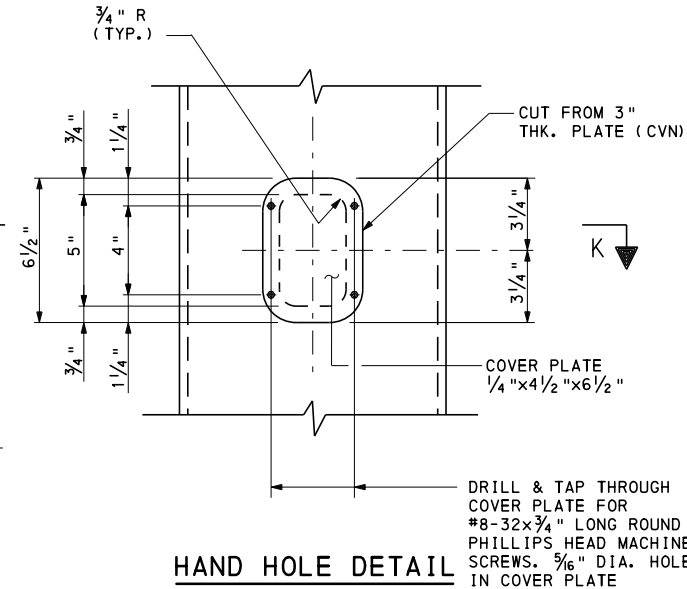
TYPICAL COLUMN DETAIL

HAND HOLE LOCATION



DETAIL X

▲ WELD TO CHANNEL ONLY.



HAND HOLE DETAIL

NOTE:
• FOR SIGN PANEL DETAILS AND LIGHTING DETAILS, SEE STANDARD DRAWINGS TC-8700C, TC-8701D, TC-8701E, TC-8701S AND TC-8715.
** CVN REQUIRED FOR WALL THICKNESSES EXCEEDING 1/2" (0.500").

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

OVERHEAD SIGN STRUCTURES
CANTILEVER AND CENTER-MOUNT STRUCTURES
STRUT LENGTHS UP TO 40'

LIGHT SUPPORT AND HANDHOLE DETAILS

INFORMATION CONTAINED IN THE BD-643M DESIGN TABLES

- DESIGN TABLES ON STANDARD DRAWING BD-643M WERE DEVELOPED USING A COMPUTER PROGRAM AND ARE BASED ON THE DESIGN CRITERIA SHOWN ON THIS SHEET, EXCEPT, THE MEMBER SIZES INDICATED DO NOT INCLUDE THE FATIGUE REQUIREMENTS INDICATED IN THE DESIGN CRITERIA.
- THE MEMBER SIZES INDICATED IN THE DESIGN TABLES MEET THE FATIGUE REQUIREMENTS FOR FATIGUE CATEGORY II. THE DESIGNER MUST CHECK THE ADEQUACY OF THE MEMBER SIZES INDICATED WHEN THE FATIGUE CATEGORY IS SPECIFIED TO BE I FOR THE PROJECT.
- THE SPAN RANGE INCLUDED ON STANDARD DRAWING BD-643M IS AS FOLLOWS:
 BD-643M: TWO-POST PLANAR TRUSS, SPANS FROM 30' TO 100'.
- THE DESIGN TABLES INCLUDE MEMBER SIZES FOR THE STRUCTURES FOR VARIOUS COMBINATIONS OF COLUMN HEIGHT, SPAN LENGTH, AND SIGN AREA. THEY ALSO INCLUDE SPREAD FOOTING DESIGNS. ALTERNATE CAISSON FOUNDATIONS ARE PERMITTED, HOWEVER, THE REQUIRED CAISSON EMBEDMENT AND REINFORCEMENT MUST BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF PENNSYLVANIA. THE DESIGN COMPUTATIONS MUST BE SUBMITTED TO THE DISTRICT BRIDGE ENGINEER FOR REVIEW AND APPROVAL. THE CORRESPONDING FABRICATION AND CONSTRUCTION DETAILS ARE CONTAINED IN THIS STANDARD.

GENERAL NOTES

- PROVIDE 3-INCH CONCRETE COVER ON REINFORCEMENT BARS, EXCEPT AS NOTED.
- USE CLASS A CEMENT CONCRETE $f'c = 3000$ PSI IN PEDESTALS, FOOTINGS AND CAISSONS.
- PROVIDE GRADE 60 REINFORCING STEEL BARS THAT MEET THE REQUIREMENTS OF ASTM A615 FOR CONCRETE REINFORCEMENT. DO NOT WELD REINFORCING STEEL BARS.
- RAKE-FINISH ALL HORIZONTAL CONSTRUCTION JOINTS, EXCEPT AS INDICATED.
- VERIFY ALL DIMENSIONS AND GEOMETRY OF THE EXISTING STRUCTURES IN THE FIELD AS NECESSARY FOR PROPER FIT OF THE PROPOSED CONSTRUCTION.
- CHAMFER EXPOSED CONCRETE EDGES 1 INCH BY 1 INCH.
- ALL DIMENSIONS SHOWN ARE HORIZONTAL, EXCEPT AS NOTED.
- DIMENSIONS ARE BASED ON A NORMAL TEMPERATURE OF 68 DEGREES F.
- SPREAD FOOTINGS MAY BE ORDERED BY THE ENGINEER TO BE AT ANY ELEVATION OR OF ANY DIMENSIONS NECESSARY TO PROVIDE A PROPER FOUNDATION.
- GALVANIZE ALL STRUCTURAL STEEL, BOLTS, NUTS & WASHERS IN ACCORDANCE WITH PUB. 408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
- PIPE DIAMETERS SHOWN UP TO AND INCLUDING 12 INCHES ARE NOMINAL DIAMETERS. PIPE DIAMETERS SHOWN FROM 14 INCHES AND UP ARE ACTUAL DIAMETERS.
- USE STANDARD SIZE HOLE. THE STANDARD HOLE DIAMETER FOR BOLTS SMALLER THAN 1" DIAMETER SHALL BE THE NOMINAL DIAMETER OF THE BOLT PLUS $\frac{1}{16}$ ". FOR BOLTS 1" DIAMETER AND LARGER, THE WIDTH OF EACH STANDARD HOLE SHALL BE THE NOMINAL DIAMETER OF THE BOLT PLUS $\frac{1}{8}$ ".
- CLEAR DISTANCE BETWEEN BOLT HOLES OR BETWEEN THE BOLT HOLE AND THE END OF THE MEMBER IN THE DIRECTION OF THE APPLIED BEARING FORCE SHALL BE CHECKED.
- PROVIDE ANCHOR BOLT HOLES $\frac{1}{4}$ " LARGER THAN BOLT DIAMETER.
- PROVIDE A MINIMUM ANCHOR BOLT EMBEDMENT LENGTH OF 20 ANCHOR BOLT DIAMETERS.
- PROVIDE DOUBLE NUTS AND WASHER FOR EACH ANCHOR BOLT.
- STEEL MEMBER COMPONENTS REQUIRING CHARPY V-NOTCH TESTING ARE DESIGNATED ON THE PLANS BY (CVN). PROVIDE STEEL CONFORMING TO THE CVN REQUIREMENTS FOR ZONE 2, NON FRACTURE CRITICAL AS GIVEN IN THE AASHTO MATERIAL SPECIFICATIONS.

NOTES TO FABRICATOR

- DYNAMIC/VARIABLE MESSAGE SIGNS (DMS/VMS) ARE PROHIBITED ON 2-POST PLANAR TRUSS STRUCTURE TYPES AS PRESENTED IN THESE STANDARDS. OVERHEAD SIGN STRUCTURES INTENDED TO CARRY DMS/VMS MUST BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF PENNSYLVANIA AND SUBMITTED TO THE CHIEF BRIDGE ENGINEER FOR REVIEW AND APPROVAL.
- DESIGN COMPUTATIONS ARE REQUIRED FOR ANY PORTION OF A STRUCTURE FOR WHICH THE INFORMATION IS NOT TAKEN DIRECTLY FROM THE CONTRACT DRAWINGS OR THE DETAILS CONTAINED IN THIS STANDARD. DO NOT VIOLATE CRITERIA USED FOR THE DEVELOPMENT OF THE DESIGN TABLES ON STANDARD DRAWING BD-643M AND THE DETAILS IN THIS STANDARD.
- FABRICATOR TO SELECT PANEL POINT CONNECTION DETAIL TYPE BASED ON MEMBER SIZE AND TRUSS CONFIGURATION TO ENSURE FIT-UP, FABRICATION, GALVANIZING AND ERECTION.

DESIGN CRITERIA FOR PENNDOT SIGN STRUCTURES

- DEAD LOADS** PENNDOT STD. DWGS. (U.N.O.)*
 SIGN PANELS TC-8701E OR TC-8701S
 LIGHT FIXTURES BC-743M, SHT. 9
 SIGN SUPPORT BEAM BC-743M, SHT. 10
 COLUMNS, CHORDS CALCULATED INTERNALLY WITHIN PROGRAM
- EXTERNAL LOADS** AASHTO SIGN SPECS.
 ICE LOAD 3.7
 WIND LOAD APPENDIX C, SECTION C.3,
 EQ. C-1, WITH 80 MPH
 WIND AND 30% GUST FACTOR
- GROUP LOADS** AASHTO SIGN SPECS. 3.4
- STEEL CRITERIA** AASHTO SIGN SPECS.
 SECTION PROPERTIES FOR TUBULAR SHAPES APPENDIX B, TABLE B-1
 MAXIMUM STRESSES IN TUBULAR SHAPES APPENDIX B, TABLE B-2
 ALLOWABLE STRESSES FOR TUBULAR SHAPES 5.6 (TABLE 5-3) & 5.11
 ALLOWABLE STRESSES FOR SIGN SUPPORTS 5.12
 ALLOWABLE STRESSES FOR BASE PLATES 5.8
 ALLOWABLE STRESSES FOR COMBINED STEEL STRESS 5.12
 FATIGUE REQUIREMENTS (FATIGUE CATEGORY II) SECTION 11
 ALLOWABLE DEFLECTION 10.4
 PERMANENT CAMBER 10.5
 ALLOWABLE STRESSES FOR STRUCTURAL STEEL SECTION 5
- BOLT CRITERIA** AASHTO HIGHWAY BRIDGES (U.N.O.)
 ALLOWABLE BOLT STRESSES TABLE 10.32.3B
 SLIP-CRITICAL BOLT ALLOWABLE 10.32.3.2.1
 BOLT PRYING ACTION 10.32.3.3.2
 COMBINED BOLT SHEAR AND TENSION 10.32.3.3.3
 BOLT DESIGN CRITERIA AASHTO SIGN SPECS. 5.16
 ALLOWABLE ANCHOR BOLT STRESSES AASHTO SIGN SPECS. 5.17
- CONCRETE CRITERIA** AASHTO HIGHWAY BRIDGES (U.N.O.)
 ALLOWABLE BEARING STRESS 8.15.2.1.3
 REINFORCEMENT TENSILE STRESS 8.15.2.2
 SHEAR CAPACITY OF FOOTINGS 8.15.5.6.1
 SHEAR STRESS IN FOOTINGS 8.15.5.6.2
 ALLOWABLE SHEAR STRESS 8.15.5.6.4
 SLENDERNESS OF COLUMNS 8.16.5.2
 MINIMUM REINF. OF FLEXURAL MEMBERS 8.17.1
 SPACING LIMITS FOR REINFORCEMENT 8.21
 MINIMUM CONCRETE COVER DM4 D8.22.1*
 PRESSURES FOR ECCENTRICALLY LOADED FOOTINGS FIG. 4.4.7.1.1.1C
 DISTRIBUTION OF REINFORCEMENT 4.4.11.2.2
 FOOTING STABILITY REQUIREMENTS DM4 D5.5.5
 TORSION ACI SECTION A.7.3*
 COLUMN DESIGN (PEDESTALS) 8.15.4
- SPREAD FOOTINGS**
 MAXIMUM DESIGN PRESSURE 1.5 TONS PER SQUARE FOOT
 MINIMUM AREA IN BEARING 95%
 UNIT WEIGHT OF SOIL 100 POUNDS PER CUBIC FOOT
- DRILLED SHAFTS (CAISSONS)** DM4 SEC. 4.6, PENNDOT COM624 COMPUTER PROGRAM
 MAXIMUM DESIGN PRESSURE 1.5 TONS PER SQUARE FOOT
 MAXIMUM DESIGN LATERAL DISPLACEMENT 0.5"
 MODULUS OF SUBGRADE REACTION 10.0 POUNDS PER CUBIC INCH
 UNIT WEIGHT OF SOIL 100 POUNDS PER CUBIC FOOT
 ANGLE OF INTERNAL FRICTION 25°
 COHESION 0 KIPS PER SQUARE FOOT
- SEISMIC DESIGN CRITERIA**
 STRUCTURES ARE DESIGNED FOR A SEISMIC ACCELERATION COEFFICIENT = 0.15

CONSTRUCTION GENERAL NOTES

- MATERIALS AND WORKMANSHIP:**
 PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CURRENT VERSIONS OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, AASHTO/AWS WELDING CODE D1.5 CONTRACT SPECIAL PROVISIONS, AND AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS". USE AASHTO/AWS D1.1 FOR WELDING NOT COVERED IN AASHTO/AWS D1.5.
- PROVIDE STRUCTURAL STEEL CONFORMING TO THE FOLLOWING:**
 COLUMNS & PIPE CHORDS: SEE PUBLICATION 408, SECTION 948.2.
 ANGLES, SHAPES, AND PLATES: AASHTO M270, GRADE 36
 ASTM A709, GRADE 36
- ALTERNATE PRESS-BREAK MEMBERS:**
 ALTERNATE PRESS-BREAK MEMBERS MUST HAVE THE EQUIVALENT STRENGTH OF THE MEMBER THEY ARE REPLACING. EQUIVALENT RADIUS FOR PRESS-BREAK MEMBERS IS MEASURED FROM THE CENTER OF THE MEMBER TO THE MID-POINT OF ANY CHORD OF THE MEMBER. MINIMUM THICKNESS OF PRESS-BREAK MEMBERS TO BE $\frac{3}{4}$ ". PENNDOT SIGN STRUCTURE COMPUTER PROGRAM OR AN APPROVED FINITE ELEMENT ANALYSIS COMPUTER PROGRAM MUST BE RUN TO VERIFY THE ADEQUACY OF PRESS-BREAK MEMBERS FOR STRENGTH AND FATIGUE. ALTERNATE PRESS-BREAK MEMBERS ARE ONLY PERMITTED FOR COLUMNS. PRESS-BREAK MEMBERS ARE NOT PERMITTED FOR CHORDS.
- PROVIDE BOLTS CONFORMING TO THE FOLLOWING:**
 ANCHOR BOLTS: ASTM, F1554 GRADE 55 PER PUBLICATION 408 SECTION 1105.02(c)3.
 BOLTS: AASHTO M164 (ASTM A325) H.S. BOLTS EXCEPT AS NOTED
- DESIGN SPECIFICATIONS:**
 AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", 2001 WITH CURRENT INTERIMS (UNLESS NOTED OTHERWISE); AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1996 WITH INTERIMS THROUGH AND INCLUDING 2000; PENNDOT DESIGN MANUAL - PART 4, AUGUST 1993 EDITION (INCLUDING AUGUST 1995 REVISIONS)
- ALL FILLET WELDS SHOWN ARE MINIMUM SIZE UNLESS NOTED OTHERWISE.

*** LEGEND:**

- AASHTO SIGN SPEC: AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS"
- AASHTO HIGHWAY BRIDGES: AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES"
- DM4: PENNSYLVANIA DEPARTMENT OF TRANSPORTATION, DESIGN MANUAL PART 4, STRUCTURES
- U.N.O.: UNLESS NOTED OTHERWISE
- ACI: AMERICAN CONCRETE INSTITUTE - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE WITH COMMENTARY (ACI 318-99).
- CVN: CHARPY V-NOTCH.

CHANGE 1

TC-8700C	SPACING CHARTS/DIRECT APPLIED LETTERS, NUMERALS, & ARROWS
TC-8701D	SIGN DETAILS/FREEWAY AND EXPRESSWAY GUIDE SIGNS
TC-8701E	EXTRUDED ALUMINUM CHANNEL SIGN
TC-8701S	FLAT SHEET ALUMINUM SIGNS WITH EXTRUDED ALUMINUM STIFFENERS
TC-8715	SIGN LIGHTING
BC-736M	REINFORCEMENT BAR FABRICATION DETAILS
RC-11M	CLASSIFICATION OF EARTHWORK FOR STRUCTURES
RC-51M	TYPE 31 STRONG POST GUIDE RAIL
RC-53M	TYPE 2 WEAK POST GUIDE RAIL
RC-54M	BARRIER PLACEMENT AT OBSTRUCTIONS
RC-58M	SINGLE FACE CONCRETE BARRIER PLACEMENT AT MEDIAN PIERS

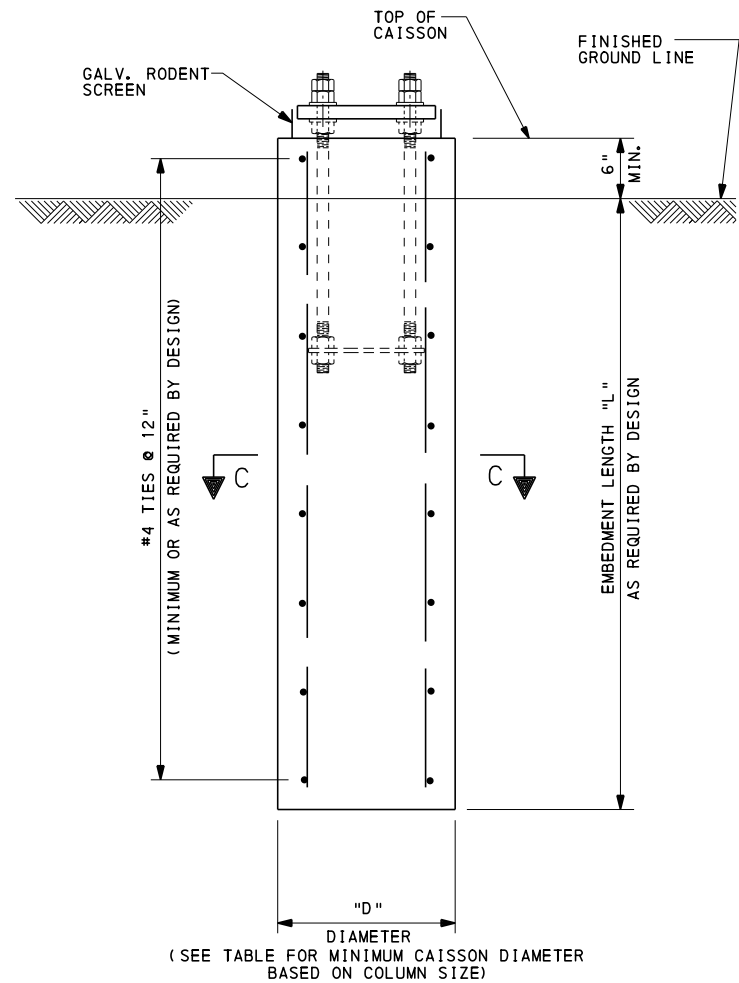
REFERENCE DRAWINGS

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

OVERHEAD SIGN STRUCTURES
2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'

NOTES AND DESIGN CRITERIA

RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Bruce S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 1 OF 10 BC-743M
--	--	--------------------------------



CAISSON ELEVATION
N. T. S.

ALTERNATE CAISSON FOUNDATIONS			
COLUMN NOMINAL SIZE X WALL THK.	MINIMUM CAISSON DIAMETER "D"	CAISSON EMBEDMENT LENGTH "L"	CAISSON REINFORCEMENT QUANTITY AND BAR SIZE "N"
8"x. 322"	3'-6"	EMBEDMENT LENGTH "L" AS REQUIRED BY DESIGN	QUANTITY AND BAR SIZE "N" AS REQUIRED BY DESIGN
10"x. 365"	3'-6"		
12"x. 375"	3'-9"		
14"x. 375"	3'-9"		
16"x. 375"	4'-0"		
18"x. 375"	4'-3"		
20"x. 375"	4'-9"		
24"x. 375"	5'-3"		
24"x. 500"	5'-3"		

NOTES:

- ALTERNATE CAISSON FOUNDATIONS ARE PERMITTED IN PLACE OF THE SPREAD FOOTING SIZE SHOWN ON THE CONTRACT DRAWINGS.
- ALTERNATE CAISSON FOUNDATIONS MUST BE DESIGNED IN ACCORDANCE WITH DESIGN CRITERIA GIVEN ON SHEET 1.
- DESIGN COMPUTATIONS FOR THE REQUIRED CAISSON EMBEDMENT AND REINFORCEMENT MUST BE SUBMITTED TO THE DISTRICT BRIDGE ENGINEER FOR REVIEW AND APPROVAL.
- IN PLACE OF #4 TIES AT 12", A #4 BAR SPIRAL WITH A 3" PITCH MAY BE USED. THE #4 TIES AT 12" ARE THE MINIMUM OR AS REQUIRED BY DESIGN.

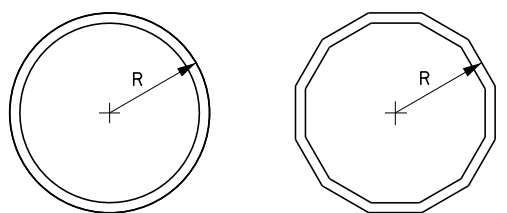
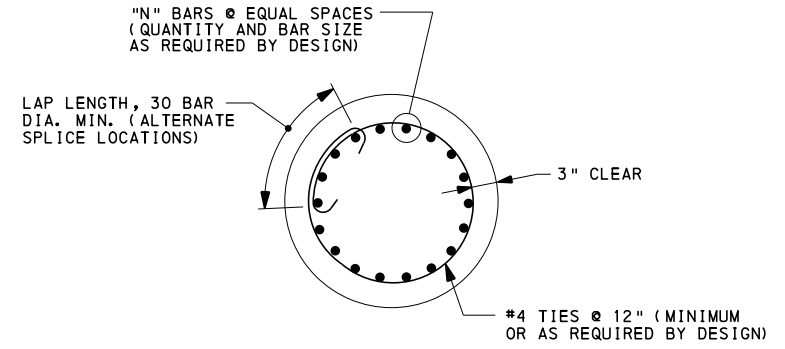


ILLUSTRATION OF DIMENSION "R" FOR CIRCULAR MEMBERS AND EQUIVALENT "PRESS-BREAK" MEMBERS

"PRESS-BREAK" NOTE:

ALTERNATE "PRESS-BREAK" MEMBERS ARE PERMITTED FOR COLUMNS. "PRESS-BREAK" MEMBERS MUST HAVE THE EQUIVALENT STRENGTH AND FATIGUE RESISTANCE OF THE CIRCULAR MEMBER BEING REPLACED. A MINIMUM NUMBER OF 12 BREAKS IS REQUIRED. A CHANGE IN STEEL MATERIAL OR WALL THICKNESS REQUIRES A SPECIAL DESIGN TO BE SUBMITTED FOR REVIEW. CONTRACTOR MUST SUBMIT DESIGN CALCULATIONS AND DESIGN DRAWINGS FOR REVIEW AND ACCEPTANCE FOR LONGITUDINAL SEAM WELDS INDICATING TYPE OF WELD, WELD PENETRATION, EFFECTIVE DEPTH AND LENGTH OF EACH WELD TYPE. LONGITUDINAL SEAM WELDS SHALL HAVE 60 PERCENT MINIMUM PENETRATION, EXCEPT LONGITUDINAL SEAM WELDS WITHIN 6" OF THE ENDS OF THE PRESS BREAK MEMBER OR LENGTH SHOWN ON DETAILS SHALL BE COMPLETE PENETRATION WELDS. COMPLETE PENETRATION LONGITUDINAL SEAM WELDS MUST BE 100% RADIOGRAPHICALLY INSPECTED. FOR THE COLUMN CONNECTION TO BASE PLATE, AND AT COLUMN CONNECTION SPLICE PLATE LOCATIONS, WELD SHALL START AND STOP IN THE MIDDLE THIRD REGION OF FLAT SECTIONS BETWEEN BREAK POINTS.

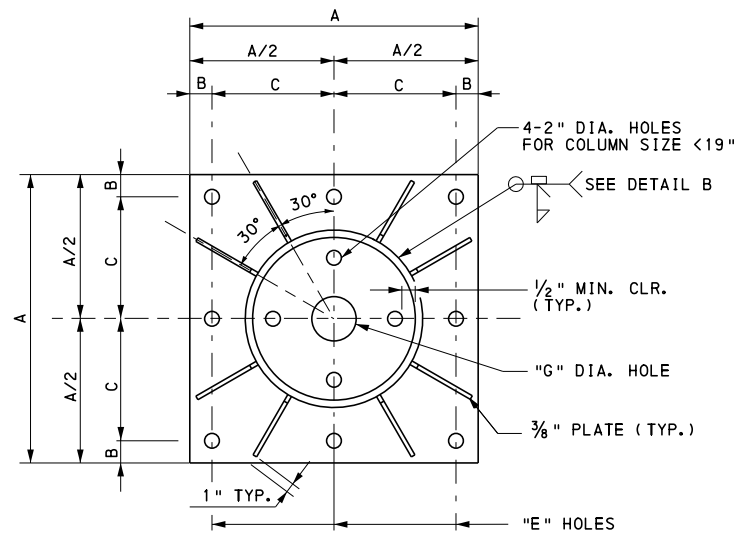


SECTION C-C
N. T. S.

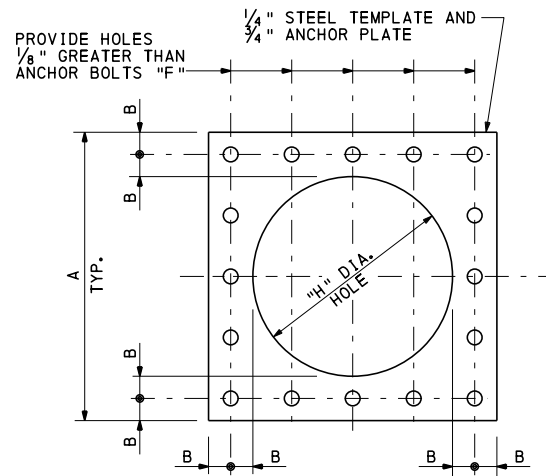
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

OVERHEAD SIGN STRUCTURES
2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'
ALTERNATE CAISSON FOUNDATION

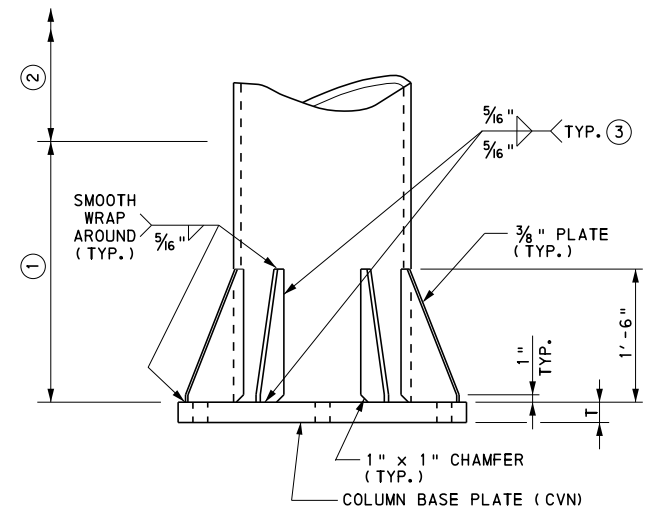
RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Brenda S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 3 OF 10 BC-743M
--	---	--------------------------------



PLAN OF COLUMN BASE TYPE 'Y'



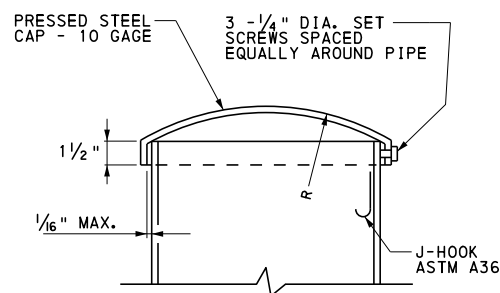
ANCHOR PLATE AND STEEL TEMPLATE DETAIL



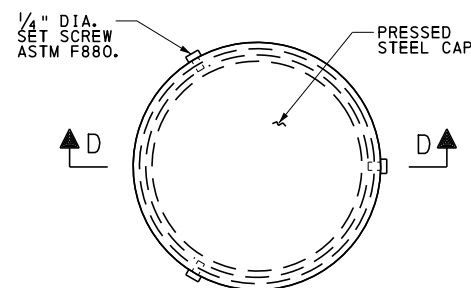
ELEVATION - TYPE Y
(TYPE - X SIMILAR)

- ① FOR PRESS BREAK COLUMN, 2'-6" LENGTH OF SEAM WELD TO BE COMPLETE PENETRATION GROOVE WELD.
- ② SEAM WELD TO HAVE 60% MIN. PENETRATION.
- ③ TERMINATE WELDS 1/4" SHORT OF STIFFENER CHAMFER.

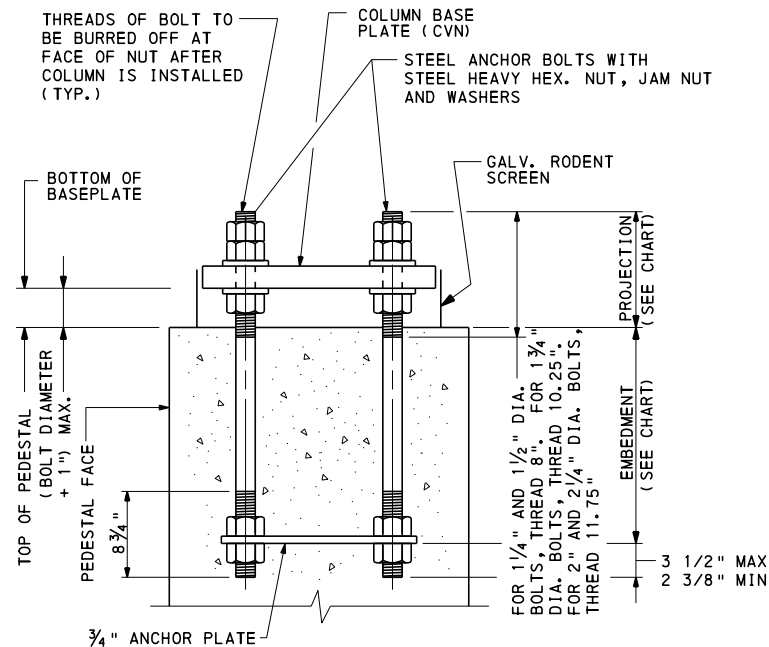
PIPE CAPS	
PIPE SIZE (NOMINAL)	R
8" DIA.	9"
10" DIA.	9"
12" DIA.	1'-6"
14" DIA.	1'-6"
16" DIA.	1'-6"
18" DIA.	1'-6"
20" DIA.	2'-6"
24" DIA.	2'-6"



SECTION D-D

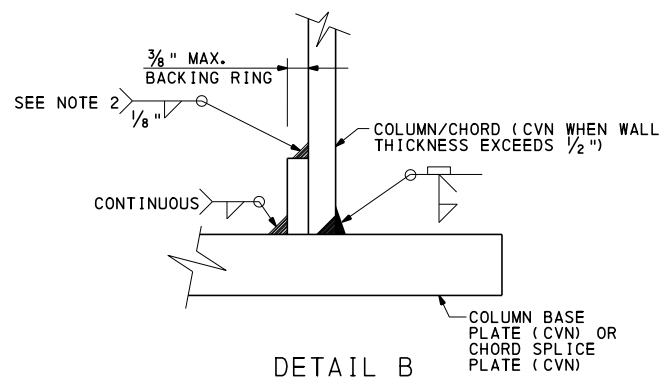


PIPE CAP DETAILS



ANCHOR BOLT DETAIL

COLUMN, STIFFENERS, AND REINF. OMITTED FOR CLARITY



DETAIL B

DETAIL B NOTES:

1. BACKING RING MUST BE FITTED/SIZED TO THE PIPE COLUMN AND CONTINUOUSLY FILLET WELDED TO THE BASE PLATE BEFORE THE FULL PENETRATION GROOVE WELD IS MADE. BACKING RING MUST BE FABRICATED AS A CONTINUOUS RING.
2. FOR COLUMNS AND CHORDS LESS THAN 19" DIA., THIS FILLET WELD IS NOT REQUIRED BUT SHOP IS TO APPLY SILICON CAULKING TO THIS LOCATION AFTER POLE ASSEMBLY IS GALVANIZED.

COLUMN BASES												
COLUMN NOMINAL SIZE X WALL THK. *	BASE TYPE	A	B	C	E	F	G	H	T	WASHER SIZE	PROJECTION	EMBEDMENT
8"x.322"	Y	1'-8"	2 1/2"	7.5"	1 1/2"D	1 1/4"D	2"	10"	2"	3 1/2"Dx3/8"	7 3/4"	2'-1"
10"x.365"	Y	1'-8"	2 1/2"	7.5"	1 1/2"D	1 1/4"D	3 1/4"	10"	2"	3 1/2"Dx3/8"	7 3/4"	2'-1"
12"x.375"	Y	1'-10"	2 1/2"	8.5"	1 3/4"D	1 1/2"D	5 1/4"	1'-0"	2"	3 1/2"Dx3/8"	8 1/2"	2'-6"
14"x.375"	Y	2'-0"	2 1/2"	9.5"	1 3/4"D	1 1/2"D	6 1/2"	1'-2"	2"	3 1/2"Dx3/8"	8 1/2"	2'-6"
16"x.375"	Y	2'-2"	2 1/2"	10.5"	2"D	1 3/4"D	8"	1'-4"	2"	4"Dx3/8"	9 1/4"	2'-11"
18"x.375"	Y	2'-4"	2 1/2"	11.5"	2"D	1 3/4"D	9 1/4"	1'-6"	2"	4"Dx3/8"	9 1/4"	2'-11"
20"x.375"	Y	2'-7"	3"	1'-0 1/2"	2 1/4"D	2"D	1'-5"	1'-7"	3"	5"Dx3/8"	11"	3'-4"
24"x.375"	Y	2'-11"	3"	1'-2 1/2"	2 1/4"D	2"D	1'-6"	1'-11"	3"	5"Dx3/8"	11"	3'-4"
24"x.500"	Y	3'-0"	3 1/2"	1'-2 1/2"	2 1/2"D	2 1/4"D	1'-6"	1'-10"	3"	5"Dx3/8"	11 3/4"	3'-9"

NOTE: D DENOTES DIAMETER
* CVN REQUIRED FOR WALL THICKNESSES EXCEEDING 1/2" (.500").

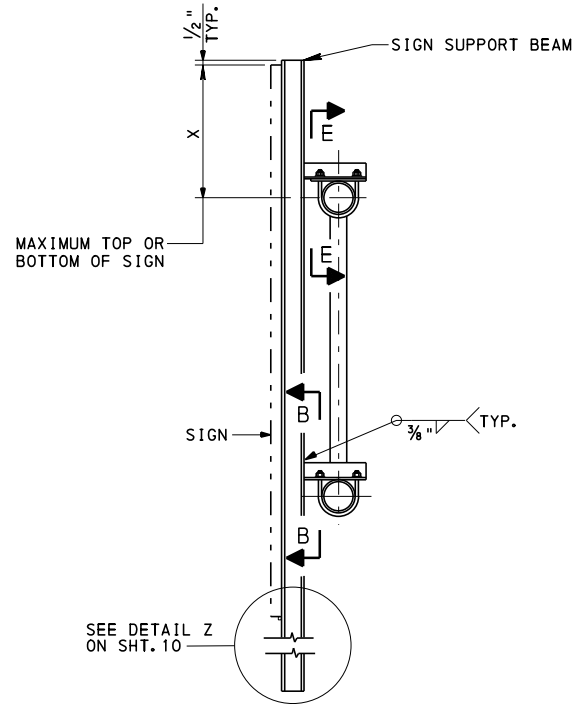
NOTES:

- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEXAGON NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE GALVANIZED AFTER THREADING.
- USE STEEL TEMPLATE TO SET ANCHOR BOLTS IN ACCORDANCE WITH PUBLICATION 408, SECTION 948.3(b).
- STEEL TEMPLATE AND ANCHOR PLATE TO BE PROVIDED BY SIGN FABRICATOR.
- STEEL TEMPLATE PLATE WITH NUTS ON BOTH SIDES SHALL BE USED TO MAINTAIN THE SPACING AND ALIGNMENT OF ANCHOR BOLTS.
- FOR EQUIVALENT "PRESS BREAK" MEMBER DETAILS AND NOTES, SEE SHEET 3.
- FOR ALTERNATE PIPE CAP DETAIL, SEE SHEET 10.
- SEAL BASE PLATE TO FOUNDATION GAP WITH GALVANIZED STEEL SCREEN, 1/2" BY 1/2" MESH AND 0.063" DIAMETER WIRES. SCREEN IS TO PREVENT ENTRY OF RODENTS WHILE PERMITTING DRAINAGE. SCREEN IS TO BE REMOVABLE AND ATTACHED TO BASEPLATE WITH STAINLESS STEEL HARDWARE.

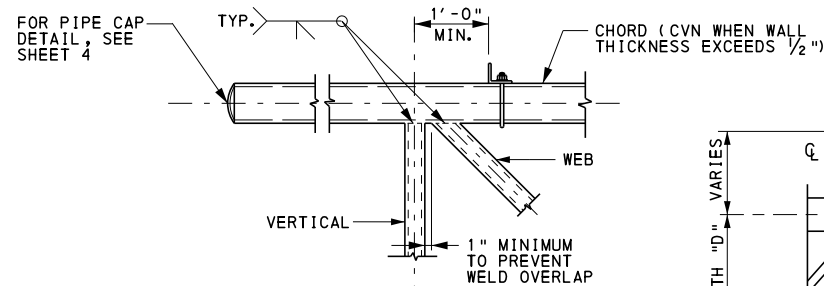
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES
2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'
COLUMN BASE

SIGN SUPPORT BEAM SIZES	
X	SIZE
0" TO 5'-6"	W6x15.0
5'-6" TO 6'-6"	W6x20.0
6'-6" TO 7'-6"	W6x25.0
7'-6" TO 8'-6"	W8x28.0
8'-6" TO 9'-6"	W8x31.0



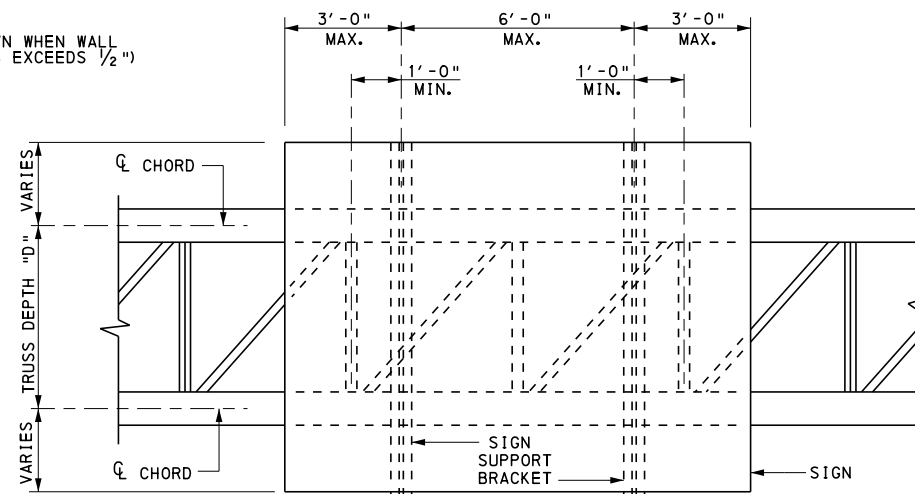
SIGN SUPPORT BEAM SIZES
FOR SECTION B-B SEE SHT. 10



SECTION E-E

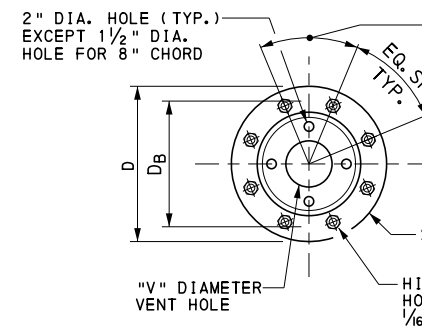
WORKLINES TO INTERSECT AT COMMON WORKPOINT

NOTE:
SEE SHEET 6 FOR ALTERNATE PANEL POINT CONNECTION DETAIL.

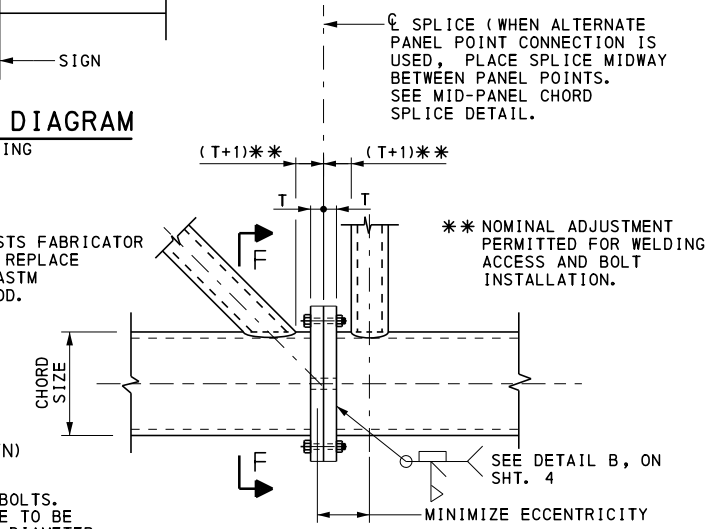


TYPICAL SIGN SUPPORT BRACKET SPACING DIAGRAM

PROVIDE ADDITIONAL BRACKETS AS REQUIRED AT 6'-0" MAX. SPACING



SECTION F-F

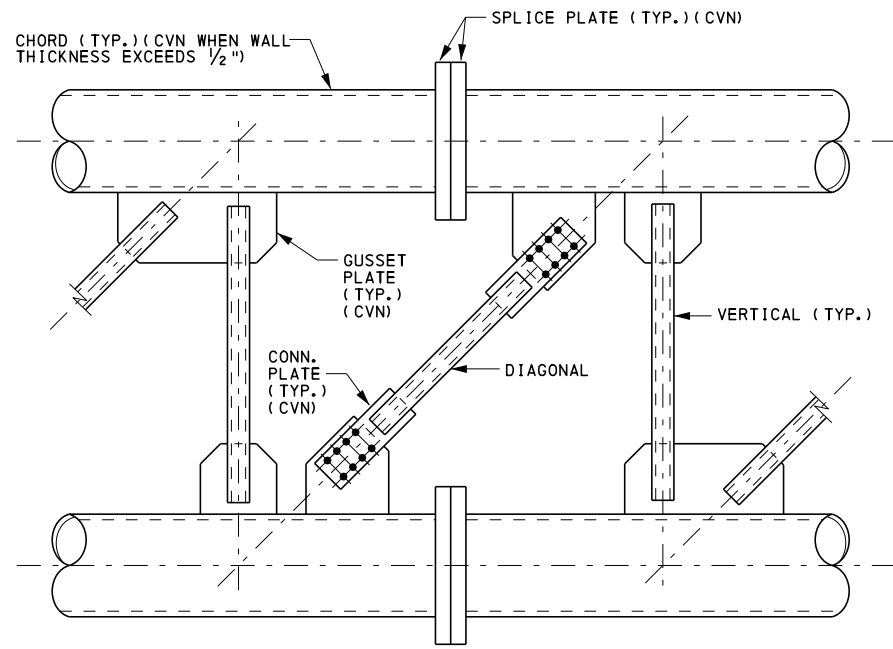


ELEVATION

CHORD SPLICE

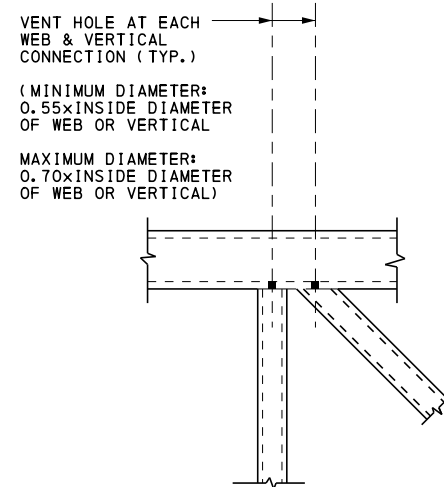
ONE OR MORE SPLICES MAY BE ADDED OR ELIMINATED AT THE OPTION OF THE FABRICATOR.

CHORD SPLICE					
CHORD NOMINAL SIZE X WALL THK.	D	D _B	BOLTS	T	V
8"x. 322"	1'-4 5/8"	1'-1 5/8"	8- 7/8" ∅	2 1/4"	2"
10"x. 365"	1'-6 3/4"	1'-3 3/4"	12- 7/8" ∅	2 1/2"	3 1/4"
12"x. 375"	1'-8 3/4"	1'-5 3/4"	14- 7/8" ∅	2 1/2"	5 1/4"
14"x. 375"	1'-10"	1'-7"	16- 7/8" ∅	2 1/2"	6 1/2"
16"x. 375"	2'-0"	1'-9"	18- 7/8" ∅	2 1/2"	8"
18"x. 375"	2'-2"	1'-11"	20- 7/8" ∅	2 1/2"	9 1/4"
20"x. 375"	2'-4"	2'-1"	22- 7/8" ∅	2 1/2"	10 1/2"
24"x. 375"	2'-8 1/2"	2'-5"	20-1" ∅	2 1/2"	1'-0 3/4"
24"x. 500"	2'-8 1/2"	2'-5"	26-1" ∅	3"	1'-0 3/4"



ELEVATION

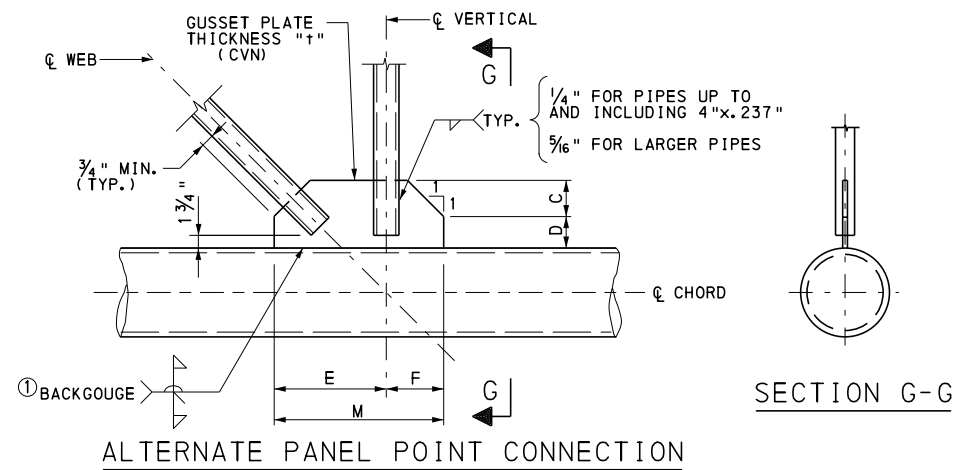
MID-PANEL CHORD SPLICE



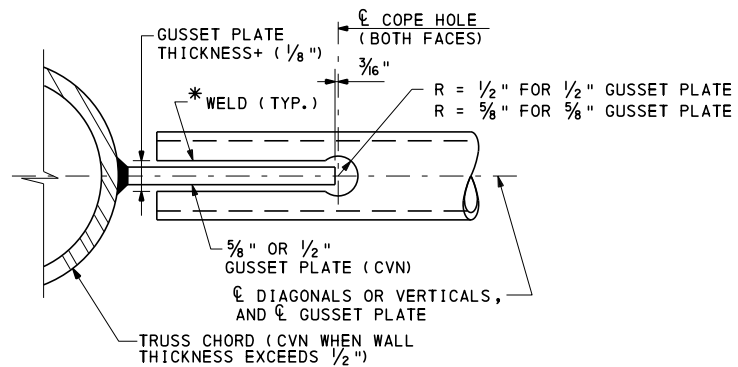
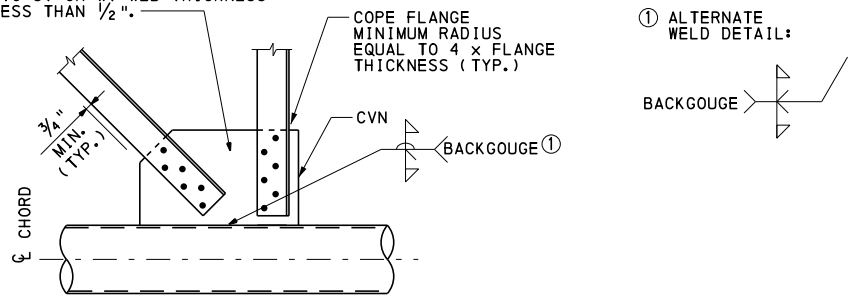
SECTION THRU TRUSS AT PANEL POINT

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES
2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'
TRUSS DETAILS - 1



CONNECTION PLATE THICKNESS SHALL BE EQUAL TO ST OR WT WEB THICKNESS BUT NOT LESS THAN 1/2".



* PROVIDE A WELD 'HOLDBACK' AT THE EDGE OF THE GUSSET PLATE IN THE BRACING MEMBERS EQUAL TO THE MINIMUM WELD SIZE REQUIRED.

WEB AND/OR VERTICAL PIPE SECTIONS MAY BE REPLACED WITH THE ST OR WT SUBSTITUTION SECTION SHOWN IN THIS TABLE. IF ST OR WT SUBSTITUTION SECTIONS ARE USED, USE THE "ST/WT ALTERNATE PANEL POINT CONNECTION DETAIL". IF THIS SUBSTITUTION IS MADE, IT WILL BE AT NO ADDITIONAL COST TO THE DEPARTMENT.

WEB AND VERTICAL MEMBER SUBSTITUTION TABLE	
PIPE SECTION	ST/WT SUBSTITUTION SECTION
2 1/2 "x. 203 "	ST4x11.5
3 "x. 216 "	ST6x15.9
3 1/2 "x. 226 "	ST6x17.5
4 "x. 237 "	ST6x20.4
5 "x. 258 "	ST7.5x25
6 "x. 280 "	WT10.5x41.5

ALTERNATE PANEL POINT CONNECTION GUSSET PLATE DIMENSIONS									
CHORD NOMINAL SIZE X WALL THK.	WEB AND VERTICAL SIZE	C	D	E	F	M	t	MIN. VERT. WELD LENGTH	MIN. WEB WELD LENGTH
6"x. 280 "	2 1/2 "x. 203 "	3 1/4 "	4 "	10 1/2 "	5 3/4 "	1' - 4 1/4 "	1/2 "	5 1/4 "	3 5/8 "
8"x. 322 "	2 1/2 "x. 203 "	3 1/4 "	4 "	11 1/2 "	5 3/4 "	1' - 5 1/4 "	1/2 "	5 1/4 "	3 5/8 "
10"x. 365 "	2 1/2 "x. 203 "	3 1/4 "	4 "	1' - 0 1/2 "	5 3/4 "	1' - 6 1/4 "	1/2 "	5 1/4 "	3 5/8 "
12"x. 375 "	2 1/2 "x. 203 "	3 1/4 "	4 "	1' - 1 1/2 "	5 3/4 "	1' - 7 1/4 "	1/2 "	5 1/4 "	3 5/8 "
14"x. 375 "	3 "x. 216 "	3 5/8 "	4 5/8 "	1' - 3 1/4 "	6 3/8 "	1' - 9 5/8 "	1/2 "	6 1/4 "	4 1/2 "
16"x. 375 "	2 1/2 "x. 203 "	3 1/4 "	4 "	1' - 3 1/8 "	5 3/4 "	1' - 8 7/8 "	1/2 "	5 1/4 "	3 5/8 "
	3 "x. 216 "	3 5/8 "	4 5/8 "	1' - 4 1/4 "	6 3/8 "	1' - 10 5/8 "	1/2 "	6 1/4 "	4 1/2 "
18"x. 375 "	3 1/2 "x. 226 "	4 "	5 1/4 "	1' - 5 1/4 "	7 "	2' - 0 1/4 "	5/8 "	7 1/4 "	5 7/16 "
	3 "x. 216 "	3 5/8 "	4 5/8 "	1' - 5 1/4 "	6 3/8 "	1' - 11 5/8 "	1/2 "	6 1/4 "	4 1/2 "
20"x. 375 "	3 1/2 "x. 226 "	4 "	5 1/4 "	1' - 6 1/4 "	7 "	2' - 1 1/4 "	5/8 "	7 1/4 "	5 7/16 "
	3 "x. 216 "	3 5/8 "	4 5/8 "	1' - 6 1/4 "	6 3/8 "	2' - 0 5/8 "	1/2 "	6 1/4 "	4 1/2 "
	4 "x. 237 "	4 1/4 "	5 7/8 "	1' - 8 1/8 "	7 1/2 "	2' - 3 3/8 "	5/8 "	8 1/4 "	6 1/4 "
24"x. 375 "	3 1/2 "x. 226 "	4 "	5 1/4 "	1' - 9 1/4 "	7 "	2' - 4 1/4 "	5/8 "	7 1/4 "	5 7/16 "
	4 "x. 237 "	4 1/4 "	5 7/8 "	1' - 10 1/8 "	7 1/2 "	2' - 5 5/8 "	5/8 "	8 1/8 "	6 1/4 "
24"x. 500 "	5 "x. 258 "	5 "	6 1/4 "	1' - 11 1/4 "	8 7/8 "	2' - 8 1/8 "	5/8 "	9 1/4 "	6 3/4 "
	6 "x. 280 "	5 3/4 "	7 3/4 "	2' - 1 1/2 "	10 1/8 "	2' - 11 5/8 "	5/8 "	11 1/2 "	8 7/8 "

BOLTS REQUIRED FOR ST/WT ALTERNATE PANEL POINT CONNECTION DETAIL		
MEMBER	QTY.	DIA.
ST4x11.5	5	7/8 "
ST6x15.9	5	1 "
ST6x17.5	6	1 "
ST6x20.4	7	1 "
ST7.5x25	8	1 "
WT10.5x41.5	10	1 1/8 "

NOTE: MINIMUM GUSSET PLATE SIZES PROVIDED AS A GUIDE. FABRICATOR MUST PROVIDE PLATES OF ADEQUATE SIZE TO PROVIDE MINIMUM WELD LENGTHS SPECIFIED.

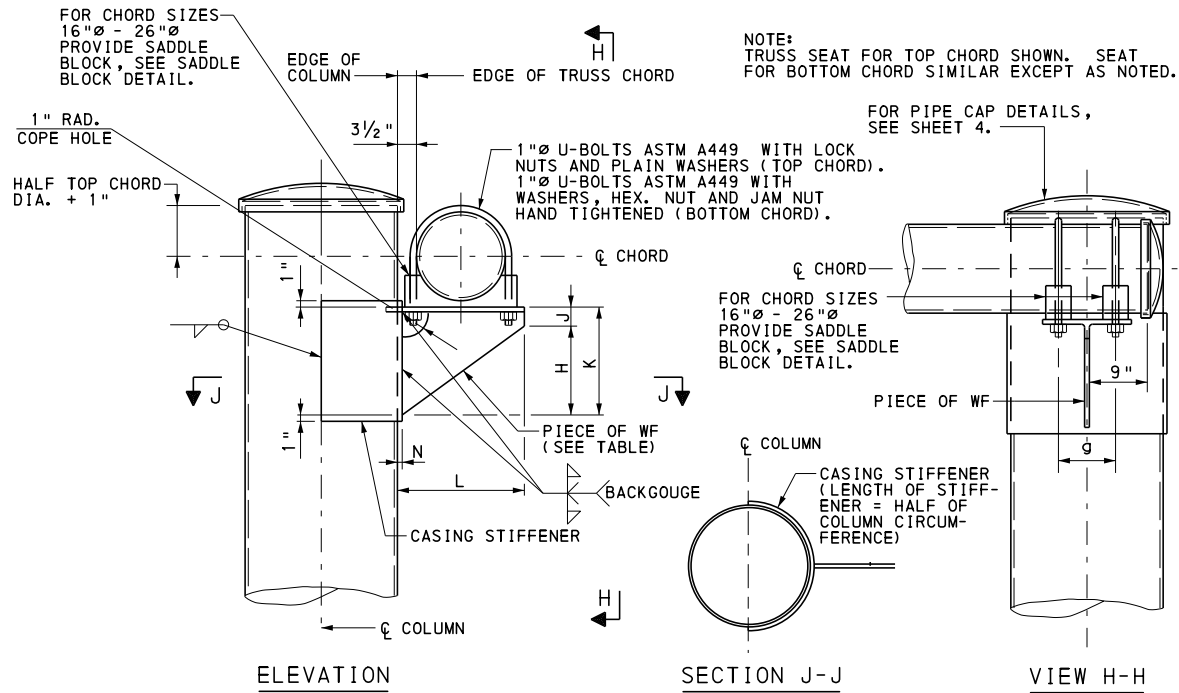
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

OVERHEAD SIGN STRUCTURES
2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'
TRUSS DETAILS - 2

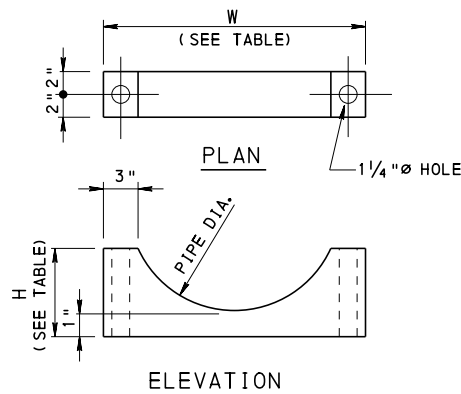
RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Brenda S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 6 OF 10 BC-743M
--	---	--------------------------------

ALTERNATE TRUSS SEAT DETAILS SEAT DIMENSIONS							
SPAN LENGTH	WF SIZE	DIMENSIONS					
		H	J	K	L	g	▲ N
30'	W16x36	9 3/4"	3"	1' - 0 3/4"	CHORD Ø + 6 1/2"	3 1/2"	1"
40'	W18x35	11 5/8"	3"	1' - 2 5/8"	CHORD Ø + 6 1/2"	3 1/2"	1 1/8"
50'	W21x44	1' - 2 1/2"	3"	1' - 5 1/2"	CHORD Ø + 6 1/2"	3 1/2"	1 1/4"
60'	W27x84	1' - 8 3/8"	3"	1' - 11 3/8"	CHORD Ø + 6 1/2"	5 1/2"	1 1/4"
70'	W30x90	1' - 9 3/8"	3"	2' - 2 3/8"	CHORD Ø + 6 1/2"	5 1/2"	1 3/8"
80'	W33x118	2' - 2 3/4"	3"	2' - 5 3/4"	CHORD Ø + 6 1/2"	5 1/2"	1 5/8"
90'	W36x135	2' - 5 3/8"	3"	2' - 8 3/8"	CHORD Ø + 6 1/2"	5 1/2"	1 5/8"
100'	W36x135	2' - 5 3/8"	3"	2' - 8 3/8"	CHORD Ø + 6 1/2"	5 1/2"	1 3/4"

▲ "N" IS TOTAL THICKNESS OF COLUMN AND CASING STIFFENER



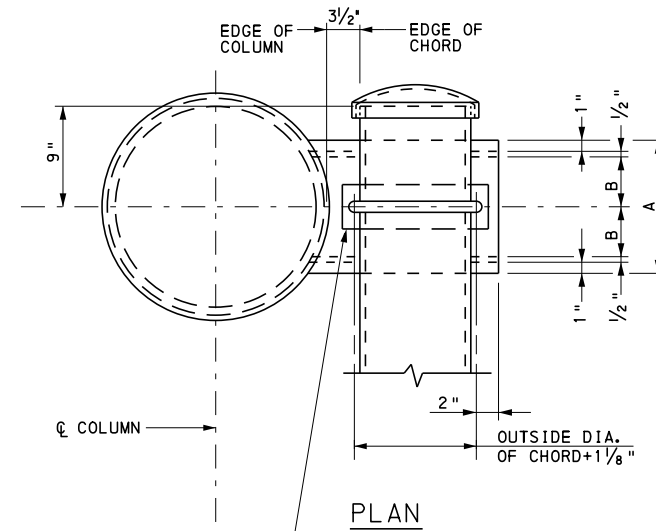
ALTERNATE TRUSS SEAT DETAILS



SADDLE BLOCK DETAIL

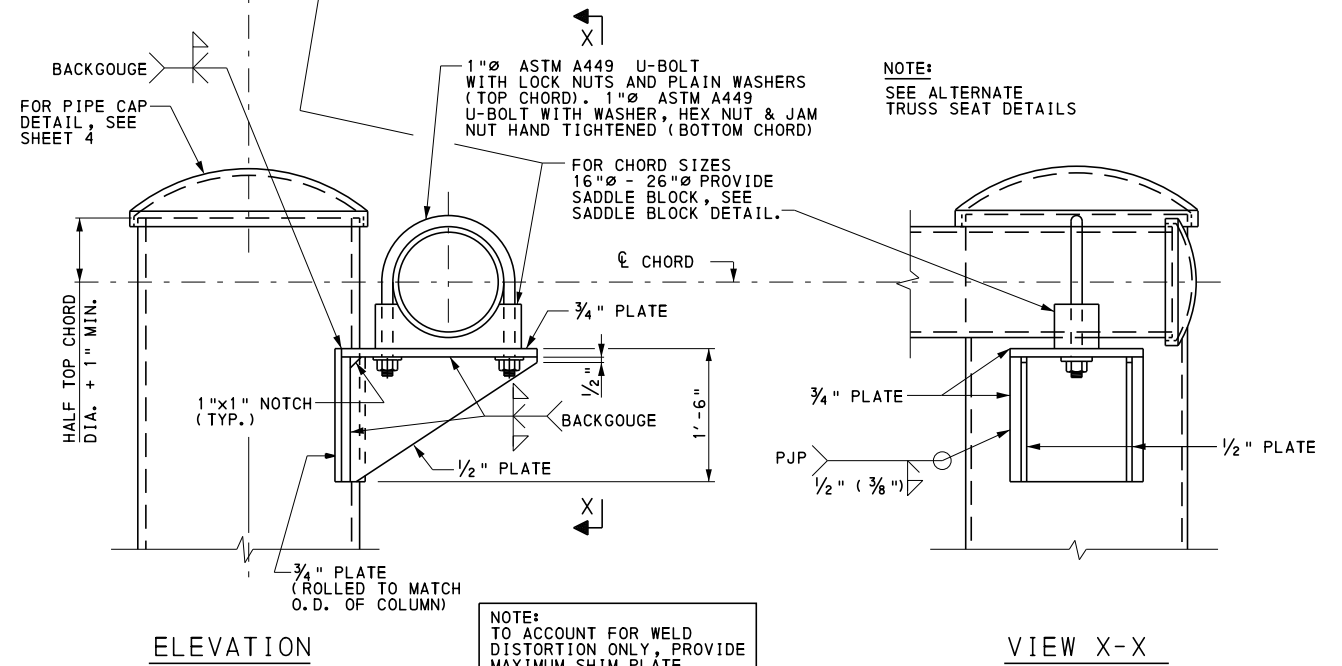
4" THICK PLATE, MATERIAL SHALL BE ASTM A36, GALVANIZED PER ASTM A123.

SADDLE BLOCK DIMENSIONS TABLE (NOMINAL)		
PIPE DIA.	1" U-BOLT DIA.	
	NOMINAL HEIGHT "H"	NOMINAL WIDTH "W"
16"	5 1/4"	1' - 8 1/8"
18"	6"	1' - 10 1/8"
20"	6 3/4"	2' - 0 1/8"
24"	8 5/16"	2' - 4 1/8"



TRUSS SEAT		
COLUMN SIZE (NOMINAL)	DIMENSION	
	A	B
8"Ø	7"	2"
10"Ø	7"	2"
12"Ø	8"	2 1/2"
14"Ø	9"	3"
16"Ø	9"	3"
18"Ø	9"	3"
20"Ø	1' - 0"	4 1/2"
24"Ø	1' - 0"	4 1/2"

ALTERNATE TRUSS SEAT DETAIL IS RECOMMENDED DUE TO POSSIBLE ACCESS LIMITATIONS FOR STIFFENER WELDS.



TRUSS SEAT DETAILS

TRUSS SEAT FOR TOP CHORD IS SHOWN. SEAT FOR BOTTOM CHORD SIMILAR EXCEPT AS NOTED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'

TRUSS SEAT DETAILS

RECOMMENDED AUG. 4, 2017

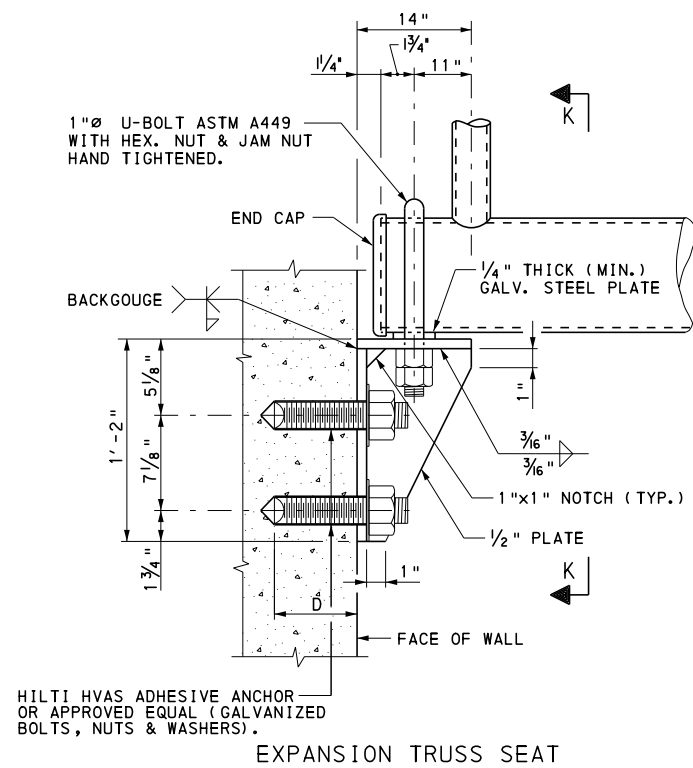
Thomas P. Maiore
CHIEF BRIDGE ENGINEER

RECOMMENDED AUG. 4, 2017

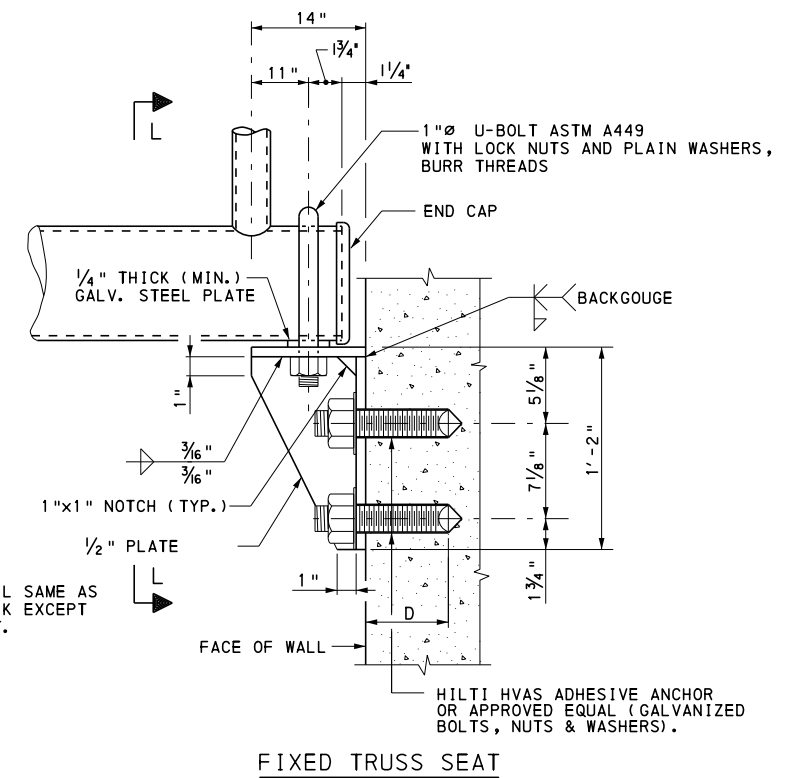
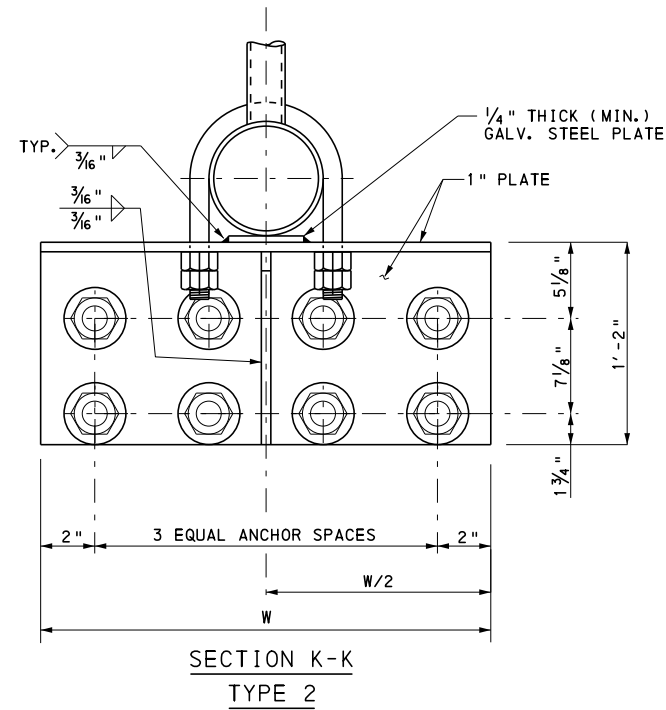
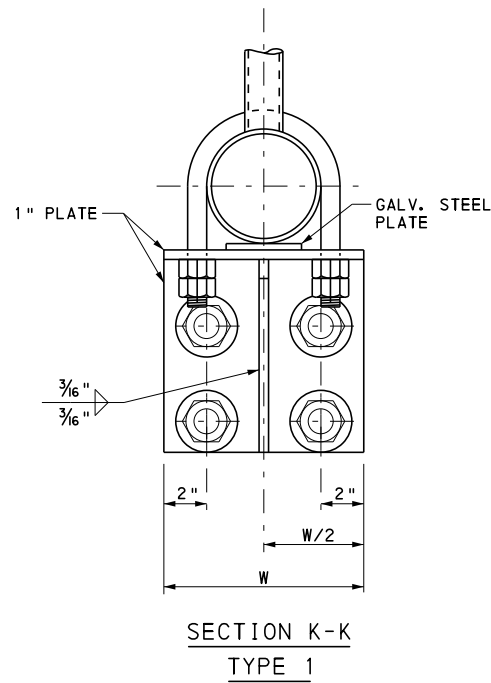
Brenda S. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHT. 7 OF 10

BC-743M



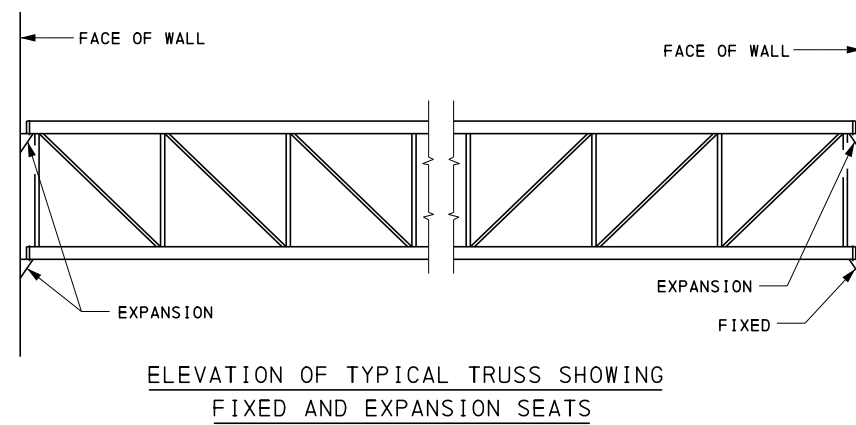
NOTE:
TO SEAL ENDS OF CHORD MEMBERS, USE ALTERNATE PIPE CAP DETAIL AS SHOWN ON SHEET 10.



NOTE:
SECTION L-L SAME AS SECTION K-K EXCEPT FOR U-BOLT.

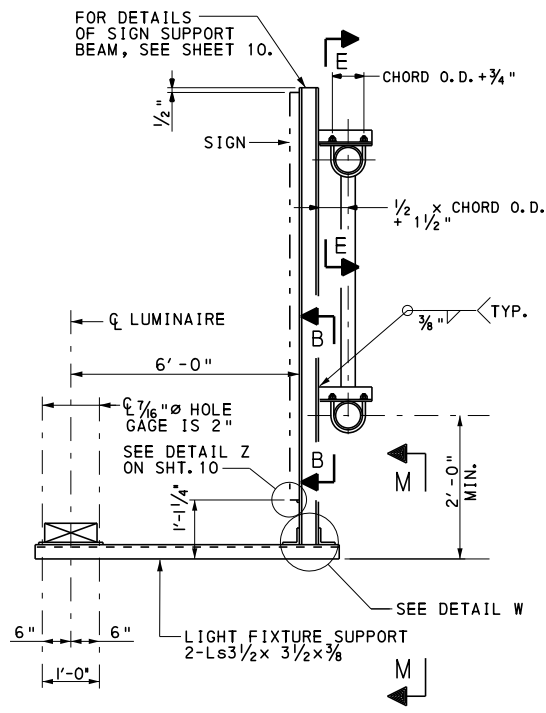
NOTE: ANCHOR DESIGN BASED ON CLASS A CEMENT CONCRETE ($f'_c = 3000$ PSI).

TRUSS SEATS				
SPAN LENGTH	ANCHOR DIA.	TYPE	W	D
30'	1/2"	1	1'-3 3/8"	8 1/2"
40'	5/8"	1	1'-5 3/8"	10"
50'	5/8"	1	1'-6 5/8"	10"
60'	3/4"	2	1'-10 3/8"	10"
70'	7/8"	2	2'-0 5/8"	1'-1 1/4"
80'	7/8"	2	2'-4 5/8"	1'-1 1/4"
90'	7/8"	2	2'-6 5/8"	1'-1 1/4"
100'	1"	2	2'-6 5/8"	1'-4 1/2"

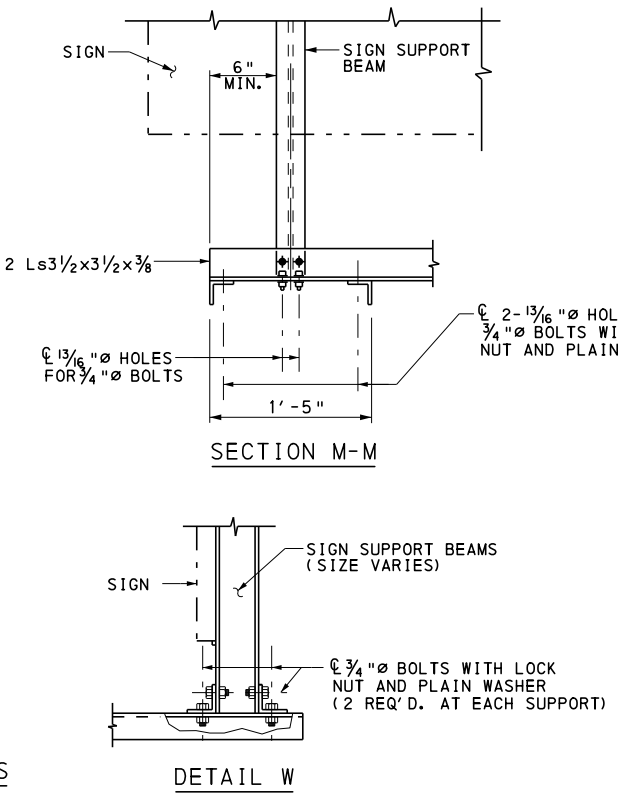


COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES
2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'
WALL MOUNTED TRUSS BEARING DETAILS

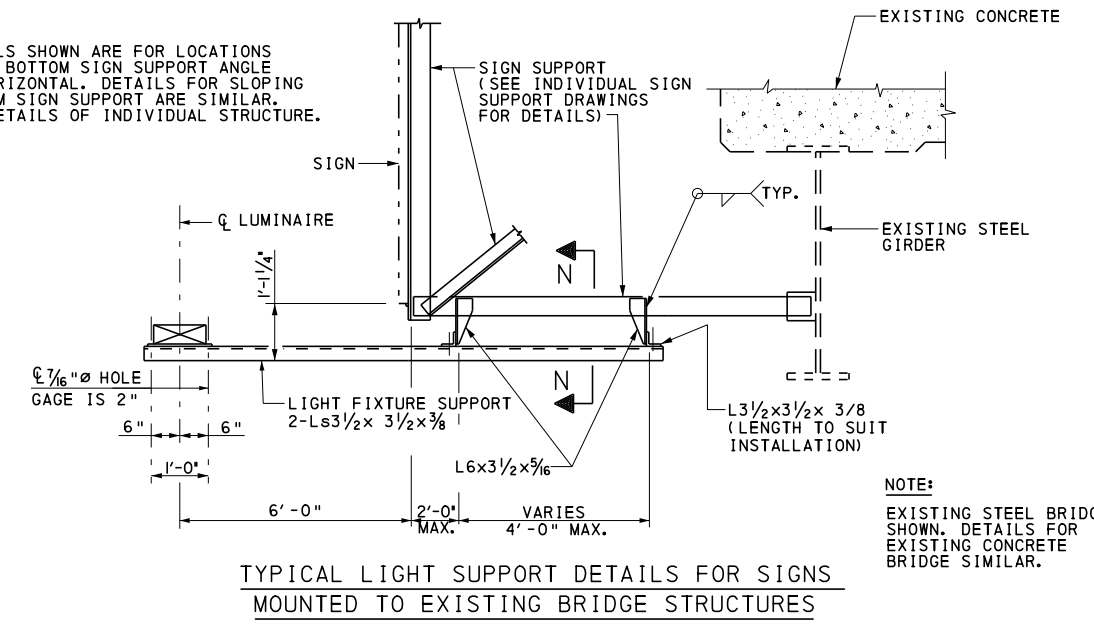


TYPICAL LIGHT FIXTURE SUPPORT DETAILS
 FOR SECTION E-E SEE SHT. 5
 FOR SECTION B-B SEE SHT. 10



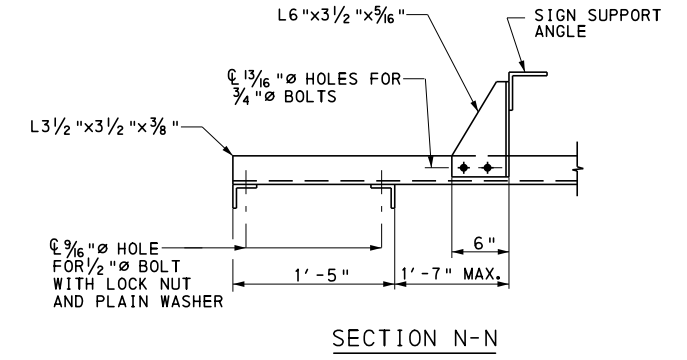
NOTE:
 WEIGHT OF LUMINAIRE AND SUPPORT BRACKETS IS 400 lbs. BASED ON 10'-0" LUMINAIRE SPACING.

NOTE:
 DETAILS SHOWN ARE FOR LOCATIONS WHERE BOTTOM SIGN SUPPORT ANGLE IS HORIZONTAL. DETAILS FOR SLOPING BOTTOM SIGN SUPPORT ARE SIMILAR. SEE DETAILS OF INDIVIDUAL STRUCTURE.

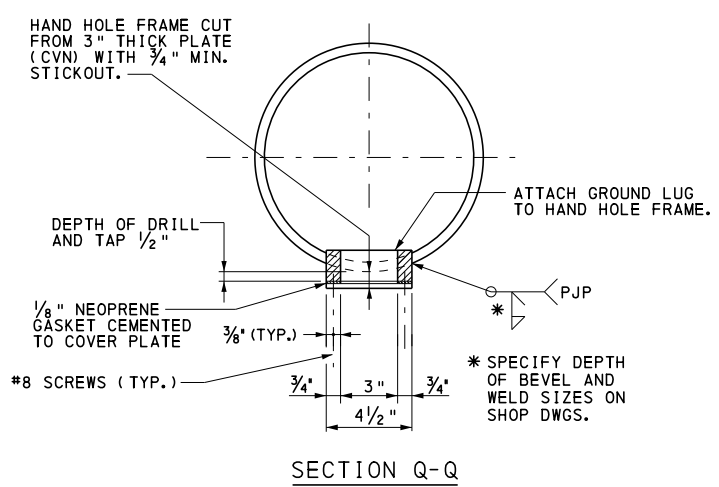


NOTE:
 EXISTING STEEL BRIDGE SHOWN. DETAILS FOR EXISTING CONCRETE BRIDGE SIMILAR.

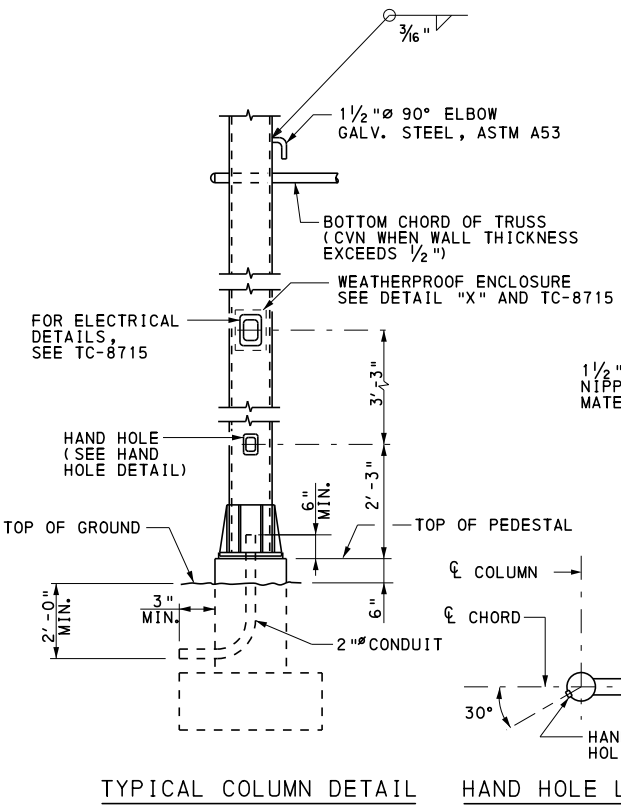
TYPICAL LIGHT SUPPORT DETAILS FOR SIGNS MOUNTED TO EXISTING BRIDGE STRUCTURES



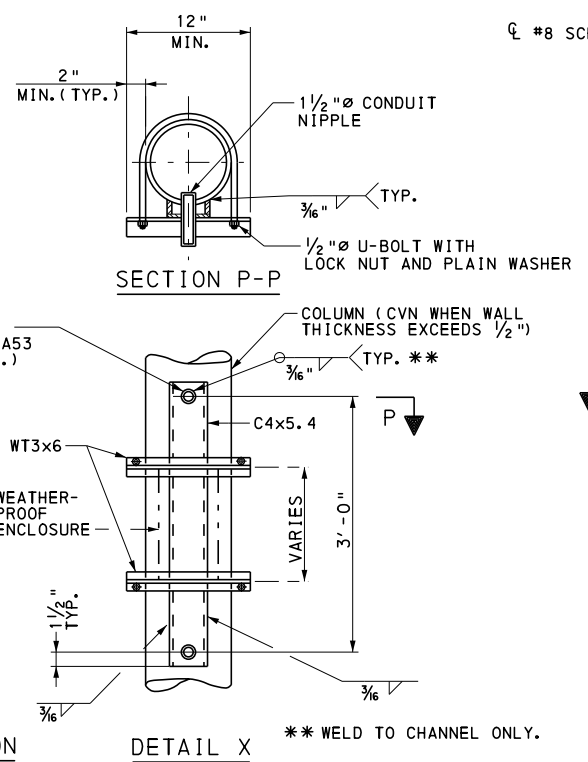
NOTE:
 FOR SIGN PANEL DETAILS AND LIGHTING DETAILS, SEE STANDARD DRAWINGS TC-8700C, TC-8701D, TC-8701E, TC-8701S AND TC-8715.



SECTION Q-Q

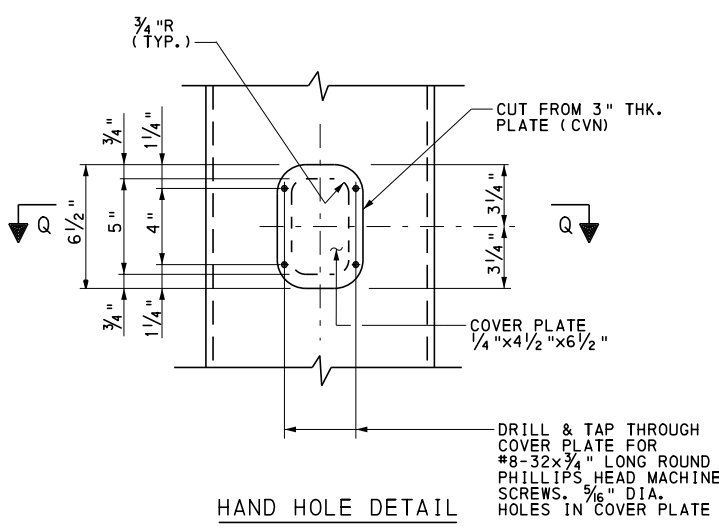


TYPICAL COLUMN DETAIL **HAND HOLE LOCATION**



SECTION P-P

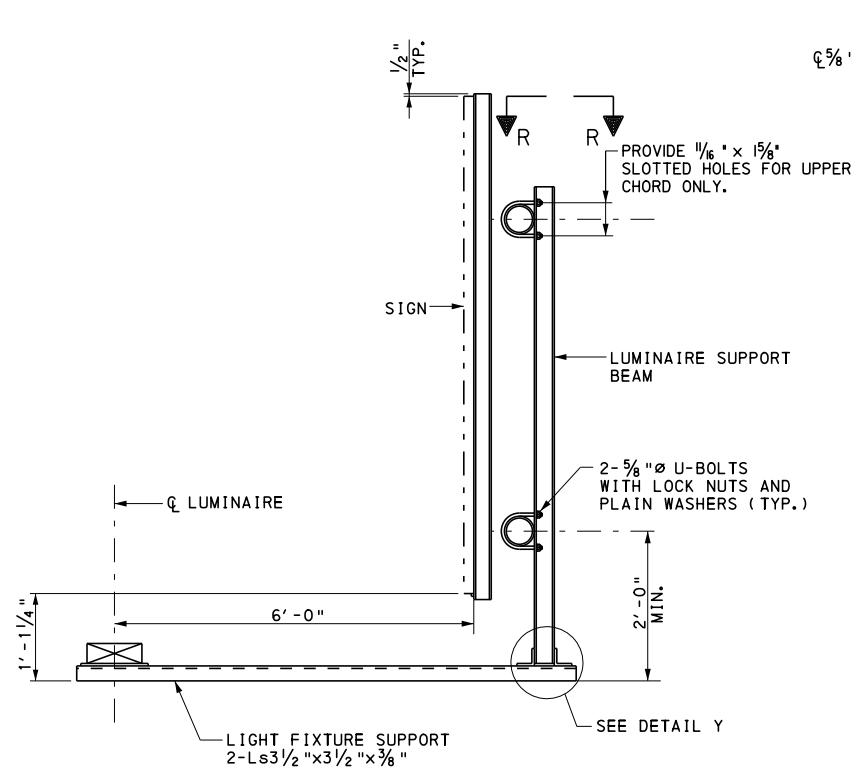
DETAIL X ** WELD TO CHANNEL ONLY.



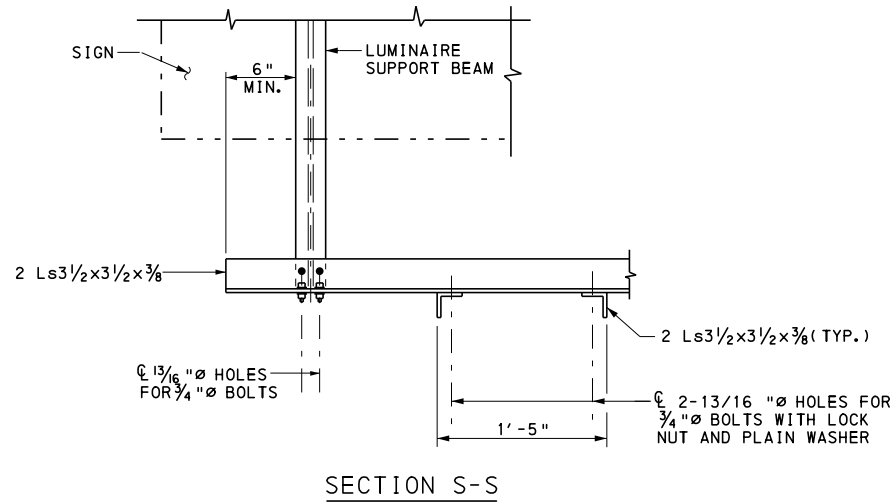
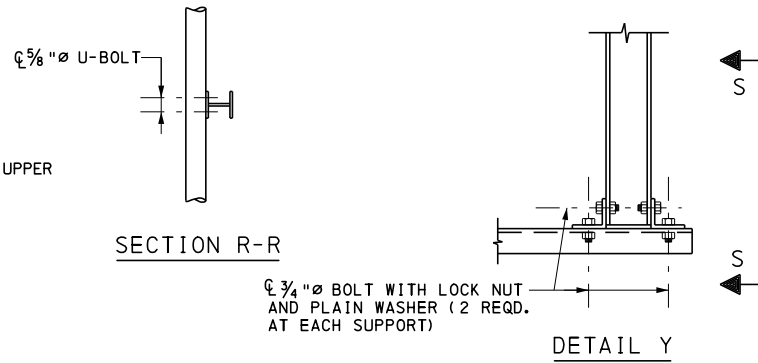
HAND HOLE DETAIL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

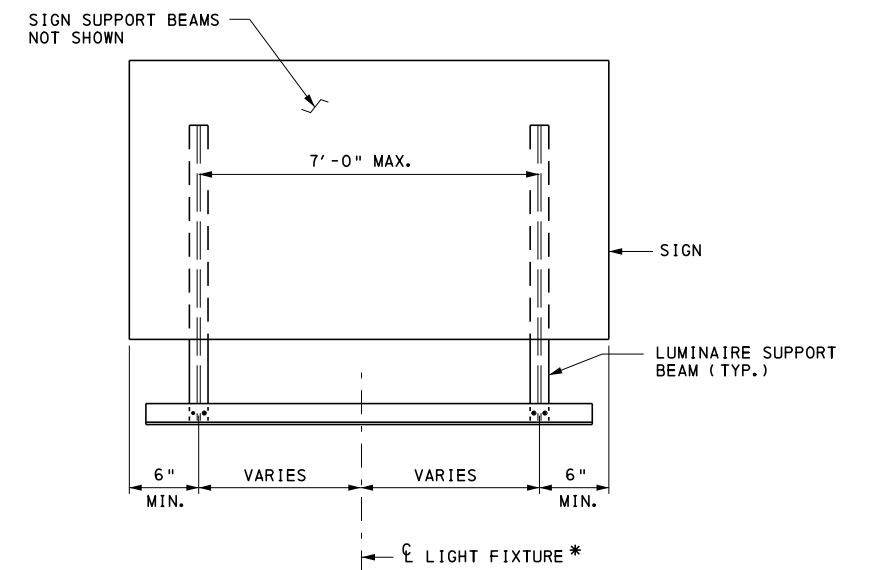
OVERHEAD SIGN STRUCTURES
 2 POST PLANAR TRUSS
 SPANS FROM 30' TO 100'
 LIGHT SUPPORT & HAND HOLE DETAILS



**SPECIAL LIGHT FIXTURE SUPPORT DETAILS-LUMINAIRE
FOR STRUCTURE MOUNTED ON HIGHWAY BRIDGE**

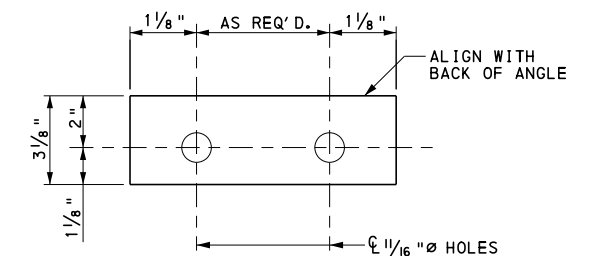


SECTION S-S



LUMINAIRE SUPPORT BEAM SPACING

* WHEN TWO OR MORE LIGHT FIXTURES ARE REQUIRED, PLACE ONE ADDITIONAL LUMINAIRE SUPPORT BEAM BETWEEN BEAMS SHOWN.

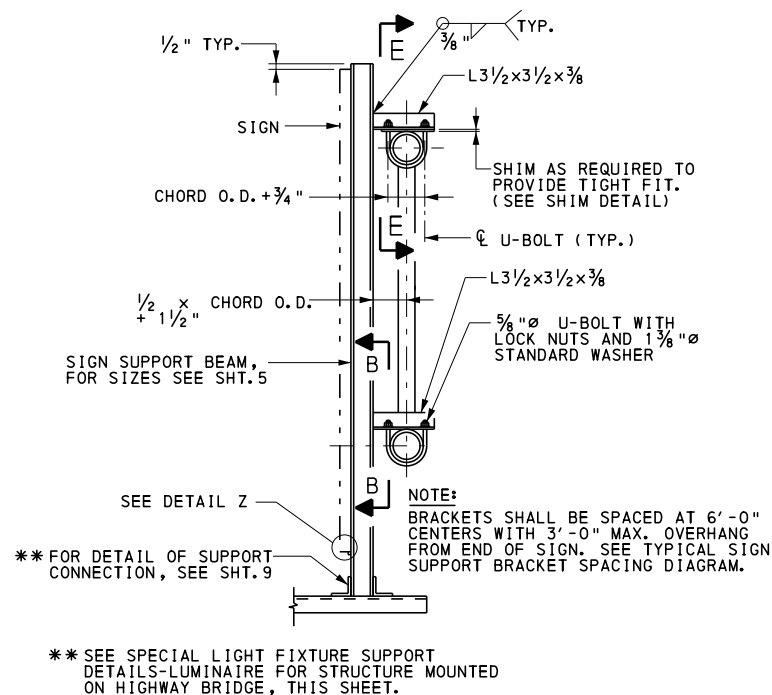


SHIM DETAIL

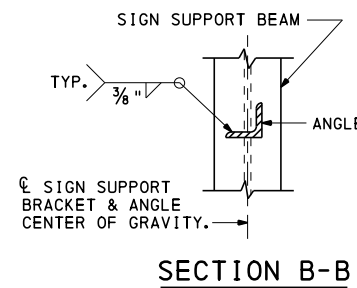
PROVIDE 1 AT 1/4", 3 AT 1/8" AND 1 AT 1/16" THICKNESS FOR EACH UPPER SIGN SUPPORT CONNECTION ANGLE.

NOTE:

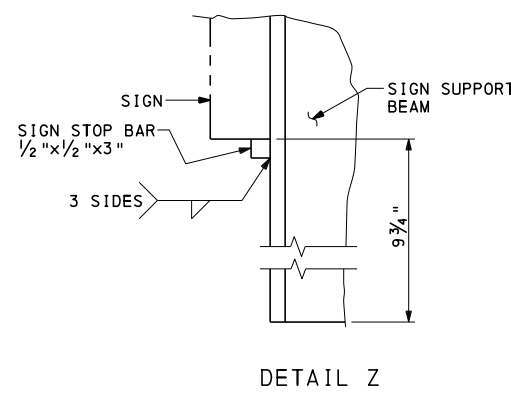
FOR SIGN PANEL DETAILS AND LIGHTING DETAILS, SEE STANDARD DRAWINGS TC-8700C, TC-8701D, TC-8701E, TC-8701S, AND TC-8715.



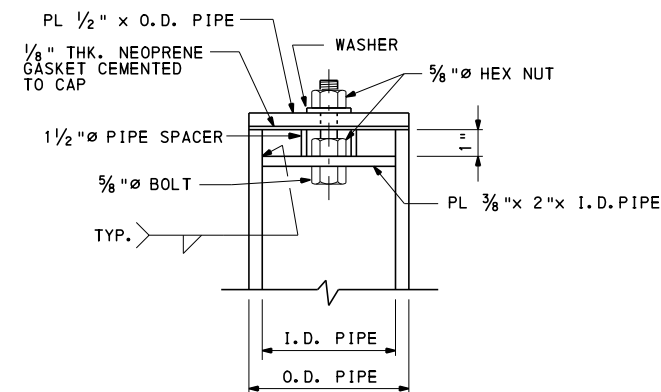
**SIGN SUPPORT DETAIL
FOR SECTION E-E SEE SHT.5**



SECTION B-B



DETAIL Z



ALTERNATE PIPE CAP

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

OVERHEAD SIGN STRUCTURES
2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'
SPECIAL LIGHT SUPPORT DETAILS
FOR BRIDGE MOUNTED STRUCTURES

INFORMATION CONTAINED IN THE BD-644M DESIGN TABLES

- DESIGN TABLES ON STANDARD DRAWING BD-644M WERE DEVELOPED USING A COMPUTER PROGRAM AND ARE BASED ON THE DESIGN CRITERIA SHOWN ON THIS SHEET, EXCEPT, THE MEMBER SIZES INDICATED DO NOT INCLUDE THE FATIGUE REQUIREMENTS INDICATED IN THE DESIGN CRITERIA.
- THE MEMBER SIZES INDICATED IN THE DESIGN TABLES SHOULD MEET THE FATIGUE REQUIREMENTS FOR FATIGUE CATEGORY III. THE DESIGNER MUST CHECK THE ADEQUACY OF THE MEMBER SIZES INDICATED WHEN THE FATIGUE CATEGORY IS SPECIFIED TO BE I OR II FOR THE PROJECT.
- THE SPAN RANGES INCLUDED ON STANDARD DRAWING BD-644M ARE AS FOLLOWS:
 BD-644M: TWO-POST TRI-CHORD TRUSS, SPANS FROM 60' TO 100'. FOUR-POST TRI-CHORD TRUSS, SPANS FROM 60' TO 200'.
- THE DESIGN TABLES INCLUDE MEMBER SIZES FOR THE STRUCTURES FOR VARIOUS COMBINATIONS OF COLUMN HEIGHT, SPAN LENGTH, AND SIGN AREA. THEY ALSO INCLUDE SPREAD FOOTING DESIGNS. ALTERNATE CAISSON FOUNDATIONS ARE PERMITTED, HOWEVER, THE REQUIRED CAISSON EMBEDMENT AND REINFORCEMENT MUST BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF PENNSYLVANIA. THE DESIGN COMPUTATIONS MUST BE SUBMITTED TO THE DISTRICT BRIDGE ENGINEER FOR REVIEW AND APPROVAL. THE CORRESPONDING FABRICATION AND CONSTRUCTION DETAILS ARE CONTAINED IN THIS STANDARD.

GENERAL NOTES

- PROVIDE 3-INCH CONCRETE COVER ON REINFORCEMENT BARS, EXCEPT AS NOTED.
- USE CLASS A CEMENT CONCRETE $f'c = 3000$ PSI IN PEDESTALS, FOOTINGS AND CAISSONS.
- PROVIDE GRADE 60 REINFORCING STEEL BARS THAT MEET THE REQUIREMENTS OF ASTM A615 FOR CONCRETE REINFORCEMENT. DO NOT WELD REINFORCING STEEL BARS.
- RAKE-FINISH ALL HORIZONTAL CONSTRUCTION JOINTS, EXCEPT AS INDICATED.
- VERIFY ALL DIMENSIONS AND GEOMETRY OF THE EXISTING STRUCTURES IN THE FIELD AS NECESSARY FOR PROPER FIT OF THE PROPOSED CONSTRUCTION.
- CHAMFER EXPOSED CONCRETE EDGES 1 INCH BY 1 INCH.
- ALL DIMENSIONS SHOWN ARE HORIZONTAL, EXCEPT AS NOTED.
- DIMENSIONS ARE BASED ON A NORMAL TEMPERATURE OF 68 DEGREES F.
- SPREAD FOOTINGS MAY BE ORDERED BY THE ENGINEER TO BE AT ANY ELEVATION OR OF ANY DIMENSIONS NECESSARY TO PROVIDE A PROPER FOUNDATION.
- GALVANIZE ALL STRUCTURAL STEEL, BOLTS, NUTS & WASHERS IN ACCORDANCE WITH PUB. 408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
- PIPE DIAMETERS SHOWN UP TO AND INCLUDING 12 INCHES ARE NOMINAL DIAMETERS. PIPE DIAMETERS SHOWN FROM 14 INCHES AND UP ARE ACTUAL DIAMETERS.
- USE STANDARD SIZE HOLE. THE STANDARD HOLE DIAMETER FOR BOLTS SMALLER THAN 1" DIAMETER SHALL BE THE NOMINAL DIAMETER OF THE BOLT PLUS $1/16$ ". FOR BOLTS 1" DIAMETER AND LARGER, THE WIDTH OF EACH STANDARD HOLE SHALL BE THE NOMINAL DIAMETER OF THE BOLT PLUS $1/8$ ".
- CLEAR DISTANCE BETWEEN BOLT HOLES OR BETWEEN THE BOLT HOLE AND THE END OF THE MEMBER IN THE DIRECTION OF THE APPLIED BEARING FORCE SHALL BE CHECKED.
- PROVIDE ANCHOR BOLT HOLES $1/4$ " LARGER THAN BOLT DIAMETER.
- PROVIDE A MINIMUM ANCHOR BOLT EMBEDMENT LENGTH OF 20 ANCHOR BOLT DIAMETERS.
- PROVIDE DOUBLE NUTS AND WASHER FOR EACH ANCHOR BOLT.
- STEEL MEMBER COMPONENTS REQUIRING CHARPY V-NOTCH TESTING ARE DESIGNATED ON THE PLANS BY (CVN), PROVIDE STEEL CONFORMING TO THE CVN REQUIREMENTS FOR ZONE 2, NON FRACTURE CRITICAL AS GIVEN IN THE AASHTO MATERIAL SPECIFICATIONS.

NOTES TO FABRICATOR

- DYNAMIC/VARIABLE MESSAGE SIGNS (DMS/VMS) ARE PROHIBITED ON 2-POST AND 4-POST TRI-CHORD TRUSS STRUCTURE TYPES AS PRESENTED IN THESE STANDARDS. OVERHEAD SIGN STRUCTURES INTENDED TO CARRY DMS/VMS MUST BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF PENNSYLVANIA AND SUBMITTED TO THE CHIEF BRIDGE ENGINEER FOR REVIEW AND APPROVAL.
- DESIGN COMPUTATIONS ARE REQUIRED FOR ANY PORTION OF A STRUCTURE FOR WHICH THE INFORMATION IS NOT TAKEN DIRECTLY FROM THE CONTRACT DRAWINGS OR THE DETAILS CONTAINED IN THIS STANDARD. DO NOT VIOLATE CRITERIA USED FOR THE DEVELOPMENT OF THE DESIGN TABLES ON STANDARD DRAWING BD-644M AND THE DETAILS IN THIS STANDARD.
- FABRICATOR TO SELECT PANEL POINT CONNECTION DETAIL TYPE BASED ON MEMBER SIZE AND TRUSS CONFIGURATION TO ENSURE FIT-UP, FABRICATION, GALVANIZING AND ERECTION.

DESIGN CRITERIA FOR PENNDOT SIGN STRUCTURES

DEAD LOADS		PENNDOT STD. DWGS. (U.N.O.)*
SIGN PANELS		TC-8701E OR TC-8701S
LIGHT FIXTURES		BC-744M, SHT. 12
SIGN SUPPORT BEAM		BC-744M, SHT. 8
COLUMNS, CHORDS		CALCULATED INTERNALLY WITHIN PROGRAM
CAT WALK		BC-744M, SHT. 10
EXTERNAL LOADS		AASHTO SIGN SPECS.
ICE LOAD		3.7
WIND LOAD		APPENDIX C, SECTION C.3, EQ. C-1, WITH 80 MPH WIND AND 30% GUST FACTOR
GROUP LOADS		AASHTO SIGN SPECS. 3.4
STEEL CRITERIA		AASHTO SIGN SPECS.
SECTION PROPERTIES FOR TUBULAR SHAPES		APPENDIX B, TABLE B-1
MAXIMUM STRESSES IN TUBULAR SHAPES		APPENDIX B, TABLE B-2
ALLOWABLE STRESSES FOR TUBULAR SHAPES		5.6 (TABLE 5-3) & 5.11
ALLOWABLE STRESSES FOR SIGN SUPPORTS		5.12
ALLOWABLE STRESSES FOR BASE PLATES		5.8
ALLOWABLE STRESSES FOR COMBINED STEEL STRESS		5.12
FATIGUE REQUIREMENTS (FATIGUE CATEGORY II)		SECTION 11
ALLOWABLE DEFLECTION		10.4
PERMANENT CAMBER		10.5
ALLOWABLE STRESSES FOR STRUCTURAL STEEL		SECTION 5
BOLT CRITERIA		AASHTO HIGHWAY BRIDGES (U.N.O.)
ALLOWABLE BOLT STRESSES		TABLE 10.32.3B
SLIP-CRITICAL BOLT ALLOWABLE		10.32.3.2.1
BOLT PRYING ACTION		10.32.3.3.2
COMBINED BOLT SHEAR AND TENSION		10.32.3.3.3
BOLT DESIGN CRITERIA		AASHTO SIGN SPECS. 5.16
ALLOWABLE ANCHOR BOLT STRESSES		AASHTO SIGN SPECS. 5.17
CONCRETE CRITERIA		AASHTO HIGHWAY BRIDGES (U.N.O.)
ALLOWABLE BEARING STRESS		8.15.2.1.3
REINFORCEMENT TENSILE STRESS		8.15.2.2
SHEAR CAPACITY OF FOOTINGS		8.15.5.6.1
SHEAR STRESS IN FOOTINGS		8.15.5.6.2
ALLOWABLE SHEAR STRESS		8.15.5.6.4
SLENDERNESS OF COLUMNS		8.16.5.2
MINIMUM REINF. OF FLEXURAL MEMBERS		8.17.1
SPACING LIMITS FOR REINFORCEMENT		8.21
MINIMUM CONCRETE COVER		DM4 D8.22.1*
PRESSURES FOR ECCENTRICALLY LOADED FOOTINGS		FIG. 4.4.7.1.1.1C
DISTRIBUTION OF REINFORCEMENT		4.4.11.2.2
FOOTING STABILITY REQUIREMENTS		DM4 D5.5.5
TORSION		ACI SECTION A.7.3*
COLUMN DESIGN (PEDESTALS)		8.15.4
SPREAD FOOTINGS		
MAXIMUM DESIGN PRESSURE		1.5 TONS PER SQUARE FOOT
MINIMUM AREA IN BEARING		95%
UNIT WEIGHT OF SOIL		100 POUNDS PER CUBIC FOOT
DRILLED SHAFTS (CAISSONS)		DM4 SEC. 4.6, PENNDOT COM624 COMPUTER PROGRAM
MAXIMUM DESIGN PRESSURE		1.5 TONS PER SQUARE FOOT
MAXIMUM DESIGN LATERAL DISPLACEMENT		0.5"
MODULUS OF SUBGRADE REACTION		10.0 POUNDS PER CUBIC INCH
UNIT WEIGHT OF SOIL		100 POUNDS PER CUBIC FOOT
ANGLE OF INTERNAL FRICTION		25°
COHESION		0 KIPS PER SQUARE FOOT
SEISMIC DESIGN CRITERIA		
STRUCTURES ARE DESIGNED FOR A SEISMIC ACCELERATION COEFFICIENT = 0.15		

CONSTRUCTION GENERAL NOTES

- MATERIALS AND WORKMANSHIP:
 PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CURRENT VERSIONS OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, AASHTO/AWS WELDING CODE D1.5 CONTRACT SPECIAL PROVISIONS, AND AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS". USE AASHTO/AWS D1.1 FOR WELDING NOT COVERED IN AASHTO/AWS D1.5.
- PROVIDE STRUCTURAL STEEL CONFORMING TO THE FOLLOWING:
 COLUMNS & PIPE CHORDS: SEE PUBLICATION 408, SECTION 948.2.
 ANGLES, SHAPES, AND PLATES: AASHTO M270, GRADE 36
 ASTM A709, GRADE 36
- ALTERNATE PRESS-BREAK MEMBERS:
 ALTERNATE PRESS-BREAK MEMBERS MUST HAVE THE EQUIVALENT STRENGTH OF THE MEMBER THEY ARE REPLACING. EQUIVALENT RADIUS FOR PRESS-BREAK MEMBERS IS MEASURED FROM THE CENTER OF THE MEMBER TO THE MID-POINT OF ANY CHORD OF THE MEMBER. MINIMUM THICKNESS OF PRESS-BREAK MEMBERS TO BE $3/4$ ". PENNDOT SIGN STRUCTURE COMPUTER PROGRAM OR AN APPROVED FINITE ELEMENT ANALYSIS COMPUTER PROGRAM MUST BE RUN TO VERIFY THE ADEQUACY OF PRESS-BREAK MEMBERS FOR STRENGTH AND FATIGUE. ALTERNATE PRESS-BREAK MEMBERS ARE ONLY PERMITTED FOR COLUMNS. PRESS-BREAK MEMBERS ARE NOT PERMITTED FOR CHORDS.
- PROVIDE BOLTS CONFORMING TO THE FOLLOWING:
 ANCHOR BOLTS: ASTM, F1554 GRADE 55 PER PUBLICATION 408 SECTION 1105.02(c)3.
 BOLTS: AASHTO M164 (ASTM A325) H.S. BOLTS EXCEPT AS NOTED
- DESIGN SPECIFICATIONS:
 AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", 2001 WITH CURRENT INTERIMS (UNLESS NOTED OTHERWISE); AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1996 WITH INTERIMS THROUGH AND INCLUDING 2000; PENNDOT DESIGN MANUAL - PART 4, AUGUST 1993 EDITION (INCLUDING AUGUST 1995 REVISIONS)
- ALL FILLET WELDS SHOWN ARE MINIMUM SIZE UNLESS NOTED OTHERWISE.

*** LEGEND:**

- AASHTO SIGN SPEC: AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS"
- AASHTO HIGHWAY BRIDGES: AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES"
- DM4: PENNSYLVANIA DEPARTMENT OF TRANSPORTATION, DESIGN MANUAL PART 4, STRUCTURES
- U.N.O.: UNLESS NOTED OTHERWISE
- ACI: AMERICAN CONCRETE INSTITUTE - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE WITH COMMENTARY (ACI 318-99).
- CVN: CHARPY V-NOTCH.

CHANGE 1

TC-8700C	SPACING CHARTS/DIRECT APPLIED LETTERS, NUMERALS, & ARROWS
TC-8701D	SIGN DETAILS/FREEWAY AND EXPRESSWAY GUIDE SIGNS
TC-8701E	EXTRUDED ALUMINUM CHANNEL SIGN
TC-8701S	FLAT SHEET ALUMINUM SIGNS WITH EXTRUDED ALUMINUM STIFFENERS
TC-8715	SIGN LIGHTING
BC-736M	REINFORCEMENT BAR FABRICATION DETAILS
RC-11M	CLASSIFICATION OF EARTHWORK FOR STRUCTURES
RC-51M	TYPE 31 STRONG POST GUIDE RAIL
RC-53M	TYPE 2 WEAK POST GUIDE RAIL
RC-54M	BARRIER PLACEMENT AT OBSTRUCTIONS
RC-58M	SINGLE FACE CONCRETE BARRIER PLACEMENT AT MEDIAN PIERS

REFERENCE DRAWINGS

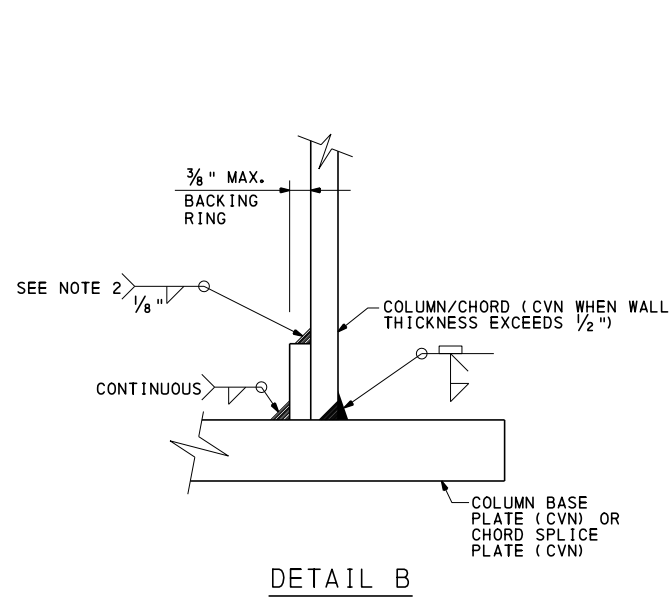
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

OVERHEAD SIGN STRUCTURES

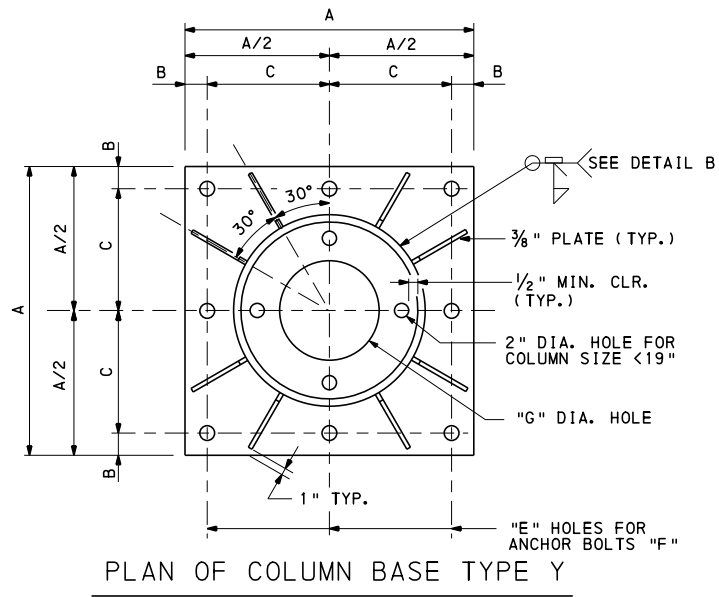
NOTES AND DESIGN CRITERIA

2 POST AND 4 POST TRI-CHORD TRUSS
SPANS FROM 60' TO 240'

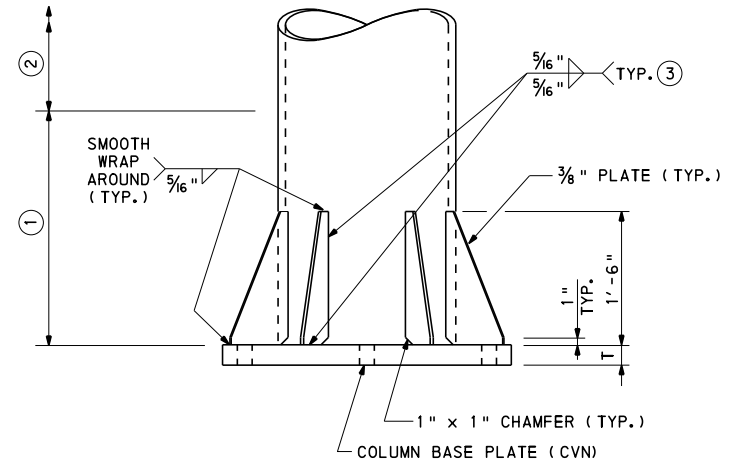
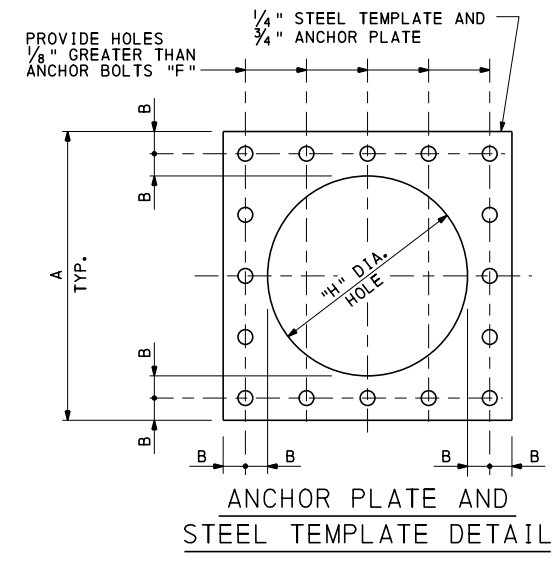
RECOMMENDED AUG. 4, 2017	RECOMMENDED AUG. 4, 2017	SHT. 1 OF 12
<i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	<i>Brenda S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	BC-744M



DETAIL B



PLAN OF COLUMN BASE TYPE Y



ELEVATION - TYPE Y (TYPES - X & W SIMILAR)

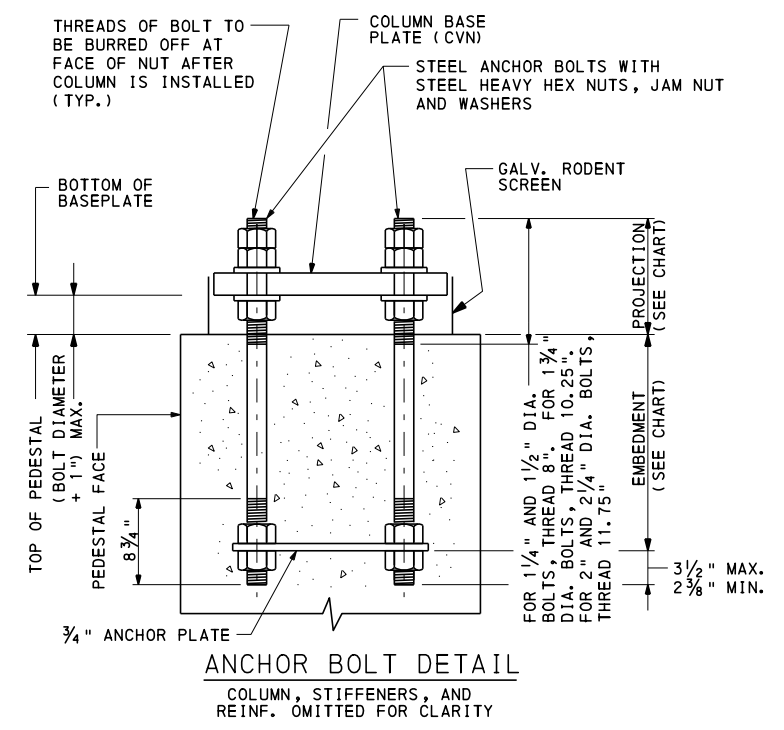
- ① FOR PRESS BREAK COLUMN, 2'-6" LENGTH OF SEAM WELD TO BE COMPLETE PENETRATION GROOVE WELD.
- ② SEAM WELD TO HAVE 60% MIN. PENETRATION.
- ③ TERMINATE WELDS 1/4" SHORT OF STIFFENER CHAMFER.

DETAIL B NOTES:

1. BACKING RING MUST BE FITTED/SIZED TO THE PIPE COLUMN AND CONTINUOUSLY FILLET WELDED TO THE BASE PLATE BEFORE THE FULL PENETRATION GROOVE WELD IS MADE. BACKING RING MUST BE FABRICATED AS A CONTINUOUS RING.
2. FOR COLUMNS AND CHORDS LESS THAN 19", THIS FILLET WELD IS NOT REQUIRED BUT SHOP IS TO APPLY SILICON CAULKING TO THIS LOCATION AFTER POLE ASSEMBLY IS GALVANIZED.

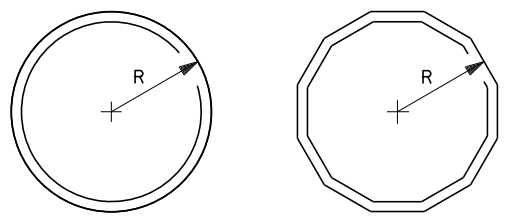
NOTES:

- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE GALVANIZED AFTER THREADING.
- USE STEEL TEMPLATE TO SET ANCHOR BOLTS IN ACCORDANCE WITH PUBLICATION 408, SECTION 948.3(b).
- STEEL TEMPLATE AND ANCHOR PLATE TO BE PROVIDED BY SIGN FABRICATOR.
- STEEL TEMPLATE PLATE WITH NUTS ON BOTH SIDES SHALL BE USED TO MAINTAIN THE SPACING AND ALIGNMENT OF ANCHOR BOLTS.
- FOR PIPE CAP DETAILS, SEE SHEET 12.
- FOR ALTERNATE PIPE CAP DETAILS, SEE SHEET 11.
- SEAL BASE PLATE TO FOUNDATION GAP WITH GALVANIZED STEEL SCREEN, 1/2" BY 1/2" MESH AND 0.063" DIAMETER WIRES. SCREEN IS TO PREVENT ENTRY OF RODENTS WHILE PERMITTING DRAINAGE. SCREEN IS TO BE REMOVABLE AND ATTACHED TO BASEPLATE WITH STAINLESS STEEL HARDWARE.



COLUMN BASES - 2 POST STRUCTURES												
COLUMN NOMINAL SIZE X WALL THK.*	BASE TYPE	A	B	C	E	F	G	H	T	WASHER SIZE	PROJECTION	EMBEDMENT
10"x.365"	Y	1'-8"	2 1/2"	7 1/2"	1 1/2"D	1 1/4"D	3 1/4"	10"	2"	3 1/2"Dx3/8"	7 3/4"	2'-1"
12"x.375"	Y	1'-10"	2 1/2"	8 1/2"	1 3/4"D	1 1/2"D	5 1/4"	1'-0"	2"	3 1/2"Dx3/8"	8 1/2"	2'-6"
14"x.375"	Y	2'-0"	2 1/2"	9 1/2"	1 3/4"D	1 1/2"D	6 1/2"	1'-2"	2"	3 1/2"Dx3/8"	8 1/2"	2'-6"
16"x.375"	Y	2'-2"	2 1/2"	10 1/2"	2"D	1 3/4"D	8"	1'-4"	2"	4"Dx3/8"	9 1/4"	2'-11"
18"x.375"	Y	2'-4"	2 1/2"	11 1/2"	2"D	1 3/4"D	9 1/4"	1'-6"	2"	4"Dx3/8"	9 1/4"	2'-11"
20"x.375"	Y	2'-7"	3"	1'-0 1/2"	2 1/4"D	2"D	1'-5"	1'-7"	3"	5"Dx3/8"	11"	3'-4"
24"x.375"	Y	2'-11"	3"	1'-2 1/2"	2 1/4"D	2"D	1'-6"	1'-11"	3"	5"Dx3/8"	11"	3'-4"
24"x.500"	Y	3'-0"	3 1/2"	1'-2 1/2"	2 1/2"D	2 1/4"D	1'-6"	1'-10"	3"	5"Dx3/8"	11 3/4"	3'-9"

NOTE: D DENOTES DIAMETER
* CVN REQUIRED FOR WALL THICKNESSES EXCEEDING 1/2" (.500").



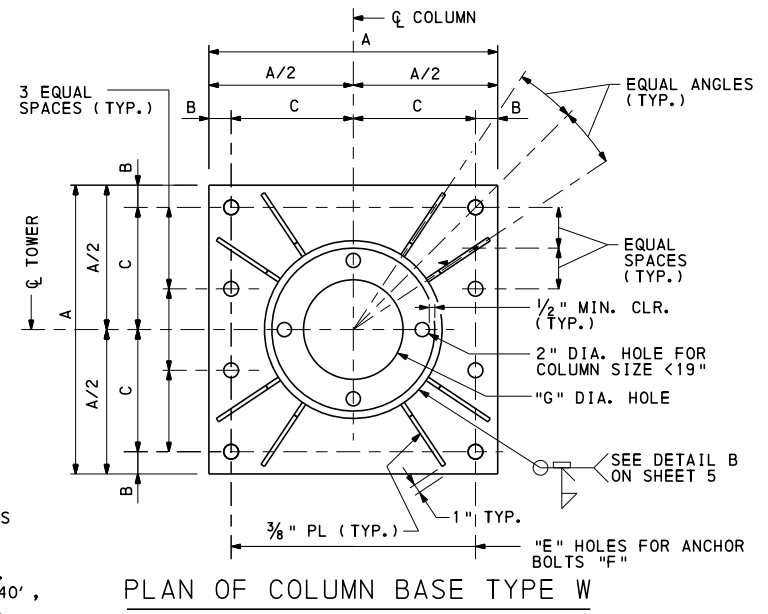
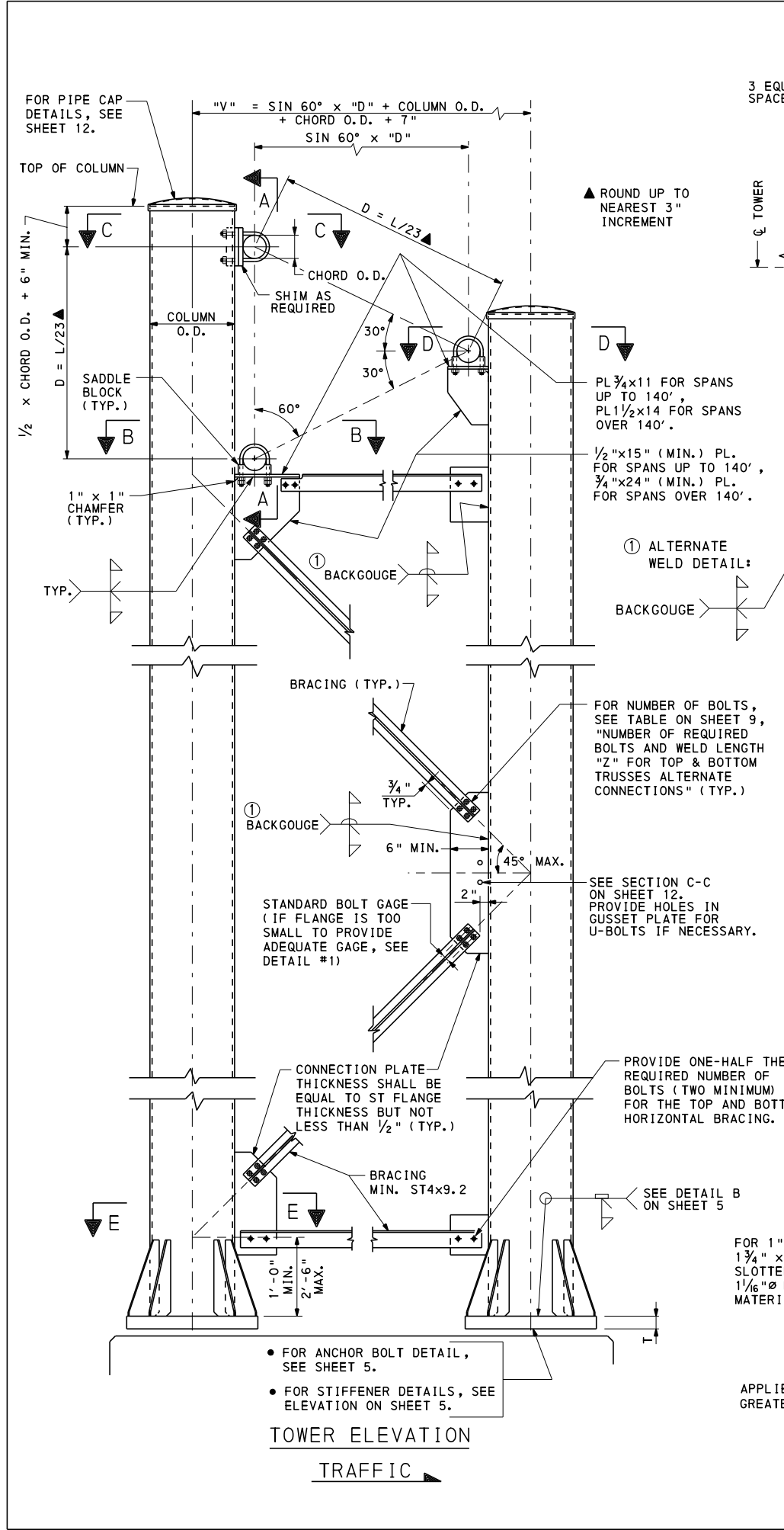
"PRESS-BREAK" NOTE:

ALTERNATE "PRESS-BREAK" MEMBERS ARE PERMITTED FOR COLUMNS. "PRESS-BREAK" MEMBERS MUST HAVE THE EQUIVALENT STRENGTH AND FATIGUE RESISTANCE OF THE CIRCULAR MEMBER BEING REPLACED. A MINIMUM NUMBER OF 12 BREAKS IS REQUIRED. A CHANGE IN STEEL MATERIAL OR WALL THICKNESS REQUIRES A SPECIAL DESIGN TO BE SUBMITTED FOR REVIEW. CONTRACTOR MUST SUBMIT DESIGN CALCULATIONS AND DESIGN DRAWINGS FOR REVIEW AND ACCEPTANCE FOR LONGITUDINAL SEAM WELDS INDICATING TYPE OF WELD, WELD PENETRATION, EFFECTIVE DEPTH AND LENGTH OF EACH WELD TYPE. LONGITUDINAL SEAM WELDS SHALL HAVE 60 PERCENT MINIMUM PENETRATION, EXCEPT LONGITUDINAL SEAM WELDS WITHIN 6" OF THE ENDS OF THE PRESS BREAK MEMBER OR LENGTH SHOWN ON DETAILS SHALL BE COMPLETE PENETRATION WELDS. COMPLETE PENETRATION LONGITUDINAL SEAM WELDS MUST BE 100% RADIOGRAPHICALLY INSPECTED. FOR THE COLUMN CONNECTION TO BASE PLATE, AND AT COLUMN CONNECTION SPLICE PLATE LOCATIONS, WELD SHALL START AND STOP IN THE MIDDLE THIRD REGION OF FLAT SECTIONS BETWEEN BREAK POINTS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

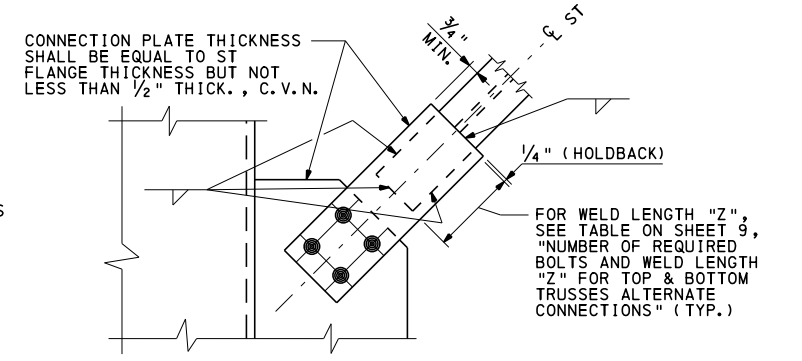
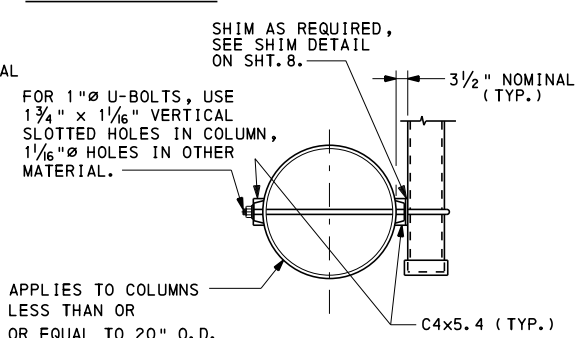
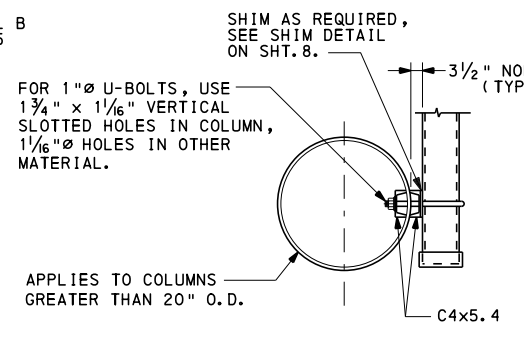
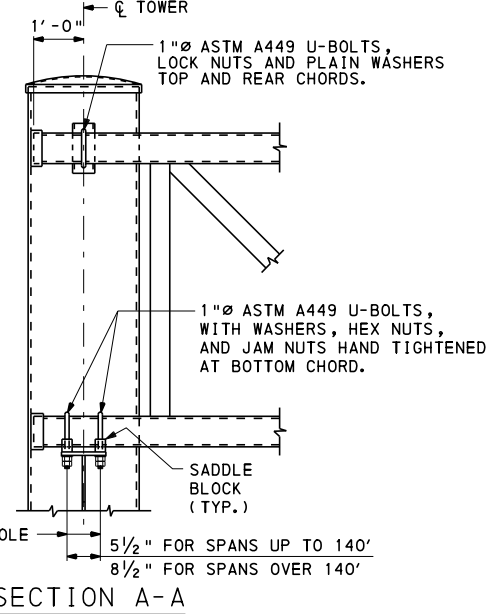
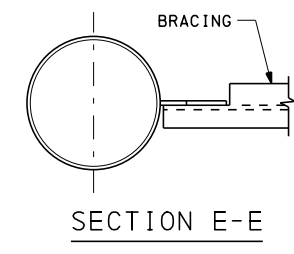
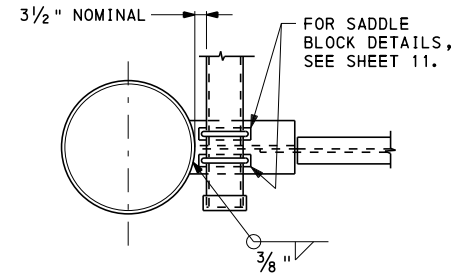
OVERHEAD SIGN STRUCTURES
2 POST AND 4 POST TRI-CHORD TRUSS
SPANS FROM 60' TO 240'

COLUMN BASE DETAILS



COLUMN BASES - 4 POST STRUCTURES													
COLUMN NOMINAL SIZE X WALL THK.*	BASE TYPE	A	B	C	E	F	G	H	T	WASHER SIZE	PRO-SECTION	EMBED-MENT	
8"x.322"	W	1'-6"	2 1/2"	6 1/2"	1 1/2"D	1 1/4"D	2"	8"	2"	3 1/2"Dx3/8"	7 3/4"	2'-1"	
10"x.365"	W	1'-8"	2 1/2"	7 1/2"	1 1/2"D	1 1/4"D	3 1/4"	10"	2"	3 1/2"Dx3/8"	7 3/4"	2'-1"	
12"x.375"	W	1'-10"	2 1/2"	8 1/2"	1 3/4"D	1 1/2"D	5 1/4"	1'-0"	2"	3 1/2"Dx3/8"	8 1/2"	2'-6"	
14"x.375"	W	2'-0"	2 1/2"	9 1/2"	1 3/4"D	1 1/2"D	6 1/2"	1'-2"	2"	3 1/2"Dx3/8"	8 1/2"	2'-6"	
16"x.375"	W	2'-2"	2 1/2"	10 1/2"	2"D	1 3/4"D	8"	1'-4"	2"	4"Dx3/8"	9 1/4"	2'-11"	
18"x.375"	W	2'-4"	2 1/2"	11 1/2"	2"D	1 3/4"D	9 1/4"	1'-6"	2"	4"Dx3/8"	9 1/4"	2'-11"	
20"x.375"	W	2'-7"	3"	1'-0 1/2"	2 1/4"D	2"D	1'-5"	1'-7"	3"	5"Dx3/8"	11"	3'-4"	
24"x.375"	W	2'-11"	3"	1'-2 1/2"	2 1/4"D	2"D	1'-6"	1'-11"	3"	5"Dx3/8"	11"	3'-4"	
24"x.500"	W	3'-0"	3 1/2"	1'-2 1/2"	2 1/2"D	2 1/4"D	1'-6"	1'-10"	3"	5"Dx3/8"	11 3/4"	3'-9"	

NOTE: D DENOTES DIAMETER
 * CVN REQUIRED FOR WALL THICKNESSES EXCEEDING 1/2" (.500").



- NOTES:
- FOR GENERAL NOTES, SEE SHEET 1.
 - MEMBER SIZES INDICATED ON CONTRACT DRAWINGS OBTAINED FROM BD-644M SHEETS 9-13.
 - FOR SADDLE BLOCK DETAILS, SEE SHEET 11.
 - FOR ELEVATION AND ANCHOR BOLT DETAILS, SEE SHEET 5.
 - FOR ANCHOR PLATE AND STEEL TEMPLATE DETAILS, SEE SHEET 5.
 - TO PREVENT INTERSECTING FILLET WELDS ON OPPOSITE SIDES OF A COMMON PLANE, PROVIDE A WELD 'HOLDBACK' AT THE EDGE OF THE GUSSET PLATE IN THE BRACING MEMBERS EQUAL TO THE MINIMUM WELD SIZE REQUIRED. ENSURE MINIMUM TOTAL WELD LENGTHS ARE ACHIEVED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

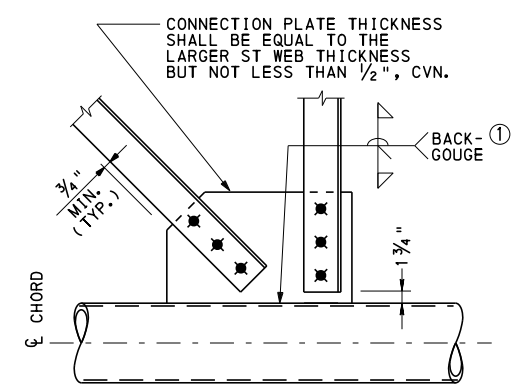
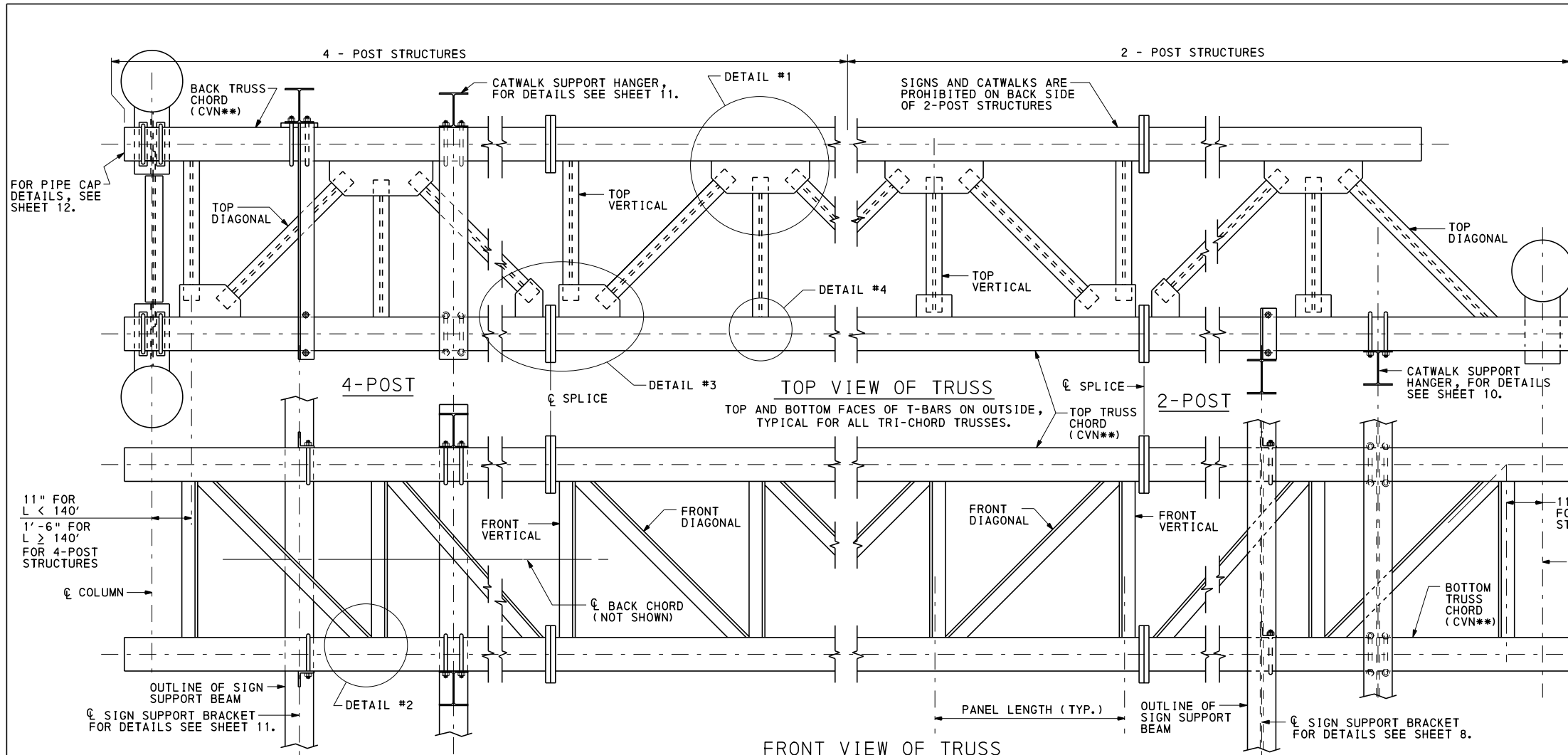
OVERHEAD SIGN STRUCTURES
 4 POST TRI-CHORD TRUSS
 SPANS FROM 60' TO 240'

COLUMN DETAILS

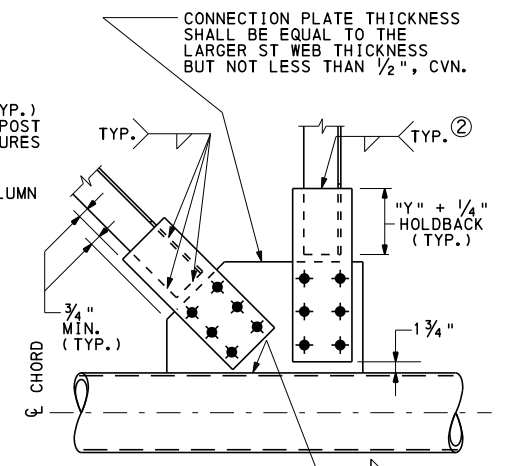
RECOMMENDED AUG. 4, 2017
 Thomas P. Maiore
 CHIEF BRIDGE ENGINEER

RECOMMENDED AUG. 4, 2017
 Bruce S. Thompson
 DIRECTOR, BUR. OF PROJECT DELIVERY

SHT. 6 OF 12
 BC-744M



ALTERNATE BOLTED CONNECTION (FRONT TRUSS)
FOR ST SECTIONS TOO SHALLOW TO BOLT THROUGH, USE DETAIL #5.

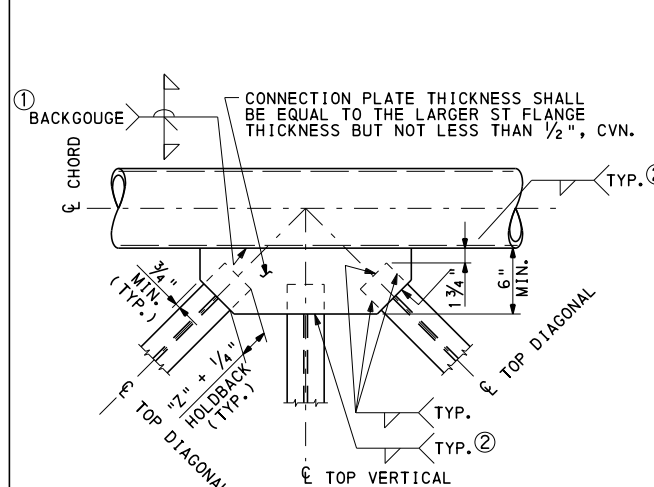


- ① ALTERNATE WELD DETAIL:
BACKGOUGE
- ② TO PREVENT INTERSECTING FILLET WELDS ON OPPOSITE SIDES OF A COMMON PLANE, PROVIDE A WELD 'HOLDBACK' AT THE END OF THE GUSSET PLATE IN THE BRACING MEMBERS EQUAL TO THE MINIMUM WELD SIZE REQUIRED. ENSURE MINIMUM TOTAL WELD LENGTHS ARE ACHIEVED.

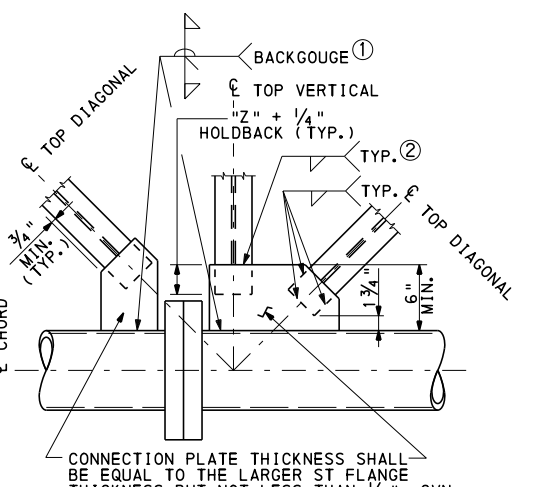
NOTES:

- FOR ADDITIONAL ALTERNATE BOLTED CONNECTIONS AND WELD LENGTH "Z", SEE SHEET 9.
- ONE OR MORE SPLICES IN THE TRUSS MAY BE ADDED OR ELIMINATED AT THE OPTION OF THE FABRICATOR. IN CASE OF THE ADDITION OR ELIMINATION OF SPLICES, THE HEAVIER CHORD MATERIAL MUST BE EXTENDED TOWARD THE LIGHTER CHORD MATERIAL TO THE DESIRED SPLICE LOCATION.

** CVN REQUIRED FOR WALL THICKNESSES EXCEEDING 1/2" (.500").

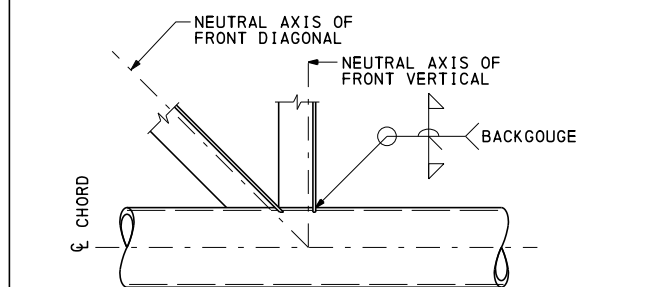


DETAIL #1
FOR WELD "Z" SEE TABLE ON SHEET 9

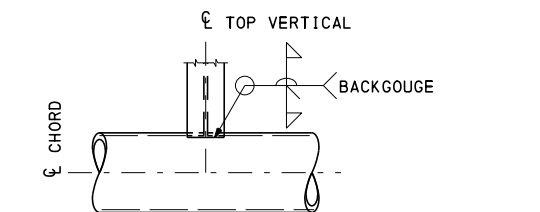


DETAIL #3

NOTE:
OFFSET CENTERLINE OF SPLICE TO CLEAR GUSSET PLATE FOR THE TOP VERTICAL AND TOP DIAGONAL CONNECTIONS.



DETAIL #2



DETAIL #4

NUMBER OF REQUIRED BOLTS AND WELD LENGTH "Y" FOR FRONT TRUSS ALTERNATE CONNECTIONS				
MEMBER	NO.	DIA.	WELD SIZE	MIN. LENGTH "Y"
ST1.5x2.85	2	7/8"	*	4"
ST1.5x3.75	2	7/8"	1/4"	4"
ST2x3.85	2	7/8"	*	4"
ST2x4.75	3	7/8"	1/4"	4"
ST2.5x5	3	7/8"	*	4"
ST3x6.25	4	7/8"	*	4"
ST3x8.625	5	7/8"	3/8"	4"
ST4x9.2	5	7/8"	3/16"	6"
ST4x11.5	6	7/8"	3/8"	4"
ST5x12.7	7	7/8"	3/16"	9"
ST5x17.5	7	1"	1/2"	4"
ST6x15.9	7	1"	1/4"	7"
ST6x17.5	7	1"	5/16"	6"
ST6x20.4	6	1 1/4"	3/8"	6"
ST6x25	8	1 1/4"	1/2"	4"
ST7.5x21.45	7	1 1/4"	5/16"	6"
ST7.5x25	8	1 1/4"	3/16"	4"
ST9x27.35	8	1 1/4"	3/8"	6"
ST9x35	11	1 1/4"	1/2"	6"
ST10x48	15	1 1/4"	1/2"	9"
WT10.5x73.5	22	1 1/4"	1/2"	1'-6"

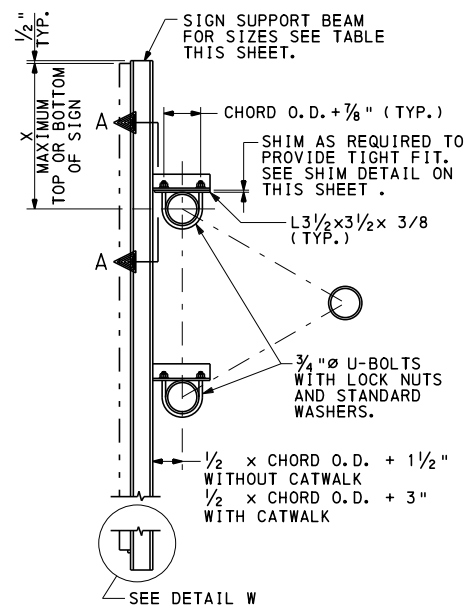
* - INDICATES THAT WELD SIZE IS EQUAL TO BASE METAL THICKNESS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES
2 POST AND 4 POST TRI-CHORD TRUSS
SPANS FROM 60' TO 240'

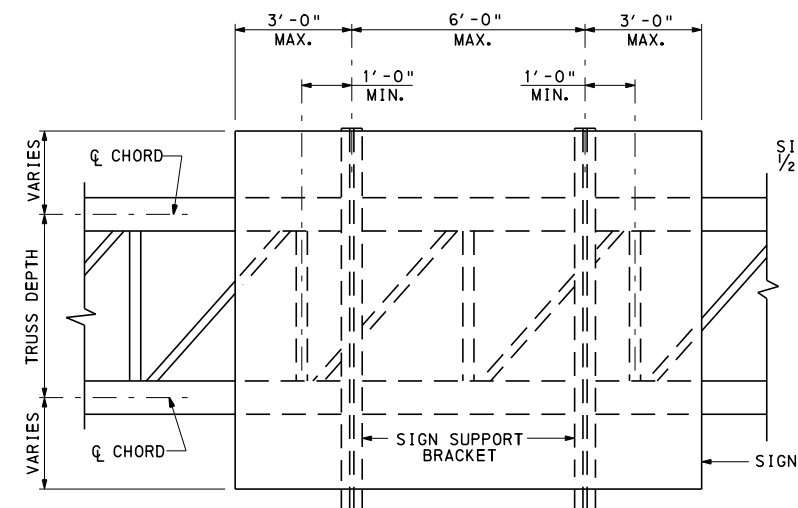
TRUSS DETAILS

RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Brian S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 7 OF 12 BC-744M
--	--	--------------------------------



SIGN SUPPORT BRACKET DETAIL

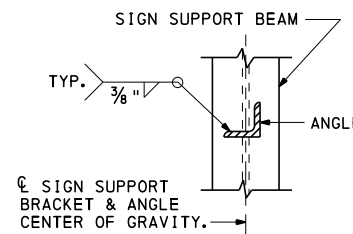
FOR SIGN ATTACHMENT TO BACK OF TRUSS, SEE SHEET 11.



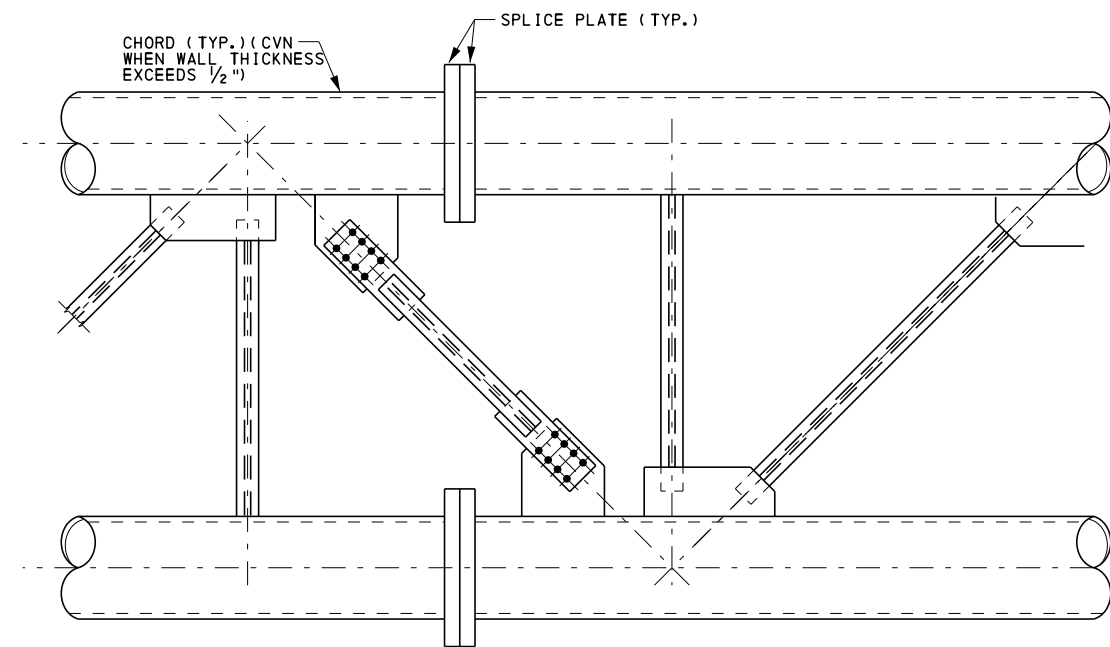
TYPICAL SIGN SUPPORT BRACKET SPACING DIAGRAM

PROVIDE ADDITIONAL BRACKETS AS REQUIRED AT 6'-0" MAXIMUM SPACING

SIGN SUPPORT BEAM	
X	SIZE
0 TO 5'-6"	W6x15
5'-6" TO 6'-6"	W6x20
6'-6" TO 7'-6"	W6x25
7'-6" TO 8'-6"	W8x28
8'-6" TO 9'-6"	W8x31



SECTION A-A



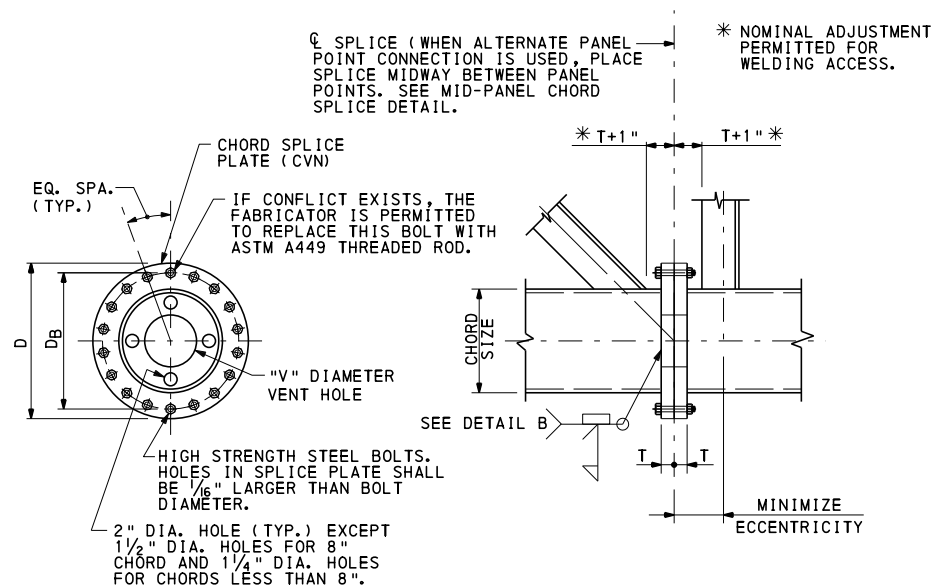
ELEVATION

(REAR TRUSS SHOWN, FRONT TRUSS SIMILAR)

MID-PANEL CHORD SPLICE

NOTES:

- ALL BOLTS TO BE ASTM A325 AND GALVANIZED IN ACCORDANCE WITH PUB. 408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
- U-BOLTS PER PUBLICATION 408, SECTION 948.2, UNLESS NOTED OTHERWISE.
- FOR DETAILS OF MOUNTING SIGNS TO SIGN SUPPORT BEAMS, SEE STANDARD DRAWING TC-8701E.
- ALL MATERIALS FOR TRUSS SEATS AND SIGN SUPPORT BRACKETS TO BE STRUCTURAL STEEL AASHTO M270, GRADE 36.
- FOR DETAIL B, SEE SHEET 5.



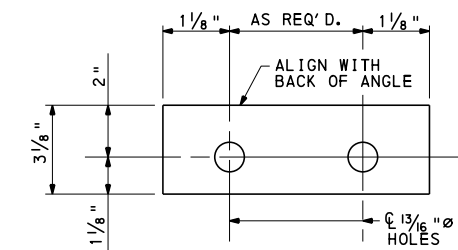
CHORD SPLICE

NOTES:

- ADJUST BOLT PATTERN AS NECESSARY TO AVOID CHORD BRACING AND GUSSET PLATES. DO NOT VIOLATE MINIMUM BOLT SPACING OF 3 TIME THE BOLT DIAMETER.

CHORD SPLICE					
CHORD NOMINAL SIZE X WALL THK. ▲	D	D _B	BOLTS	T	V
5"x. 250"	1'-1 1/16"	10 9/16"	4- 7/8"Ø	2"	0
5"x. 375"	1'-1 1/16"	10 9/16"	6- 7/8"Ø	2 1/2"	0
6"x. 280"	1'-2 5/8"	11 5/8"	6- 7/8"Ø	2"	0
6"x. 432"	1'-2 5/8"	11 5/8"	8- 7/8"Ø	2 1/2"	0
8"x. 322"	1'-4 5/8"	1'-1 5/8"	8- 7/8"Ø	2 1/4"	2"
8"x. 500"	1'-4 5/8"	1'-1 5/8"	12- 7/8"Ø	2 3/4"	2"
10"x. 365"	1'-6 3/4"	1'-3 3/4"	12- 7/8"Ø	2 1/2"	3 1/4"
10"x. 500"	1'-6 3/4"	1'-3 3/4"	16- 7/8"Ø	2 3/4"	3 1/4"
12"x. 375"	1'-8 3/4"	1'-5 3/4"	14- 7/8"Ø	2 1/2"	5 1/4"
12"x. 500"	1'-8 3/4"	1'-5 3/4"	18- 7/8"Ø	2 3/4"	5 1/4"
14"x. 375"	1'-10"	1'-7"	16- 7/8"Ø	2 1/2"	6 1/2"
14"x. 500"	1'-10"	1'-7"	20- 7/8"Ø	2 3/4"	6 1/2"
16"x. 375"	2'-0"	1'-9"	18- 7/8"Ø	2 1/2"	8"
16"x. 500"	2'-0"	1'-9"	22- 7/8"Ø	2 3/4"	8"
18"x. 375"	2'-2"	1'-11"	20- 7/8"Ø	2 1/2"	9 1/4"
18"x. 500"	2'-2 1/2"	1'-11"	20-1"Ø	2 3/4"	9 1/4"
20"x. 375"	2'-4"	2'-1"	22- 7/8"Ø	2 1/2"	10 1/2"
20"x. 500"	2'-4 1/2"	2'-1"	22-1"Ø	2 3/4"	10 1/2"
24"x. 375"	2'-8 1/2"	2'-5"	20-1"Ø	2 1/2"	1'-0 3/4"
24"x. 500"	2'-8 1/2"	2'-5"	26-1"Ø	3"	1'-0 3/4"

NOTE:
WHERE LARGER CHORD SIZE SPLICES TO SMALLER CHORD SIZE, USE SPLICE AS SHOWN FOR SMALLER CHORD.
▲ CVN REQUIRED FOR WALL THICKNESSES EXCEEDING 1/2" (0.500").



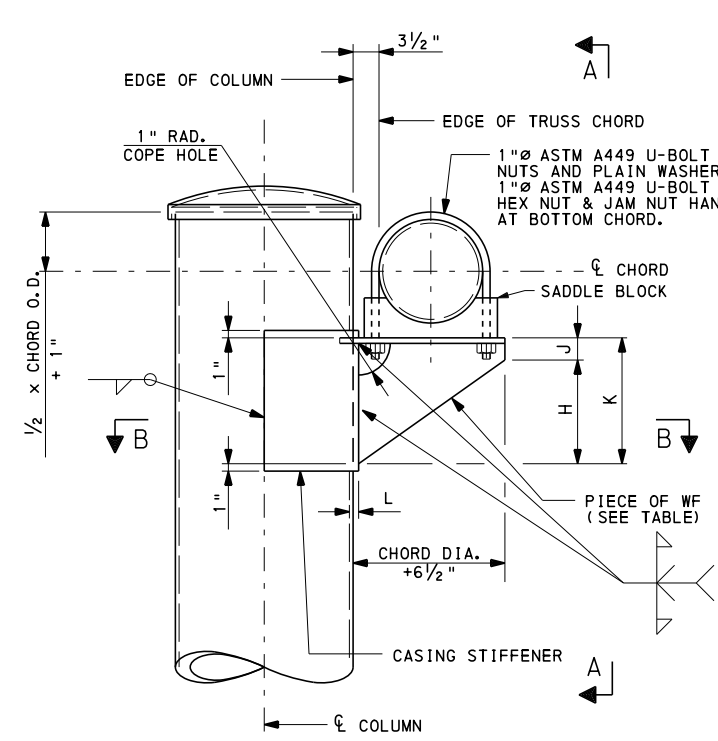
SHIM DETAIL

PROVIDE 1 AT 1/4", 3 AT 1/8" AND 1 AT 1/16" THICKNESS FOR EACH UPPER SIGN SUPPORT CONNECTION ANGLE.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

OVERHEAD SIGN STRUCTURES
2 POST AND 4 POST TRI-CHORD TRUSS
SPANS FROM 60' TO 240'

STRUCTURAL DETAILS-1



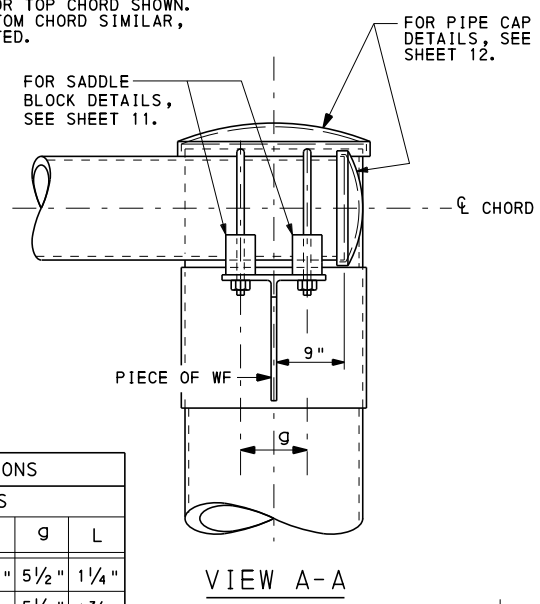
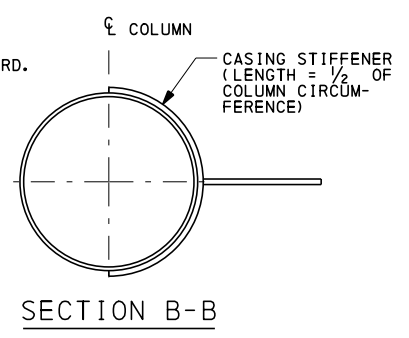
ALTERNATE TRUSS SEAT DETAIL
(2-POST STRUCTURES ONLY)

2-POST ALTERNATE TRUSS SEAT DIMENSIONS

SPAN LENGTH	WF SIZE	DIMENSIONS				
		H	J	K	g	L
60'	W27x84	1'-8 5/8"	3"	1'-11 5/8"	5 1/2"	1 1/4"
70'	W30x90	1'-11 3/8"	3"	2'-2 5/8"	5 1/2"	1 3/8"
80'	W33x118	2'-2 3/4"	3"	2'-5 3/4"	5 1/2"	1 5/8"
90'	W36x135	2'-5 3/8"	3"	2'-8 3/8"	5 1/2"	1 5/8"
100'	W36x135	2'-5 3/8"	3"	2'-8 3/8"	5 1/2"	1 3/4"

NOTE: "L" IS THE TOTAL THICKNESS OF COLUMN AND CASING STIFFENER

NOTE:
TRUSS SEAT FOR TOP CHORD SHOWN. SEAT FOR BOTTOM CHORD SIMILAR, EXCEPT AS NOTED.



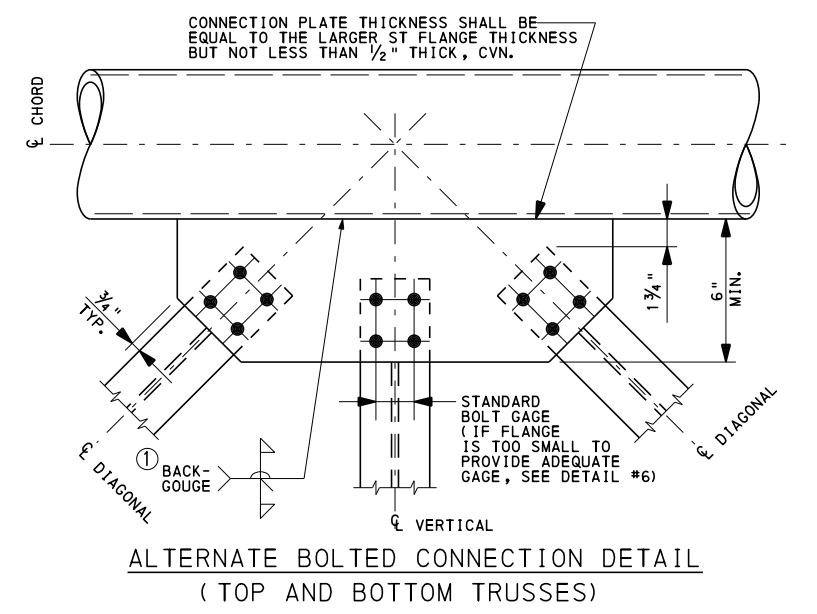
VIEW A-A

** - INDICATES THAT WELD SIZE IS EQUAL TO BASE METAL THICKNESS AT TOE OF ST MEMBER

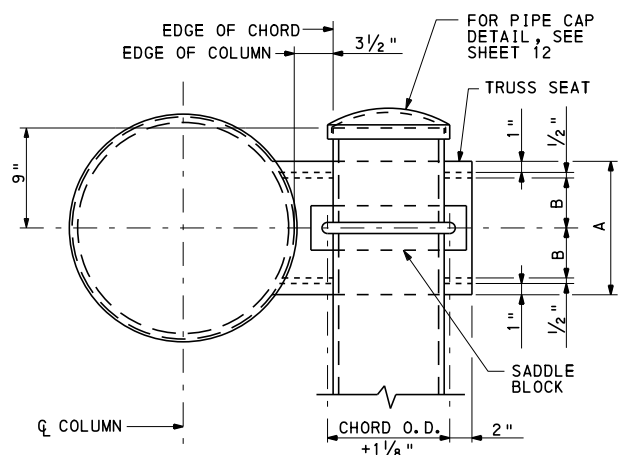
NUMBER OF REQUIRED BOLTS AND WELD LENGTH "Z" FOR TOP & BOTTOM TRUSSES ALTERNATE CONNECTIONS

MEMBER	NO.	DIA.	WELD SIZE	MIN. LENGTH "Z"
ST1.5x2.85	2	7/8"	**	4"
ST1.5x3.75	2	7/8"	**	4"
ST2x3.85	2	7/8"	**	4"
ST2x4.75	2	7/8"	**	4"
ST2.5x5	2	7/8"	**	4"
ST3x6.25	4	7/8"	**	4"
ST3x8.625	4	7/8"	**	4"
ST4x9.2	4	7/8"	**	4"
ST4x11.5	6	7/8"	**	5"
ST5x12.7	6	7/8"	**	4"
ST5x17.5	8	7/8"	**	5"
ST6x15.9	8	7/8"	**	4"
ST6x17.5	8	7/8"	**	4"
ST6x20.4	8	7/8"	**	4"
ST6x25	8	1"	**	5"
ST7.5x21.45	8	1"	**	5"
ST7.5x25	8	1"	**	5"
ST9x27.35	10	1"	**	6"
ST9x35	10	1"	**	7"
ST10x48	12	1 1/4"	**	6"

ABOVE TABLE ALSO APPLIES TO DETAIL #1 ON SHEET 6.



ALTERNATE BOLTED CONNECTION DETAIL
(TOP AND BOTTOM TRUSSES)



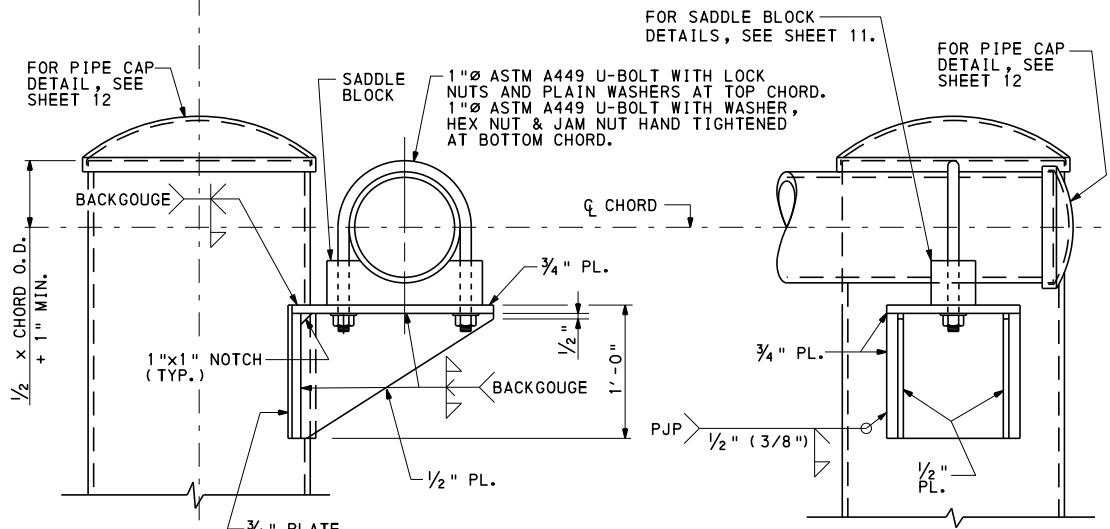
TRUSS SEAT

COLUMN SIZE (NOMINAL)	DIMENSION	
	A	B
8"Ø	7"	2"
10"Ø	7"	2"
12"Ø	8"	2 1/2"
14"Ø	9"	3"
16"Ø	9"	3"
18"Ø	9"	3"
20"Ø	1'-0"	4 1/2"
24"Ø	1'-0"	4 1/2"

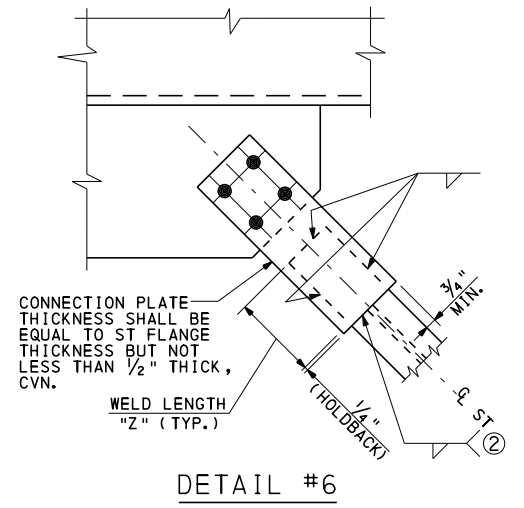
ALTERNATE TRUSS SEAT DETAIL IS RECOMMENDED DUE TO POSSIBLE ACCESS LIMITATIONS FOR STIFFENER WELDS.

TRUSS SEAT NOTES:

- TRUSS SEAT FOR TOP CHORD IS SHOWN. SEAT FOR BOTTOM CHORD IS SIMILAR, EXCEPT AS NOTED.
- SEE ALTERNATE TRUSS SEAT DETAILS, THIS SHEET.
- TO ACCOUNT FOR WELD DISTORTION ONLY, PROVIDE MAXIMUM SHIM PLATE THICKNESS OF 1/2" AT BOTTOM CHORD ONLY.



TRUSS SEAT DETAILS
(2-POST STRUCTURES ONLY)

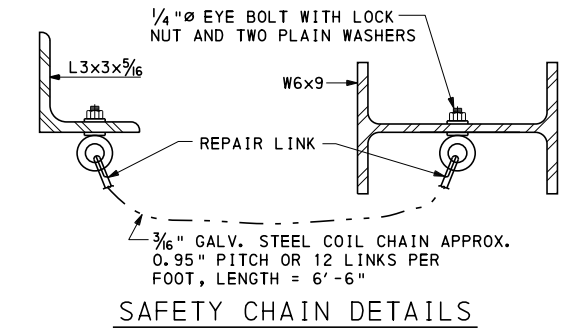
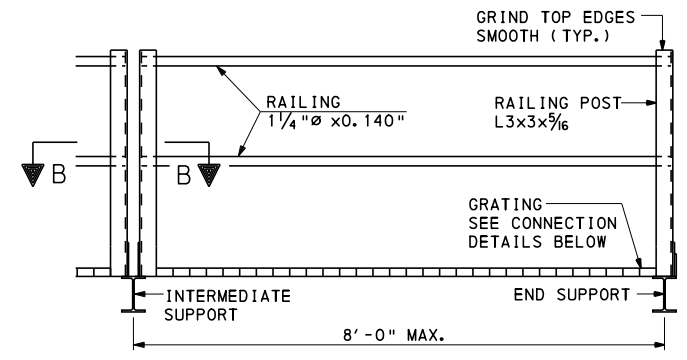
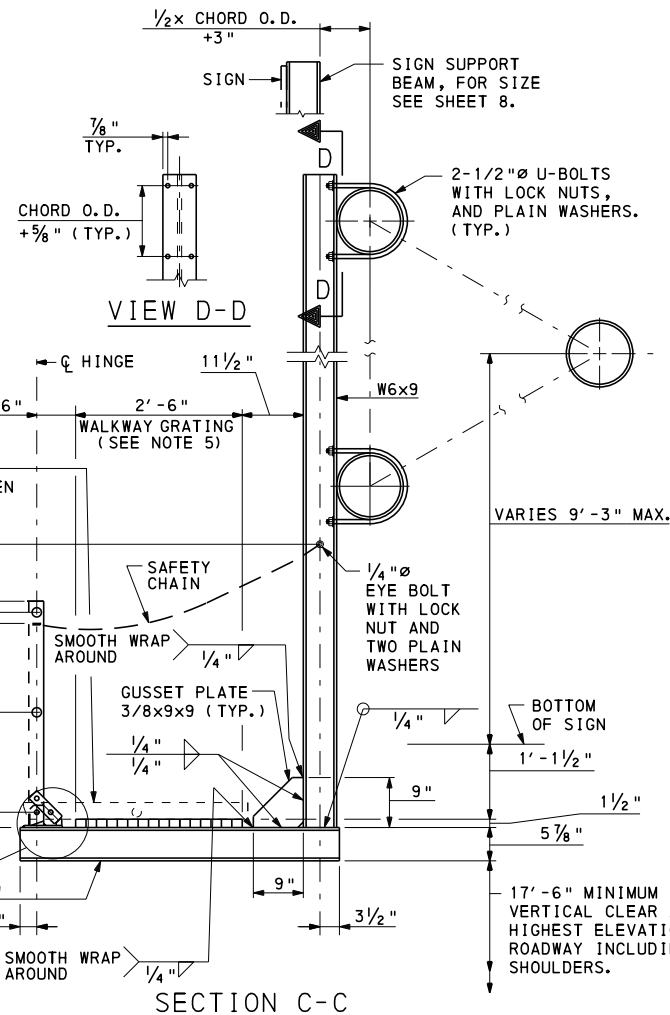
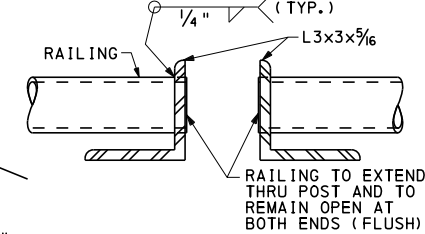
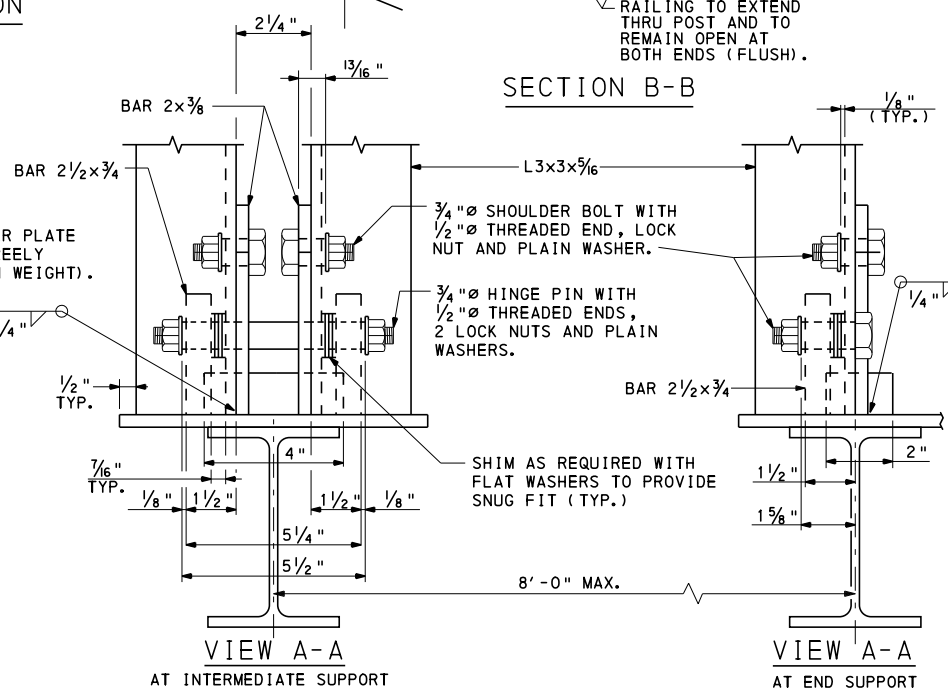
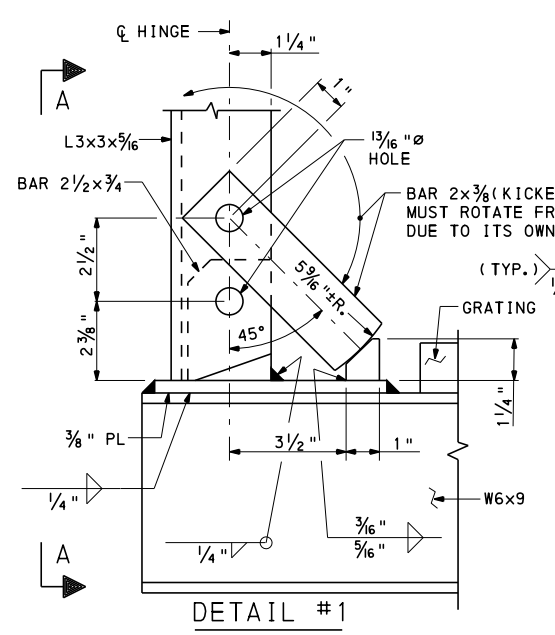
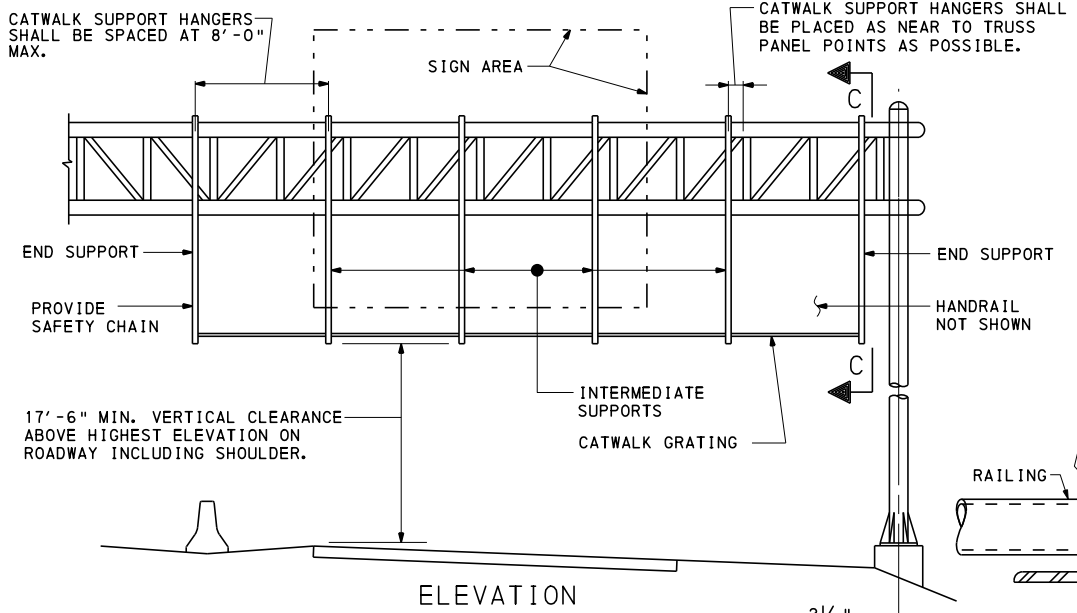
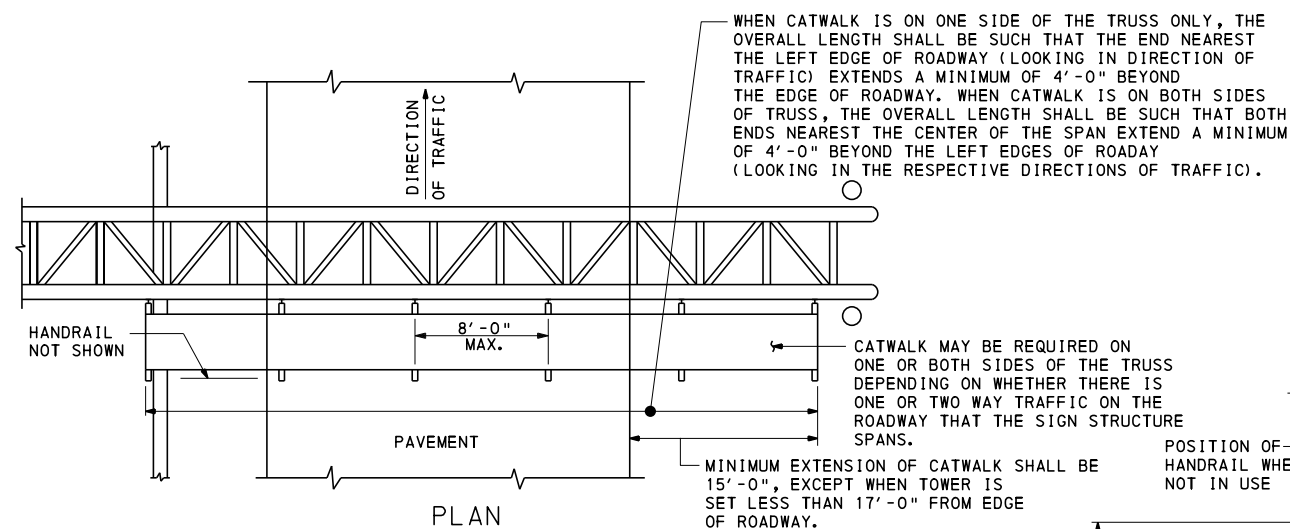


DETAIL #6

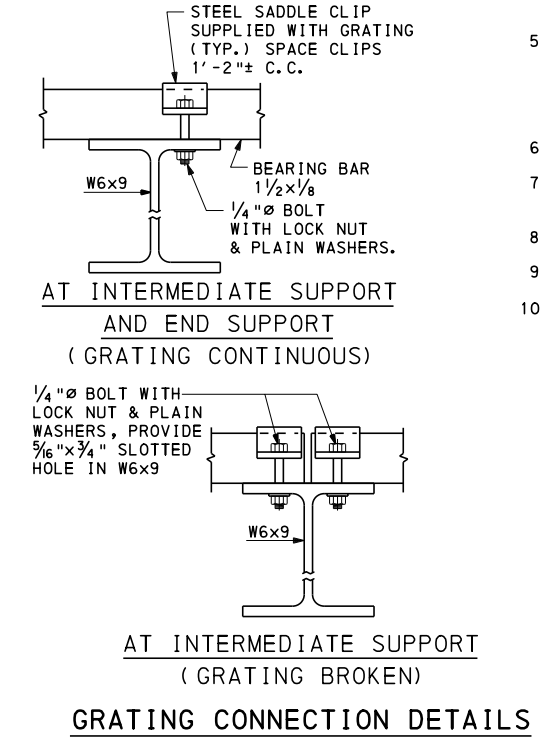
- ① ALTERNATE WELD DETAIL: BACK-GOUGE
- ② TO PREVENT INTERSECTING FILLET WELDS ON OPPOSITE SIDES OF A COMMON PLANE, PROVIDE A WELD 'HOLDBACK' AT THE EDGE OF THE GUSSET PLATE IN THE BRACING MEMBERS EQUAL TO THE MINIMUM WELD SIZE REQUIRED. ENSURE MINIMUM TOTAL WELD LENGTHS ARE ACHIEVED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES
2 POST AND 4 POST TRI-CHORD TRUSS
SPANS FROM 60' TO 240'
STRUCTURE DETAILS - 2



- NOTES:**
1. FOR GENERAL NOTES SEE SHEET 1.
 2. FOR ALTERNATE HANDRAIL DETAILS, SEE SHEET 11.
 3. SPECIAL CARE SHALL BE TAKEN TO INSURE THAT THE COMPLETED POST HINGE AND KICKER PLATE ASSEMBLY WILL HOLD THE SAFETY RAILING IN A STEADY MANNER, FREE OF WOBBLE WHILE IN THE RAISED POSITION. MAXIMUM ALLOWABLE DISPLACEMENT FROM VERTICAL AT TOP OF RAILING WHEN KICKER PLATES ARE IN JAM POSITION SHALL BE 1".
 4. CATWALK GRATING TO BE CONTINUOUS (NO SPLICES) OVER AS MANY SUPPORTS AS PRACTICABLE CONSISTENT WITH FABRICATION, EASE OF HANDLING AND ASSEMBLY.
 5. WELDED-TYPE GRATING SHALL BE TYPE W-19, PER NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM) MBG531-00 STANDARD, 1 1/2" x 1/8" SERRATED BEARING BARS @ 1 3/8" CENTERS. THE CROSS BARS SHALL BE 1/4" TWISTED BAR @ 4" CENTERS. WEARING SURFACES OF ALL BARS SHALL BE SERRATED.
 6. PROVIDE 3 CLIPS EVENLY SPACED AT EACH GRATING SUPPORT.
 7. ALL BOLTS TO BE ASTM A325 AND GALVANIZED IN ACCORDANCE WITH PUB. 408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
 8. U-BOLTS PER PUBLICATION 408, SECTION 948.2.
 9. USE ASTM A53 GRADE B STEEL PIPE FOR RAILING.
 10. USE AASHTO M270, GRADE 36 STEEL FOR CATWALK SUPPORTS.

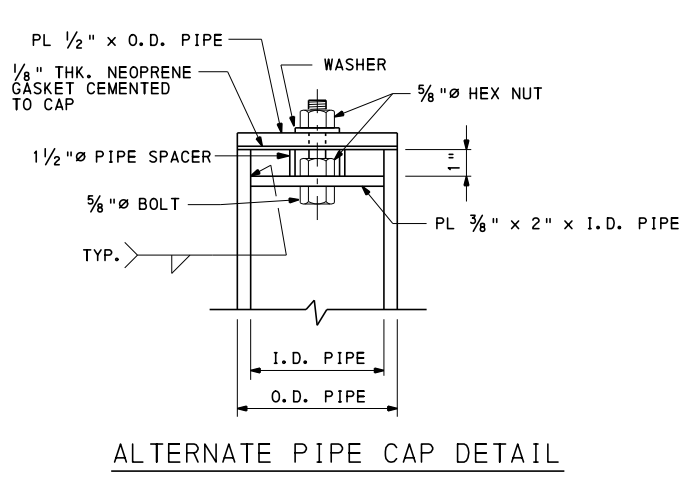
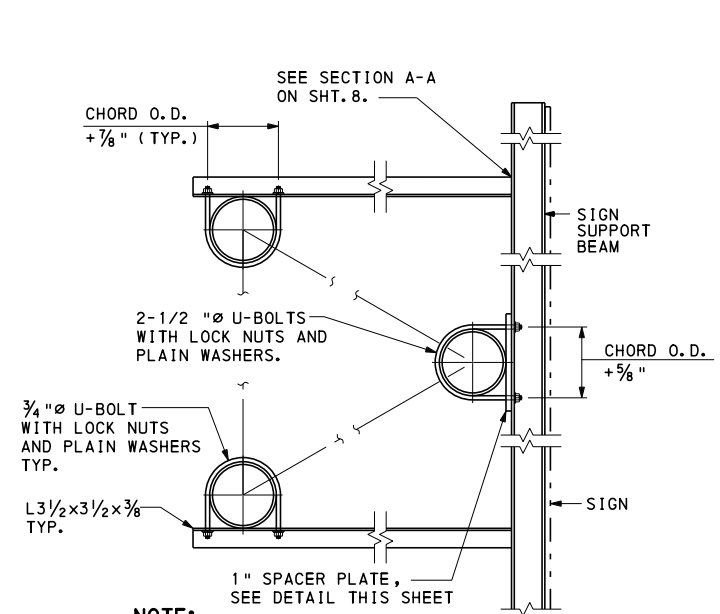
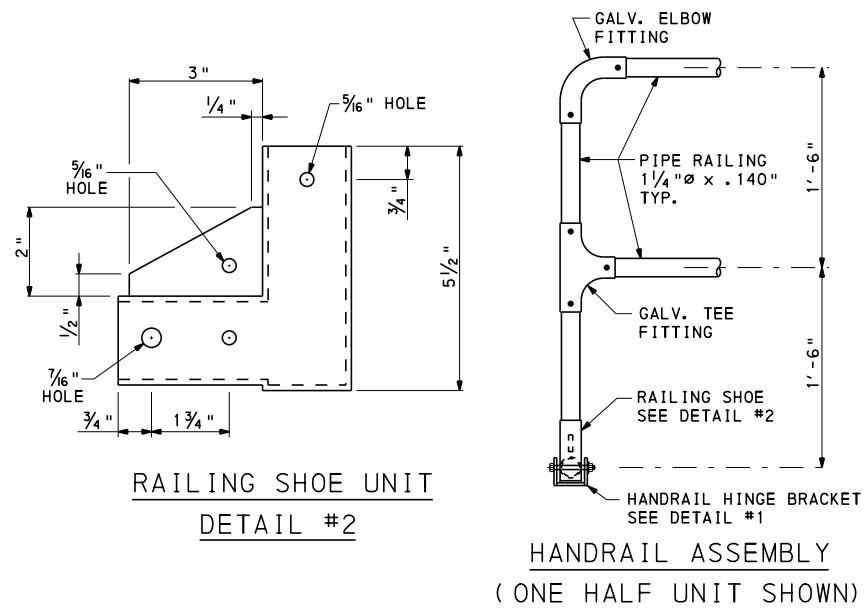


COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

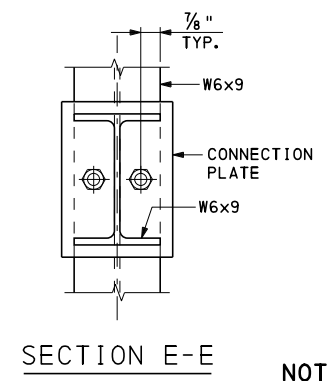
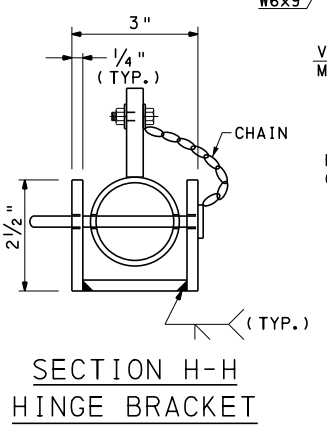
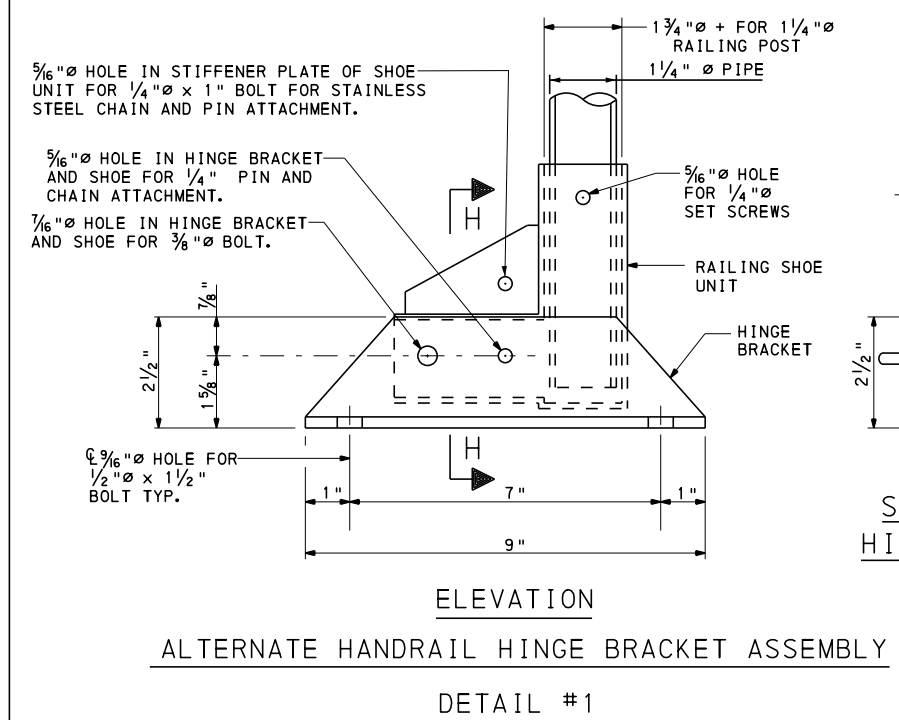
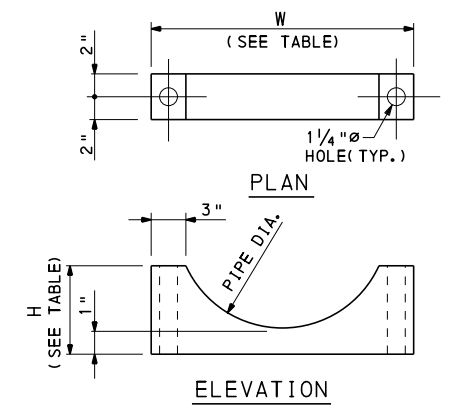
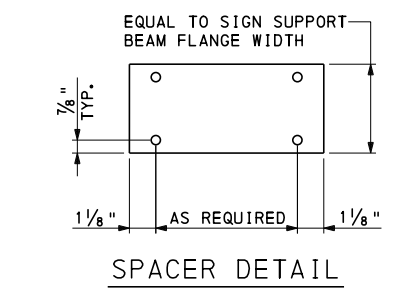
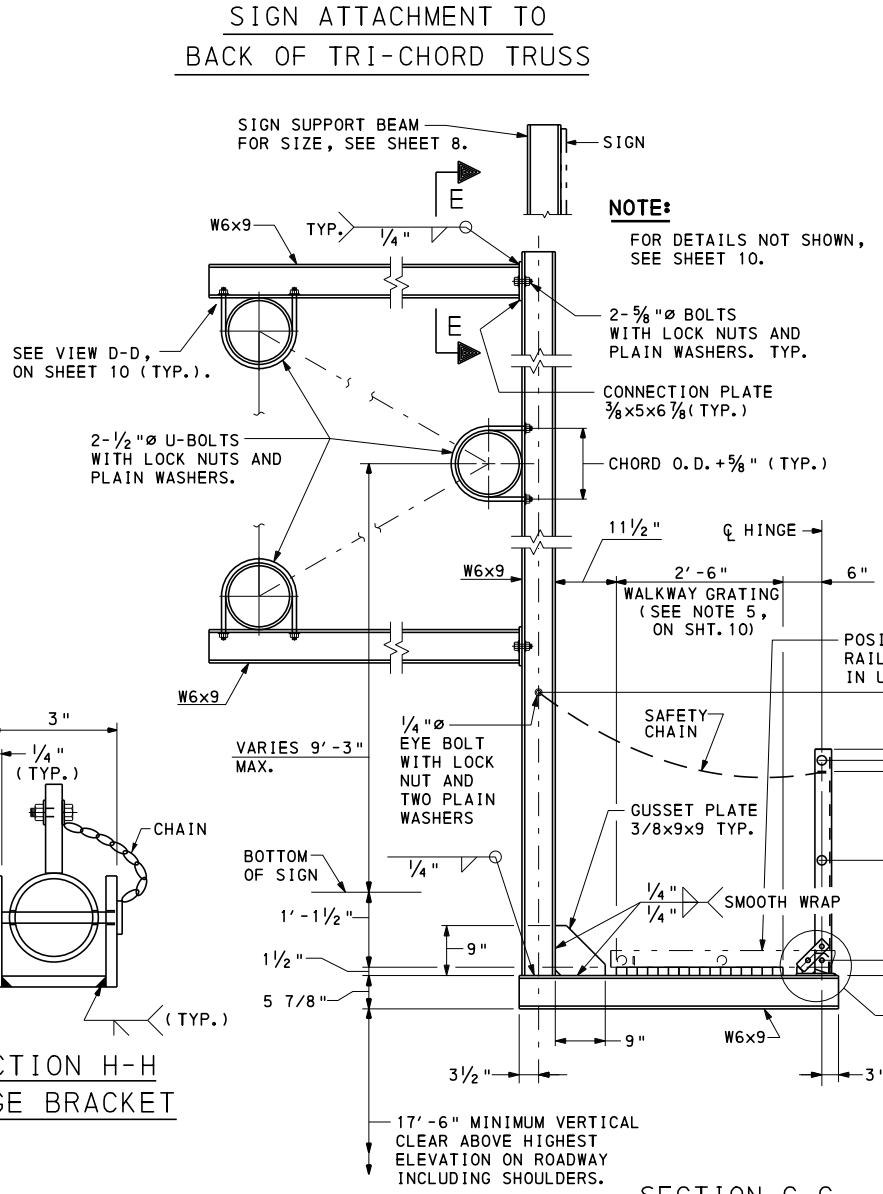
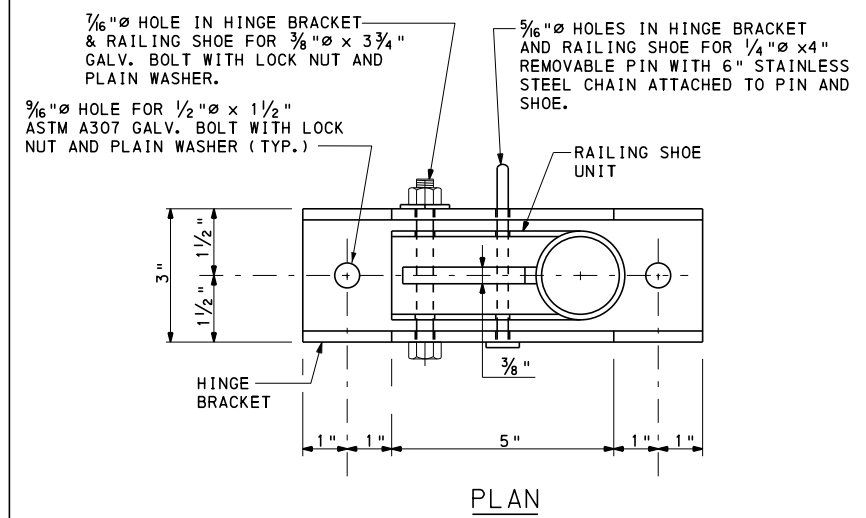
OVERHEAD SIGN STRUCTURES
2 POST AND 4 POST TRI-CHORD TRUSS
SPANS FROM 60' TO 240'

CATWALK AND HANDRAIL DETAILS

RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Benjamin S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 10 OF 12 BC-744M
--	---	---------------------------------



PIPE DIA.	1" U-BOLT DIA.	
	NOMINAL HEIGHT "H"	NOMINAL WIDTH "W"
6"	2"	10 3/4"
8"	2 5/8"	1' - 0 3/4"
10"	3 3/8"	1' - 2 1/8"
12"	4 1/8"	1' - 4 1/8"
14"	4 1/2"	1' - 6 1/8"
16"	5 1/4"	1' - 8 1/8"
18"	6"	1' - 10 1/8"
20"	6 3/4"	2' - 0 1/8"
24"	8 5/8"	2' - 4 1/8"

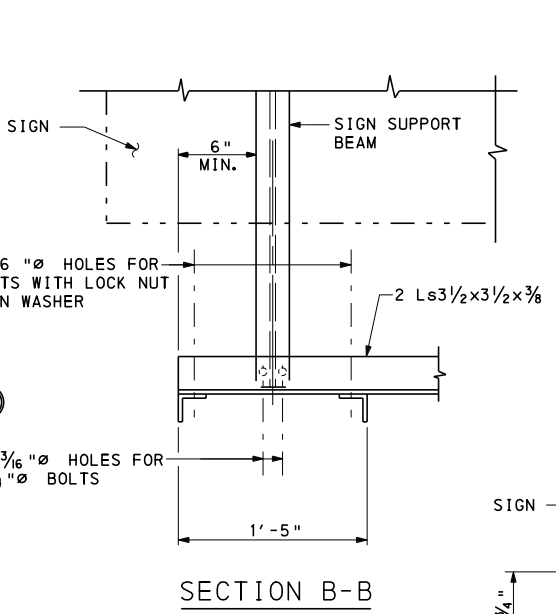
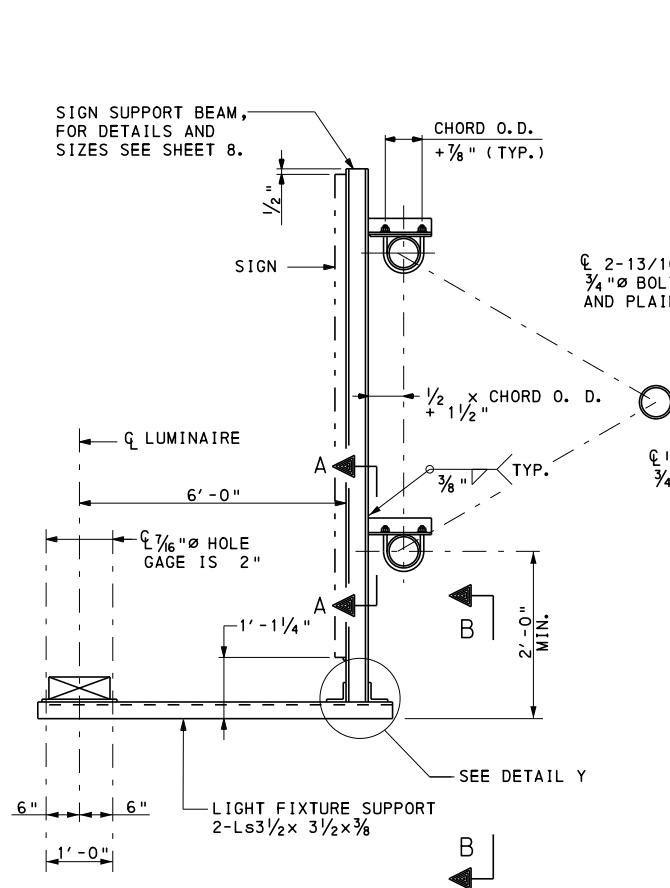


- SADDLE BLOCK NOTE:**
- 4" THICK PLATE, MATERIAL SHALL BE ASTM A36, GALVANIZED PER ASTM A123.
- NOTES:**
- ALL BOLTS TO BE ASTM A325 AND GALVANIZED IN ACCORDANCE WITH PUB. 408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
 - U-BOLTS PER PUBLICATION 408, SECTION 948.2.
 - USE ASTM A-53 GRADE B STEEL PIPE FOR RAILING.
 - INDICATE/IDENTIFY SUPPLIER FOR RAILING FITTINGS AND SHOE ON SHOP DRAWINGS.
 - USE AASHTO M270, GRADE 36 STEEL FOR CATWALK SUPPORTS.
 - FOR VIEW D-D, SEE SHEET 10.

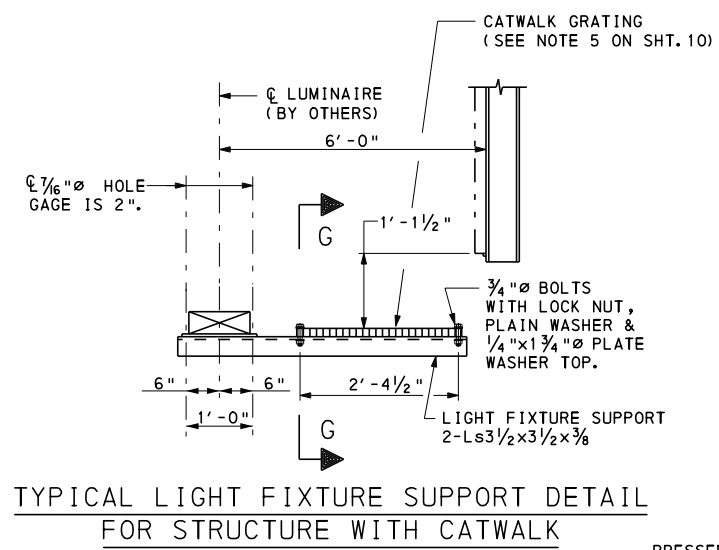
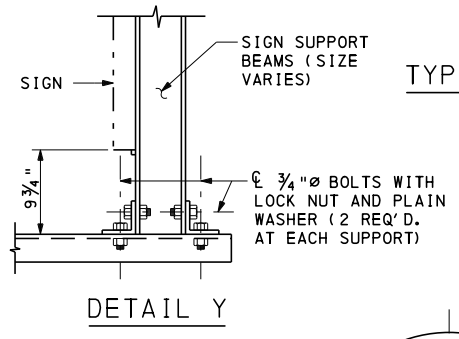
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

OVERHEAD SIGN STRUCTURES
2 POST AND 4 POST TRI-CHORD TRUSS
SPANS FROM 60' TO 240'
CONNECTIONS TO BACK OF TRI-CHORD TRUSS
AND ALTERNATE CATWALK DETAILS

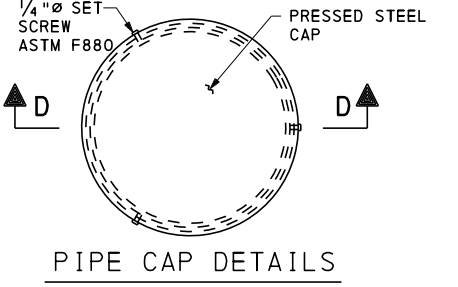
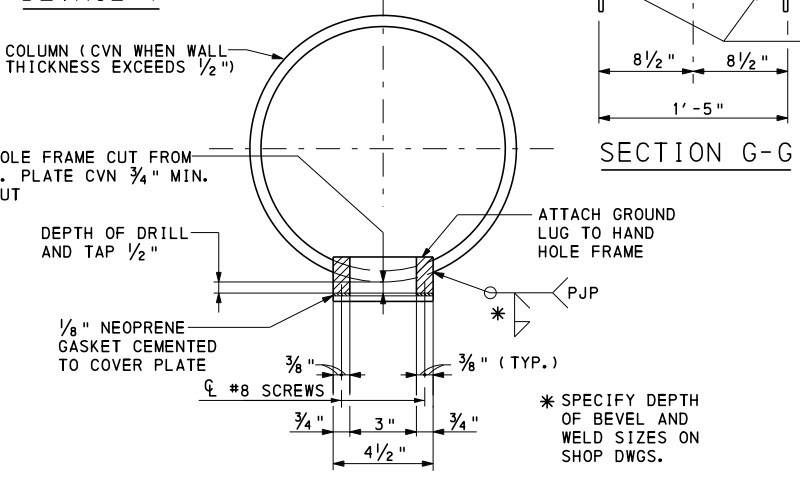
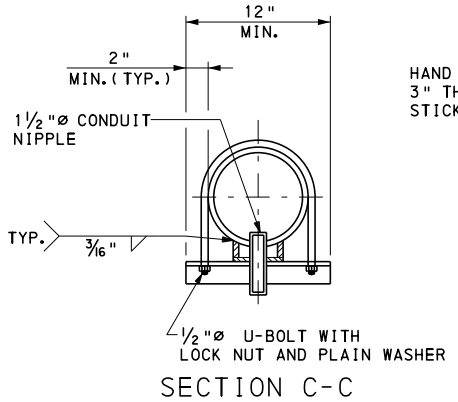
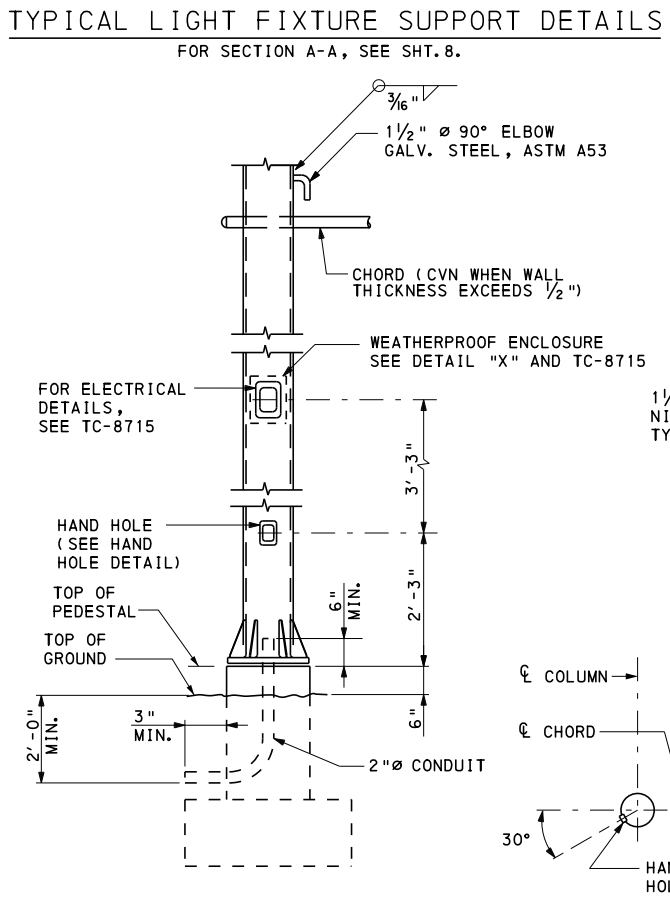
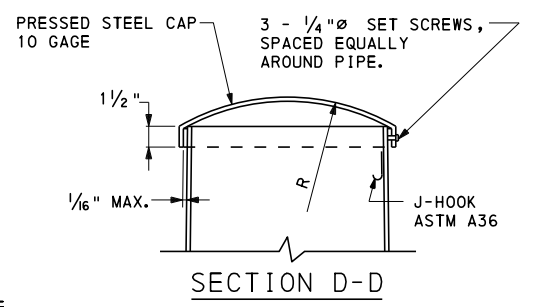
RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Brenda S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 11 OF 12 BC-744M
--	---	---------------------------------



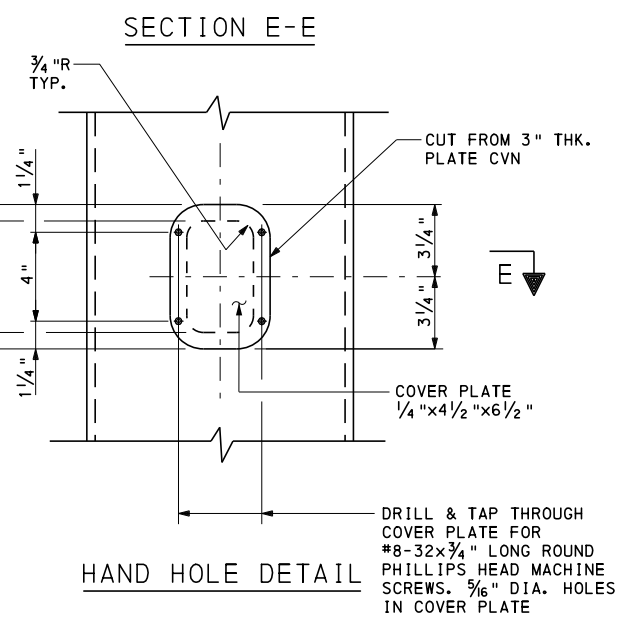
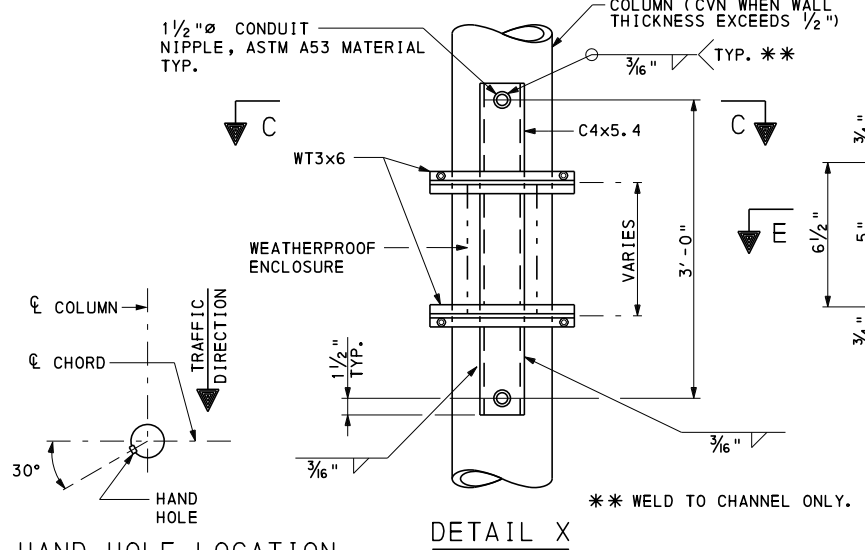
NOTE:
WEIGHT OF LUMINAIRE AND SUPPORT BRACKETS IS 400 lbs. BASED ON 10'-0" LUMINAIRE SPACING.



PIPE CAPS	
PIPE SIZE (NOMINAL)	R
5" DIA.	9"
6" DIA.	9"
8" DIA.	9"
10" DIA.	9"
12" DIA.	1'-6"
14" DIA.	1'-6"
16" DIA.	1'-6"
18" DIA.	1'-6"
20" DIA.	2'-6"
24" DIA.	2'-6"



- NOTES:**
- ALL BOLTS TO BE ASTM A325 AND GALVANIZED IN ACCORDANCE WITH PUB. 408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
 - U-BOLTS PER PUBLICATION 408, SECTION 948.2.
 - FOR SIGN PANEL DETAILS AND LIGHTING DETAILS, SEE STANDARD DRAWINGS TC-8700C, TC-8701D, TC-8701E, TC-8701S AND TC-8715.
 - ALL MATERIAL FOR SIGN SUPPORT BRACKETS TO BE STRUCTURAL STEEL AASHTO M270, GRADE 36.
 - FOR ALTERNATE PIPE CAP DETAIL SEE SHEET 11.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES
2 POST AND 4 POST TRI-CHORD TRUSS SPANS FROM 60' TO 240'
LIGHT SUPPORT AND HAND HOLE DETAILS

RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Brenda Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 12 OF 12 BC-744M
--	--	---------------------------------

INFORMATION CONTAINED IN THE BD-645M DESIGN TABLES

- DESIGN TABLES ON STANDARD DRAWING BD-645M WERE DEVELOPED USING A COMPUTER PROGRAM AND ARE BASED ON THE DESIGN CRITERIA SHOWN ON THIS SHEET.
- THE MEMBER SIZES INDICATED IN THE DESIGN TABLES MEET THE FATIGUE REQUIREMENTS FOR FATIGUE CATEGORY II. THE DESIGNER MUST CHECK THE ADEQUACY OF THE MEMBER SIZES INDICATED WHEN THE FATIGUE CATEGORY IS SPECIFIED TO BE I FOR THE PROJECT.
- THE SPAN RANGE INCLUDED ON STANDARD DRAWING BD-645M IS AS FOLLOWS:
BD-645M: 4 POST 4 CHORD TRUSS SPANS FROM 100' TO 200'.
- THE DESIGN TABLES INCLUDE MEMBER SIZES FOR THE STRUCTURES FOR VARIOUS COMBINATIONS OF COLUMN HEIGHT, SPAN LENGTH, AND SIGN AREA. THEY ALSO INCLUDE SPREAD FOOTING DESIGNS. THE CORRESPONDING FABRICATION AND CONSTRUCTION DETAILS ARE CONTAINED IN THIS STANDARD.

GENERAL NOTES

- PROVIDE 3-INCH CONCRETE COVER ON REINFORCEMENT BARS, EXCEPT AS NOTED.
- USE CLASS A CEMENT CONCRETE $f'c = 3000$ PSI IN PEDESTALS, FOOTINGS AND CAISSONS.
- PROVIDE GRADE 60 REINFORCING STEEL BARS THAT MEET THE REQUIREMENTS OF ASTM A615 FOR CONCRETE REINFORCEMENT. DO NOT WELD REINFORCING STEEL BARS.
- RAKE-FINISH ALL HORIZONTAL CONSTRUCTION JOINTS, EXCEPT AS INDICATED.
- VERIFY ALL DIMENSIONS AND GEOMETRY OF THE EXISTING STRUCTURES IN THE FIELD AS NECESSARY FOR PROPER FIT OF THE PROPOSED CONSTRUCTION.
- CHAMFER EXPOSED CONCRETE EDGES 1 INCH BY 1 INCH.
- ALL DIMENSIONS SHOWN ARE HORIZONTAL, EXCEPT AS NOTED.
- DIMENSIONS ARE BASED ON A NORMAL TEMPERATURE OF 68 DEGREES F.
- SPREAD FOOTINGS MAY BE ORDERED BY THE ENGINEER TO BE AT ANY ELEVATION OR OF ANY DIMENSIONS NECESSARY TO PROVIDE A PROPER FOUNDATION.
- GALVANIZE ALL STRUCTURAL STEEL, BOLTS, NUTS & WASHERS IN ACCORDANCE WITH PUB. 408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
- PIPE DIAMETERS SHOWN UP TO AND INCLUDING 12 INCHES ARE NOMINAL DIAMETERS. PIPE DIAMETERS SHOWN FROM 14 INCHES AND UP ARE ACTUAL DIAMETERS.
- USE STANDARD SIZE HOLE. THE STANDARD HOLE DIAMETER FOR BOLTS SMALLER THAN 1" DIAMETER SHALL BE THE NOMINAL DIAMETER OF THE BOLT PLUS $\frac{1}{16}$ ". FOR BOLTS 1" DIAMETER AND LARGER, THE WIDTH OF EACH STANDARD HOLE SHALL BE THE NOMINAL DIAMETER OF THE BOLT PLUS $\frac{1}{8}$ ".
- CLEAR DISTANCE BETWEEN BOLT HOLES OR BETWEEN THE BOLT HOLE AND THE END OF THE MEMBER IN THE DIRECTION OF THE APPLIED BEARING FORCE SHALL BE CHECKED.
- PROVIDE ANCHOR BOLT HOLES $\frac{1}{4}$ " LARGER THAN BOLT DIAMETER.
- PROVIDE A MINIMUM ANCHOR BOLT EMBEDMENT LENGTH OF 20 ANCHOR BOLT DIAMETERS.
- PROVIDE DOUBLE NUTS AND WASHER FOR EACH ANCHOR BOLT.
- STEEL MEMBER COMPONENTS REQUIRING CHARPY V-NOTCH TESTING ARE DESIGNATED ON THE PLANS BY (CVN), PROVIDE STEEL CONFORMING TO THE CVN REQUIREMENTS FOR ZONE 2, NON FRACTURE CRITICAL AS GIVEN IN THE AASHTO MATERIAL SPECIFICATIONS.

DESIGN CRITERIA FOR PENNDOT SIGN STRUCTURES

- DEAD LOADS** PENNDOT STD. DWGS. (U.N.O.)*
SIGN PANELS TC-8701E OR TC-8701S
LIGHT FIXTURES BC-745M, SHT. 10
SIGN SUPPORT BEAM BC-745M, SHT. 8
COLUMNS, CHORDS CALCULATED INTERNALLY WITHIN PROGRAM
CATWALK BC-745M, SHT. 8 AND 9
- EXTERNAL LOADS** AASHTO SIGN SPECS.
ICE LOAD 3.7
WIND LOAD APPENDIX C, SECTION C.3,
EQ. C-1, WITH 80 MPH
WIND AND 30% GUST FACTOR
CATWALK 3.6
- GROUP LOADS** AASHTO SIGN SPECS. 3.4
- STEEL CRITERIA** AASHTO SIGN SPECS.
SECTION PROPERTIES FOR TUBULAR SHAPES APPENDIX B, TABLE B-1
MAXIMUM STRESSES FOR TUBULAR SHAPES APPENDIX B, TABLE B-2
ALLOWABLE STRESSES FOR TUBULAR SHAPES 5.6 (TABLE 5-3) & 5.11
ALLOWABLE STRESSES FOR SIGN SUPPORTS 5.12
ALLOWABLE STRESSES FOR BASE PLATES 5.8
ALLOWABLE STRESSES FOR COMBINED STEEL STRESS 5.12
FATIGUE REQUIREMENTS (FATIGUE CATEGORY II) SECTION 11
ALLOWABLE DEFLECTION 10.4
PERMANENT CAMBER 10.5
ALLOWABLE STRESSES FOR STRUCTURAL STEEL SECTION 5
- BOLT CRITERIA** AASHTO HIGHWAY BRIDGES (U.N.O.)
ALLOWABLE BOLT STRESSES TABLE 10.32.3B
SLIP-CRITICAL BOLT ALLOWABLE 10.32.3.2.1
BOLT PRYING ACTION 10.32.3.3.2
COMBINED BOLT SHEAR AND TENSION 10.32.3.3.3
BOLT DESIGN CRITERIA AASHTO SIGN SPECS. 5.16
ALLOWABLE ANCHOR BOLT STRESSES AASHTO SIGN SPECS. 5.17
- CONCRETE CRITERIA** AASHTO HIGHWAY BRIDGES (U.N.O.)
ALLOWABLE BEARING STRESS 8.15.2.1.3
REINFORCEMENT TENSILE STRESS 8.15.2.2
SHEAR CAPACITY OF FOOTINGS 8.15.5.6.1
SHEAR STRESS IN FOOTINGS 8.15.5.6.2
ALLOWABLE SHEAR STRESS 8.15.5.6.4
SLENDERNESS OF COLUMNS 8.16.5.2
MINIMUM REINF. OF FLEXURAL MEMBERS 8.17.1
SPACING LIMITS FOR REINFORCEMENT 8.21
MINIMUM CONCRETE COVER DM4 D8, 22, 1*
PRESSURES FOR ECCENTRICALLY LOADED FOOTINGS FIG. 4.4.7.1.1.1C
DISTRIBUTION OF REINFORCEMENT 4.4.11.2.2
FOOTING STABILITY REQUIREMENTS DM4 D5, 5.5
TORSION ACI SECTION A.7.3*
COLUMN DESIGN (PEDESTALS) 8.15.4
- SPREAD FOOTINGS**
MAXIMUM DESIGN PRESSURE 1.5 TONS PER SQUARE FOOT
MINIMUM AREA IN BEARING 95%
UNIT WEIGHT OF SOIL 100 POUNDS PER CUBIC FOOT
- DRILLED SHAFTS (CAISSONS) DM4 SEC. 4.6, PENNDOT COM624 COMPUTER PROGRAM**
MAXIMUM DESIGN PRESSURE 1.5 TONS PER SQUARE FOOT
MAXIMUM DESIGN LATERAL DISPLACEMENT 0.5"
MODULUS OF SUBGRADE REACTION 10.0 POUNDS PER CUBIC INCH
UNIT WEIGHT OF SOIL 100 POUNDS PER CUBIC FOOT
ANGLE OF INTERNAL FRICTION 25°
COHESION 0 KIPS PER SQUARE FOOT
- SEISMIC DESIGN CRITERIA**
STRUCTURES ARE DESIGNED FOR A SEISMIC ACCELERATION COEFFICIENT = 0.15

CONSTRUCTION GENERAL NOTES

- MATERIALS AND WORKMANSHIP:**
PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CURRENT VERSIONS OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, AASHTO/AWS WELDING CODE D1.5, CONTRACT SPECIAL PROVISIONS, AND AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS". USE AASHTO/AWS D1.1 FOR WELDING NOT COVERED IN AASHTO/AWS D1.5.
- PROVIDE STRUCTURAL STEEL CONFORMING TO THE FOLLOWING:**
COLUMNS, PIPE CHORDS & PIPE BRACING: SEE PUBLICATION 408, SECTION 948.2.
ANGLES, SHAPES, AND PLATES: AASHTO M270, GRADE 36
ASTM A709, GRADE 36
- ALTERNATE PRESS-BREAK MEMBERS:**
ALTERNATE PRESS-BREAK MEMBERS MUST HAVE THE EQUIVALENT STRENGTH OF THE MEMBER THEY ARE REPLACING. EQUIVALENT RADIUS FOR PRESS-BREAK MEMBERS IS MEASURED FROM THE CENTER OF THE MEMBER TO THE MID-POINT OF ANY CHORD OF THE MEMBER. MINIMUM THICKNESS OF PRESS-BREAK MEMBERS TO BE $\frac{3}{16}$ ". PENNDOT SIGN STRUCTURE COMPUTER PROGRAM OR AN APPROVED FINITE ELEMENT ANALYSIS COMPUTER PROGRAM MUST BE RUN TO VERIFY THE ADEQUACY OF PRESS-BREAK MEMBERS FOR STRENGTH AND FATIGUE. ALTERNATE PRESS-BREAK MEMBERS ARE ONLY PERMITTED FOR COLUMNS. PRESS-BREAK MEMBERS ARE NOT PERMITTED FOR CHORDS.
- PROVIDE BOLTS CONFORMING TO THE FOLLOWING:**
ANCHOR BOLTS: ASTM, F1554 GRADE 55 PER PUBLICATION 408 SECTION 1105.02(c)3.
BOLTS: AASHTO M164 (ASTM A325) H.S. BOLTS EXCEPT AS NOTED
- DESIGN SPECIFICATIONS:**
AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", 2001 WITH CURRENT INTERIMS (UNLESS NOTED OTHERWISE); AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1996 WITH INTERIMS THROUGH AND INCLUDING 2000; PENNDOT DESIGN MANUAL - PART 4, AUGUST 1993 EDITION (INCLUDING AUGUST 1995 REVISIONS)
- ALL FILLET WELDS SHOWN ARE MINIMUM SIZE UNLESS NOTED OTHERWISE.

NOTES TO FABRICATOR

- 4-POST 4-CHORD STRUCTURE TYPES AS PRESENTED IN THESE STANDARDS ARE RECOMMENDED TO BE USED TO SUPPORT DYNAMIC/VARIABLE MESSAGE SIGNS (DMS/VMS).
- DESIGN COMPUTATIONS ARE REQUIRED FOR ANY PORTION OF A STRUCTURE FOR WHICH THE INFORMATION IS NOT TAKEN DIRECTLY FROM THE CONTRACT DRAWINGS OR THE DETAILS CONTAINED IN THIS STANDARD. DO NOT VIOLATE CRITERIA USED FOR THE DEVELOPMENT OF THE DESIGN TABLES ON STANDARD DRAWING BD-645M AND THE DETAILS IN THIS STANDARD.

*** LEGEND:**

- AASHTO SIGN SPEC: AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS"
- AASHTO HIGHWAY BRIDGES: AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES"
- DM4: PENNSYLVANIA DEPARTMENT OF TRANSPORTATION, DESIGN MANUAL PART 4, STRUCTURES
- U.N.O.: UNLESS NOTED OTHERWISE
- ACI: AMERICAN CONCRETE INSTITUTE - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE WITH COMMENTARY (ACI 318-99).
- CVN: CHARPY V-NOTCH.

CHANGE 1

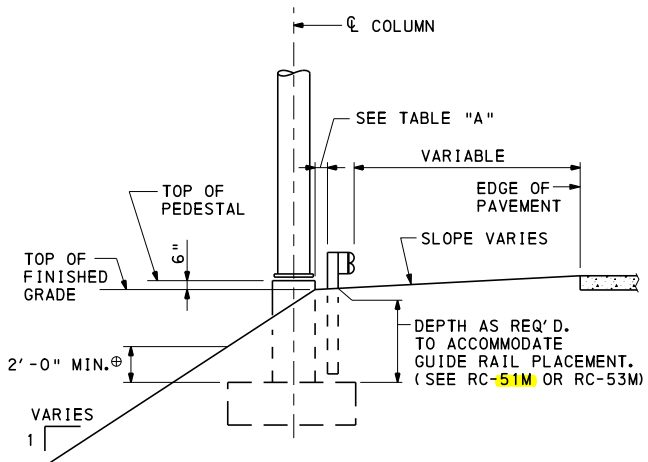
TC-8700C	SPACING CHARTS/DIRECT APPLIED LETTERS, NUMERALS, & ARROWS
TC-8701D	SIGN DETAILS/FREEWAY AND EXPRESSWAY GUIDE SIGNS
TC-8701E	EXTRUDED ALUMINUM CHANNEL SIGN
TC-8701S	FLAT SHEET ALUMINUM SIGNS WITH EXTRUDED ALUMINUM STIFFENERS
TC-8715	SIGN LIGHTING
BC-736M	REINFORCEMENT BAR FABRICATION DETAILS
RC-11M	CLASSIFICATION OF EARTHWORK FOR STRUCTURES
RC-51M	TYPE 31 STRONG POST GUIDE RAIL
RC-53M	TYPE 2 WEAK POST GUIDE RAIL
RC-54M	BARRIER PLACEMENT AT OBSTRUCTIONS
RC-58M	SINGLE FACE CONCRETE BARRIER PLACEMENT AT MEDIAN PIERS

REFERENCE DRAWINGS

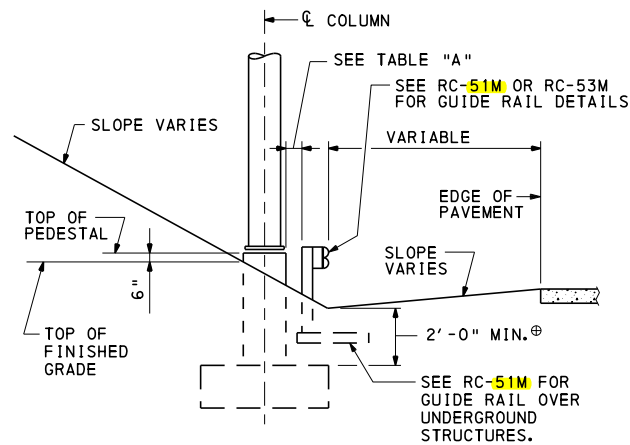
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

OVERHEAD SIGN STRUCTURES
4 POST 4 CHORD TRUSS
SPANS FROM 100' TO 200'
NOTES AND DESIGN CRITERIA

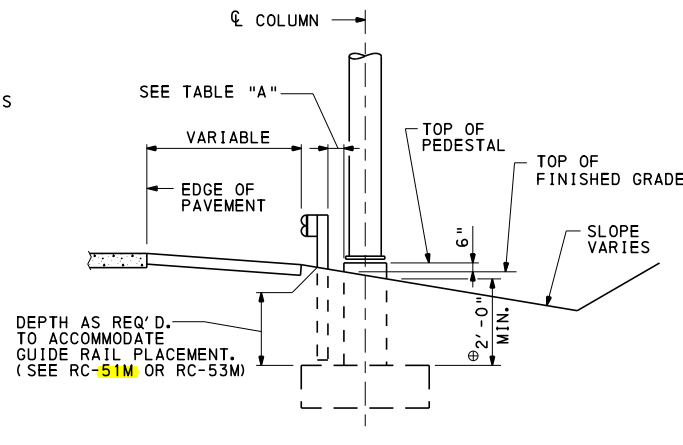
RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Brenda S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 1 OF 10 BC-745M
--	---	--------------------------------



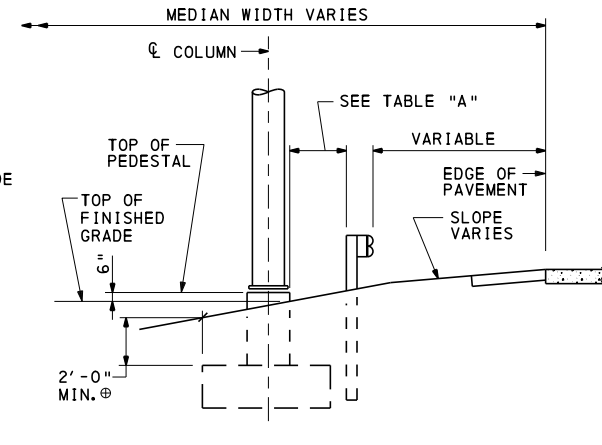
TYPICAL SHOULDER
INSTALLATION IN FILL



TYPICAL SHOULDER
INSTALLATION IN CUT

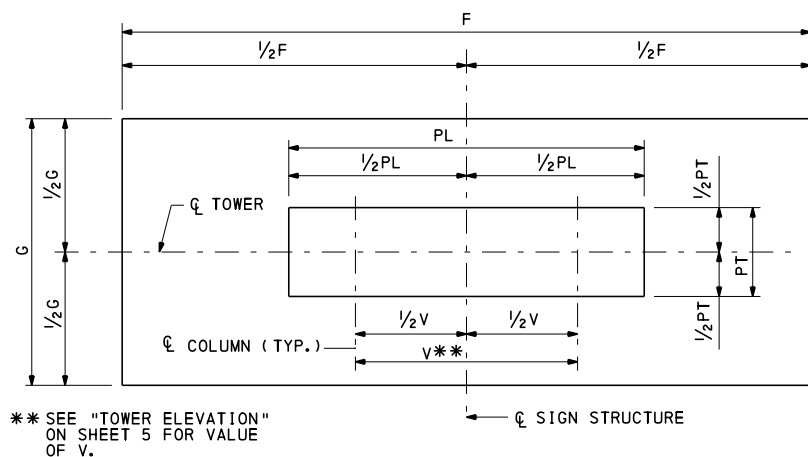


TYPICAL SHOULDER
INSTALLATION IN CUT WITH SWALE



TYPICAL GRADED
MEDIAN INSTALLATION

⊕ FOOTING DESIGN INFORMATION ON THIS SHEET
BASED ON 10 FOOT FILL HEIGHT. DESIGNER
MUST CHECK ADEQUACY FOR FILL HEIGHTS <10'-0" FT.

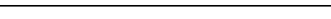


PLAN OF FOUNDATION

PEDESTAL TYPE	PT	PL	CU. YDS. CONC. (▲)	"P" BARS	HORIZONTAL REINFORCEMENT						WEIGHT PER SET * (LBS.)
					#4 BARS TYPE "M"			#4 BARS TYPE "N"			
					LENGTH	A	B	LENGTH	C	NO.	
FP12	2'-9"	9'-9"	0.99	40 - #9	13'-11"	9'-3"	2'-4"	3'-1 1/2"	2'-3"	5	35.0
FP16	3'-3"	10'-3"	1.23	38 - #10	14'-11"	9'-9"	2'-7"	3'-7 1/2"	2'-9"	5	38.0
FP20	3'-9"	11'-0"	1.53	40 - #11	16'-2"	10'-6"	2'-10"	4'-1 1/2"	3'-3"	5	41.4
FP24	4'-0"	11'-9"	1.74	46 - #11	17'-3"	11'-3"	3'-0"	4'-4 1/2"	3'-6"	6	46.6
FP26	4'-3"	12'-3"	1.93	50 - #11	17'-11"	11'-9"	3'-1"	4'-7 1/2"	3'-9"	6	48.5

* ONE SET INCLUDES 2 "M" BARS, 2 "R" BARS AND NO. OF "N" BARS SHOWN IN TABLE.
▲ CUBIC YARDS OF CONCRETE PER 1 FOOT HEIGHT OF PEDESTAL.

TABLE "P"			
BAR SIZE	WEIGHT LBS./FT.	A	LENGTH
9	3.400	1'-3"	K + 2'-8"
10	4.303	1'-5"	K + 2'-10"
11	5.313	1'-7"	K + 3'-0"



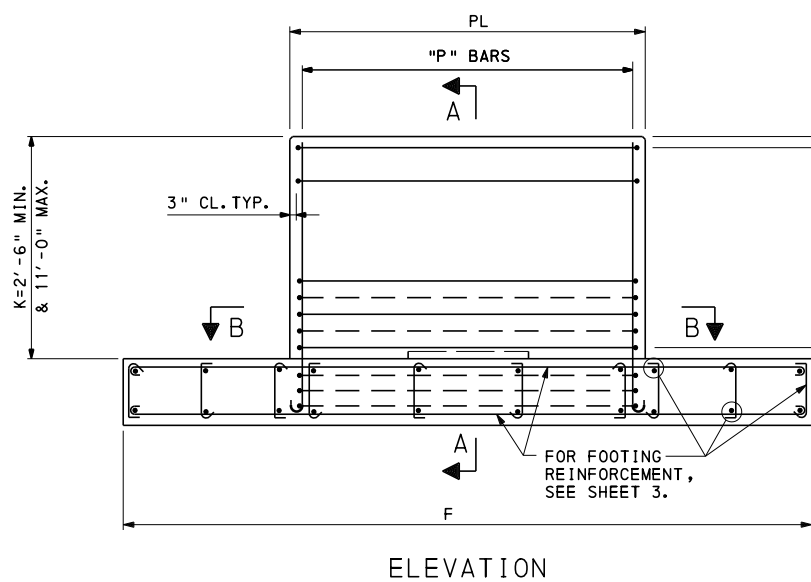
PROVIDE HOOK ON ALL "P" BARS. "P" BARS MAY BE DOWELED TO FOOTING USING CLASS C MIN. LAP SPLICE, HOWEVER NO COMPENSATION WILL BE ALLOWED FOR ADDITIONAL STEEL INVOLVED.

TYPE OF GUIDE RAIL	TABLE "A"	
	MINIMUM †	UNOBSTRUCTED DISTANCE
31-SCC	1'-6"	
31-SC	3'-0"	
31-S	4'-0"	
2-WCC	5'-6"	
2-WC	6'-6"	
2-W	9'-0"	
MEDIAN BARRIER	0'-0"	

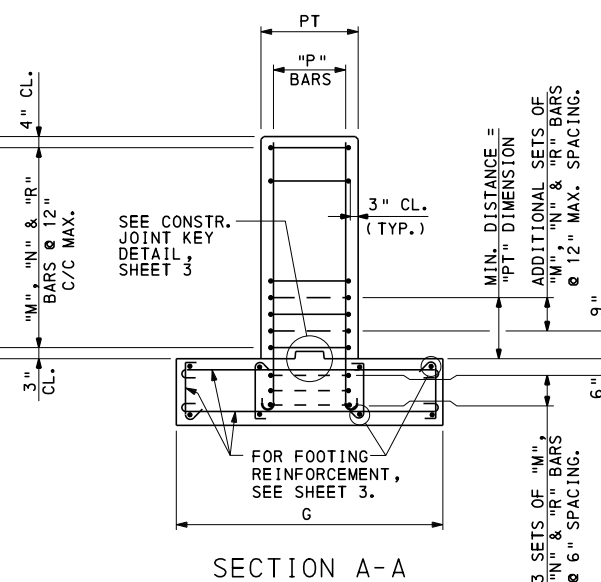
† FROM BACK OF GUIDE RAIL POST TO FACE OF PEDESTAL.

BAR TYPE "M"

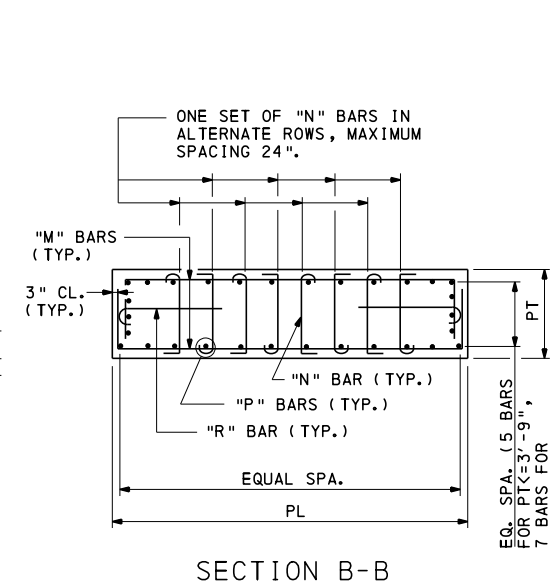
BAR TYPES "N" & "R"



ELEVATION



SECTION A-A



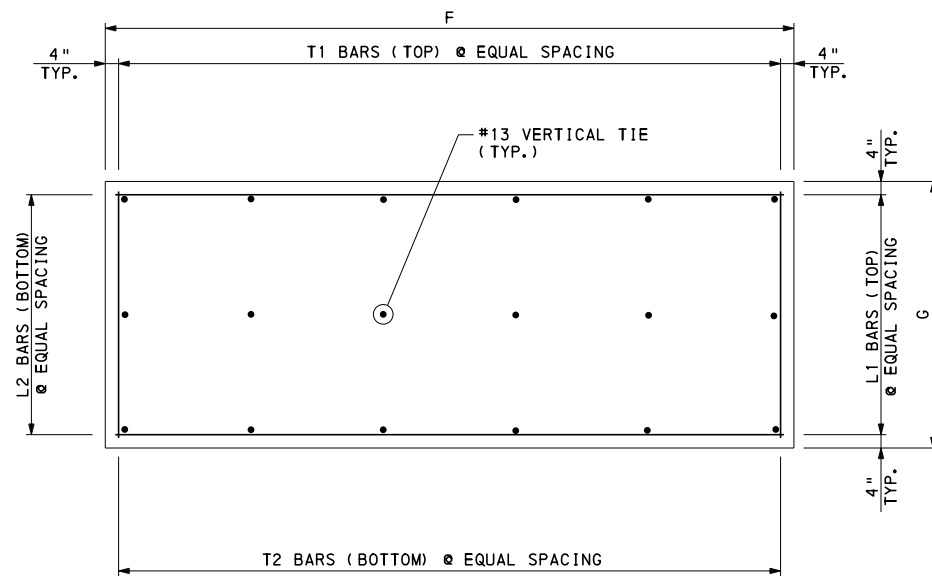
SECTION B-B

NOTES:

- PEDESTAL TYPE AND FOOTING TYPE INDICATED ON CONTRACT DRAWINGS OBTAINED FROM BD-645M, SHEETS 5, 6, AND 7.
- FOR FOOTING SIZES AND REINFORCEMENT, SEE SHEET 3.
- SEE STANDARD DRAWING BC-736M FOR REINFORCING BAR FABRICATION DETAILS.
- SEE STANDARD DRAWING RC-11M FOR LIMITS OF CLASS 3 EXCAVATION.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES
4 POST 4 CHORD TRUSS
SPANS FROM 100' TO 200'
FOUNDATION DETAILS



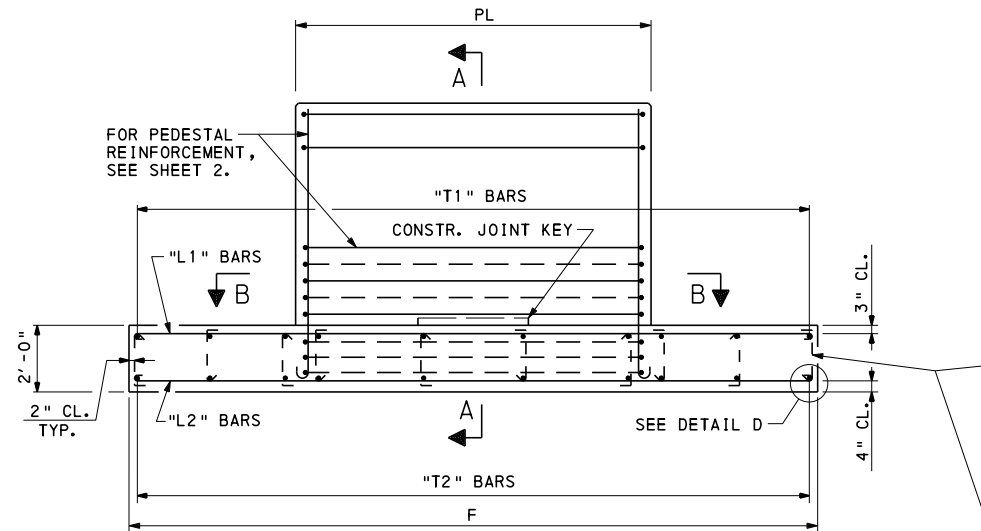
PLAN VIEW - FOOTING REINFORCEMENT

TYPE	FOOTING DIMENSION		CU. YDS. CONC.	FOOTING REINFORCEMENT									
	G	F		"L" BARS				"T" BARS					
				L1 NO.	L1 SIZE	L2 NO.	L2 SIZE	LENGTH	T1 NO.	T1 SIZE	T2 NO.	T2 SIZE	LENGTH
716	7'-0"	16'-0"	8.3	11	5	8	5	15'-6"	14	4	12	5	6'-6"
717	7'-0"	17'-0"	8.8	14	5	9	5	16'-6"	16	4	14	5	6'-6"
718	7'-0"	18'-0"	9.3	12	6	11	5	17'-6"	17	4	14	5	6'-6"
720	7'-0"	20'-0"	10.4	13	6	13	5	19'-6"	20	4	15	5	6'-6"
818	8'-0"	18'-0"	10.7	13	5	10	5	17'-6"	20	4	14	5	7'-6"
819	8'-0"	19'-0"	11.3	15	5	13	5	18'-6"	24	4	14	5	7'-6"
820	8'-0"	20'-0"	11.9	15	7	13	6	19'-6"	29	4	15	5	7'-6"
821	8'-0"	21'-0"	12.4	13	8	15	6	20'-6"	31	4	15	5	7'-6"
822	8'-0"	22'-0"	13.0	16	7	15	6	21'-6"	32	4	16	5	7'-6"
921	9'-0"	21'-0"	14.0	16	6	17	5	20'-6"	29	4	15	5	8'-6"
922	9'-0"	22'-0"	14.7	15	8	16	6	21'-6"	40	4	16	5	8'-6"
923	9'-0"	23'-0"	15.3	15	8	15	7	22'-6"	42	4	17	6	8'-6"
924	9'-0"	24'-0"	16.0	16	8	16	7	23'-6"	47	4	18	5	8'-6"
925	9'-0"	25'-0"	16.7	17	8	18	7	24'-6"	50	4	19	5	8'-6"
926	9'-0"	26'-0"	17.3	16	8	18	7	25'-6"	48	4	21	5	8'-6"
1016	10'-0"	16'-0"	11.9	12	4	8	5	15'-6"	22	5	14	5	9'-6"
1024	10'-0"	24'-0"	17.8	17	8	17	7	23'-6"	48	4	24	5	9'-6"
1025	10'-0"	25'-0"	18.5	17	8	18	7	24'-6"	50	4	23	5	9'-6"
1026	10'-0"	26'-0"	19.3	18	8	19	7	25'-6"	47	4	21	5	9'-6"
1027	10'-0"	27'-0"	20.0	19	8	17	8	26'-6"	52	4	23	5	9'-6"
1028	10'-0"	28'-0"	20.7	19	8	17	8	27'-6"	54	4	24	5	9'-6"
1117	11'-0"	17'-0"	13.9	21	5	13	5	16'-6"	28	5	14	5	10'-6"

FOOTING TABLE NOTES:

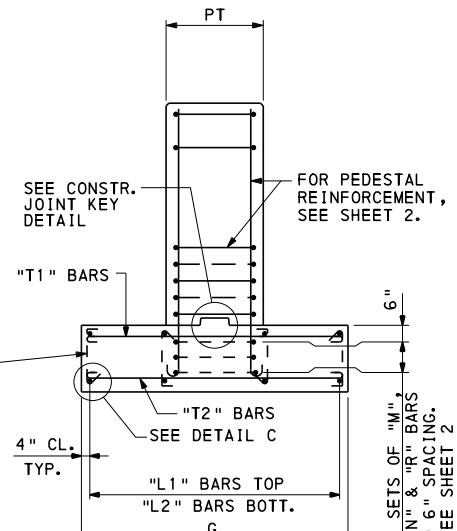
- PROVIDE 90° OR 180° HOOKS ON ALL "L" AND "T" BARS.
- LENGTH FOR "L" AND "T" BARS DOES NOT INCLUDE 90° OR 180° HOOK LENGTHS.
- FOR ADDITIONAL FOUNDATION NOTES, SEE SHEET 2.

TYPE	FOOTING DIMENSION		CU. YDS. CONC.	FOOTING REINFORCEMENT									
	G	F		"L" BARS				"T" BARS					
				L1 NO.	L1 SIZE	L2 NO.	L2 SIZE	LENGTH	T1 NO.	T1 SIZE	T2 NO.	T2 SIZE	LENGTH
1118	11'-0"	18'-0"	14.7	19	6	17	5	17'-6"	33	5	20	5	10'-6"
1120	11'-0"	20'-0"	16.3	20	7	17	6	19'-6"	39	5	22	5	10'-6"
1125	11'-0"	25'-0"	20.4	18	8	18	7	24'-6"	51	5	31	5	10'-6"
1127	11'-0"	27'-0"	22.0	18	8	20	7	26'-6"	42	5	25	5	10'-6"
1129	11'-0"	29'-0"	23.6	20	9	19	8	28'-6"	46	5	28	5	10'-6"
1130	11'-0"	30'-0"	24.4	19	9	19	8	29'-6"	47	5	30	5	10'-6"
1219	12'-0"	19'-0"	16.9	23	5	15	5	18'-6"	29	5	14	5	11'-6"
1221	12'-0"	21'-0"	18.7	19	8	19	6	20'-6"	33	6	29	5	11'-6"
1222	12'-0"	22'-0"	19.6	20	8	23	6	21'-6"	39	6	29	5	11'-6"
1223	12'-0"	23'-0"	20.4	20	8	23	6	22'-6"	40	6	37	5	11'-6"
1323	13'-0"	23'-0"	22.1	26	7	21	6	22'-6"	46	5	23	5	12'-6"
1324	13'-0"	24'-0"	23.1	21	8	20	7	23'-6"	43	6	39	5	12'-6"
1325	13'-0"	25'-0"	24.1	21	8	24	7	24'-6"	42	6	44	5	12'-6"
1426	14'-0"	26'-0"	27.0	23	8	27	7	25'-6"	39	7	45	6	13'-6"
1427	14'-0"	27'-0"	28.0	23	8	23	8	26'-6"	44	7	42	6	13'-6"
1429	14'-0"	29'-0"	30.1	24	9	24	8	28'-6"	47	7	52	6	13'-6"
1528	15'-0"	28'-0"	31.1	27	8	26	8	27'-6"	53	7	42	7	14'-6"
1530	15'-0"	30'-0"	33.3	27	9	26	8	29'-6"	59	7	50	7	14'-6"
1531	15'-0"	31'-0"	34.4	30	9	27	8	30'-6"	56	7	58	6	14'-6"
1533	15'-0"	33'-0"	36.7	30	10	29	9	32'-6"	62	7	52	7	14'-6"
1630	16'-0"	30'-0"	35.6	29	9	28	8	29'-6"	51	8	51	7	15'-6"

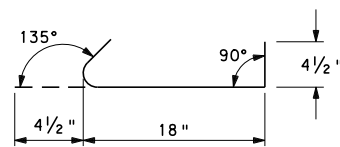


ELEVATION FOR SECTION B-B, SEE SHEET 2.

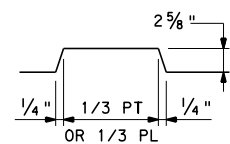
#4 VERTICAL TIES @ 48" (MAX.) GRID PATTERN W/135° HOOKS. ALTERNATE 135° HOOK UP AND DOWN BETWEEN THE TOP AND BOTTOM MATS OF REINFORCING.



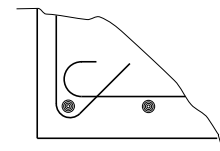
SECTION A-A



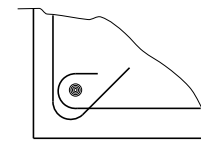
BAR TYPE #4 VERTICAL TIE



CONSTRUCTION JOINT KEY DETAIL SECTION A-A SHOWN, ELEVATION SIMILAR



DETAIL C



DETAIL D

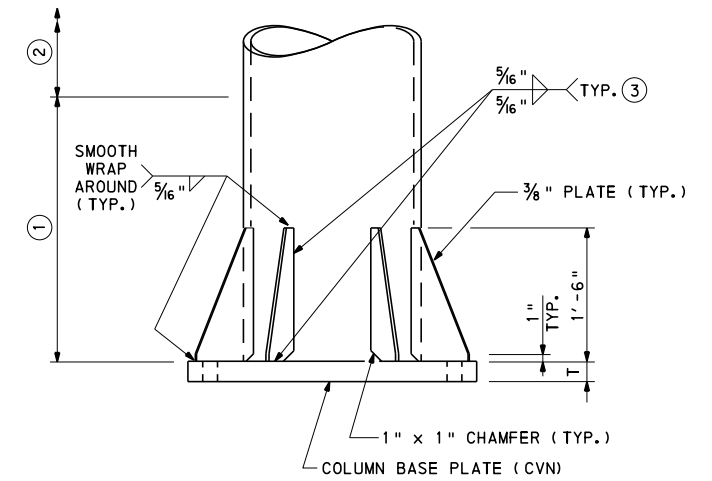
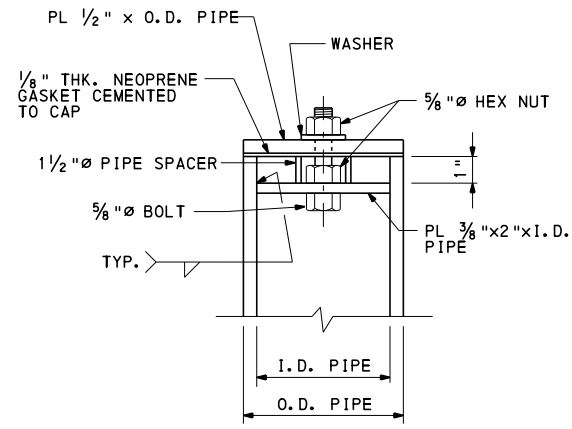
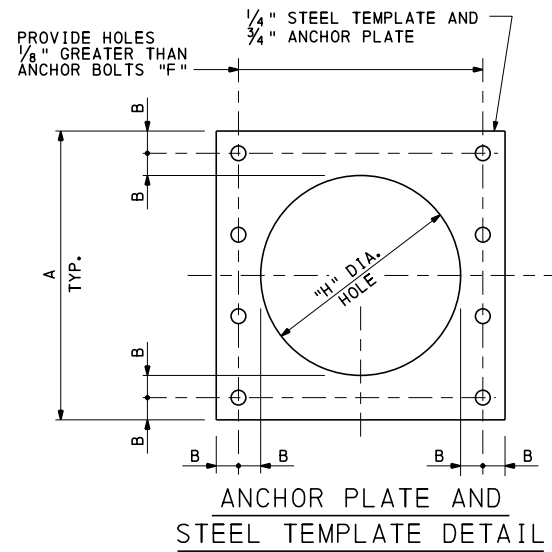
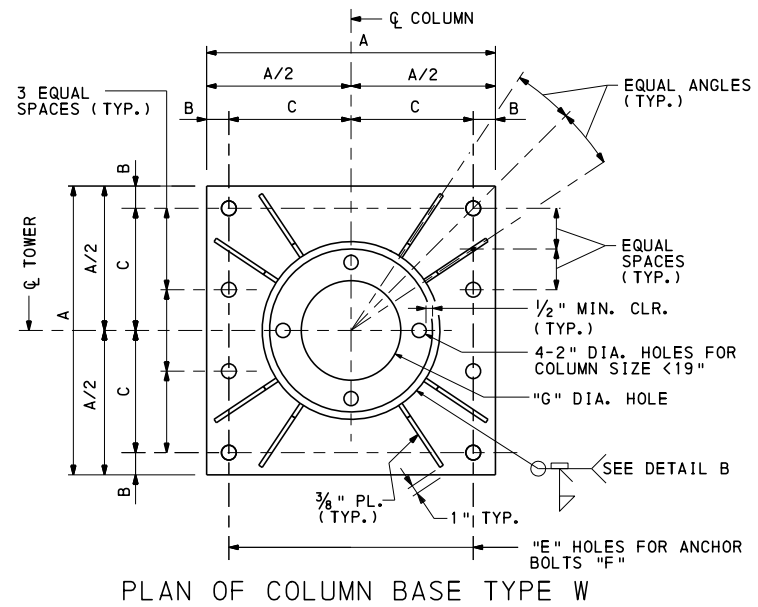
NOTES:

- PEDESTAL TYPE AND FOOTING TYPE INDICATED ON CONTRACT DRAWINGS OBTAINED FROM BD-645M, SHEETS 5, 6, AND 7.
- FOR INSTALLATION DETAILS, SEE SHEET 2.
- FOOTING DESIGN INFORMATION ON THIS SHEET BASED ON 10 FOOT FILL HEIGHT. DESIGNER MUST CHECK ADEQUACY FOR FILL HEIGHTS < 10 FT.
- SEE STANDARD DRAWING BC-736M FOR REINFORCING BAR FABRICATION DETAILS.

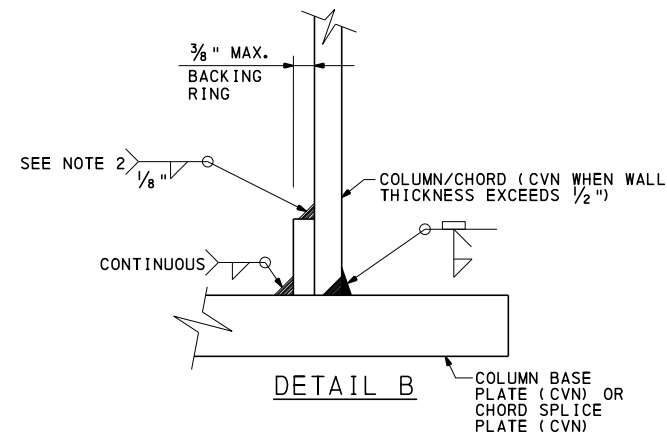
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES
4 POST 4 CHORD TRUSS
SPANS FROM 100' TO 200'
FOUNDATION DETAILS

RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Brenda S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 3 OF 10 BC-745M
--	---	-------------------------



- ① FOR PRESS BREAK COLUMN, 2'-6" LENGTH OF SEAM WELD TO BE COMPLETE PENETRATION GROOVE WELD.
- ② SEAM WELD TO HAVE 60% MIN. PENETRATION.
- ③ TERMINATE WELDS 1/4" SHORT OF STIFFENER CHAMFER.

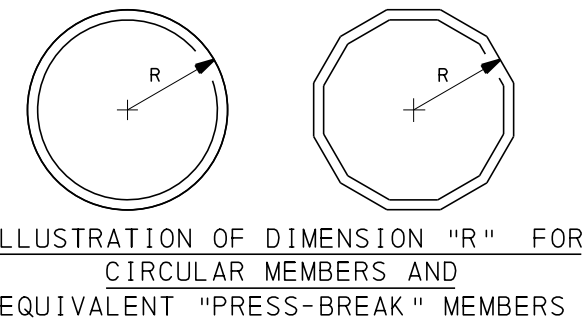
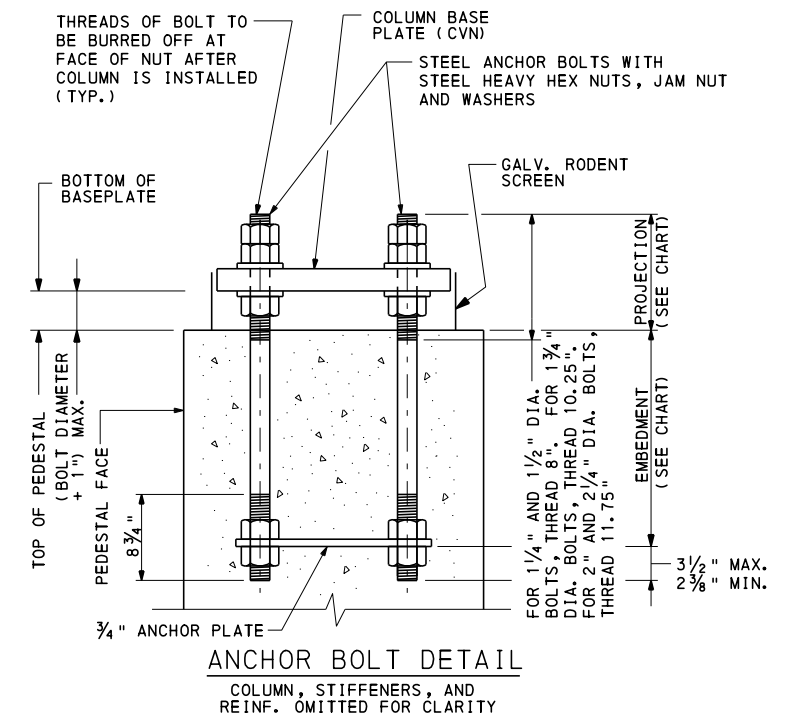


DETAIL B NOTES:

1. BACKING RING MUST BE FITTED/SIZED TO THE PIPE COLUMN AND CONTINUOUSLY FILLET WELDED TO THE BASE PLATE BEFORE THE FULL PENETRATION GROOVE WELD IS MADE. BACKING RING MUST BE FABRICATED AS A CONTINUOUS RING.
2. FOR COLUMNS AND CHORDS LESS THAN 19", THIS FILLET WELD IS NOT REQUIRED BUT SHOP IS TO APPLY SILICON CAULKING TO THIS LOCATION AFTER POLE ASSEMBLY IS GALVANIZED.

NOTES:

- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE GALVANIZED AFTER THREADING.
- USE STEEL TEMPLATE TO SET ANCHOR BOLTS IN ACCORDANCE WITH PUBLICATION 408, SECTION 948.3(b).
- STEEL TEMPLATE AND ANCHOR PLATE TO BE PROVIDED BY SIGN FABRICATOR.
- TEMPLATE PLATE WITH NUTS ON BOTH SIDES SHALL BE USED TO MAINTAIN THE SPACING AND ALIGNMENT OF ANCHOR BOLTS.
- FOR PIPE CAP DETAILS SEE SHEET 5.
- SEAL BASE PLATE TO FOUNDATION GAP WITH GALVANIZED STEEL SCREEN, 1/2" BY 1/2" MESH AND 0.063" DIAMETER WIRES. SCREEN IS TO PREVENT ENTRY OF RODENTS WHILE PERMITTING DRAINAGE. SCREEN IS TO BE REMOVABLE AND ATTACHED TO BASEPLATE WITH STAINLESS STEEL HARDWARE.



"PRESS-BREAK" NOTE:

ALTERNATE "PRESS-BREAK" MEMBERS ARE PERMITTED FOR COLUMNS. "PRESS-BREAK" MEMBERS MUST HAVE THE EQUIVALENT STRENGTH AND FATIGUE RESISTANCE OF THE CIRCULAR MEMBER BEING REPLACED. A MINIMUM NUMBER OF 12 BREAKS IS REQUIRED. A CHANGE IN STEEL MATERIAL OR WALL THICKNESS REQUIRES A SPECIAL DESIGN TO BE SUBMITTED FOR REVIEW. CONTRACTOR MUST SUBMIT DESIGN CALCULATIONS AND DESIGN DRAWINGS FOR REVIEW AND ACCEPTANCE FOR LONGITUDINAL SEAM WELDS INDICATING TYPE OF WELD, WELD PENETRATION, EFFECTIVE DEPTH AND LENGTH OF EACH WELD TYPE. LONGITUDINAL SEAM WELDS SHALL HAVE 60 PERCENT MINIMUM PENETRATION, EXCEPT LONGITUDINAL SEAM WELDS WITHIN 6" OF THE ENDS OF THE PRESS BREAK MEMBER OR LENGTH SHOWN ON DETAILS SHALL BE COMPLETE PENETRATION WELDS. COMPLETE PENETRATION LONGITUDINAL SEAM WELDS MUST BE 100% RADIOGRAPHICALLY INSPECTED. FOR THE COLUMN CONNECTION TO BASE PLATE, AND AT COLUMN CONNECTION SPLICE PLATE LOCATIONS, WELD SHALL START AND STOP IN THE MIDDLE THIRD REGION OF FLAT SECTIONS BETWEEN BREAK POINTS.

COLUMN BASES												
COLUMN NOMINAL SIZE X WALL THK. *	BASE TYPE	A	B	C	E	F	G	H	T	WASHER SIZE	PROJECTION	EMBEDMENT
10"x.365"	W	1'-8"	2 1/2"	7 1/2"	1 1/2"D	1 1/4"D	3 1/4"	10"	2"	3 1/2"Dx3/8"	7 3/4"	2'-1"
12"x.375"	W	1'-10"	2 1/2"	8 1/2"	1 3/4"D	1 1/2"D	5 1/4"	1'-0"	2"	3 1/2"Dx3/8"	8 1/2"	2'-6"
14"x.375"	W	2'-0"	2 1/2"	9 1/2"	1 3/4"D	1 1/2"D	6 1/2"	1'-2"	2"	3 1/2"Dx3/8"	8 1/2"	2'-6"
16"x.375"	W	2'-2"	2 1/2"	10 1/2"	2"D	1 3/4"D	8"	1'-4"	2"	4"Dx3/8"	9 1/4"	2'-11"
18"x.375"	W	2'-4"	2 1/2"	11 1/2"	2"D	1 3/4"D	9 1/4"	1'-6"	2"	4"Dx3/8"	9 1/4"	2'-11"
20"x.375"	W	2'-9"	3"	1'-0 1/2"	2 1/4"D	2"D	1'-5"	1'-7"	3"	5"Dx3/8"	11"	3'-4"
24"x.375"	W	2'-11"	3"	1'-2 1/2"	2 1/4"D	2"D	1'-6"	1'-11"	3"	5"Dx3/8"	11"	3'-4"
24"x.500"	W	3'-0"	3 1/2"	1'-2 1/2"	2 1/2"D	2 1/4"D	1'-6"	1'-10"	3"	5"Dx3/8"	11 3/4"	3'-9"

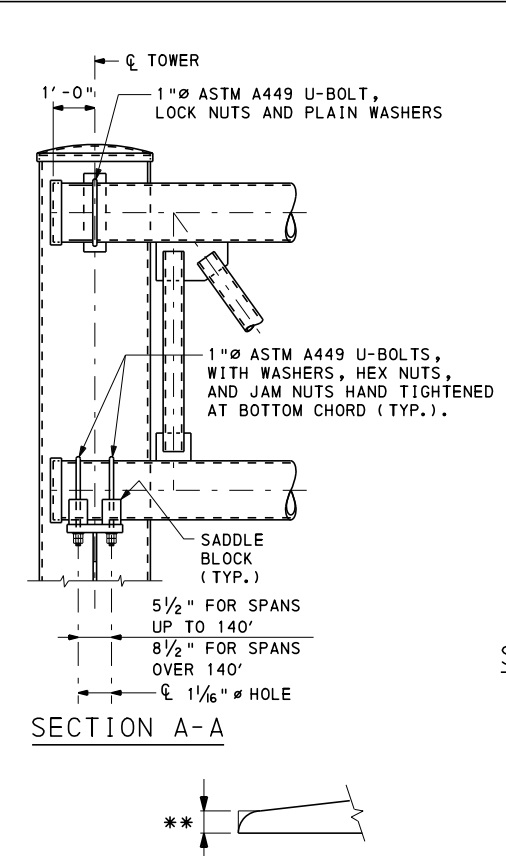
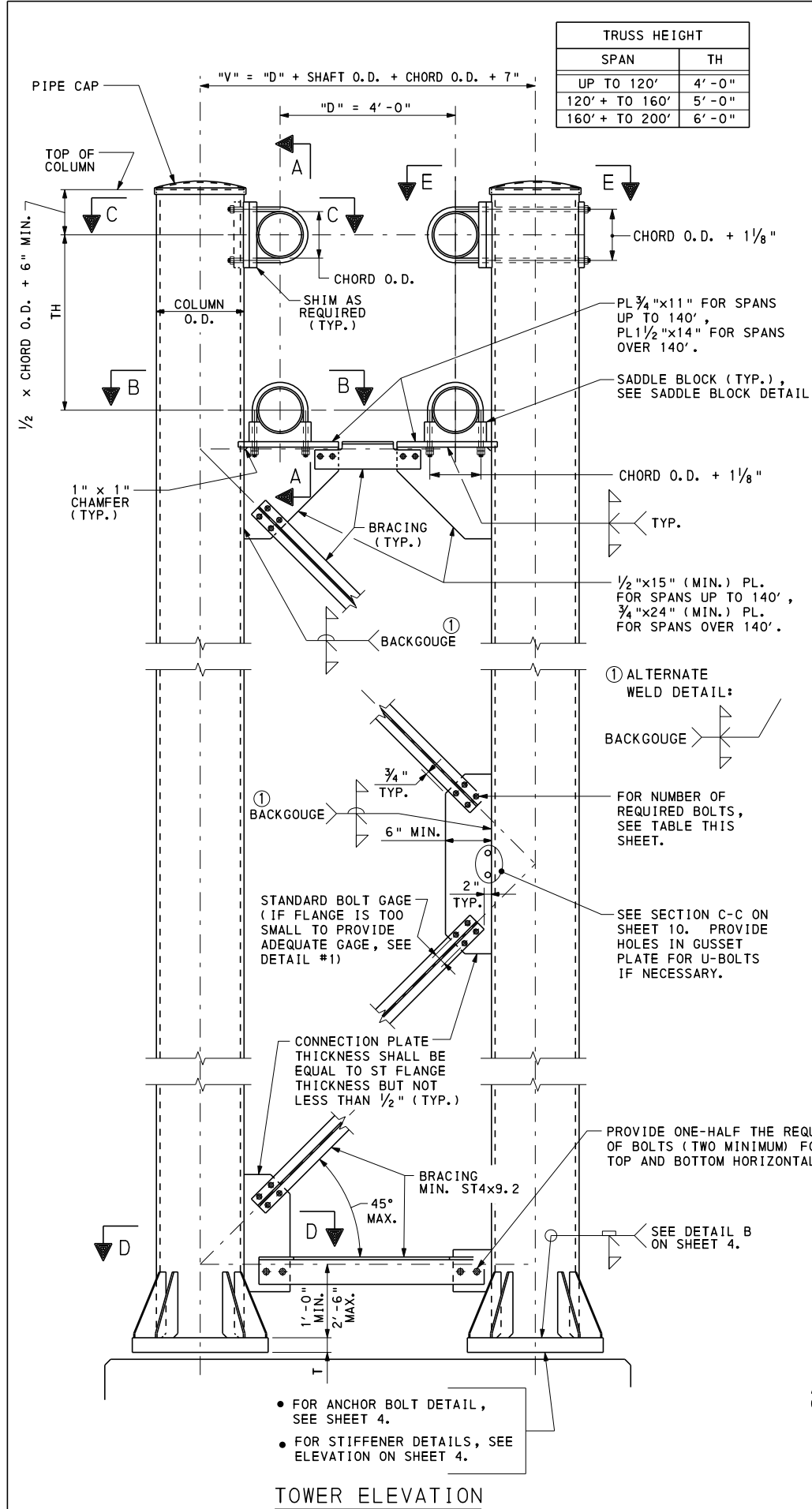
NOTE: D DENOTES DIAMETER
* CVN REQUIRED FOR WALL THICKNESSES EXCEEDING 1/2" (.500").

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

OVERHEAD SIGN STRUCTURES

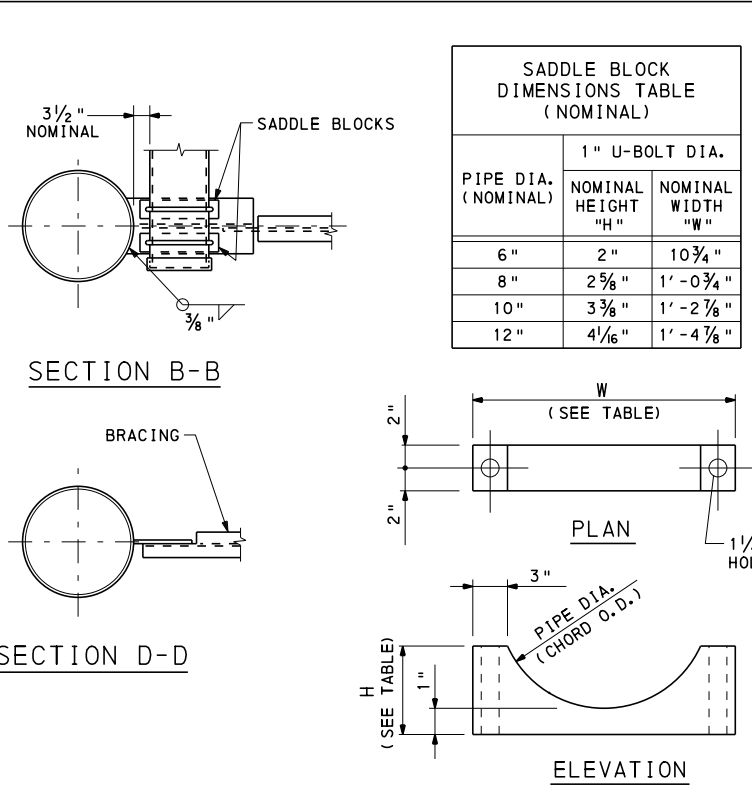
4 POST 4 CHORD TRUSS
SPANS FROM 100' TO 200'

COLUMN BASE DETAILS

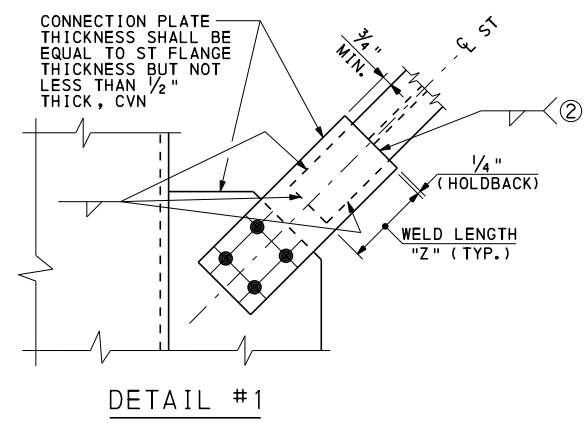
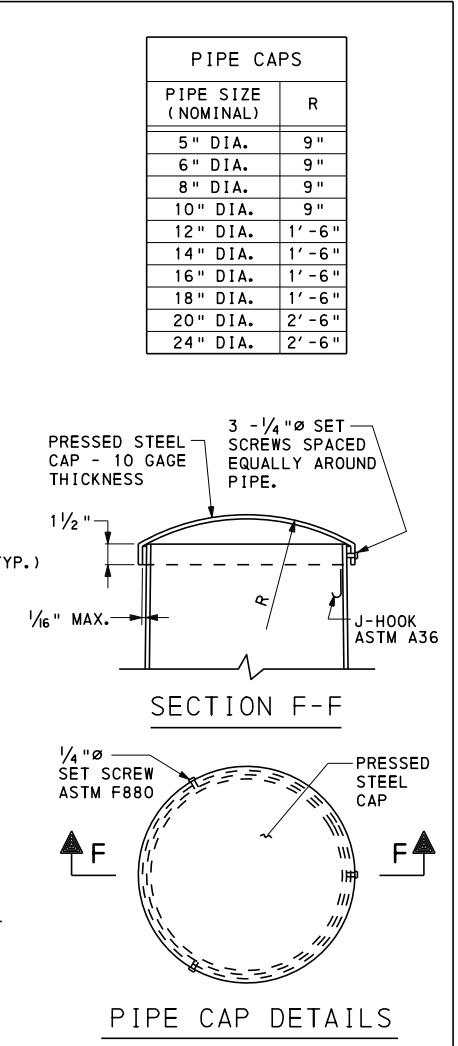


** - INDICATES THAT WELD SIZE IS EQUAL TO BASE METAL THICKNESS AT TOE OF ST MEMBER

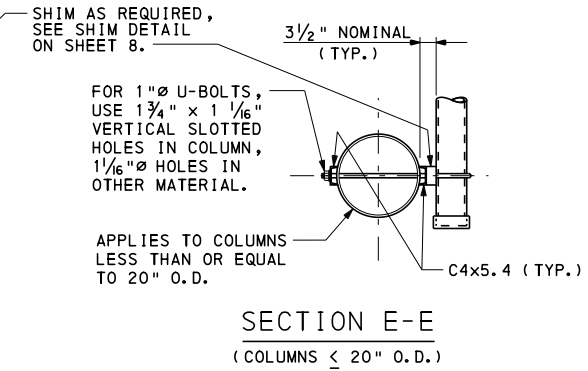
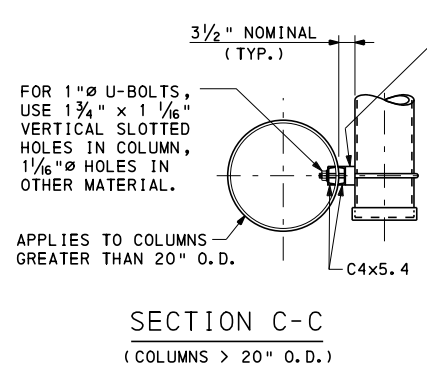
NUMBER OF REQUIRED BOLTS AND WELD LENGTH "Z" FOR TOWER BRACING CONNECTIONS				
MEMBER	NO. OF BOLTS	BOLT DIA.	WELD SIZE	MIN. LENGTH "Z"
ST2x3.85	2	7/8"	**	4"
ST2x4.75	2	7/8"	**	4"
ST2.5x5	2	7/8"	**	4"
ST3x6.25	4	7/8"	**	4"
ST3x8.625	4	7/8"	**	4"
ST4x9.2	4	7/8"	**	4"
ST4x11.5	6	7/8"	**	5"
ST5x12.7	6	7/8"	**	4"
ST5x17.5	8	7/8"	**	5"
ST6x15.9	8	7/8"	**	4"
ST6x17.5	8	7/8"	**	4"
ST6x20.4	8	7/8"	**	4"
ST6x25	8	1"	**	5"
ST7.5x21.45	8	1"	**	5"
ST7.5x25	8	1"	**	5"



SADDLE BLOCK NOTE:
4" THICK PLATE, MATERIAL SHALL BE ASTM A36, GALVANIZED PER ASTM A123.



- NOTES:**
- FOR GENERAL NOTES, SEE SHEET 1.
 - MEMBER SIZES INDICATED ON CONTRACT DRAWINGS OBTAINED FROM BD-645M SHEETS 5, 6, AND 7.
 - FOR ANCHOR BOLT DETAILS, SEE SHEET 4.
 - FOR ANCHOR PLATE AND STEEL TEMPLATE DETAILS, SEE SHEET 4.
 - FOR ALTERNATE PIPE CAP DETAIL, SEE SHEET 4.
 - TO PREVENT INTERSECTING FILLET WELDS ON OPPOSITE SIDES OF A COMMON PLANE, PROVIDE A WELD 'HOLDBACK' AT THE EDGE OF THE GUSSET PLATE IN THE BRACING MEMBERS EQUAL TO 1/4". ENSURE MINIMUM TOTAL WELD LENGTHS ARE ACHIEVED.



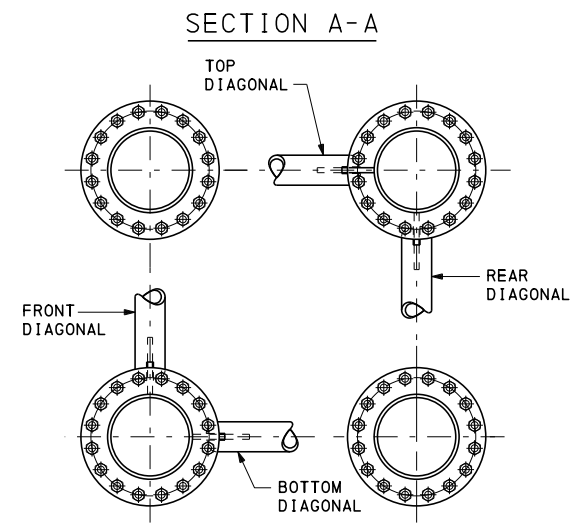
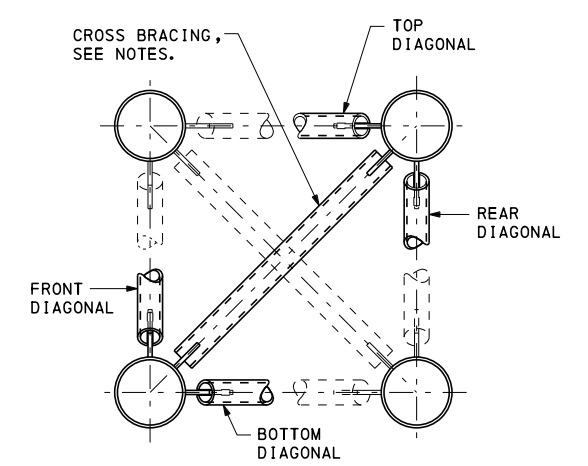
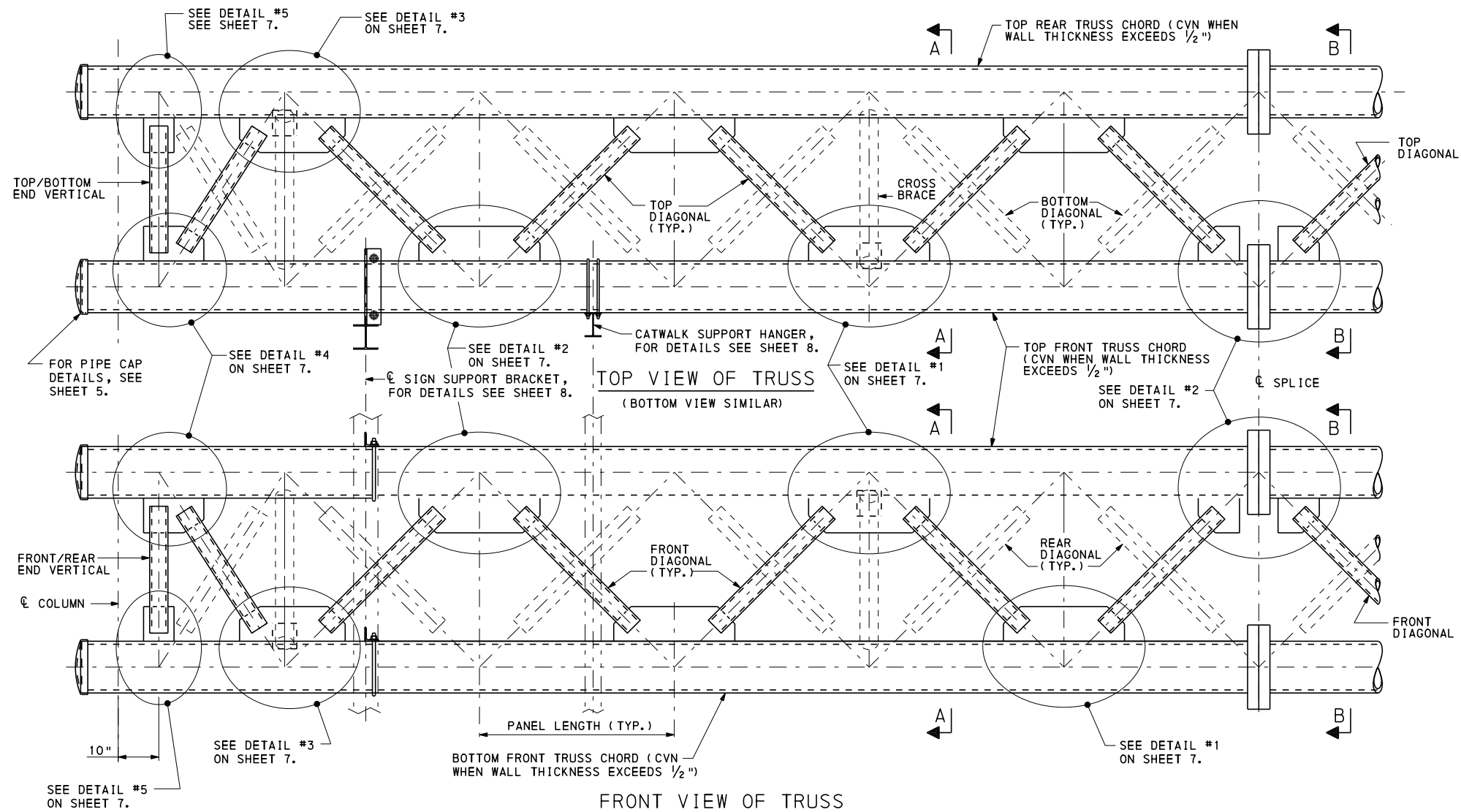
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

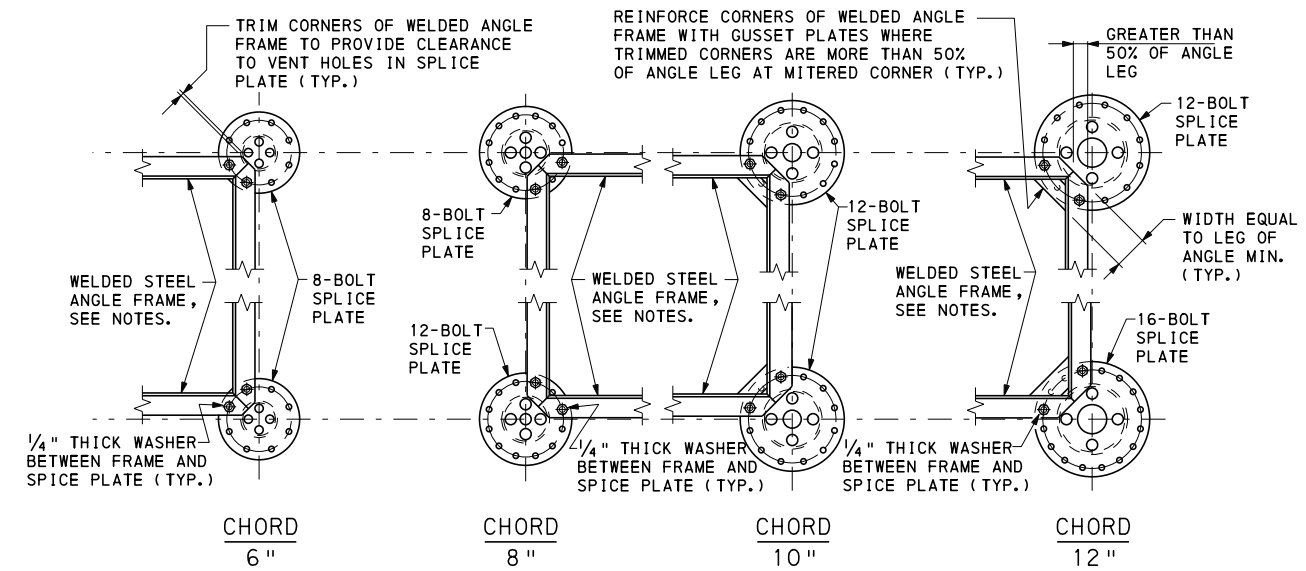
4 POST 4 CHORD TRUSS
SPANS FROM 100' TO 200'

COLUMN DETAILS

RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Brenda Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 5 OF 10 BC-745M
--	--	--------------------------------



- NOTES:**
- FOR GENERAL NOTES, SEE SHEET 1.
 - MEMBER SIZES INDICATED ON CONTRACT DRAWINGS OBTAINED FROM BD-645M SHEETS 5-7.
 - ONE OR MORE SPLICES IN THE TRUSS MAY BE ADDED OR ELIMINATED AT THE OPTION OF THE FABRICATOR. IN CASE OF THE ADDITION OR ELIMINATION OF SPLICES, THE HEAVIER CHORD MATERIAL MUST BE EXTENDED TOWARD THE LIGHTER CHORD MATERIAL TO THE DESIRED SPLICE LOCATION.
 - TEMPORARY END FRAME TO BE USED TO PROVIDE ADDITIONAL SUPPORT TO ENDS OF TRUSS CHORDS DURING FABRICATION AND GALVANIZING PROCESSES. REMOVE AND REPAIR GALVANIZING AT POINTS OF CONTACT PRIOR TO TRUSS ASSEMBLY AND ERECTION. TEMPORARY FRAME IS NOT PART OF THE STRUCTURE AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR.
 - TRUSSES SHALL BE FABRICATED WITH CAMBER AT THE CENTER OF THE SPAN EQUAL TO THE VALUE GIVEN BY THE CAMBER DIAGRAM ON THE CONTRACT DRAWING. ALL TRUSSES SHALL BE ASSEMBLED IN THE SHOP IN A NO LOAD CONDITION TO ENSURE FIT AT SPLICES AND TO CHECK CAMBER.
 - CROSS BRACING - ALTERNATING IN DIRECTION AT MAXIMUM SPACING OF 3 PANEL LENGTHS, SHALL NOT BE PLACED AT END VERTICALS NOR AT SPLICE POINTS.



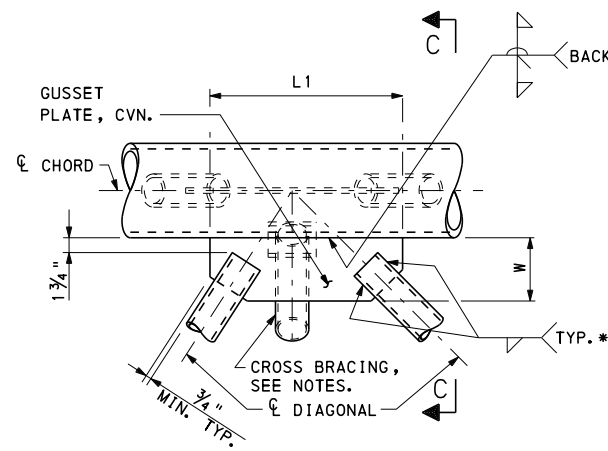
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

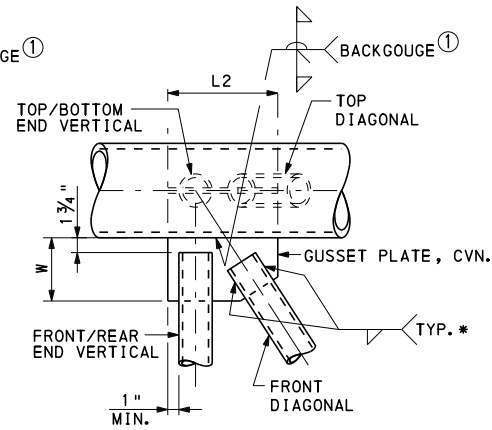
4 POST 4 CHORD TRUSS
 SPANS FROM 100' TO 200'

TRUSS DETAILS

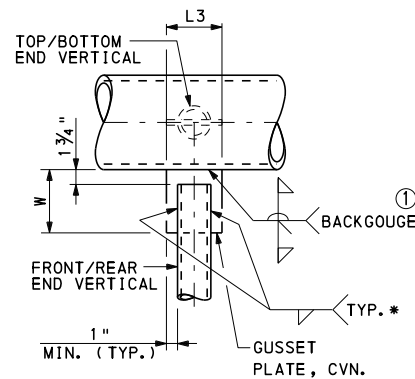
RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Brenda S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 6 OF 10 BC-745M
--	---	--------------------------------



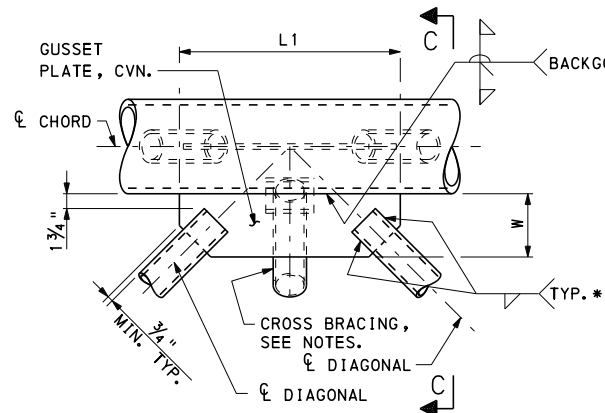
DETAIL #3



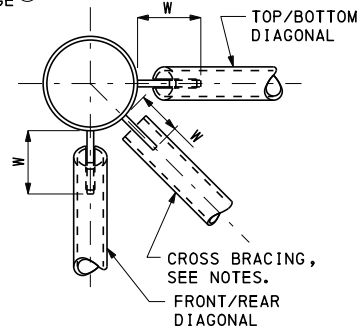
DETAIL #4



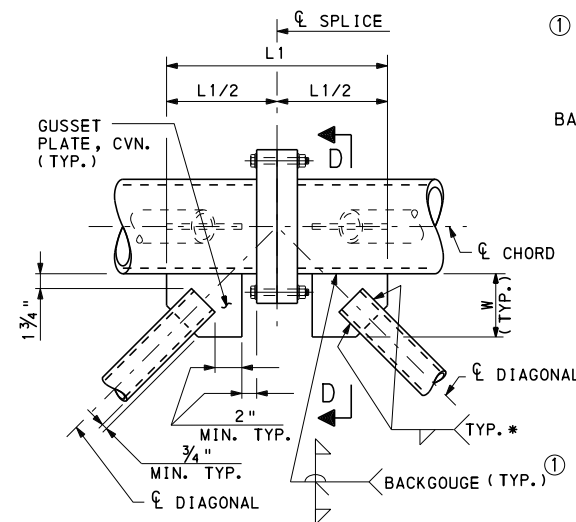
DETAIL #5



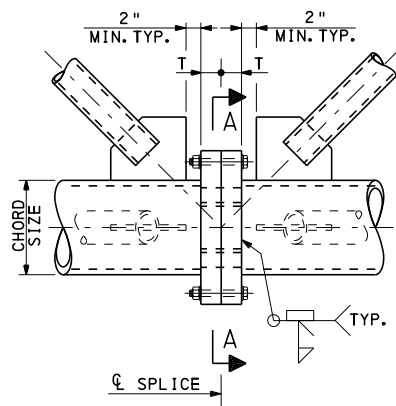
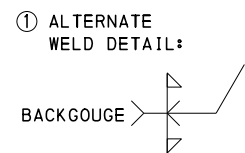
DETAIL #1



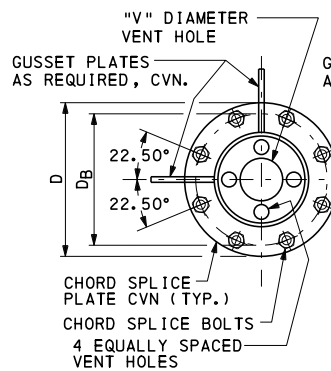
SECTION C-C



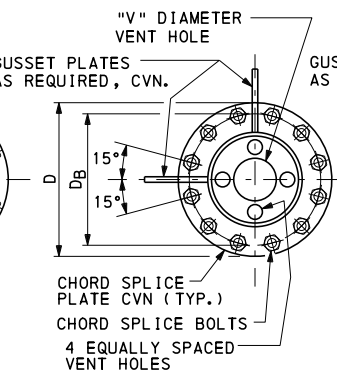
DETAIL #2



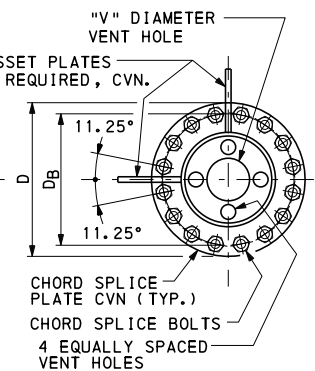
ELEVATION



SECTION A-A
(8-BOLT)

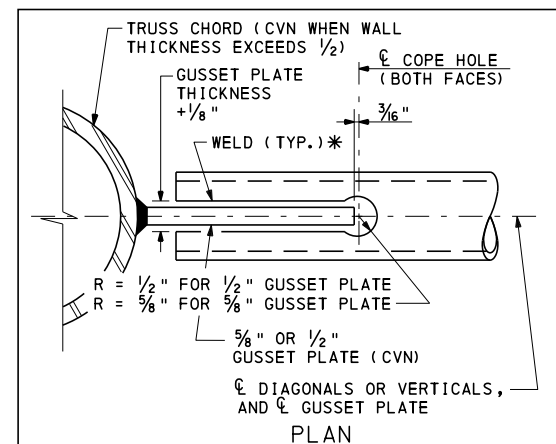


SECTION A-A
(12-BOLT)



SECTION A-A
(16-BOLT)

CHORD SPLICE DETAILS



COPE HOLE DETAIL (TYP.)

* PROVIDE A WELD 'HOLDBACK' AT THE EDGE OF THE GUSSET PLATE IN THE BRACING MEMBERS EQUAL TO THE MINIMUM WELD SIZE REQUIRED.

CHORD SPLICE					
CHORD NOMINAL SIZE X WALL THK. ▲	D	D _B	BOLTS	T	V
6"x. 280"	1'-2 5/8"	11 5/8"	8- 7/8" Ø	2"	0
8"x. 322"	1'-4 5/8"	1'-1 5/8"	8- 7/8" Ø	2 1/4"	2"
8"x. 500"	1'-4 5/8"	1'-1 5/8"	12- 1/8" Ø	2 3/4"	2"
10"x. 365"	1'-6 3/4"	1'-3 3/4"	12- 1/8" Ø	2 3/8"	3 1/4"
12"x. 375"	1'-8 3/4"	1'-5 3/4"	16- 1/8" Ø	2 1/2"	5 1/4"
12"x. 500"	1'-9 3/4"	1'-5 3/4"	12- 1 1/8" Ø	2 3/4"	5 1/4"
12"x. 562"	1'-10 1/4"	1'-5 3/4"	12- 1 1/4" Ø	3"	5 1/4"
12"x. 688"	1'-10 3/4"	1'-5 3/4"	12- 1 3/8" Ø	3 1/4"	5 1/4"
12"x. 844"	1'-11 1/4"	1'-5 3/4"	12- 1 1/2" Ø	3 1/2"	5 1/4"

NOTE: WHERE LARGER CHORD SIZE SPLICES TO SMALLER CHORD SIZE, USE SPLICE AS SHOWN FOR SMALLER CHORD.

▲ CVN REQUIRED FOR WALL THICKNESSES EXCEEDING 1/2" (0.500").

TRUSS GUSSET PLATE TABLE									
CHORD SIZE (NOMINAL)	PLATE THICK. ▲	BRACING		MIN. WELD SIZE "Z"	MIN. WELD LENGTH	MIN. GUSSET WIDTH W	MAX. GUSSET LENGTH		
		SIZE	WALL SIZE				L1	L2	L3
6"	1/2"	2 1/2"	.203"	1/4"	2 1/2"	6 3/8"	1'-7 1/4"	1'-0 1/8"	4 7/8"
8"	1/2"	2 1/2"	.203"	1/4"	2 1/2"	6 3/8"	1'-11"	1'-2"	4 7/8"
8"	1/2"	3"	.216"	1/4"	3 1/4"	7 3/8"	1'-11 1/4"	1'-2 3/8"	5 1/2"
8"	1/2"	3"	.300"	1/4"	4 1/2"	8 1/4"	2'-1"	1'-3 1/4"	5 1/2"
10"	1/2"	2 1/2"	.203"	1/4"	2 1/2"	6 1/2"	2'-6 3/8"	1'-5 5/8"	4 7/8"
10"	1/2"	3"	.216"	1/4"	3 1/4"	7 1/4"	2'-0 7/8"	1'-3 1/4"	5 1/2"
12"	5/8"	3"	.216"	1/4"	3 1/4"	7 3/8"	2'-8 5/8"	1'-7 1/8"	5 1/2"
12"	5/8"	3 1/2"	.226"	1/4"	4"	8 1/4"	3'-1 1/2"	1'-9 3/4"	6"
12"	5/8"	4"	.237"	1/4"	4 3/4"	9 1/8"	3'-0 1/2"	1'-9 1/4"	6 1/2"
12"	5/8"	4"	.337"	5/16"	5 1/4"	9 1/2"	3'-4 3/8"	1'-11 1/2"	6 1/2"
12"	5/8"	5"	.258"	5/16"	5"	10"	3'-5 3/4"	2'-0 3/4"	7 5/8"

NOTE: ▲ CVN REQUIRED FOR WALL THICKNESSES EXCEEDING 1/2" (0.500").

NOTES:

- CHORD SPLICE BOLTS SHALL BE ASTM A325 HIGH STRENGTH STEEL BOLTS. HOLES IN SPLICE PLATE SHALL BE 1/16" LARGER THAN BOLT DIAMETER.
- ASTM A325 SPLICE BOLTS SHALL BE HEAVY HEXAGON TYPE AND SHALL BE FURNISHED WITH HEAVY HEXAGON NUTS AND WASHERS.
- THE THREADED PORTION OF THE SPLICE BOLTS SHALL BE EXCLUDED FROM THE SHEAR PLANE OF THE SPLICE.
- 4 EQUALLY SPACED VENT HOLES - 2" DIAMETER HOLES, TYPICAL, EXCEPT 1 1/2" DIAMETER HOLES FOR 8" CHORD SIZE AND 1 1/4" DIAMETER HOLES FOR CHORDS LESS THAN 8".
- GUSSET PLATE SIZES PROVIDED AS A GUIDE. FABRICATOR MUST PROVIDE PLATES OF ADEQUATE SIZE TO ACHIEVE MIN. WELD SIZE AND LENGTH REQUIRED.
- CROSS BRACING - ALTERNATING IN DIRECTION AT MAXIMUM SPACING OF 3 PANEL LENGTHS, SHALL NOT BE PLACED AT END VERTICALS NOR AT SPLICE POINTS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

4 POST 4 CHORD TRUSS
SPANS FROM 100' TO 200'

TRUSS DETAILS

RECOMMENDED AUG. 4, 2017

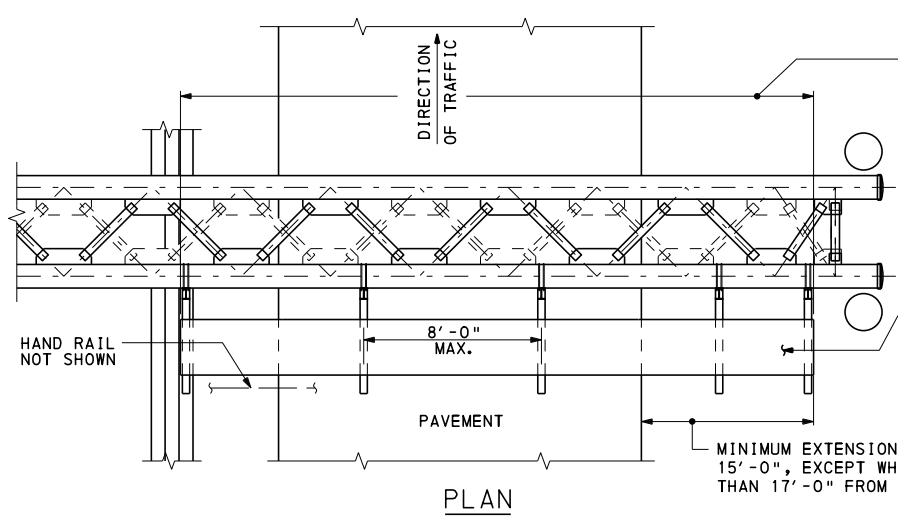
RECOMMENDED AUG. 4, 2017

SHT. 7 OF 10

Thomas P. Maiore
CHIEF BRIDGE ENGINEER

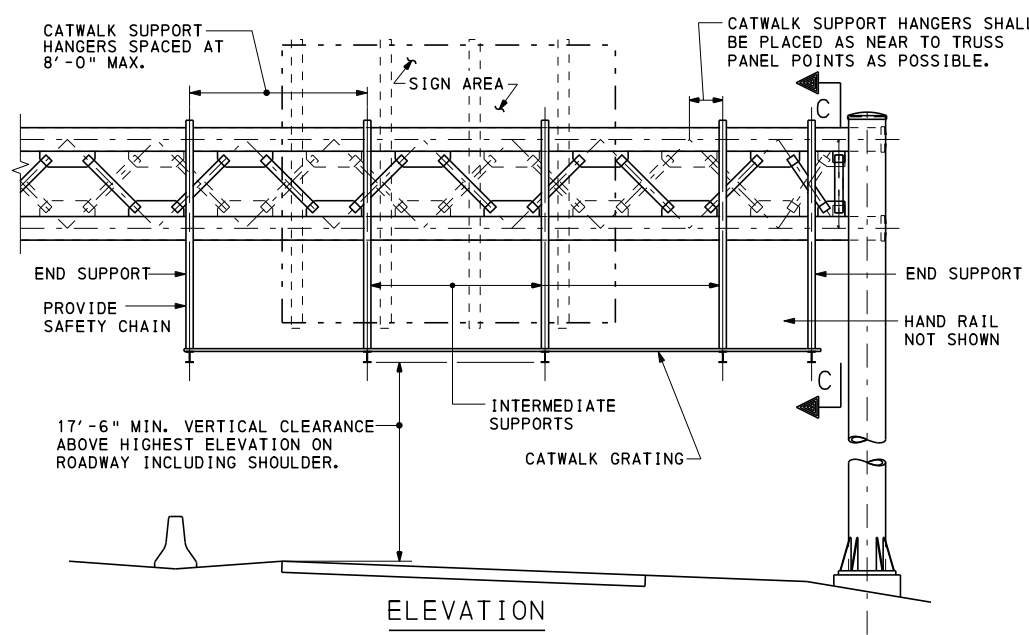
Brian S. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-745M

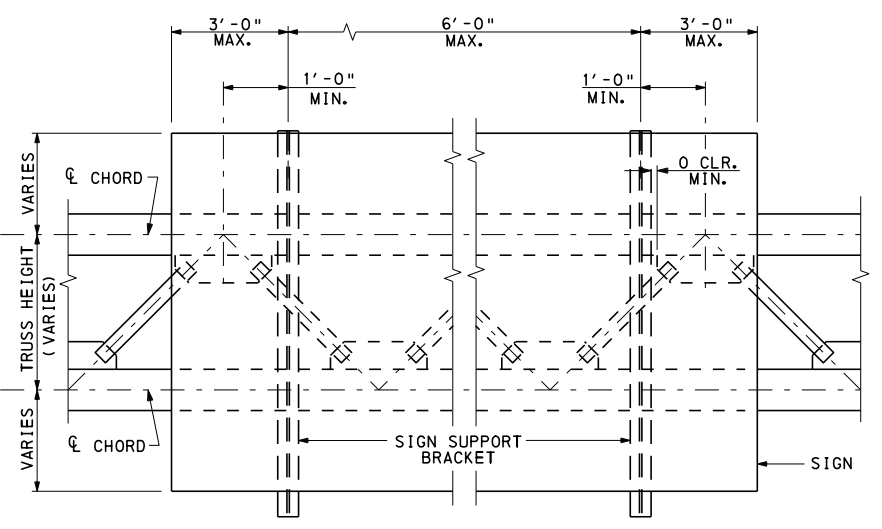


WHEN CATWALK IS ON ONE SIDE OF THE TRUSS ONLY, THE OVERALL LENGTH SHALL BE SUCH THAT THE END NEAREST THE LEFT EDGE OF ROADWAY (LOOKING IN DIRECTION OF TRAFFIC) EXTENDS A MINIMUM OF 4'-0" BEYOND THE EDGE OF ROADWAY. WHEN CATWALK IS ON BOTH SIDES OF TRUSS, THE OVERALL LENGTH SHALL BE SUCH THAT BOTH ENDS NEAREST THE CENTER OF THE SPAN EXTEND A MINIMUM OF 4'-0" BEYOND THE LEFT EDGES OF ROADWAY (LOOKING IN THE RESPECTIVE DIRECTIONS OF TRAFFIC).

CATWALK MAY BE REQUIRED ON ONE OR BOTH SIDES OF THE TRUSS DEPENDING ON WHETHER THERE IS ONE OR TWO WAY TRAFFIC ON THE ROADWAY THAT THE SIGN STRUCTURE SPANS.

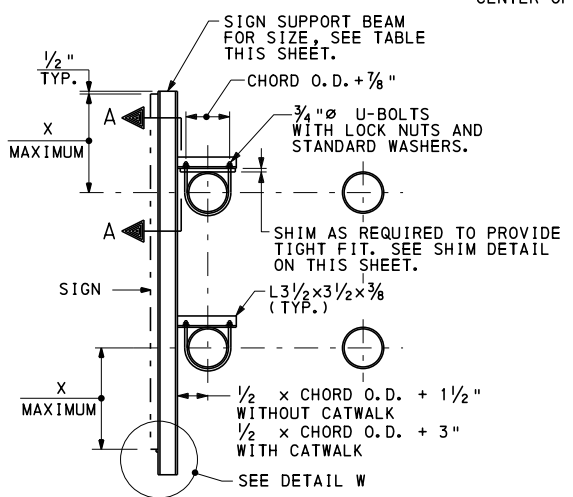


ELEVATION

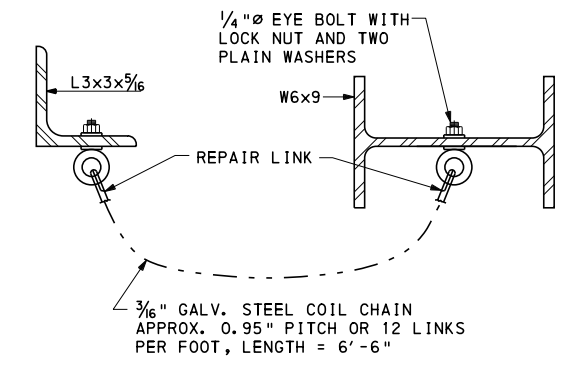
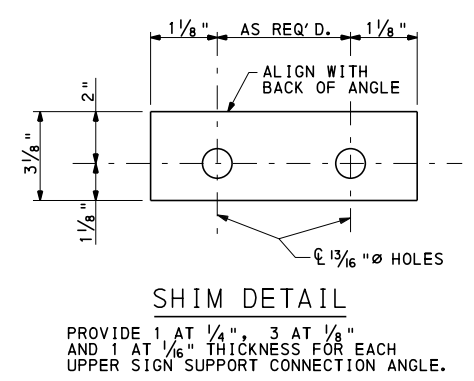
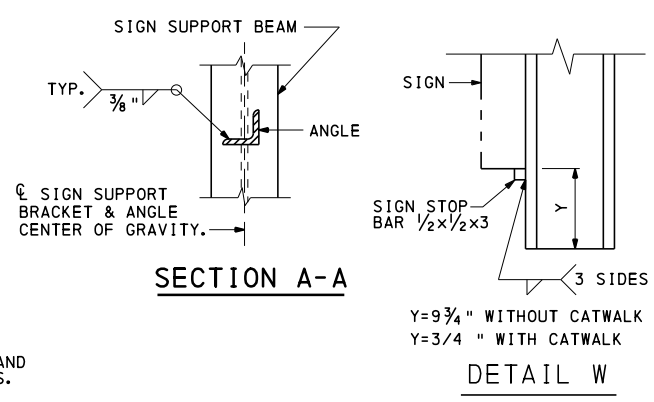
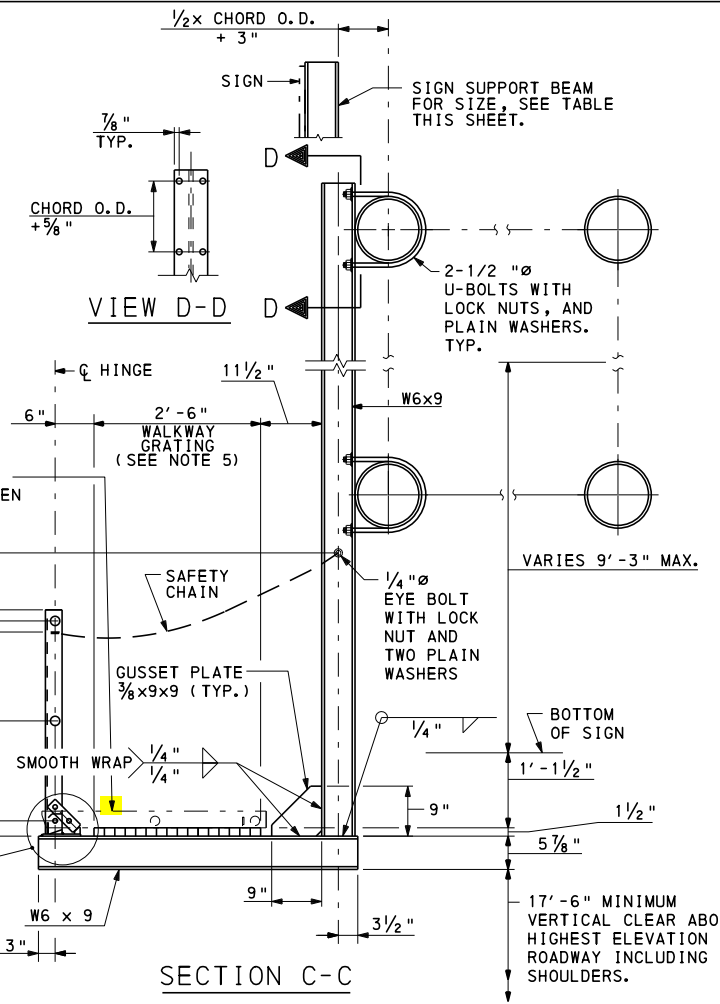


TYPICAL SIGN SUPPORT BRACKET SPACING DIAGRAM
PROVIDE ADDITIONAL BRACKETS AS REQUIRED AT 6'-0" MAXIMUM SPACING

SIGN SUPPORT BEAM	
X	SIZE
0 TO 5'-6"	W6x15
5'-6" TO 6'-6"	W6x20
6'-6" TO 7'-6"	W6x25
7'-6" TO 8'-6"	W8x28
8'-6" TO 9'-6"	W8x31



SIGN SUPPORT BRACKET DETAIL



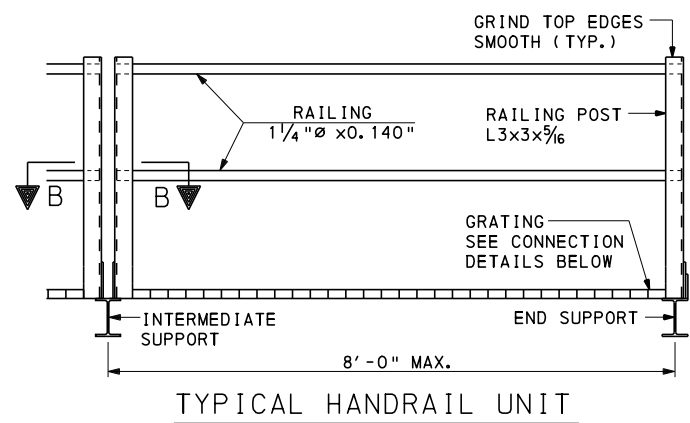
SAFETY CHAIN DETAILS

NOTES:

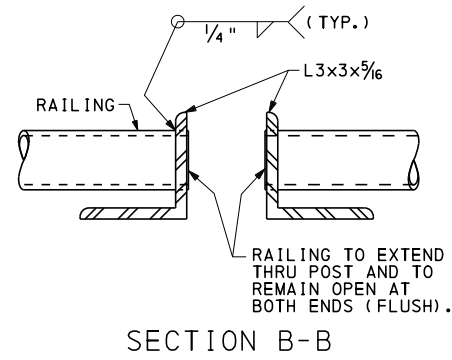
- FOR GENERAL NOTES, SEE SHEET 1.
- FOR HANDRAIL DETAILS, SEE SHEET 9.
- SPECIAL CARE SHALL BE TAKEN TO INSURE THAT THE COMPLETED POST HINGE AND KICKER PLATE ASSEMBLY WILL HOLD THE SAFETY RAILING IN A STEADY MANNER, FREE OF WOBBLE WHILE IN THE RAISED POSITION. MAXIMUM ALLOWABLE DISPLACEMENT FROM VERTICAL AT TOP OF RAILING WHEN KICKER PLATES ARE IN JAM POSITION SHALL BE 1".
- CATWALK GRATING TO BE CONTINUOUS (NO SPLICES) OVER AS MANY SUPPORTS AS PRACTICABLE CONSISTENT WITH FABRICATION, EASE OF HANDLING AND ASSEMBLY.
- WELDED-TYPE GRATING SHALL BE TYPE W-19, PER NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM) MBG531-00 STANDARD, 1 1/2" x 1/8" SERRATED BEARING BARS @ 1 3/8" CENTERS. THE CROSS BARS SHALL BE 1/4" TWISTED BAR @ 4" CENTERS. WEARING SURFACES OF ALL BARS SHALL BE SERRATED.
- PROVIDE 3 CLIPS EVENLY SPACED AT EACH GRATING SUPPORT.
- ALL BOLTS TO BE ASTM A325 AND GALVANIZED IN ACCORDANCE WITH PUB. 408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
- U-BOLTS PER PUBLICATION 408, SECTION 948.2.
- USE ASTM A53 GRADE B STEEL PIPE FOR RAILING.
- USE AASHTO M270, GRADE 36 STEEL FOR CATWALK SUPPORTS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

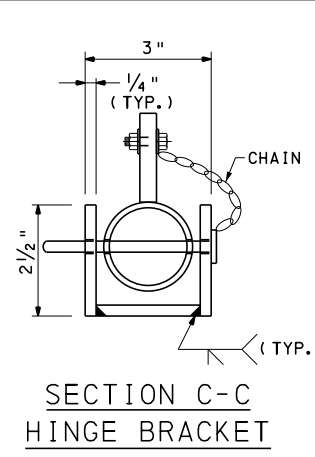
OVERHEAD SIGN STRUCTURES
4 POST 4 CHORD TRUSS
SPANS FROM 100' TO 200'
STRUCTURAL DETAILS



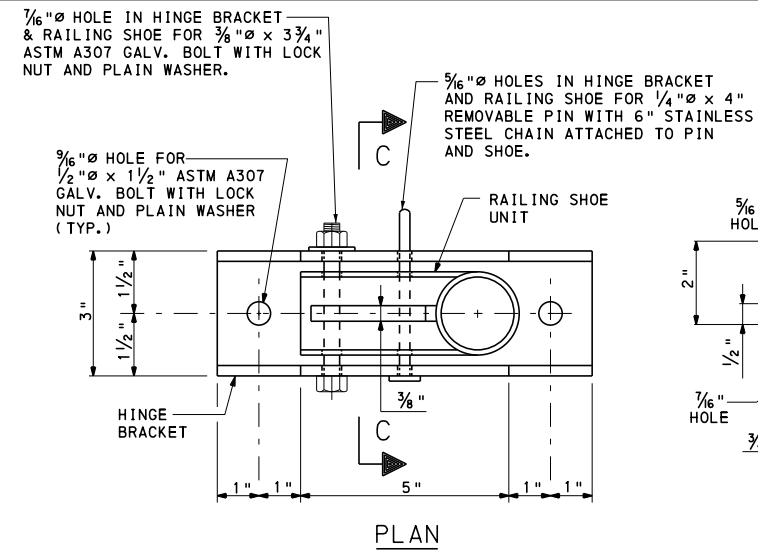
TYPICAL HANDRAIL UNIT



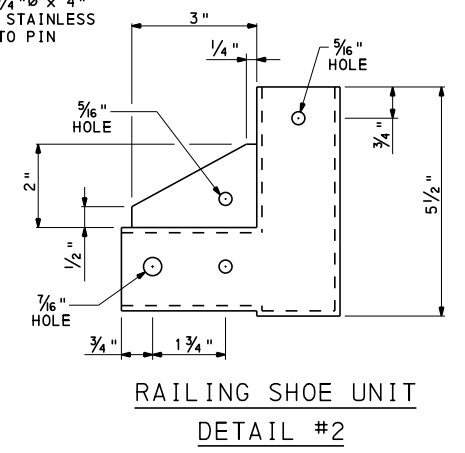
SECTION B-B



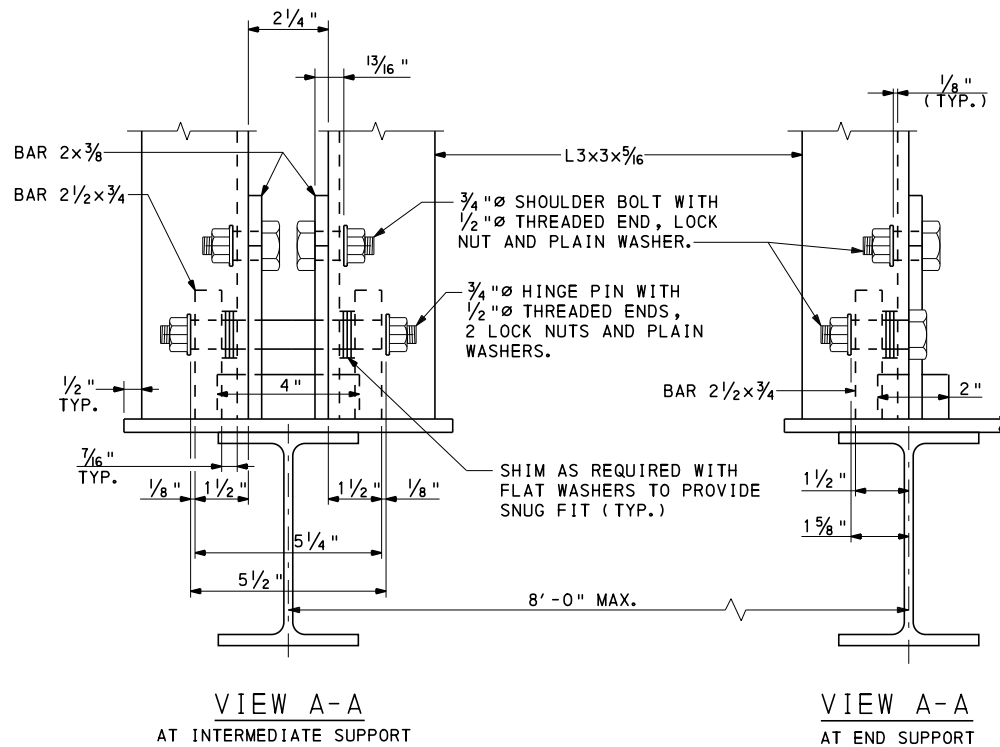
SECTION C-C
HINGE BRACKET



PLAN



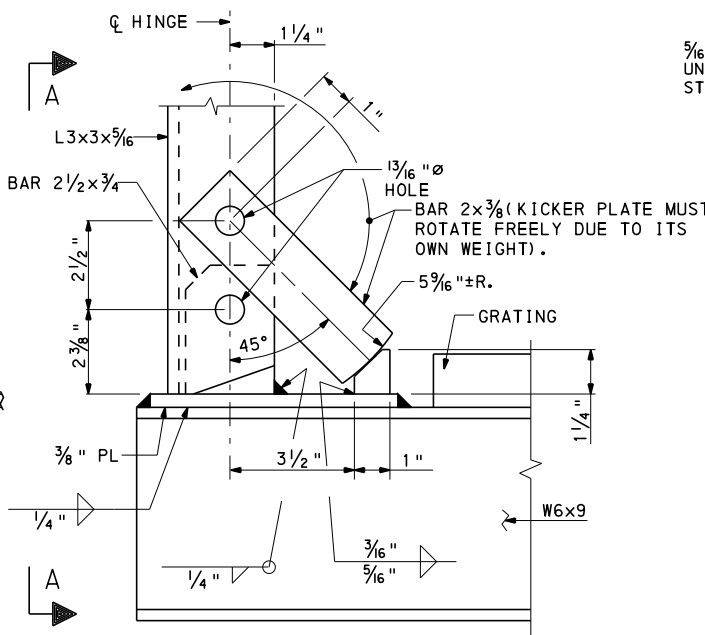
RAILING SHOE UNIT
DETAIL #2



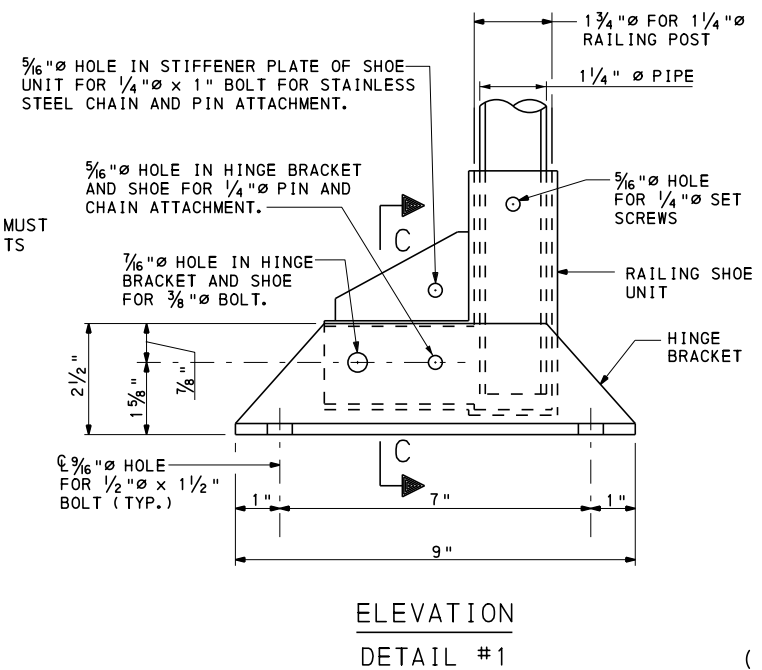
VIEW A-A
AT INTERMEDIATE SUPPORT

VIEW A-A
AT END SUPPORT

TYPICAL HANDRAIL DETAILS

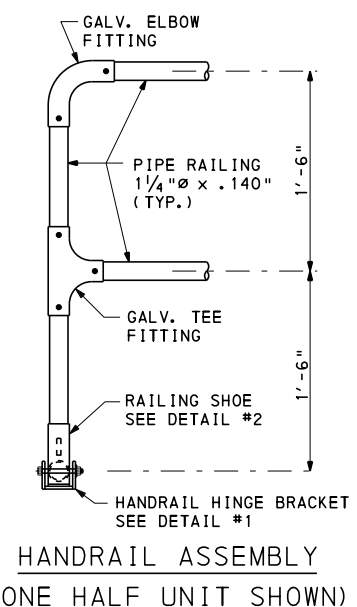


DETAIL #1

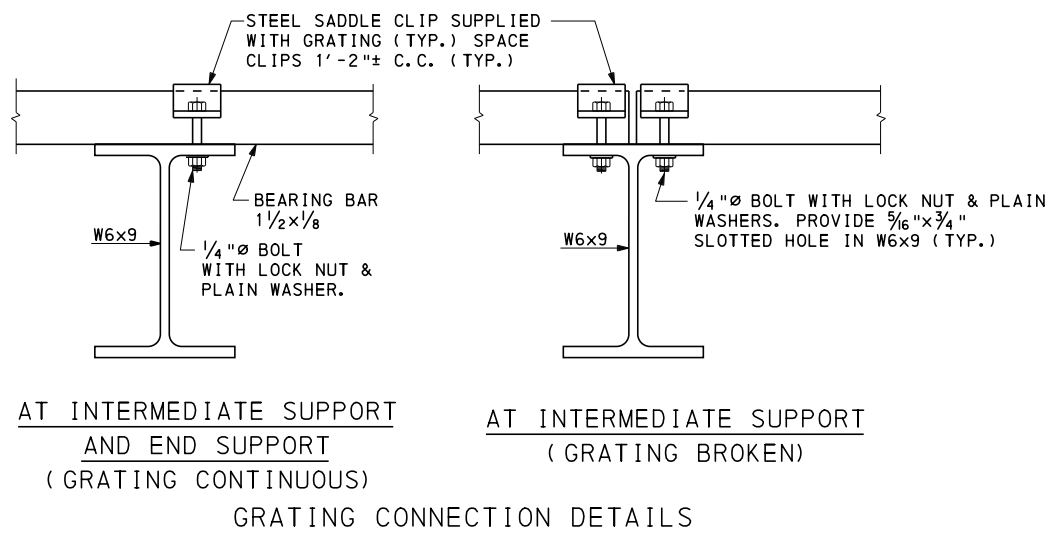


ELEVATION
DETAIL #1

ALTERNATE HANDRAIL HINGE BRACKET ASSEMBLY



HANDRAIL ASSEMBLY
(ONE HALF UNIT SHOWN)



AT INTERMEDIATE SUPPORT
AND END SUPPORT
(GRATING CONTINUOUS)

AT INTERMEDIATE SUPPORT
(GRATING BROKEN)

GRATING CONNECTION DETAILS

NOTES:

- ALL BOLTS TO BE ASTM A325 AND GALVANIZED IN ACCORDANCE WITH PUB. 408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
- USE ASTM A-53 GRADE B STEEL PIPE FOR RAILING.
- USE AASHTO M270, GRADE 36 STEEL FOR CATWALK SUPPORTS.
- SPECIAL CARE SHALL BE TAKEN TO INSURE THAT THE COMPLETED POST HINGE AND KICKER PLATE ASSEMBLY WILL HOLD THE SAFETY RAILING IN A STEADY MANNER, FREE OF WOBBLE WHILE IN THE RAISED POSITION. MAXIMUM ALLOWABLE DISPLACEMENT FROM VERTICAL AT TOP OF RAILING WHEN KICKER PLATES ARE IN JAM POSITION SHALL BE 1".
- CATWALK GRATING TO BE CONTINUOUS (NO SPLICES) OVER AS MANY SUPPORTS AS PRACTICABLE CONSISTENT WITH FABRICATION, EASE OF HANDLING AND ASSEMBLY.
- WELDED-TYPE GRATING SHALL BE TYPE W-19, PER NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM) MBG531-00 STANDARD. 1 1/2" X 1/2" SERRATED BEARING BARS @ 1 1/2" CENTERS. THE CROSS BARS SHALL BE 1/4" TWISTED BAR @ 4" CENTERS. WEARING SURFACES OF ALL BARS SHALL BE SERRATED.
- PROVIDE 3 CLIPS EVENLY SPACED AT EACH GRATING SUPPORT.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

4 POST 4 CHORD TRUSS
SPANS FROM 100' TO 200'

HANDRAIL DETAILS

RECOMMENDED AUG. 4, 2017

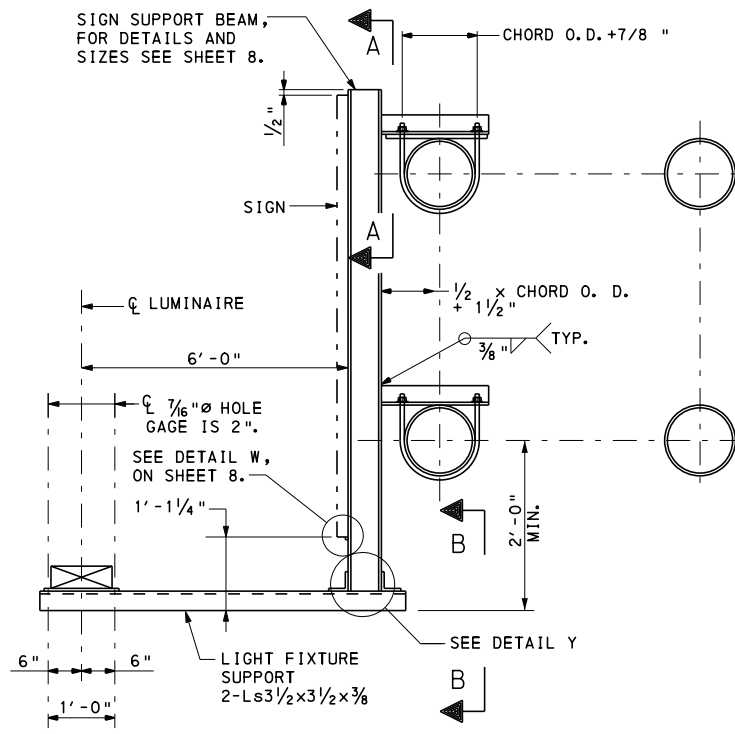
RECOMMENDED AUG. 4, 2017

SHT. 9 OF 10

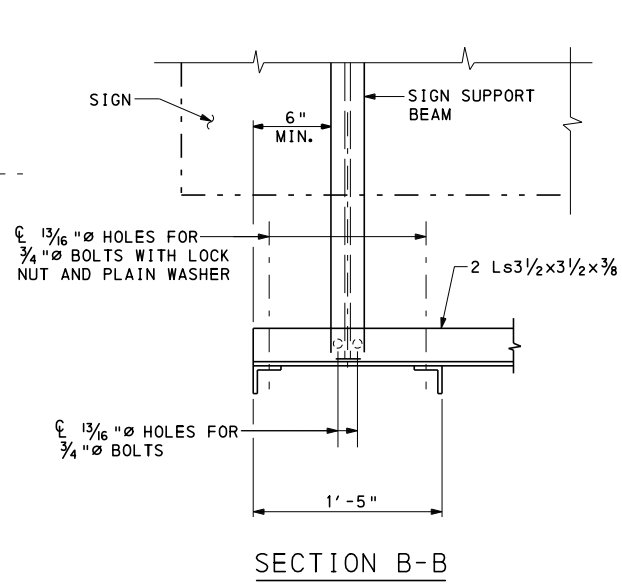
Thomas P. Maiore
CHIEF BRIDGE ENGINEER

Brenda S. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

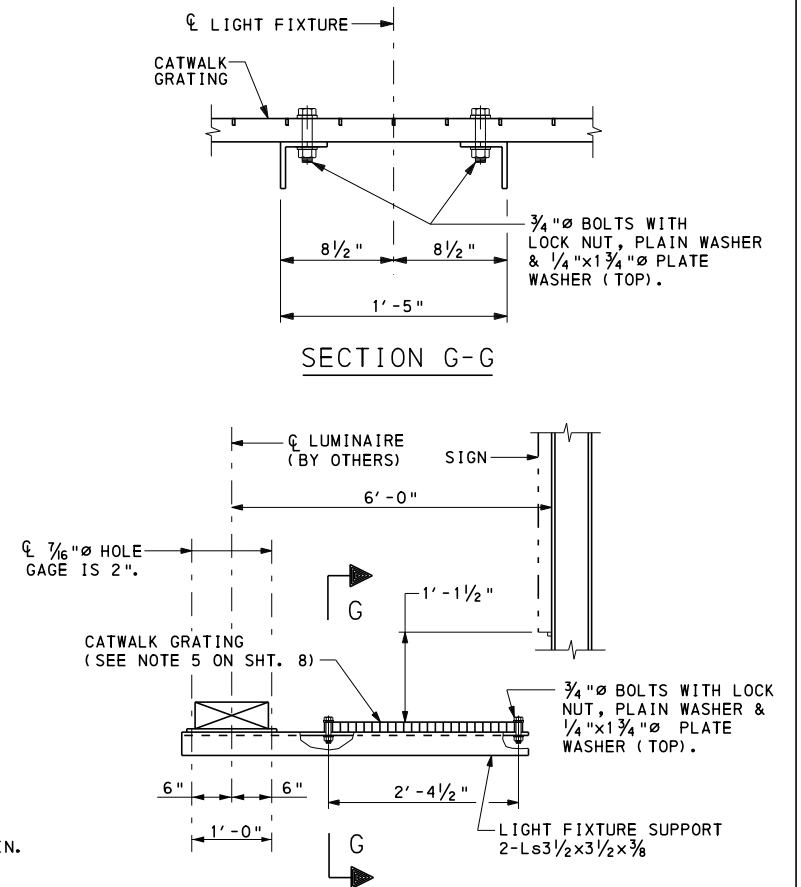
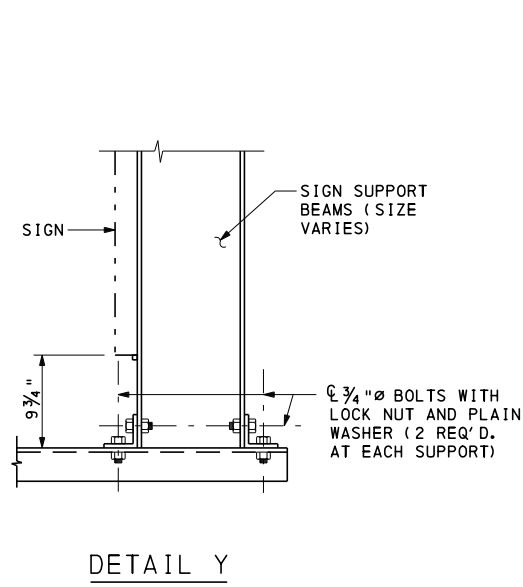
BC-745M



TYPICAL LIGHT FIXTURE SUPPORT DETAILS
FOR SECTION A-A, SEE SHEET 8.

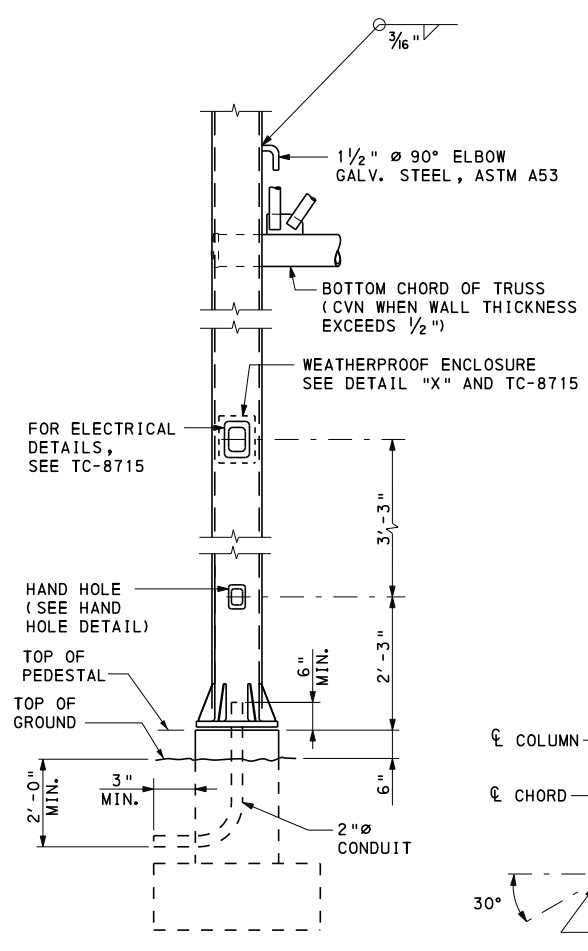


NOTE:
WEIGHT OF LUMINAIRE AND SUPPORT BRACKETS IS 400 lbs. BASED ON 10'-0" LUMINAIRE SPACING.

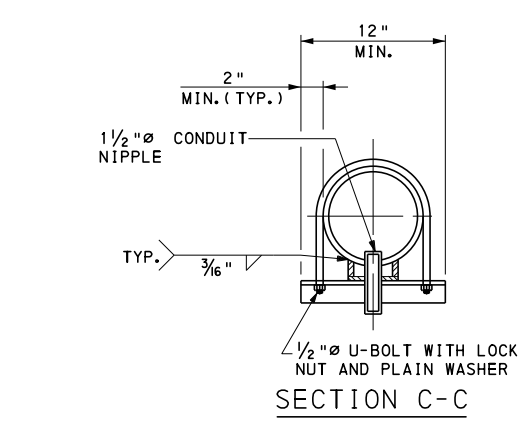


TYPICAL LIGHT FIXTURE SUPPORT DETAIL
FOR STRUCTURE WITH CATWALK

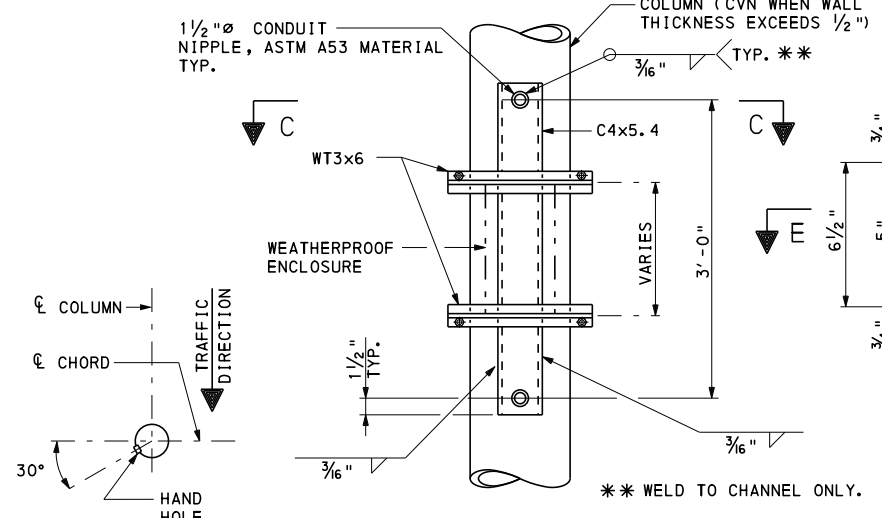
- NOTES:**
- ALL BOLTS TO BE ASTM A325 AND GALVANIZED IN ACCORDANCE WITH PUB. 408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
 - U-BOLTS PER PUBLICATION 408, SECTION 948.2
 - FOR SIGN PANEL DETAILS AND LIGHTING DETAILS, SEE STANDARD DRAWINGS TC-8700C, TC-8701D, TC-8701E, TC-8701S AND TC-8715.
 - ALL MATERIALS FOR SIGN SUPPORT BRACKETS TO BE STRUCTURAL STEEL AASHTO M270, GRADE 36.
 - FOR TYPICAL SIGN SUPPORT BEAM SPACING DIAGRAM, SEE SHEET 8.



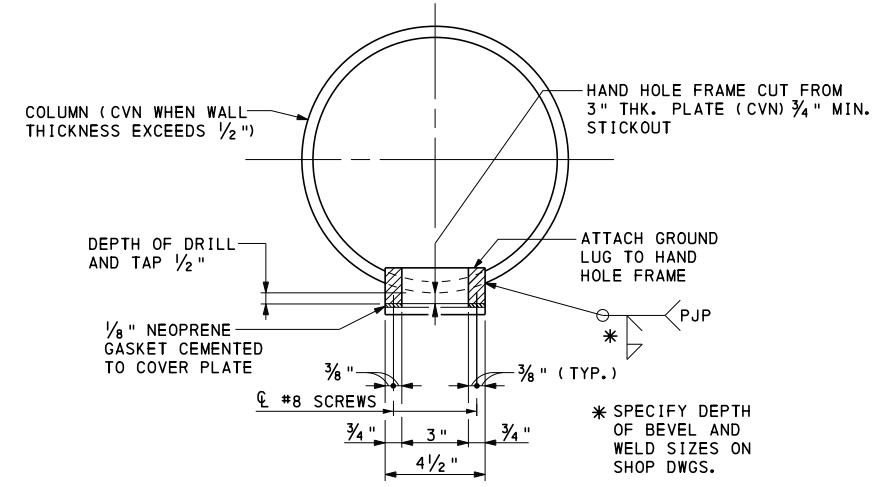
TYPICAL COLUMN DETAIL



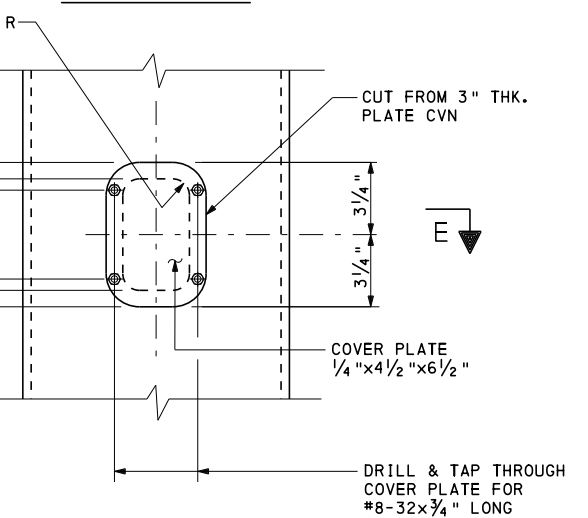
SECTION C-C



DETAIL X



SECTION E-E



HAND HOLE DETAIL

HAND HOLE LOCATION

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

OVERHEAD SIGN STRUCTURES
4 POST 4 CHORD TRUSS
SPANS FROM 100' TO 200'
LIGHT SUPPORT AND HAND HOLE DETAILS

INFORMATION CONTAINED IN THE BD-647M DESIGN TABLES

- THE MEMBER SIZES INDICATED IN THE DESIGN TABLES MEET THE FATIGUE REQUIREMENTS FOR A FATIGUE CATEGORY I.
- THE SPAN RANGE INCLUDED ON STANDARD DRAWING BD-647M IS AS FOLLOWS:
CANTILEVER STRUT LENGTHS UP TO 38' AND FRAME LENGTHS UP TO 200'.
- THE DESIGN TABLES INCLUDE MEMBER SIZES FOR THE STRUCTURES FOR VARIOUS COMBINATIONS OF SPAN LENGTH AND SIGN AREA. THE CORRESPONDING FABRICATION AND CONSTRUCTION DETAILS ARE CONTAINED IN THIS STANDARD.

GENERAL NOTES

1. PROVIDE 3-INCH CONCRETE COVER ON REINFORCEMENT BARS, EXCEPT AS NOTED.
2. USE CLASS A CEMENT CONCRETE $f'c = 3000$ PSI IN PEDESTALS, FOOTINGS AND CAISSONS.
3. PROVIDE GRADE 60 REINFORCING STEEL BARS THAT MEET THE REQUIREMENTS OF ASTM A615 FOR CONCRETE REINFORCEMENT. DO NOT WELD REINFORCING STEEL BARS.
4. RAKE-FINISH ALL HORIZONTAL CONSTRUCTION JOINTS, EXCEPT AS INDICATED.
5. VERIFY ALL DIMENSIONS AND GEOMETRY OF THE EXISTING STRUCTURES IN THE FIELD AS NECESSARY FOR PROPER FIT OF THE PROPOSED CONSTRUCTION.
6. CHAMFER EXPOSED CONCRETE EDGES 1 INCH BY 1 INCH.
7. ALL DIMENSIONS SHOWN ARE HORIZONTAL, EXCEPT AS NOTED.
8. DIMENSIONS ARE BASED ON A NORMAL TEMPERATURE OF 68 DEGREES F.
9. PIPE DIAMETERS SHOWN IN THE DESIGN TABLES ARE OUTSIDE DIAMETERS.
10. USE STANDARD SIZE HOLE. THE STANDARD HOLE DIAMETER FOR BOLTS SMALLER THAN 1" DIAMETER SHALL BE THE NOMINAL DIAMETER OF THE BOLT PLUS $1/16$ ". FOR BOLTS 1" DIAMETER AND LARGER, THE WIDTH OF EACH STANDARD HOLE SHALL BE THE NOMINAL DIAMETER OF THE BOLT PLUS $1/8$ ".
11. CLEAR DISTANCE BETWEEN BOLT HOLES OR BETWEEN THE BOLT HOLE AND THE END OF THE MEMBER IN THE DIRECTION OF THE APPLIED BEARING FORCE SHALL BE CHECKED.
12. PROVIDE ANCHOR BOLT HOLES $1/4$ " LARGER THAN BOLT DIAMETER.
13. PROVIDE DOUBLE NUTS AND WASHER FOR EACH ANCHOR BOLT.
14. STEEL MEMBER COMPONENTS REQUIRING CHARPY V-NOTCH TESTING ARE DESIGNATED ON THE PLANS BY (CVN), PROVIDE STEEL CONFORMING TO THE CVN REQUIREMENTS FOR ZONE 2, NON FRACTURE CRITICAL AS GIVEN IN THE AASHTO MATERIAL SPECIFICATIONS.

DESIGN

1. SPECIFICATIONS: "AASHTO 4TH EDITION STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS" (2001 WITH INTERIMS THROUGH 2006) AND "AASHTO 17TH EDITION STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" (2004).
2. WIND LOADS ARE BASED ON 90 MPH (3 SECOND GUST) BASIC WIND SPEED.
3. CAISSON FOUNDATIONS ARE BASED ON A MAXIMUM $1/2$ " LATERAL DEFLECTION AT TOP OF CAISSON AND ON THE FOLLOWING SOIL PARAMETERS:
A) LOOSE GRANULAR SOIL WITH 100 PCF UNIT WEIGHT, 28 DEGREE INTERNAL FRICTION ANGLE, 0 PSF COHESION, AND 25 PCI MODULUS OF SUBGRADE REACTION.
B) SOFT COHESIVE SOIL WITH 100 PCF UNIT WEIGHT, 0 DEGREE INTERNAL FRICTION ANGLE, 800 PSF COHESION, 200 PCI MODULUS OF SUBGRADE REACTION, AND 0.02 E50 STRAIN.
4. DESIGN TABLES MEMBER SIZES ARE ADEQUATE FOR FATIGUE CATEGORY I, THEREFORE, PENNDOT MINIMUM REQUIREMENT OF FATIGUE CATEGORY II IS MET.

MATERIAL

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CURRENT VERSIONS OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, ANSI/AWS WELDING CODE D1.5, CONTRACT SPECIAL PROVISIONS, AND AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS". USE ANSI/AWS D1.1 FOR WELDING NOT COVERED IN ANSI/AASHTO/AWS D1.5.
2. PROVIDE STRUCTURAL STEEL CONFORMING TO AASHTO M270, GRADE 36 (ASTM A709, GRADE 36) DESIGNATION EXCEPT WHEN NOTED OTHERWISE.
3. PROVIDE WELDED OR SEAMLESS STEEL PIPE CONFORMING TO PUBLICATION 408, SECTION 948.2(c) 1.
4. PROVIDE HIGH-STRENGTH STEEL BOLTS CONFORMING TO AASHTO M164 (ASTM A325). MECHANICALLY GALVANIZE ALL BOLTS (EXCEPT ANCHOR BOLTS), NUTS AND WASHERS. EITHER MECHANICALLY GALVANIZE ALL ANCHOR BOLTS OR HOT-DIP GALVANIZE ALL ANCHOR BOLTS IN ACCORDANCE WITH FABRICATION NOTE 6 ON THIS SHEET. PROVIDE U-BOLTS CONFORMING TO ASTM A449. PROVIDE ANCHOR BOLTS CONFORMING TO ASTM F1554, GRADE 55.

FABRICATION

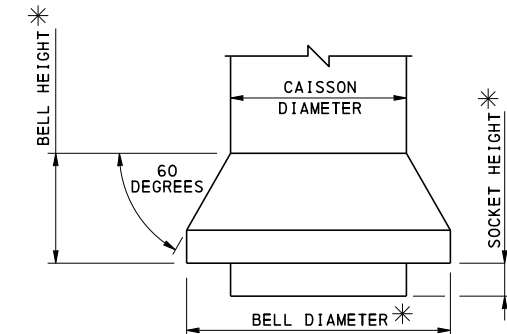
1. CONSTRUCT SIGN STRUCTURES TRUE TO DIMENSION, FREE FROM KINKS, TWISTS OR BENDS, AND UNIFORM IN APPEARANCE. ASSEMBLE COMPLETED SECTIONS IN THE SHOP AND CHECK FOR STRAIGHTNESS, ALIGNMENT, DIMENSION, AND THE FIRM SEATING OF THE SPLICE PLATES. CORRECT ANY VARIATIONS TO THE SATISFACTION OF THE ENGINEER.
2. FORM MASTS FOR SIGN STRUCTURES TO THE RADIUS SHOWN ON THE PLANS IN ACCORDANCE WITH THE TUBE AND PIPE ASSOCIATION INTERNATIONAL RECOMMENDED STANDARDS FOR INDUCTION BENDING OF PIPE AND TUBE (TPA-IBS-98).
3. AFFIX CLIPS, EYES, OR REMOVABLE BRACKETS TO ALL MASTS AND MAST ARMS, AS NECESSARY, TO SECURE THE SIGN STRUCTURE DURING SHIPPING AND FOR LIFTING AND MOVING DURING ERECTION. THIS IS TO PREVENT DAMAGE TO THE FINISHED GALVANIZED OR PAINTED SURFACES. REMOVE BRACKETS ON SIGN STRUCTURES AFTER ERECTION. INCLUDE DETAILS OF SUCH DEVICES ON THE SHOP DRAWINGS.
4. FABRICATE ALL SIGN STRUCTURES INTO THE LARGEST PRACTICAL SECTIONS PRIOR TO GALVANIZING. SUBMIT SPLICE LOCATIONS TO THE ENGINEER FOR APPROVAL. DO NOT COMMENCE FABRICATION UNTIL SUCH SPLICE LOCATIONS ARE APPROVED.
5. GRIND ALL AREAS TO BE WELDED TO BRIGHT METAL. BUTT WELD SPLICES ARE NOT PERMITTED, UNLESS SHOWN ON THE PLANS. COMPLETE ALL WELDING AND REQUIRED TESTING BEFORE ANY MATERIAL IS GALVANIZED. NON-DESTRUCTIVELY TEST ALL CIRCUMFERENTIAL AND STIFFENER WELDS USING THE METHODS AND PROCEDURES IN ACCORDANCE WITH SECTION 948. THE ACCEPTABLE CRITERIA ARE STATED IN TABLE 6.1 OF ANSI/AWS D1.1/D1.1M. PROVIDE FULL PENETRATION GROOVE WELDS FOR ALL LONGITUDINAL WELDS WITHIN 6" OF A FULL PENETRATION CIRCUMFERENTIAL GROOVE WELD AND INSPECT AS SPECIFIED ABOVE. PROVIDE MAXIMUM WELD UNDERCUT OF 0.01".
6. HOT-DIP GALVANIZE ALL COMPONENTS (EXCEPT REINFORCEMENT BARS, ALUMINUM, AND NON-FERROUS INCIDENTALS) AFTER FABRICATION PER ASTM A123 OR ASTM A153, AS APPROPRIATE.

CONSTRUCTION

1. USE TEMPLATES TO ACCURATELY SET BASE PLATE ANCHOR BOLTS TO CORRECT ELEVATION AND ALIGNMENT. SECURELY BRACE ANCHOR BOLTS AGAINST DISPLACEMENT BEFORE CAISSON CONCRETE IS PLACED AND DURING CONCRETE CURING.
2. ERECT SIGN STRUCTURE ONLY AFTER CAISSON CONCRETE MEETS 7 DAY STRENGTH REQUIREMENTS.
3. TEMPORARILY SUPPORT MAST ARMS TO RELIEVE LOAD FROM THE SPLICES WHILE HIGH-STRENGTH BOLTS ARE BEING TIGHTENED IN ORDER TO FIRMLY SEAT THE CONNECTION PLATES.
4. PRIOR TO ERECTION, DEMONSTRATE TO THE ENGINEER BY PREASSEMBLY OR OTHER APPROVED METHOD THAT FRAME STRUCTURE LENGTH IN A NO-LOAD CONDITION MATCHES FIELD MEASURED CAISSON SPACING WITHIN $1/2$ ".
5. ADEQUATELY SUSPEND FRAME STRUCTURES TO AVOID DISTORTIONS OR CHANGES IN SPAN LENGTH IF ERECTED ONTO FOUNDATIONS AS ONE UNIT.

NOTES TO FABRICATOR

- DYNAMIC/VARIABLE MESSAGE SIGNS (DMS/VMS) ARE PROHIBITED ON MONOPIPE STRUCTURES.
- DESIGN COMPUTATIONS ARE REQUIRED FOR ANY PORTION OF A STRUCTURE FOR WHICH THE INFORMATION IS NOT TAKEN DIRECTLY FROM THE CONTRACT DRAWINGS OR THE DETAILS CONTAINED IN THIS STANDARD. DO NOT VIOLATE CRITERIA USED FOR THE DEVELOPMENT OF THE DESIGN TABLES ON STANDARD DRAWING BD-647M AND THE DETAILS IN THIS STANDARD.



CAISSON BELL DETAIL

* SUBMIT THE PROPOSED DRILLING EQUIPMENT TO THE REPRESENTATIVE FOR ACCEPTANCE AND INCLUDE THE SOCKET AND BELL DIMENSIONS.

SPAN (FEET)	PANEL AREA (S.F.)	CAISSON DIAMETER (INCHES)	BELL DIAMETER (INCHES)
100	1,000	48	54
120	800	54	60
140	420	48	54

CHANGE 1

TC-8700C	SPACING CHARTS/DIRECT APPLIED LETTERS, NUMERALS, & ARROWS
TC-8701D	SIGN DETAILS/FREEWAY AND EXPRESSWAY GUIDE SIGNS
TC-8701E	EXTRUDED ALUMINUM CHANNEL SIGN
TC-8701S	FLAT SHEET ALUMINUM SIGNS WITH EXTRUDED ALUMINUM STIFFENERS
TC-8715	SIGN LIGHTING/MERCURY VAPOR LAMPS
TC-8716	ERECTION DETAILS/EXTRUDED ALUMINUM CHANNEL SIGNS FLAT SHEET ALUMINUM WITH STIFFENERS/OVERHEAD STRUCTURES
BC-736M	REINFORCEMENT BAR FABRICATION DETAILS
RC-11M	CLASSIFICATION OF EARTHWORK FOR STRUCTURES
RC-51M	TYPE 31 STRONG POST GUIDE RAIL
RC-53M	TYPE 2 WEAK POST GUIDE RAIL
RC-54M	BARRIER PLACEMENT AT OBSTRUCTIONS
RC-58M	SINGLE FACE CONCRETE BARRIER PLACEMENT AT MEDIAN PIERS

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

MONOPIPE SIGN STRUCTURES
FRAME STRUCTURE SPANS UP TO 160'
AND CANTILEVER MONOPIPE STRUCTURE
STRUT LENGTHS UP TO 27'

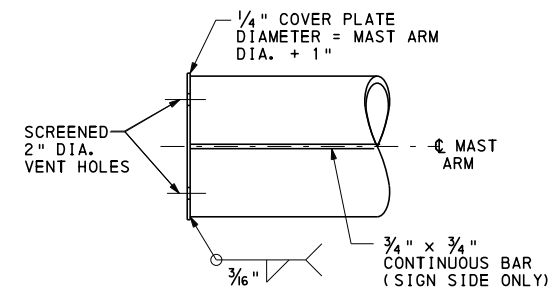
GENERAL NOTES

RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Brenda S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 1 OF 5 BC-747M
--	---	--------------------------------

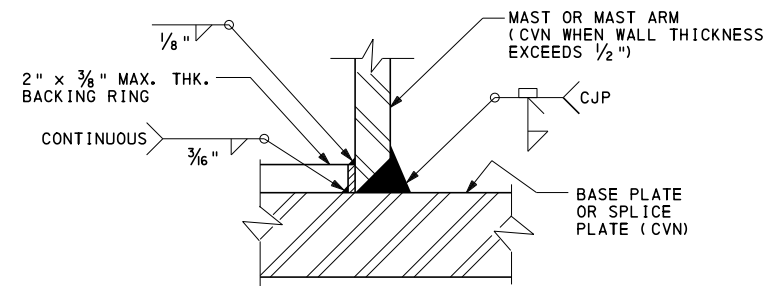
REFERENCE DRAWINGS

MAST ARM & END CONNECTION COMPONENT SELECTION TABLE (CANTILEVER STRUCTURES)												
SPAN (FEET)	PANEL AREA (S.F.)	MAST ARM			H. S. BOLTS		SPLICE PLATE		STIFFENERS			
		DIAMETER (INCHES)	THICKNESS (INCHES)	NO.	DIAMETER (INCHES)	CIRCLE (INCHES)	DIAMETER (INCHES)	THICKNESS (INCHES)	NO.	THICKNESS (INCHES)	WIDTH (INCHES)	HEIGHT (INCHES)
27	350	24	0.375 (SCH. 20)	20	1	27 1/2	31	2	(NONE REQUIRED)			
	250	24	0.375 (SCH. 20)	18	1	27 1/2	31	2	(NONE REQUIRED)			

MAST & BASE CONNECTION COMPONENT SELECTION TABLE (CANTILEVER STRUCTURES)													
SPAN (FEET)	PANEL AREA (S.F.)	MAST			ANCHOR BOLTS		BASE PLATE		STIFFENERS				
		DIAMETER (INCHES)	THICKNESS (INCHES)	NO.	DIAMETER (INCHES)	CIRCLE (INCHES)	DIAMETER (INCHES)	THICKNESS (INCHES)	NO.	THICKNESS (INCHES)	WIDTH (INCHES)	HEIGHT (INCHES)	WELD (INCHES)
27	350	24	0.562 (SCH. 30)	16	1 3/4	31	37	2 1/4	8	3/8	5 1/2	15 1/2	5/16
	250	24	0.500 (WT. XS)	18	1 1/2	30 1/2	35 1/2	2	9	3/8	4 3/4	13 1/2	5/16



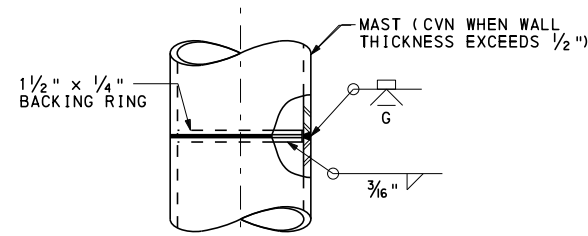
MAST ARM END DETAIL
(CANTILEVER STRUCTURES)



WELD DETAIL

WELD DETAIL NOTE:

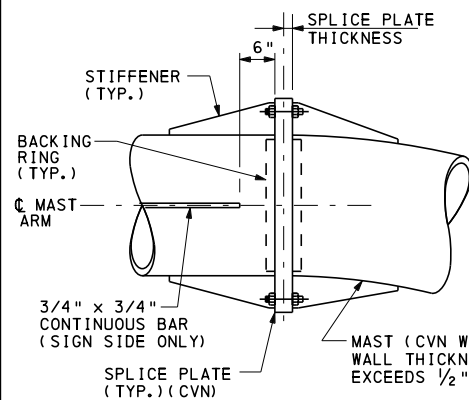
BACKING RING MUST BE FITTED/SIZED TO THE PIPE COLUMN AND CONTINUOUSLY FILLET WELDED TO THE BASE PLATE BEFORE THE FULL PENETRATION GROOVE WELD IS MADE. BACKING RING MUST BE FABRICATED AS A CONTINUOUS RING.



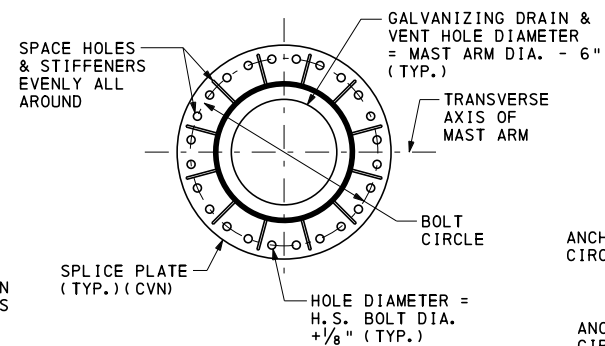
OPTIONAL SHOP CONNECTION DETAIL

NOTES:

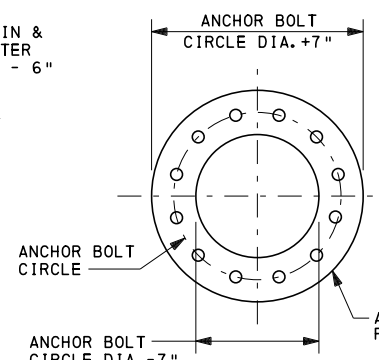
- FOR GENERAL NOTES, SEE SHEET 1.
- PROVIDE MAXIMUM 2'-0" SPACE BETWEEN ADJACENT SIGN PANELS WHEN PRESENT.
- TERMINATE WELDS 1/4" SHORT OF STIFFENER CHAMFER.
- PROVIDE STIFFENERS AS INDICATED IN CONNECTION COMPONENT SELECTION TABLES.
- FOR CAISSON INFORMATION, SEE SHEET 6.
- FOR SIGN PANEL SUPPORT BEAM DETAILS, SEE SHEET 5.
- SEAL BASE PLATE TO FOUNDATION GAP WITH GALVANIZED STEEL SCREEN, 1/2" BY 1/2" MESH AND 0.063" DIAMETER WIRES. SCREEN IS TO PREVENT ENTRY OF RODENTS WHILE PERMITTING DRAINAGE. SCREEN IS TO BE REMOVABLE AND ATTACHED TO BASEPLATE WITH STAINLESS STEEL HARDWARE.
- FOR FRAME STRUCTURE COMPONENT SELECTION TABLE, SEE SHEETS 3 AND 4.



ELEVATION



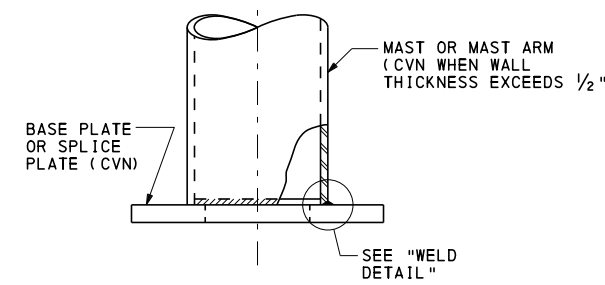
SECTION



PLAN

ANCHOR PLATE DETAIL

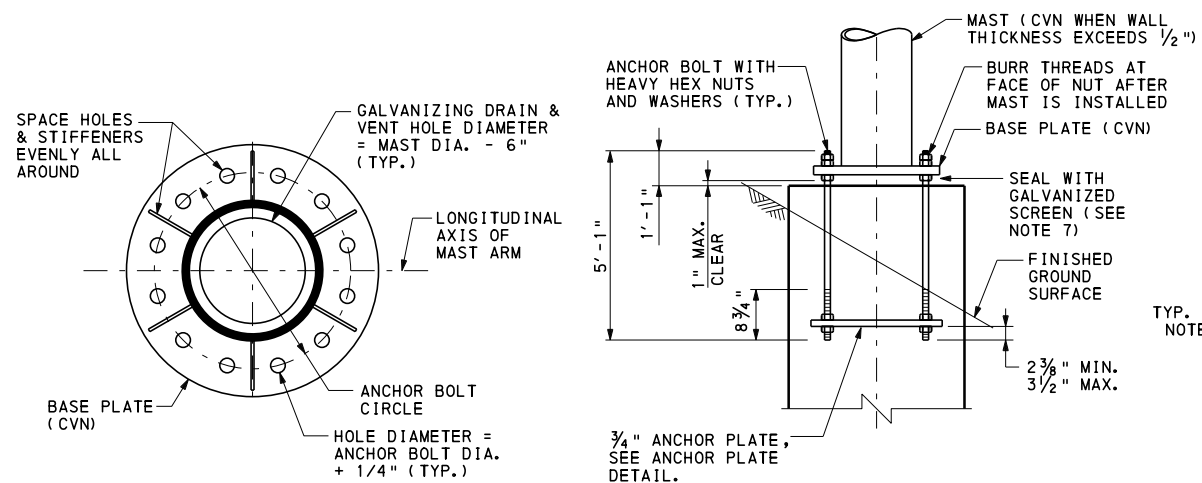
(12 BOLT CONFIGURATION SHOWN)



PIPE TO PLATE CONNECTION DETAIL

END CONNECTION DETAILS

(MAST ARM SPLICE CONNECTION SIMILAR)
(24 BOLT CONFIGURATION SHOWN)



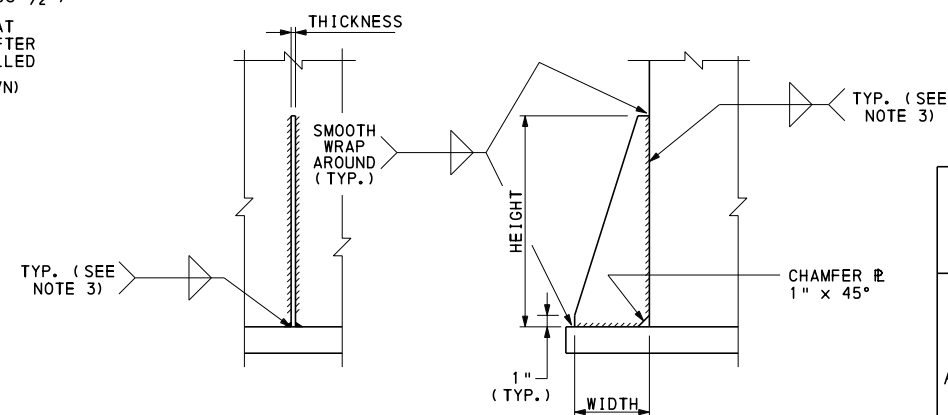
ELEVATION

NOTE: STIFFENERS NOT SHOWN FOR CLARITY

PLAN

BASE CONNECTION DETAILS

(12 BOLT CONFIGURATION SHOWN)



SECTION

ELEVATION

STIFFENER DETAILS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

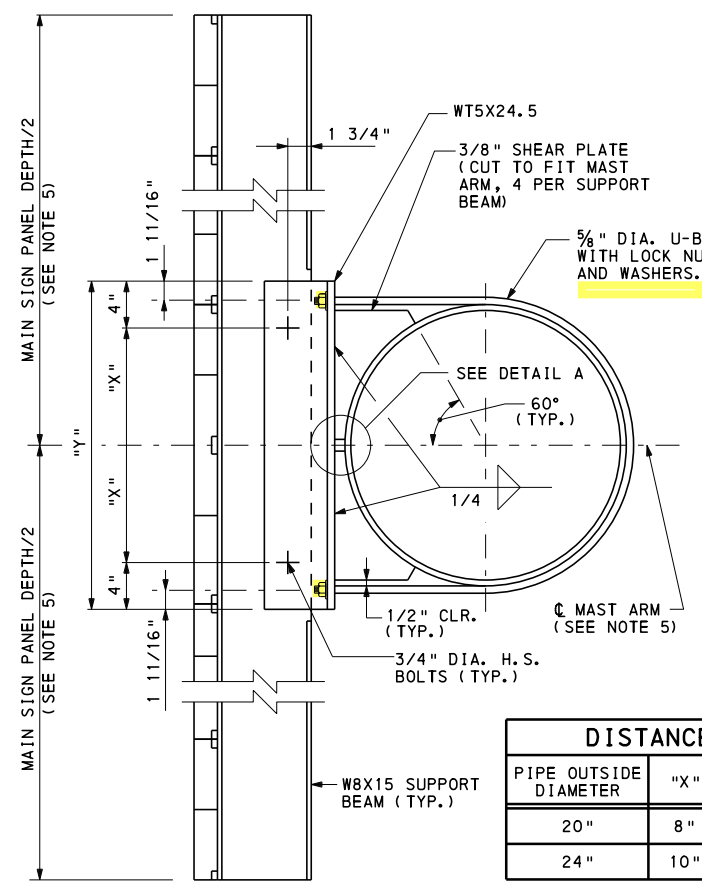
MONOPIPE SIGN STRUCTURES
FRAME STRUCTURE SPANS UP TO 160'
AND CANTILEVER MONOPIPE STRUCTURE
STRUT LENGTHS UP TO 27'

MAST AND MAST ARM DETAILS - 1

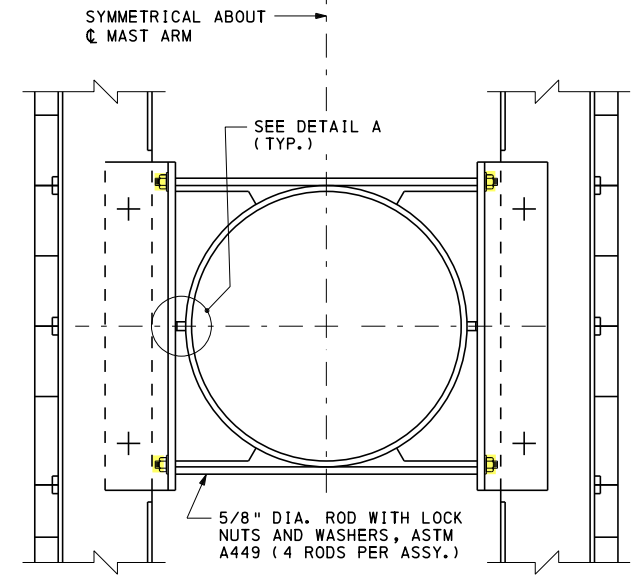
RECOMMENDED AUG. 4, 2017
Thomas P. Maiore
CHIEF BRIDGE ENGINEER

RECOMMENDED AUG. 4, 2017
Brenda S. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 2 OF 5
BC-747M

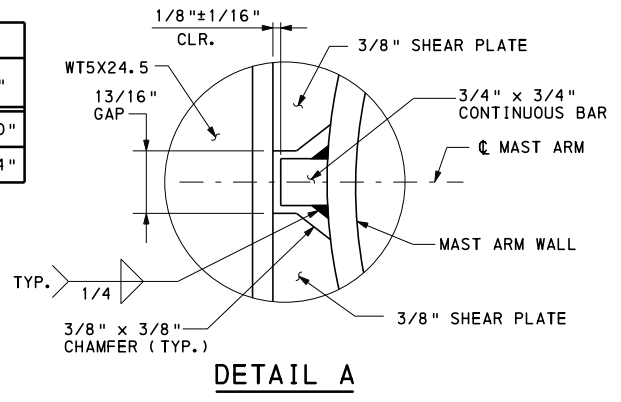


SINGLE SIGN PANEL SECTION

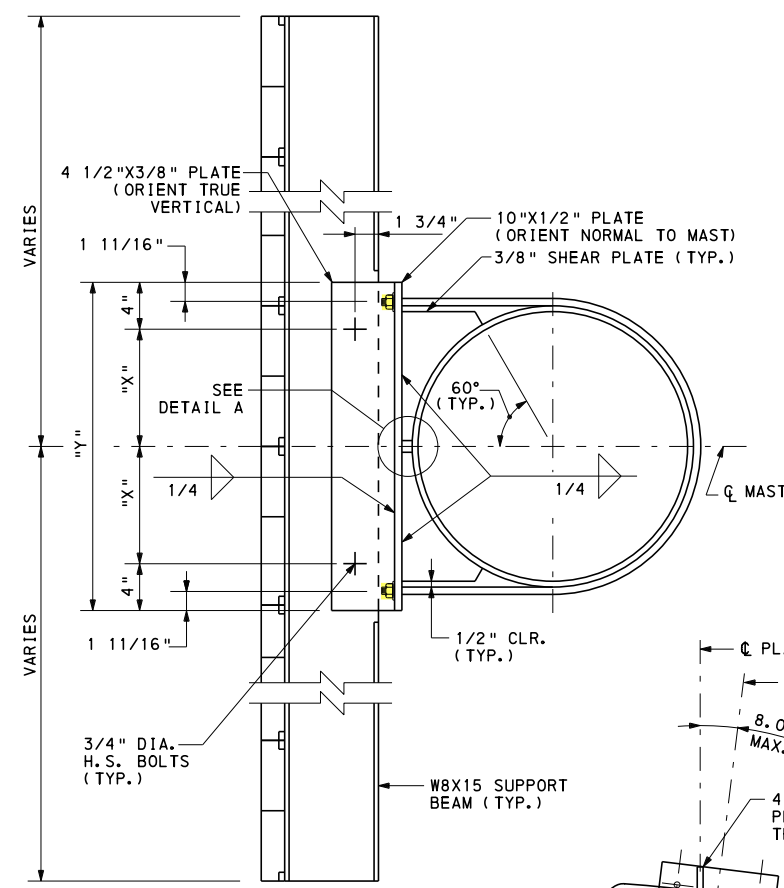


BACK-TO-BACK SIGN PANEL SECTION
(SEE NOTE 2)

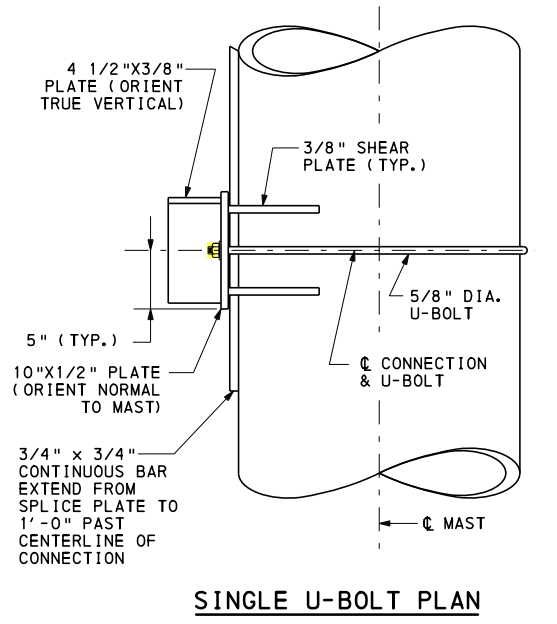
DISTANCE		
PIPE OUTSIDE DIAMETER	"X"	"Y"
20"	8"	2'-0"
24"	10"	2'-4"



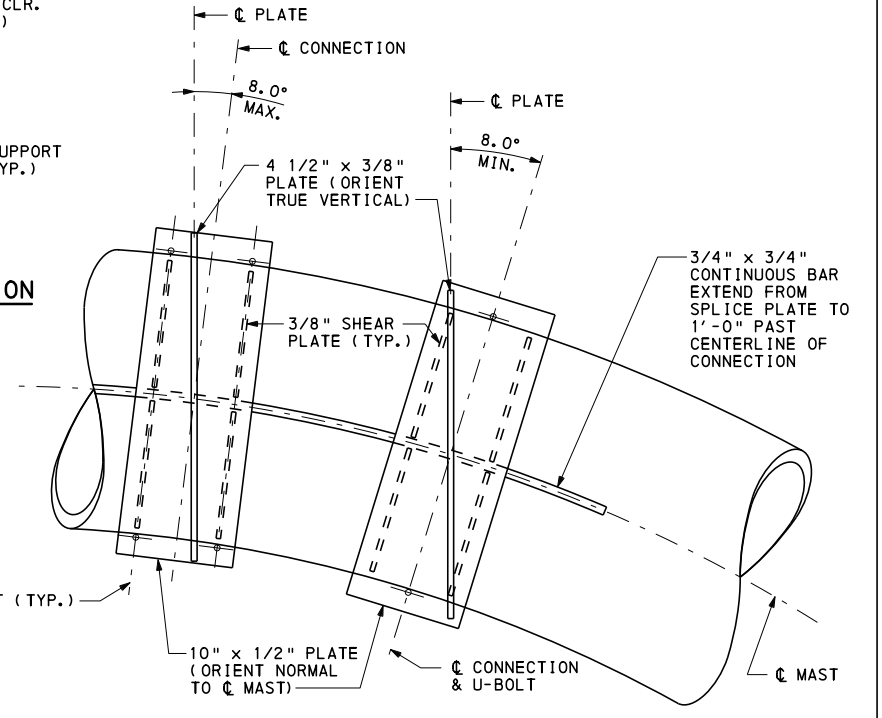
DETAIL A



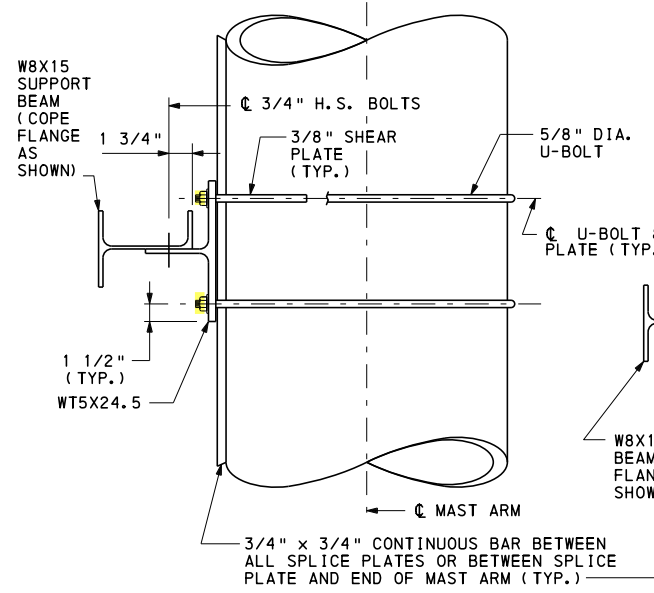
SINGLE SIGN PANEL SECTION



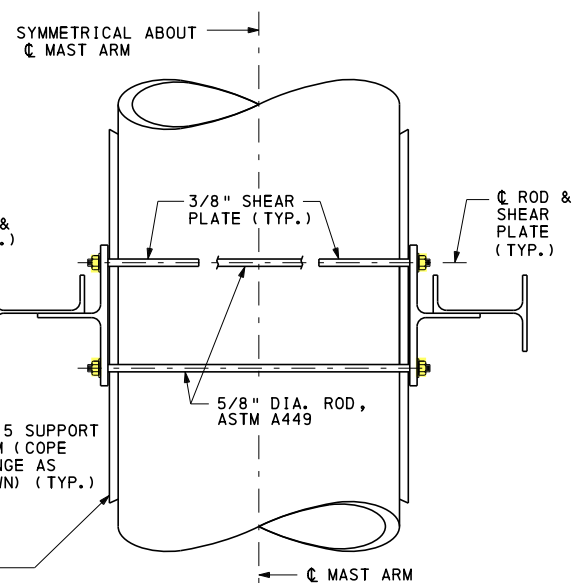
SINGLE U-BOLT PLAN



DOUBLE U-BOLT SINGLE U-BOLT



SINGLE SIGN PANEL PLAN



BACK-TO-BACK SIGN PANEL PLAN
(SEE NOTE 2)

SUPPORT BEAM TO MAST ARM CONNECTION DETAILS

SUPPORT BEAM TO MAST CONNECTION DETAILS

(FOR DETAILS NOT SHOWN OR NOTED, SEE SUPPORT BEAM TO MAST ARM CONNECTION DETAILS)
(SUPPORT BEAM NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY)

NOTES:

- FOR GENERAL NOTES, SEE SHEET 1.
- FOR DETAILS NOT SHOWN OR NOTED, SEE SINGLE SIGN PANEL DETAILS, THIS SHEET.
- FOR SIGN PANEL DETAILS, SEE TRAFFIC CONTROL STANDARD TC-8701E.
- LOCATE SUPPORT BEAMS TO AVOID END AND SPLICE CONNECTIONS. MAXIMUM SPACING = 5'-0". MAXIMUM DISTANCE TO PANEL EDGE = 2'-6".
- SIGN PANEL SUPPORT BEAM DETAILS GIVEN ON THIS SHEET ARE ONLY VALID FOR SIGNS WHERE THE HORIZONTAL CENTERLINE OF THE SIGN PANEL IS AT THE SAME LOCATION AS THE CENTERLINE OF MAST ARM. PROVIDE SIGN PANEL SUPPORT BEAM DETAILS ON SHOP DRAWINGS WHEN THE HORIZONTAL CENTERLINE OF THE SIGN PANEL IS NOT AT THE SAME LOCATION AS THE CENTERLINE OF THE MAST ARM.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

MONOPIPE SIGN STRUCTURES
FRAME STRUCTURE SPANS UP TO 160'
AND CANTILEVER MONOPIPE STRUCTURE
STRUT LENGTHS UP TO 27'

SIGN PANEL SUPPORT BEAM DETAILS

CAISSON COMPONENT SELECTION TABLE FRAME STRUCTURES									
SPAN (FEET)	PANEL AREA (S.F.)	CAISSON DIAMETER (INCHES)	CAISSON EMBEDMENT (FEET)				VERT. REINF.		
			SOIL	MAX. GROUND SLOPE				NO.	SIZE
				8:1	4:1	2:1	1.5:1		
60	1,040	54	C	23.0	24.0	25.0	25.5	18	#8
			G	19.5	20.0	21.5	-		
	760	48	C	22.0	23.0	24.0	24.5	16	#8
			G	18.5	19.0	21.0	-		
80	1,000	60	C	24.5	25.5	26.5	27.5	20	#8
			G	21.0	22.0	22.5	-		
	880	54	C	24.5	25.5	27.5	29.0	19	#8
			G	20.5	21.0	22.5	-		
100	520	48	C	22.0	23.0	24.0	24.5	16	#8
			G	18.5	19.0	21.0	-		
	280	48	C	17.5	17.5	18.5	19.0	12	#8
			G	15.5	16.0	17.0	-		
120	520	48	C	23.5	24.5	26.5	28.5	17	#8
			G	19.5	20.0	22.0	-		
	360	48	C	20.0	20.5	21.5	22.0	14	#8
			G	17.5	18.0	19.5	-		
140	420	48*	C	23.5	24.0	26.0	28.0	16	#8
			G	19.5	20.0	22.0	-		
	300	48	C	20.0	20.5	21.5	22.0	14	#8
			G	17.0	17.5	19.5	-		
160	300	48	C	21.5	22.0	23.5	24.0	15	#8
			G	18.0	18.5	20.5	-		

OPTIONAL CAISSON COMPONENT SELECTION TABLE FRAME STRUCTURES - MEDIAN BARRIER INSTALLATION									
SPAN (FEET)	PANEL AREA (S.F.)	CAISSON DIAMETER (INCHES)	CAISSON EMBEDMENT (FEET)				VERT. REINF.		
			SOIL	MAX. GROUND SLOPE				NO.	SIZE
				8:1	4:1	2:1	1.5:1		
60	1,040	48	C	24.0	25.0	27.0	28.5	18	#8
			G	20.0	20.5	22.5	-		
80	1,000	48	C	27.0	28.0	31.0	33.0	20	#8
			G	21.5	22.0	24.5	-		
	880	48	C	25.5	27.0	29.5	31.0	19	#8
			G	21.0	21.5	23.5	-		
100	1,000	48*	C	29.5	31.5	35.0	37.0	22	#8
			G	23.0	23.5	27.0	-		
	740	48	C	25.5	27.0	29.5	31.5	19	#8
			G	21.0	21.5	23.5	-		

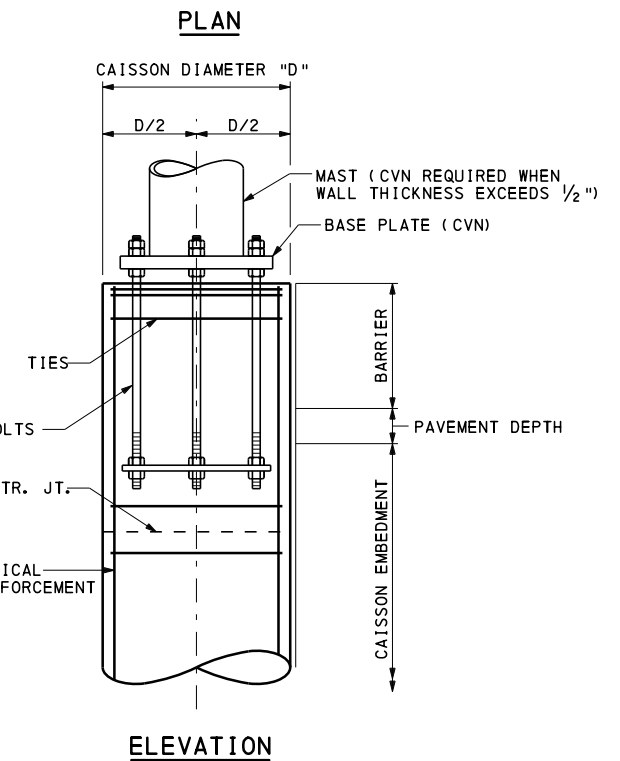
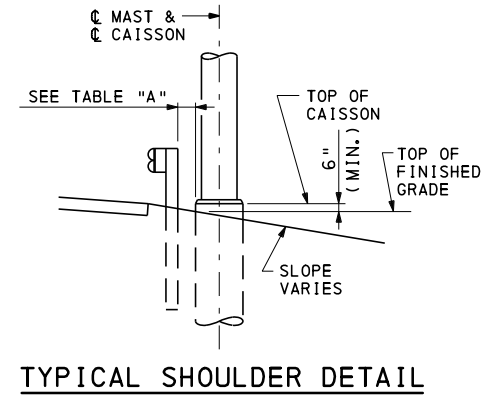
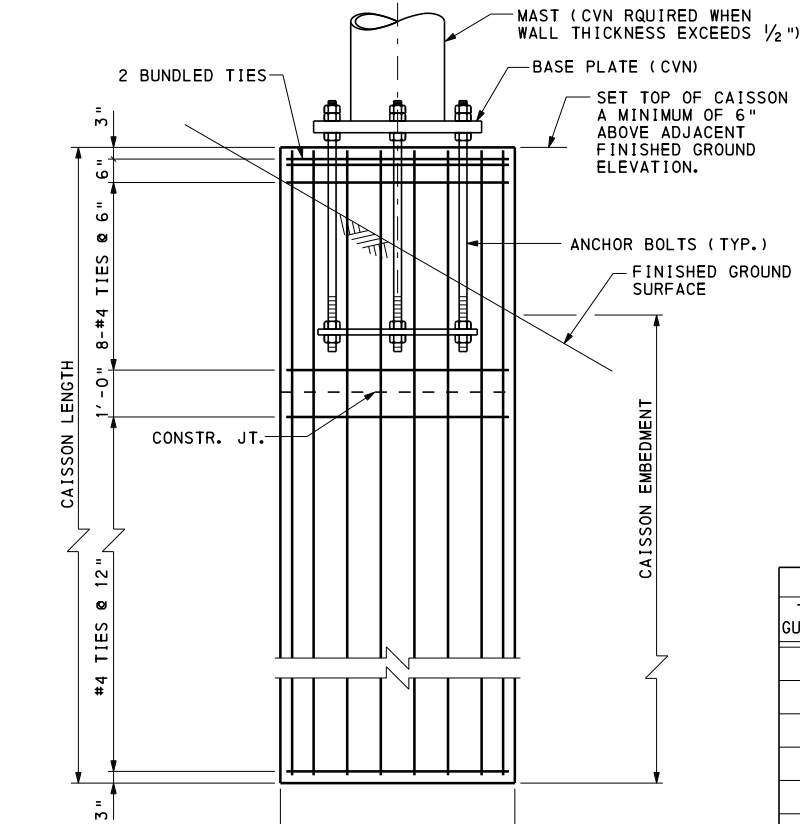
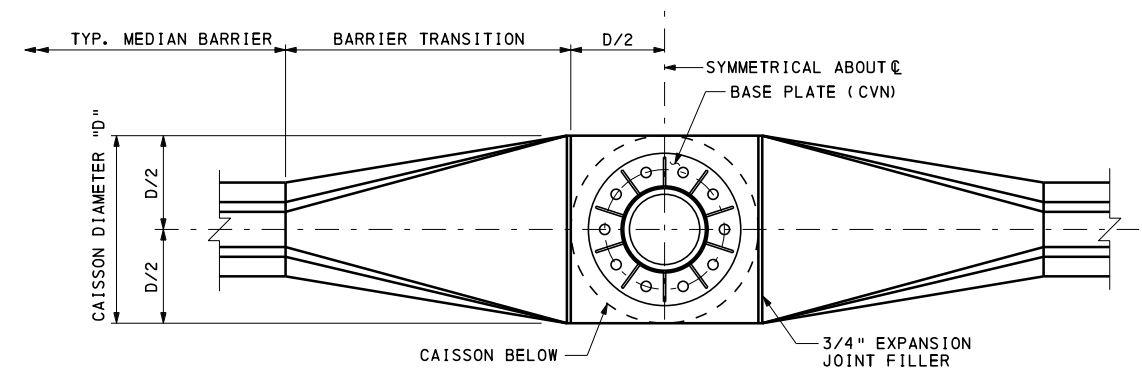


TABLE "A"	
TYPE OF GUIDE RAIL	MINIMUM † UNOBSTRUCTED DISTANCE
31-SCC	1'-6"
31-SC	3'-0"
31-S	4'-0"
2-WCC	5'-6"
2-WC	6'-6"
2-W	9'-0"
MEDIAN BARRIER	0'-0"

† FROM BACK OF GUIDE RAIL POST TO FACE OF CAISSON.

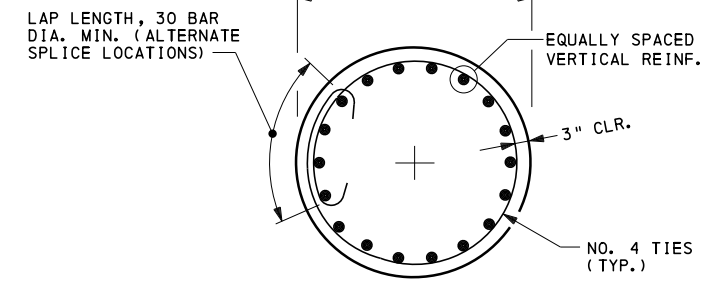
**CAISSON FOUNDATION DETAILS
MEDIAN BARRIER INSTALLATION**

(SEE ROADSIDE INSTALLATION, THIS SHEET, FOR ADDITIONAL INFORMATION) (10 BOLT CONFIGURATION SHOWN)

NOTES:

- FOR GENERAL NOTES, SEE SHEET 1.
- FOR ANCHOR BOLT INFORMATION, SEE SHEET 2 (CANTILEVER STRUCTURES) OR SHEET 4 (FRAME STRUCTURES).

CAISSON COMPONENT SELECTION TABLE CANTILEVER STRUCTURES									
SPAN (FEET)	PANEL AREA (S.F.)	CAISSON DIAMETER (INCHES)	CAISSON EMBEDMENT (FEET)				VERT. REINF.		
			SOIL	MAX. GROUND SLOPE				NO.	SIZE
				8:1	4:1	2:1	1.5:1		
27	350	48	C	20.5	21.0	21.5	22.0	15	#8
			G	21.0	21.0	21.0	-		
	250	48	C	17.5	18.0	18.5	19.0	12	#8
			G	19.0	19.0	19.0	-		



**CAISSON FOUNDATION DETAILS
ROADSIDE INSTALLATION**

CAISSON SELECTION NOTES:

- SOIL TYPE "C" IS SOFT COHESIVE SOIL AND SOIL TYPE "G" IS LOOSE GRANULAR SOIL, SEE DESIGN NOTE 3 ON SHEET 1 OF 6.
- *REPRESENTS THAT A BELLED CAISSON IS REQUIRED FOR THE SOFT COHESIVE SOIL, SEE SHEET 1 OF 6.

CAISSON DRILLING AND INSTALLATION NOTES:

- CONTACT THE STRUCTURE CONTROL ENGINEER IF ANY OF THE FOLLOWING SOIL CONDITIONS ARE ENCOUNTERED DURING DRILLING:
 - THE SOIL HAS A HIGH ORGANIC CONTENT OR CONSISTS OF SATURATED SILT AND CLAY.
 - THE SITE WILL NOT SUPPORT THE WEIGHT OF THE DRILLING RIG.
 - FIRM BEDROCK IS ENCOUNTERED.
- CONSTRUCT DRILLED CAISSONS PER PUB. 408, SECTION 1006.3
- SUBMIT AN AS-BUILT SURVEY OF EACH CAISSON FOUNDATION TO THE REPRESENTATIVE THAT IDENTIFIES ANCHOR BOLT LOCATION, ANCHOR BOLT ORIENTATION, DISTANCE BETWEEN ANCHOR BOLT GROUPS (FOR FRAME STRUCTURES), TOP OF ANCHOR BOLT ELEVATIONS, TOP OF CAISSON ELEVATIONS, AND ADJACENT FINISHED GROUND ELEVATIONS. INCLUDE A COPY OF THE SURVEY NOTES. RECONCILE ANY DIFFERENCES BETWEEN SURVEY INFORMATION AND DATA ON THE APPROVED SHOP DRAWINGS. SUBMIT ALL PROPOSED ADJUSTMENTS OR MODIFICATIONS TO THE REPRESENTATIVE FOR ACCEPTANCE.

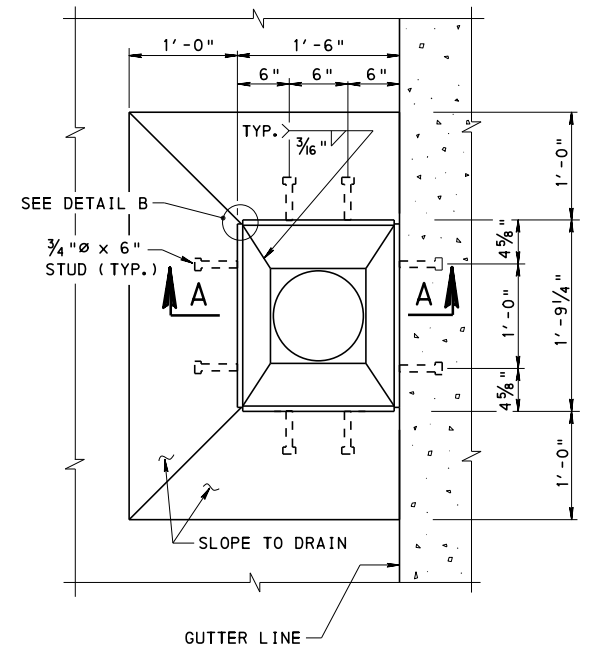
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

MONOPIPE SIGN STRUCTURES
FRAME STRUCTURE SPANS UP TO 160'
AND CANTILEVER MONOPIPE STRUCTURE
STRUT LENGTHS UP TO 27'

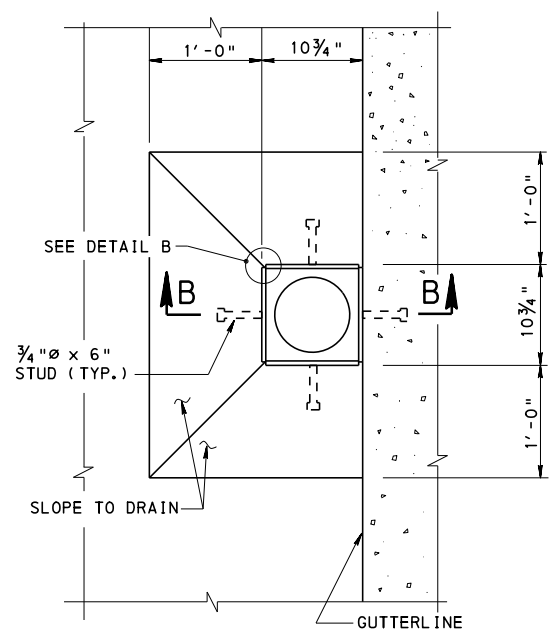
FOUNDATION DETAILS

RECOMMENDED AUG. 4, 2017 <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED AUG. 4, 2017 <i>Brenda S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 5 OF 5 BC-747M
--	---	--------------------------------

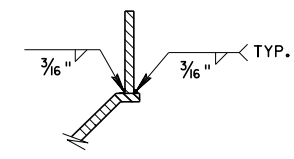
CHANGE 2



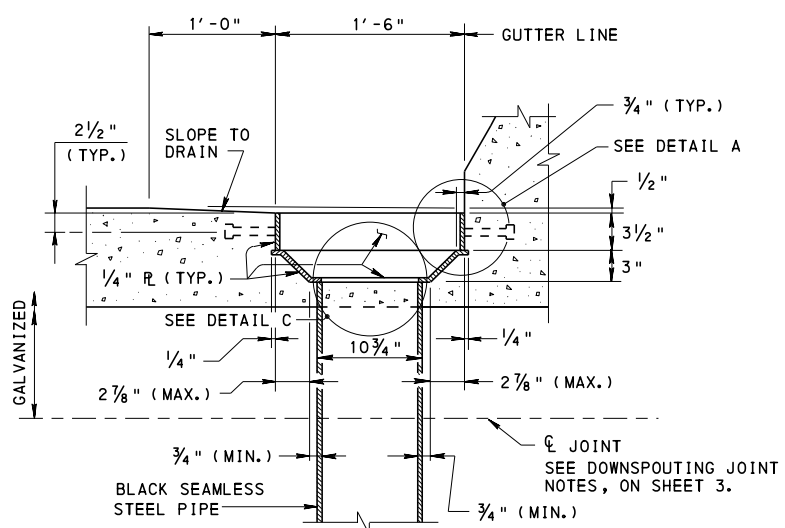
PLAN



PLAN



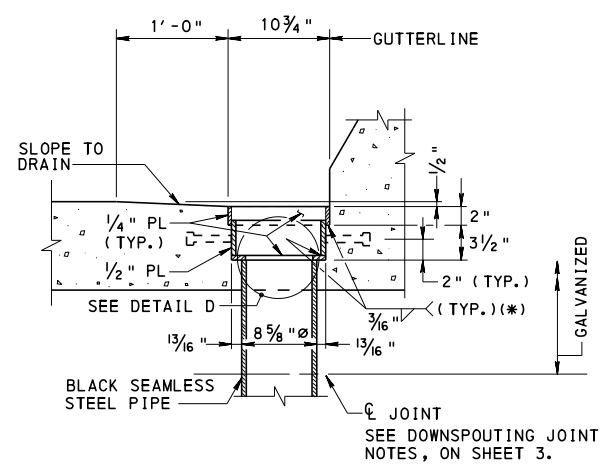
DETAIL A



SECTION A-A

TYPE 1 SCUPPER

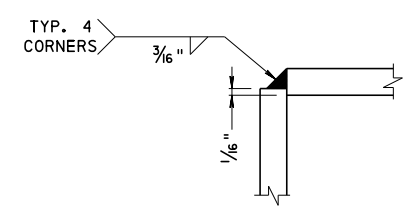
SHOWN WITHOUT GRATE, SEE TYPE 1 GRATE DETAIL THIS SHT.



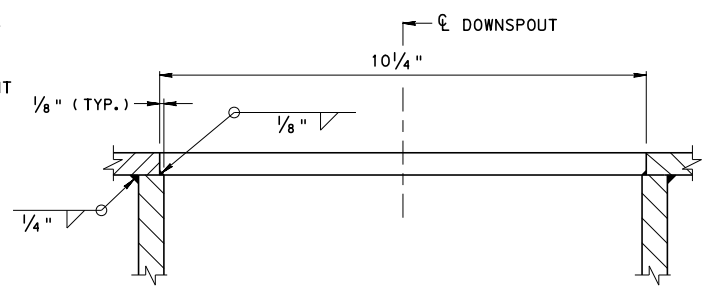
SECTION B-B

TYPE 2 SCUPPER

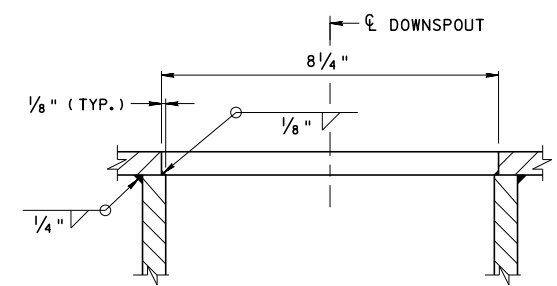
SHOWN WITHOUT GRATE, SEE TYPE 2 GRATE DETAIL THIS SHT.



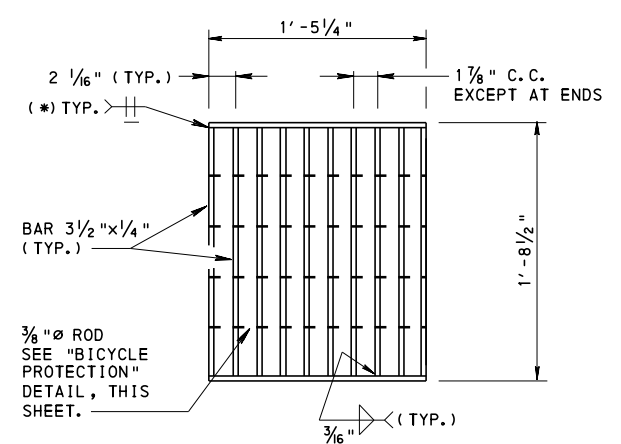
DETAIL B



DETAIL C

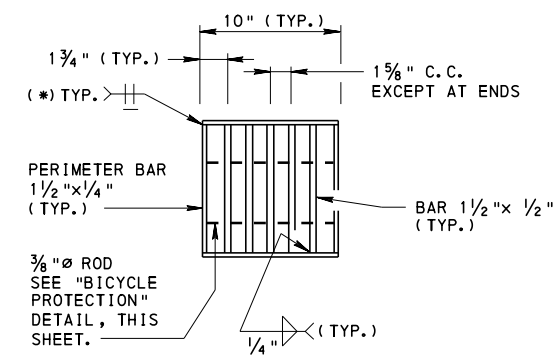


DETAIL D



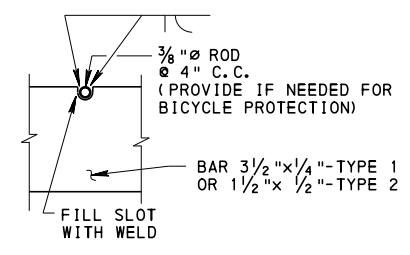
PLAN

TYPE 1 GRATE



PLAN

TYPE 2 GRATE



BICYCLE PROTECTION

(UNLESS DELETED BY CONTRACT DRAWINGS)

(*) = OR EQUIVALENT FULL PENETRATION WELD.

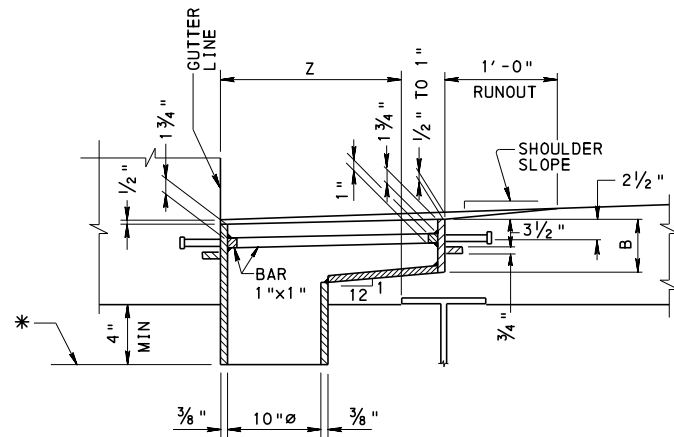
NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CURRENT VERSIONS OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, AASHTO/AWS BRIDGE WELDING CODE D1.5, AND CONTRACT SPECIAL PROVISIONS. USE AWS D1.1 FOR WELDING NOT COVERED IN AASHTO/AWS D1.5.
2. DO NOT USE TYPE 2 SCUPPER UNLESS TYPE 1 SCUPPER CANNOT BE ACCOMMODATED.
3. WELDED CONSTRUCTION: USE STRUCTURAL STEEL CONFORMING TO AASHTO M270M/M270, GR. 36 (ASTM A709/A709M, GR. 36).
4. PROVIDE WELDED STUDS CONFORMING TO PUB. 408, SECTION 1105.02(e).
5. GALVANIZE ALL MATERIALS IN ACCORDANCE WITH PUB. 408, SECTION 1105.02(s) 1, AFTER FABRICATION.
6. REPAIR ALL DAMAGED GALVANIZED SURFACES IN ACCORDANCE WITH PUB. 408, SECTION 1105.02(s) 2.
7. CAST GRATES: CONSTRUCT GRATES OF MALLEABLE IRON CONFORMING TO ASTM A47/A47M, GRADE 32510, CAST STEEL CONFORMING TO ASTM A27/A27M, GRADE 65-35, OR DUCTILE IRON CONFORMING TO ASTM A536, GRADE 60-40-18.
8. DO NOT WELD CAST MATERIAL.
9. PROVIDE EITHER STANDARD 8"Ø OR 10"Ø NPS STEEL PIPE (ASTM A53/A53M) AS INDICATED. PROVIDE PIPE JOINTS OF SCREWED MALLEABLE IRON (ASTM A 338) OR STEEL WELDING FITTINGS (ASTM A234/A234M) FOR USE WITH STEEL PIPE. PROVIDE EQUIVALENT SIZE FIBERGLASS OR PVC PIPE BELOW JOINT WHEN SPECIFIED BY THE DISTRICT BRIDGE ENGINEER.
10. TACK WELD ALL FOUR CORNERS OF GRATES.
11. ALL DIAMETERS SPECIFIED ARE NOMINAL.
12. MANUFACTURE METAL CURB DRAIN PER PUB. 408, SECTION 1052.
13. METAL CURB DRAINS DESIGNED AND MANUFACTURED IN ACCORDANCE WITH THIS STANDARD DRAWING DO NOT REQUIRE SHOP DRAWINGS.
14. PROVIDE FLOOR DRAINS OF EITHER GALVANIZED STEEL OR ALUMINUM PIPE AS INDICATED UNLESS FIBERGLASS OR PVC PIPE IS SPECIFIED BY THE DISTRICT BRIDGE ENGINEER.
15. ALUMINUM CURB OR FLOOR DRAINS IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALKALINE-RESISTANT BITUMINOUS PAINT.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

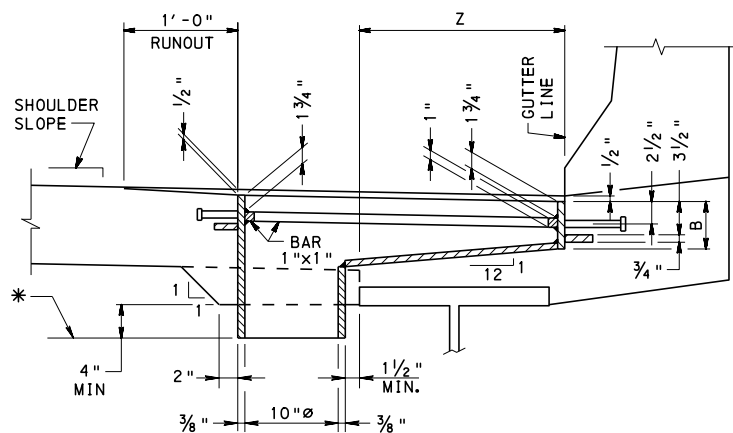
**STANDARD
BRIDGE DRAINAGE
SCUPPER DETAILS
TYPE 1 & TYPE 2**

RECOMMENDED JAN. 31, 2019 <i>T. Ross R. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>William J. ...</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 1 OF 7 BC-751M
---	--	--------------------------------



- NOTES:
 1. USE CONTINUOUS FILLET WELD FOR INSIDE AND OUTSIDE. 1/4" MIN. SIZE.
 2. GRATING NOT SHOWN

SECTION C-C
(TYPE A OR B SCUPPER)

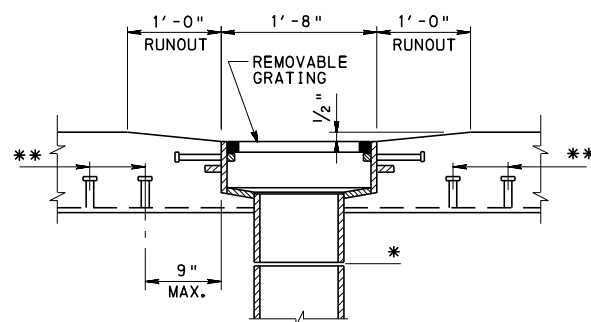


- NOTES:
 1. USE CONTINUOUS FILLET WELD FOR INSIDE AND OUTSIDE. 1/4" MIN. SIZE.
 2. GRATING NOT SHOWN

SECTION C-C
(TYPE C OR D SCUPPER)

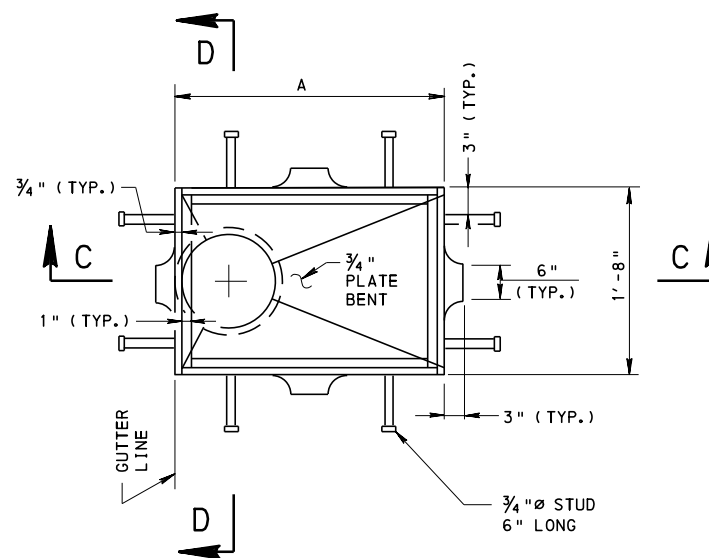
* SEE DOWNSPOUTING JOINT NOTES ON SHEET 3.

** RESPACE SHEAR CONNECTORS ON COMPOSITE CONSTRUCTION TO CLEAR SCUPPERS.

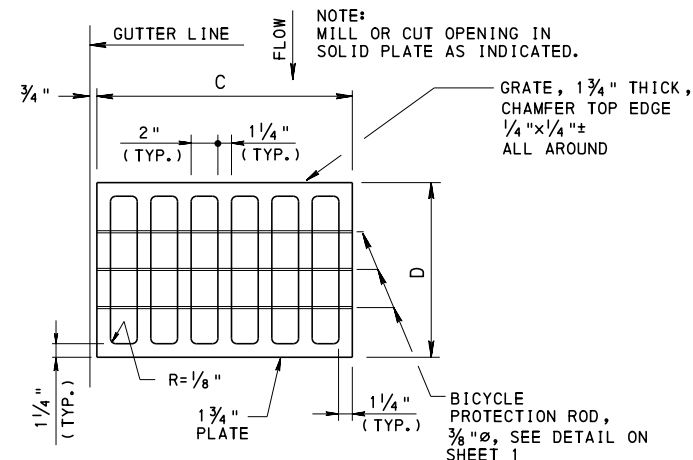


SECTION D-D

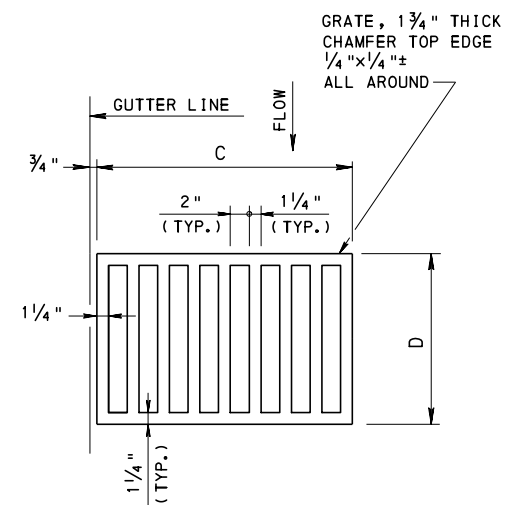
WELDED SCUPPER DETAILS



PLAN



ALTERNATE STRUCTURAL STEEL SCUPPER GRATE



CAST GRATING PLAN

NOTE:
 PROVIDE ALTERNATE STRUCTURAL STEEL GRATE WHEN BICYCLE PROTECTION IS REQUIRED, SEE DETAIL THIS SHEET.

NOTE:
 THE SCUPPERS DETAILED ON THIS SHEET ARE FOR GUIDANCE ONLY IN REHABILITATION PROJECTS. DO NOT USE IN NEW CONSTRUCTION UNLESS SPECIFICALLY APPROVED BY THE DISTRICT BRIDGE ENGINEER.

TABLE I	
SPECIFY TYPE A SCUPPER FOR Z UP TO 1'-6"	
SPECIFY TYPE B SCUPPER FOR Z OVER 1'-6" TO 3'-0"	
SPECIFY TYPE C SCUPPER FOR Z UP TO 1'-10 1/2"	
SPECIFY TYPE D SCUPPER FOR Z OVER 1'-10 1/2" TO 2'-8 1/4"	

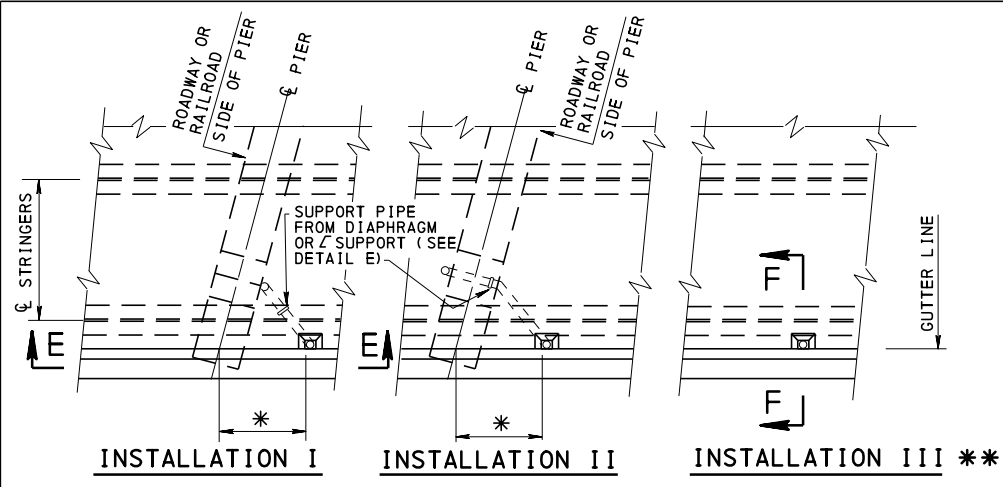
TABLE II - U.S. CUSTOMARY UNITS						
	DIMENSIONS				APPROXIMATE WEIGHT	
	A	B	C	D	SCUPPER	W/ GRATE
TYPE A SCUPPER	1'-10 1/2"	6"	1'-8 3/4"	1'-6 1/4"	295 LB	395 LB
TYPE B SCUPPER	2'-8 1/4"	5"	2'-6 1/2"	1'-6 1/4"	380 LB	525 LB
TYPE C SCUPPER	2'-11 1/2"	5"	2'-9 3/4"	1'-6 1/4"	400 LB	545 LB
TYPE D SCUPPER	3'-9 1/4"	5"	3'-7 1/2"	1'-6 1/4"	465 LB	655 LB

SCUPPER WEIGHTS LISTED ARE FOR A SCUPPER ASSEMBLY DEPTH OF 1'-3".

COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

STANDARD
 BRIDGE DRAINAGE
 SCUPPER DETAILS
 TYPE A, B, C & D

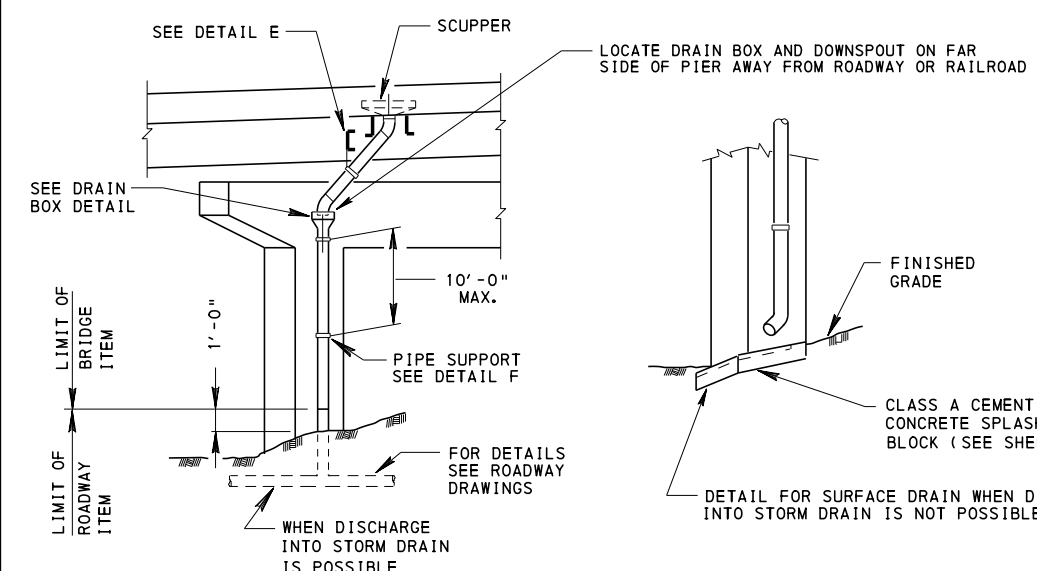
RECOMMENDED JAN. 31, 2019 T. Ross R. Maciora CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 [Signature] ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 2 OF 7 BC-751M
--	--	-------------------------



INSTALLATION I INSTALLATION II INSTALLATION III **

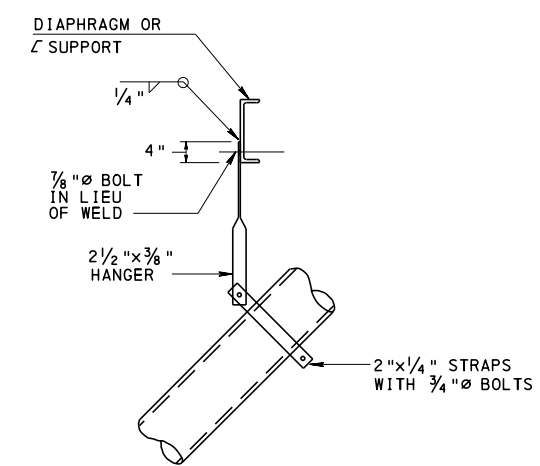
PLAN SHOWING TYPICAL INSTALLATION OF SCUPPERS

- * AS REQUIRED FOR A MIN. 45° DRAIN PIPE SLOPE
- ** USE INSTALLATION III IN SPANS OVER STREAMS AND OVER GROUND WHERE DISCHARGE IS NOT OBJECTIONABLE.



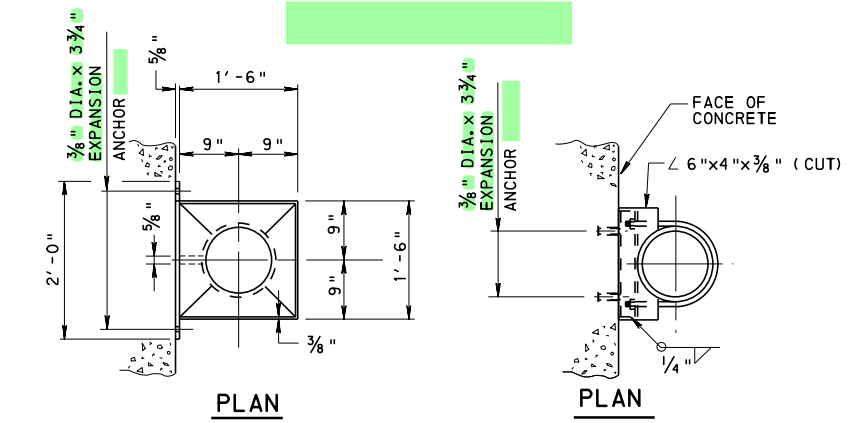
ELEVATION E-E

FOR INSTALLATIONS I AND II, CONNECT DOWNSPOUT TO STORM DRAIN, IF PRACTICAL, AND INCLUDE DETAILS OF THE CONNECTION ON ROADWAY DRAWINGS. IF CONNECTION TO STORM DRAIN IS IMPRACTICAL, HAVE DOWNSPOUT DISCHARGE ONTO SPLASH BLOCK.



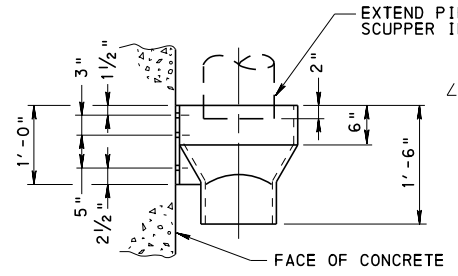
DETAIL E

SPACING OF HANGER SUPPORTS TO BE BASED ON FULL PIPE (SELF WEIGHT, WATER, ICE AND ANTI-SKID DEBRIS)

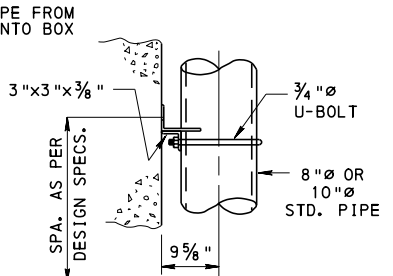


PLAN

PLAN



ELEVATION DRAIN BOX DETAIL

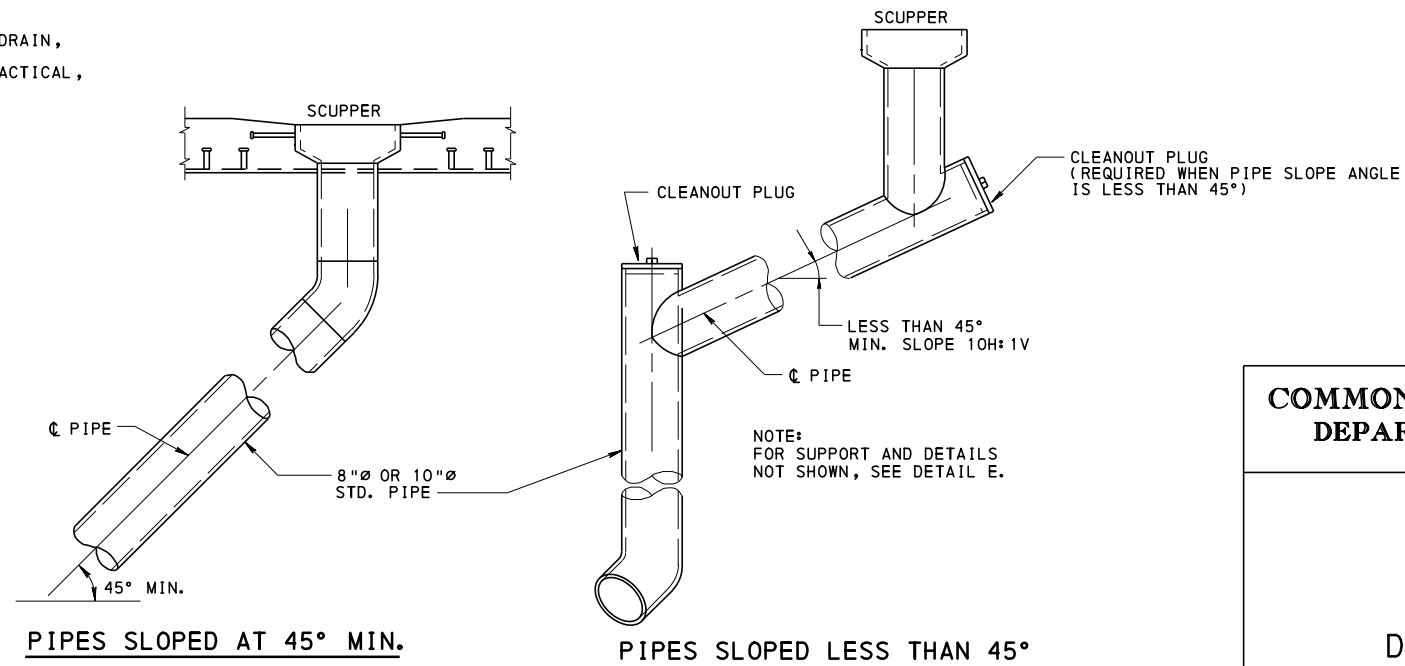


ELEVATION DETAIL F

DETAILS SHOWN ARE SUITABLE FOR PLANE CONCRETE SURFACES. MODIFY THE DETAILS AS REQUIRED FOR ROUND CONCRETE SURFACES.

DOWNSPOUTING JOINT NOTES:

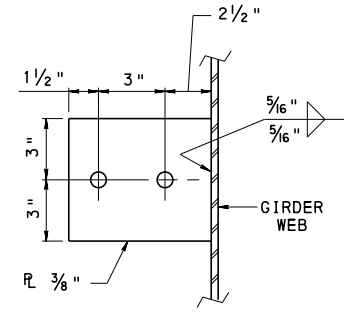
- FOR STEEL PIPE: PROVIDE MECHANICAL COUPLINGS.
- FOR PVC OR FIBERGLASS PIPE: PROVIDE MECHANICAL COUPLINGS.
- AT THE DISCRETION OF THE ENGINEER, DELETE JOINT FROM INSTALLATION III.
- FOR ALL MECHANICAL COUPLINGS, PROVIDE COUPLING AS PER PIPE MANUFACTURERS RECOMMENDATIONS.



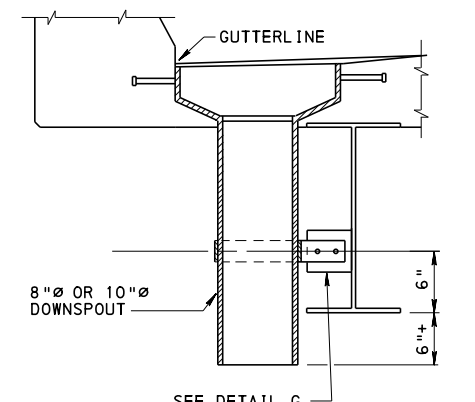
PIPES SLOPED AT 45° MIN.

PIPES SLOPED LESS THAN 45°

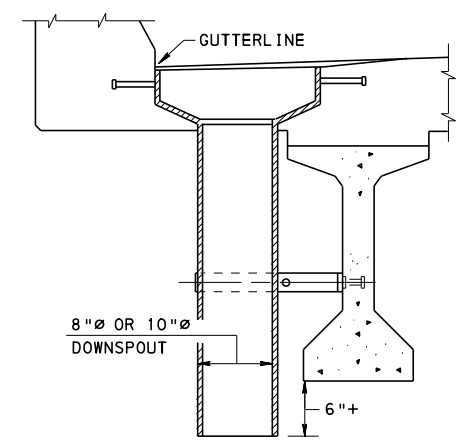
INSTALLATIONS I & II



DETAIL G



SECTION F-F STEEL GIRDER



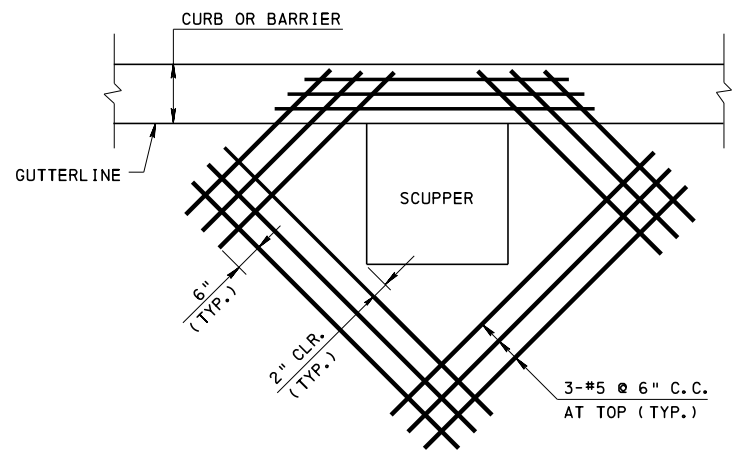
SECTION F-F PRESTRESSED I-BEAM

INSTALLATION III

FOR ADDITIONAL INFORMATION SEE DOWNSPOUTING DETAILS ON SHEET 4

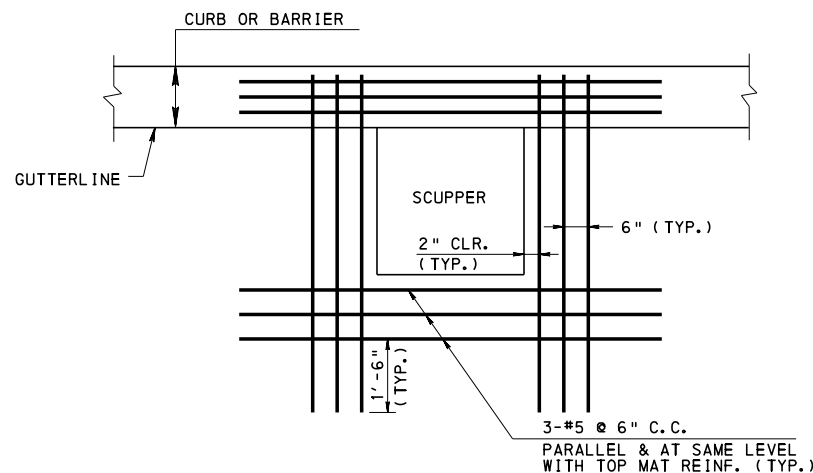
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
BRIDGE DRAINAGE
DOWNSPOUTING DETAILS**



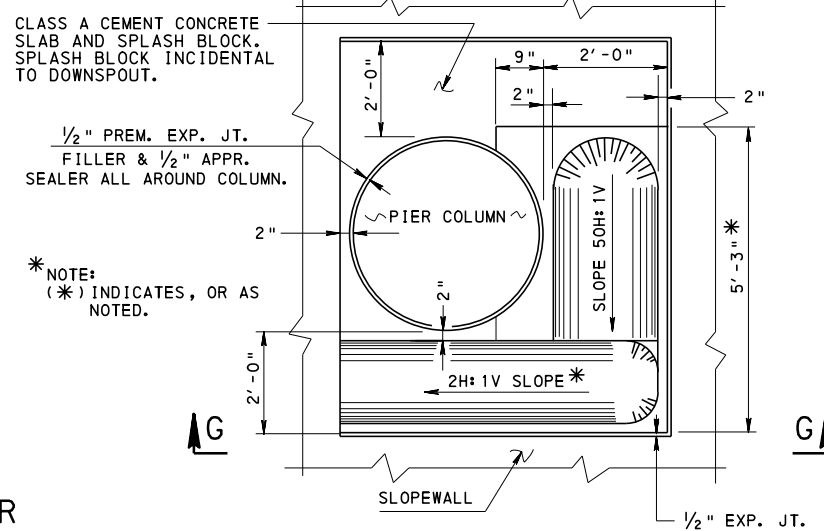
ADDITIONAL DECK REINFORCEMENT AT SCUPPER

CUT AND/OR REPOSITION DECK REINFORCEMENT TO ACCOMMODATE SCUPPERS OR DRAINS

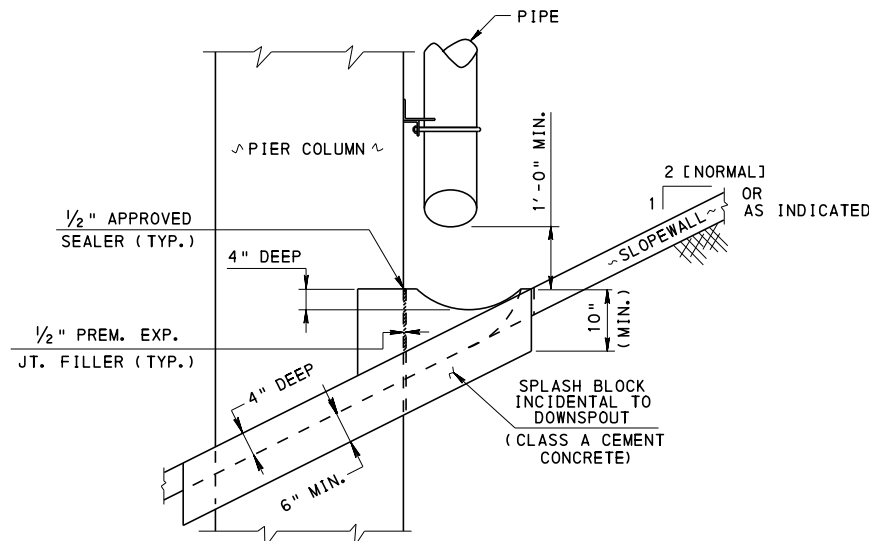


ALTERNATE DECK REINFORCEMENT AT SCUPPER

CUT AND/OR REPOSITION DECK REINFORCEMENT TO ACCOMMODATE SCUPPERS OR DRAINS (ALTERNATE TO DETAIL ABOVE)

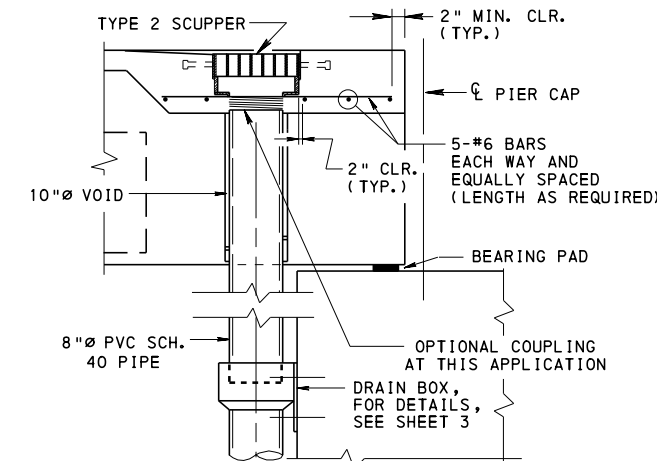


PLAN

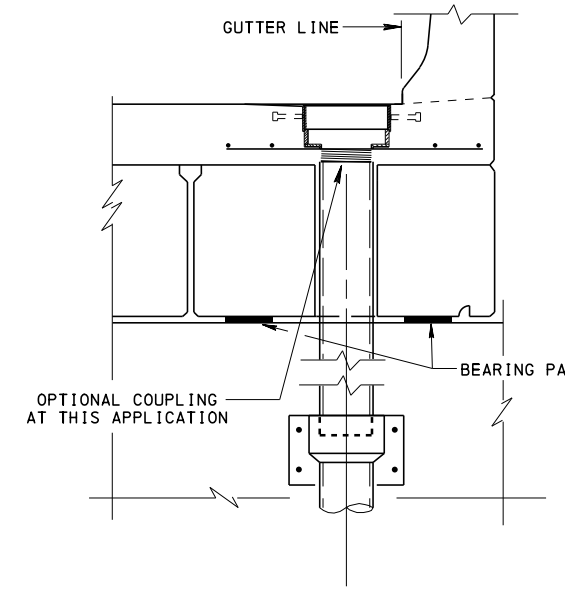


VIEW G-G

SPLASH BLOCK DETAIL



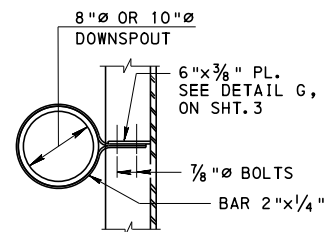
SECTION ALONG C BEAM



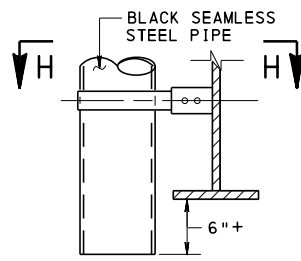
SECTION THRU BEAM

THRU ADJACENT BOX BEAM DETAILS

- LOCATE DRAINS IN BEAM END BLOCKS ONLY.
- FORM VOID IN BOX BEAM USING 10"Ø P.V.C. PIPE OR APPROVED EQUAL.
- CUT AND/OR REPOSITION DECK REINFORCEMENT TO ACCOMMODATE SCUPPERS OR DRAINS.
- ONLY 48" WIDE BOX BEAMS CAN BE USED.

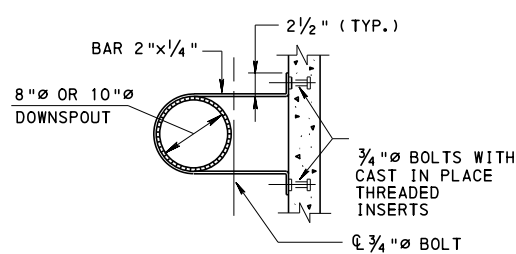


SECTION H-H

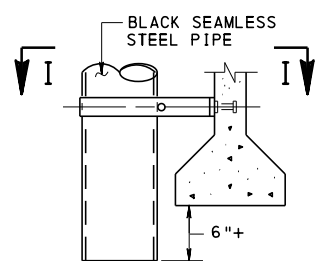


ELEVATION

STEEL GIRDER

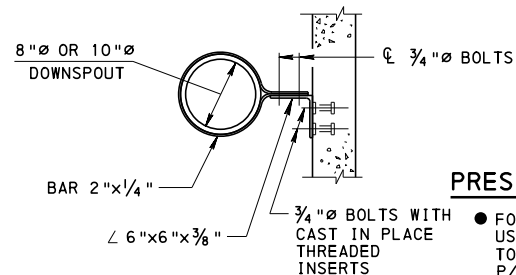


SECTION I-I

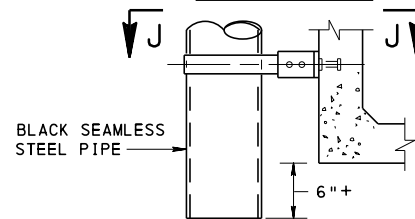


ELEVATION

PRESTRESSED I-BEAM



SECTION J-J



ELEVATION

PRESTRESSED BOX BEAM

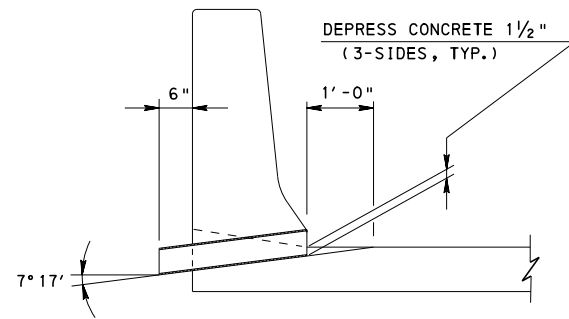
PRESTRESSED DRILLING NOTES:

- FOR REHABILITATION PROJECTS ONLY: USE A PACHOMETER (OR EQUIVALENT) TO LOCATE ALL REINFORCEMENT AND P/S STRANDS IN PRESTRESSED I-BEAMS BEFORE DRILLING HOLES THROUGH WEB. NO DRILLING OF PRESTRESSED BOX BEAMS IS PERMITTED.
- ANY DRILLING OF A PRESTRESSED I-BEAM REQUIRES THE PRIOR APPROVAL OF THE DISTRICT BRIDGE ENGINEER.
- CAST IN PLACE THREADED INSERTS ARE TO BE USED IN NEW P/S BEAMS.

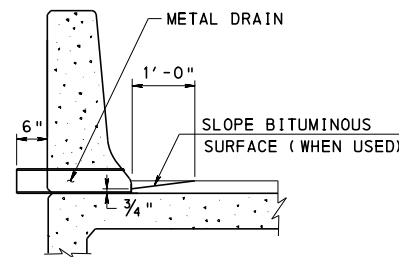
DOWNSPOUTING CONNECTION DETAILS

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

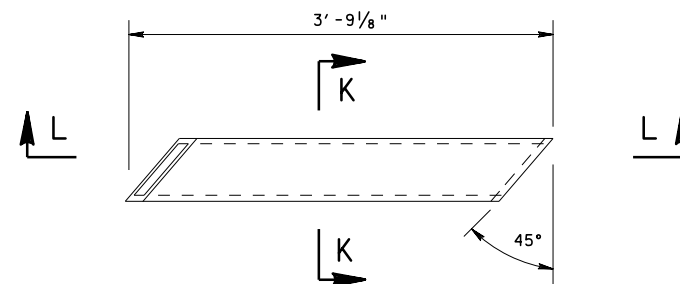
**STANDARD
BRIDGE DRAINAGE
MISCELLANEOUS DETAILS**



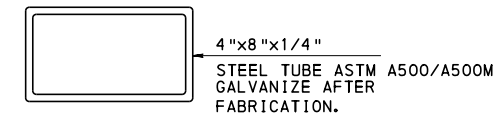
ELEVATION - CONCRETE DECK



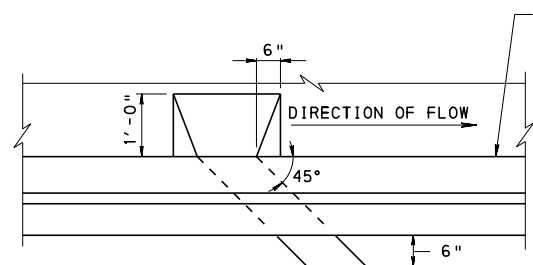
ELEVATION - BITUMINOUS DECK ONLY



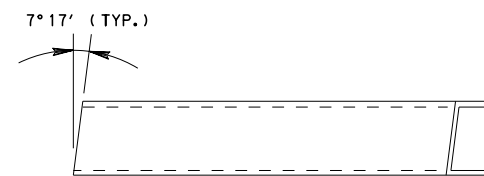
PLAN



SECTION K-K

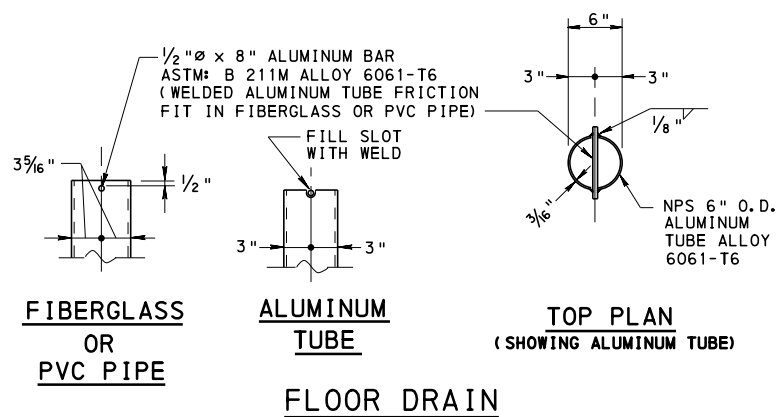


PLAN



VIEW L-L

TYPICAL METAL CURB DRAIN DETAILS

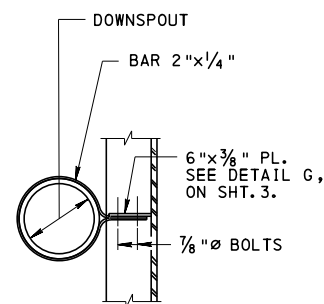


FIBERGLASS OR PVC PIPE

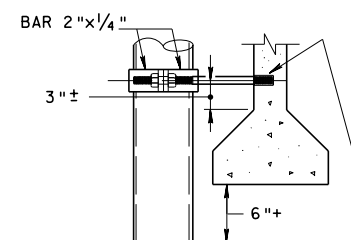
ALUMINUM TUBE

TOP PLAN (SHOWING ALUMINUM TUBE)

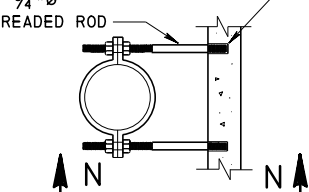
FLOOR DRAIN



STEEL GIRDER



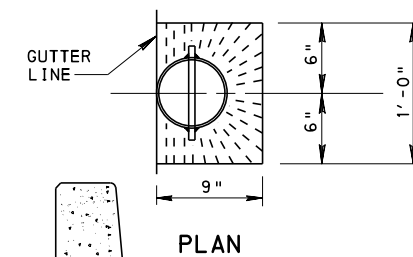
VIEW N-N



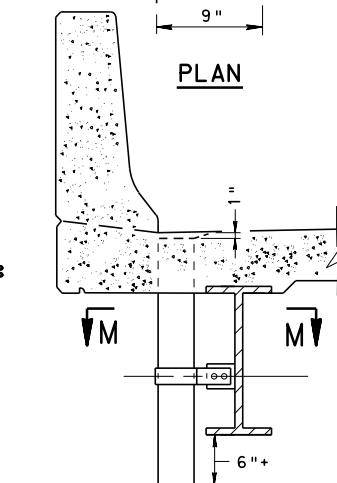
PRESTRESSED GIRDER

PRESTRESSED DRILLING NOTES:

- FOR REHABILITATION PROJECTS: USE A PACHOMETER (OR EQUIVALENT) TO LOCATE ALL REINFORCEMENT AND P/S STRANDS BEFORE DRILLING HOLES FOR THREADED INSERTS.
- ANY DRILLING OF A PRESTRESSED GIRDER REQUIRES THE PRIOR APPROVAL OF THE DISTRICT BRIDGE ENGINEER



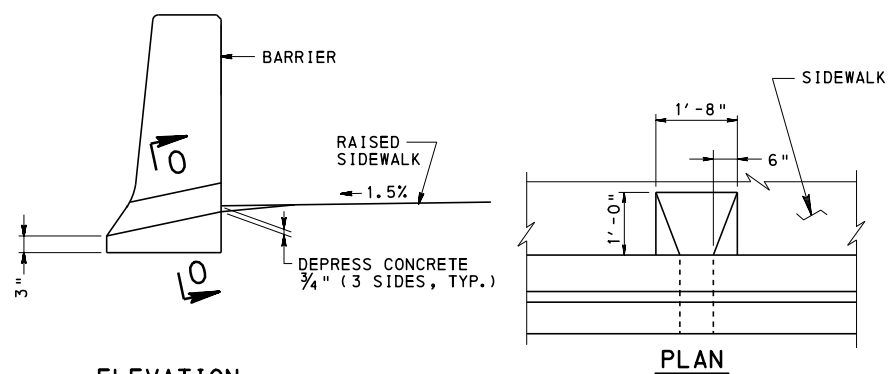
PLAN



SECTION AT BARRIER (FLOOR DRAIN)

SECTION M-M

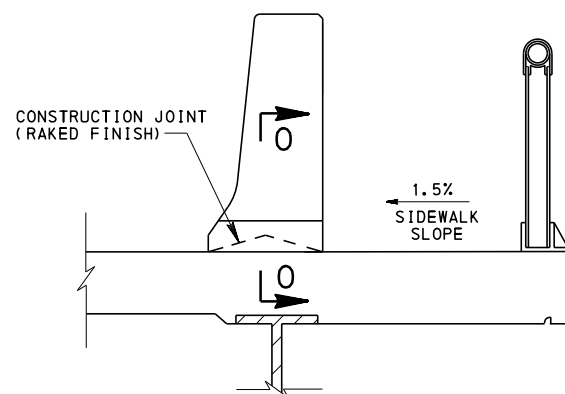
TYPICAL FLOOR DRAIN DETAILS



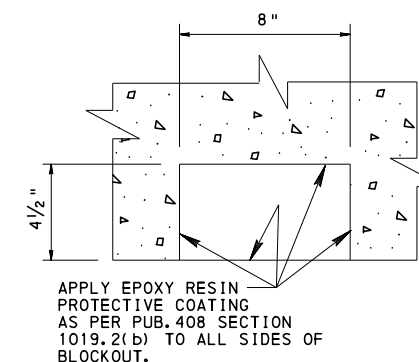
ELEVATION

PLAN

RAISED SIDEWALK DRAINAGE DETAIL



TYPICAL SIDEWALK & BARRIER DRAIN



SECTION 0-0

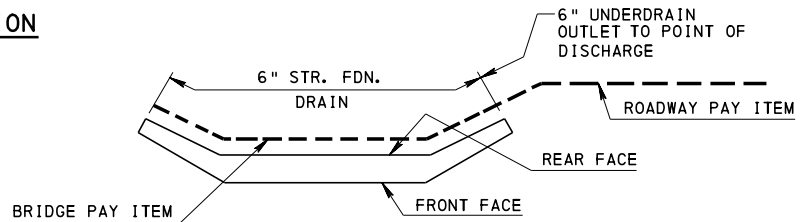
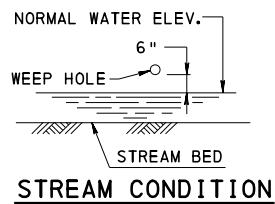
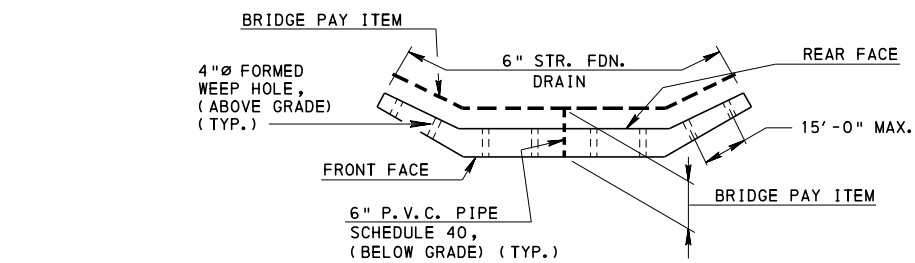
BARRIER DRAIN BLOCKOUTS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

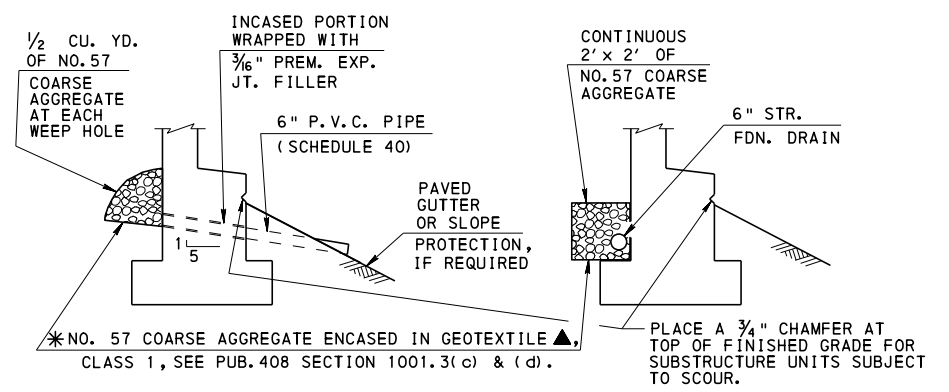
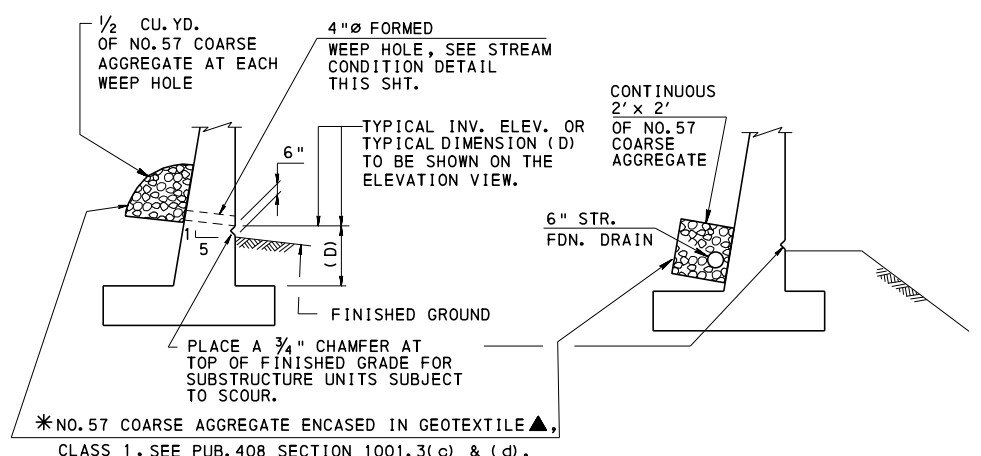
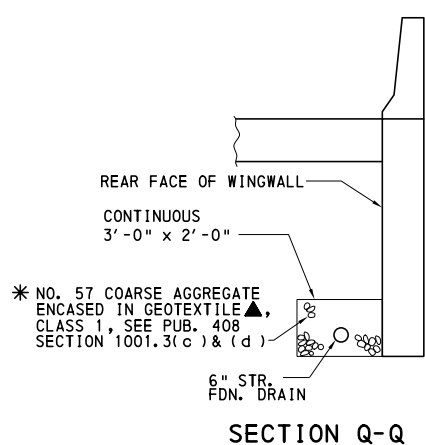
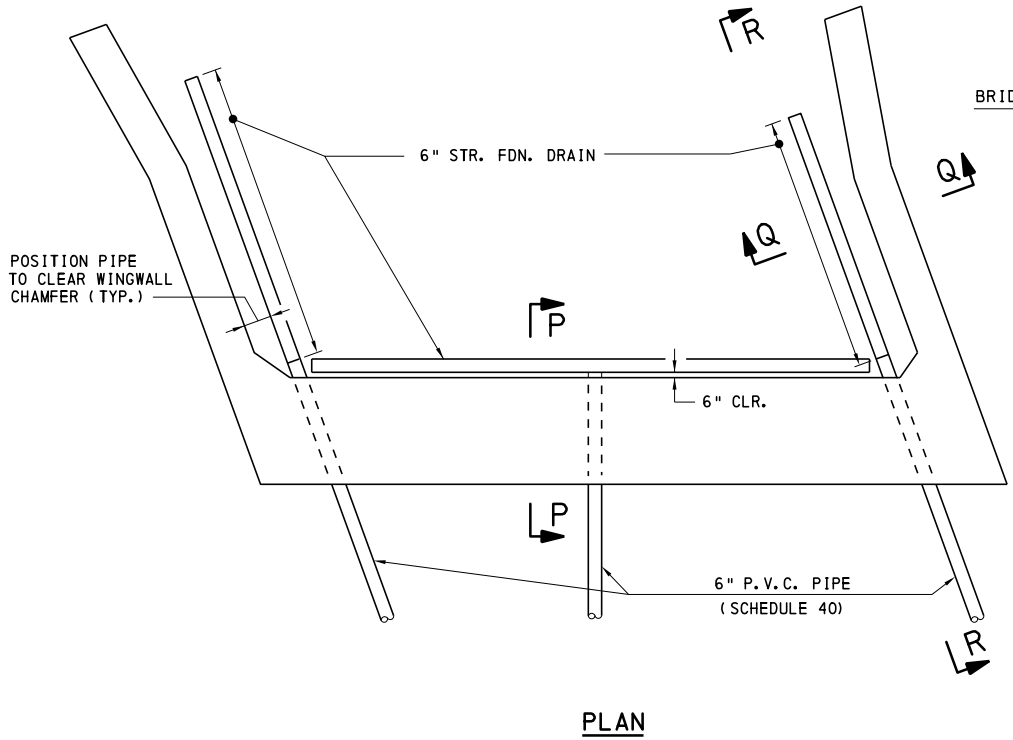
STANDARD
BRIDGE DRAINAGE
METAL CURB AND FLOOR DRAINS

DRAINAGE NOTES:

1. USE SCHEME A IF DISCHARGE AT FRONT OF WALL IS NOT OBJECTIONABLE, OTHERWISE USE SCHEME B.
2. SPACE WEEP HOLES SO AS TO NOT EXCEED 15'.
3. SLOPE 6" STRUCTURE FOUNDATION DRAIN A MINIMUM OF 1/8"/FT.
4. SHOW PIPES IF USED TO COLLECT WATER AT THE REAR OF ABUTMENTS, WINGWALLS AND RETAINING WALLS ON A PLAN VIEW OF THE BRIDGE DRAWINGS, AND INCLUDE THE QUANTITY IN THE BRIDGE QUANTITIES AS 6" STRUCTURE FOUNDATION DRAIN AND 6" P.V.C. PIPE (SCHEDULE 40).
5. SHOW PIPE UNDERDRAIN OUTLETS CARRYING DRAINAGE COLLECTED FROM THE REAR OF ABUTMENTS, WINGWALLS, AND RETAINING WALLS TO A HIGHWAY DRAINAGE SYSTEM ON A PLAN VIEW OF THE BRIDGE DRAWINGS AND ALSO ON THE ROADWAY PLANS. INDICATE THESE PIPES ON THE BRIDGE DRAWING AS A ROADWAY PAY ITEM. FOR DETAILS SEE DRAINAGE SCHEMES. HOWEVER, INCLUDE PIPES ENCASED IN CONCRETE WALLS OR EXTENDING BEYOND THE FRONT FACE OF STUB ABUTMENTS, AND DISCHARGING INTO A DITCH OR ONTO A PAVED SLOPE IN THE BRIDGE QUANTITIES AS 6" P.V.C. PIPE (SCHEDULE 40).
6. SEE SHEET 7 FOR ADDITIONAL DRAINAGE REQUIREMENTS FOR ABUTMENTS WITHOUT BACKWALLS.

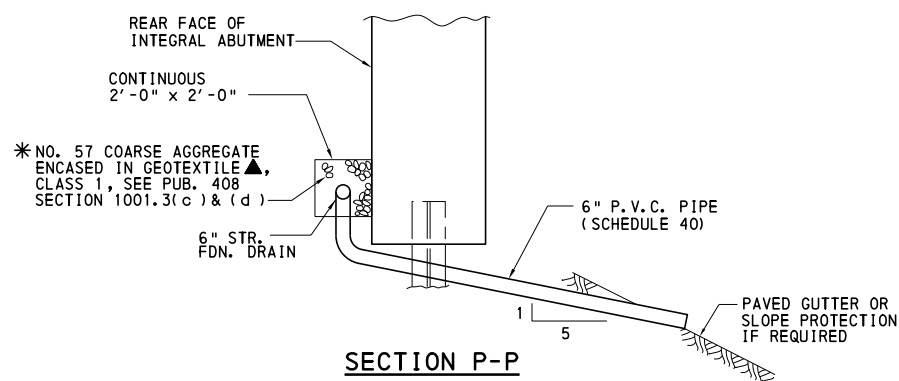
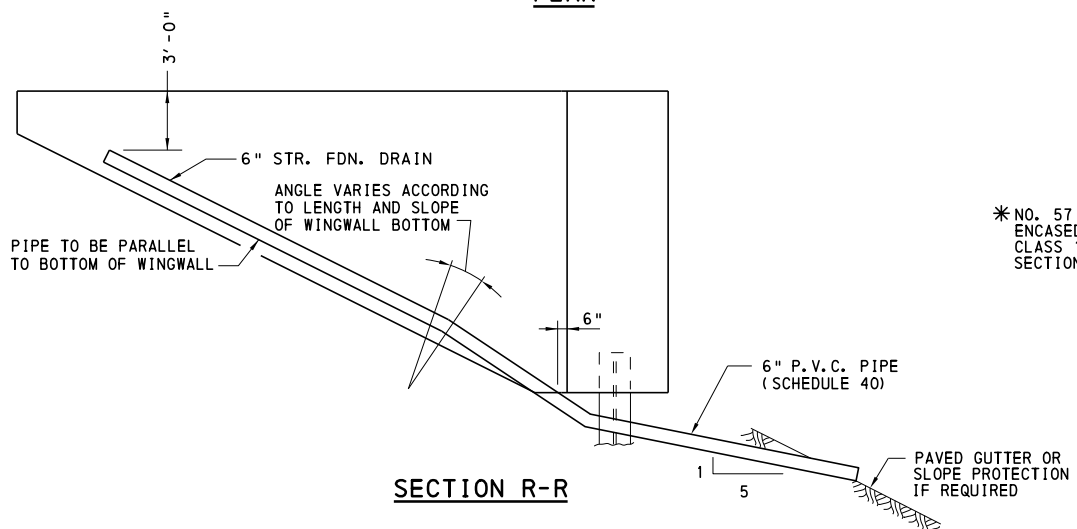


DRAINAGE SCHEMES



ABUTMENT, WING & RETAINING WALL DRAINAGE DETAILS

- * NO. 57 COARSE AGGREGATE ENCASED IN GEOTEXTILE IS NOT REQUIRED IF NO. 57 COARSE AGGREGATE BACKFILL IS USED.
 - ▲ COST OF GEOTEXTILE IS INCIDENTAL TO THE COST OF THE NO. 57 COARSE AGGREGATE.
- SEE SHEET 7 FOR ADDITIONAL DRAINAGE AT ABUTMENT WITHOUT BACKWALL DETAIL.



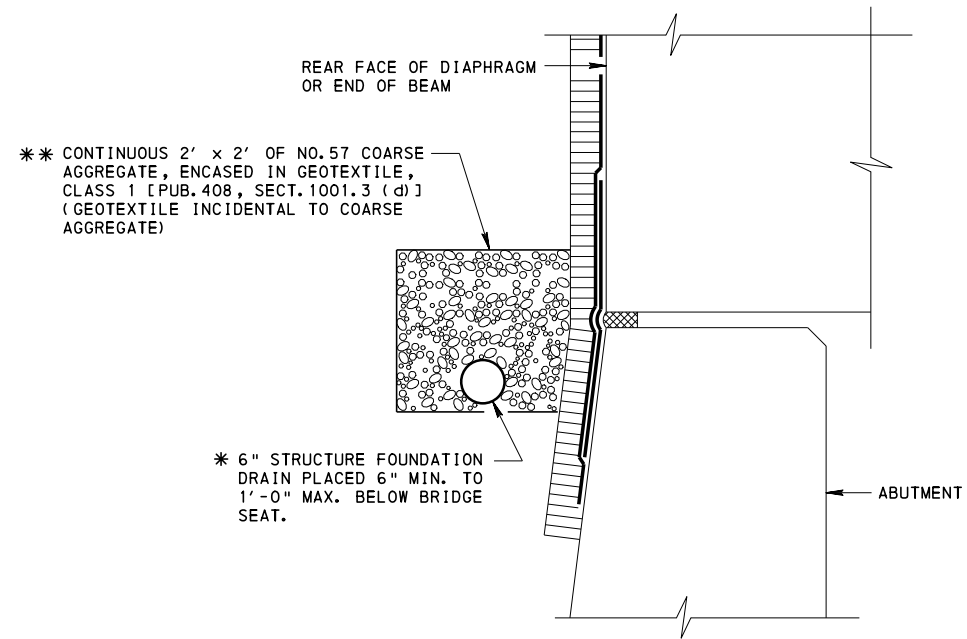
LEGEND:
 STR. FDN. DRAIN = STRUCTURE FOUNDATION DRAIN
 P. V. C. = POLYVINYL CHLORIDE (SCHEDULE 40)

INTEGRAL ABUTMENT SUBSTRUCTURE DRAINAGE

**COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY**

**STANDARD
 BRIDGE DRAINAGE
 MISCELLANEOUS DETAILS**

RECOMMENDED JAN. 31, 2019 <i>T. Ross P. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. ...</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 6 OF 7 BC-751M
---	--	--------------------------------



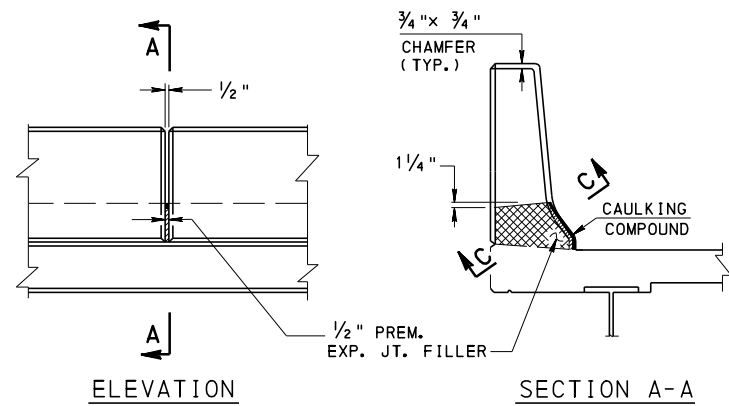
**ADDITIONAL DRAINAGE DETAIL
AT ABUTMENT WITHOUT BACKWALL**

- * SLOPE FOUNDATION DRAIN A MINIMUM OF $\frac{1}{4}$ " PER FOOT. CONNECT TO LOWER STRUCTURE FOUNDATION DRAIN OR OUTLET TO GRADE SIMILAR TO SECTION P-P ON SHEET 6.
- ** NO. 57 COARSE AGGREGATE ENCASED IN GEOTEXTILE IS NOT REQUIRED IF NO. 57 COARSE AGGREGATE BACKFILL IS USED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

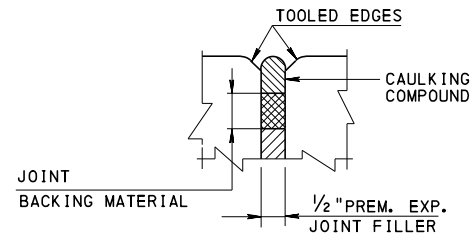
STANDARD
BRIDGE DRAINAGE
MISCELLANEOUS DETAILS

RECOMMENDED JAN. 31, 2019 <i>T. Ross R. Maciara</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. [Signature]</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 7 OF 7 BC-751M
---	--	-------------------------

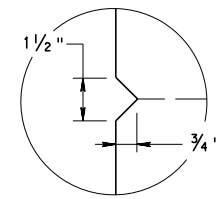


ELEVATION SECTION A-A

BARRIER OPEN JOINT DETAILS



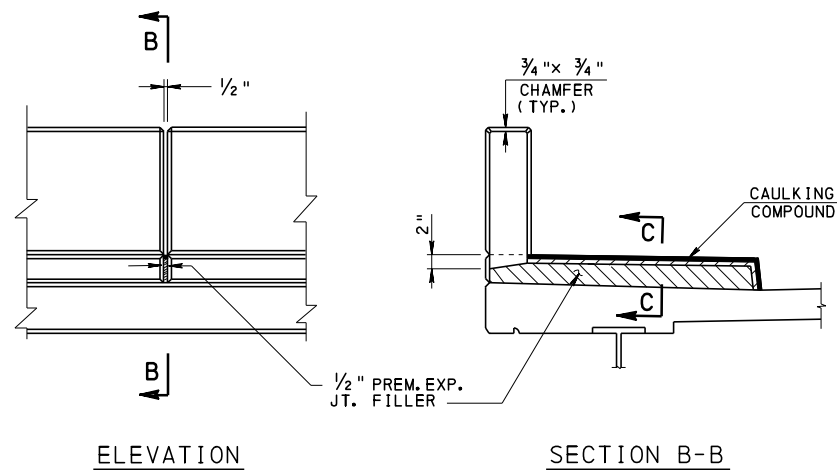
SECTION C-C



V-NOTCH DETAIL

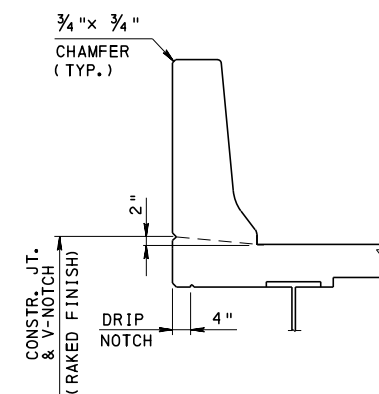
NOTES:

1. PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH PUBLICATION 408.
2. ALL REINFORCEMENT STEEL BARS SHOWN MEET THE REQUIREMENTS OF ASTM A 615, A 996, OR A 706.
3. FOR LOCATION OF CONSTRUCTION JOINTS AND OPEN JOINTS, REFER TO DESIGN DRAWINGS.
4. REMOVE FORMS AND BULKHEAD MATERIALS AT CONSTRUCTION JOINTS IN ACCORDANCE WITH PUBLICATION 408 SECTION 1001.3(c) 1. APPLY EPOXY BONDING COMPOUND CONFORMING TO PUBLICATION 408 SECTION 1001.3(m) BEFORE PLACING FRESH CONCRETE ADJACENT TO PREVIOUSLY PLACED CONCRETE.
5. OPEN JOINT DETAILS APPLY TO ALL TYPE OF BARRIERS. MODIFIED DEFLECTION JOINTS APPLY TO THE FOLLOWING TYPES OF BARRIERS EXCEPT WHEN SUPPORTING A SOUND BARRIER: 32" AND 42" F-SHAPE CONCRETE BARRIERS, 32" AND 50" SPLIT CONCRETE MEDIAN BARRIERS, 32" AND 50" CONCRETE MEDIAN BARRIERS, AND 32" AND 42" VERTICAL WALL CONCRETE BARRIERS.
6. PROVIDE PREMOLDED EXPANSION JOINT FILLER CONFORMING TO PUBLICATION 408, SECTION 705.1.
7. PROVIDE JOINT BACKING MATERIAL CONFORMING TO PUBLICATION 408, SECTION 705.8.
8. PROVIDE CAULKING COMPOUND CONFORMING TO PUBLICATION 408, SECTION 705.7 (b).
9. FOR DRIP NOTCH DETAILS, SEE BC-775M.
10. PROVIDE HIGH MOLECULAR WEIGHT METHACRYLATE (HMWM) CONSTRUCTION JOINT FILLER AND SEALER CONFORMING TO PUBLICATION 408, SECTION 1090.2(e).

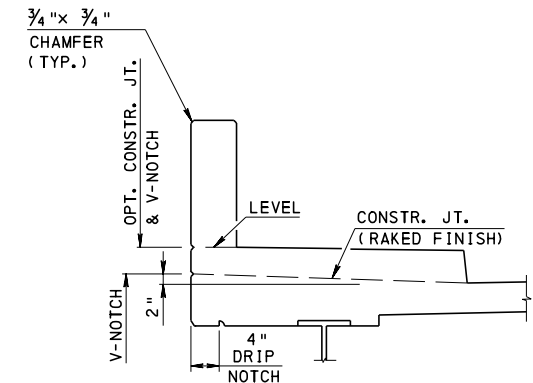


ELEVATION SECTION B-B

SIDEWALK OPEN JOINT DETAILS

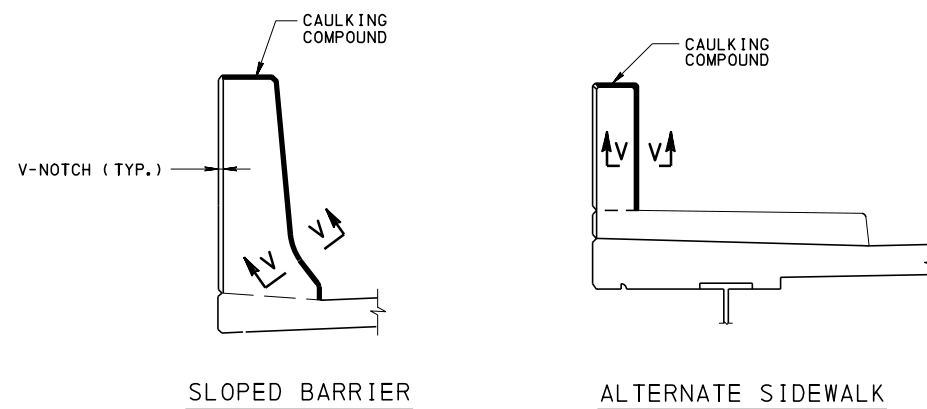


SLOPED BARRIER DETAIL



ALTERNATE SIDEWALK DETAIL

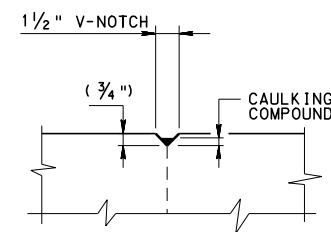
CHANGE 3
CHANGE 4



SLOPED BARRIER

ALTERNATE SIDEWALK

MODIFIED DEFLECTION JOINT DETAILS



SECTION V-V

NOTE: LONGITUDINAL REINFORCEMENT IS CONTINUOUS THROUGH THE JOINT

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

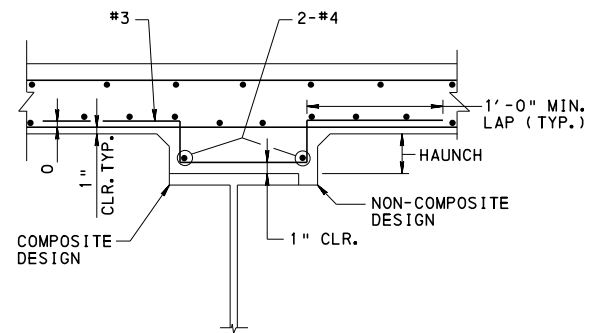
STANDARD
CONCRETE DECK SLAB DETAILS

BC-775M	MISCELLANEOUS PRESTRESS DETAILS
BC-788M	TYPICAL WATERPROOFING AND EXPANSION DETAILS
REFERENCE DRAWINGS	

RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF BRIDGE ENGINEER

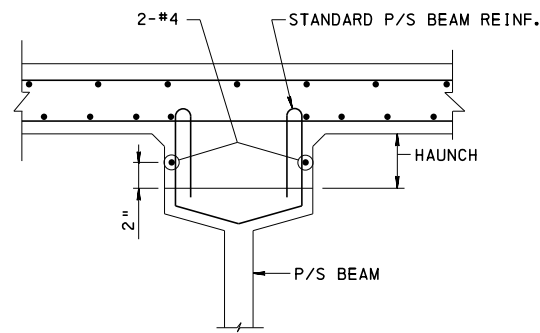
RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 1 OF 3
BC-752M



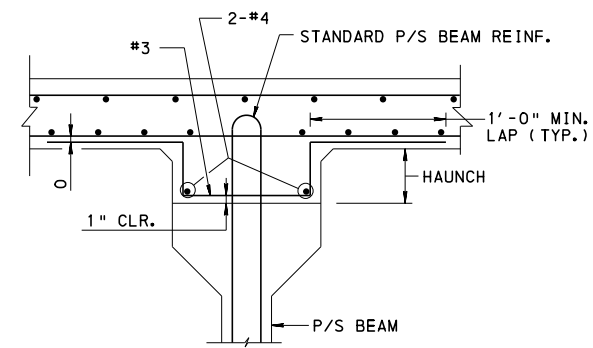
STEEL BEAMS

PROVIDE WHEN HAUNCH THICKNESS IS 3" OR GREATER ANYWHERE ACROSS WIDTH OF HAUNCH



**AASHTO TYPE P/S CONC. I-BEAM
(P/S SPREAD BOX BEAM SIMILAR)**

PROVIDE WHEN HAUNCH THICKNESS IS 5" OR GREATER ANYWHERE ACROSS WIDTH OF HAUNCH

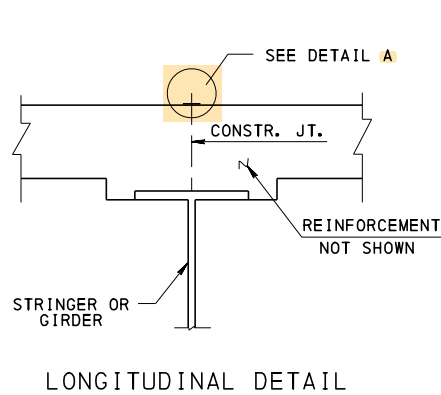


P/S CONC. PA I-BEAM & PA BULB-TEE BEAM

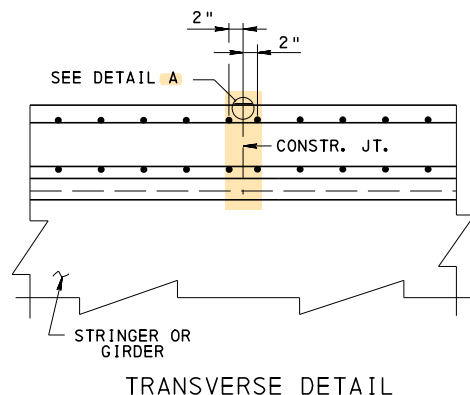
PROVIDE WHEN SIP FORMS ARE PRESENT AND HAUNCH THICKNESS IS 5" OR GREATER ANYWHERE ACROSS WIDTH OF HAUNCH OR WHEN SIP FORMS ARE NOT PRESENT AND THE HAUNCH THICKNESS IS 3" OR GREATER ANYWHERE ACROSS WIDTH OF HAUNCH.

HAUNCH REINFORCEMENT DETAILS

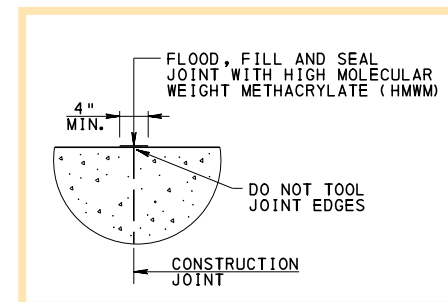
1. EPOXY COAT ALL REINFORCEMENT IN DECK SLAB (INCLUDES HAUNCH REINFORCEMENT AND REINFORCEMENT PROJECTING FROM P/S CONC. BEAMS)
2. IN NEGATIVE MOMENT REGIONS, DO NOT SPLICE LONGITUDINAL REINFORCEMENT OVER PIERS.
3. FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.



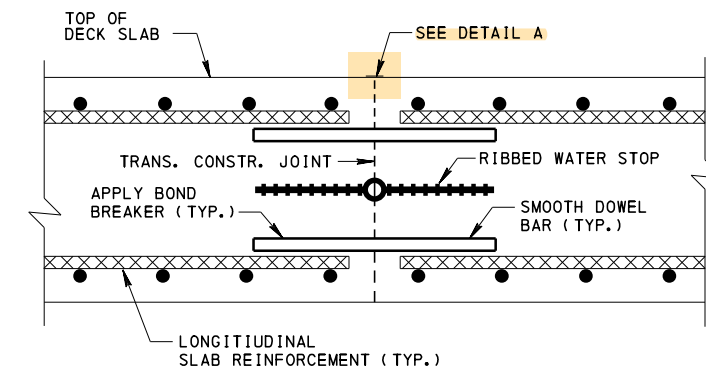
LONGITUDINAL DETAIL



TRANSVERSE DETAIL



DETAIL A



ALTERNATE TRANSVERSE CONSTRUCTION AND CRACK CONTROL JOINT

1. FOR CONTINUOUS BRIDGES USING ALTERNATE PLACEMENT SEQUENCE, SEE BD-660M.
2. FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.
3. DOWELS ARE SAME NOMINAL SIZE AS LAPPED BAR AND 3 FT. LONG.

CONSTRUCTION JOINT DETAILS

1. FOR STAGED CONSTRUCTION, FLOOD, FILL AND SEAL LONGITUDINAL AND TRANSVERSE CONSTRUCTION JOINTS IN BRIDGE DECKS, APPROACH SLABS, AND LATEX MODIFIED CONCRETE (LMC) OVERLAYS WITH HIGH MOLECULAR WEIGHT METHACRYLATE (HMWM) AS SPECIFIED IN PUBLICATION 408, SECTION 1090.3(e).
2. PROVIDE CONSTRUCTION JOINTS ONLY WHERE INDICATED. DO NOT ADD LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINTS.

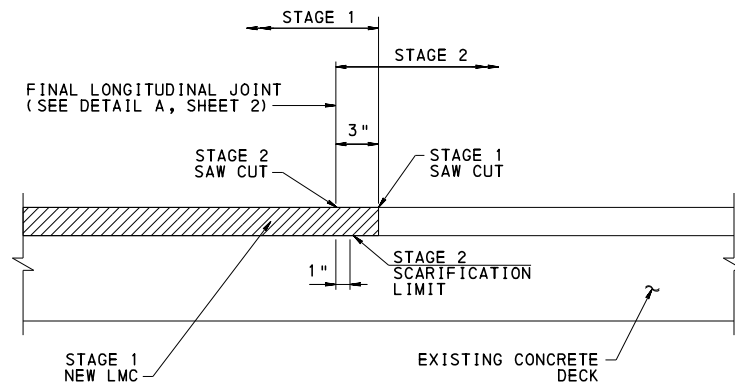
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

**STANDARD
CONCRETE DECK SLAB DETAILS**

RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF BRIDGE ENGINEER

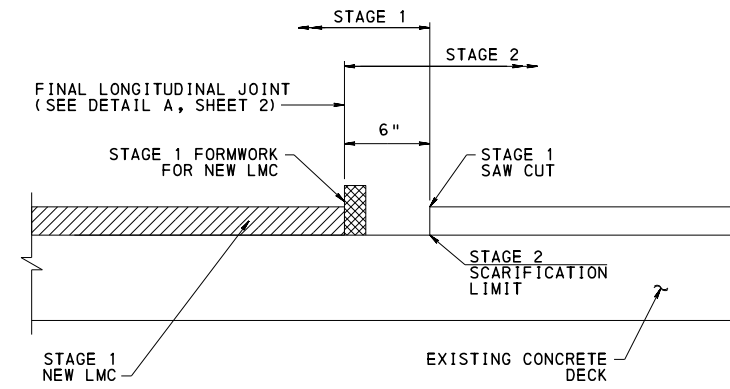
RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 2 OF 3
BC-752M



- STAGE 1**
1. SAWCUT 3 INCHES BEYOND (TOWARDS STAGE 2) FINAL LOCATION OF LONGITUDINAL CONSTRUCTION JOINT.
 2. PERFORM SCARIFICATION.
 3. PERFORM HYDRODEMOLITION WHEN INDICATED.
 4. PLACE LMC WEARING SURFACE TO STAGE 1 SAWCUT LOCATION.
- STAGE 2**
1. SAWCUT STAGE 1 LMC WEARING SURFACE AT FINAL LOCATION OF LONGITUDINAL CONSTRUCTION JOINT.
 2. PERFORM SCARIFICATION TO 1 INCH FROM FINAL LOCATION OF LONGITUDINAL CONSTRUCTION JOINT. USE PNEUMATIC HAMMERS NOT EXCEEDING 30 FT-LBS TO REMOVE REMAINING 1 INCH OF STAGE 1 LMC WEARING SURFACE.
 3. PERFORM HYDRODEMOLITION WHEN INDICATED.
 4. WATER BLAST VERTICAL FACE OF JOINT. PROVIDE WATER BLASTING EQUIPMENT WITH A MINIMUM RATED CAPACITY OF 5,000 PSI.
 5. PLACE LMC WEARING SURFACE FLUSH TO STAGE 1. DO NOT TOOL JOINT EDGE.

OPTION 1



- STAGE 1**
1. SAWCUT 6 INCHES BEYOND (TOWARDS STAGE 2) FINAL LOCATION OF LONGITUDINAL CONSTRUCTION JOINT.
 2. PERFORM SCARIFICATION.
 3. PERFORM HYDRODEMOLITION WHEN INDICATED.
 4. INSTALL FORMWORK ALONG FINAL LOCATION OF LONGITUDINAL CONSTRUCTION JOINT AND PLACE LMC WEARING SURFACE.
- STAGE 2**
1. PERFORM SCARIFICATION.
 2. PERFORM HYDRODEMOLITION WHEN INDICATED.
 3. REMOVE STAGE 1 FORMWORK AND WATER BLAST VERTICAL FACE OF JOINT. PROVIDE WATER BLASTING EQUIPMENT WITH A MINIMUM RATED CAPACITY OF 5,000 PSI.
 3. PLACE LMC WEARING SURFACE FLUSH TO STAGE 1. DO NOT TOOL JOINT EDGE.

OPTION 2

LATEX MODIFIED CONCRETE (LMC) WEARING SURFACE CONSTRUCTION JOINT PREPARATION

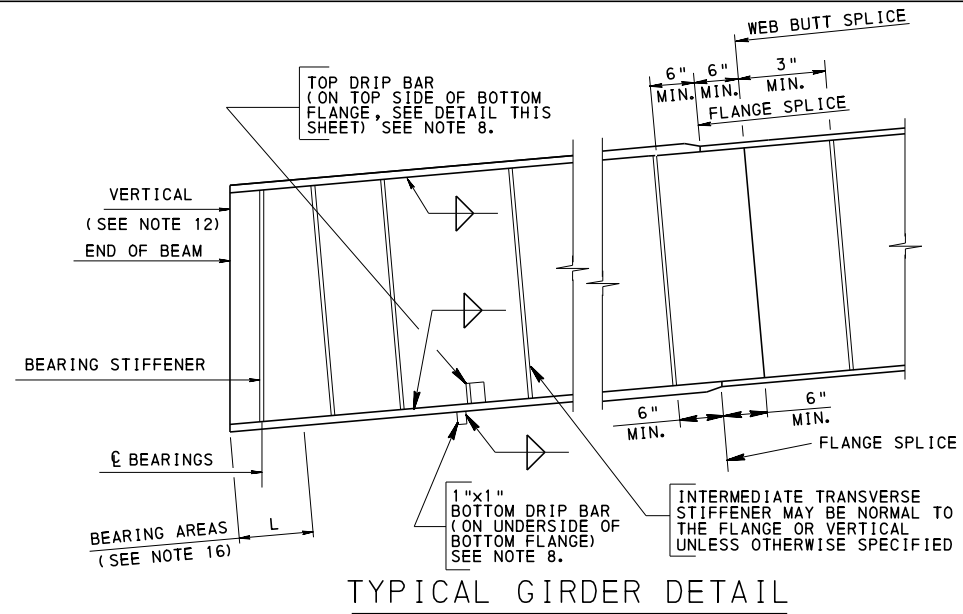
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
CONCRETE DECK SLAB DETAILS

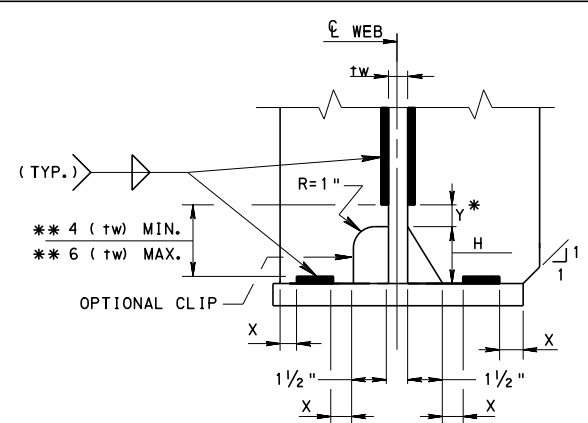
RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 3 OF 3
BC-752M

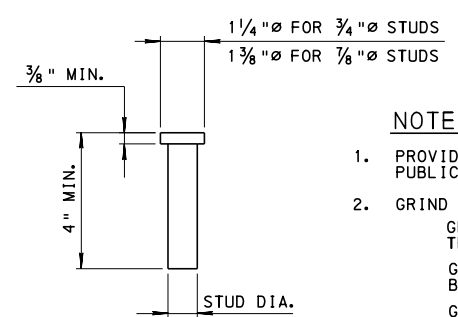


TYPICAL GIRDER DETAIL



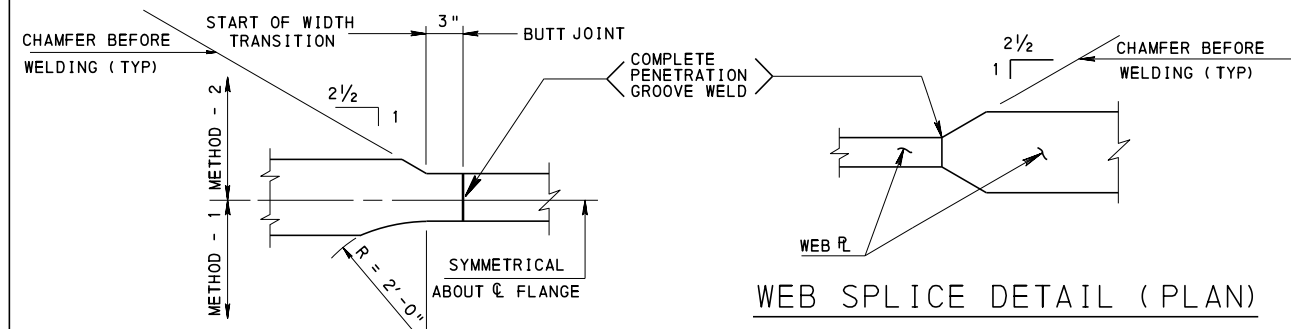
CORNER CHAMFER DETAIL (TYP.)

SHOW STIFFENER PLATE AND FILLET WELD SIZES ON THE PLAN
 $X = 0" \text{ TO } \frac{1}{4}" \pm \frac{1}{8}"$
 $Y = 0" \text{ TO } \frac{1}{2}" \pm \frac{1}{4}"$ (FOR SKEWED PLATES, VALUE IS DIFFERENT ON EITHER SIDE OF PLATE. VALUE SHOWN IS NOMINAL.)
 $H = \frac{2}{2}"$ FOR GIRDERS WITH WEBS ($t_w \leq \frac{1}{2}"$) ;
 $\frac{2}{2}"$ MIN. FOR GIRDERS WITH WEBS $> \frac{1}{2}"$
 * 0 FOR GROOVE WELD.
 ** DOES NOT APPLY TO GIRDERS WITH $t_w \leq \frac{1}{2}"$

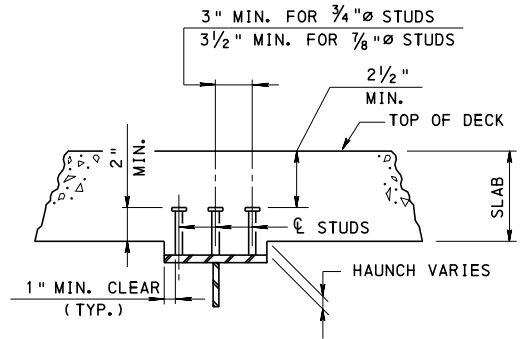


STUD DETAIL

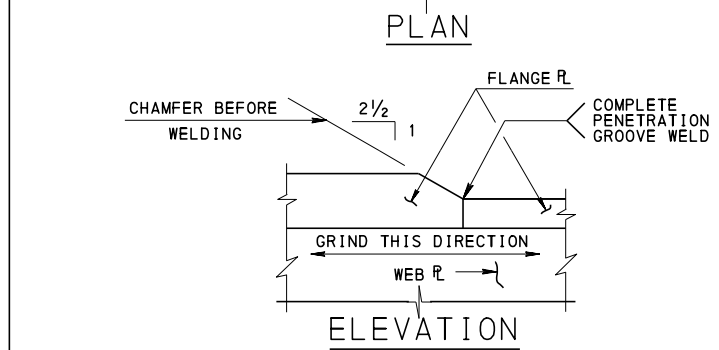
- NOTES:
- PROVIDE MATERIALS AND WORKMANSHIP CONFORMING TO PUBLICATION 408, AND AASHTO/AWS D1.5 WELDING CODE.
 - GRIND GROOVE WELDED SPLICES AS FOLLOWS:
 GRIND FLUSH ALL WELDS SUBJECTED TO NON-DESTRUCTIVE TESTING.
 GRIND FLUSH ALL EXPOSED WELDS OF FASCIA WEBS AND FASCIA BOTTOM FLANGES.
 GRIND SMOOTH ALL OTHER WELDS THAT EXCEED $\frac{1}{2}"$ REINFORCEMENT AND WHERE REQUIRED TO PRODUCE A GRADUAL TRANSITION TO THE PLANE OF THE BASE METAL ALONG WITH REMOVING ANY DISCONTINUITIES.
 - FOR DIAPHRAGM CONNECTION PLATE DETAILS, SEE BC-754M.
 - SEE DESIGN DRAWINGS FOR LOCATION OF LONGITUDINAL, BEARING, AND INTERMEDIATE TRANSVERSE STIFFENERS.
 - PROVIDE ALL INTERMEDIATE STIFFENERS ON OPPOSITE SIDE OF WEB FROM LONGITUDINAL STIFFENER.
 - FOR ALL GROOVE WELDS USE PREQUALIFIED COMPLETE PENETRATION WELDS.
 - PROVIDE CONTROLLED PEENING IF INDICATED OR SPECIFIED.
 - THE FOLLOWING NOTES ARE TO BE USED WHEN REFERENCED ON THE DRAWINGS:
 8. DRIP BARS TO BE PROVIDED FOR WEATHERING STEEL GIRDERS ONLY. DRIP BARS SHOULD NOT BE PROVIDED AT THE ABUTMENT WHEN THE BEAM SLOPE IS AWAY FROM THE ABUTMENT.
 9. USE HANDRAILS AS SHOWN ON GIRDERS 6'-0" DEEP OR GREATER. REFER TO DESIGN MANUAL PART 4 FOR ADDITIONAL INSPECTION DEVICES.
 10. WELD AT TOP AND BOTTOM WHEN THE BEARING STIFFENER IS USED AS CONNECTION PLATE.
 11. FOR HANDRAIL, USE CLIP ANGLES OR PLATES BETWEEN STIFFENERS WHEN STIFFENERS ARE SPACED AT 8'-6" OR GREATER.
 12. UNDER FULL DEAD LOAD BEAM ENDS AND ALL BEARING STIFFENERS, INCLUDING BEARING STIFFENERS AT PIERS, ARE VERTICAL TO WITHIN APPLICABLE AASHTO/AWS FABRICATION AND CONSTRUCTION TOLERANCES.
 13. DIRECTION OF WELDS IS NOT APPLICABLE IF STIFFENERS ARE FITTED WITH TACK WELDS.
 14. TIGHT FIT AT TENSION FLANGES AT INTERIOR SUPPORTS. FILLET WELDS OVER END SUPPORTS
 15. MAY BE TIGHT FITTED AT THE COMPRESSION FLANGE WHEN STIFFENERS ARE PLACED IN PAIRS, ONE ON EACH SIDE OF THE WEB.
 16. BEARING AREAS: PROVIDE BOTTOM FLANGE IN A TRUE HORIZONTAL PLANE IN TRANSVERSE DIRECTION AND IN A TRUE PLANE LONGITUDINALLY OVER DIMENSION "L", WHERE L = WIDTH OF SOLE PLATE + 6" AHEAD AND BACK, WHERE APPLICABLE. IF THE SOLE PLATE IS WELDED TO THE BOTTOM FLANGE PROVIDE THE SOLE PLATE MEETING THE SAME FLATNESS REQUIREMENTS. EACH BEARING MUST BE STRESSED UNIFORMLY AFTER ALL DEAD LOAD IS PLACED. MAKE NECESSARY SHOP AND/OR FIELD ADJUSTMENTS TO PROVIDE UNIFORM BEARING STRESS UNDER ALL DEAD LOADS.
 17. PERFORM NON-DESTRUCTIVE TESTING (NDT) ON LONGITUDINAL STIFFENER BUTT WELDS PRIOR TO ATTACHMENT TO GIRDER WEB.
 18. USE DETAILS A & B ON SHEET 2 IN COMPRESSION ZONE. USE DETAIL C ON SHEET 2 IN REVERSAL ZONE. NO FATIGUE CATEGORY D, E, OR E' DETAILS ALLOWED IN TENSION ZONE.
 19. OPTIONAL METHOD FOR STUD LOCATION IS TO STAGGER STUD ROWS TRANSVERSELY ACROSS DECK, BY NOT PLACING STUDS AT SAME LOCATION ON ALL THE BEAMS. SEE STAGGERED STUD ROW PLAN ON SHEET 3.



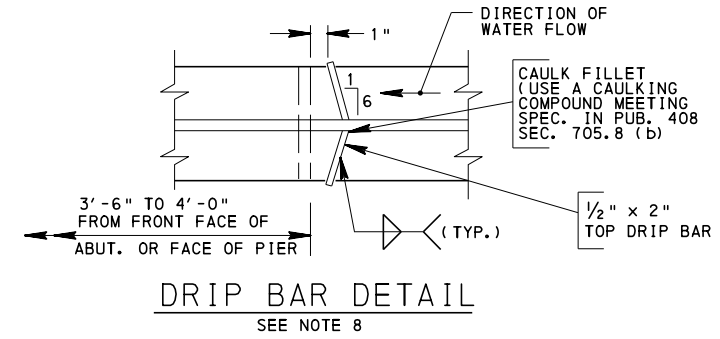
WEB SPLICE DETAIL (PLAN)



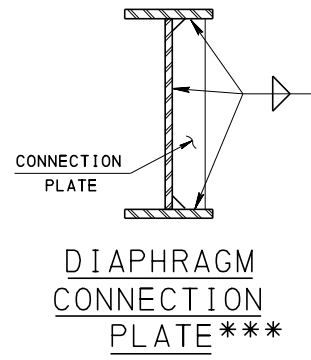
SHEAR CONNECTOR DETAILS



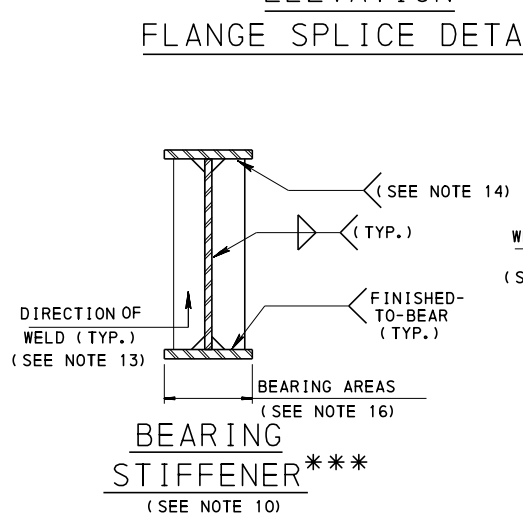
FLANGE SPLICE DETAILS



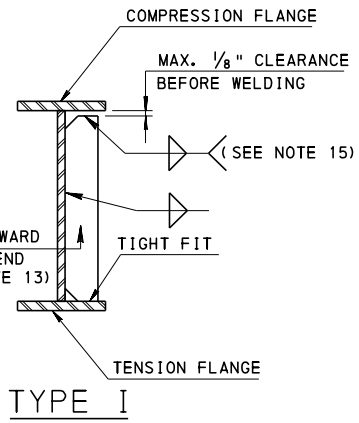
DRIP BAR DETAIL
SEE NOTE 8



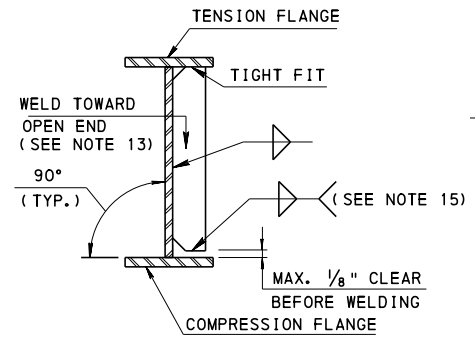
DIAPHRAGM CONNECTION PLATE ***



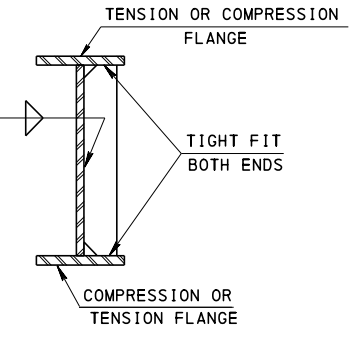
BEARING STIFFENER ***
(SEE NOTE 10)



TYPE I



TYPE II



TYPE III
(IN STRESS REVERSAL ZONE)

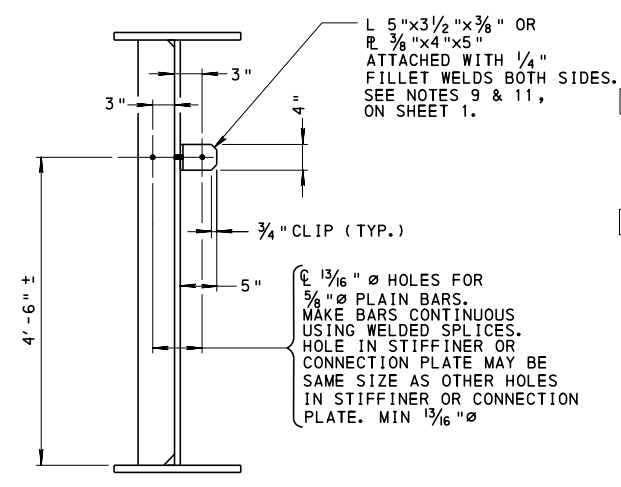
*** INTERMEDIATE STIFFENER DETAILS
 *** SEE CORNER CHAMFER DETAIL FOR LIMITS OF WELDS.

CHANGE 2

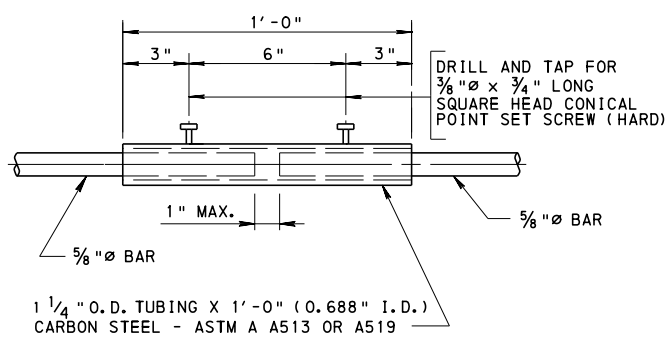
COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

STANDARD
 STEEL GIRDER DETAILS

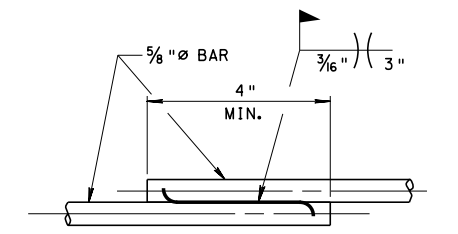
BC-754M	STEEL DIAPHRAGMS FOR STEEL BEAM/GIRDER STRUCTURES	RECOMMENDED JAN. 31, 2019	RECOMMENDED JAN. 31, 2019	SHEET 1 OF 3
REFERENCE DRAWINGS		<i>T. Romeo R. Maciora</i> CHIEF BRIDGE ENGINEER	<i>Alvin J. ...</i> ACTING DIR. BUR. OF PROJECT DELIVERY	BC-753M



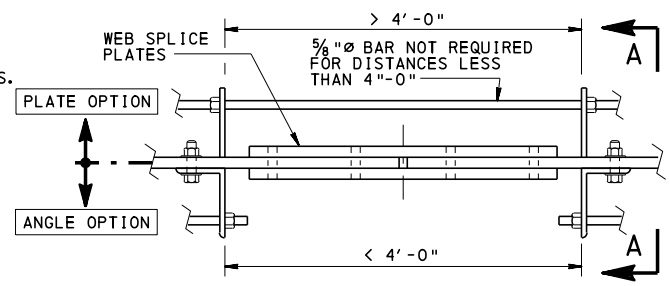
SECTION



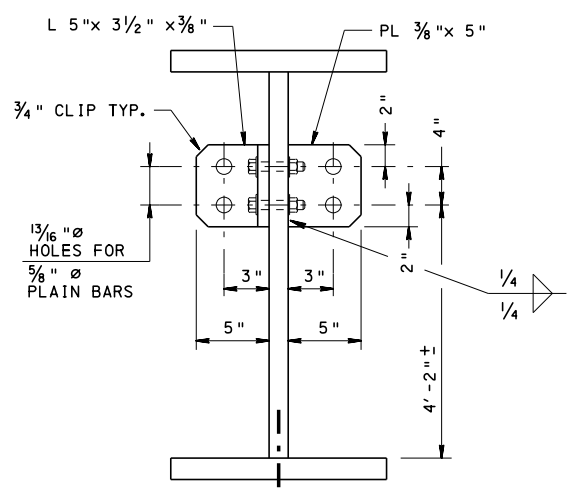
ALTERNATE BOLTED SPLICE DETAIL AT MAIN MEMBER FIELD SPLICE (FOR HANDRAIL)



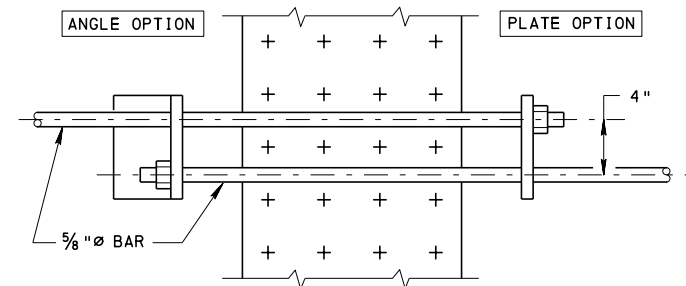
WELDED SPLICE DETAIL AT MAIN MEMBER FIELD SPLICE (FOR HANDRAIL)



PLAN MAIN MEMBER FIELD SPLICE (FOR HANDRAIL)

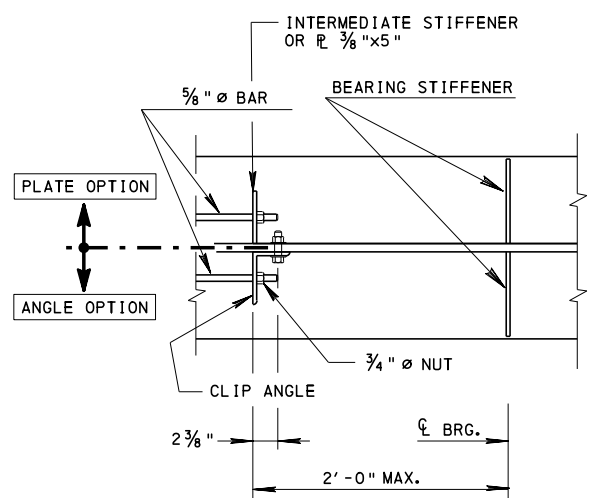


SECTION A-A (> 4'-0")

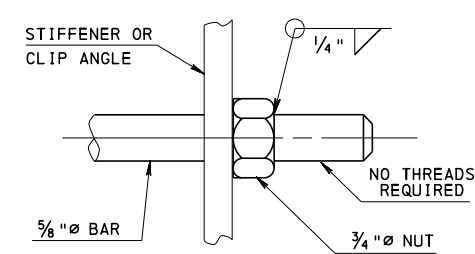


ELEVATION (> 4'-0")

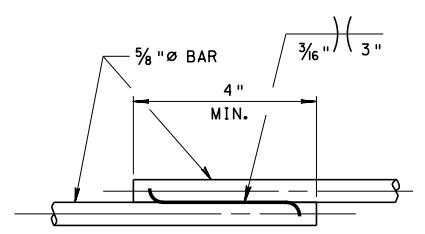
HANDRAIL DETAILS



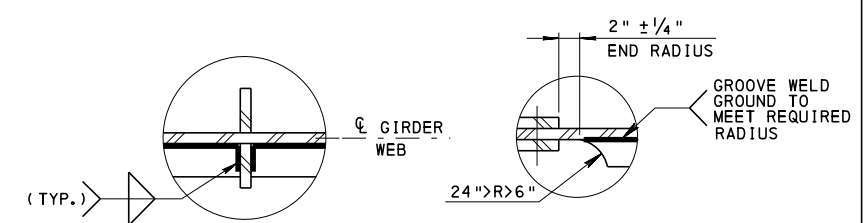
HANDRAIL PLAN AT END BEARING (FOR HANDRAIL)



END CONNECTION DETAIL (FOR HANDRAIL)

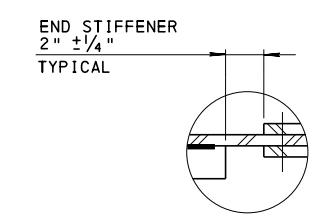


WELDED SPLICE DETAIL (FOR HANDRAIL)

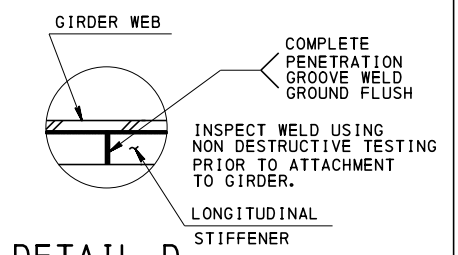


DETAIL A SEE CORNER CHAMFER DETAIL AND NOTE 18, ON SHEET 1

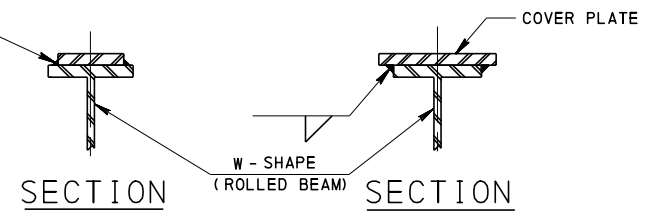
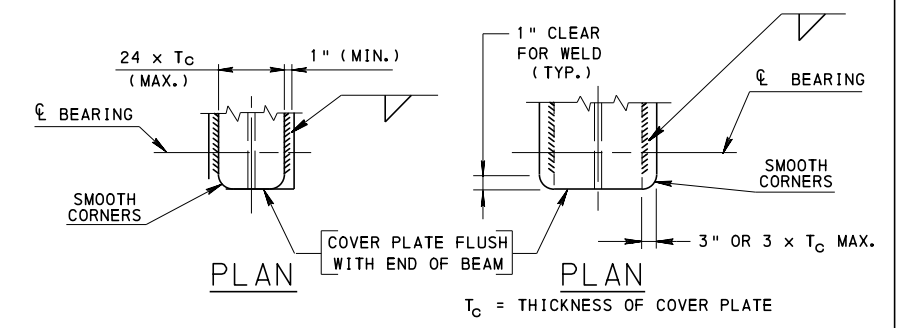
DETAIL C SEE NOTE 18, ON SHEET 1



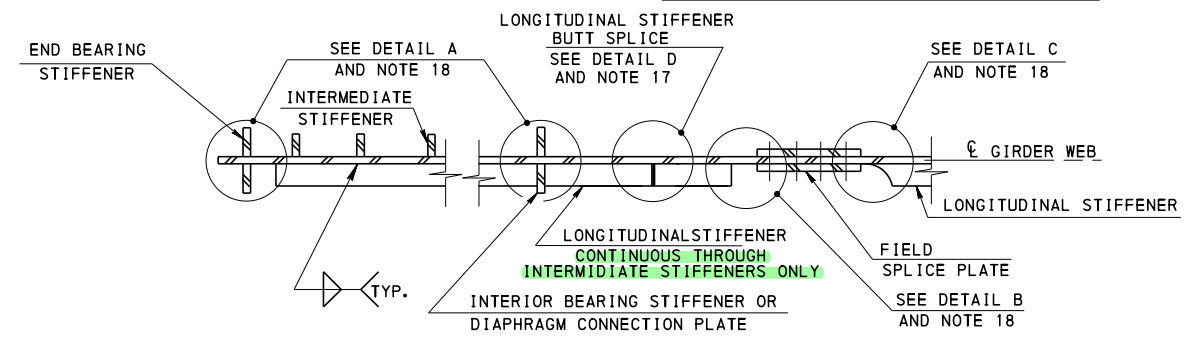
DETAIL B SEE NOTE 18, ON SHEET 1



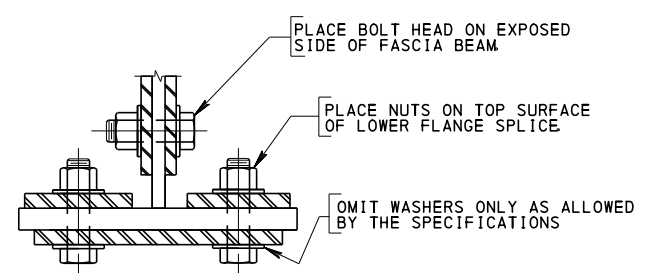
DETAIL D SEE NOTE 17, ON SHEET 1



COVER PLATE DETAILS



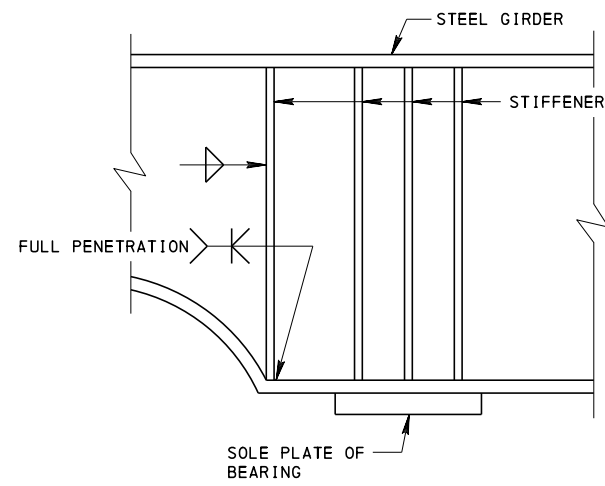
PLAN VIEW LONGITUDINAL-TRANSVERSE STIFFENER INTERSECTION DETAILS FOR NOTES, SEE SHEET 1.



BOLTED SPLICE DETAIL

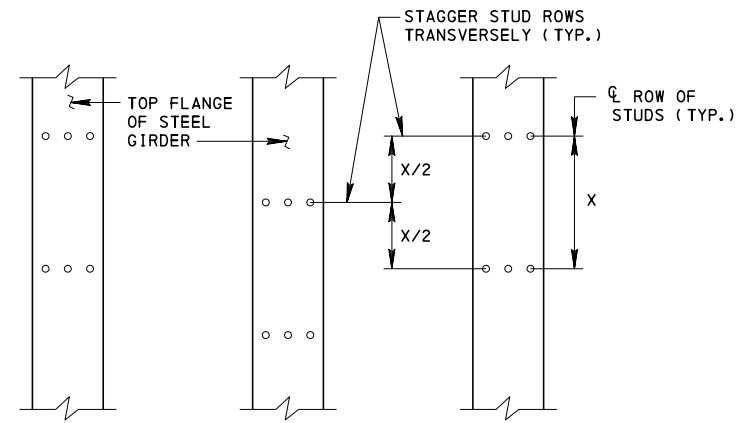
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STEEL GIRDER DETAILS



GIRDER HAUNCH STIFFENER DETAIL

(PARABOLIC WEB DEPTH VARIATION SHOWN;
STRAIGHT LINE WEB DEPTH VARIATION SIMILAR)

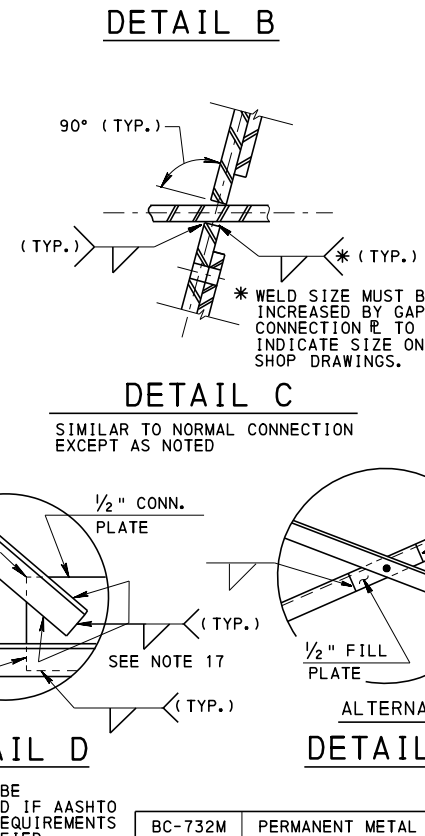
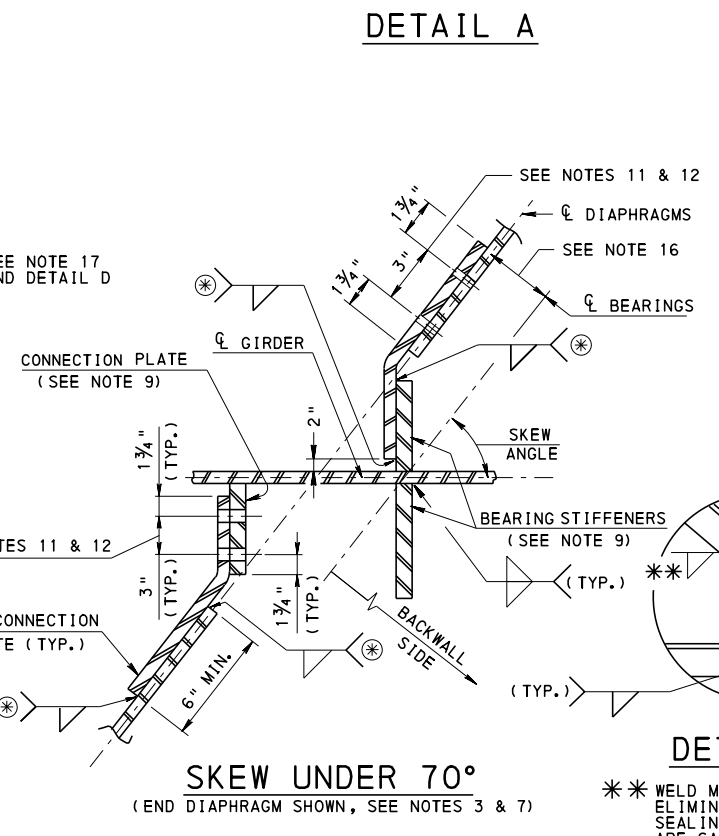
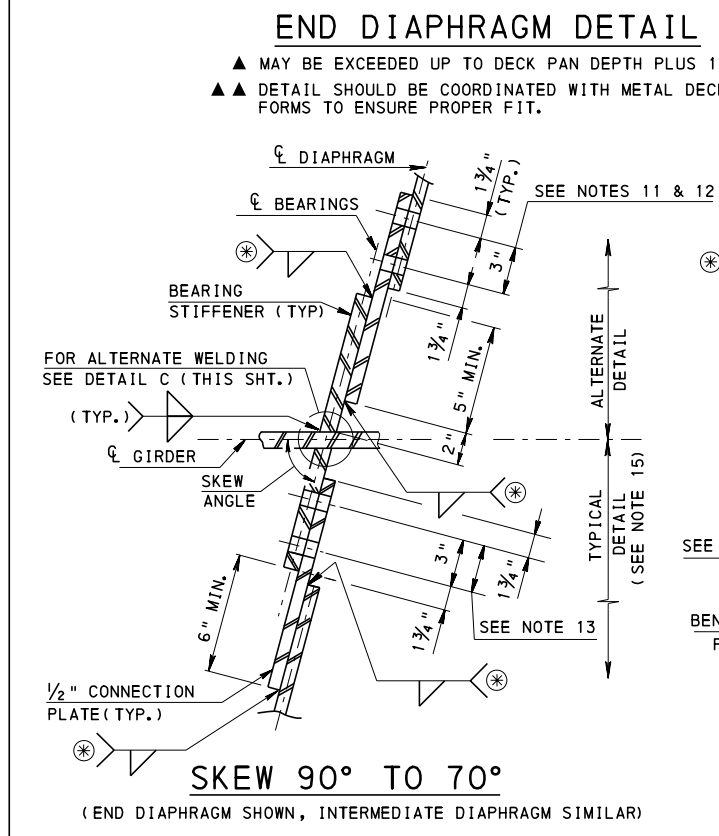
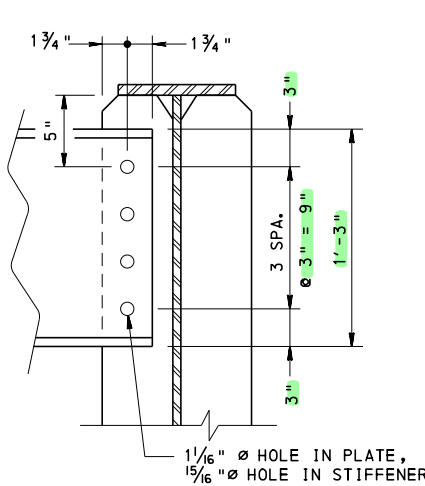
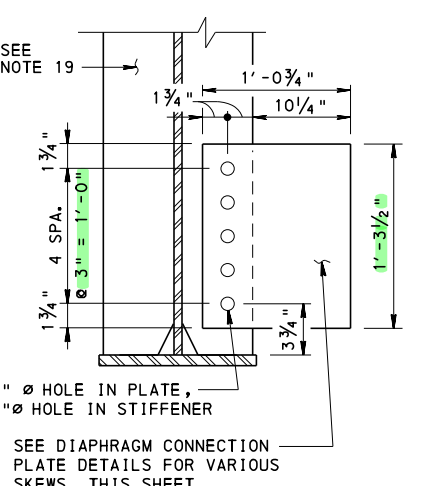
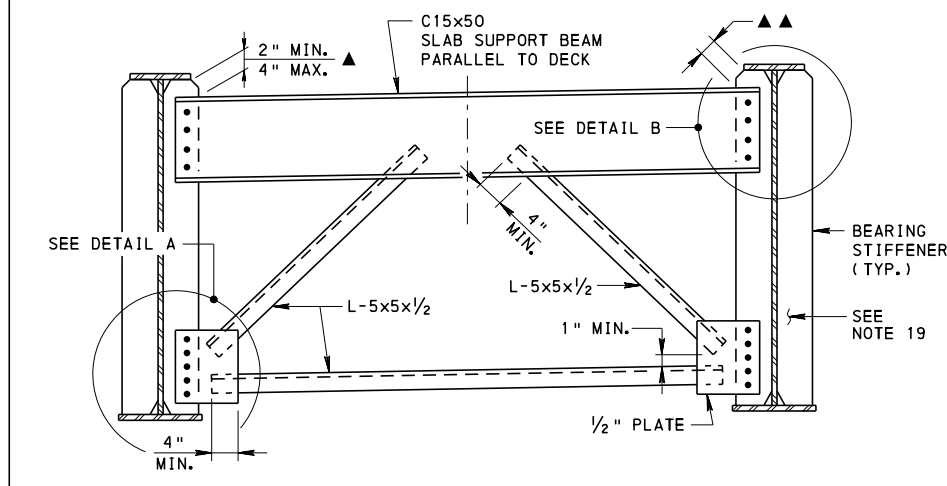
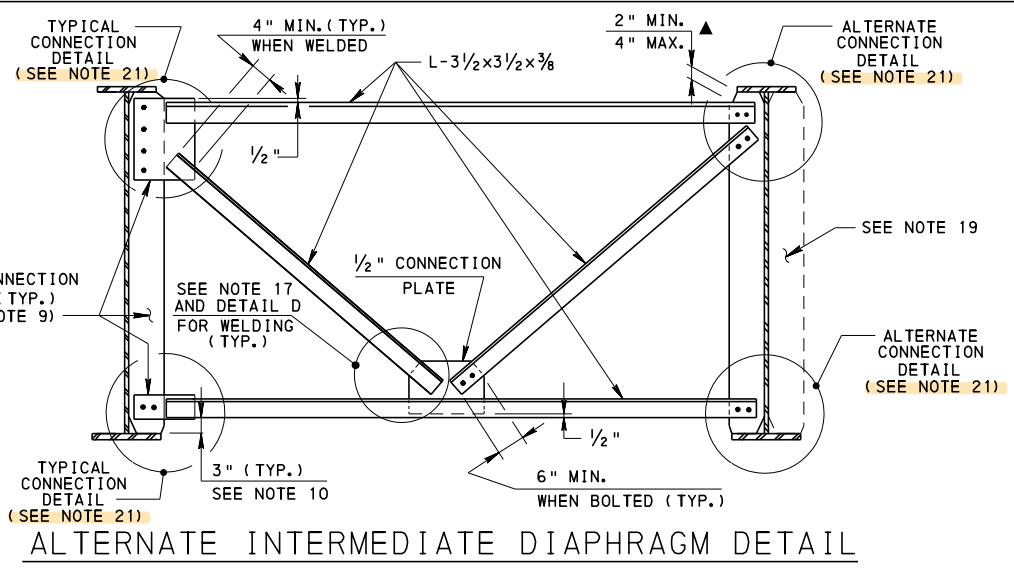
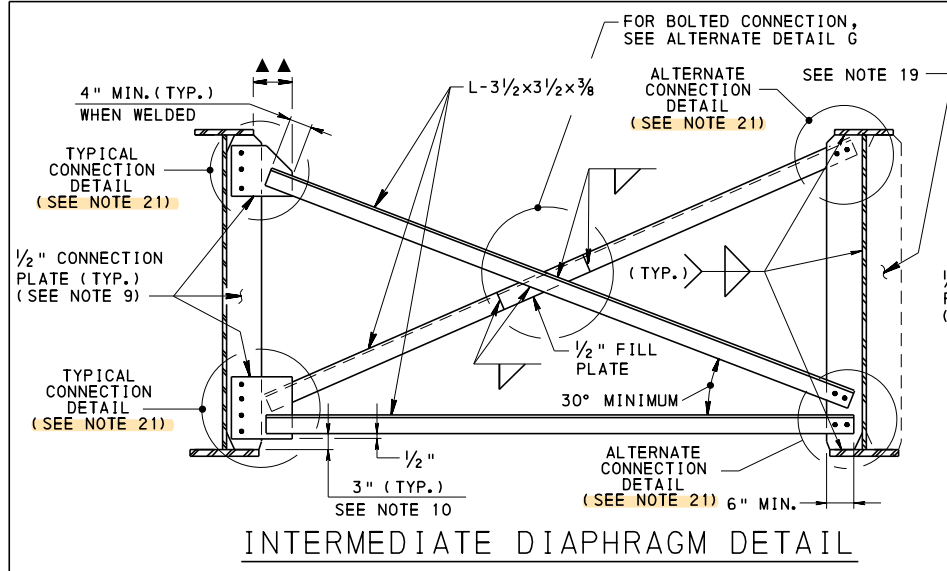


STAGGERED STUD ROW PLAN

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STEEL GIRDER DETAILS

RECOMMENDED JAN. 31, 2019 <i>T. Romeo R. Maciara</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. [Signature]</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 3 OF 3 BC-753M
--	--	-------------------------



- NOTES:**
- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408 AND AASHTO/AWS D1.5 SPECIFICATIONS.
 - MEMBERS, WELDS AND PLATE SIZES SHOWN ARE VALID FOR STRAIGHT GIRDERS WITH MAXIMUM GIRDER SPACING OF 8'-0" AND FOR SKEW ANGLES BETWEEN 70° AND 90°. PROVIDE SPECIAL DESIGNS FOR ALL THE DIAPHRAGM MEMBERS, WELDS AND PLATE SIZES WHEN THE GIRDER SPACING EXCEEDS 8'-0" AND/OR THE SKEW ANGLE IS LESS THAN 70°.
 - THE DETAILS SHOWN ARE VALID FOR SKEW ANGLES 25° TO 70°. PROVIDE SPECIAL DETAILS FOR SKEW ANGLES LESS THAN 25°.
 - FILLET WELD SIZES ARE GOVERNED BY MATERIAL THICKNESS IN ACCORDANCE WITH AASHTO/AWS EXCEPT AS NOTED.
 - FOR SKEW ANGLES BETWEEN 90° AND 70°, DEVELOP SHOP DRAWINGS WHICH DETAIL ALL WEBS VERTICAL WHEN GIRDERS ARE ERECTED AND DIAPHRAGMS CONNECTED. FOR SKEW ANGLES LESS THAN 70°, DEVELOP SHOP DRAWINGS AND ERECTION PROCEDURES WHICH DETAIL ALL WEBS VERTICAL AFTER ALL DEAD LOADS ARE APPLIED (WEIGHT OF STEEL, WEIGHT OF DECK SLAB AND SUPERIMPOSED DEAD LOAD NOT INCLUDING THE FUTURE WEARING SURFACE).
 - AVOID WELDING GUSSET PLATE TO WEB PLATE. HOWEVER, IF ABSOLUTELY NECESSARY THE WEB BENDING STRESS MUST BE LESS THAN 0.75 X CRITICAL BUCKLING STRESS AND THE FATIGUE CATEGORY ASSOCIATED WITH THE GUSSET PLATE MUST BE CONSIDERED AS CATEGORY C.
 - PROVIDE INTERMEDIATE DIAPHRAGMS NORMAL TO THE MAIN MEMBERS FOR SKEWS <70°.
 - THE DIAPHRAGMS SHOWN DO NOT INCLUDE WIND LOAD TRANSFERRED TO THE BEARINGS THROUGH CONNECTIONS.
- ★ THE FOLLOWING NOTES ARE TO BE USED WHEN REFERENCED ON THE DRAWINGS:
- SEE BC-753M FOR THE BEARING STIFFENER AND CONNECTION PLATE INSTALLATION DETAILS.
 - MODIFY THE DISTANCE BETWEEN THE GIRDER BOTTOM FLANGE AND THE LOWER DIAPHRAGM COMPONENT WHEN LOWER LATERAL BRACING IS USED. INDICATE MODIFICATIONS ON THE DESIGN DRAWINGS.
 - 1/16" DIAMETER HOLE IN CONNECTION PLATE; 15/16" DIAMETER HOLE IN CONNECTION MEMBER, FOR 7/8" DIAMETER ASTM F3125 GRADE A325 BOLTS. OVERSIZE HOLE IN CONNECTION PLATE IS OPTIONAL. STANDARD SIZE HOLE IS PERMITTED.
 - USE 7/8" DIAMETER ASTM F3125 GRADE A325 BOLTS HAVING AN UNTHREADED SHANK OF SUFFICIENT LENGTH TO NOT ALLOW ANY THREADS TO EXIST IN THE PLANE BETWEEN THE TWO CONNECTED PARTS (SHEAR PLANE).
 - 1/16" DIAMETER HOLE IN BEARING STIFFENERS; 15/16" DIAMETER HOLE IN CONNECTION PLATE FOR 7/8" DIAMETER ASTM F3125 GRADE A325 BOLTS, NOTE 12 DOES NOT APPLY. OVERSIZE HOLE IN BEARING STIFFENERS IS OPTIONAL. STANDARD SIZE HOLE IS PERMITTED. IF A STANDARD HOLE IS PROVIDED IN THE CONNECTION PLATE, THE EDGE DISTANCE MAY BE REDUCED TO 1 1/2".
 - "K" = FLANGE THICKNESS + FILLET, AS INDICATED IN AISC TABLES OF BEAM DIMENSIONS.
 - DETAIL SHOWN FOR CONNECTION PLATES (SKEW 90° TO 70°), INDICATING WHICH COMPONENTS ARE WELDED OR BOLTED, MAY BE APPLIED TO ALL OTHER CASES WHERE APPLICABLE.
 - POSITION DIAPHRAGM CONNECTION COMPONENTS SO AS TO CREATE MINIMUM OFFSET FROM CL BEARINGS. DIAPHRAGM BENT CONNECTION PLATE MAY BE PLACED BEHIND THE BEARING STIFFENER TO MINIMIZE OFFSET.
 - PROVIDE WELDING AS SHOWN IN "DETAIL D". THIS DETAIL IS TYPICAL FOR ALL WELDED CONNECTIONS. TERMINATE WELDS 1/2" SHORT OF EDGE AT EACH END OF EACH WELD.
 - CHECK ANCHOR BOLT CLEARANCES WHEN STIFFENERS ARE WIDER THAN FLANGE.
 - PROVIDE CONNECTION PLATES ON THE OUTSIDE FACE OF FASCIA GIRDERS FOR TWO AND THREE GIRDER SYSTEMS.
 - FOR HALF-WIDTH OR PHASED CONSTRUCTION, THE DEFLECTION OF EACH GIRDER IS CALCULATED TO A PRECISION THAT IS MUCH LESS THAN THAT REQUIRED FOR BOLT HOLES. AVOID DIAPHRAGM FABRICATION AND ERECTION PLANS THAT REQUIRE HOLES OF SHOP FABRICATED DIAPHRAGMS INSTALLED BEFORE DECK PLACEMENT TO ALIGN WITH HOLES IN STIFFENERS AFTER DEAD LOAD IS APPLIED.
 - FOR THE TYPICAL AND ALTERNATE CONNECTION DETAILS BOLT SPACING, EDGE DISTANCES, AND CLEARANCES, SEE DETAIL A. FOR THE ALTERNATE CONNECTION DETAIL, USE K + 1" (MIN.) FOR THE VERTICAL EDGE DISTANCE MEASURED AS SHOWN IN DETAIL F.

CHANGE 2
CHANGE 4

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
STEEL DIAPHRAGMS
FOR STEEL BEAM/GIRDER STRUCTURES
(STRAIGHT PLATE GIRDERS ONLY)

BC-732M	PERMANENT METAL DECK FORMS	RECOMMENDED NOV. 23, 2022	RECOMMENDED NOV. 23, 2022	SHEET 1 OF 2
BC-753M	STEEL GIRDER DETAILS	<i>L. W. Gray</i> CHIEF BRIDGE ENGINEER	<i>Gavin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	BC-754M
REFERENCE DRAWINGS				

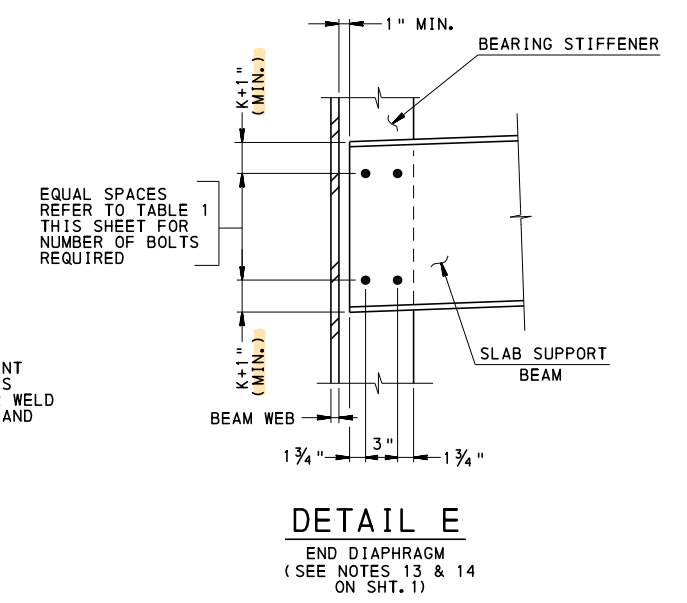
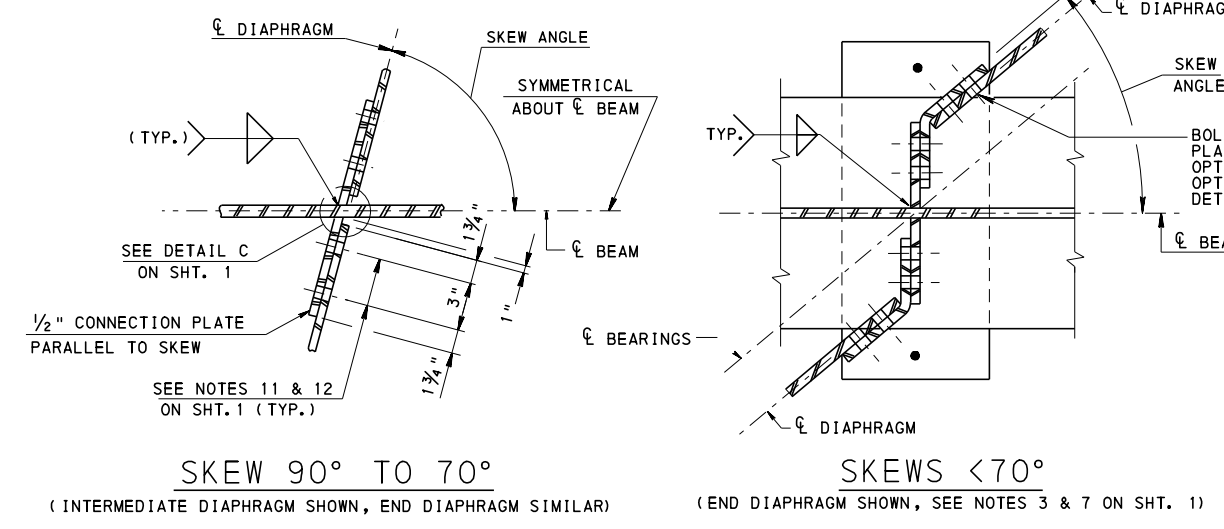
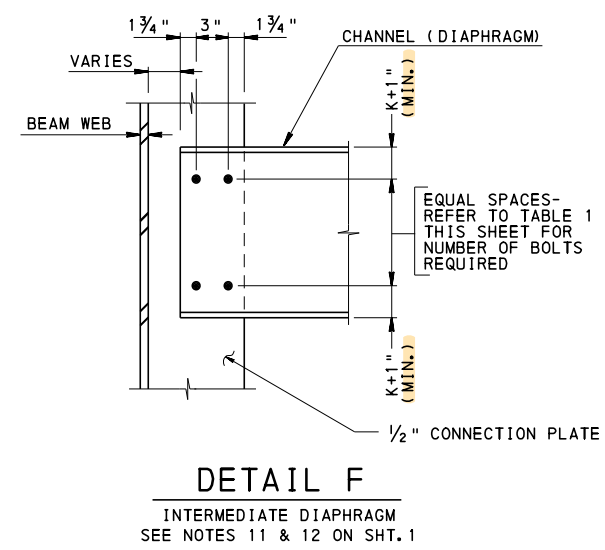
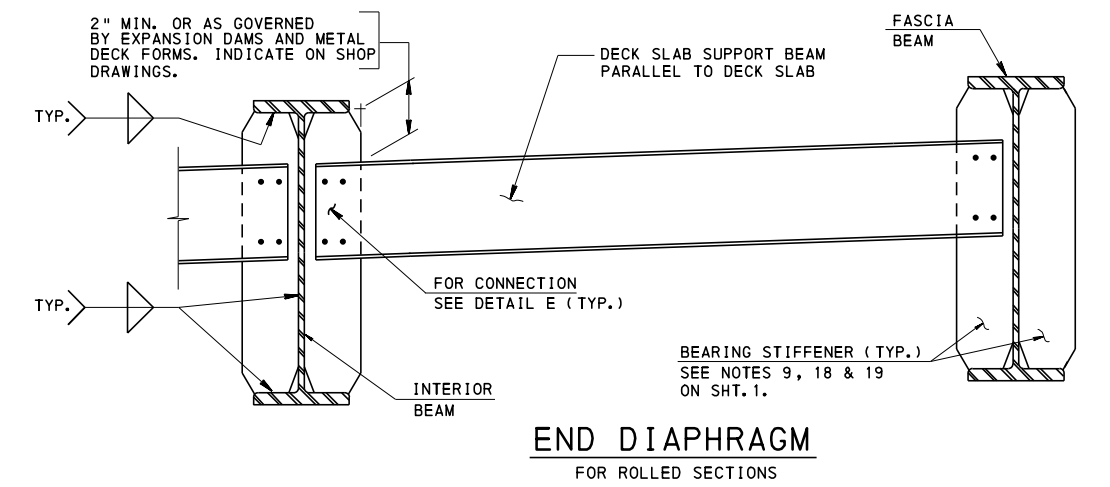
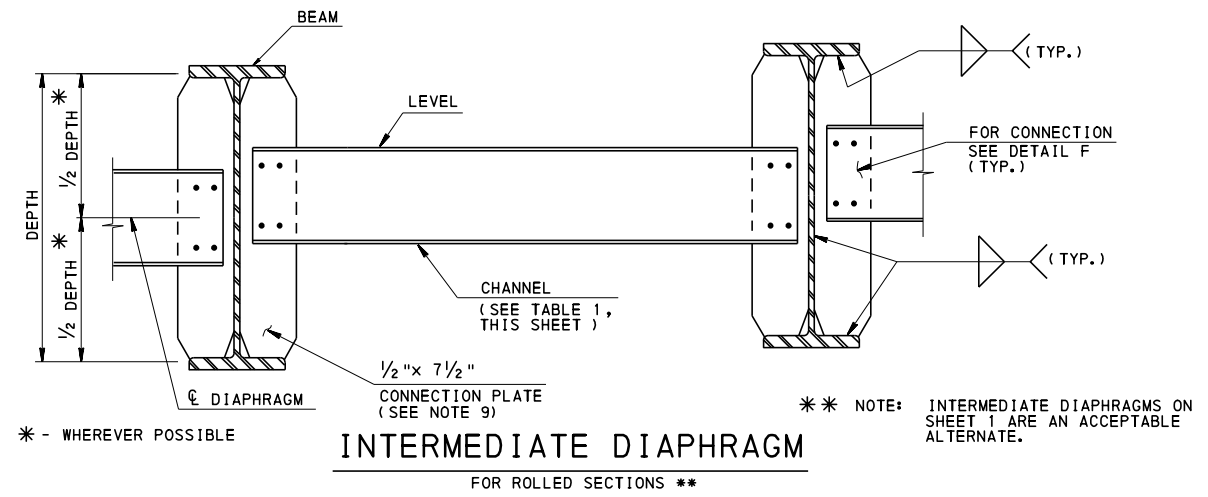
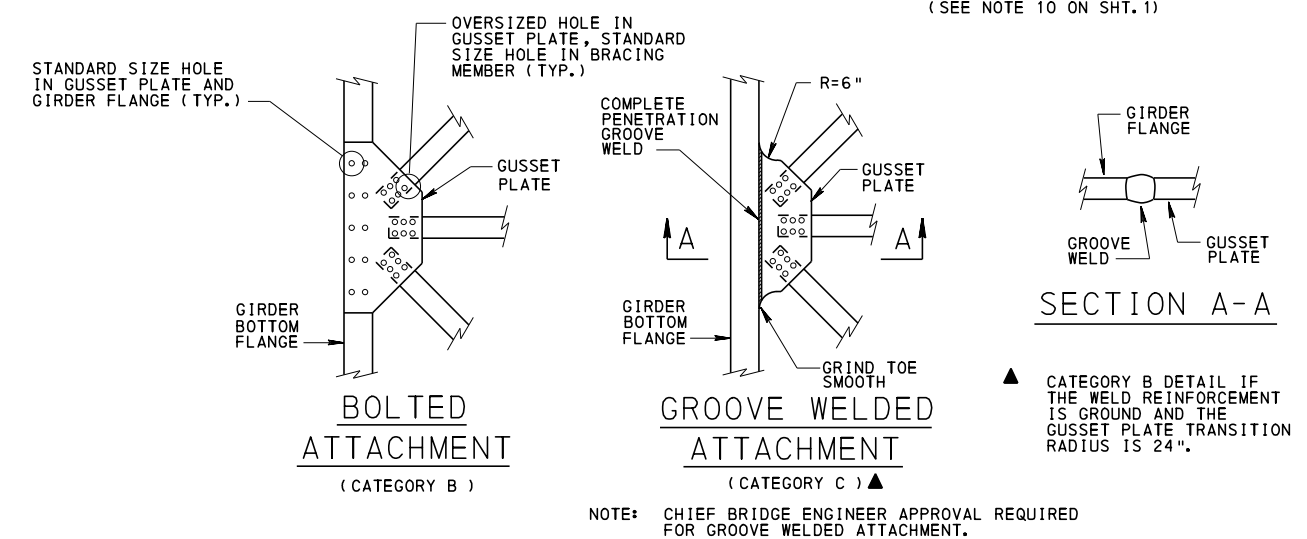


TABLE 1

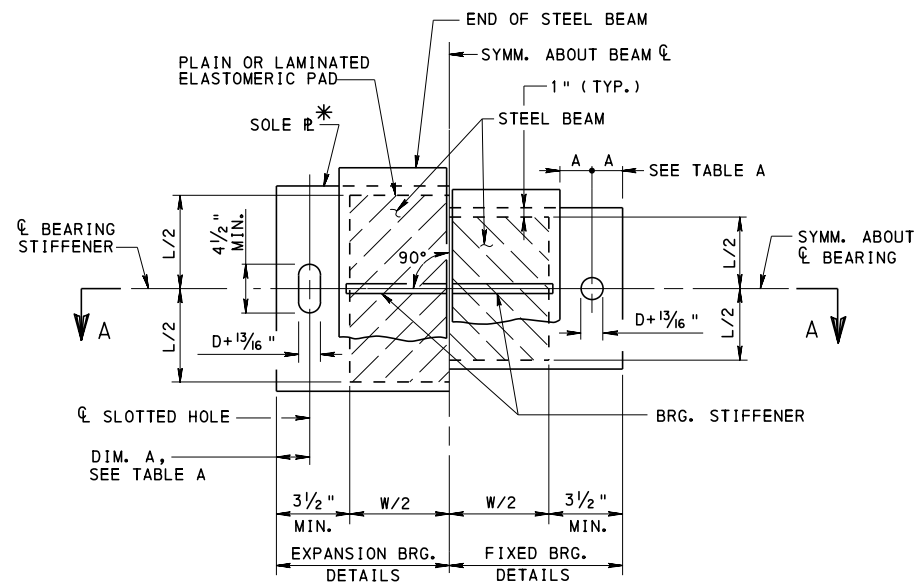
BEAM SIZE	DIAPHRAGM SIZE	NO. OF BOLTS
≥ 27" DEPTH	C 15x33.9	8
UP TO 24" DEPTH	C 12x25	6



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

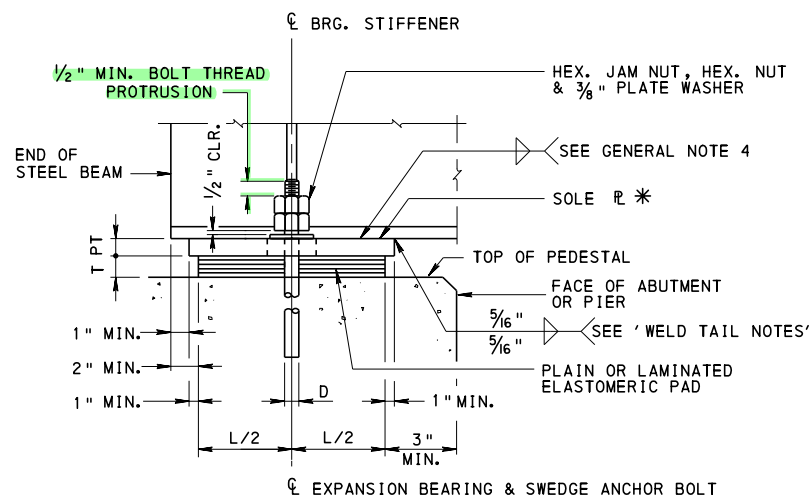
STANDARD
STEEL DIAPHRAGMS
FOR STEEL BEAM/GIRDER STRUCTURES
(ROLLED BEAMS ONLY)

RECOMMENDED NOV. 23, 2022 <i>L. W. [Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Gavin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 2 OF 2 BC-754M
--	---	-------------------------



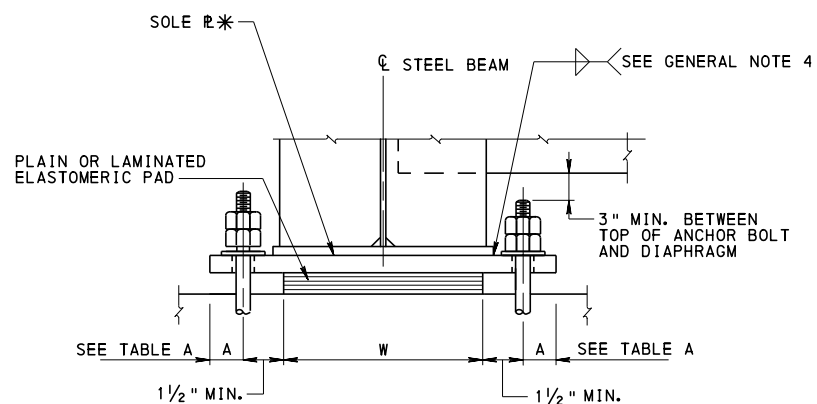
PLAN VIEW

* PROVIDE FLATNESS TOLERANCE IN ACCORDANCE WITH PUB. 408, SECTION 1105.03(q). PROVIDE SOLE PLATE IN ACCORDANCE WITH DESIGN MANUAL PART 4, SECTION D14.7.6.3.9P



ELEVATION - EXPANSION BEARING

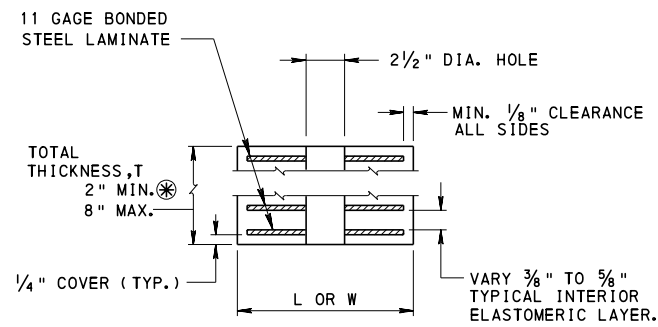
PT = SOLE PLATE THICKNESS AT ϕ BEARING 1" MIN.



BEARING SECTION A-A

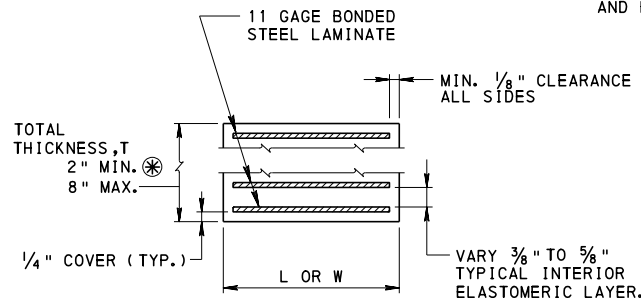
ELASTOMERIC BEARING PADS NOTES:

1. ELASTOMERIC BEARINGS DESIGNED AND MANUFACTURED IN ACCORDANCE WITH THIS STANDARD DRAWING DO NOT REQUIRE SHOP DRAWINGS.
2. MANUFACTURE ALL BEARINGS IN ACCORDANCE WITH THE COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PLANS AND SPECIFICATIONS (PUB. 408) SECTION 1113.
3. ALL BEARING PADS ARE TO BE MOLDED TO DESIGN DIMENSIONS. CUTTING TO SIZE AFTER FABRICATION IS PROHIBITED UNLESS INDICATED ON THE DESIGN DRAWINGS.
4. HOLES ARE NOT PERMITTED IN ELASTOMERIC BEARINGS UNLESS INDICATED ON THE DESIGN DRAWINGS.
5. PROVIDE NEOPRENE 50 \pm 5 DUROMETER.
6. VULCANIZE PATCH PIN GROOVES.
7. PROVIDE MINIMUM LOW-TEMPERATURE NEOPRENE GRADE 3.

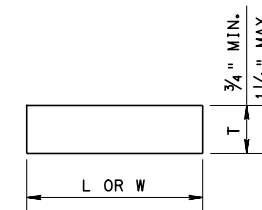


LAMINATED ELASTOMERIC PAD WITH HOLE

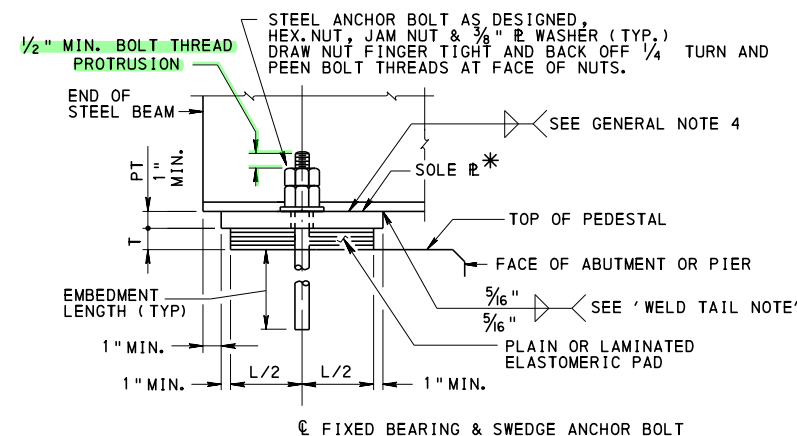
* A LESSER THICKNESS MAY BE USED FOR REHABILITATIONS AND BLC STANDARDS.



LAMINATED ELASTOMERIC PAD



PLAIN PAD



ELEVATION - FIXED BEARING

GENERAL NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH SPECIFICATIONS, PUBLICATION 408, AASHTO/AWS BRIDGE WELDING CODE AND CONTRACT SPECIAL PROVISIONS.
2. PROVIDE MECHANICALLY GALVANIZED OR HOT DIPPED GALVANIZED SWEDGE OR APPROVED TYPE OF ANCHOR BOLTS. SET IN THE MASONRY AS SHOWN ON THE DESIGN DRAWINGS.
3. PROVIDE STRUCTURAL STEEL CONFORMING TO AASHTO M270, GRADE 36 (ASTM A709, GRADE 36) UNLESS OTHERWISE NOTED.
4. PROVIDE MINIMUM SIZE WELD IN ACCORDANCE WITH AASHTO/AWS CODE UNLESS LARGER WELD IS REQUIRED BY DESIGN.
5. PROVIDE PLATE WASHERS OF SUFFICIENT SIZE TO COVER THE ROUND HOLE OR SLOT FOR EXTREMES OF MOVEMENT OF THE BEARINGS. WASHERS MAY BE CLIPPED IF REQUIRED.
6. DRILLING OF ANCHOR BOLT HOLES IS PERMITTED AT ABUTMENTS ONLY. RINSE CLEAN WITH WATER AND DRY HOLE BEFORE FILLING WITH NON-SHRINK GROUT.
7. MARK THICKER END OF BEVELED SOLE PLATES TO IDENTIFY THICKER END IN THE FIELD.
8. PAINT ALL STEEL SURFACES IN ACCORDANCE WITH PUB. 408, SECTION 1060. APPLY ALL COATS IN FABRICATION SHOP.
9. PREPARE BEARING AREAS IN ACCORDANCE WITH PUB. 408, SECTION 1001.3 (k) 9. DO NOT APPLY PROTECTIVE COATINGS TO THE BEARING SURFACES WITHIN 2" OF THE BEARING PAD, MASONRY PLATE, OR NEOPRENE SPONGE.
10. OBTAIN THE FOLLOWING INFORMATION FROM THE DESIGN DRAWINGS:
 - (a) SOLE PLATE DIMENSIONS, ORIENTATION AND CONNECTION TO BEAM
 - (b) ANCHOR BOLT SIZES (DIAMETER, EMBEDMENT LENGTH AND PROJECTION)
 - (c) BEARING PAD SIZES (LENGTH, WIDTH, THICKNESS, AND SHIMS)
11. FOR SKEW LESS THAN 45° AND LARGER SIZE BEARINGS, CIRCULAR BEARINGS MAY BE DESIGNED AND DETAILED.
12. WHERE SOLE PLATES ARE WELDED TO BEAMS THAT ARE SUBSEQUENTLY GALVANIZED, PROVIDE AN ALL AROUND 5/16" FILLET WELD TO SEAL JOINT AND PREVENT ACID INTRUSION DURING PICKLING.
13. FOR LEGEND, SEE SHEET 2.

WELD TAIL NOTES:

- FOR BEAMS THAT ARE HOT DIP GALVANIZED SUBSEQUENT TO WELDING, CALL OUT "SEAL". SEE GENERAL NOTE 12.
- FOR BEAMS THAT ARE PAINTED SUBSEQUENT TO WELDING CALL OUT "1/4" HOLD BACK".

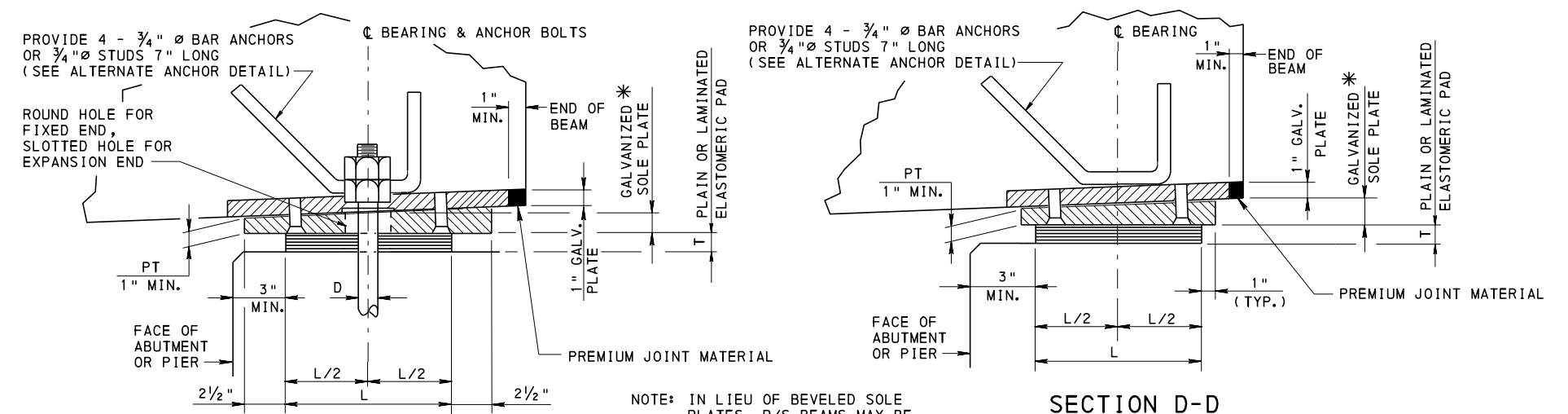
TABLE A ANCHOR BOLT CLEARANCE	
INCHES	
BOLT DIA.	DIM. A
1"	1 13/16"
1 1/8"	2 1/16"
1 1/4"	2 1/16"
1 3/8"	2 3/16"
1 1/2"	2 5/16"
1 3/4"	2 3/4"
2"	3 1/4"

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

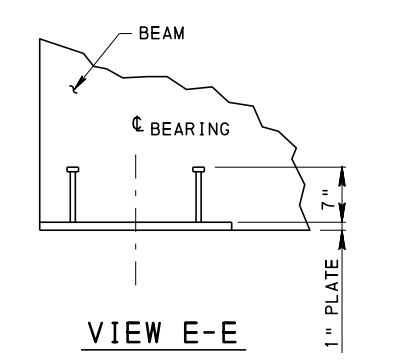
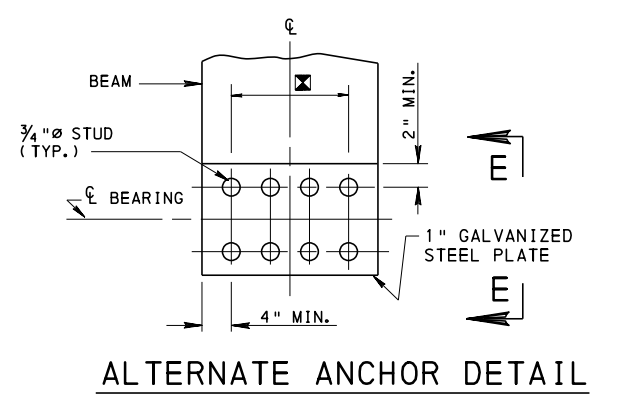
STANDARD
BEARINGS
ELASTOMERIC BEARING PADS
FOR STEEL BEAM BRIDGES
AND GENERAL

BC-753M	STEEL GIRDER DETAILS	RECOMMENDED JAN. 31, 2019	RECOMMENDED JAN. 31, 2019	SHEET 1 OF 4
BC-788M	TYPICAL WATERPROOFING AND EXPANSION DETAILS	<i>T. Ross R. Maciora</i> CHIEF BRIDGE ENGINEER	<i>Alvin J. [Signature]</i> ACTING DIR. BUR. OF PROJECT DELIVERY	BC-755M
REFERENCE DRAWINGS				

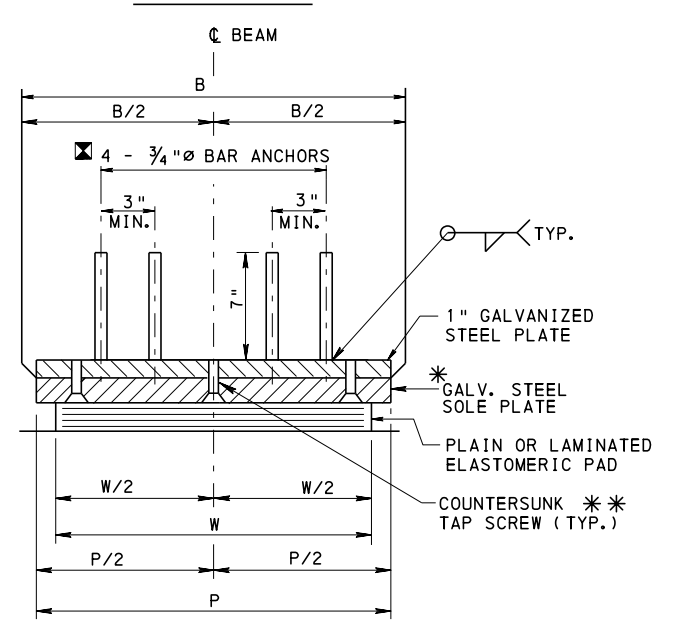
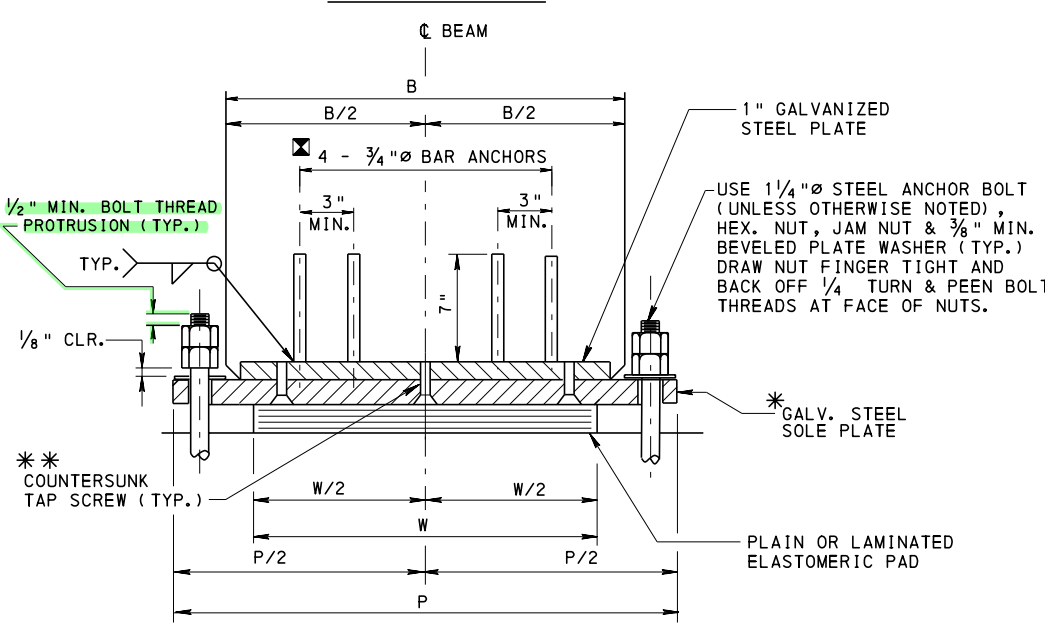
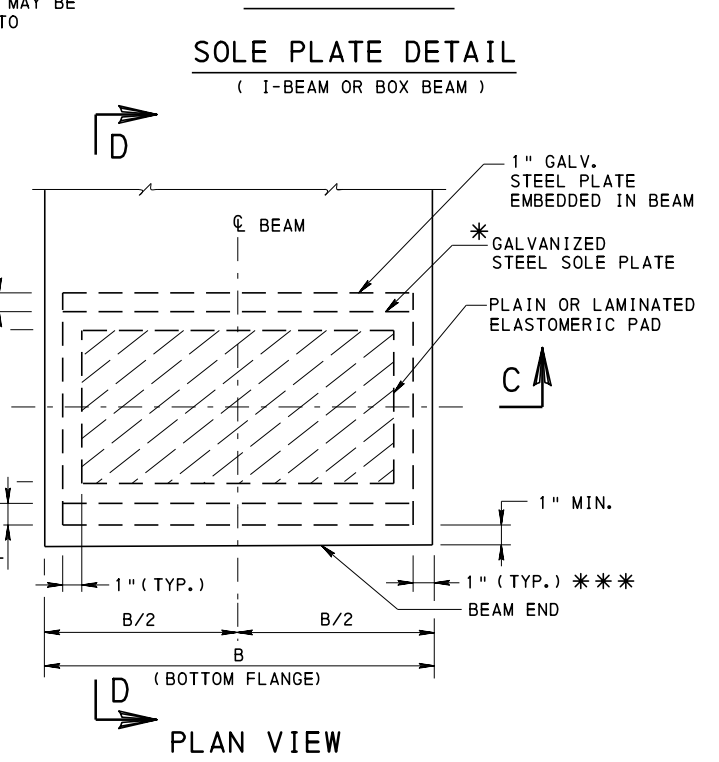
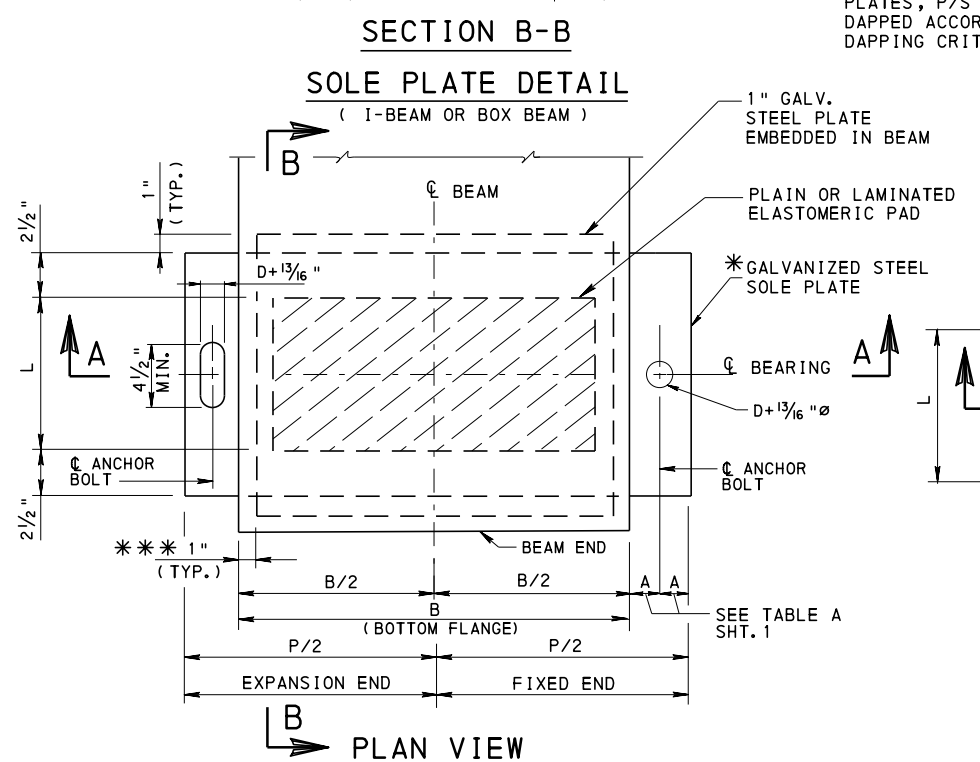
CHANGE 2



NOTE: IN LIEU OF BEVELED SOLE PLATES, P/S BEAMS MAY BE DAPPED ACCORDING TO DAPPING CRITERIA.



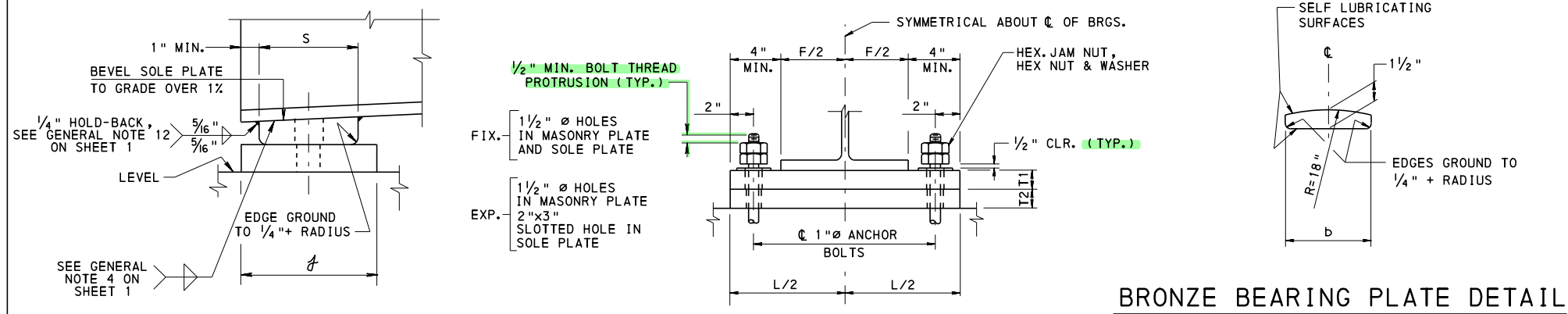
- LEGEND**
- L = BEARING PAD LENGTH
 - W = BEARING PAD WIDTH
 - T = BEARING PAD THICKNESS
 - B = BEAM FLANGE WIDTH
 - P = SOLE PLATE LENGTH
 - PT = SOLE PLATE THICKNESS
 - ▲ = APPLIES TO ADJACENT BOX BEAMS ONLY.
 - ⊠ = SPACED AS REQUIRED TO MISS STRAND PATTERN
 - * PROVIDE FLATNESS TOLERANCE IN ACCORDANCE WITH PUB. 408, SECTION 1105.03(q).
 - PROVIDE SOLE PLATE IN ACCORDANCE WITH DESIGN MANUAL PART 4, D14.7.6.3.9P
 - ** USE 3/4" Ø STAINLESS STEEL COUNTERSUNK TAP SCREWS FOR AN ULTIMATE STRENGTH OF 100 KSI ON 8" CENTERS AND A 2" MIN. EDGE DISTANCE TO CONNECT THE BEVELED SOLE PLATE.
 - *** FOR VERY LARGE PADS, THIS 1" MAY BE ELIMINATED.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

STANDARD BEARINGS
ELASTOMERIC BEARING PADS
FOR P/S CONCRETE BRIDGES

RECOMMENDED JAN. 31, 2019 <i>T. Ross R. Maciara</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. Blaser</i> ACTING DIR. BUREAU OF PROJECT DELIVERY	SHEET 2 OF 4 BC-755M
---	---	--------------------------------

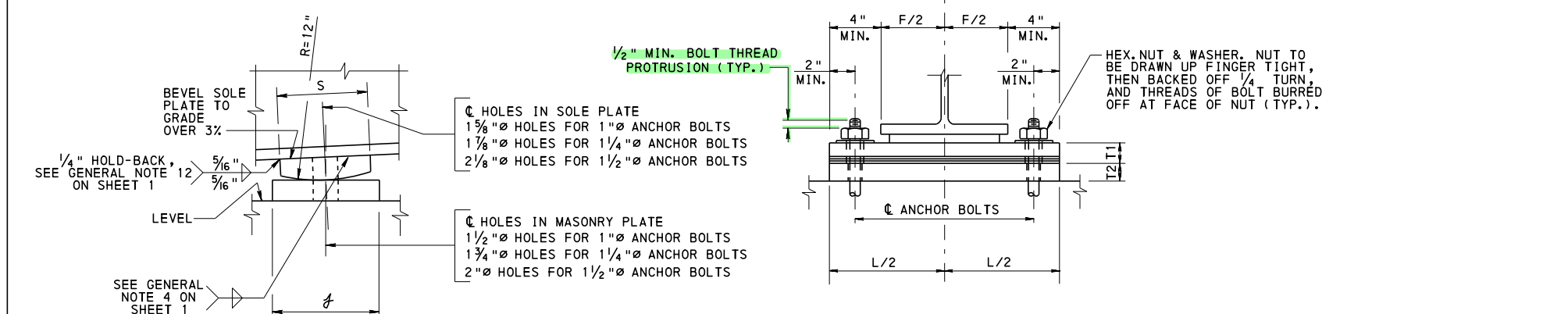


BRONZE BEARING PLATE DETAIL

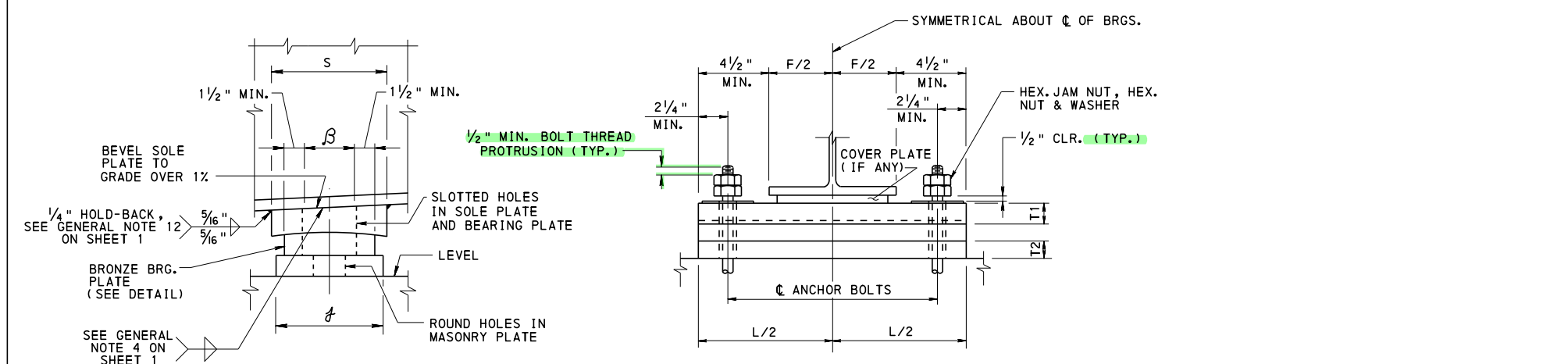
METAL BEARING NOTES - FOR SKEWS > 75°

- THICKNESS SHOWN IS AT \bar{C} BEARINGS.
- FACING OF BEARING SURFACES SPECIFIED IN PUB. 408 APPLIES TO FLAT SURFACES OR CIRCULAR SURFACES IN ACCORDANCE WITH DIMENSIONS AND RADII GIVEN IN THIS STANDARD DRAWING.
- THE DESIGNER IS REQUIRED TO COMPLETE THE APPROPRIATE BEARING DATA TABLE/TABLES BASED ON THE DESIGN CALCULATIONS.
- USE SERVICE LOADS (UNFACTORED) IN THE TABLES.
- DO NOT USE THESE BEARINGS FOR SKEW LESS THAN 75°. SEE SHEET 4 FOR APPROPRIATE BEARINGS FOR SKEW LESS THAN 75°.
- PROVIDE 1/8" THICK TYPE II BEDDING MATERIAL FOR BRIDGE SHOES, CONFORMING TO THE REQUIREMENTS OF PUB. 408, SECTION 1113.03(h).

FIXED BEARINGS IF & EXPANSION BEARINGS IE FOR SPANS UP TO 50 FT.
(EXPANSION BEARING SHOWN)



FIXED BEARINGS IIF



EXPANSION BEARINGS IIIE

- HOLES IN MASONRY PLATE:**
 2" \varnothing HOLES FOR 1" \varnothing ANCHOR BOLTS
 2 1/4" \varnothing HOLES FOR 1 1/4" \varnothing ANCHOR BOLTS
 2 1/2" \varnothing HOLES FOR 1 1/2" \varnothing ANCHOR BOLTS
- HOLES IN SOLE PLATE & BEARING PLATE:**
 2" \varnothing x 5" SLOTTED HOLE FOR 1" \varnothing ANCHOR BOLTS
 2 1/4" \varnothing x 5 1/4" SLOTTED HOLE FOR 1 1/4" \varnothing ANCHOR BOLTS
 2 1/2" \varnothing x 5 1/2" SLOTTED HOLE FOR 1 1/2" \varnothing ANCHOR BOLTS

USE THE FOLLOWING INFORMATION AS A GUIDE WHEN DESIGNING EXPANSION BEARINGS IIIE:

- MINIMUM β = DIA. OF HOLE IN MASONRY PLATE + Δl
- MINIMUM b = ($\beta + \Delta l$) BUT NOT LESS THAN ($\beta + 3"$)
- MINIMUM f = ($b + \Delta l$) BUT NOT LESS THAN ($b + 2"$) IN WHICH Δl = TOTAL LONGITUDINAL MOVEMENT
- MINIMUM L = $F + 9"$
- MINIMUM S = $b + 1 1/2"$

FIXED BEARINGS IF & EXPANSION BEARINGS IE							
DEAD LOAD	LIVE LOAD	TOTAL LOAD	MARK	DIMENSIONS			WEIGHT
				S	f	L	

MINIMUM $L = F + 8"$ FOR BEARINGS IF OR IE

FIXED BEARINGS IIF							
DEAD LOAD	LIVE LOAD	TOTAL LOAD	MARK	DIMENSIONS			WEIGHT
				S	f	L	

MINIMUM $L = F + 8"$

EXPANSION BEARINGS IIIE							
DEAD LOAD	LIVE LOAD	TOTAL LOAD	MARK	DIMENSIONS			WEIGHT
				b	f	L	

DESIGN BEARINGS TO PROVIDE FOR A TOTAL LONGITUDINAL MOVEMENT OF 3". FOR LARGER MOVEMENT, SPECIAL DESIGN IS REQUIRED.

LEGEND

- F = FLANGE WIDTH
- T = PLATE THICKNESS
- S = SOLE PLATE WIDTH
- B = SOLE PLATE LENGTH
- b = BEARING PLATE WIDTH
- L = LENGTH OF PLATE
- R = RADIUS OF BEVEL SOLE PLATE

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

STANDARD BEARINGS METAL BEARINGS FOR STEEL BEAM BRIDGES

RECOMMENDED JAN. 31, 2019
 T. Ross R. Maciora
 CHIEF BRIDGE ENGINEER

RECOMMENDED JAN. 31, 2019
 [Signature]
 ACTING DIR. BUREAU OF PROJECT DELIVERY

SHEET 3 OF 4
 BC-755M

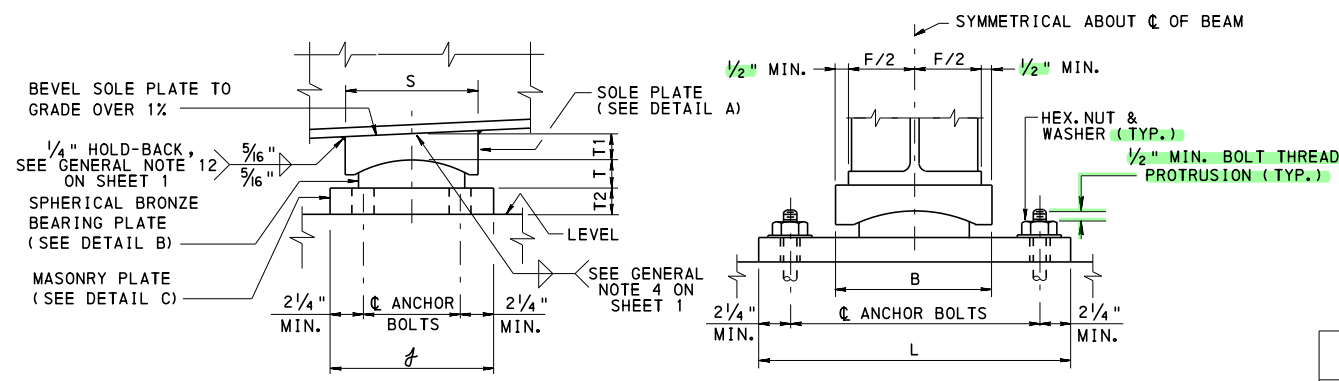
METAL BEARING NOTES - FOR SKEW $\leq 75^\circ$
OR CURVED STEEL BEAM BRIDGES

- THICKNESS SHOWN IS AT \bar{C} BEARING.
- FACING OF BEARING SURFACES SPECIFIED IN PUB. 408 APPLIES TO FLAT SURFACES OR CIRCULAR SURFACES IN ACCORDANCE WITH DIMENSIONS AND RADII GIVEN IN THIS STANDARD DRAWING.
- THE DESIGNER IS REQUIRED TO COMPLETE THE APPROPRIATE BEARING DATA TABLE/TABLES BASED ON THE DESIGN CALCULATIONS.
- USE SERVICE LOADS (UNFACTORED) IN THE TABLES.
- USE THESE BEARINGS FOR SKEW LESS THAN OR EQUAL TO 75° AND CURVED STEEL BRIDGES.
- PROVIDE $\frac{1}{8}$ " THICK TYPE II BEDDING MATERIAL CONFORMING TO THE REQUIREMENTS OF PUB. 408, SECTION 1113.03 (h).
- USE THE FOLLOWING AS A GUIDE:

MINIMUM VALUES OF	TYPES OF BEARINGS (in)		
	III ES	III EL	III ET
B	=F+1" BUT. \neq S	=F+1"	=F+1"
\bar{f}	=D+ $\Delta\bar{L}$ + $\frac{1}{2}$ " MIN.	=b+ $\Delta\bar{L}$ + $\frac{1}{2}$ " MIN.	=b+2" MIN.
L	=B+ $\Delta\bar{t}$ +8"	=B+11" MIN.	=B+ $\Delta\bar{t}$ +9"
S	=D+2"	=b+1 $\frac{1}{2}$ "	=b+1 $\frac{1}{2}$ "

SPECIFY TYPE OF STEEL ON THE DESIGN DRAWINGS.
 $\Delta\bar{L}$ = TOTAL LONGITUDINAL MOVEMENT
 $\Delta\bar{t}$ = TOTAL TRANSVERSE MOVEMENT
 \neq = NOT LESS THAN

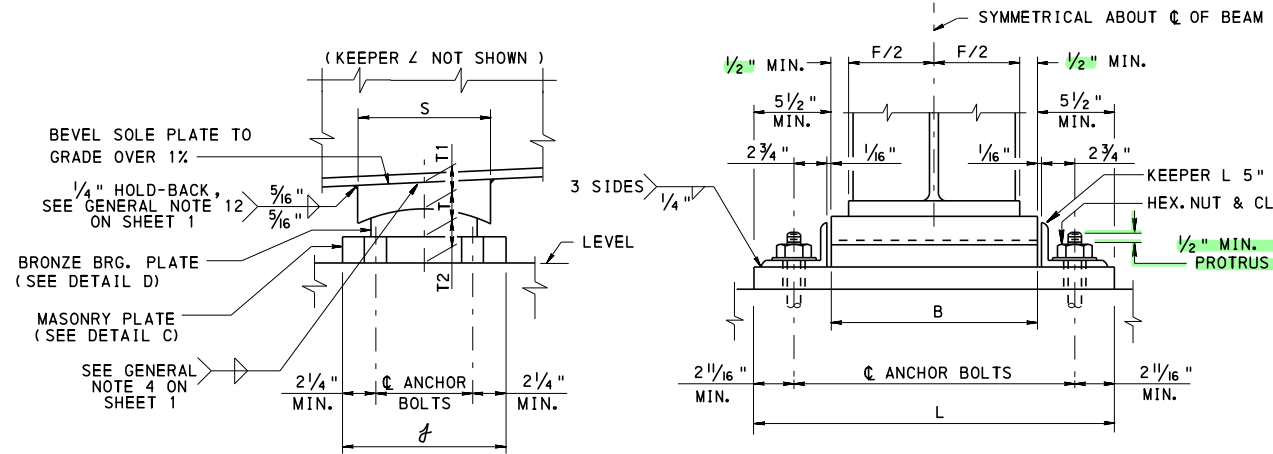
- SEE LEGEND ON SHEET 3.



EXPANSION BEARINGS III ES

DEAD LOAD	LIVE LOAD	TOTAL LOAD	MARK	DIMENSIONS							WEIGHT		
				D	S	B	\bar{f}	L	T1	T2		T	

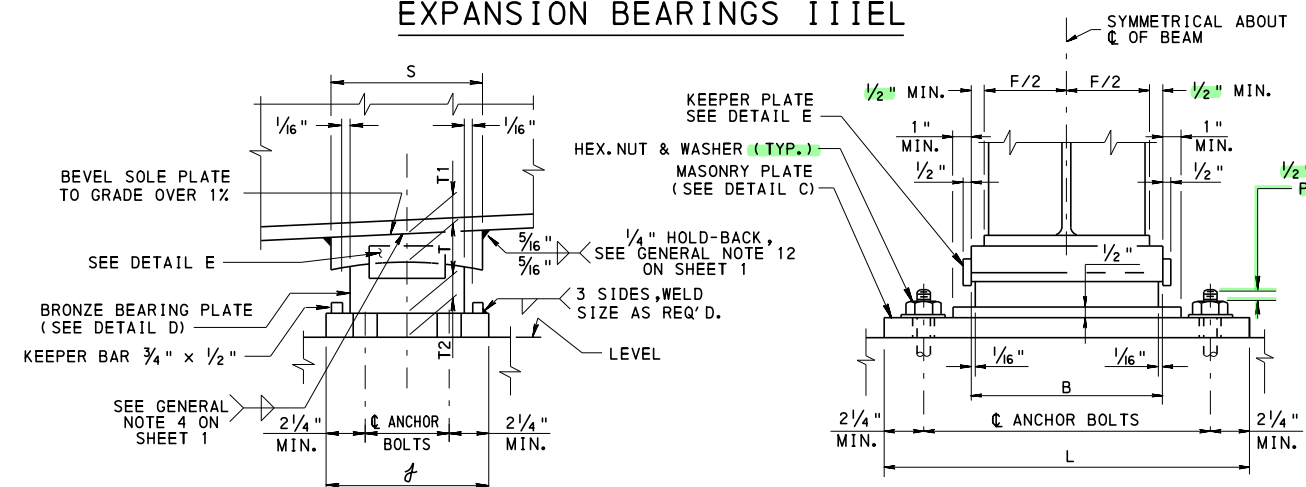
DESIGN BEARINGS TO PROVIDE FOR A TOTAL LONGITUDINAL MOVEMENT OF 3" AND A TOTAL TRANSVERSE MOVEMENT OF 1 $\frac{1}{2}$ ".



EXPANSION BEARINGS III EL

DEAD LOAD	LIVE LOAD	TOTAL LOAD	MARK	DIMENSIONS							WEIGHT		
				b	B	\bar{f}	L	S	T1	T2		T	

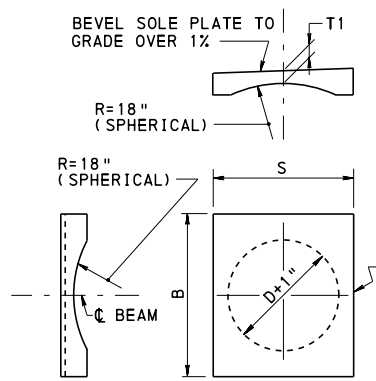
DESIGN BEARINGS TO PROVIDE FOR A TOTAL LONGITUDINAL MOVEMENT OF 3" AND ARE RESTRAINED TRANSVERSELY. MAXIMUM RESTRAINED FORCE = COEFFICIENT OF FRICTION X DEAD LOAD REACTION + F_K , FORCE RESISTED BY KEEPER ANGLE.



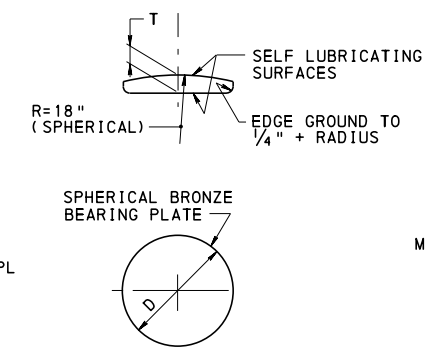
EXPANSION BEARINGS III ET

DEAD LOAD	LIVE LOAD	TOTAL LOAD	MARK	DIMENSIONS							WEIGHT		
				b	B	\bar{f}	L	S	T1	T2		T	

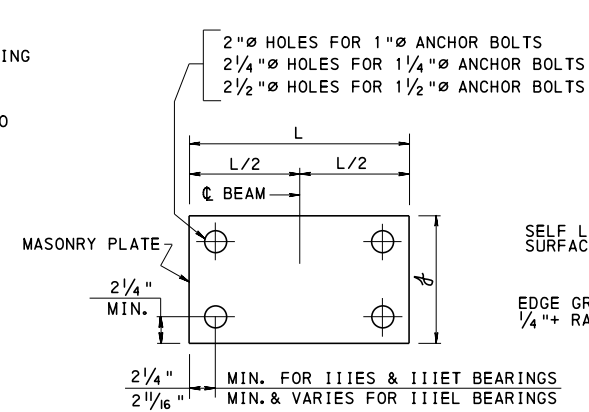
DESIGN BEARINGS TO PROVIDE FOR A TOTAL TRANSVERSE MOVEMENT OF 2" AND ARE RESTRAINED LONGITUDINALLY. MAXIMUM RESTRAINED FORCE = COEFFICIENT OF FRICTION X DEAD LOAD REACTION + F_K , FORCE RESISTED BY KEEPER BAR.



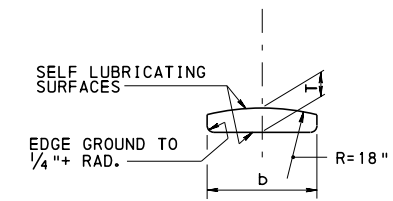
DETAIL A



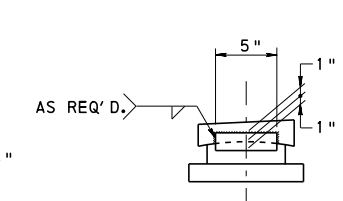
DETAIL B



DETAIL C



DETAIL D



DETAIL E

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
BEARINGS
METAL BEARINGS
FOR SKEW $\leq 75^\circ$
OR CURVED STEEL BEAM BRIDGES

RECOMMENDED JAN. 31, 2019 <i>T. Ross R. Macosca</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Michael J. ...</i> ACTING DIR. BUREAU OF PROJECT DELIVERY	SHEET 4 OF 4 BC-755M
---	--	-------------------------

A. GENERAL NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH SPECIFICATIONS PUBLICATION 408, ANSI/AASHTO/AWS/D1.5 BRIDGE WELDING CODE AND CONTRACT SPECIAL PROVISIONS.
2. SANDBLAST IN ACCORDANCE WITH SSPC-SP10 TO REMOVE MILL SCALE FROM BEARINGS.
3. GRIND SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ANY SHARP PROTRUSIONS. FABRICATION TOLERANCES AND THE LIMITATIONS ON SURFACE FINISH WILL BE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1111.
4. PAINT ALL STEEL SURFACES IN ACCORDANCE WITH PUBLICATION 408, SECTION 1060. APPLY ALL COATS IN THE FABRICATION SHOP ONLY. DO NOT PAINT PTFE, STAINLESS STEEL OR THE INSIDE OF THE POT. APPLY ONLY PRIME COAT TO THE CONTACT AREA BETWEEN BEAM BOTTOM FLANGE AND SOLE PLATE AND TO THE BOTTOM SIDE OF THE MASONRY PLATE.
5. ROUND ALL PTFE CORNERS TO ACCOMMODATE THE MACHINED RECESS IN STEEL GUIDE PLATE / PISTON.
6. ETCH PTFE ON ONE SIDE FOR BONDING INTO THE MACHINED RECESS.
7. PTFE ON THE SIDE OF GUIDE PLATE MUST BE PIGMENTED.
8. PRIOR TO THE APPLICATION OF ADHESIVE, CLEAN ALL MATING STEEL AND PTFE SURFACES BY GRIT BLASTING AND DEGREASING. APPLY ADHESIVE AS PER THE MANUFACTURER'S RECOMMENDATION.
9. LUBRICATE ALL SURFACES OF NEOPRENE DISC WITH SILICONE GREASE IN ACCORDANCE WITH MILITARY SPECIFICATION SAE-AS8660.
10. CUT FLAT BRASS SEALING RING ENDS AT 45° ANGLE WITH A MAXIMUM GAP OF 0.05". STAGGER THE OPENINGS IN THE BRASS RINGS 120° APART.
11. MARK THE THICKER EDGE OF THE SOLE PLATE AS SUCH FOR THE PURPOSE OF FIELD IDENTIFICATION. PLACE MARK ON THE EDGE OF SOLE PLATE SO THAT IT WILL BE VISIBLE AFTER BEARING INSTALLATION. IN THE CASE OF A SOLE PLATE WITH A COMPOUND BEVEL PLACE THE MARK ON EITHER EDGE OF THE THICKEST SOLE PLATE CORNER.
12. MARK CENTERLINE OF GUIDED AND NON-GUIDED POT BEARINGS ON THE SIDES OF MASONRY PLATE AND SOLE PLATE. THE CENTERLINE IDENTIFICATION MARKS WILL BE USEFUL TO LOCATE OFFSET DISTANCES IN THE FIELD. USE INDELIBLE INK TO PLACE ALL MARKS.
13. MARK EACH BEARING WITH THE NAME OF THE MANUFACTURER AND TYPE OR MODEL NUMBER. PLACE THE IDENTIFICATION MARK IN A PERMANENT MANNER AND LOCATION SO THAT IT IS VISIBLE AFTER ERECTION.
14. WHEN THE POT IS RECESSED INTO THE MASONRY PLATE SEAL AROUND THE POT PERIMETER WITH AN APPROVED CAULKING COMPOUND IN THE SHOP AFTER PAINT COATING HAS DRIED.
15. ENSURE ALL BEARING SURFACES INCLUDING THE BEARING SEAT ARE LEVEL PRIOR TO INSTALLATION OF POT BEARINGS IN ACCORDANCE WITH PUBLICATION 408.
16. TEST ONE BEARING PER TYPE OR PER LOT SIZE OF 25 FOR A HORIZONTAL FORCE CAPACITY PRIOR TO SHIPMENT.

B. MATERIALS:

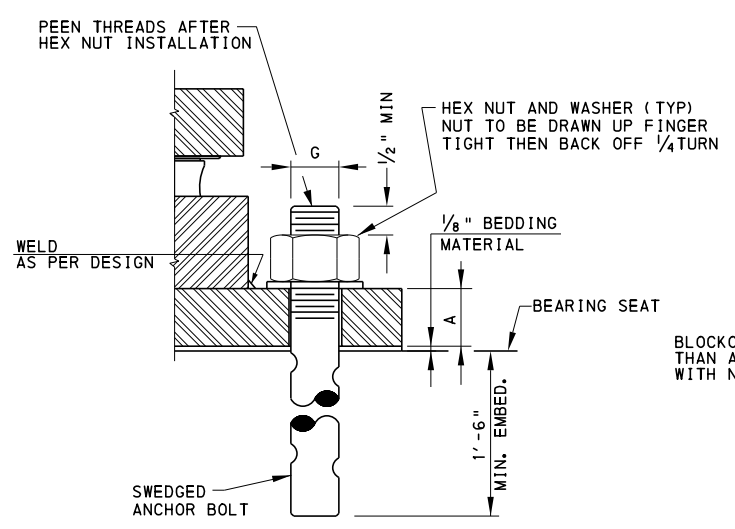
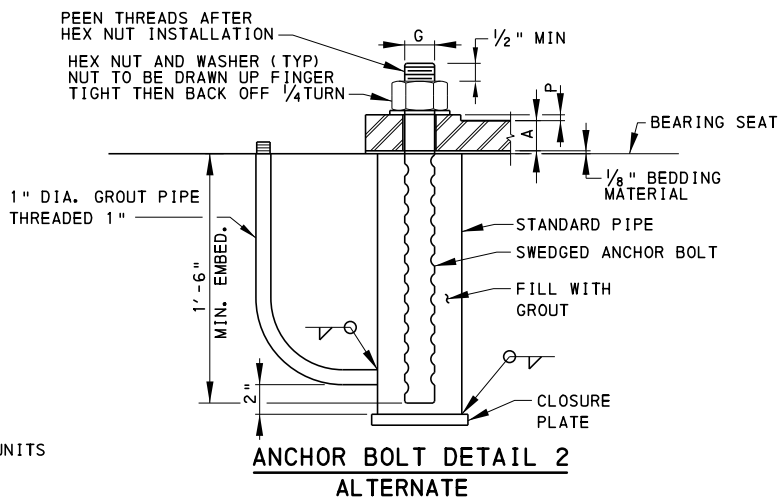
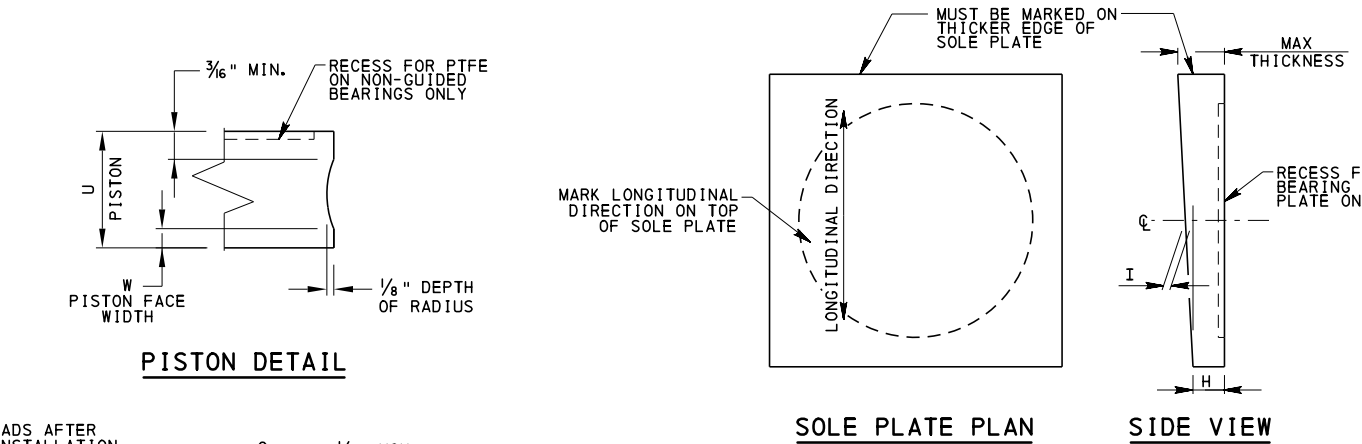
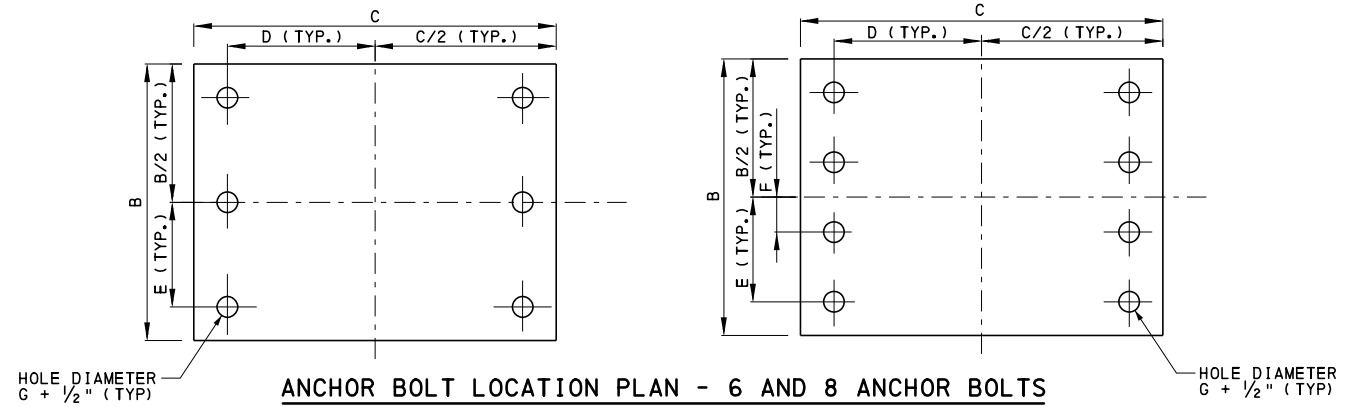
1. STRUCTURAL STEEL:
 - MATERIAL 4" THICK OR LESS - AASHTO M270 (ASTM A709/ A A709M) GRADE 50
 - MATERIAL GREATER THAN 4" THICK - ASTM A572 GRADE 50
2. ANCHOR BOLTS: ASTM F1554, GRADE 55
3. NUTS: ASTM A563, GRADE DH
4. WASHERS: ASTM F436, TYPE 1
5. GALVANIZING OF ANCHOR BOLTS, NUTS AND WASHERS: PUBLICATION 408, SECTION 1105.02(S).
6. STAINLESS STEEL: ASTM A240, GRADE 30, TYPE 304 WITH AN ANSI 0.02 mil SURFACE FINISH OR LESS.
7. FLAT BRASS SEALING RINGS: ASTM B36 (HALF HARD) SPECIFICATION.
8. ELASTOMERIC DISC: VIRGIN PLAIN NEOPRENE OR NATURAL RUBBER WITH HARDNESS OF 50 DUROMETER (+/- 10) PER AASHTO M251.
9. PTFE SHEET: MADE FROM VIRGIN TFE RESIN PER ASTM D4894.
 - MAIN SLIDING SURFACE PTFE - UNFILLED, DIMPLED AND LUBRICATED. DIMPLES MUST HAVE A MINIMUM EDGE DISTANCE OF 0.5" AND CONFORM TO 1998 AASHTO LRFD, SECTION 14.7.2.
 - GUIDE BAR SURFACE PTFE - PIGMENTED, FILLED OR UNFILLED.
10. CAULK FOR SEALING AROUND THE POT PERIMETER: SIKAFLEX 1A OR APPROVED EQUAL.
11. BEDDING MATERIAL: PUBLICATION 408, SECTION 1113.03 (h), TYPE 11.

C. MATERIAL DESIGN PARAMETERS:

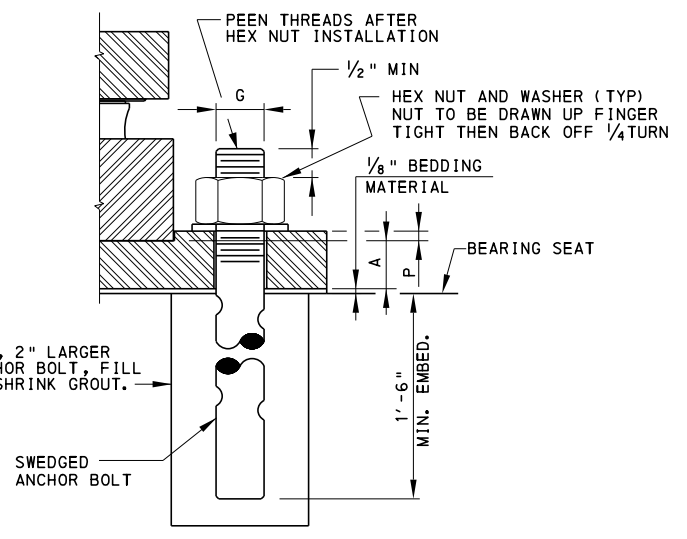
1. ALLOWABLE PRESSURE IN ELASTOMER AND PTFE:
 - MAXIMUM = 3500 psi ELASTOMER & PTFE
 - MINIMUM = 700 psi ELASTOMER
2. COEFFICIENT OF FRICTION BETWEEN PTFE AND STAINLESS STEEL: 0.04
3. CONCRETE BEARING STRENGTH: $f'c = 3000$ psi

D. ANCHOR BOLT INSTALLATION:

1. IF ANCHOR BOLTS ARE INSTALLED BEFORE THE MASONRY PLATE INSTALLATION, USE ANCHOR BOLT DETAIL 1. THE USE OF A BLOCKOUT FORM IS OPTIONAL.
2. IF ANCHOR BOLTS ARE INSTALLED AFTER THE BEARINGS ARE INSTALLED, USE ANCHOR BOLT DETAIL 2.
3. IF BLOCKOUTS ARE USED, REMOVE BLOCKOUT FORM AND DEBRIS FROM HOLE PRIOR TO GROUTING. INSTALL NON-SHRINK GROUT IN ACCORDANCE WITH PUBLICATION 408, SECTION 1001. DO NOT GROUT UNTIL ALL GIRDER UNITS ARE PROPERLY ALIGNED.
4. PREVENT WATER FROM ACCUMULATING IN THE PREFORMED ANCHOR BOLT HOLES OR STANDARD PIPE AND ENSURE THE HOLES ARE COMPLETELY FILLED WITH GROUT.



ALTERNATE POT PLATE ATTACHMENT
NOTE: CAN BE USED IN LIEU OF RECESSING POT PLATE.



ANCHOR BOLT DETAIL 1 PREFERRED

INDEX OF SHEETS	
SHEET NO.	SHEET TITLE
1	GENERAL NOTES AND DETAILS
2	FIXED - DETAILS
3	NON-GUIDED - DETAILS
4	GUIDED - DETAILS-1
5	GUIDED - DETAILS-2
6	CONNECTION OPTIONS

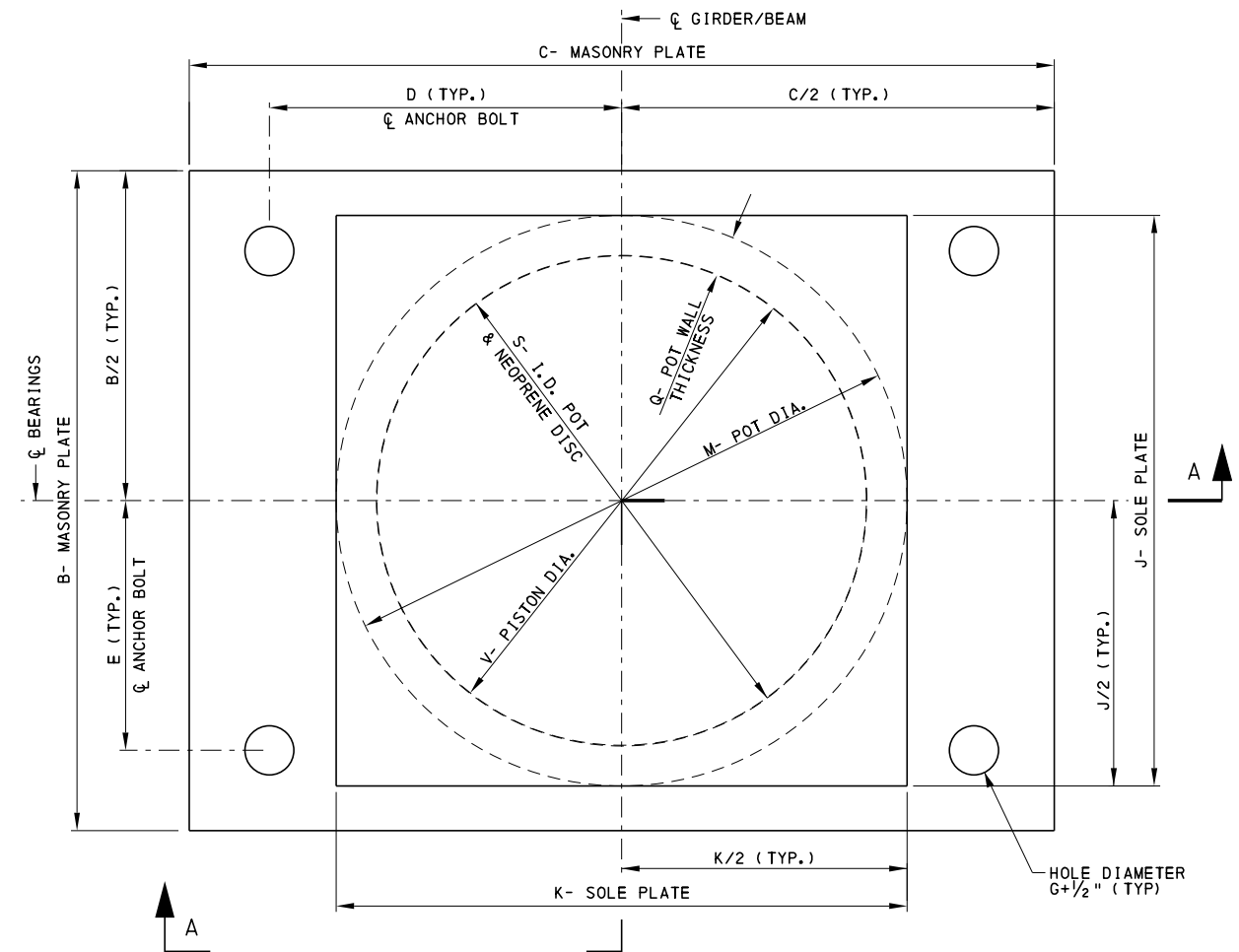
NOTE:
THE INDICATED BEARING COMPONENT DIMENSION VARIABLES TO BE TAKEN FROM CONTRACT DRAWINGS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

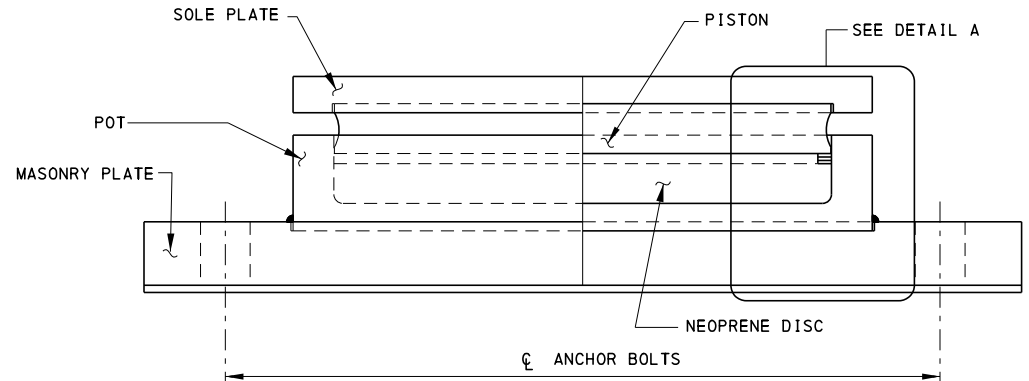
STANDARD
HIGH LOAD MULTI-ROTATIONAL
POT BEARINGS
GENERAL NOTES AND DETAILS

RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 1 OF 6 BC-756M
--	---	--------------------------------

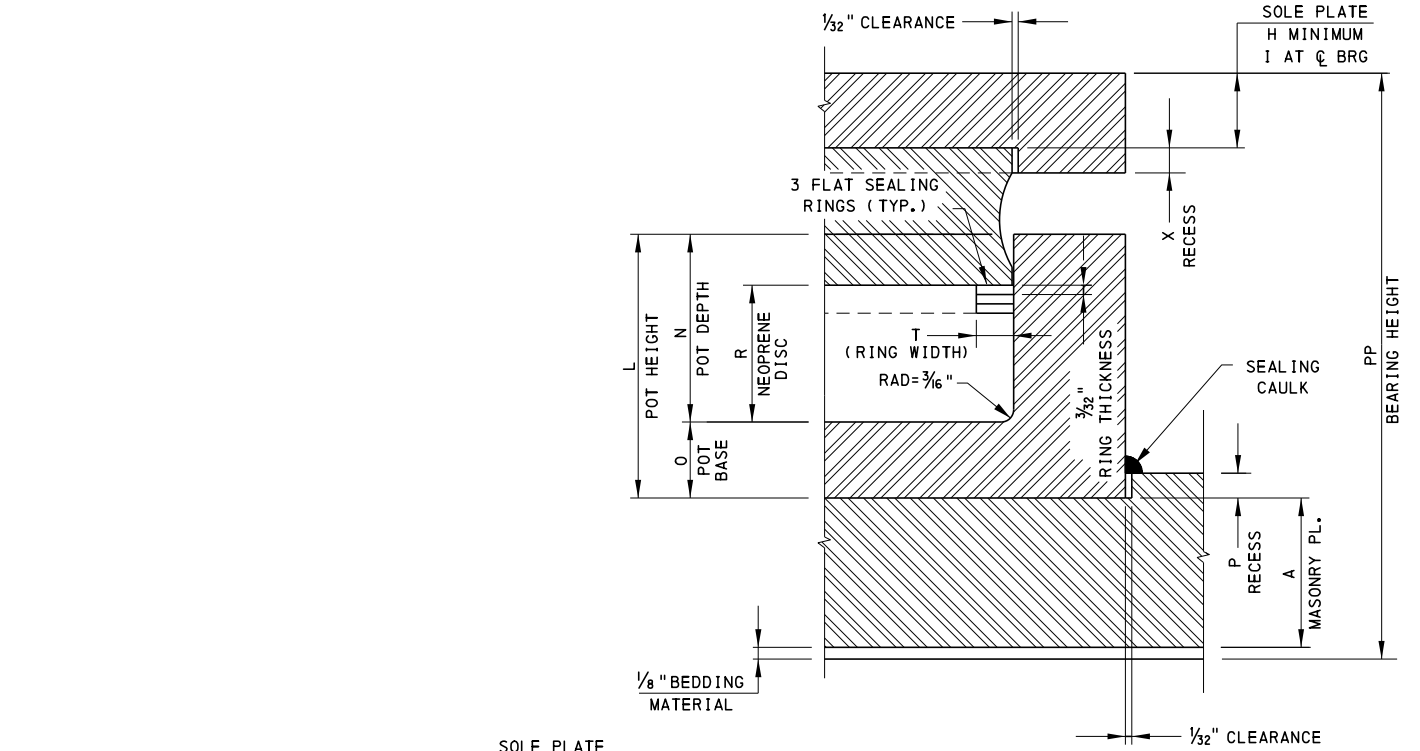
CHANGE 4



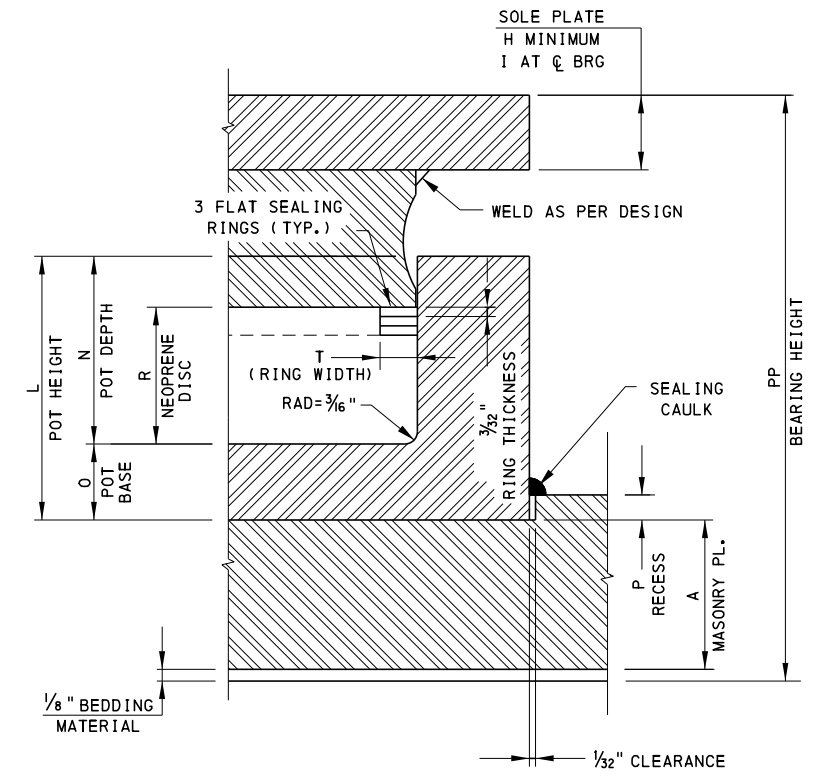
FIXED POT BEARING PLAN



SECTION A-A



DETAIL A



ALTERNATE SOLE PLATE ATTACHMENT FOR FIXED BEARINGS ONLY

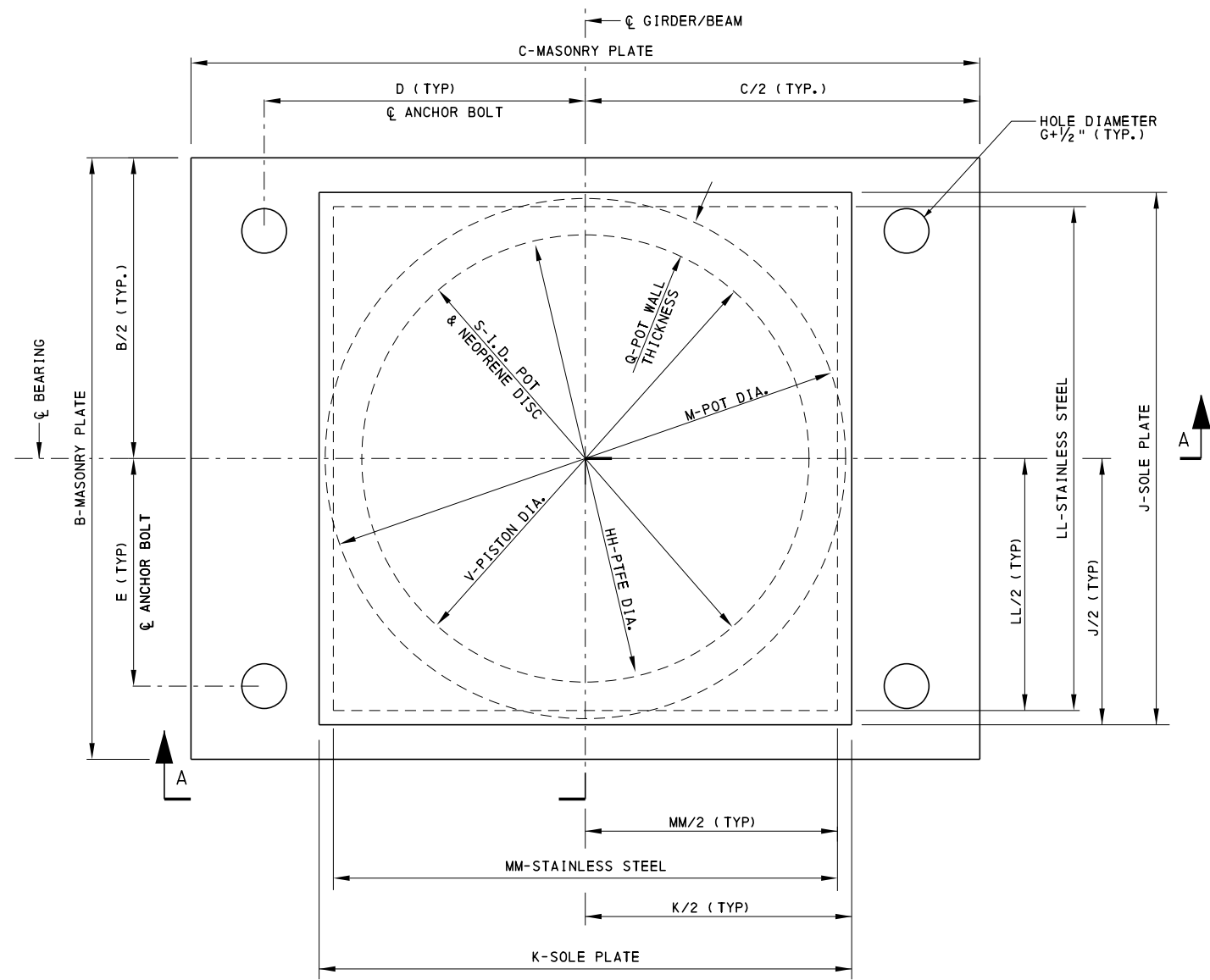
NOTE:
THE INDICATED BEARING COMPONENT DIMENSION VARIABLES TO BE TAKEN FROM CONTRACT DRAWINGS.

FOR ADDITIONAL DETAILS, SEE SHEETS 1 AND 6.

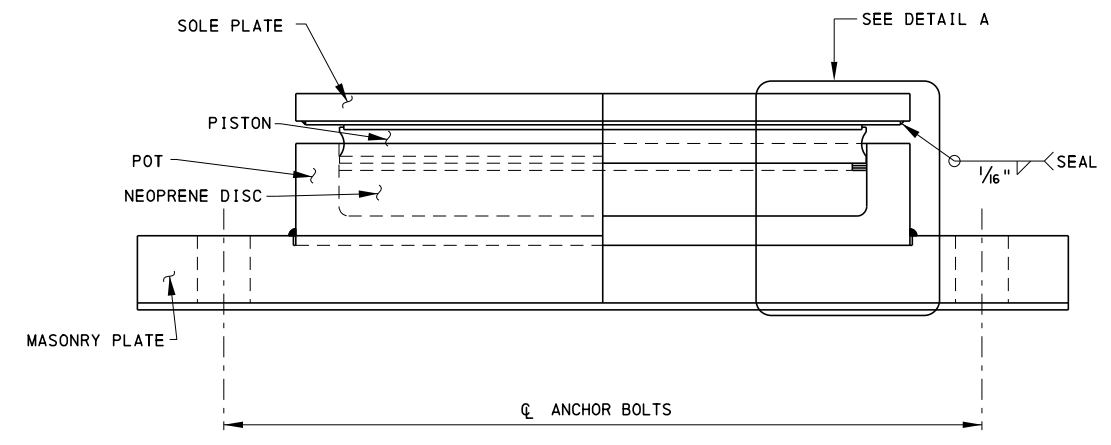
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

**STANDARD
HIGH LOAD MULTI ROTATIONAL
POT BEARINGS - FIXED
DETAILS**

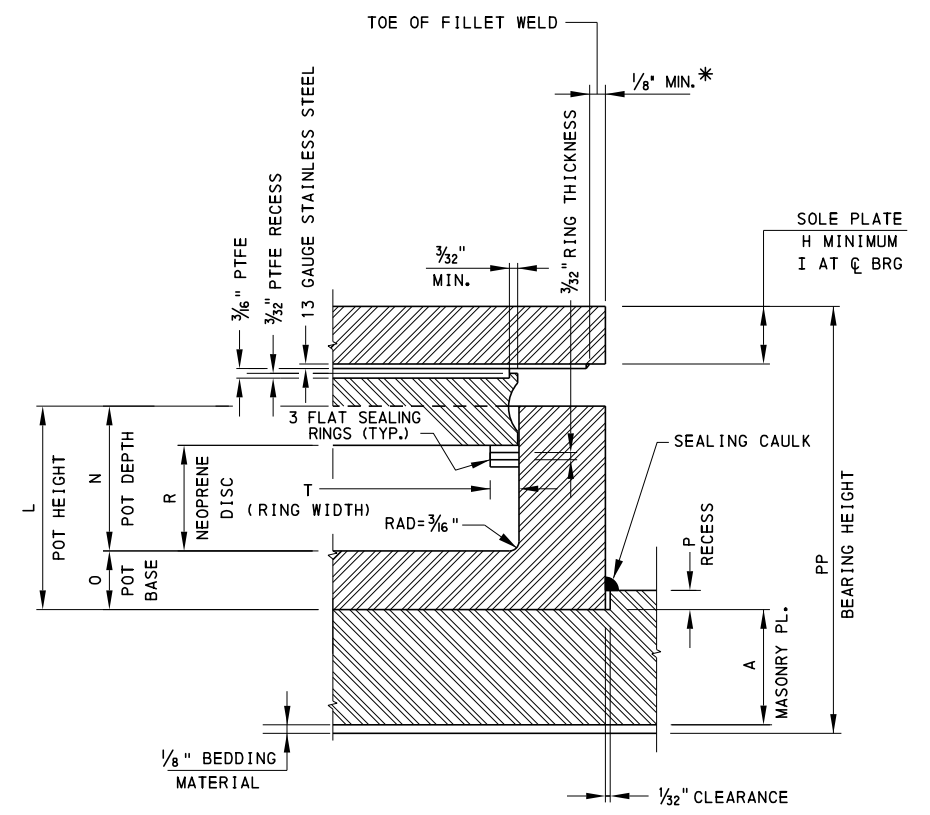
RECOMMENDED NOV. 23, 2022 <i>L. W. Gray</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Grain E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 2 OF 6 BC-756M
---	---	--------------------------------



NON-GUIDED POT BEARING PLAN



SECTION A-A



DETAIL A

* 1/8" MIN. MAY BE REDUCED TO ZERO IN ORDER TO ELIMINATE BLASTING AND PAINTING OF SMALL EDGE AREA BENEATH SOLE PLATE AS LONG AS THE QUALITY OF WELD IS NOT COMPROMISED.

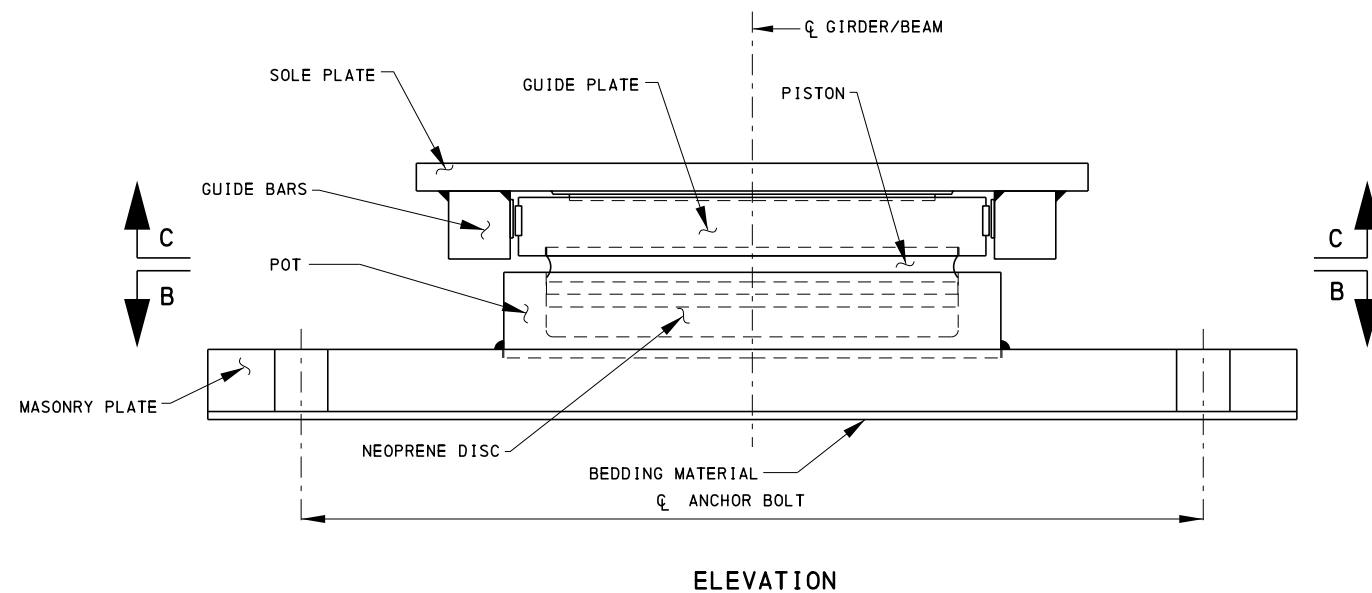
NOTE:
THE INDICATED BEARING COMPONENT DIMENSION VARIABLES TO BE TAKEN FROM CONTRACT DRAWINGS.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

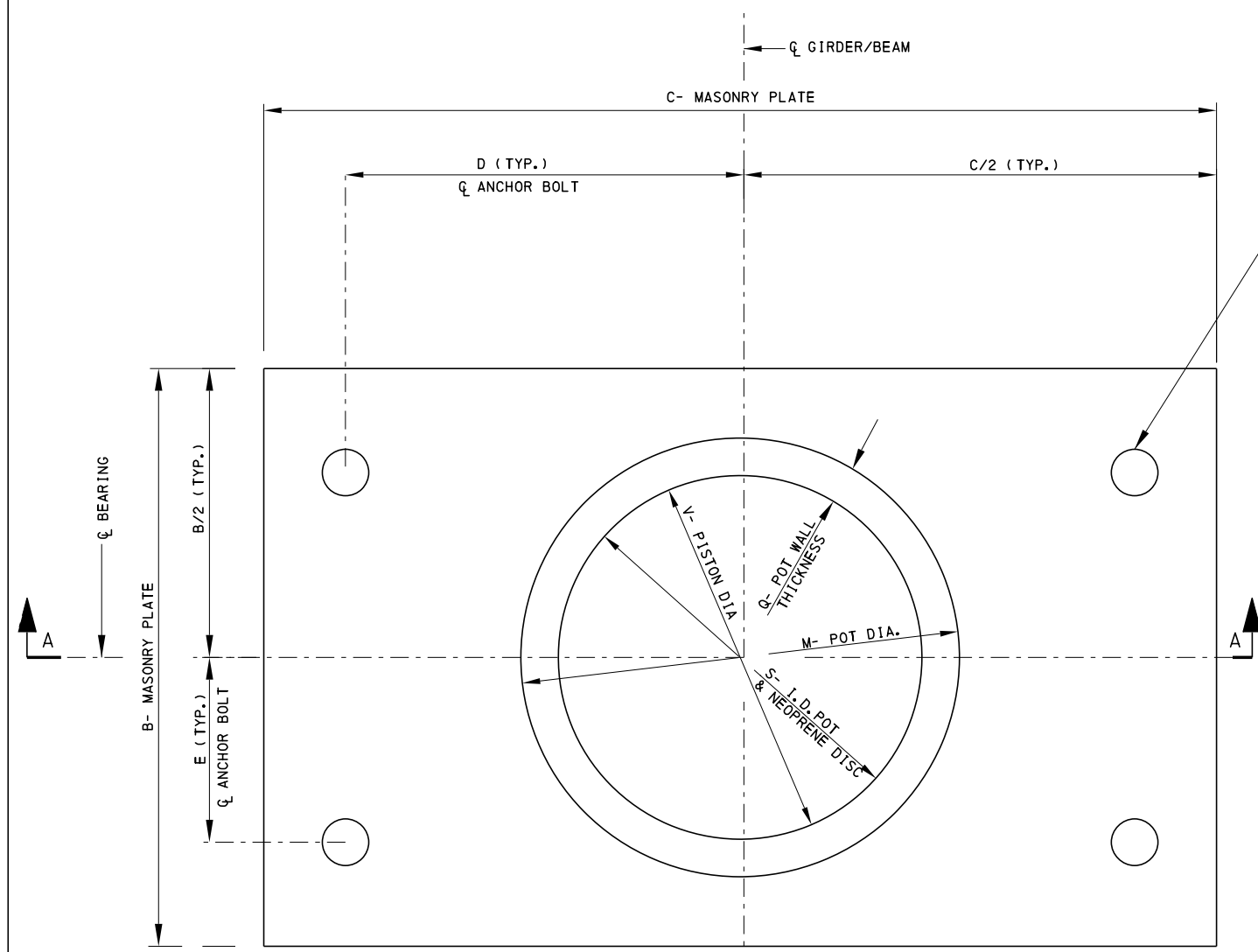
**STANDARD
HIGH LOAD MULTI ROTATIONAL
POT BEARINGS - NON-GUIDED
DETAILS**

RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 3 OF 6 BC-756M
--	---	--------------------------------

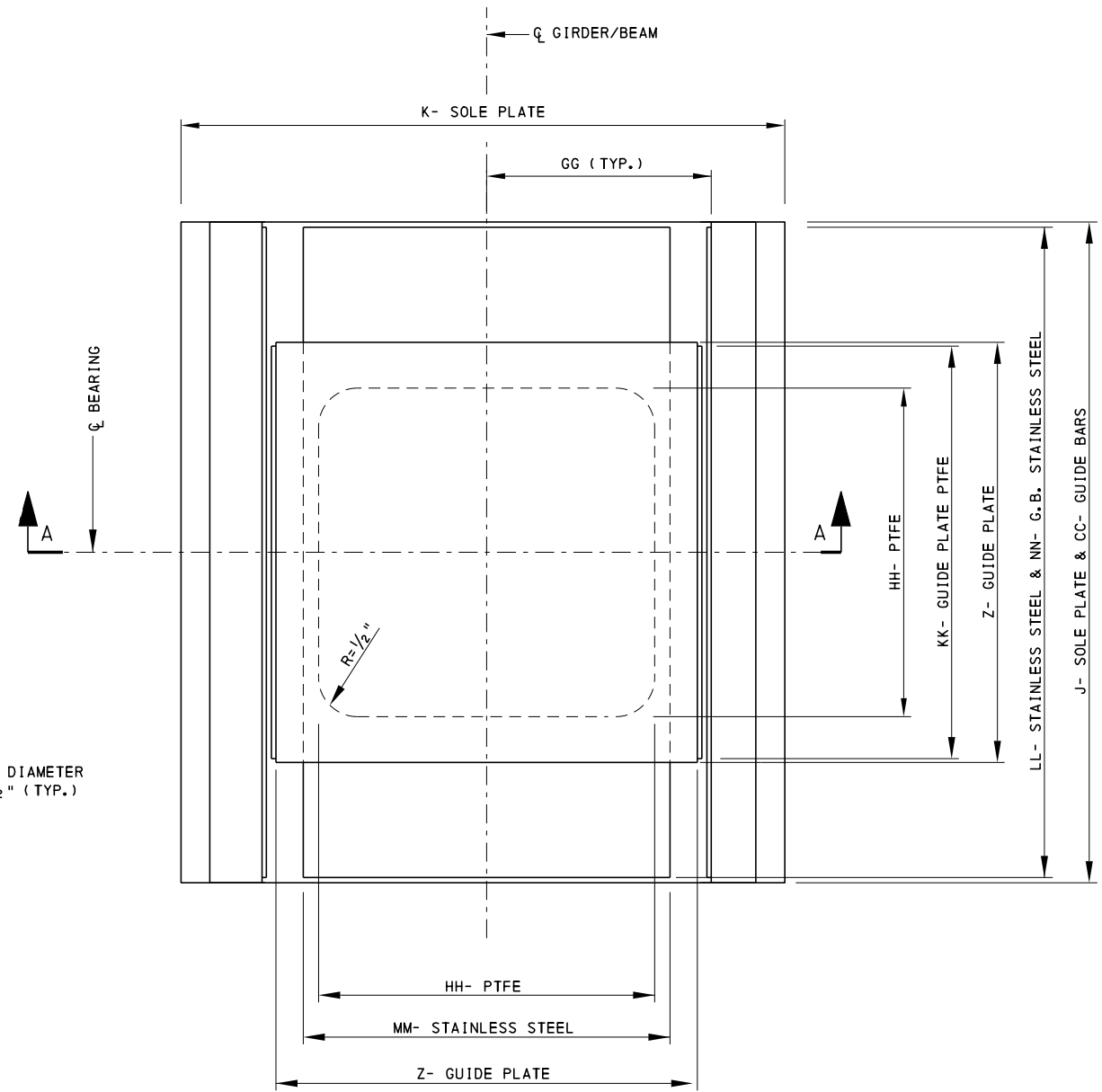
FOR ADDITIONAL DETAILS, SEE SHEETS 1 AND 6.



ELEVATION



SECTION B-B



SECTION C-C

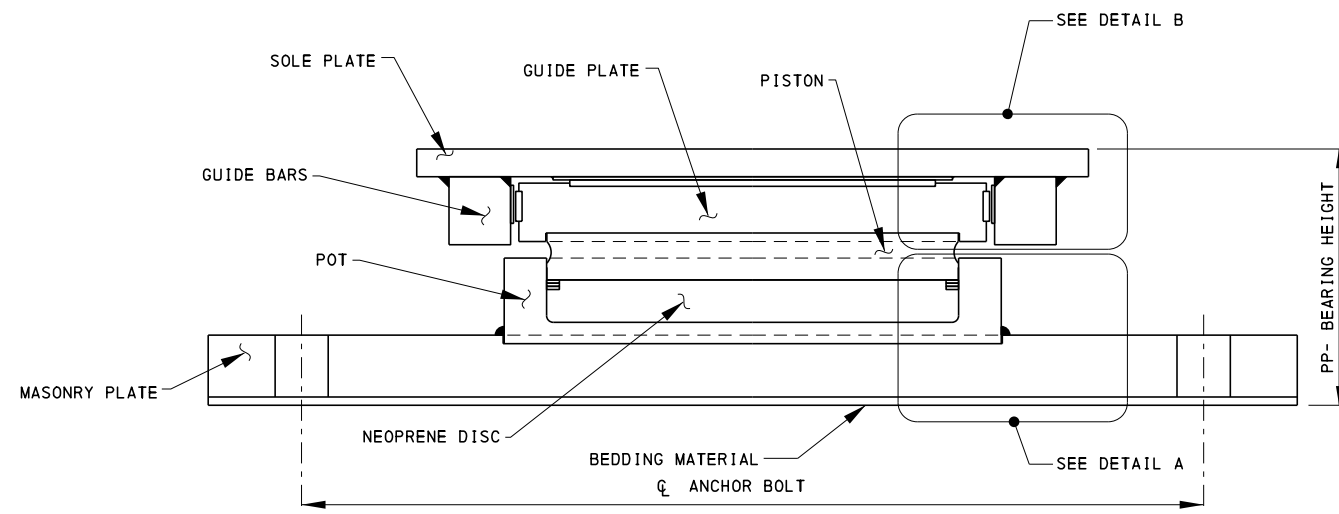
(NOTE: PISTON NOT SHOWN FOR CLARITY)

HOLE DIAMETER
G + 1/2" (TYP.)

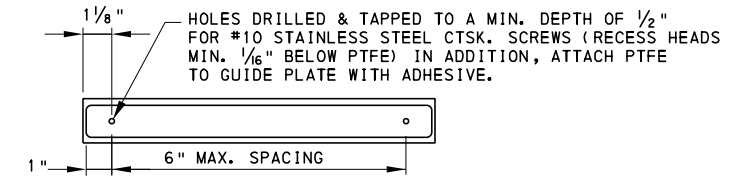
NOTE:
THE INDICATED BEARING COMPONENT DIMENSION
VARIABLES TO BE TAKEN FROM CONTRACT DRAWINGS.

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BRIDGE OFFICE		
STANDARD HIGH LOAD MULTI ROTATIONAL POT BEARINGS - GUIDED DETAILS - 1		
RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 4 OF 6 BC-756M

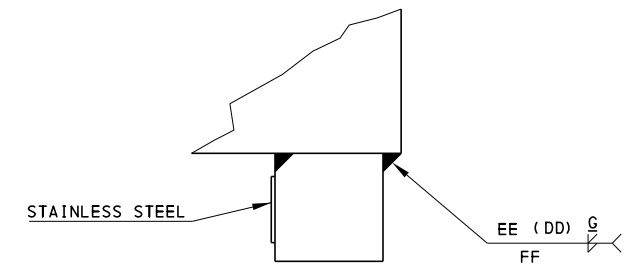
FOR ADDITIONAL DETAILS, SEE SHEETS 1, 5 AND 6.



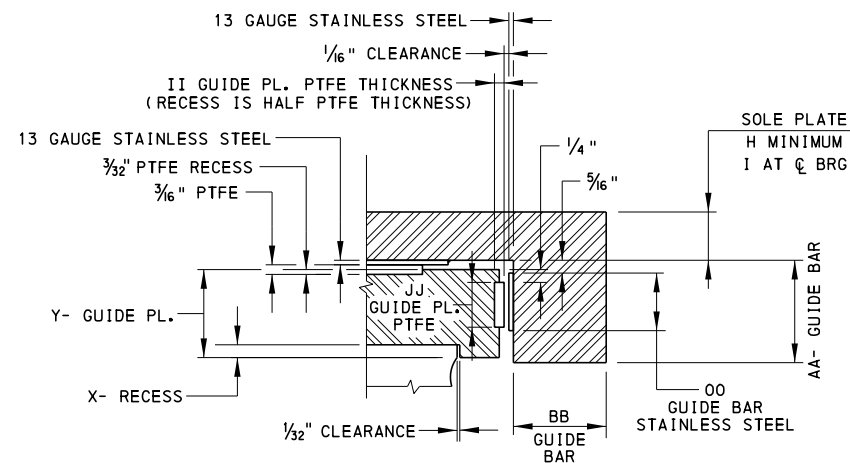
SECTION A-A



GUIDE PLATE PTFE DETAIL

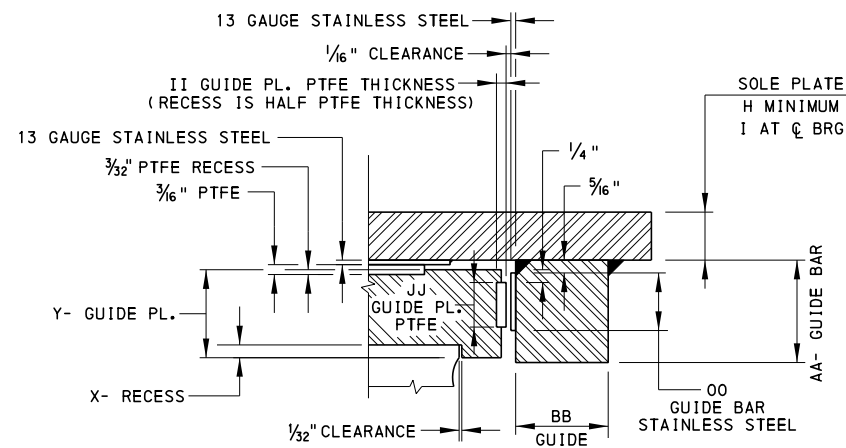


GUIDE BAR WELD DETAIL

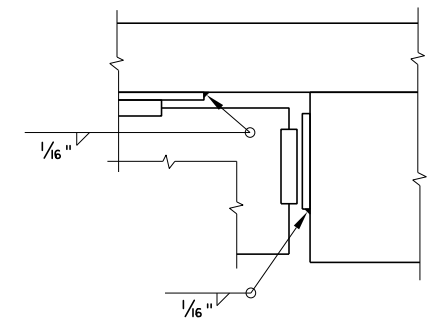


ALTERNATE GUIDE BAR FABRICATION DETAIL

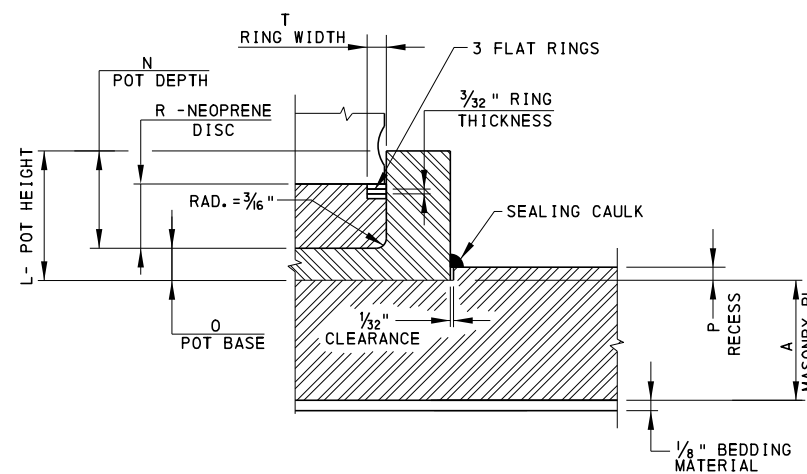
(GUIDE BAR FABRICATED FROM SINGLE PLATE)



DETAIL B



STAINLESS STEEL WELD DETAIL



DETAIL A

NOTE:
THE INDICATED BEARING COMPONENT DIMENSION VARIABLES TO BE TAKEN FROM CONTRACT DRAWINGS.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

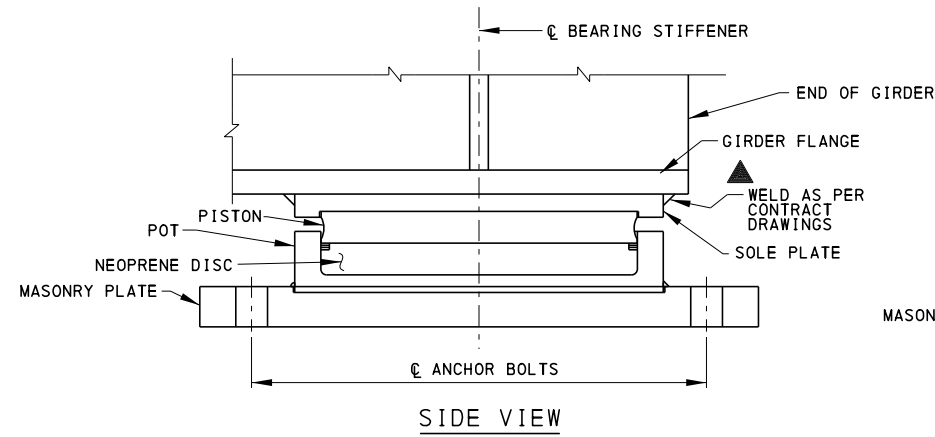
**STANDARD
HIGH LOAD MULTI ROTATIONAL
POT BEARINGS
GUIDED DETAILS - 2**

FOR ADDITIONAL DETAILS, SEE SHEETS 1, 4 AND 6.

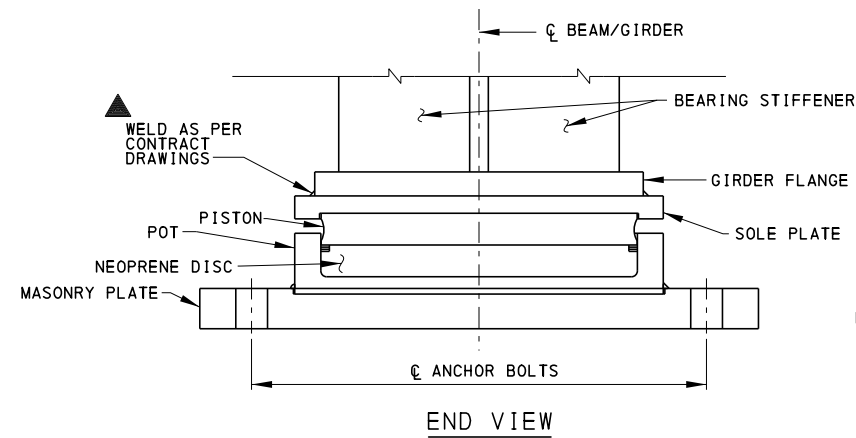
RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 5 OF 6
BC-756M

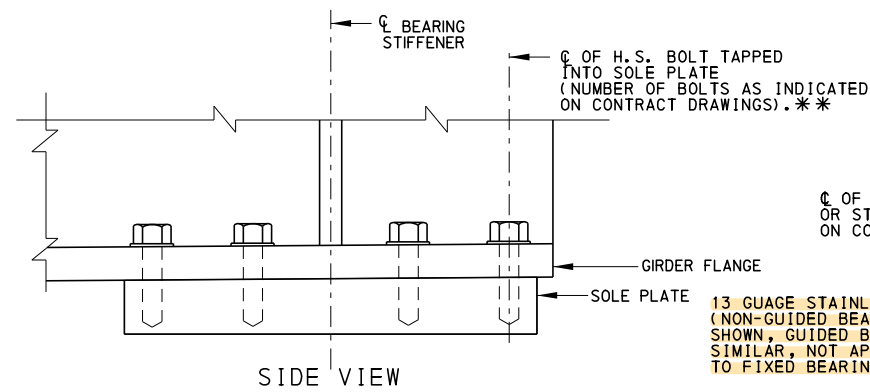


SIDE VIEW



END VIEW

WELDED CONNECTION FOR STEEL BEAM



SIDE VIEW

TAPPED BOLT CONNECTION FOR STEEL BEAM

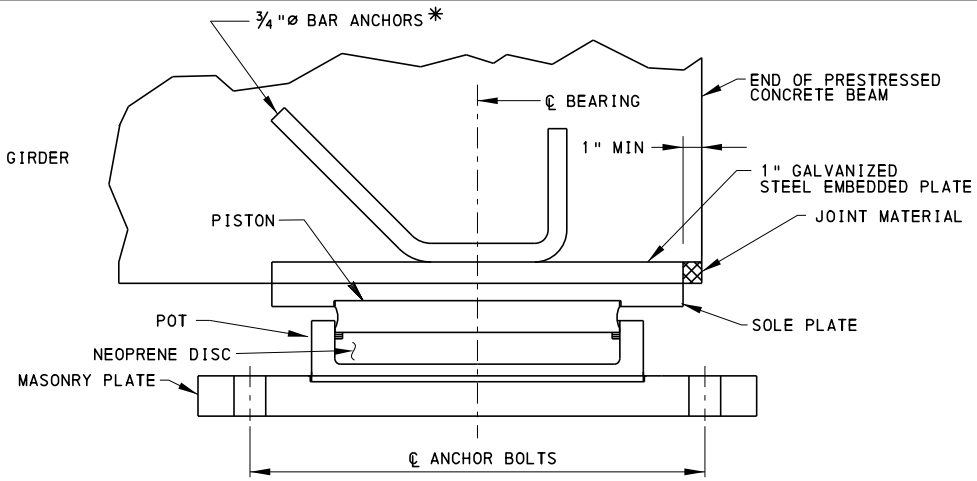
LEGEND:

▲ PROVIDE MINIMUM SIZE WELD IN ACCORDANCE WITH AASHTO/AWS CODE UNLESS LARGER WELD IS REQUIRED BY DESIGN AS INDICATED ON CONTRACT DRAWINGS.

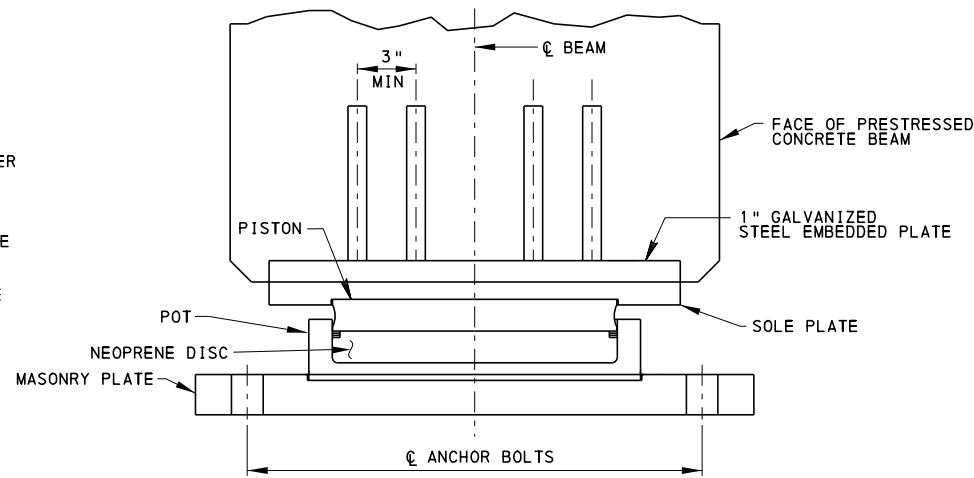
* NUMBER OF STUDS OR ANCHORS AS INDICATED ON CONTRACT DRAWINGS. SPACED AS REQUIRED TO MISS STRAND PATTERN.

** THROUGH BOLT CONNECTIONS BETWEEN GIRDER AND SOLE PLATE ARE ACCEPTABLE PROVIDED ALL CLEARANCE REQUIREMENTS ARE SATISFIED.

*** FOR BEVELED SOLE PLATES, ENSURE THE THREADED HOLES IN THE EMBEDDED PLATE ARE ALIGNED NORMAL TO THE EMBEDDED PLATE.

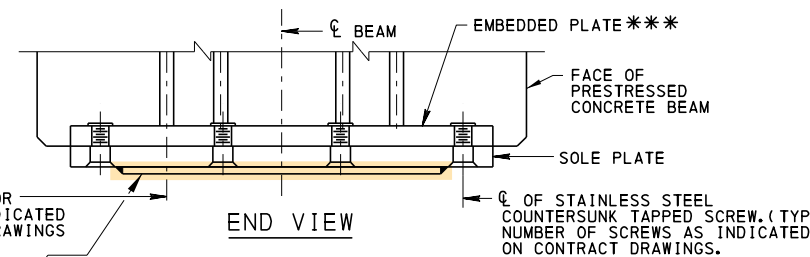


SIDE VIEW

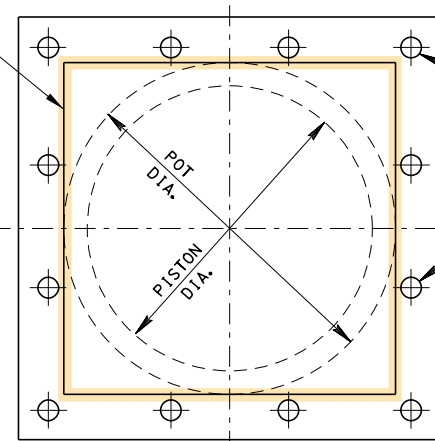


END VIEW

ANCHOR CONNECTION FOR PRESTRESSED CONCRETE BEAM

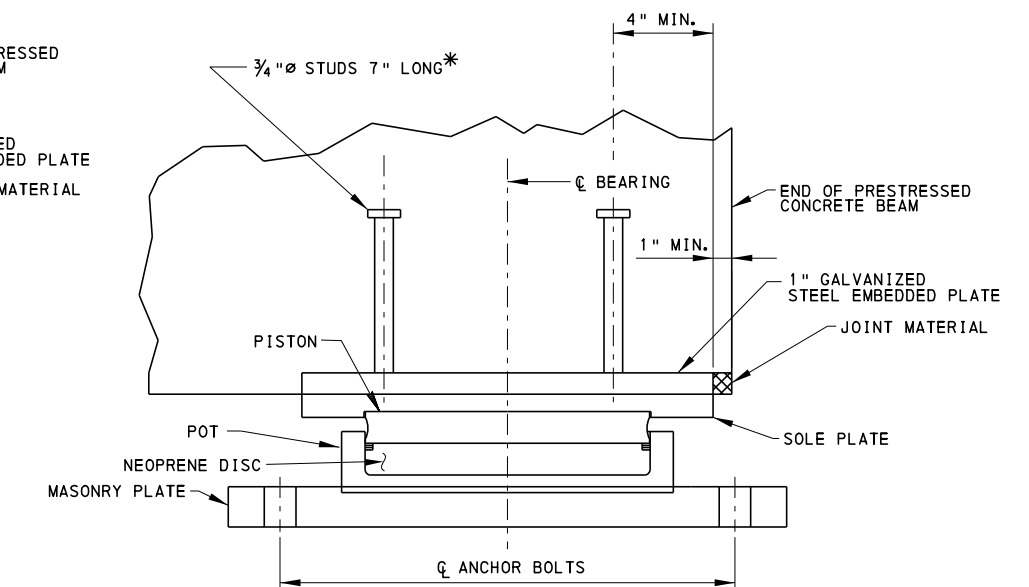


END VIEW

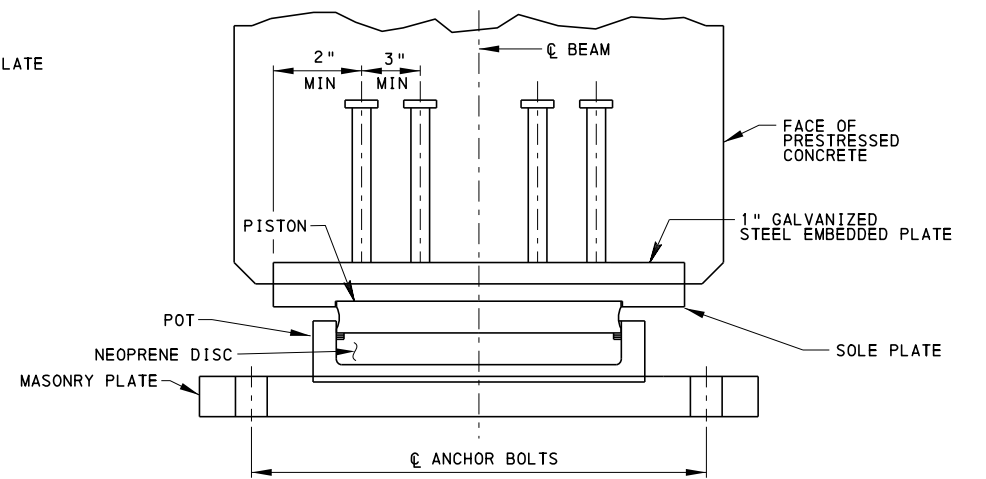


PLAN - SOLE PLATE

TAPPED SCREW CONNECTION FOR PRESTRESSED CONCRETE BEAM



SIDE VIEW



END VIEW

STUD CONNECTION FOR PRESTRESSED CONCRETE BEAM

USE 3/4" DIA. STAINLESS STEEL COUNTERSUNK TAP SCREWS FOR AN ULTIMATE STRENGTH OF 100 KSI ON 8" MAXIMUM CENTERS AND A 2" MINIMUM EDGE DISTANCE TO CONNECT THE BEVELED SOLE PLATE. LOCATE TO AVOID INTERFERENCE WITH 13 GAUGE STAINLESS STEEL AND/OR WELD CONNECTION TO SOLE PLATE.

HOLES FOR STAINLESS STEEL COUNTERSUNK TAPPED SCREW (TYP) NUMBER OF SCREWS AS INDICATED ON CONTRACT DRAWINGS.

NOTE:

THE CONNECTIONS SHOWN ARE FOR INFORMATION ONLY. THE DESIGN OF THE CONNECTION IS THE RESPONSIBILITY OF THE ENGINEER AND INDICATED ON THE CONTRACT DRAWINGS.

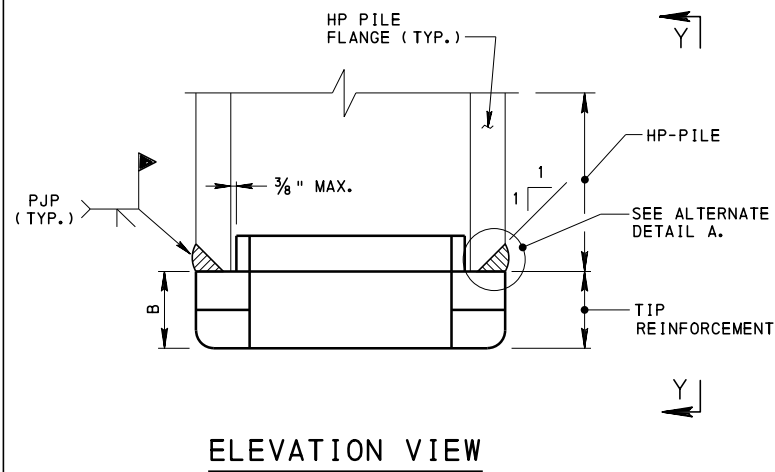
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
HIGH LOAD MULTI ROTATIONAL
POT BEARINGS
CONNECTION OPTIONS

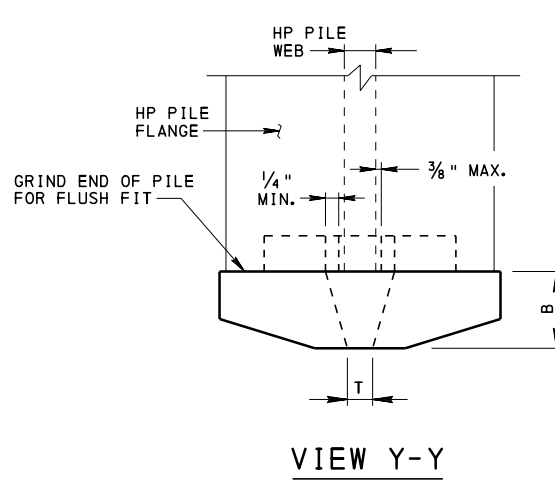
RECOMMENDED NOV. 23, 2022
L. W. Gray
CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022
Grain E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

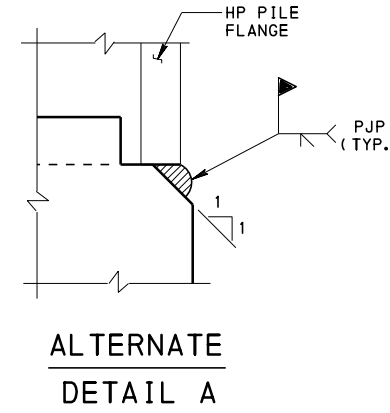
SHEET 6 OF 6
BC-756M



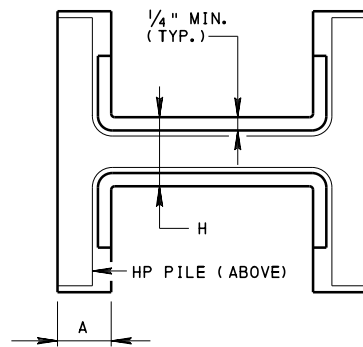
ELEVATION VIEW



VIEW Y-Y



ALTERNATE
DETAIL A

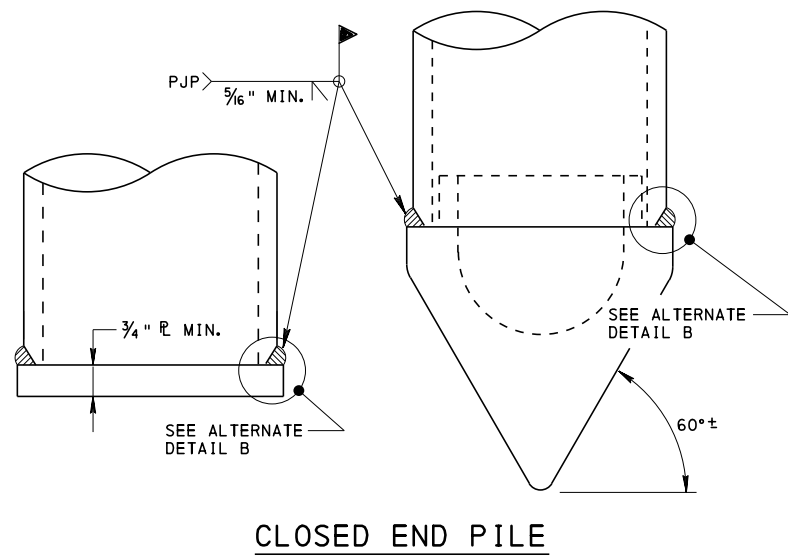


PLAN
TYPICAL HP-PILE TIP

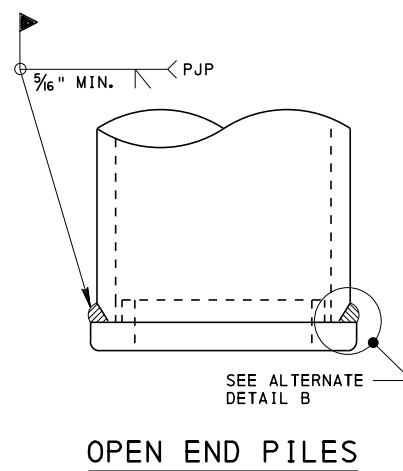
HP-PILE TYPE	WELD SIZE	CAST TIPS			
		A (MIN.)	B (MIN.)	H (MIN.)	T (MIN.)
14 X 117	3/16				
14 X 102	3/16	*	3	**	1
14 X 89	3/16				
14 X 73	3/16				
12 X 84	3/16				
12 X 74	3/16	*	2 1/2	**	3/4
12 X 63	3/16				
12 X 53	3/16				
10 X 57	3/16	*	2 1/8	**	1 1/16

▲ = REFER TO NOTES 6 AND 7, THIS SHT.
 * = FLANGE THICKNESS + 1/4" MIN. + FIT-UP TOLERANCE 3/8" MAX.
 ** = WEB THICKNESS + 2 x 1/4" MIN. + 2 x FIT-UP TOLERANCE 3/8" MAX.

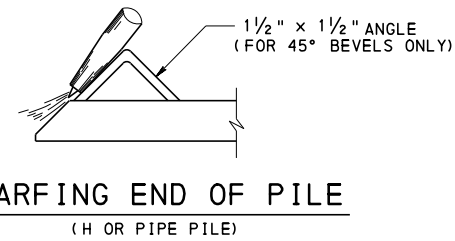
HP-PILE TIP REINFORCEMENT DETAILS



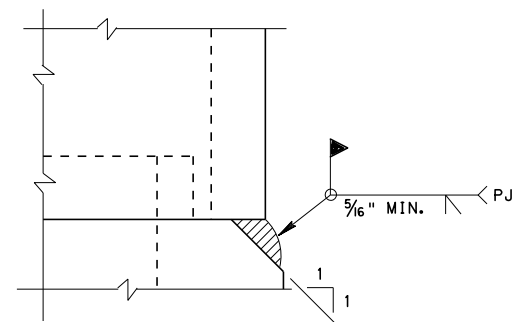
CLOSED END PILE



OPEN END PILES



SCARFING END OF PILE
(H OR PIPE PILE)



ALTERNATE
DETAIL B

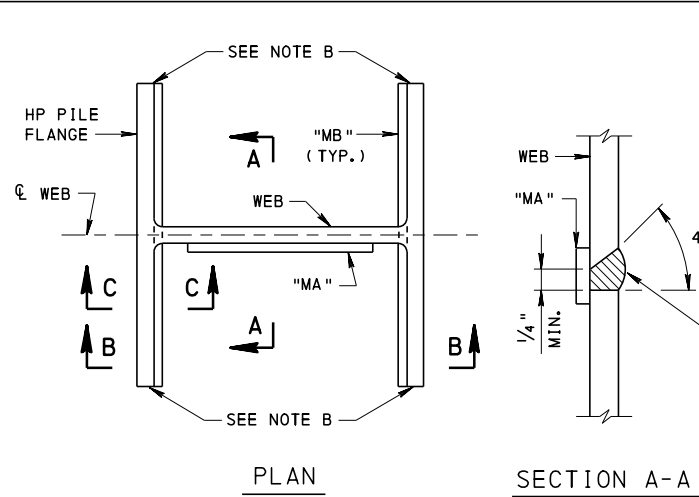
PIPE PILE TIP REINFORCEMENT

GENERAL NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CURRENT VERSIONS OF PUBLICATION 408 AND AASHTO/AWS WELDING CODE D1.5. USE AWS D1.1 FOR WELDING NOT COVERED IN AASHTO/AWS D1.5. THE NDT REQUIREMENTS IN D1.5 MAY BE WAIVED BY THE STRUCTURE CONTROL ENGINEER.
2. THIS STANDARD COVERS ONLY "NORMAL DUTY" PILE TIP REINFORCEMENT. DESIGNER MAY SPECIFY "HEAVY-DUTY" PILE TIP REINFORCEMENT FOR HARD DRIVING CONDITIONS. THE CONNECTION FOR "HEAVY-DUTY" PILE TIP REINFORCEMENT TO BE IN ACCORDANCE WITH NOTE 6 ON THIS SHEET.
3. FURNISH AND INSTALL TIP REINFORCEMENT SUPPLIED BY BULLETIN 15 APPROVED SUPPLIERS.
4. FURNISH A CERTIFIED STATEMENT THAT THE TIP REINFORCEMENT STEEL COMPLIES WITH THE SPECIFICATION REQUIREMENTS INCLUDING CERTIFIED REPORT SHOWING THE CHEMICAL AND PHYSICAL PROPERTIES, AND ROLLING DIRECTION FOR PLATES USED IN THE PREFABRICATED TIPS.
5. DO NOT USE FILLET WELD FOR ATTACHING CAST TIP REINFORCEMENT TO HP-PILES.
6. CONNECTION OF TIP REINFORCEMENT TO PILE:
 JOIN HP PILE TO CAST TIPS USING GROOVE WELDS ONLY. WELD SIZE TO BE THE GREATER OF 3/16" OR MINIMUM GROOVE WELD SIZE RECOMMENDED BY THE TIP MANUFACTURER FOR THE PILE/TIP COMBINATION REQUIRED.
 BEVEL OUTSIDE OF EACH FLANGE OF THE HP-PILE FOR GROOVE WELD, WHERE TIP REINFORCEMENTS ARE NOT PRE-BEVELED OR TO ACHIEVE THE MINIMUM GROOVE WELD SIZE.
 ATTACH A PILE TIP REINFORCEMENT ON THE SQUARE CUT END OF THE PILE AND HOLD IT IN CLOSE CONTACT AGAINST THE PILE OR TO ACHIEVE THE MINIMUM GROOVE WELD SIZE.
7. THE WELDS SHOWN ARE SUGGESTED ACCEPTABLE GROOVE WELDS. THE CONTRACTOR MAY USE ANY PREQUALIFIED GROOVE WELDS APPROVED BY THE ENGINEER.
8. THE DEPARTMENT MAY REJECT AN APPROVED PILE TIP TYPE, IF FOUND UNSUITABLE FOR A JOB SITE BASED UPON DRIVING RECORDS.

COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

STANDARD
 STEEL PILE TIP REINFORCEMENTS
 & SPLICES

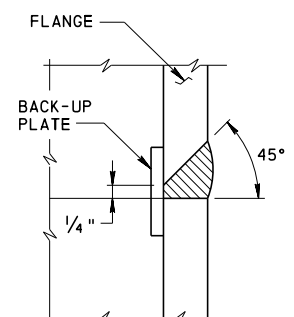


METHOD 1

NOTE B: EXTEND BAR "MB" A MINIMUM OF 2" BEYOND THE FLANGE EDGE TO ALLOW FOR WELD INITIATION AND TERMINATION. REMOVE PORTION OF BAR "MB" BEYOND THE EDGE OF FLANGE AND GRIND FLUSH AFTER FINAL WELDING IS COMPLETE.

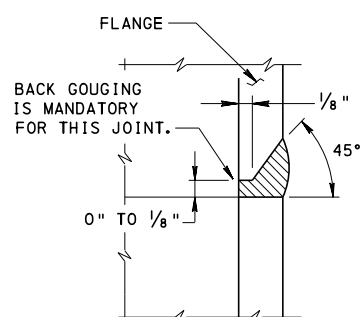
LEGEND

- * - B-U4a (TYP.) OR B-U2a AT SPLICER, B-U4a/B-U4b OR B-U2a/B-U2 BEYOND SPLICER
- ** - THE SINGLE BEVEL GROOVE WELDS B-U4a AND B-U4b ARE LIMITED TO THE HORIZONTAL WELDING POSITION ONLY PER THE AWS CODE.

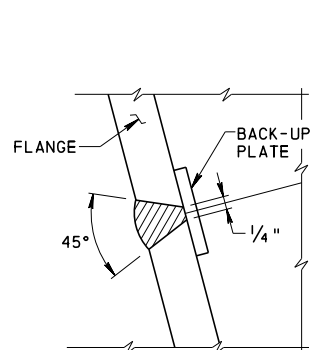


B-U4a **
(RECOMMENDED)

OR

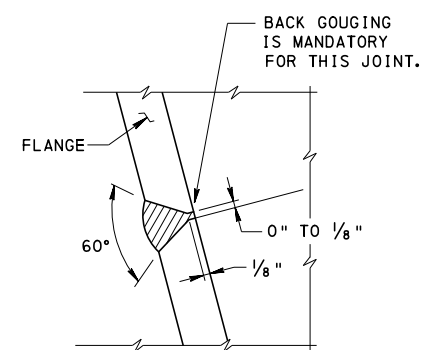


B-U4b **



B-U2a
(RECOMMENDED)

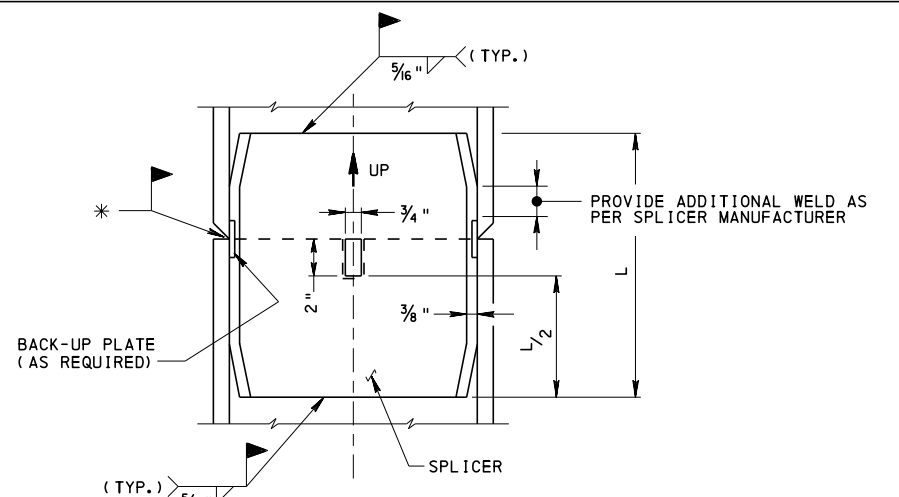
OR



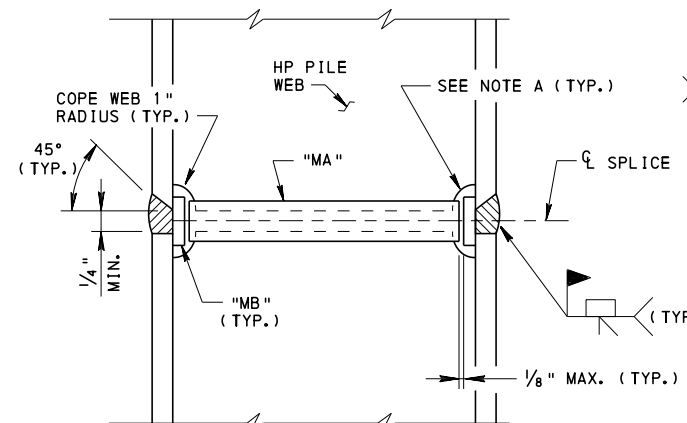
B-U2

JOINT DETAILS

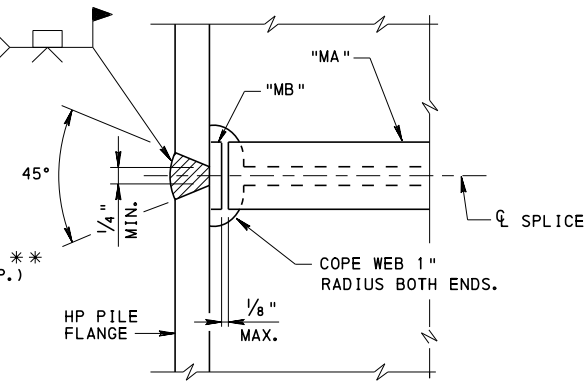
WEB COPE NOT SHOWN, SEE SECTION B-B AND C-C FOR DETAILS. THE CONTRACTOR MAY ELECT TO USE THE BACK GOUGED JOINT DETAILS B-U4b OR B-U2 IN LIEU OF DETAILS B-U4a OR B-U2a.



METHOD 2



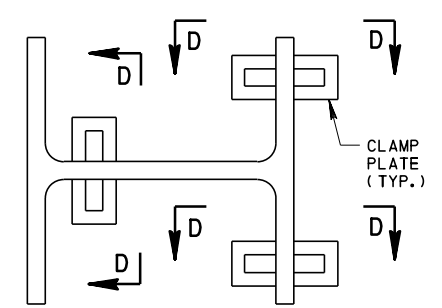
SECTION B-B
(B-U4a FLANGE WELD SHOWN)



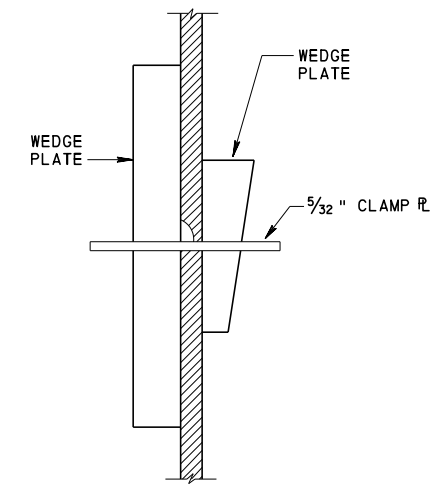
SECTION C-C
(B-U2a ALTERNATE FLANGE WELD SHOWN)

WEB COPE AND BACK-UP PLATE DETAIL

NOTE A: END OF WELD TO BE GROUND SMOOTH AND FLUSH WITH WEB COPE.



PLAN - HP PILE WITH CLAMPS



SECTION D-D
SHOWN USING CLAMPS TO HOLD PILE DURING WELDING

POSITIONING DETAILS

GENERAL NOTES:

1. METHOD 1 SHOWS GROOVE WELDED FLANGE AND WEB SPLICES.
2. METHOD 2 SHOWS SPLICE DETAILS USING SPLICER.
3. BARS "MA" AND "MB" TO BE IN ACCORDANCE WITH AWS CODE FOR WELD BACKING. RECOMMENDED MINIMUM SIZE IS 1/4" x 3/16".

FIELD WELDING NOTES:

1. SUBMIT A WELD PROCEDURE SPECIFICATION TO THE ENGINEER FOR APPROVAL BEFORE WELDING IS PERFORMED.
2. USE THE MANUAL SHIELDED METAL ARC PROCESS WITH PROPERLY DRIED ELECTRODES CONFORMING TO AWS CLASSIFICATION E-7016, E-7018 OR E-7028.
3. DRY THE ELECTRODES FOR AT LEAST TWO HOURS AT A TEMPERATURE BETWEEN 450° AND 500°F PRIOR TO USE. REDRY ELECTRODES IF NOT USED WITHIN FOUR HOURS. DO NOT REDRY ELECTRODES MORE THAN ONE TIME. DO NOT USE ELECTRODES WHICH HAVE DRIED OUT AND CRACKED, OR THOSE WHICH HAVE BEEN WET. STORE ALL LOW HYDROGEN ELECTRODES IN SUITABLE OVENS HELD AT A TEMPERATURE OF AT LEAST 250°F.
4. DO NOT WELD WHEN SURFACES ARE WET OR EXPOSED TO RAIN, SNOW, WIND OR WHEN WELDERS ARE EXPOSED TO INCLEMENT CONDITIONS THAT WILL HAMPER GOOD WORKMANSHIP.
5. REMOVE ANY MOISTURE FROM FOG, DEW, ETC. PRESENT BEFORE WELDING.
6. PROVIDE WIND BREAKS TO PROTECT WORKING AREAS FROM DIRECT WIND.
7. DO NOT WELD WHEN THE AMBIENT TEMPERATURE IS BELOW 0°F.
8. PREHEAT METAL TO AT LEAST 70°F IN AN AREA AT LEAST 3" AWAY FROM THE WELD IN ALL DIRECTIONS AND MAINTAIN AT THIS MINIMUM TEMPERATURE DURING WELDING.
9. PROVIDE BACKING PLATES AND WELD TABS FOR FLANGE WELDS OF THE SAME MATERIAL AS THE PILE TO BE SPLICED. MAY LEAVE BACKING PLATES IN PLACE.
10. ONLY AWS CERTIFIED WELDERS ALLOWED TO PERFORM THE WELDING.
11. FOR SCARFING DETAILS, SEE SHEET 1.

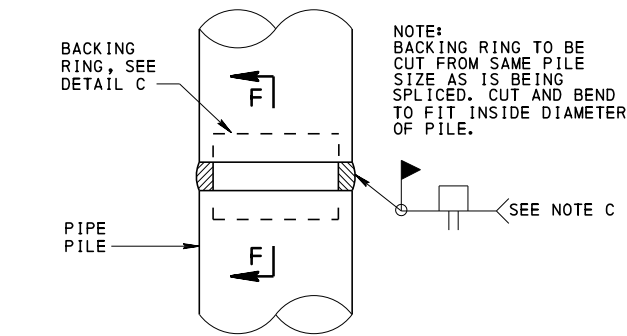
SPLICE NOTES:

1. DO NOT ALLOW PILE SPLICING ON ANY PORTION OF PILE THAT IS TO REMAIN EXPOSED ABOVE FINISHED GROUND LINE IN COMPLETED STRUCTURE.
2. PROVIDE SPLICED SLEEVE MATERIAL SAME AS PILE MATERIAL.
3. USE EITHER THE "SPLICER SLEEVE" OR "ALL WELDED ALTERNATES".
4. LET WELDS COOL TO AIR TEMPERATURE BEFORE DRIVING PILES.
5. SPLICE MUST DEVELOP THE YIELD STRENGTH OF THE PILE IN BEARING AND BENDING.
6. REFER TO SEC. 1005.2 (c) OF PUB. 408 FOR SPLICE LOCATION REQUIREMENTS.
7. GRIND WELD SMOOTH WITH EDGE OF FLANGE IF PILE IS UNSUPPORTED IN WELD AREA SUCH AS: IN AIR, WATER OR SOFT MUD (INCLUDING SCOUR ZONES OR OTHER VOID AREAS).

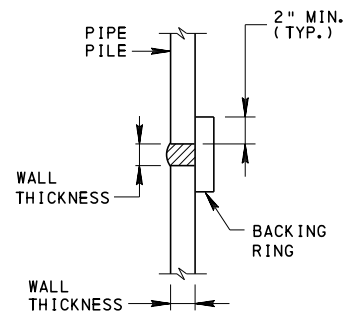
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STEEL PILE TIP REINFORCEMENTS
& SPLICES

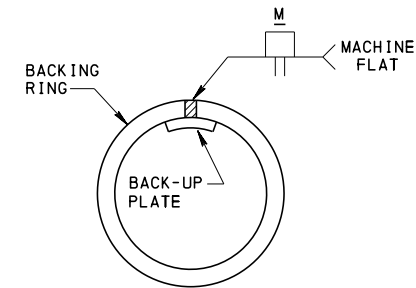
HP-PILE SPLICE DETAILS



**ELEVATION - SPLICE
USING ALL WELDED ALTERNATE**



SECTION F-F



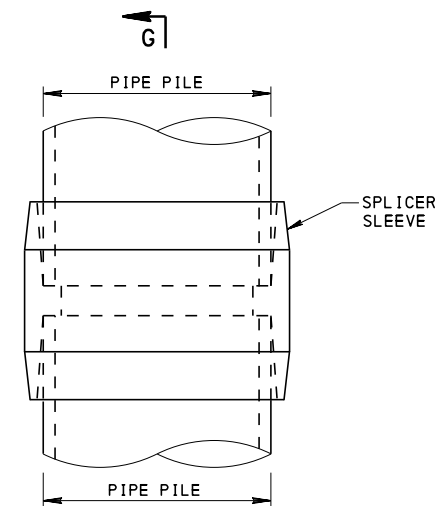
**PLAN
(PIPE PILE NOT SHOWN FOR CLARITY)**

DETAIL C

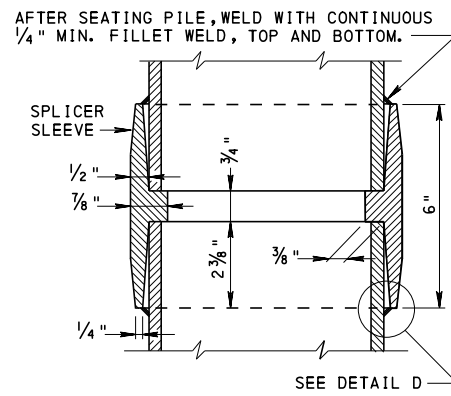
SPLICE NOTES:

1. DO NOT ALLOW PILE SPLICING ON ANY PORTION OF PILE THAT IS TO REMAIN EXPOSED ABOVE FINISHED GROUND LINE IN COMPLETED STRUCTURE.
2. PROVIDE SPLICED SLEEVE MATERIAL SAME AS PILE MATERIAL.
3. USE EITHER THE "SPLICER SLEEVE" OR "ALL WELDED ALTERNATES."
4. LET WELDS COOL TO AIR TEMPERATURE BEFORE DRIVING PILES.
5. SPLICE MUST DEVELOP THE YIELD STRENGTH OF THE PILE IN BEARING AND BENDING.
6. REFER TO SEC. 1005.2(b) OF PUB. 408 FOR SPLICE LOCATION REQUIREMENTS.

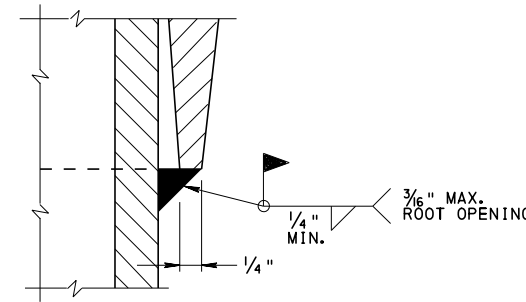
NOTE C: IF PIPE WALL THICKNESS EXCEEDS 1/4", USE WELD DETAIL B-U2g OR B-U4g SHOWN ON SHEET 2 OF 3.



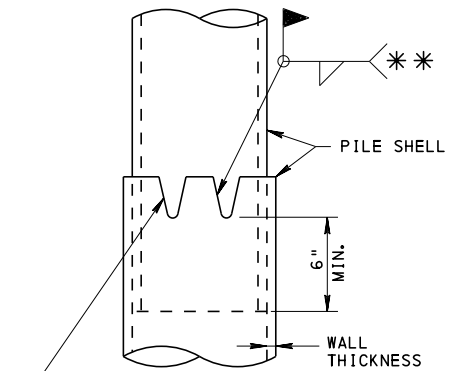
**ELEVATION - SPLICE
(USING SPLICER SLEEVE)**



**SECTION G-G
ALL DIMENSIONS ARE MINIMUM**



DETAIL D



**FLUTED TUBE
SPLICE DETAIL**

** WELD SIZE DEPENDS ON PIPE WALL THICKNESS.

PIPE PILE SPLICE DETAILS

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
STEEL PILE TIP REINFORCEMENTS
& SPLICES**

RECOMMENDED SEPT. 30, 2016

Thomas P. Maiore
CHIEF BRIDGE ENGINEER

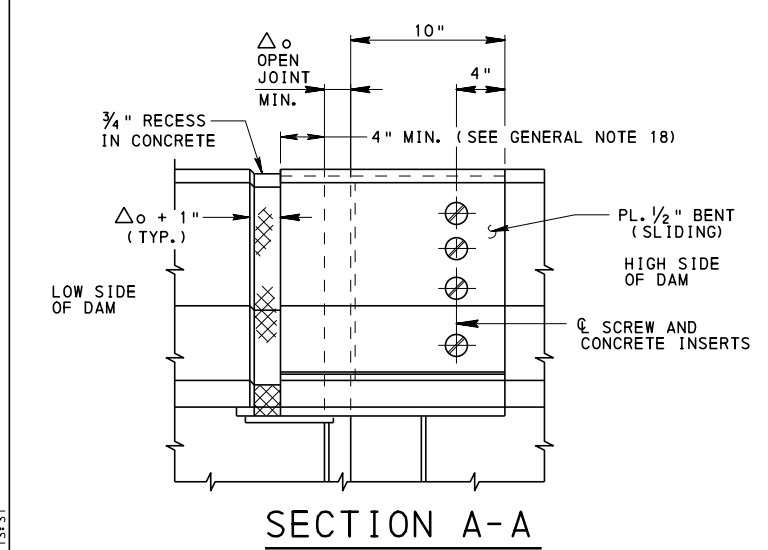
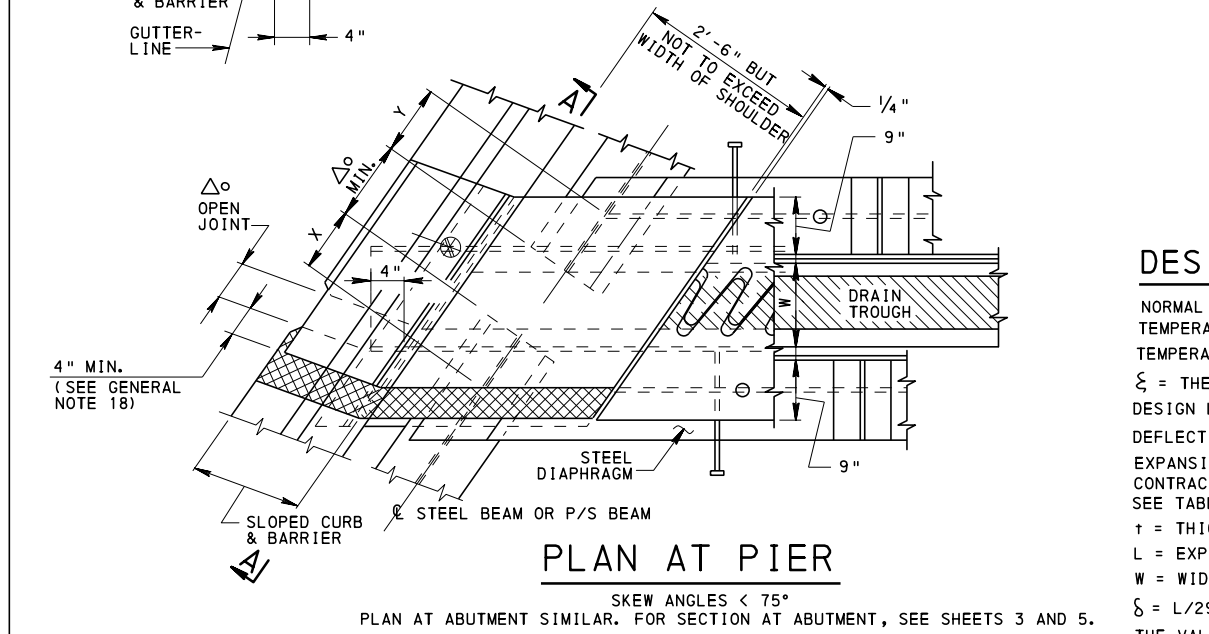
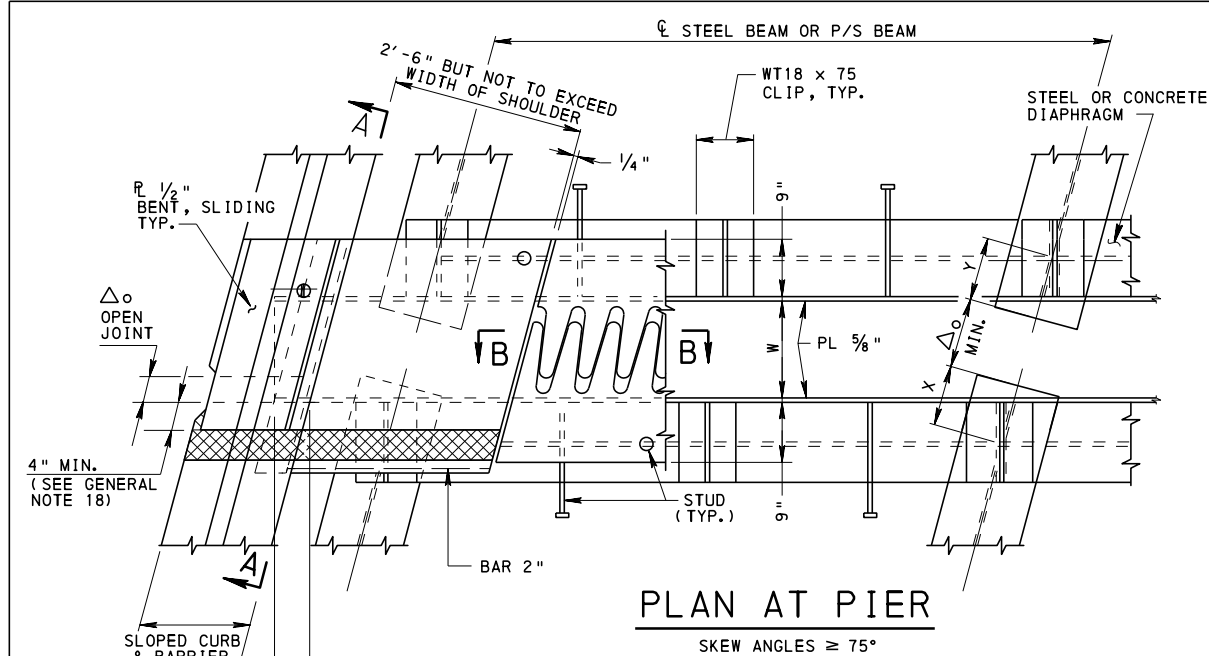
RECOMMENDED SEPT. 30, 2016

Brenda Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

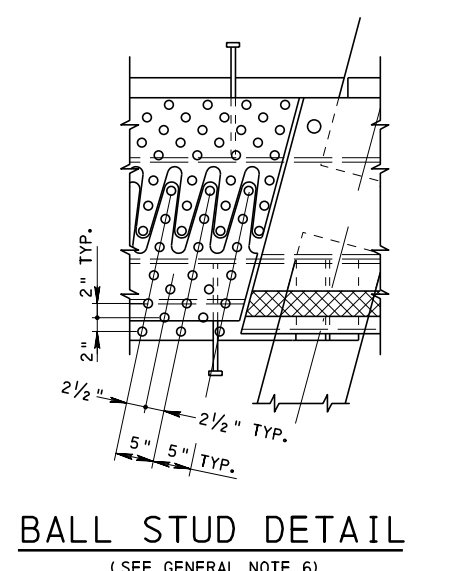
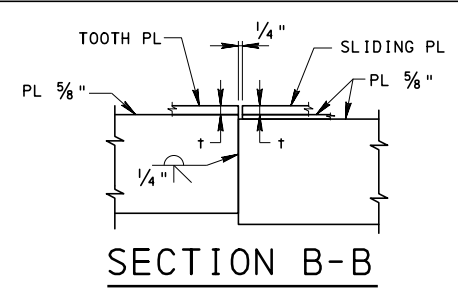
SHEET 3 OF 3

BC-757M

CHANGE 2



SECTION A-A NOTE:
FORM CONCRETE RECESS AREA IN BARRIER AND GRIND TO PROVIDE SMOOTH SURFACE. APPLY ONE COAT OF ASPHALT CEMENT PAINT WA-1 OR PERFORMANCE GRADED ASPHALT CEMENT PG 64-22 TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION.



DESIGN INFORMATION

NORMAL TEMPERATURE = 68°F.
TEMPERATURE RANGE = -10°F TO 110°F FOR STEEL & 10°F TO 100°F FOR P/S.
TEMPERATURE CHANGE = 42°F RISE, 78°F FALL FOR STEEL & 32°F RISE, 58°F FALL FOR P/S.
 ξ = THERMAL COEFFICIENT = 0.000065 PER °F FOR STEEL & 0.000060 PER °F FOR P/S.
DESIGN LIVE LOAD = 100 PSI + 60% IMPACT = 160 PSI
DEFLECTION OF TOOTH SHALL NOT EXCEED $l/300$ WHERE l = CANTILEVER LENGTH OF TOOTH.
EXPANSION: MIN. $\Delta_o = \xi + \xi T_c L$ (L IN IN.) = 0.00672 L @ 68 °F (L IN FT.)
CONTRACTION: MIN. $\Delta_c = \xi T_c L$ (L IN IN.) = 0.00953 L @ 68 °F (L IN FT.)
SEE TABLE BELOW FOR VALUES @ 68° F
 t = THICKNESS OF STEEL PLATE OR THICKNESS OF TOOTH..
 L = EXPANDED LENGTH.
 W = WIDTH OF TOOTH EXPANSION DAM.
 δ = $L/290$, BUT NOT LESS THAN 1" (L IN FT.).
THE VALUE OF $\Delta_o(t)$ FOR TEMPERATURE OF TIME OF DAM ERECTION OTHER THAN 68° F:
 $\Delta_o(t) = \Delta_o(68° F) - (T - 68° F)L$
 $\Delta_o(68° F) = \Delta_o$ FOR T 68°F NORMAL TEMPERATURE AS SHOWN ON PLAN.
FILLET WELD SIZE SHALL BE THE 'MINIMUM FILLET WELD SIZE' AS SPECIFIED IN AWS D1.5 UNLESS OTHERWISE NOTED.

FOR STEEL BEAMS *																
L (FT.)	251	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
Δ_o (IN.)	1 5/8	2	2 3/8	2 5/8	3	3 3/8	3 3/4	4	4 3/8	4 3/4	5	5 3/8	5 3/4	6	6 3/8	6 3/4
Δ_c (IN.)	2 3/8	2 7/8	3 3/8	3 3/4	4 1/4	4 3/4	5 1/4	5 3/4	6 1/4	6 5/8	7 1/8	7 3/8	8	8 5/8	9	9 1/2
t (IN.)	1	1	1	1	1	1	1	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2

* FOR P/S BRIDGES, USE 3/4 OF Δ_o & Δ_c VALUES IN THIS TABLE.

- GENERAL NOTES:**
- DO NOT WELD GRADE 60 STEEL REINFORCEMENT BARS UNLESS SPECIFIED.
 - PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408 AND AASHTO/AWS WELDING SPECIFICATIONS.
 - GALVANIZE STEEL IN ACCORDANCE WITH SECTION 1105.02 (s) OF PUBLICATION 408. IF SPECIFIED, PAINT ALL GALVANIZED STEEL SURFACES IN THE SHOP IN ACCORDANCE WITH PUBLICATION 408, SECTION 1060.2 (b).
 - PROVIDE AASHTO M 270, GRADE 36 (ASTM A 709, GRADE 36), GALVANIZED, UNLESS OTHERWISE SPECIFIED ON DESIGN DRAWINGS. ANCHOR STUDS TO BE IN ACCORDANCE WITH SECTION 1105.02 (e) OF PUB. 408. STUDSMAY BE PIGGY BACKED TO ACHIEVE REQUIRED LENGTH.
 - USE FLATHEAD STAINLESS STEEL ASTM F 738 OR F 593 (TYPE 304) FOR COUNTERSUNK SCREWS WITH INSERTS. ALL CONCRETE INSERTS AND COUNTERSUNK MACHINE SCREWS ARE 3/4" DIAMETER UNLESS OTHERWISE NOTED.
 - BALL TYPE OR MILD STEEL KNOCK-OFF STUDS SHOULD BE PROVIDED UNLESS OTHERWISE SPECIFIED. BALL STUDS ARE TO BE 3/8" DIAMETER BY 1/4" HEIGHT. KNOCK-OFF STUDS WILL BE ANTI-SKID TYPE. KNOCK-OFF STUDS ARE TO BE 3/16" NOMINAL DIAMETER BY 1/4" HEIGHT. ALTERNATE PATTERNS OTHER THAN SHOWN ON BALL OR KNOCK-OFF STUD DETAIL MUST BE APPROVED BY THE DEPARTMENT.
 - ALL BOLTS TO CONFORM TO ASTM A 325.
 - USE THIS DRAWING AS A GUIDE IN THE PREPARATION OF SHOP DRAWINGS.
 - CONSTRUCT EXPANSION DAM TO MATCH ROADWAY GRADE AND CROSS SLOPE.
 - PLACE CONCRETE UNDER THE DAM AND VIBRATE UNTIL THE CONCRETE IS FORCED THROUGH THE 3/8" DIAMETER AIR HOLES. STRIKE OFF EXCESS CONCRETE. AFTER CONCRETE HAS CURED, INSPECT THE HOLES AND REMOVE UNSOUND CONCRETE. CLEAN THE HOLES WITH AN AIR JET AND FILL WITH APPROVED SEALER.
 - CONTROL THE MAXIMUM DEPTH OF THE TROUGH SUCH THAT IT DOES NOT COME INTO CONTACT WITH THE SUBSTRUCTURE OF THE BRIDGE.
 - SET DAM AFTER ADJACENT DECKS HAVE BEEN PLACED. DO NOT PLACE CONCRETE IN TOP OF ABUTMENT BACKWALLS UNTIL THE BEAMS, DAMS AND DECK SLAB HAVE BEEN PLACED.
 - FABRICATOR TO PROVIDE A CHART SHOWING JOINT OPENING FOR TEMPERATURES BETWEEN -10°F TO 110°F FOR STEEL STRUCTURES AND 10°F TO 100°F FOR P/S CONCRETE STRUCTURES, IN 10°F INTERVALS ON SHOP DRAWINGS.
 - PERFORM NON-DESTRUCTIVE TESTING OF WELDS AS REQUIRED IN ACCORDANCE WITH AASHTO/AWS SPECIFICATIONS.
 - BEFORE PLACING BLOCKOUT CONCRETE APPLY APPROVED EPOXY BONDING AGENT TO TRANSVERSE DECK CONSTRUCTION JOINTS.
 - FABRICATOR TO SHOW DETAIL OF ALL SHIPPING AND ERECTION TEMPORARY ATTACHMENTS ON SHOP DRAWINGS. AFTER ERECTION, AND AFTER OPENING IS ADJUSTED FOR ERECTION TEMPERATURE, TEMPORARY ATTACHMENTS ARE TO BE REMOVED BY CHIPPING CONNECTION WELDS AND GRINDING SURFACE SMOOTH.
 - PLACE CLASS AAAP CEMENT CONCRETE IN THE BLOCKOUT AREA EXCEPT AS SPECIFIED OR INDICATED. THIS WORK IS INCIDENTAL TO DECK CONCRETE EXCEPT AS SPECIFIED OR INDICATED.
 - MAINTAIN 4" MIN. BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT TEMPERATURE OF -10°F FOR STEEL AND 10°F FOR P/S CONCRETE. GRIND ALL EDGES EXPOSED TO TRAFFIC OR PEDESTRIANS TO 3/16" MIN. RADIUS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
TOOTH EXPANSION DAM
FOR PRESTRESSED CONCRETE &
STEEL I-BEAM BRIDGES

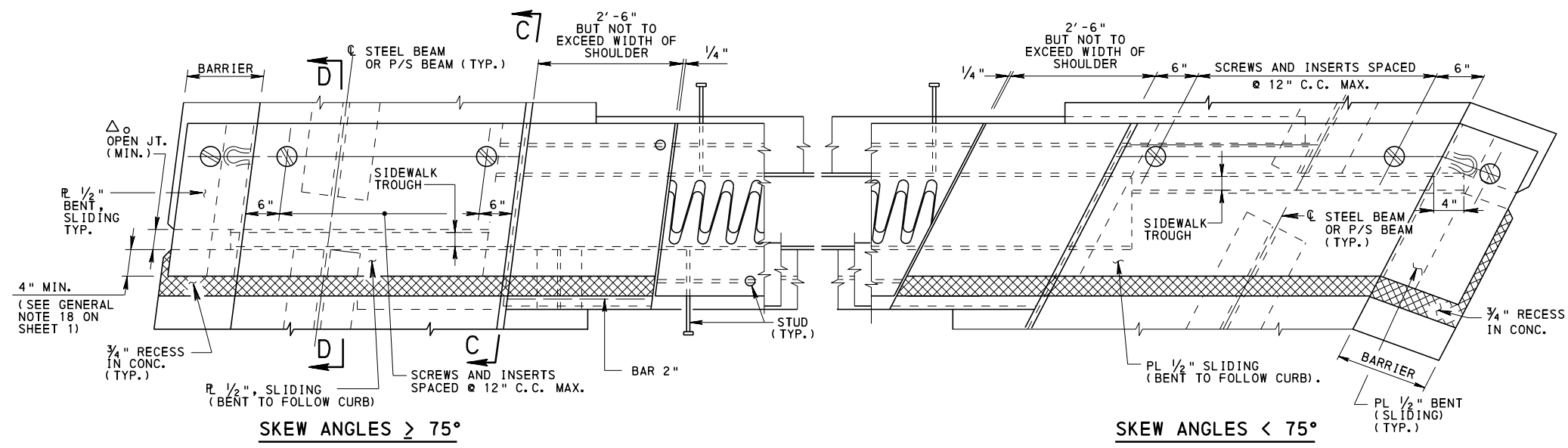
BC-734M	STANDARD ANCHOR SYSTEMS
BC-735M	WALL CONSTR. & EXPANSION JT. DETAILS
BC-751M	BRIDGE DRAINAGE
BC-788M	TYPICAL WATERPROOFING AND EXPANSION DETAILS
REFERENCE DRAWINGS	

RECOMMENDED JAN. 31, 2019
T. Rosa P. Maciora
CHIEF BRIDGE ENGINEER

RECOMMENDED JAN. 31, 2019
[Signature]
ACTING DIR. BUREAU OF PROJECT DELIVERY

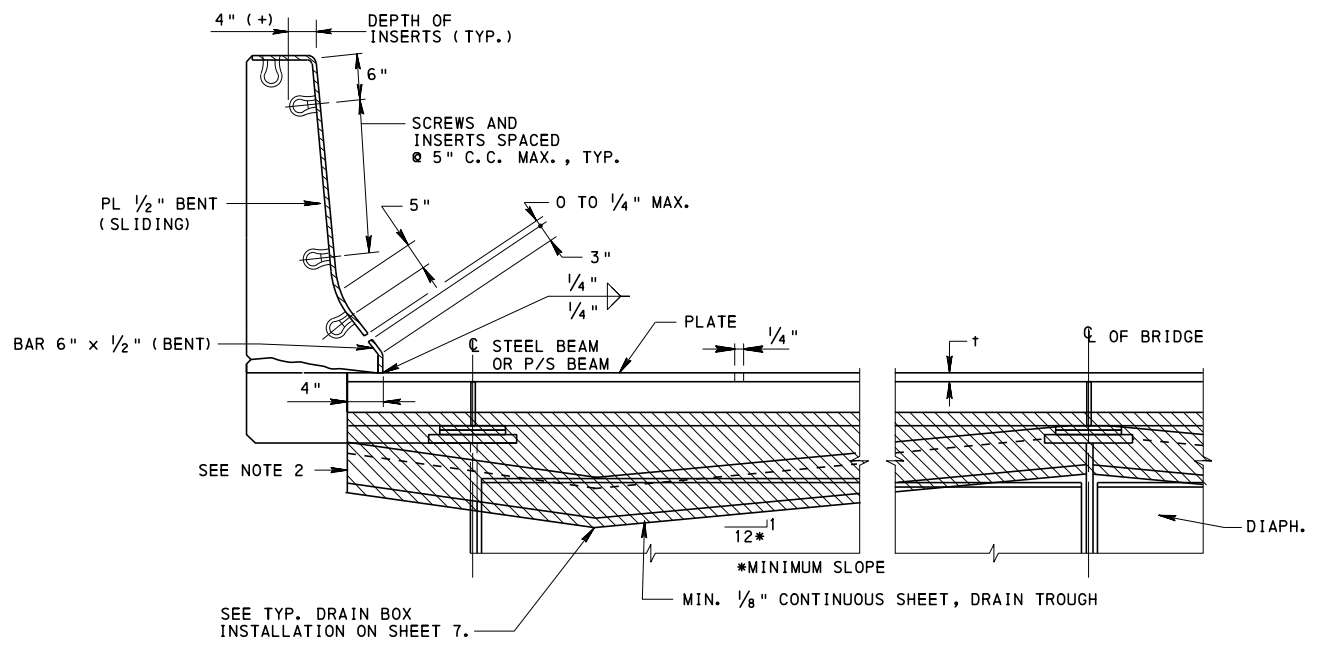
SHEET 1 OF 7
BC-762M

04-FEB-2019 131.51

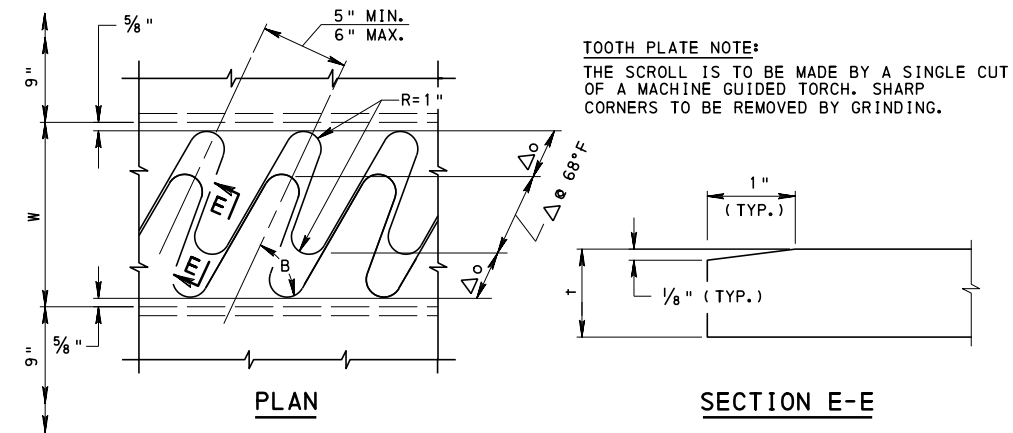


PLAN AT SIDEWALK

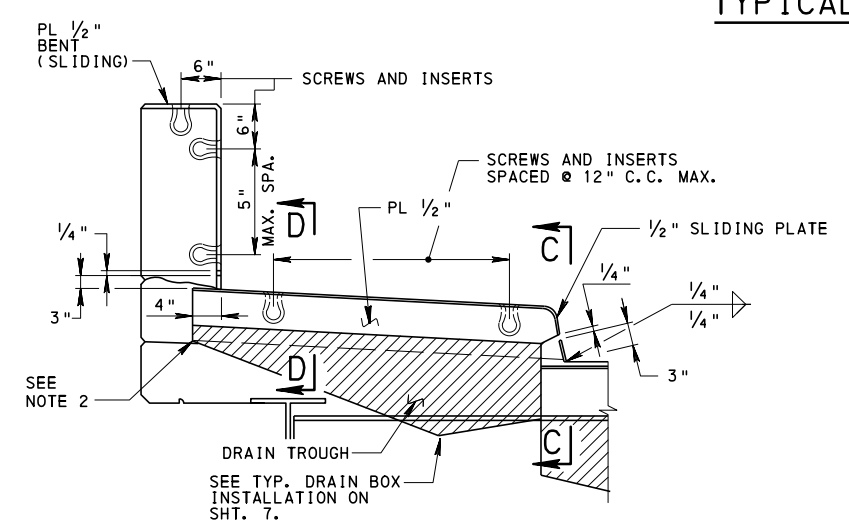
- NOTES:**
1. TO INSURE THAT INSERTS & SCREWS ARE ALIGNED PROPERLY, PLACE CURB & SIDEWALKS WITH 1/2" SLIDING PLATES IN PLACE. APPLY BOND BREAKER TO SLIDING PLATES PRIOR TO INSTALLATION.
 2. ENDS OF DRAIN TROUGH TO BE CLOSED AND MADE WATER TIGHT IN A MANNER ACCEPTABLE TO THE DEPARTMENT.
 3. TYPE OF DRAINAGE DISCHARGE IS DEPENDENT UPON THE LOCATION OF THE STRUCTURE.
 4. CONTRACT DRAWINGS TO SHOW DETAILS OF TIE-IN TO EXISTING DRAINAGE SYSTEM.
 5. TROUGH SYSTEM AS SHOWN MAY BE SUBSTITUTED BY APPROVED EQUAL.
 6. ALL DETAILS ARE SHOWN WITH A SEPARATE SIDEWALK TROUGH. DETAILS MAY BE MODIFIED TO SHOW A SINGLE TROUGH TO REDUCE DECK DRAINS. SEE SHEET 7 FOR EXAMPLE. ALL DRAIN LOCATIONS MUST BE SHOWN ON THE DESIGN DRAWINGS.



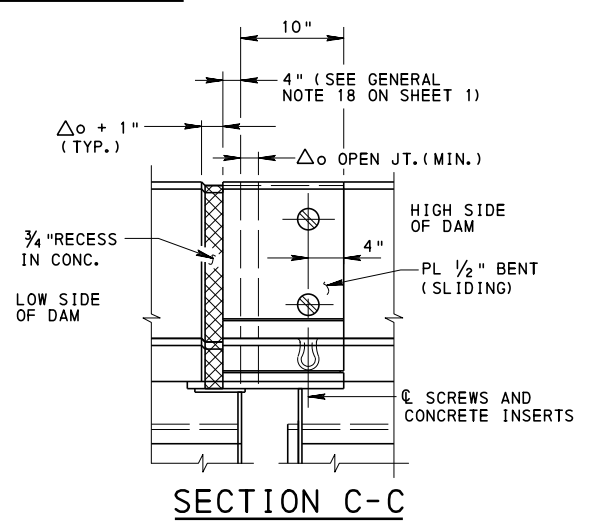
TYPICAL SECTION



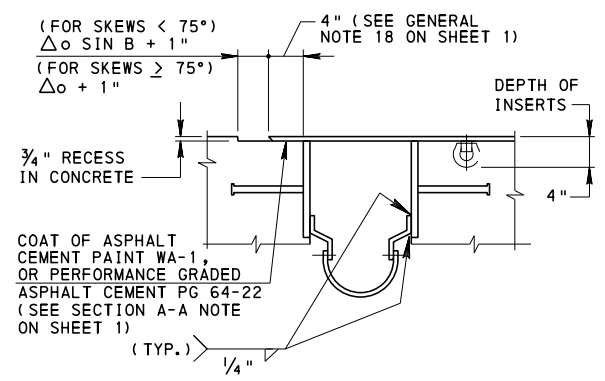
TOOTH PLATE DETAIL



SECTION AT ALTERNATE SIDEWALK



SECTION C-C

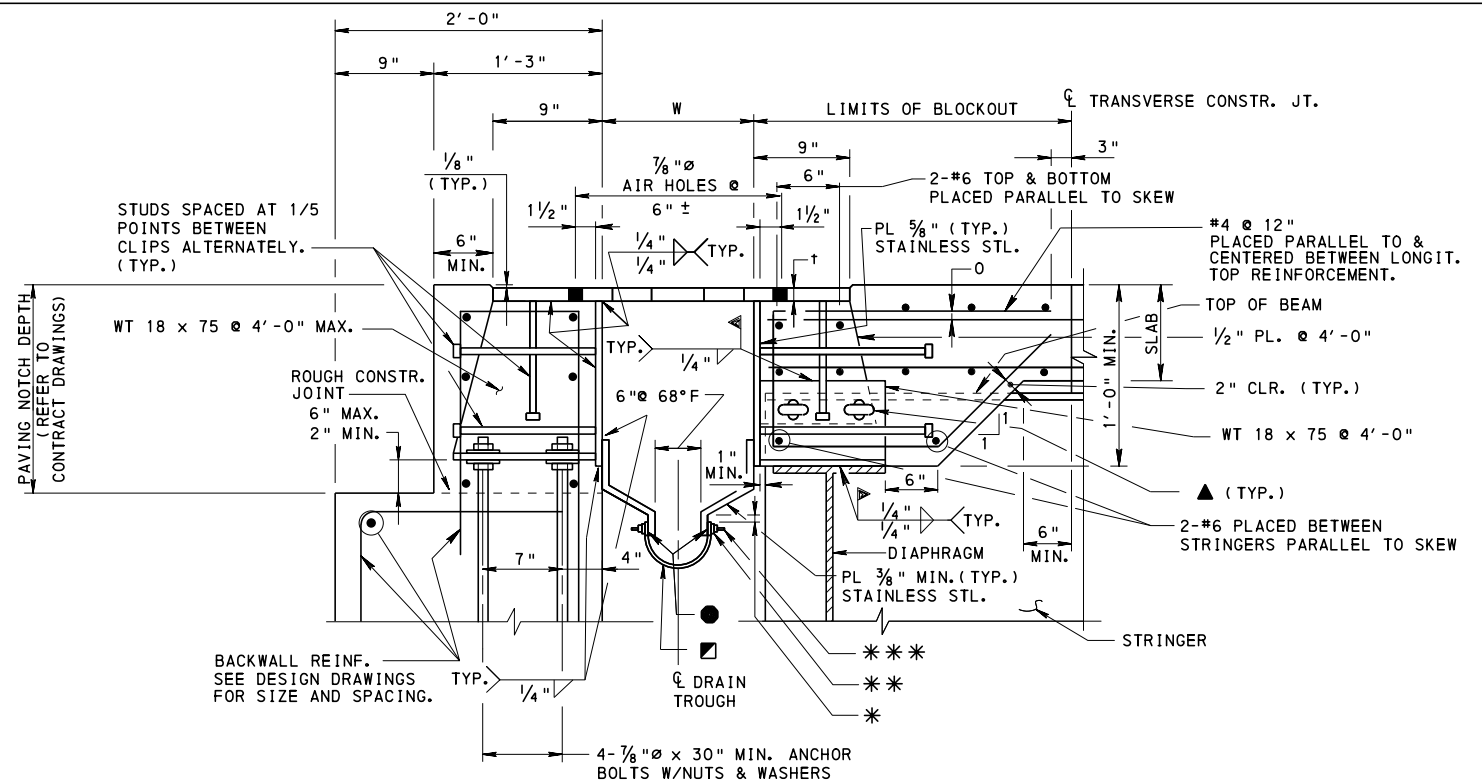


SECTION D-D

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

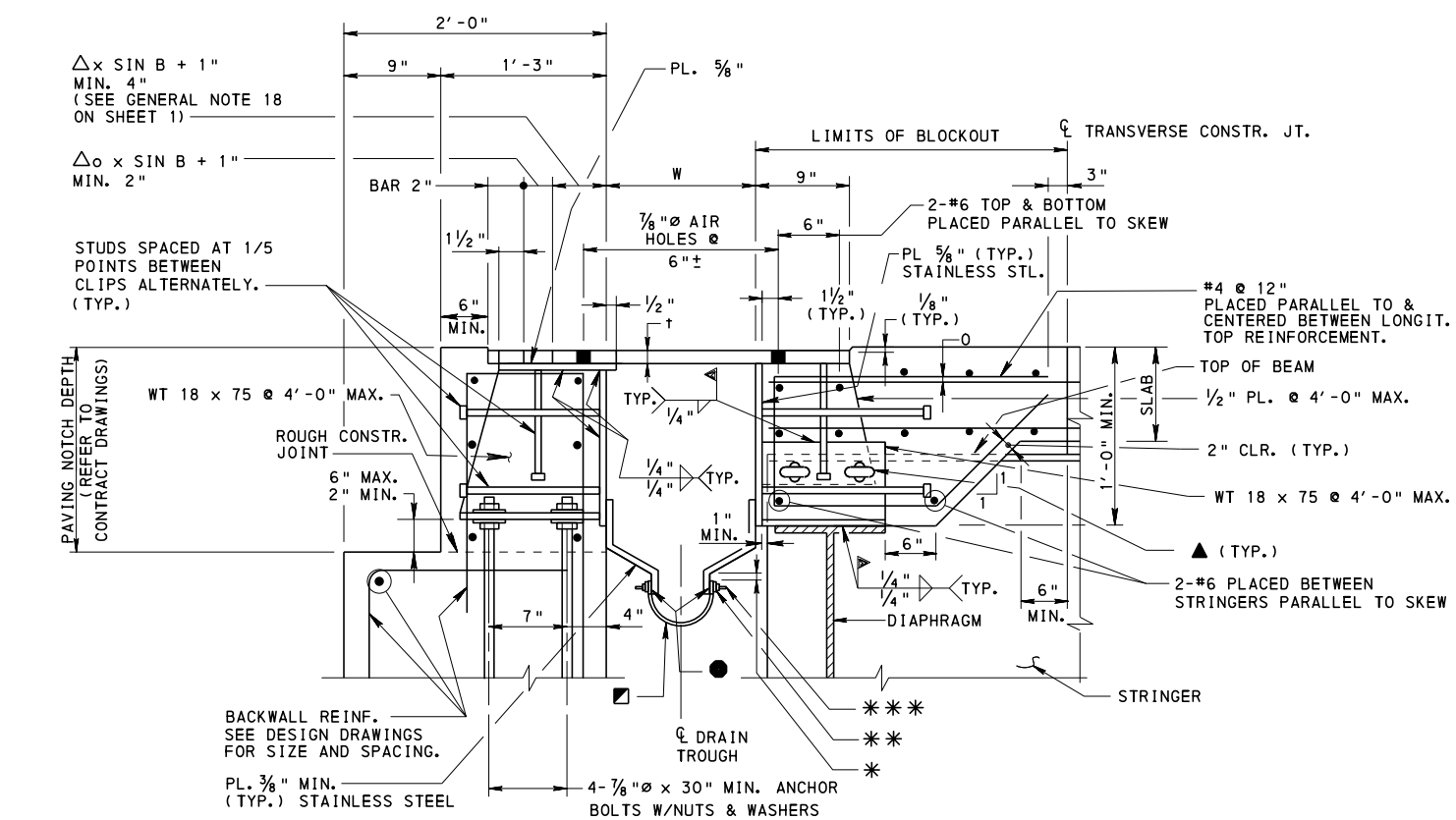
STANDARD
 TOOTH EXPANSION DAM
 FOR PRESTRESSED CONCRETE &
 STEEL I-BEAM BRIDGES

RECOMMENDED JAN. 31, 2019 <i>T. Ross P. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. [Signature]</i> ACTING DIR. BUREAU OF PROJECT DELIVERY	SHEET 2 OF 7 BC-762M
---	--	-------------------------



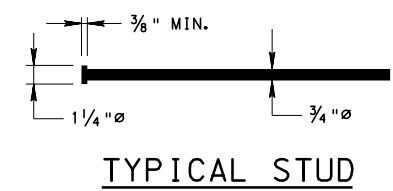
**SECTION AT ABUTMENT
FOR STEEL BEAMS**

FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.



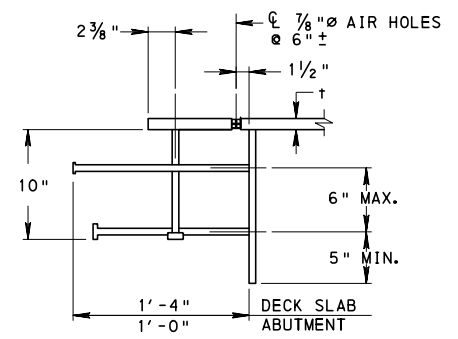
**SECTION AT ABUTMENT (@ SHOULDER)
FOR STEEL BEAMS**

FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.



- LEGEND:**
- * VARY TO PROVIDE MINIMUM 1% 12H. SLOPE TO DRAIN. SEE DESIGN DWG. FOR ACTUAL DESIGN SLOPE.
 - ** 1 1/2" x 1/4" PL. STAINLESS STEEL (TYPE 304), FULL LENGTH OF DRAIN TROUGH.
 - *** 3/8" STAINLESS STEEL STUDS WITH SELF LOCKING NUT & WASHER @ 12" C.C..
 - ▲ 1" x 1 3/4" SLOTTED HOLES FOR 7/8" H.S. BOLTS.
 - APPLY 1/4" BEAD OF AN EXTERIOR RATED SILICONE CAULK SEALANT PRIOR TO ASSEMBLY.
 - SEE PUBLICATION 408 SECTION 1020.3 FOR MATERIAL SPECIFICATION.

- SECTION NOTES:**
1. ALL VERTICAL STUDS ARE 3/4" Ø x 10" LONG.
 2. HORIZONTAL STUDS IN ABUTMENT ARE 3/4" Ø x 12" LONG.
 3. HORIZONTAL STUDS IN SLAB ARE 3/4" Ø x 16" LONG.
 4. MINIMUM DEPTH OF CONCRETE OVER DIAPHRAGMS IS 12".
 5. BEFORE PLACING BLOCKOUT APPLY APPROVED EPOXY BONDING AGENT TO TRANSVERSE CONSTRUCTION JOINTS.

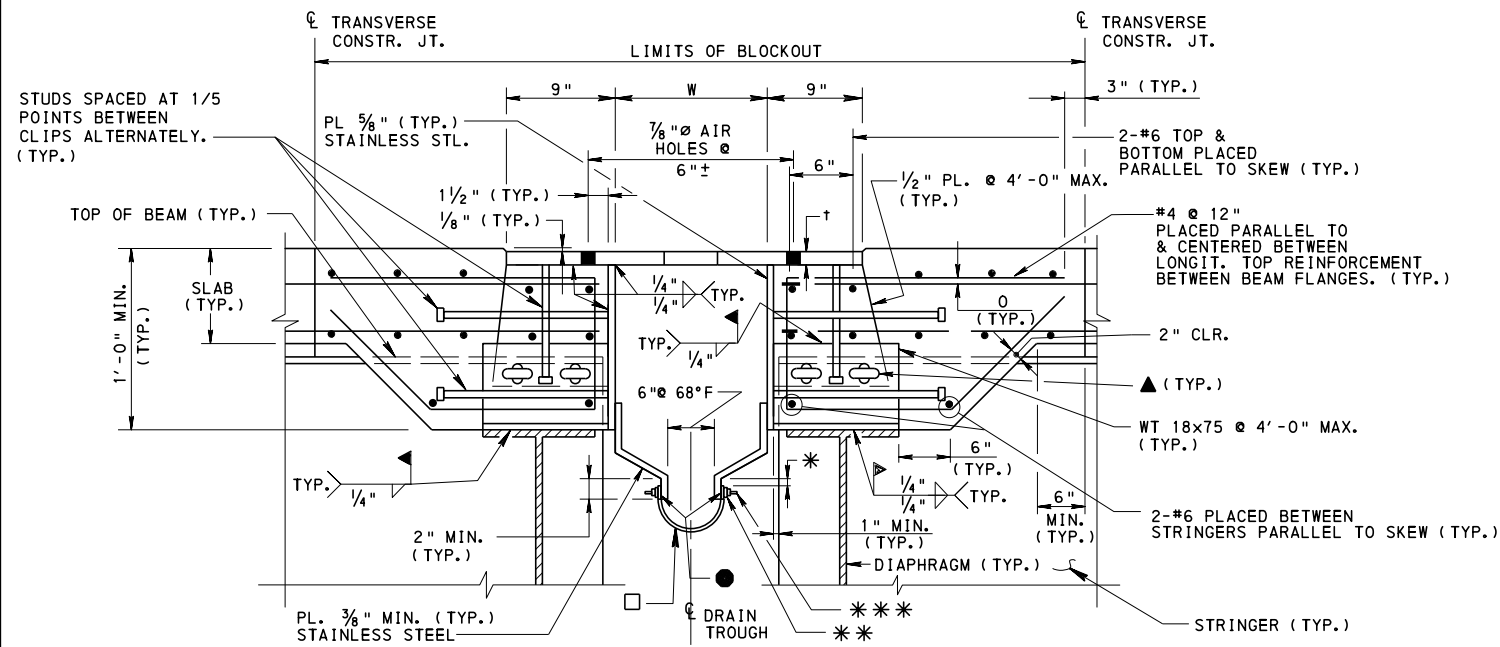


INDIVIDUAL STUDS MAY BE BENT OR SHORTER STUDS MAY BE USED (WHERE CLEARANCE IS LIMITED), IF PERMITTED BY THE STRUCTURE CONTROL ENGINEER OR DISTRICT BRIDGE ENGINEER.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

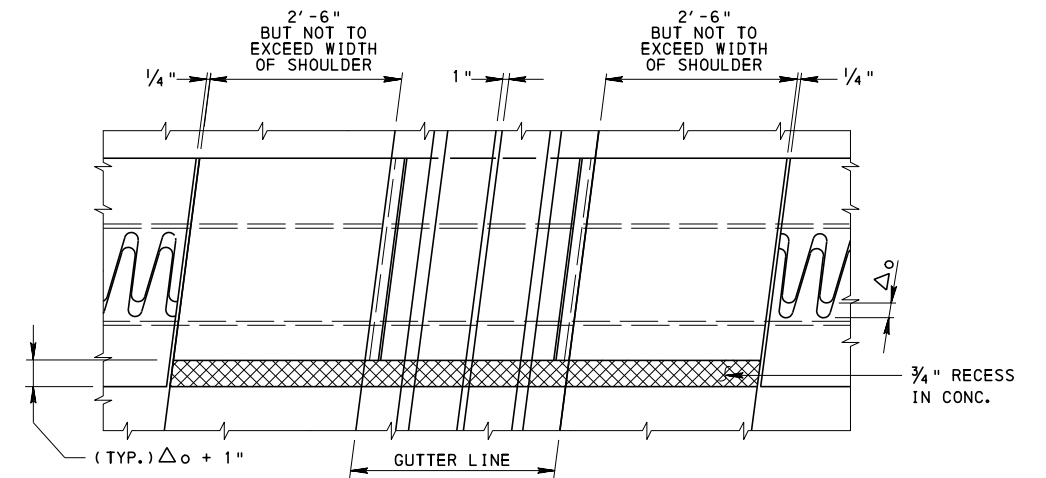
**STANDARD
TOOTH EXPANSION DAM
FOR PRESTRESSED CONCRETE &
STEEL I-BEAM BRIDGES**

RECOMMENDED JAN. 31, 2019 <i>T. Ross R. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. [Signature]</i> ACTING DIR. BUREAU OF PROJECT DELIVERY	SHEET 3 OF 7 BC-762M
---	--	--------------------------------



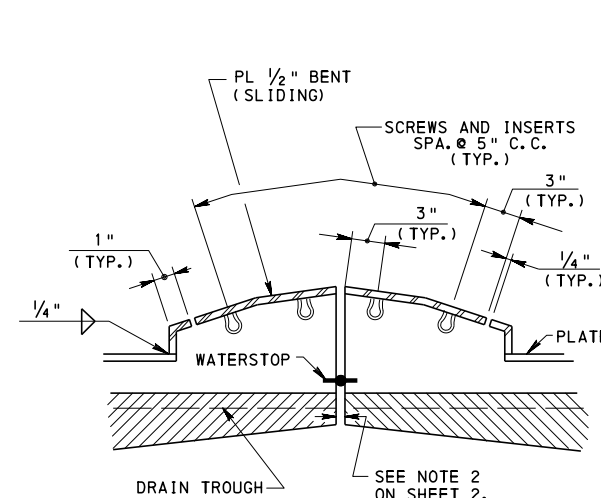
**SECTION AT PIER
FOR STEEL BEAMS**

FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.



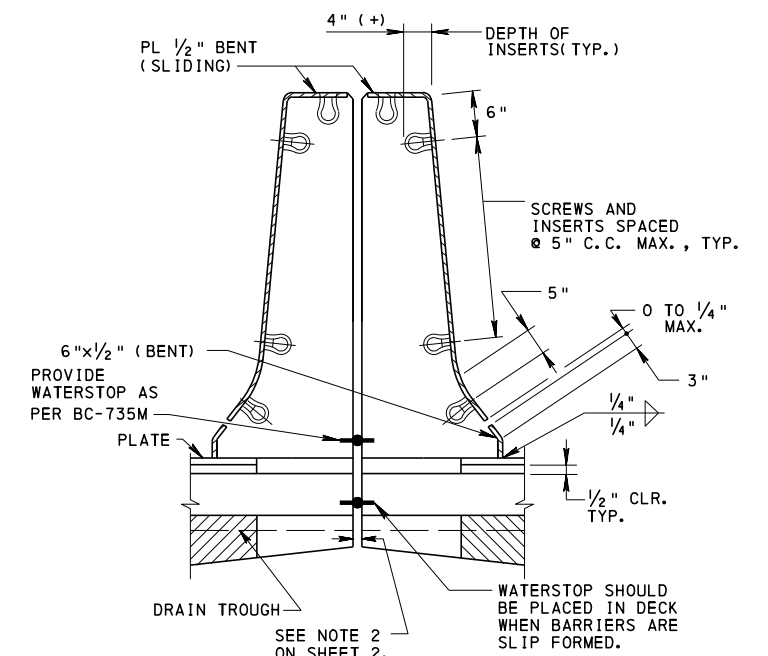
PLAN AT SPLIT MEDIAN BARRIER

NOTE: PLAN AT SPLIT CONCRETE DIVISOR SIMILAR



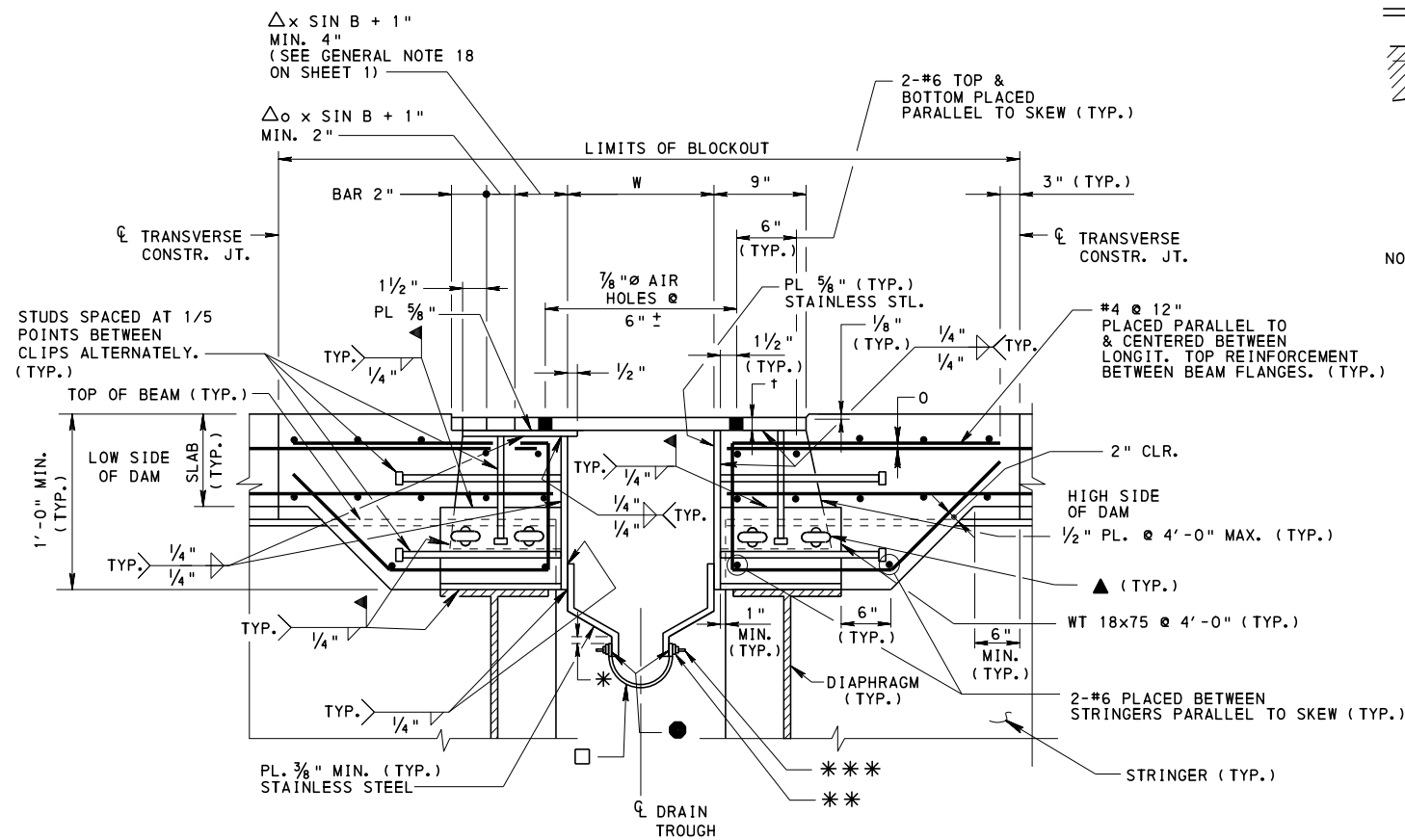
**SECTION AT SPLIT
CONCRETE DIVISOR**

NOTE: FOR CONCRETE DIVISOR NOT SPLIT, USE ONE PIECE 1/2" BENT SLIDING PLATE. DRAIN TROUGH MAY BE CONTINUOUS THROUGH DIVISOR.



**SECTION AT SPLIT
MEDIAN BARRIER**

NOTE: FOR MEDIAN BARRIER NOT SPLIT, USE ONE PIECE 1/2" BENT SLIDING PLATE. DRAIN TROUGH MAY BE CONTINUOUS THROUGH DIVISOR.



**SECTION AT PIER (@ SHOULDER)
FOR STEEL BEAMS**

FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.

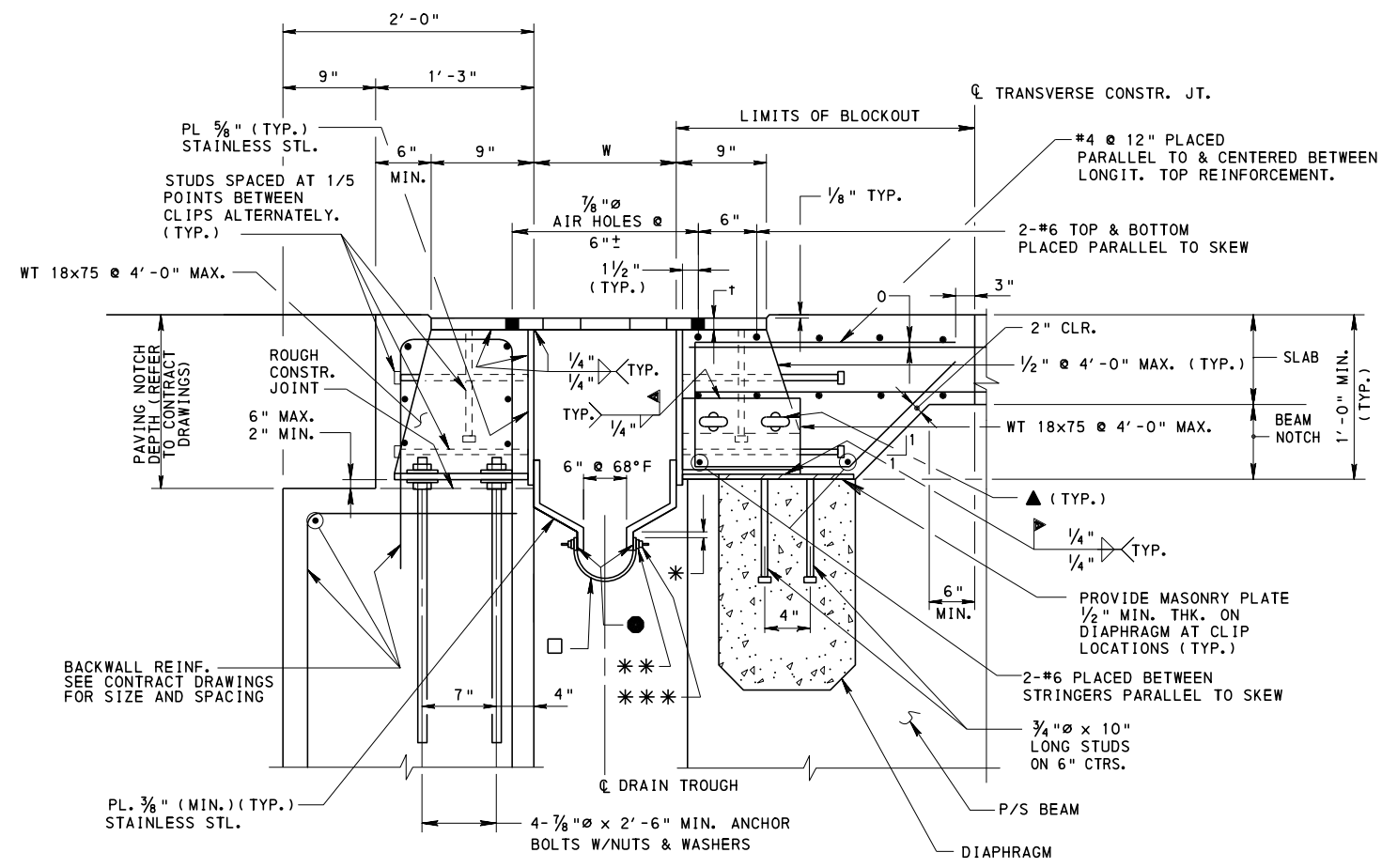
NOTES:

1. FOR LEGEND AND SECTION NOTES, SEE SHEET 3.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

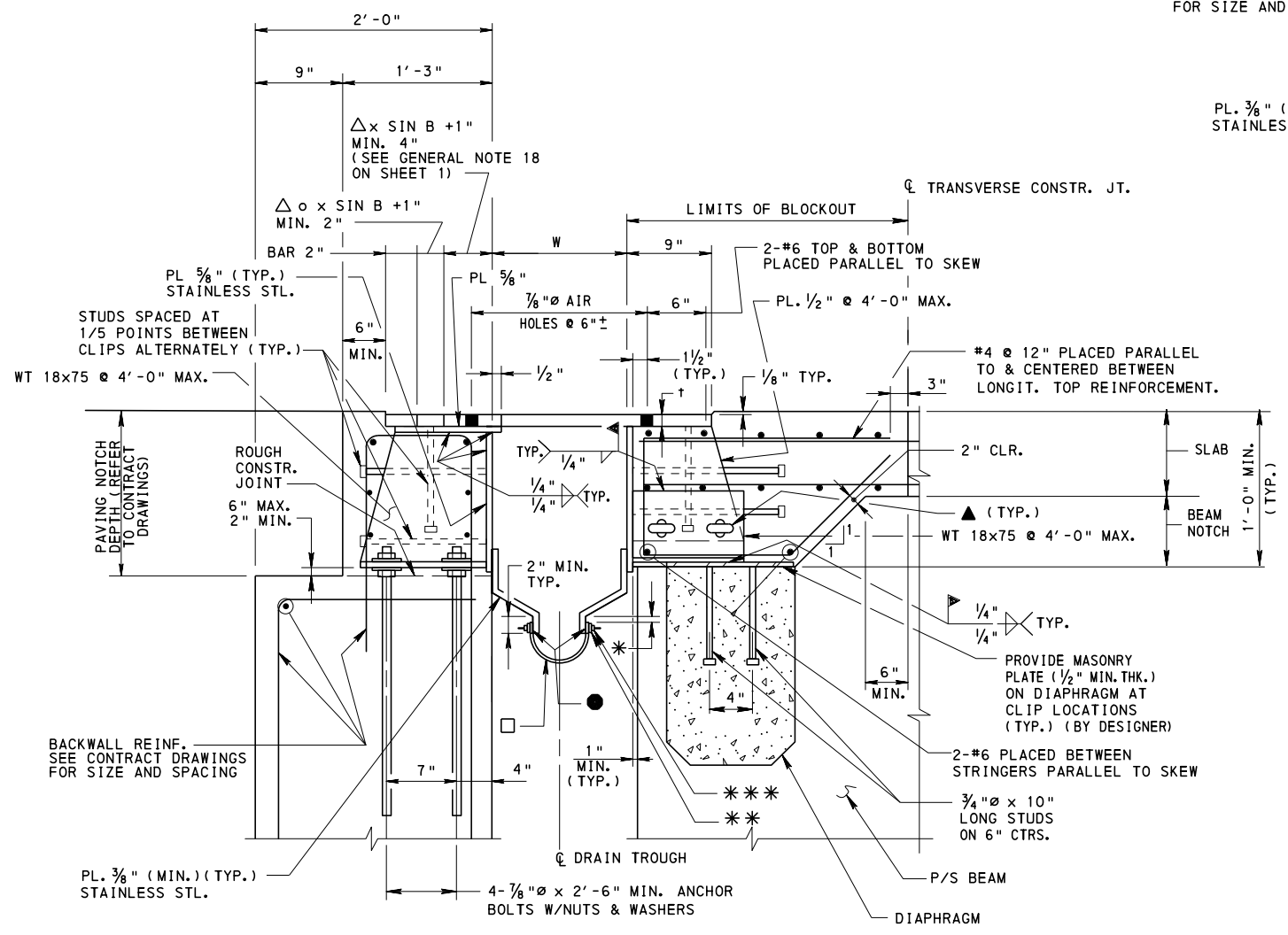
**STANDARD
TOOTH EXPANSION DAM
FOR PRESTRESSED CONCRETE &
STEEL I-BEAM BRIDGES**

RECOMMENDED JAN. 31, 2019 <i>T. Ross R. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. [Signature]</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 4 OF 7 BC-762M
---	--	--------------------------------



**SECTION AT ABUTMENT
FOR P/S BEAMS**

FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.



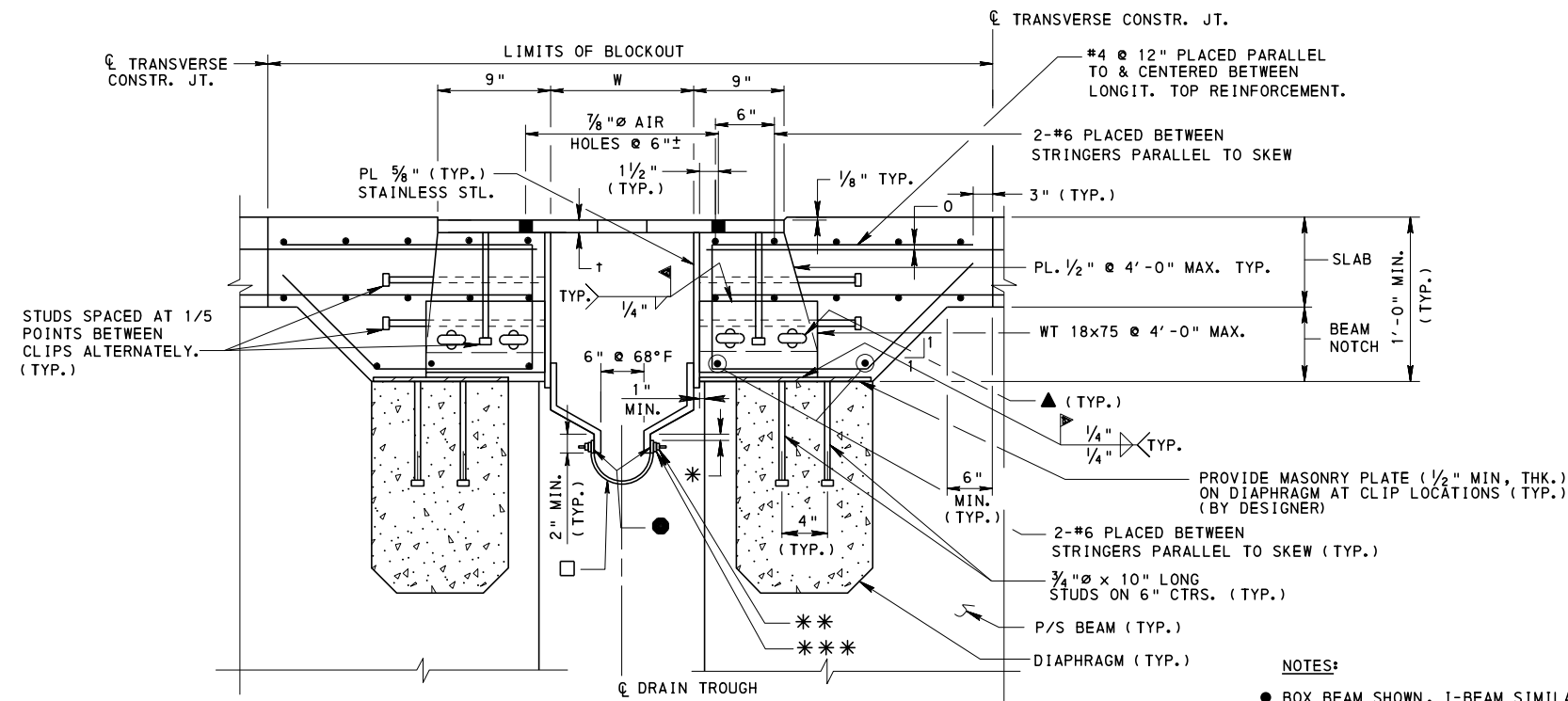
**SECTION AT ABUTMENT (@ SHOULDER)
FOR P/S BEAMS**

FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.

- NOTES:**
1. FOR LEGEND AND SECTION NOTES, SEE SHEET 3.
 2. TOOTH EXPANSION DAMS ARE NOT PERMITTED TO BE USED WITH PRESTRESSED CONCRETE ADJACENT BOX BEAM BRIDGES.

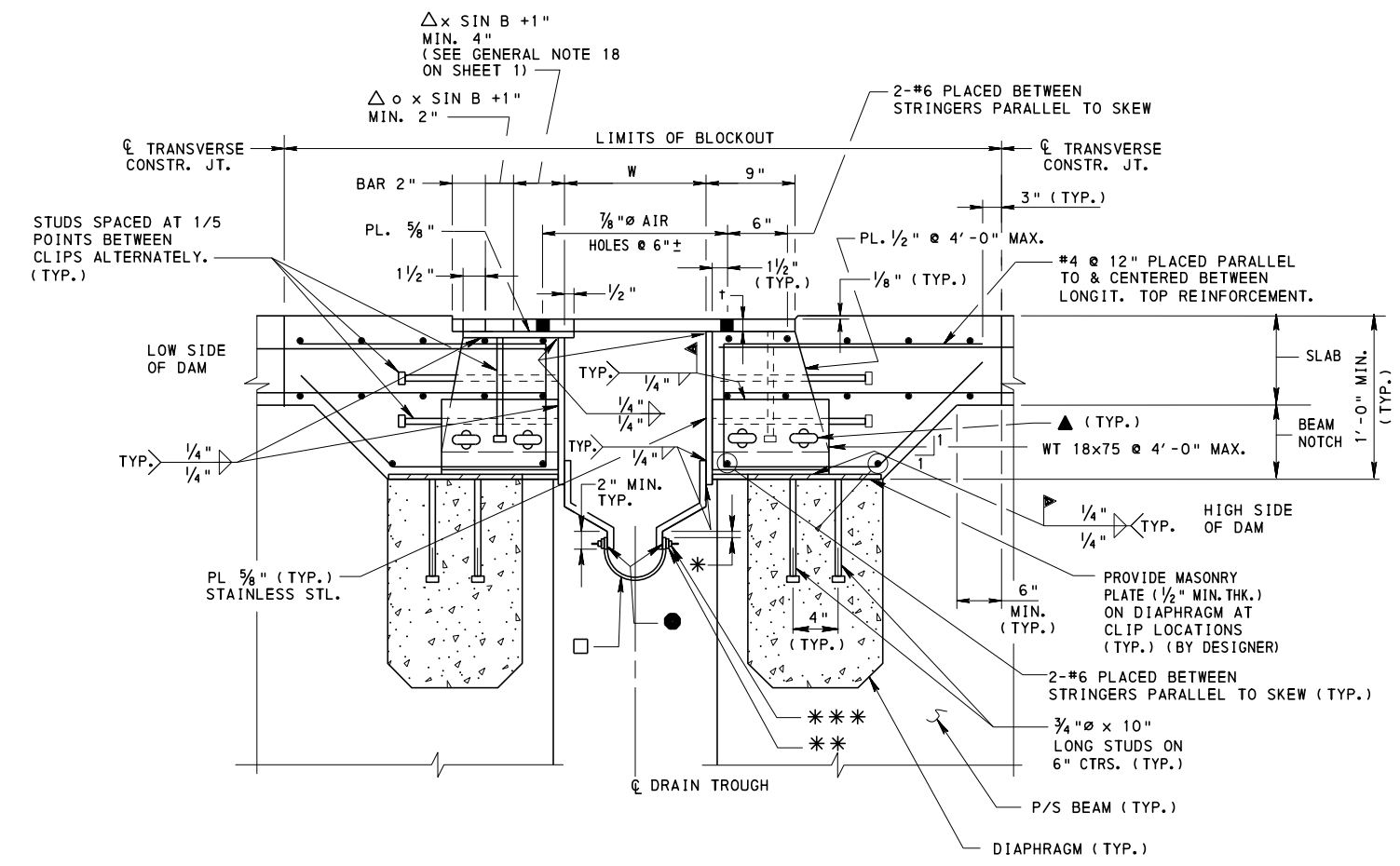
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
TOOTH EXPANSION DAM
FOR PRESTRESSED CONCRETE &
STEEL I-BEAM BRIDGES**



**SECTION AT PIER
FOR P/S BEAMS**

- NOTES:**
- BOX BEAM SHOWN, I-BEAM SIMILAR EXCEPT, REMOVE TOP OF WEB.
 - FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.

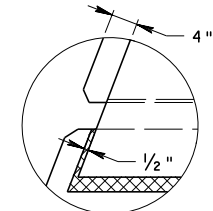
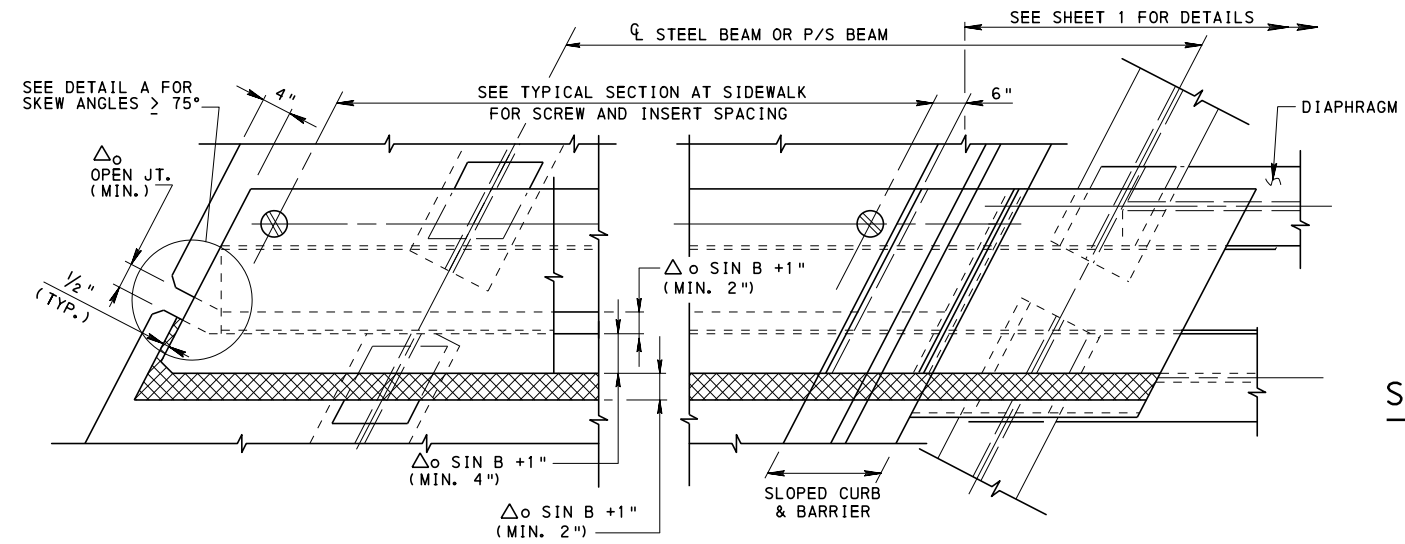


**SECTION AT PIER (@ SHOULDER)
FOR P/S BEAMS**

FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.

- NOTES:**
1. FOR LEGEND AND SECTION NOTES, SEE SHEET 3.
 2. TOOTH EXPANSION DAMS ARE NOT PERMITTED TO BE USED WITH PRESTRESSED CONCRETE ADJACENT BOX BEAM BRIDGES.

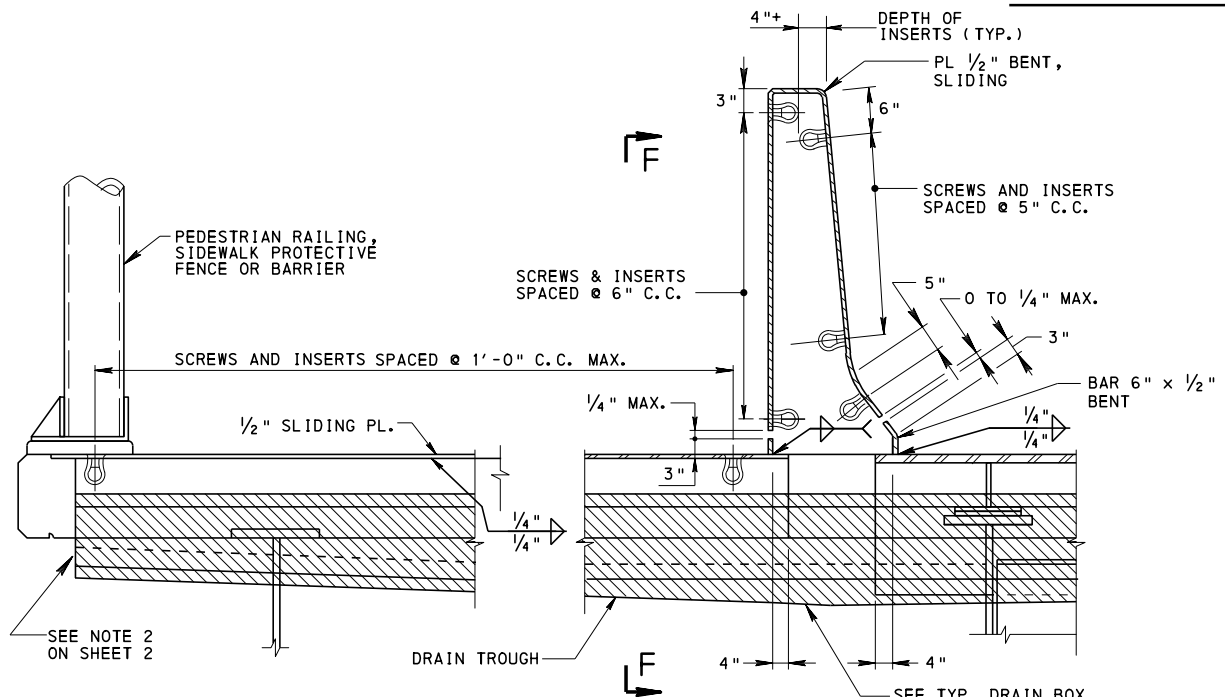
COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY		
STANDARD TOOTH EXPANSION DAM FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES		
RECOMMENDED JAN. 31, 2019 <i>T. Ross R. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. [Signature]</i> ACTING DIR. BUREAU OF PROJECT DELIVERY	SHEET 6 OF 7 BC-762M



NOTE:
 1. ALL DETAILS ARE SHOWN WITH A SINGLE TROUGH TO REDUCE DECK DRAINS. DETAILS MAY BE MODIFIED TO SHOW A SEPARATE TROUGH. SEE SHEET 2 FOR EXAMPLE. ALL DRAIN LOCATIONS MUST BE SHOWN ON THE DESIGN DRAWINGS.

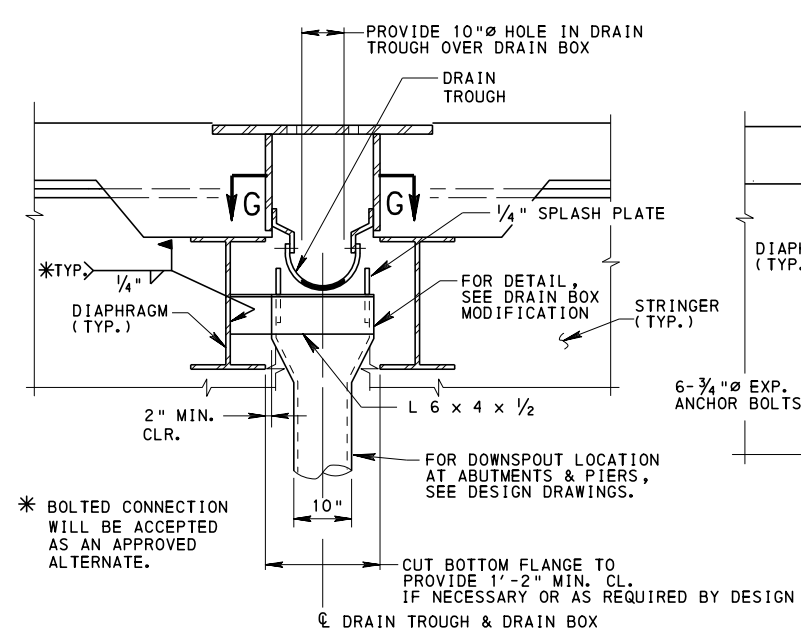
DETAIL A
SKREW ANGLES $\geq 75^\circ$

PLAN AT SIDEWALK

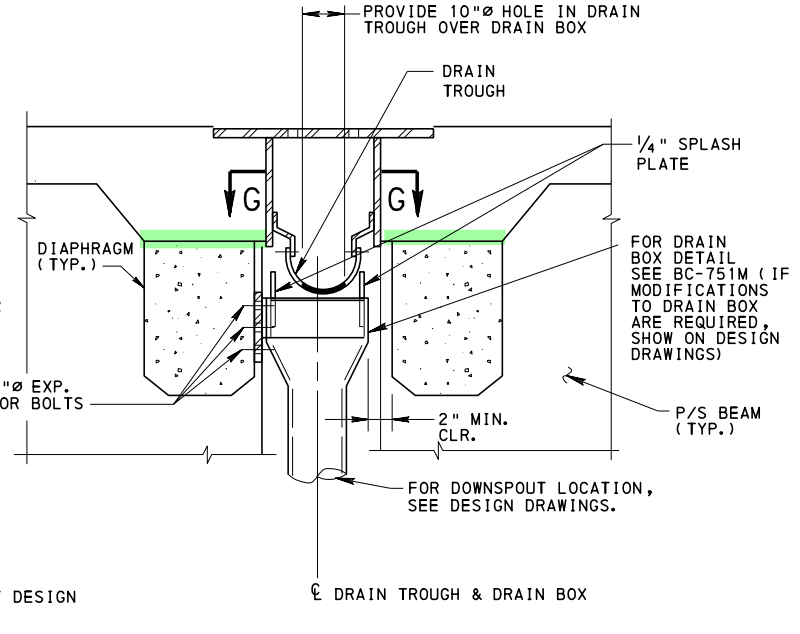


TYP. SECTION AT SIDEWALK

NOTE: SECTION IS SIMILAR FOR RAISED SIDEWALK. FOR SIDEWALK DRAINAGE SLOPES, SEE BC-767M, SHEET 4.



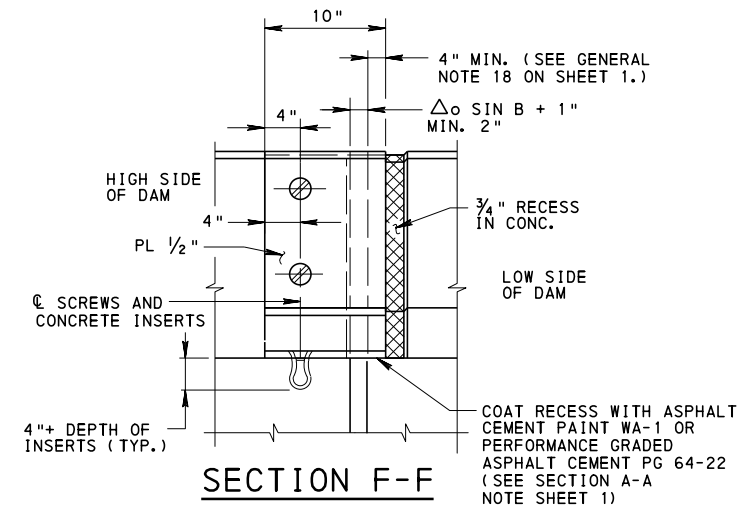
FOR STEEL BEAM



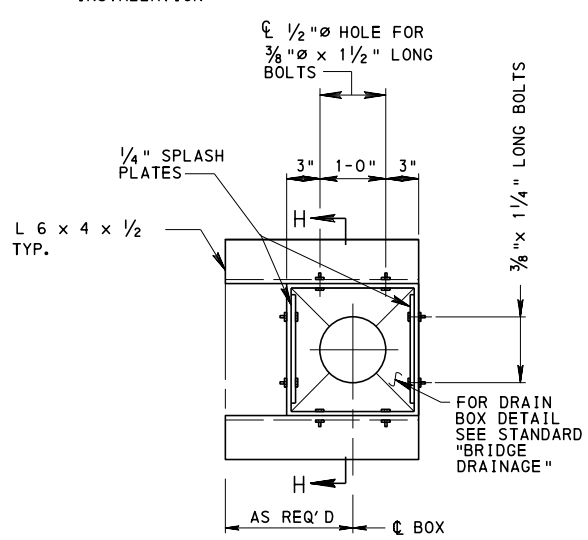
FOR P/S BEAMS

TYP. DRAIN BOX INSTALLATION @ PIERS

INSTALLATION AT ABUTMENTS SIMILAR

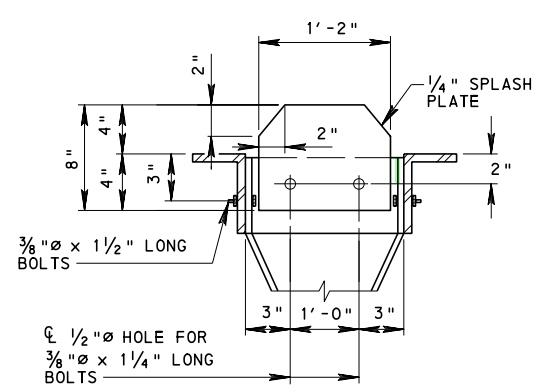


SECTION F-F



SECTION G-G

DRAIN BOX MODIFICATION

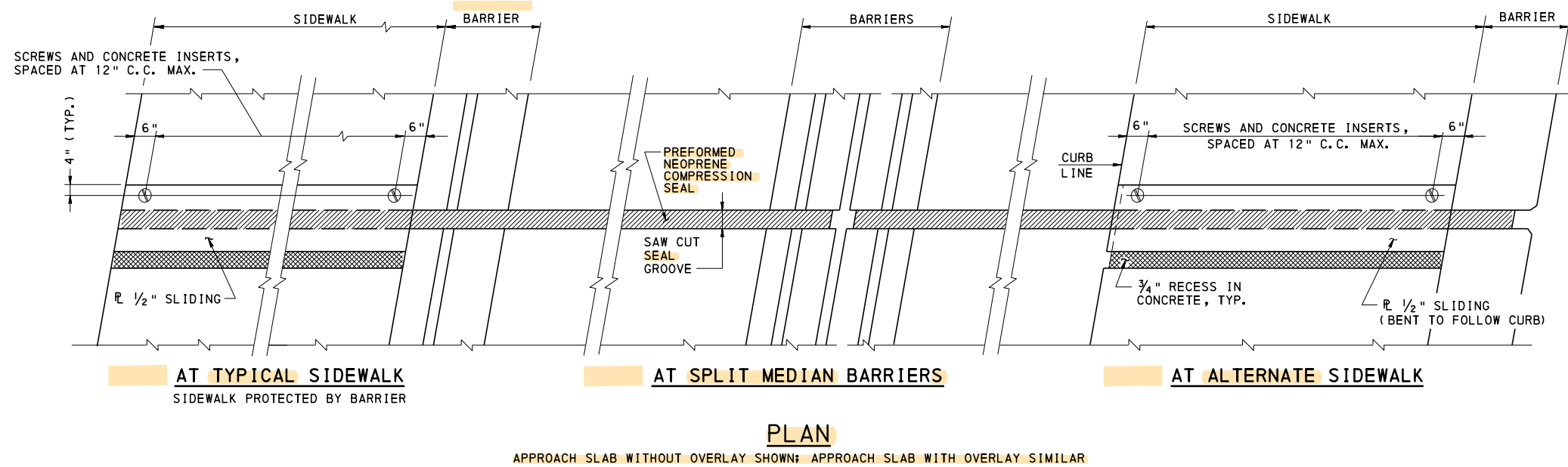


SECTION H-H

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

STANDARD
TOOTH EXPANSION DAM
FOR PRESTRESSED CONCRETE &
STEEL I-BEAM BRIDGES

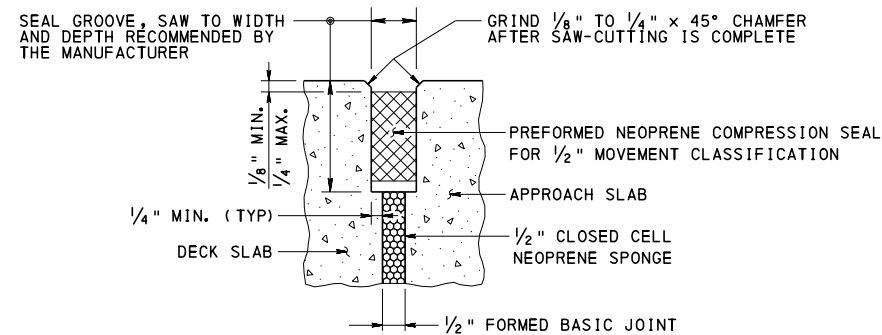
RECOMMENDED JAN. 31, 2019 <i>T. Ross P. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin P. ...</i> ACTING DIR. BUREAU OF PROJECT DELIVERY	SHEET 7 OF 7 BC-762M
---	--	--------------------------------



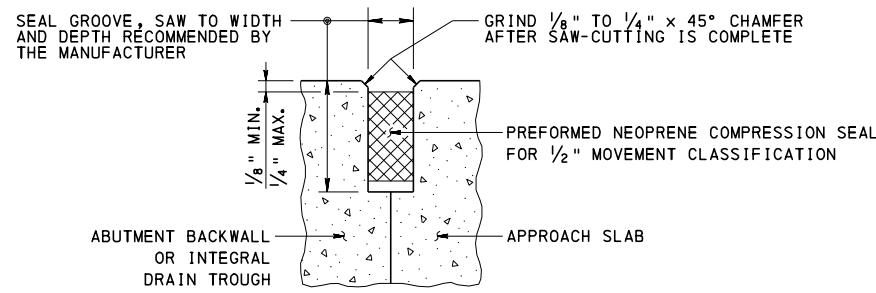
GENERAL NOTES:

1. PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408.
2. ALL STEEL SHALL CONFORM TO AASHTO M 270, GRADE 36 (ASTM A 709 GRADE 36) UNLESS OTHERWISE SPECIFIED ON THE DESIGN DRAWINGS.
3. GALVANIZE STEEL IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02 (s). IF SPECIFIED, PAINT ALL GALVANIZED STEEL SURFACES IN THE SHOP IN ACCORDANCE WITH PUBLICATION 408, SECTION 1060.2 (b).
4. USE FLATHEAD STAINLESS STEEL ASTM F 738M (TYPE 304) FOR COUNTERSUNK SCREWS WITH INSERTS. ALL CONCRETE INSERTS AND M20 COUNTERSUNK MACHINE SCREWS ARE 3/4" DIAMETER.
5. USE THIS STANDARD AS A GUIDE IN THE PREPARATION OF SHOP DRAWINGS.
6. PROVIDE PREFORMED NEOPRENE COMPRESSION SEAL WITH 1/2" MOVEMENT CLASSIFICATION.
7. THE SEALED JOINT IS CONSTRUCTED AT VARIOUS STAGES DURING DECK CONSTRUCTION; THEREFORE, PRECISELY CONTROL AND EXECUTE ALL OPERATIONS AS SPECIFIED IN SECTION 1008.3 OF PUBLICATION 408.
8. THE SEAL SHALL BE CONTINUOUS THROUGH THE DECK (BARRIER TO BARRIER). FIELD SPLICING OF SEAL IS NOT PERMITTED. TEMPORARY SEAL MAY BE REQUIRED DEPENDING ON THE OF CONSTRUCTION.
9. ASCERTAIN THAT THE TOP OF THE INSTALLED SEAL IS 1/8" MINIMUM TO 1/4" MAXIMUM BELOW THE DECK SURFACE AND THAT THE INTERSECTION OF THE VERTICAL AND THE HORIZONTAL SEALS AT THE GUTTER LINE IS WATERPROOF.
10. FOR JOINTS AT SHARP SKEWS, MODIFICATIONS TO BE MADE AS REQUIRED, BY THE DESIGNER, AND SHOWN ON THE DESIGN DRAWINGS.
11. USE DOUBLE BLADE FOR SAW-CUTTING THE SEAL GROOVE.
12. TO INSURE THAT INSERTS AND SCREWS ARE ALIGNED PROPERLY, PLACE CURBS AND SIDEWALKS WITH 1/2" SLIDING PLATES IN PLACE. APPLY BOND BREAKER TO SLIDING PLATES PRIOR TO INSTALLATION.
13. DETAILS SHOWN ON SHEET 2 ARE APPLICABLE FOR A TYPE 1 APPROACH SLAB (WITHOUT OVERLAY) SUPPORTED BY THE SUPERSTRUCTURE. DETAILS FOR OTHER APPROACH SLAB TYPES AND/OR ABUTMENT-SUPPORTED SLABS ARE SIMILAR.

CHANGE 2
 CHANGE 4

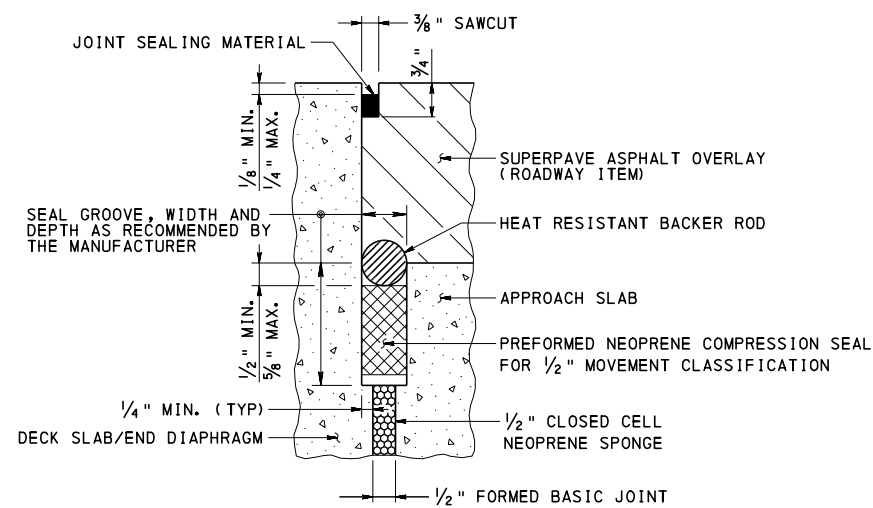


SUPERSTRUCTURE-SUPPORTED APPROACH SLAB
 TYPE 1 APPROACH SLAB SUPPORTED BY BEAM OR END DIAPHRAGM

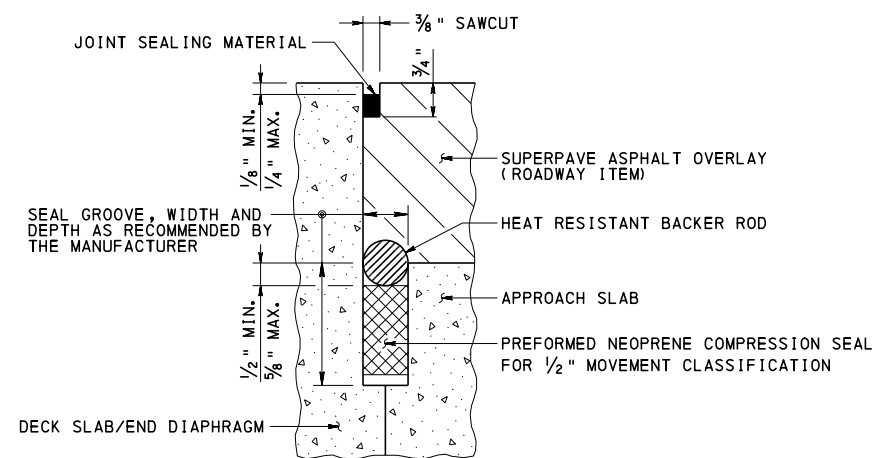


ABUTMENT-SUPPORTED APPROACH SLAB
 TYPE 1 APPROACH SLAB SUPPORTED BY ABUTMENT BACKWALL
 TYPE 4 APPROACH SLAB SUPPORTED BY INTEGRAL DRAIN TROUGH

TYPICAL JOINT AT APPROACH SLAB WITHOUT OVERLAY



SUPERSTRUCTURE-SUPPORTED APPROACH SLAB
 TYPE 2 APPROACH SLAB SUPPORTED BY BEAM OR END DIAPHRAGM

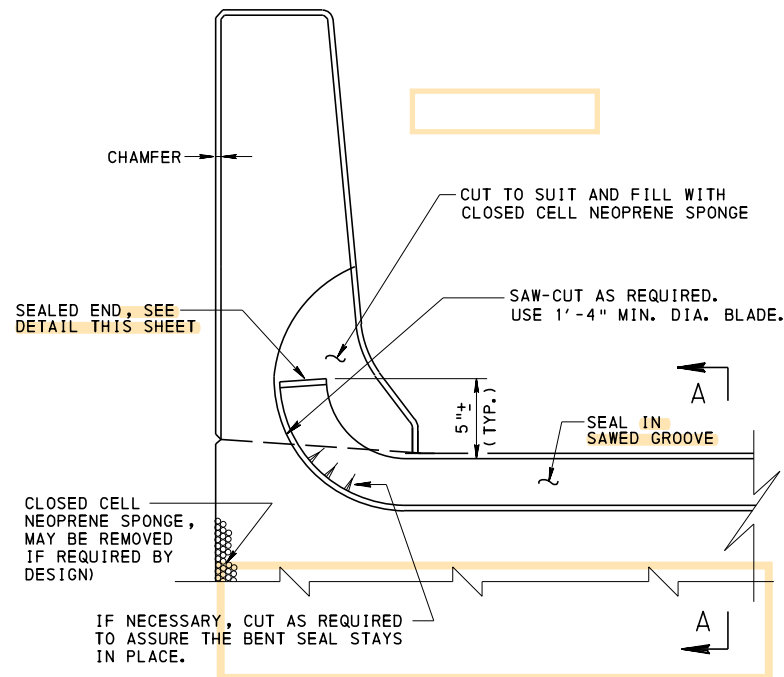


ABUTMENT-SUPPORTED APPROACH SLAB
 TYPE 2 APPROACH SLAB SUPPORTED BY ABUTMENT BACKWALL

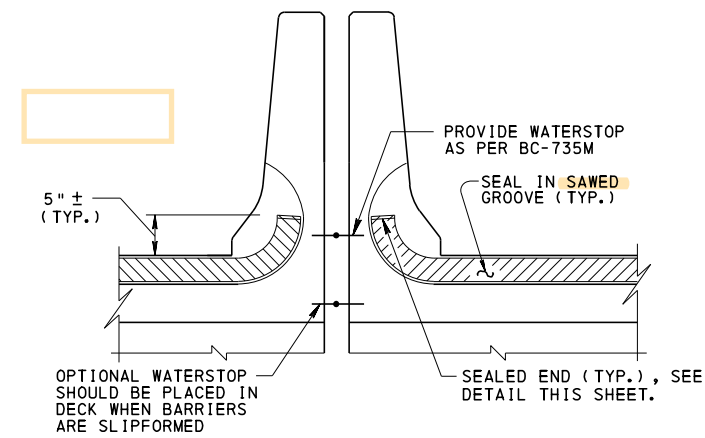
TYPICAL JOINT AT APPROACH SLAB WITH OVERLAY

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BRIDGE OFFICE

STANDARD
 PREFORMED NEOPRENE COMPRESSION
 SEAL JOINT FOR APPROACH SLABS

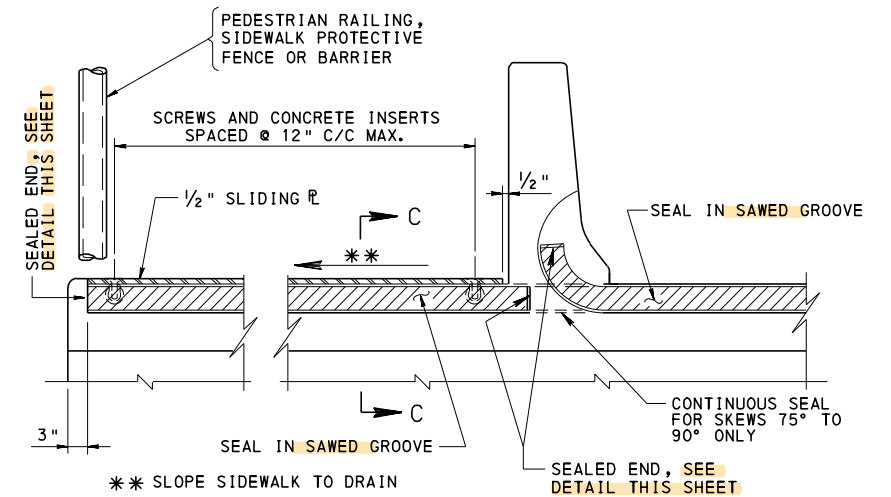


SECTION THRU JOINT WITH F-SHAPED BARRIER



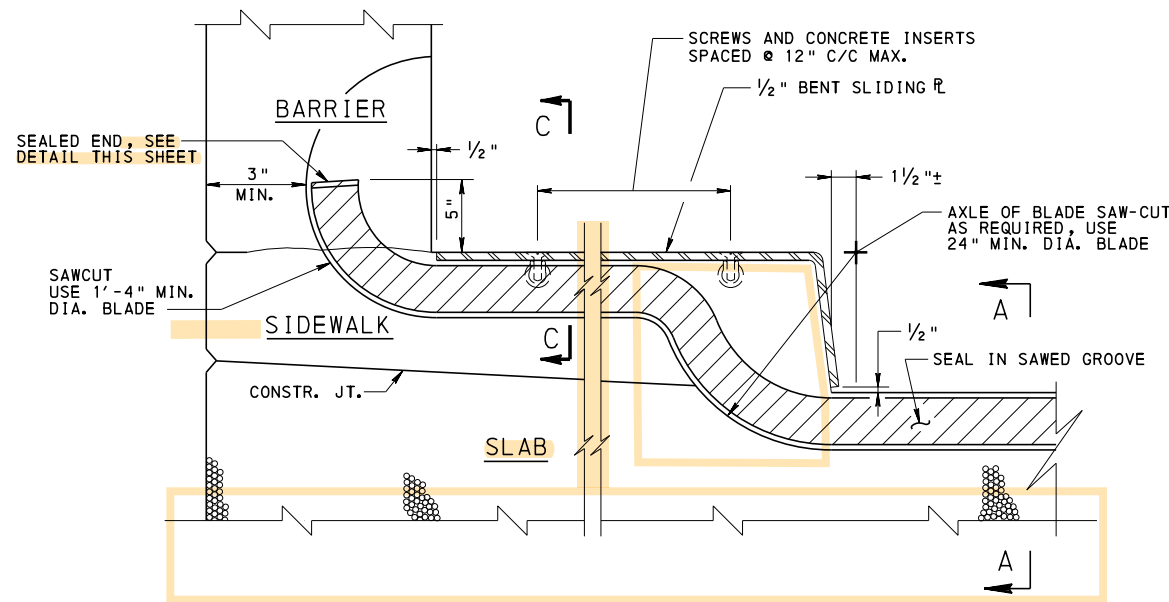
SECTION AT SPLIT MEDIAN BARRIERS

NOTE: FOR ADDITIONAL INFORMATION, SEE SECTION THRU JOINT WITH F-SHAPED BARRIER, THIS SHEET.



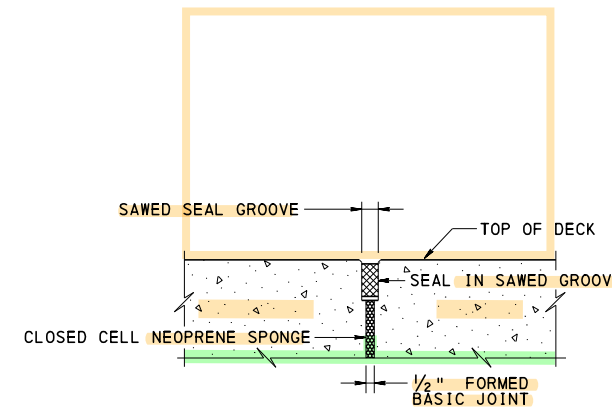
SECTION THRU JOINT AT TYPICAL SIDEWALK

NOTE: FOR ADDITIONAL INFORMATION, SEE SECTION THRU JOINT WITH F-SHAPED BARRIER, THIS SHEET.



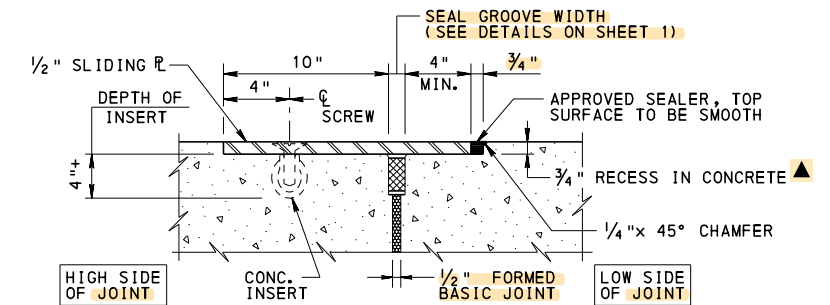
SECTION THRU JOINT WITH ALTERNATE SIDEWALK

NOTE: FOR ADDITIONAL INFORMATION, SEE SECTION THRU JOINT WITH F-SHAPED BARRIER, THIS SHEET.



SECTION A-A

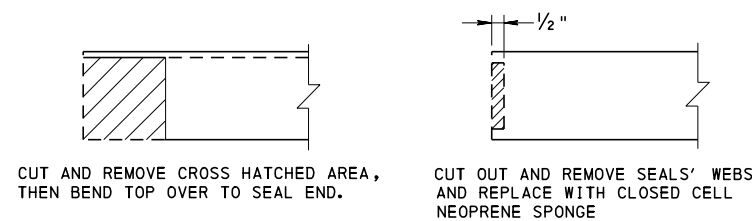
NOTE: FOR ADDITIONAL INFORMATION, SEE JOINT DETAILS ON SHEET 1.



SECTION C-C

NOTE: FOR ADDITIONAL INFORMATION, SEE JOINT DETAILS ON SHEET 1.

▲ FORM CONCRETE RECESS AREA IN SIDEWALK AND GRIND TO PROVIDE SMOOTH SURFACE. APPLY ONE COAT OF ASPHALT CEMENT PAINT WA-1 OR PERFORMANCE GRADED ASPHALT PG 64-22 TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION.



ALTERNATE "A"

ALTERNATE "B"

ALTERNATES FOR SEALED ENDS

SEAL CONTACT AREA WITH APPROVED ADHESIVE.

NOTES:

1. DETAILS SHOWN ON THIS SHEET ARE APPLICABLE FOR A TYPE 1 APPROACH SLAB (WITHOUT OVERLAY) SUPPORTED BY THE SUPERSTRUCTURE. DETAILS FOR OTHER APPROACH SLAB TYPES AND/OR ABUTMENT-SUPPORTED SLABS ARE SIMILAR.

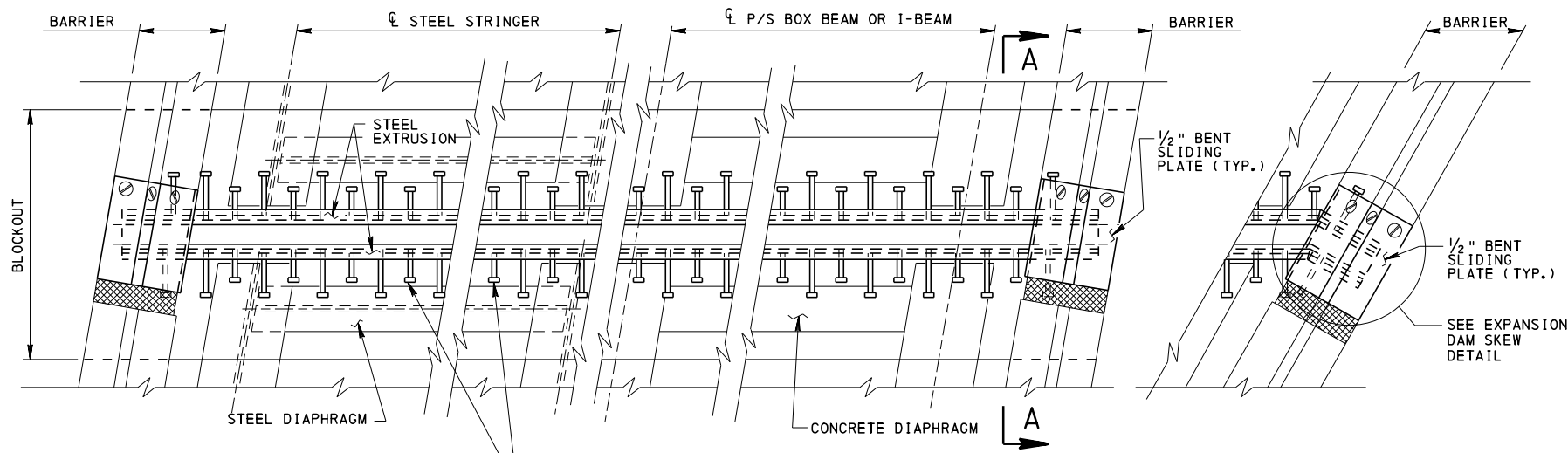
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

**STANDARD
PREFORMED NEOPRENE COMPRESSION
SEAL JOINT FOR APPROACH SLABS**

RECOMMENDED NOV. 23, 2022
L. W. Gray
CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022
Grain E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 2 OF 2
BC-766M



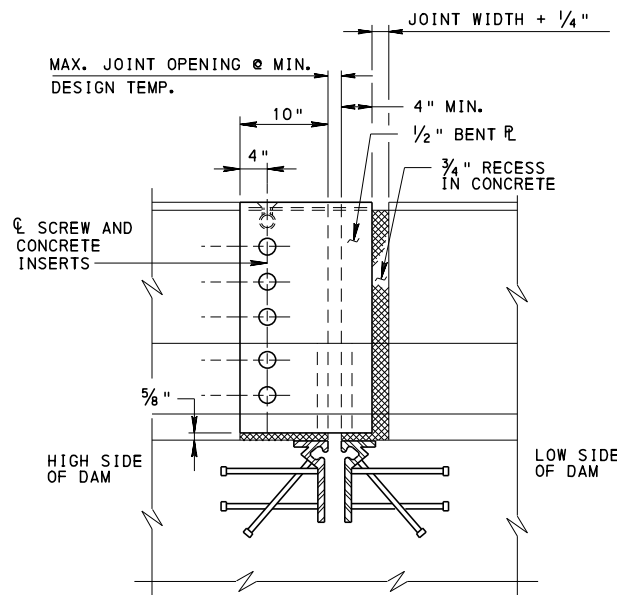
SKREW ANGLES $\geq 75^\circ$

PLAN AT BARRIER

SKREW ANGLES $< 75^\circ$

** $\frac{5}{8}$ " x 10" STUDS @ 12" C.C. - ALTERNATE (SEE SHEET 2 EXTRUSION DETAIL) (TYP.)

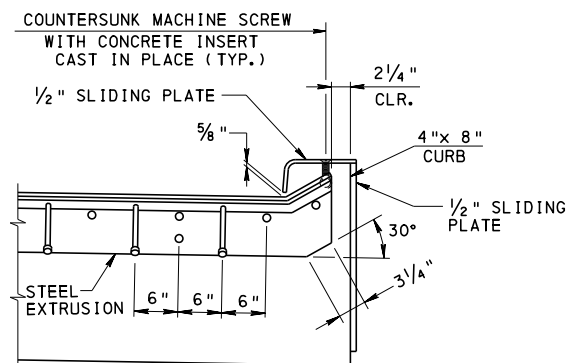
** IF 10" STUDS CANNOT BE ACCOMMODATED IN THE SPACE AVAILABLE, REQUEST SPECIFIC LENGTH APPROVAL FROM THE DISTRICT BRIDGE ENGINEER AT THE SHOP DRAWINGS APPROVAL STAGE.



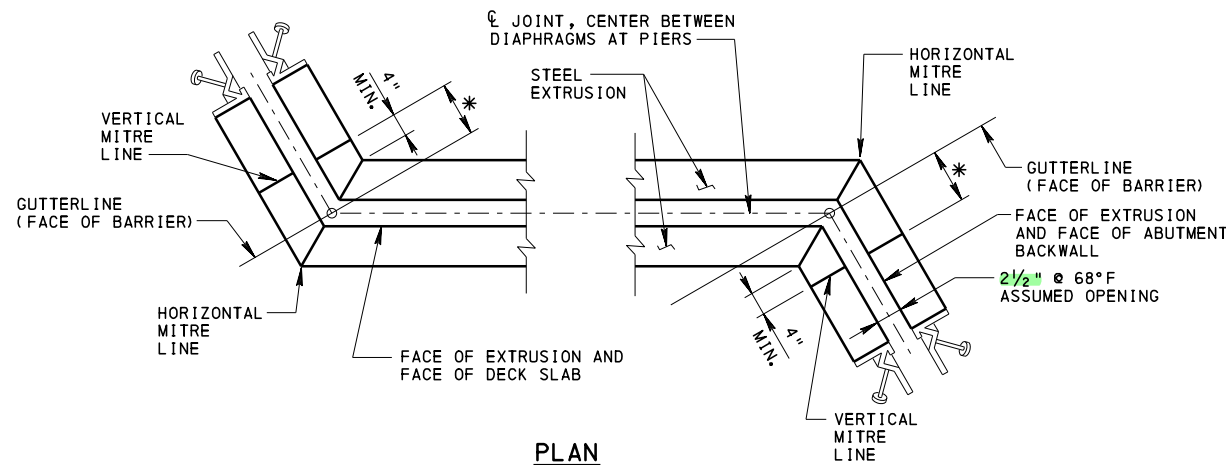
NOTE:

FORM CONCRETE RECESS AREA IN BARRIER AND GRIND TO PROVIDE SMOOTH SURFACE. APPLY ONE COAT OF ASPHALT CEMENT PAINT WA-1 OR PERFORMANCE GRADED ASPHALT CEMENT PG 64-22 TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION.

SECTION A-A



SECTION B-B

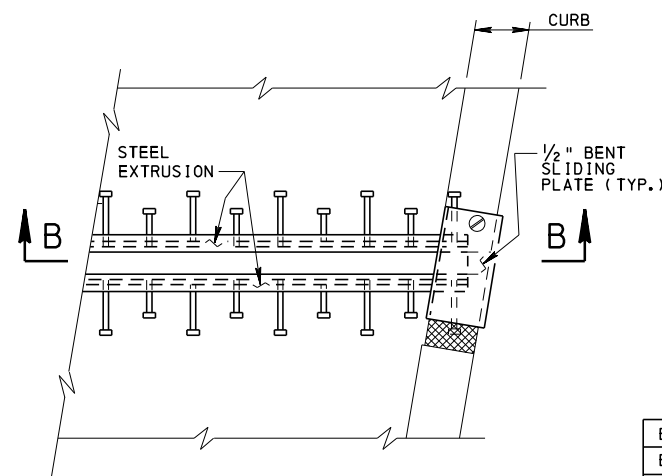


PLAN

* OFFSET DIMENSION WILL VARY WITH SKEW AND CORNER TYPE.

EXPANSION DAM SKEW DETAIL

JOINT AT ABUTMENT SHOWN WITH 30° SKEW, JOINT AT PIERS SIMILAR



PLAN AT FAR END OF BRIDGE APPROACH SLAB

GENERAL NOTES:

- DO NOT WELD GRADE 60 STEEL REINFORCEMENT BARS UNLESS SPECIFIED.
- PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408 AND AASHTO/AWS WELDING SPECIFICATIONS.
- GALVANIZE STEEL IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02 (g). IF SPECIFIED, PAINT ALL GALVANIZED STEEL SURFACES IN THE SHOP IN ACCORDANCE WITH PUBLICATION 408, SECTION 1060.2 (b).
- PROVIDE AASHTO M270 GRADE 36 (ASTM A709 GRADE 36), GALVANIZED, FOR STEEL EXTRUSION UNLESS OTHERWISE SPECIFIED ON THE DESIGN DRAWINGS. ANCHOR STUDS TO BE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02 (e). STUDS MAY BE PIGGY BACKED TO ACHIEVE REQUIRED LENGTH.
- USE FLATHEAD STAINLESS STEEL ASTM F738M OR F593 (TYPE 304) FOR COUNTERSUNK SCREWS WITH INSERTS. ALL CONCRETE INSERTS AND M 20 COUNTERSUNK MACHINE SCREWS ARE $\frac{3}{4}$ " DIAMETER UNLESS OTHERWISE NOTED. USE THIS STANDARD DRAWING AS A GUIDE IN THE PREPARATION OF SHOP DRAWINGS.
- INSTALL CONTINUOUS NEOPRENE STRIP SEAL IN THE FIELD. SPLICING OF SEAL IS NOT PERMITTED. TEMPORARY SEAL MAY BE REQUIRED DEPENDING ON STAGES OF CONSTRUCTION.
- CONSTRUCT EXPANSION DAM TO MATCH ROADWAY GRADE AND CROSS SLOPE.
- PROVIDE ALL WELDING IN THE SHOP. PROVIDE NON-DESTRUCTIVE TESTING OF WELDS IF REQUIRED BY THE ENGINEER IN ACCORDANCE WITH AASHTO/AWS SPECIFICATIONS. EXPANSION DAMS GREATER THAN 40' IN LENGTH MAY, AT THE DISCRETION OF THE FABRICATOR, HAVE THE RETAINERS FOR THE STRIP SEALS WELDED IN THE FIELD. REFER TO NOTE 10 FOR SPECIAL REQUIREMENTS AND DETAILS FOR TRANSVERSE BUTT WELDS.
- A LONGITUDINAL FULL PENETRATION WELD IS REQUIRED TO JOIN THE TOP AND BOTTOM (PLATE) OF THE RETAINER TOGETHER WHEN IT IS FURNISHED IN TWO PIECES; 25% OF THE WELD TO BE TESTED ULTRASONICALLY, AND IF DEFECTS ARE FOUND, 100% OF THE WELD TO BE TESTED. TRANSVERSE BUTT WELDS FOR SPLICING THE RETAINER TO BE PARTIAL PENETRATION DOUBLE V-GROOVE WELDS ON PREPARED BEVELED EDGES, EXTENDING ALL AROUND THE JOINT AS FAR AS PRACTICAL TO ACHIEVE A WATERTIGHT SEAL. FULL PENETRATION GROOVE WELD FOR SPLICING THE RETAINER IN LIEU OF PARTIAL PENETRATION DOUBLE V-GROOVE WELDS MAY BE USED IF SHOWN ON APPROVED SHOP DRAWINGS. DO NOT WELD INSIDE SEAL CAVITY. WHEREVER A TRANSVERSE JOINT OCCURS, TWO ADDITIONAL STUDS MUST BE ADDED ON EACH SIDE OF THE JOINT.
- PROVIDE SEALS WITH MOVEMENT CLASSIFICATION NOT LESS THAN THE CLASSIFICATION SPECIFIED ON THE DESIGN DRAWINGS. ALL SEALS SHALL CONFORM TO THE REQUIREMENTS OF PUBLICATION 408, SECTION 705. OBTAIN APPROVAL FOR USE OF THE SEAL FROM THE CHIEF MATERIALS ENGINEER, LABORATORY TESTING SECTION, MATERIALS DIVISION, BUREAU OF CONSTRUCTION AND MATERIALS.
- MINIMUM MOVEMENT CLASSIFICATION IS 3".
- FABRICATOR TO PROVIDE A CHART SHOWING JOINT OPENING FOR TEMPERATURES BETWEEN -10°F TO 110°F FOR STEEL STRUCTURES AND 10°F TO 100°F FOR P/S CONCRETE STRUCTURES, IN 10°F INTERVALS ON SHOP DRAWINGS. SET WIDTH @ 68°F . ALSO FURNISH MOVEMENT OF SEAL ON SKEW AND CERTIFY THAT SEAL IS CORRECT FOR DESIGN.
- BOND NEOPRENE STRIP SEAL TO EXTRUSION WITH APPROVED ADHESIVE.
- THE SEALS FURNISHED WITH THE RETAINERS MUST BE COMPATIBLE WITH THE RETAINER AND PROVIDE A WATERTIGHT JOINT.
- PLACE CURBS AND SIDEWALKS WITH STEEL SLIDING PLATES, WITH INSERTS AND BOLTS IN PLACE TO INSURE PROPER ALIGNMENT OF INSERTS AND HOLES IN THE STEEL SLIDING PLATE. REMOVE PLATES TO INSTALL SEAL. APPLY BONDBREAKER TO SLIDING PLATES PRIOR TO INSTALLATION.
- BEFORE PLACING BLOCKOUT CONCRETE, APPLY APPROVED EPOXY BONDING AGENT TO TRANSVERSE CONSTRUCTION JOINTS.
- PLACE CLASS AAAP CEMENT CONCRETE IN THE BLOCKOUT AREA EXCEPT AS SPECIFIED OR INDICATED. THIS WORK IS INCIDENTAL TO CONCRETE DECK EXCEPT AS SPECIFIED OR INDICATED.
- GRIND ALL STEEL EDGES EXPOSED TO TRAFFIC OR PEDESTRIANS TO $\frac{3}{16}$ " MIN. RADIUS.
- EDGE OF DECK SURFACES SHOWN ARE OBTAINED WITH USE OF REMOVABLE WOOD FORMS. WHEN PERMANENT METAL FORMS ARE USED, PLACE FORM ON TOP OF STEEL END DIAPHRAGMS AND BEHIND EXPANSION DAM EXTRUSIONS WHICH WILL RESULT IN A RECESSED FRONT FACE BELOW EXTRUSIONS.

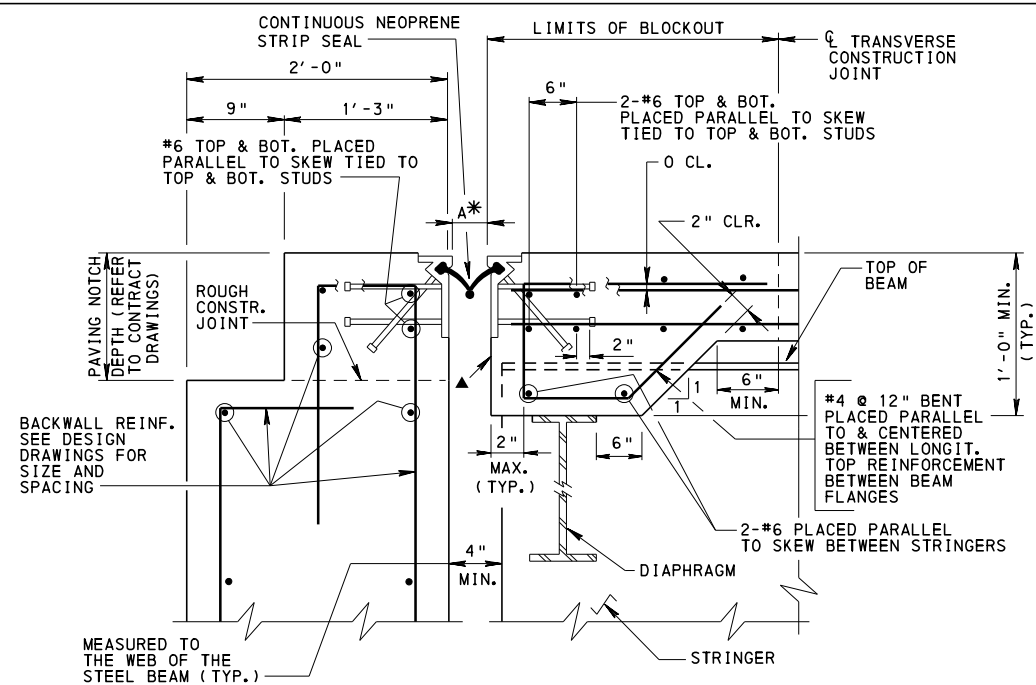
- CHANGE 2
- CHANGE 3
- CHANGE 4

BC-732M	STANDARD PERMANENT METAL DECK FORMS
BC-734M	ANCHOR SYSTEMS
BC-735M	WALL CONSTRUCTION & EXPANSION JOINT DETAILS
BC-751M	BRIDGE DRAINAGE
BC-788M	TYPICAL WATERPROOFING AND EXPANSION DETAILS
REFERENCE DRAWINGS	

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

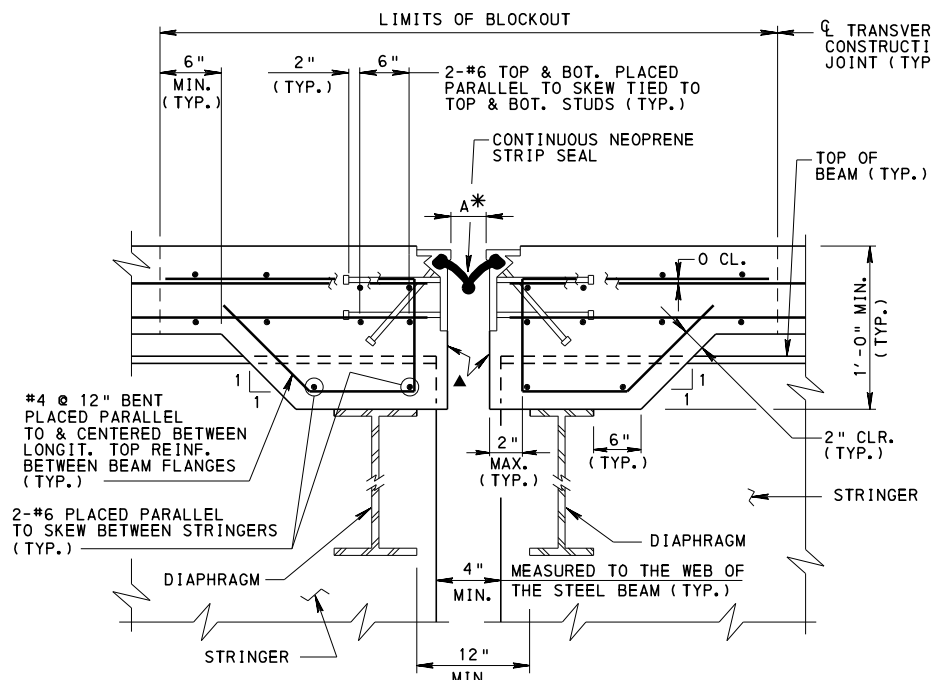
**STANDARD
NEOPRENE STRIP SEAL DAM
FOR PRESTRESSED CONCRETE
& STEEL I-BEAM BRIDGES**

RECOMMENDED NOV. 23, 2022 <i>L. W. Gray</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Gravin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 1 OF 1 BC-767M
---	--	--------------------------------

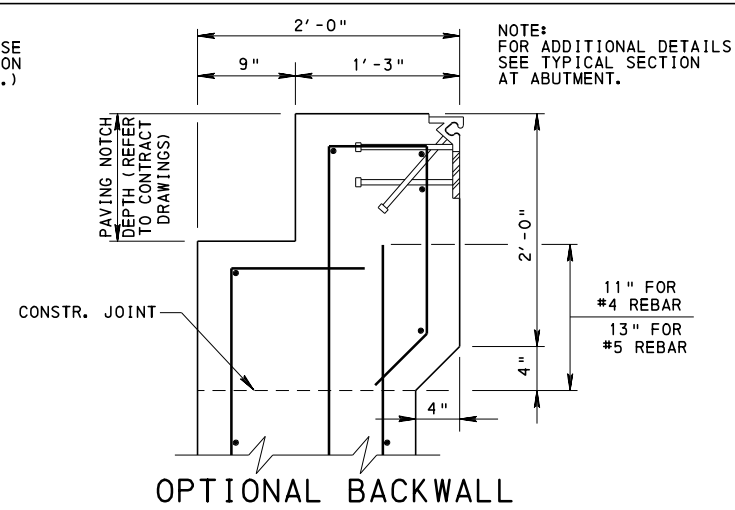


**TYPICAL SECTION AT ABUTMENT
FIXED & EXPANSION
FOR STEEL BEAMS**

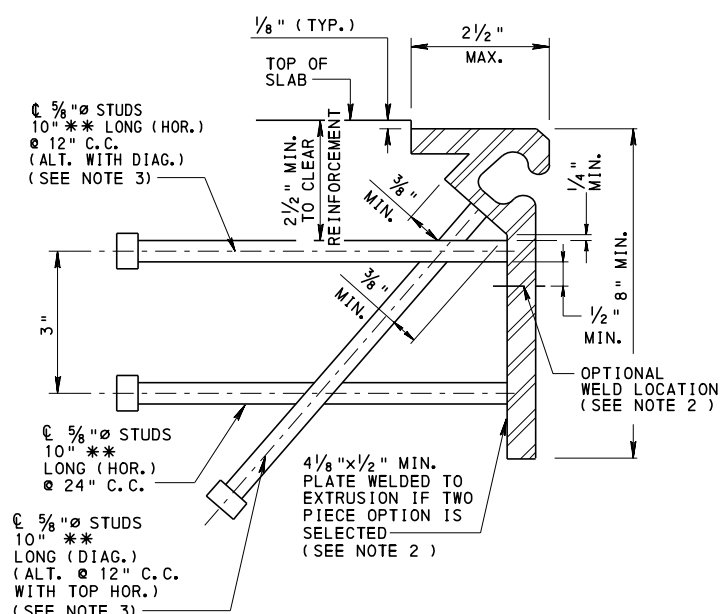
* - "A", IS INSTALLATION WIDTH AS PER DIMENSION "A" TABLE
▲ - SEE NOTE 20 ON SHEET 1



**TYPICAL SECTION AT PIER
FIXED & EXPANSION
FOR STEEL BEAMS**



OPTIONAL BACKWALL

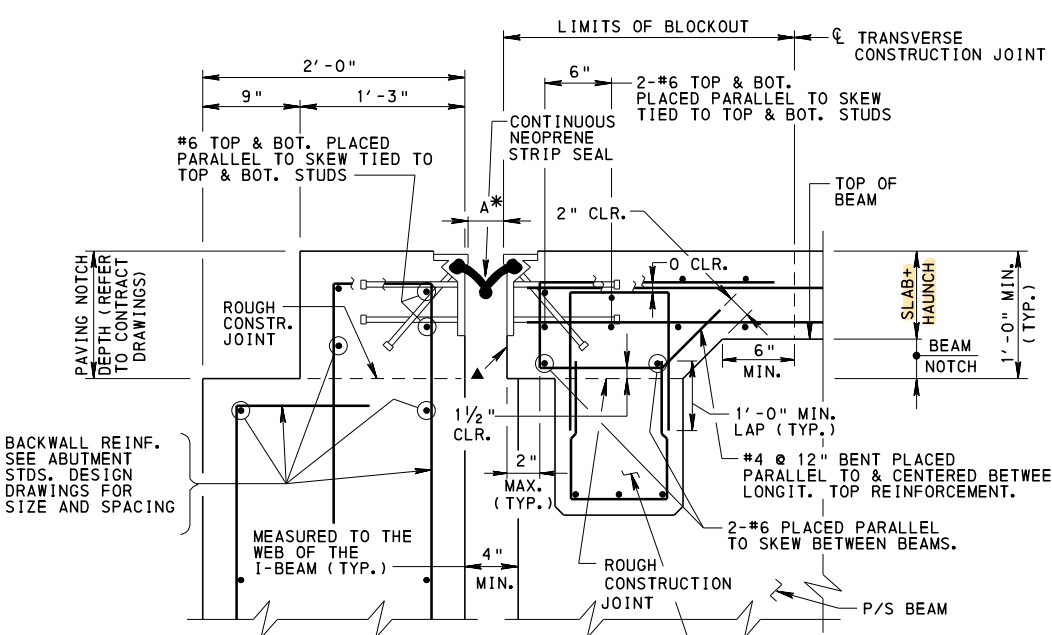


EXTRUSION SCHEMATIC

** NOTE
IF 10" STUDS CANNOT BE ACCOMMODATED IN THE SPACE AVAILABLE, REQUEST SPECIFIC LENGTH APPROVAL FROM THE DISTRICT BRIDGE ENGINEER AT THE SHOP DRAWINGS APPROVAL STAGE.

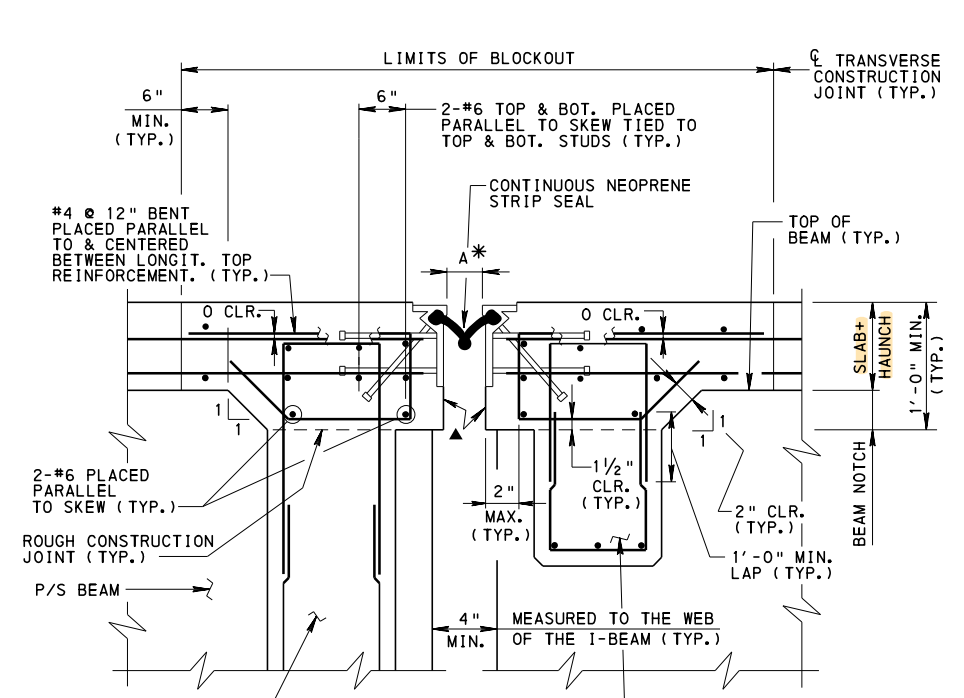
EXTRUSION NOTES:

- EXTRUSION THICKNESS 1/2".
- TWO PIECE MEMBER (EXTRUSION AND PLATE COMBINATION) IN LIEU OF ONE PIECE EXTRUSION IS PERMITTED. WELD IN ACCORDANCE WITH AASHTO/AWS SPECIFICATIONS. (FULL PENETRATION WELD AND N.D.T. REQUIRED)
- STUD SPACING IS 12" MAX. UNLESS SPECIFIED ON AN APPROVED DETAIL.



**TYPICAL SECTION AT ABUTMENT
FIXED & EXPANSION
FOR P/S SPREAD BEAMS**

NOTE: BOX BEAM SHOWN, I-BEAM SIMILAR



**TYPICAL SECTION AT PIER
FIXED & EXPANSION
FOR P/S SPREAD BEAMS**

NOTE: BOX BEAM SHOWN, I-BEAM SIMILAR.

LOCATION	TEMPERATURE (°F)														
	-10	-5	5	15	25	32	40	50	60	68	80	85	95	105	110

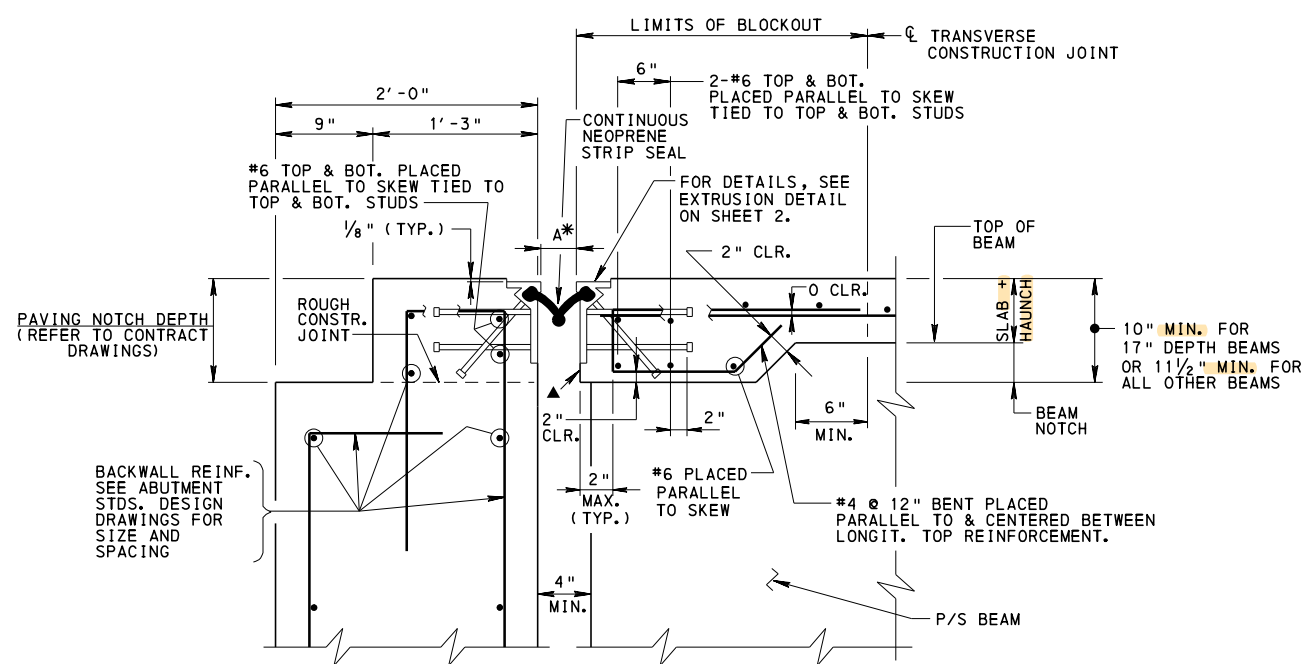
NOTE: TABLE TO BE SHOWN AND COMPLETED ON FABRICATORS SHOP DRAWINGS.
USE 2-1/2" MIN. FOR DIMENSION "A"

NOTE:
FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.

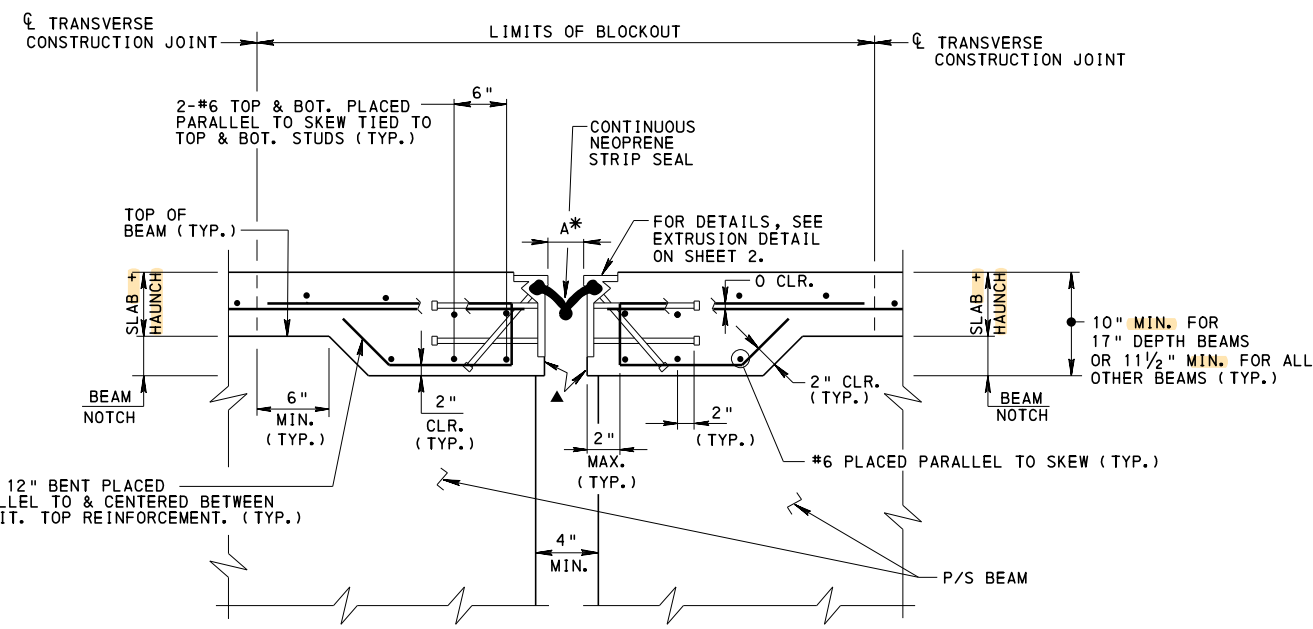
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

**STANDARD
NEOPRENE STRIP SEAL DAM
FOR PRESTRESSED CONCRETE
& STEEL I-BEAM BRIDGES**

RECOMMENDED NOV. 23, 2022 <i>L. L. W. G.</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Gavin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 2 OF 7 BC-767M
--	---	-------------------------

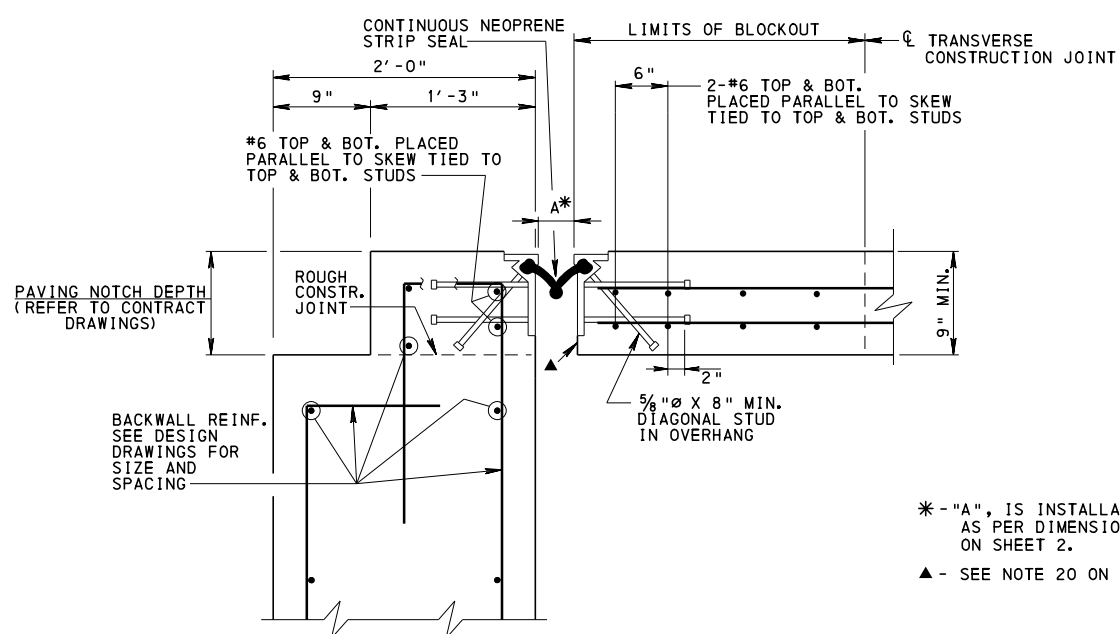


**TYPICAL SECTION AT ABUTMENT
FIXED & EXPANSION
FOR P/S ADJACENT BEAMS**



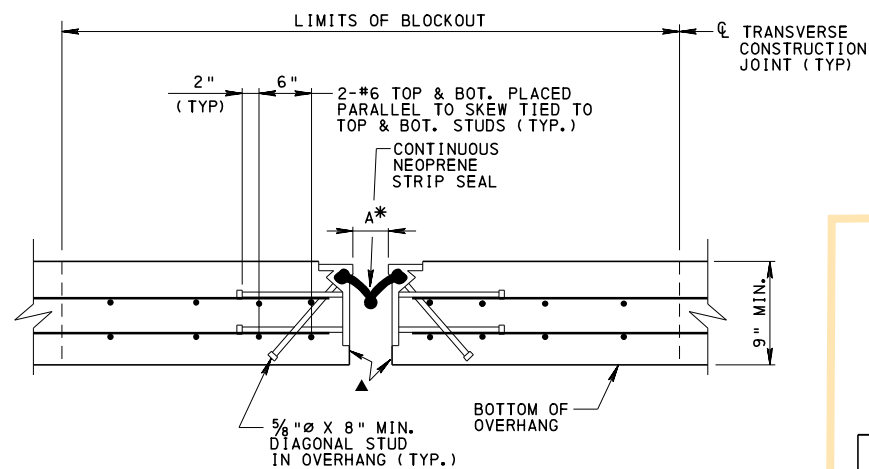
**TYPICAL SECTION AT PIER
FIXED & EXPANSION
FOR P/S ADJACENT BEAMS**

* - "A", IS INSTALLATION WIDTH AS PER DIMENSION "A" TABLE ON SHEET 2.
▲ - SEE NOTE 20 ON SHEET 1



**OVERHANG SECTION AT ABUTMENT
FIXED & EXPANSION
TYPICAL SECTION THROUGH DECK OVERHANG**

* - "A", IS INSTALLATION WIDTH AS PER DIMENSION "A" TABLE ON SHEET 2.
▲ - SEE NOTE 20 ON SHEET 1

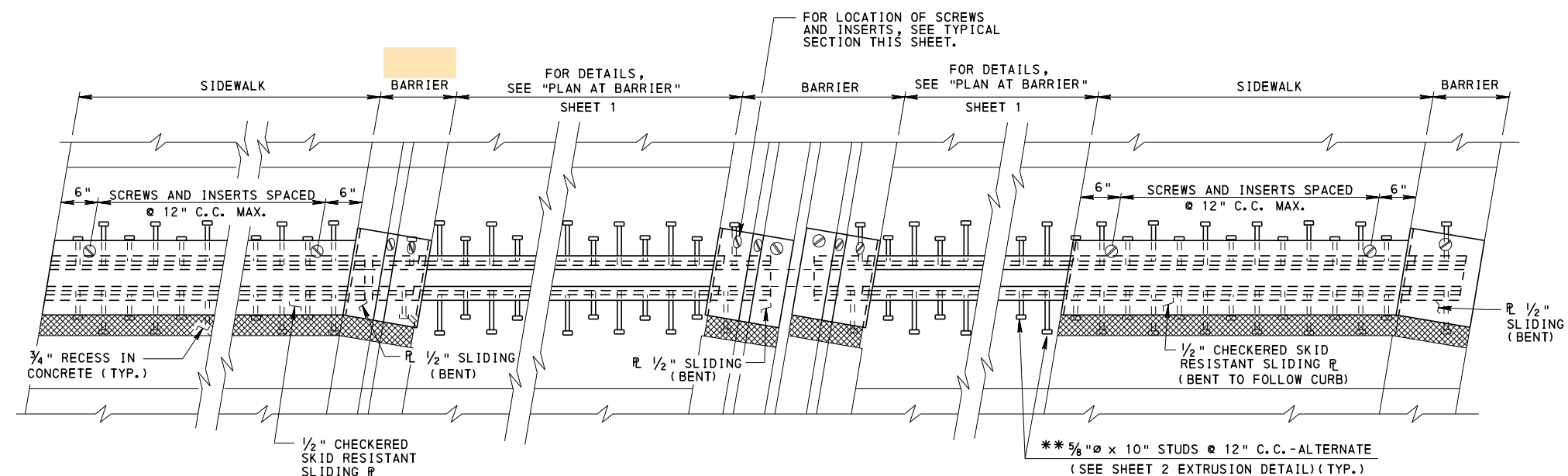


**OVERHANG SECTION AT PIER
FIXED & EXPANSION
TYPICAL SECTION THROUGH DECK OVERHANG**

NOTE:
FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

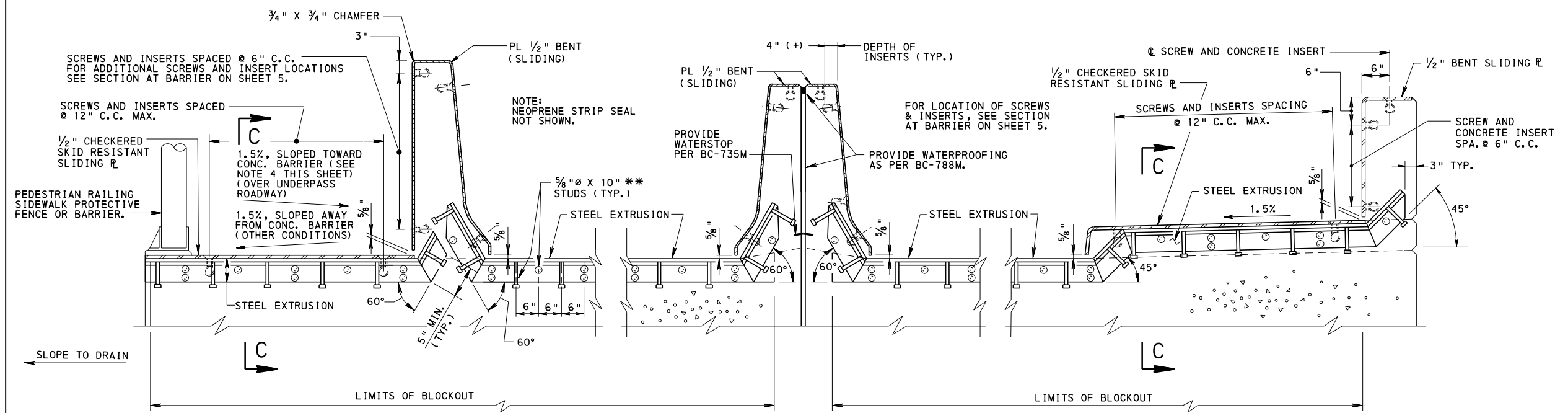
**STANDARD
NEOPRENE STRIP SEAL DAM
FOR PRESTRESSED CONCRETE
& STEEL I-BEAM BRIDGES**



PLAN AT TYPICAL SIDEWALK

PLAN AT SPLIT MEDIAN BARRIER

PLAN AT ALTERNATE SIDEWALK



SECTION AT TYPICAL SIDEWALK

SECTION AT SPLIT MEDIAN BARRIER

SECTION AT ALTERNATE SIDEWALK

NOTE: SECTION IS SIMILAR FOR RAISED SIDEWALK.

NOTE: FOR MEDIAN BARRIER NOT SPLIT, USE ONE PIECE 1/2" BENT SLIDING PLATE. STEEL EXTRUSION IS SHOWN FOR 90° SKEW. DETAIL STEEL EXTRUSION AS REQUIRED FOR SKEWS LESS THAN 90°.

** NOTE: IF 10" STUDS CANNOT BE ACCOMMODATED IN THE SPACE AVAILABLE, REQUEST SPECIFIC LENGTH APPROVAL FROM THE DISTRICT BRIDGE ENGINEER AT THE SHOP DRAWINGS APPROVAL STAGE.

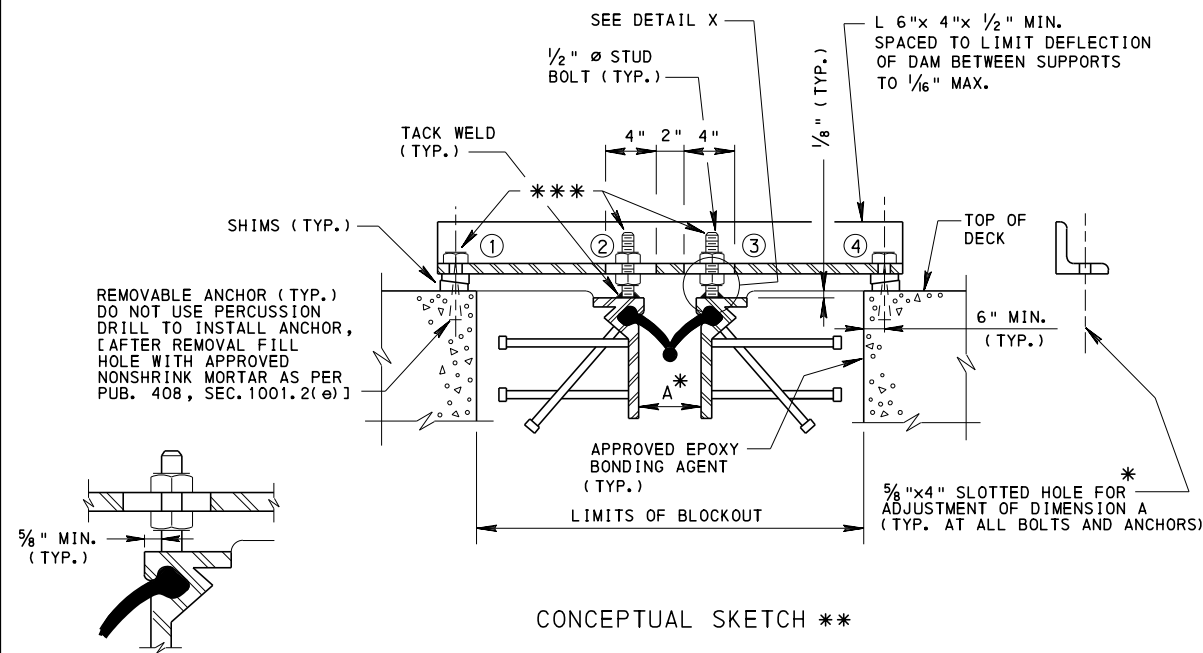
NOTES:

1. MAXIMUM DISTANCE FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3".
2. FOR STEEL EXTRUSION DETAIL, SEE SHEET 2.
3. FOR SECTION C-C, SEE SHEET 5.
4. DRAIN RUNOFF WITH CURB DRAINS THROUGH CONCRETE BARRIER OR WITH TYPE 2 SCUPPERS IN SIDEWALK SLAB. WHERE CURB DRAINS ARE USED, SET SIDEWALK ELEVATION AT REAR FACE OF BARRIER 1" ABOVE GUTTERLINE ELEVATION. BEVEL DRAINS AS PER BC-751M.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BRIDGE OFFICE

STANDARD
NEOPRENE STRIP SEAL DAM
FOR PRESTRESSED CONCRETE
& STEEL I-BEAM BRIDGES

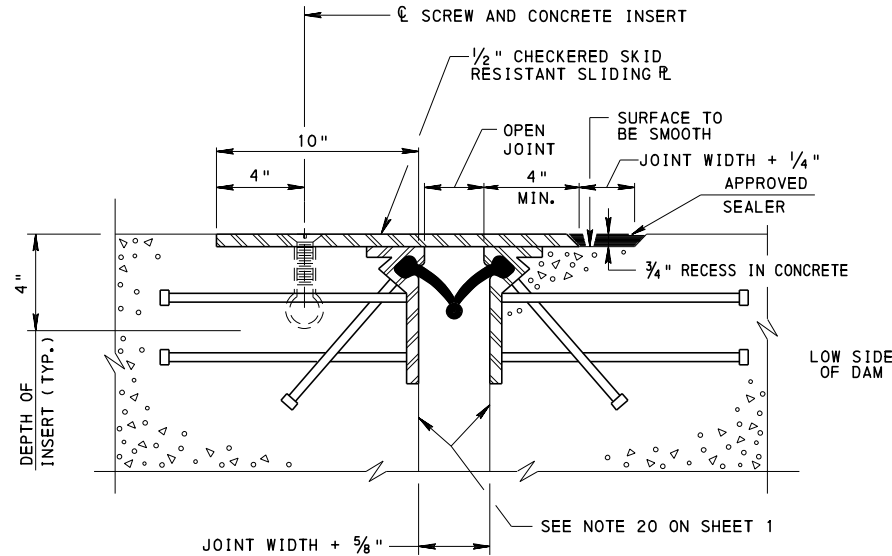
RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 4 OF 7 BC-767M
--	---	--------------------------------



DETAIL X

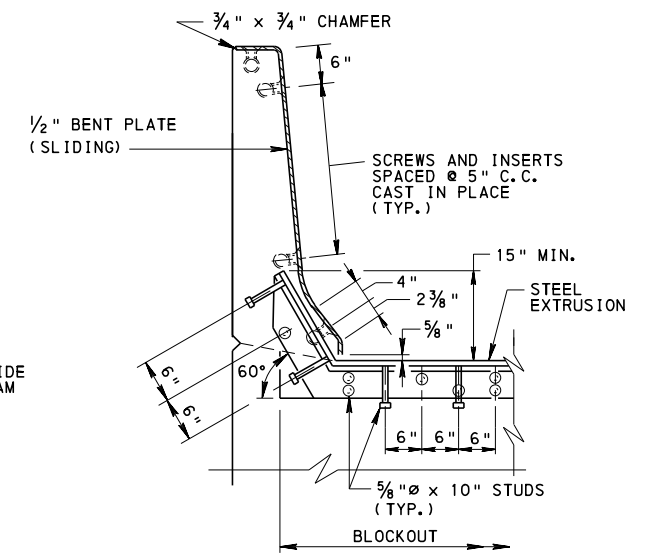
JOINT INSTALLATION SCHEME

(SEE NOTES BELOW)



SECTION C-C

FOR LOCATION OF SECTION C-C SEE SHEET 4.



SECTION AT BARRIER

NOTE:
SPACING OF THE SCREWS IS THE SAME FOR ALL F-SHAPE BARRIERS. STEEL EXTRUSION IS SHOWN FOR 90° SKEW. DETAIL STEEL EXTRUSION AS REQUIRED FOR SKEWS LESS THAN 90°.

JOINT INSTALLATION NOTES:

- * TO BE ADJUSTED FOR INSTALLATION TEMPERATURE FOR SPECIFIC MOVEMENT CLASSIFICATION.
- ** CONTRACTOR MAY USE ALTERNATE SCHEMES ONLY WITH THE APPROVAL OF THE DISTRICT BRIDGE ENGINEER OR DISTRICT STRUCTURE CONTROL ENGINEER.
- *** DURING ASSEMBLY INSTALLATION TIGHTEN BOLT ① AND BOTH NUTS ON STUD BOLTS ② AND ③ MAKING SURE DIMENSION A* REFLECTS THE INSTALLATION TEMPERATURE.
- DO NOT TIGHTEN BOLT ④
- IMMEDIATELY AFTER BLOCKOUT IS CAST, LOOSEN BOTTOM NUT ON STUD BOLT ③ TO PERMIT TEMPERATURE MOVEMENT IN THE ASSEMBLY ON ONE SIDE OF JOINT.
- PROVIDE LOW FRICTION INTERFACE BETWEEN BOLT HEADS AND ANGLE AND TOP NUTS ON STUD BOLTS AND ANGLE.
- ALTERNATE THIS PATTERN BETWEEN NEAR SIDE AND FAR SIDE OF JOINT ON SUCCESSIVE ASSEMBLIES, I.E. TIGHTEN BOLT ④ AND BOTH NUTS ON STUD BOLTS ② AND ③ AFTER A* IS SET FOR INSTALLATION TEMPERATURE. DO NOT TIGHTEN BOLT ①. LOOSEN BOTTOM NUT ON STUD BOLT ② IMMEDIATELY AFTER BLOCKOUT IS CAST.

1. THE SURFACE OF THE BLOCKOUT MUST BE COMPLETELY CLEAN WHEN THE JOINT IS INSTALLED.
2. THE EXPANSION JOINT DEVICE MUST BE SUSPENDED IN THE BLOCKOUT TO THE PROPER LINE AND GRADE, WITH THE DISTANCE BETWEEN EXTRUSIONS SET WITH RESPECT TO THE TEMPERATURE AS SHOWN ON THE PLANS.
3. AFTER THE CONCRETE OF THE BLOCKOUT ACHIEVES PRESCRIBED STRENGTH IN ACCORDANCE WITH PUBLICATION 408 SECTION 1001.3 (q) 1, REMOVE THE TEMPORARY SUPPORT ASSEMBLY AND GRIND OFF TACK WELD UNTIL SMOOTH.
4. APPLY TOUCH-UP PAINT.

STRIP SEAL INSTALLATION NOTES

1. THE FRAME RAILS SHALL BE CLEANED THOROUGHLY AND SEAL CHANNELS SHALL BE INSPECTED TO ASCERTAIN THE ABSENCE OF CONCRETE AND DEBRIS. THE SEAL CHANNEL SHALL ALSO BE INSPECTED AT ALL FIELD SPLICES, AND ALL WELD SPLATTER AND/OR SHARP EDGES SHALL BE REMOVED.
2. LIBERALLY COAT THE STRIP SEAL LUGS WITH LUBRICANT ADHESIVE. COAT ONLY 3'-0" TO 4'-0" PRECEDING THE INSTALLATION.
3. COLLAPSE THE STRIP SEAL INTO THE THE JOINT OPENING UNTIL THE LUG IS ALIGNED WITH THE FRAME RAIL CHANNEL. (SEE FIGURE 1)
4. PUSH THE LUG INTO THE CHANNEL AND THEN USE A BENT BAR TO FORCE THE LUG INTO THE CHANNEL (MAKE SURE THAT THE BAR IS DULL TO PREVENT PUNCTURING OF THE SEAL) (SEE FIGURE 2)
5. AFTER THE SEAL LOCKS INTO PLACE, PUSH THE TOP OF THE LUG AGAINST THE FRAME RAIL TO INSURE PROPER SEATING. (SEE FIGURE 3)
6. AS THE WORK PROGRESSES DOWN THE LENGTH OF THE JOINT, WORK BOTH SIDES OF THE STRIP SEAL INTO THE RAIL CHANNEL.

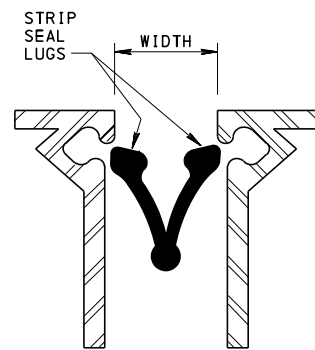


FIGURE 1

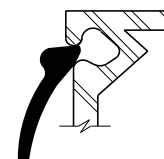


FIGURE 2

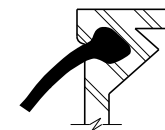
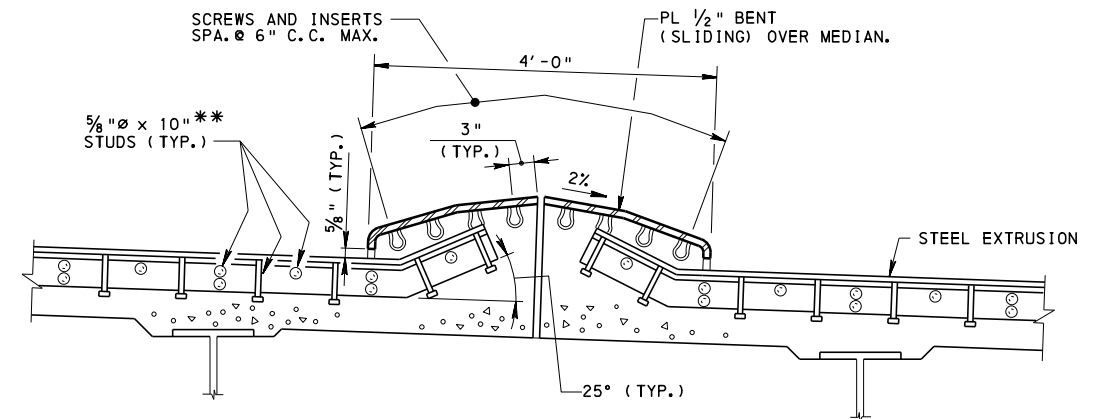


FIGURE 3

STRIP SEAL INSTALLATION PROCEDURE



SECTION AT SPLIT CONCRETE MOUNTABLE DIVISOR

NOTE: FOR CONCRETE DIVISOR NOT SPLIT, USE ONE PIECE 1/2" BENT SLIDING PLATE.

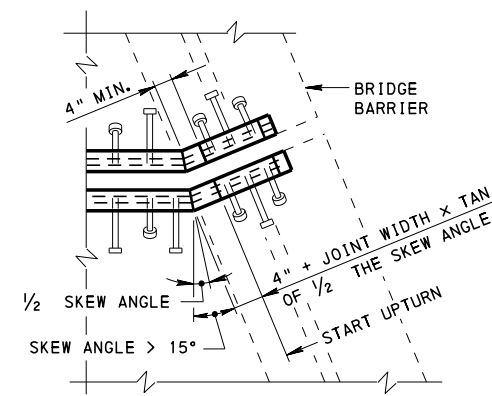
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
NEOPRENE STRIP SEAL DAM
FOR PRESTRESSED CONCRETE
& STEEL I-BEAM BRIDGES

RECOMMENDED NOV. 23, 2022
L. W. Gray
CHIEF BRIDGE ENGINEER

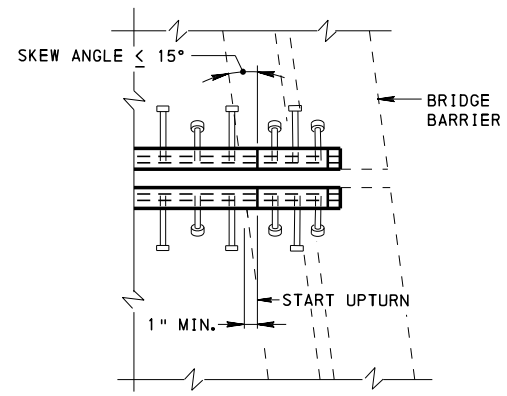
RECOMMENDED NOV. 23, 2022
Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 5 OF 7
BC-767M



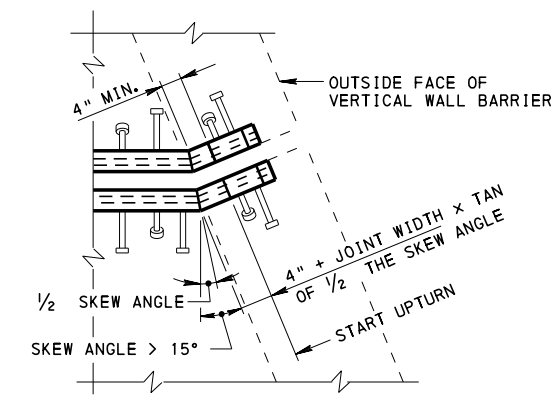
PLAN

SHOWN WITHOUT BENT SLIDING PLATE FOR CLARITY



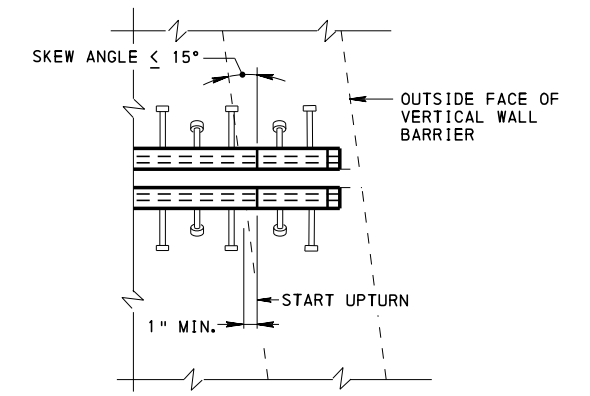
PLAN

SHOWN WITHOUT BENT SLIDING PLATE FOR CLARITY



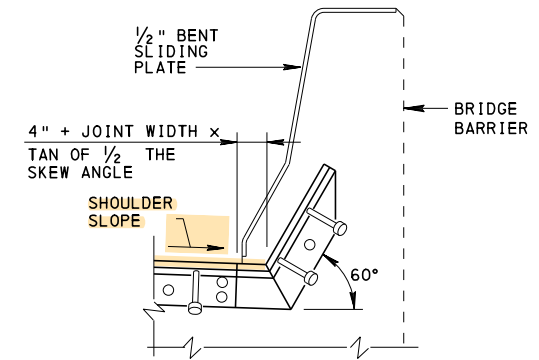
PLAN

SHOWN WITHOUT BENT SLIDING PLATE FOR CLARITY



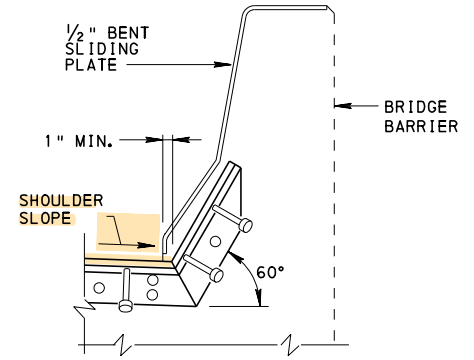
PLAN

SHOWN WITHOUT BENT SLIDING PLATE FOR CLARITY



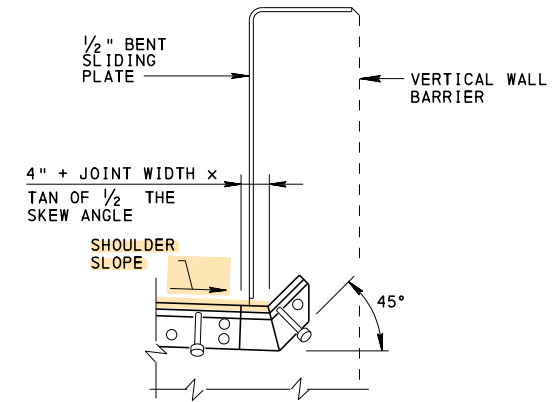
SECTION

EXPANSION DAM JOINT
MITERED AT BARRIER FACE
SKEW ANGLES > 15° PERPENDICULAR



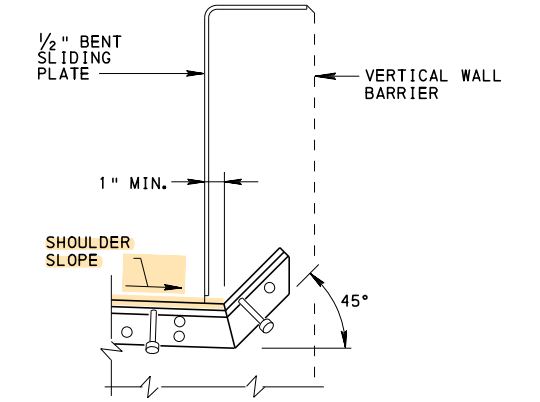
SECTION

EXPANSION DAM JOINT
MITERED AT BARRIER FACE
SKEW ANGLES <= 15° PERPENDICULAR



SECTION

EXPANSION DAM JOINT MITERED
AT VERTICAL WALL BARRIER FACE
SKEW ANGLES > 15° PERPENDICULAR



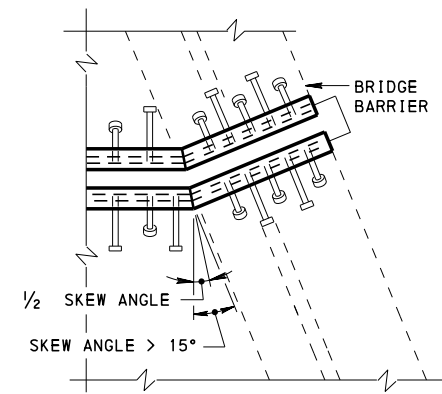
SECTION

EXPANSION DAM JOINT MITERED
AT VERTICAL WALL BARRIER FACE
SKEW ANGLES <= 15° PERPENDICULAR

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

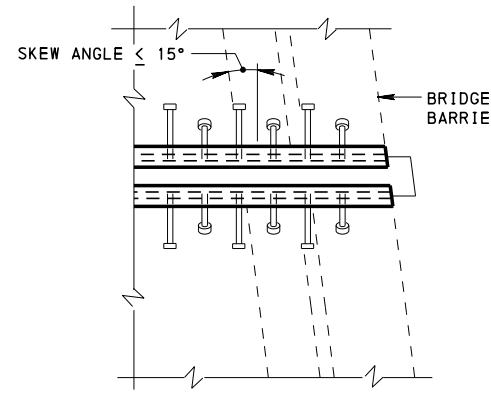
STANDARD
NEOPRENE STRIP SEAL DAM
MISCELLANEOUS DETAILS
FOR PRESTRESSED CONCRETE
& STEEL I-BEAM BRIDGES

RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 6 OF 7 BC-767M
--	---	--------------------------------



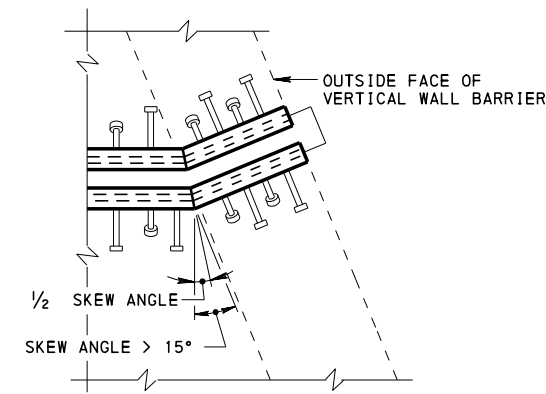
PLAN

SHOWN WITHOUT BENT SLIDING PLATE FOR CLARITY



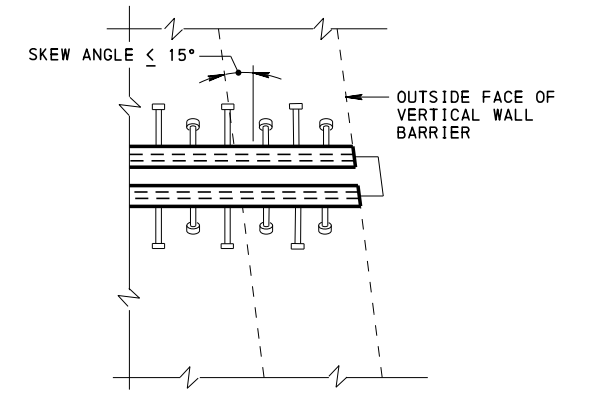
PLAN

SHOWN WITHOUT BENT SLIDING PLATE FOR CLARITY



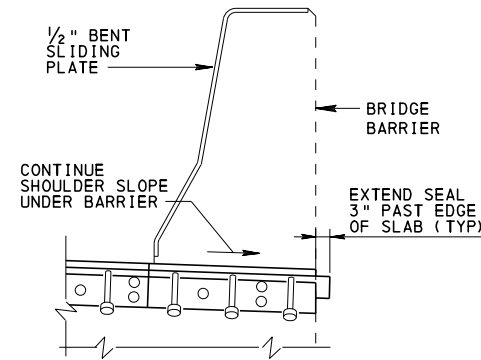
PLAN

SHOWN WITHOUT BENT SLIDING PLATE FOR CLARITY



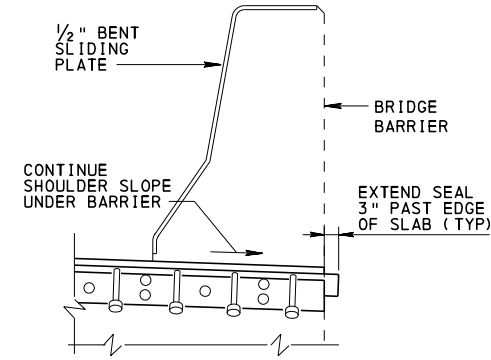
PLAN

SHOWN WITHOUT BENT SLIDING PLATE FOR CLARITY



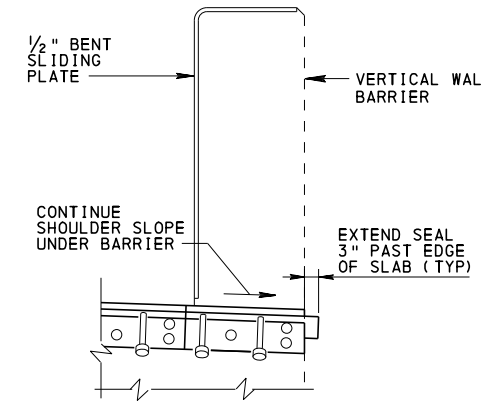
SECTION

**EXPANSION DAM JOINT
MITERED AT BARRIER FACE
SKEW ANGLES > 15° PERPENDICULAR**



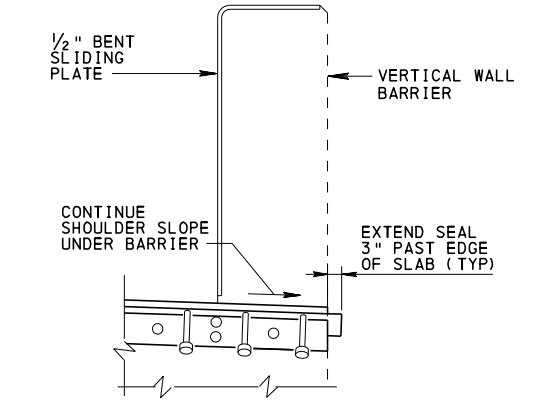
SECTION

**EXPANSION DAM JOINT
WITHOUT MITER UNDER BARRIER
SKEW ANGLES <= 15° PERPENDICULAR**



SECTION

**EXPANSION DAM JOINT MITERED
AT VERTICAL WALL BARRIER FACE
SKEW ANGLES > 15° PERPENDICULAR**



SECTION

**EXPANSION DAM JOINT WITHOUT
MITER UNDER VERTICAL WALL BARRIER
SKEW ANGLES <= 15° PERPENDICULAR**

NOTE:

ALTERNATE DETAILS MAY ONLY BE USED IF SHOWN ON THE CONTRACT PLANS.

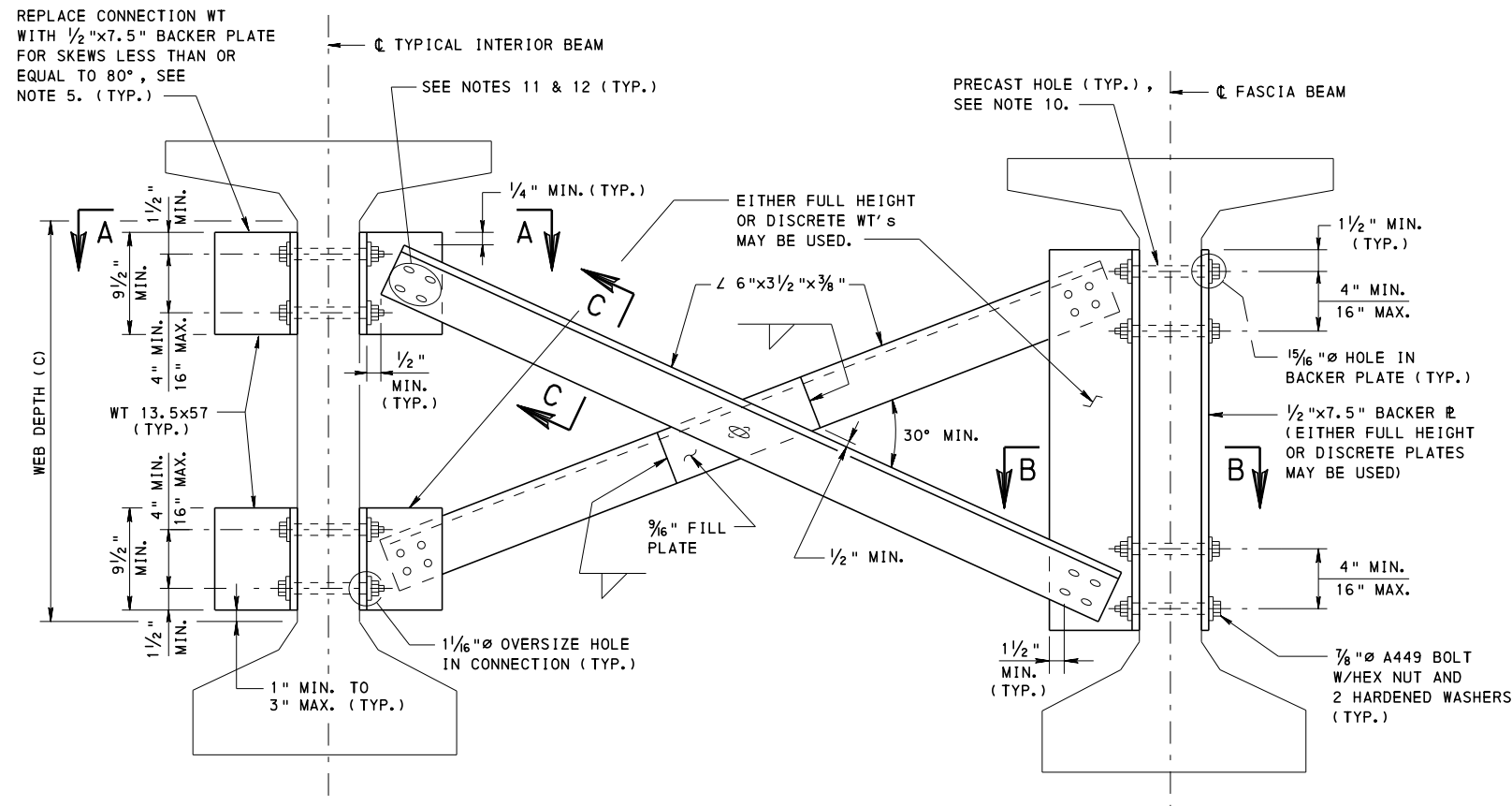
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

**STANDARD
ALTERNATE NEOPRENE STRIP SEAL DAM
MISCELLANEOUS DETAILS
FOR PRESTRESSED CONCRETE
& STEEL I-BEAM BRIDGES**

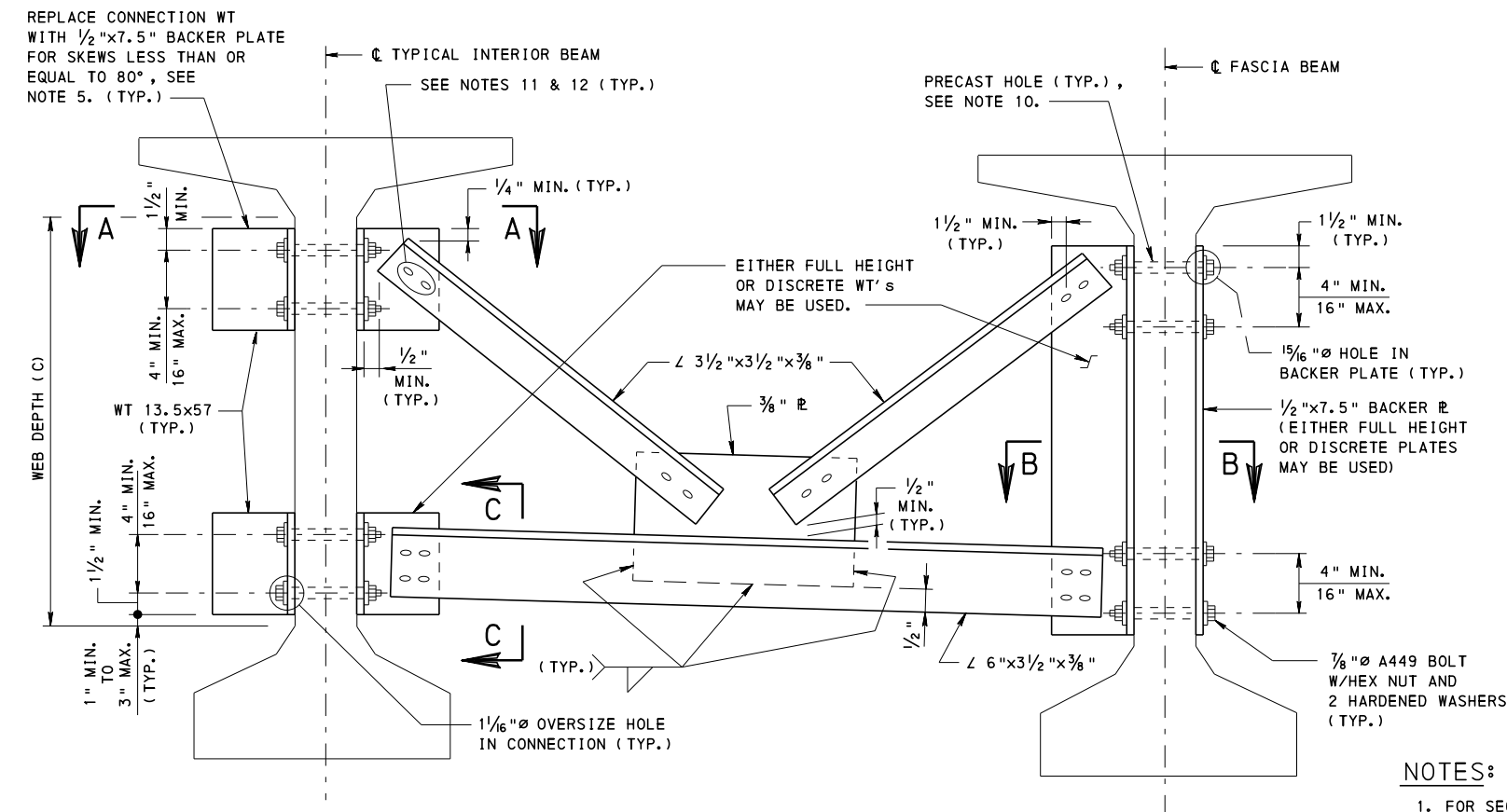
RECOMMENDED NOV. 23, 2022
L. W. [Signature]
CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022
Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 7 OF 7
BC-767M



TYPICAL DIAPHRAGM DETAIL



ALTERNATE DIAPHRAGM DETAIL

GENERAL NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408 AND AASHTO/AWS D1.5 SPECIFICATIONS. ALL STRUCTURAL STEEL INCLUDING BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AS PER PUB. 408, SECTION 1105.02(S).
2. FABRICATED STRUCTURAL STEEL SHALL CONFORM TO AASHTO M270, GRADE 50 (ASTM A709, GRADE 50) UNLESS OTHERWISE NOTED.
3. ALL FASTENERS ARE 7/8" DIAMETER ASTM F3125 GRADE A325 BOLTS, EXCEPT AS NOTED.
4. MEMBERS, WELDS AND PLATE SIZES SHOWN ARE VALID FOR STRAIGHT GIRDERS WITH SPAN LENGTH OF 160'-0" OR LESS, GIRDER SPACING BETWEEN 6'-0" AND 10'-9" AND FOR SKEW ANGLES BETWEEN 45° AND 90°. PROVIDE SPECIAL DESIGNS FOR ALL THE DIAPHRAGM MEMBERS AND CONNECTIONS WHEN THE GIRDER SPACING EXCEEDS 10'-9" AND/OR THE SKEW ANGLE IS LESS THAN 45°.
5. PROVIDE DIAPHRAGMS NORMAL TO THE MAIN MEMBERS FOR ALL SKEWS. FOR SKEWS LESS THAN OR EQUAL TO 80°, STAGGER DIAPHRAGMS AND USE BACKER PLATES ON INTERIOR BEAM CONNECTIONS.
6. DIAPHRAGMS SHALL BE SLOPED ACCORDING TO THE ELEVATION OF THE BEAMS. DIAPHRAGMS IN EXTERNAL BAYS FOR SPANS WITH VERTICAL CLEARANCE LESS THAN 16'-0" OVER VEHICULAR TRAFFIC MAY BE LEVEL.
7. USE THIS STANDARD IN THE PREPARATION OF SHOP DRAWINGS.
8. INCLUDE PAYMENT FOR FURNISHING AND INSTALLING STEEL MID-SPAN DIAPHRAGMS IN CONTRACT UNIT PRICE FOR PRESTRESSED CONCRETE GIRDERS.
9. ALL MID-SPAN DIAPHRAGMS TO BE OF SAME MATERIAL TYPE; MIXING OF STEEL AND CONCRETE MID-SPAN DIAPHRAGMS IS NOT PERMITTED.
10. THE HOLES FOR THE 7/8" DIAMETER ASTM A449 BOLTS SHALL BE CAST INTO THE BEAM WEB USING 1/4" I.D. P.V.C. TUBING OR GALVANIZED STEEL SLEEVES (CHROMATED) AND AVOID PRESTRESSING STRANDS AND OTHER REINFORCEMENT. DRILLING IS NOT ALLOWED.
11. 1/16" DIAMETER HOLE IN CONNECTION WT'S OR DOUBLE ANGLES; 15/16" x 2 3/16" LONG SLOTTED HOLE IN DIAPHRAGM MEMBER, FOR 7/8" DIAMETER ASTM F3125 GRADE A325 BOLTS.
12. ALL SLOTTED HOLES TO BE COVERED BY A 5/16" PLATE WASHER WITH STANDARD HOLES. THE PLATE WASHER SHALL PROVIDE A MINIMUM 2/4" EDGE DISTANCE IN THE DIRECTION OF THE SLOTS AND 1" EDGE DISTANCE IN THE DIRECTION PERPENDICULAR TO THE SLOTS.
13. THE 7/8" DIAMETER ASTM F3125 GRADE A325 BOLTS SHALL HAVE AN UNTHREADED SHANK OF SUFFICIENT LENGTH TO NOT ALLOW ANY THREADS TO EXIST IN THE PLANE BETWEEN THE TWO CONNECTED PARTS (SHEAR PLANE).
14. BOLTS IN DIAPHRAGMS LOCATED DIRECTLY UNDER LONGITUDINAL CONSTRUCTION JOINTS SHOULD NOT BE TIGHTENED UNTIL BOTH STAGES OF BRIDGE DECK HAVE BEEN PLACED. OTHERWISE, TIGHTEN ALL BOLTS PRIOR TO PLACING BRIDGE DECK CONCRETE.
15. FILLET WELD SIZES ARE GOVERNED BY MATERIAL THICKNESS IN ACCORDANCE WITH AASHTO/AWS D1.5 EXCEPT AS NOTED.
16. TERMINATE WELDS 1/2" SHORT OF EDGE AT EACH END OF EACH WELD.
17. "K" = FLANGE THICKNESS + FILLET, AS INDICATED IN AISC TABLES OF BEAM DIMENSIONS.
18. PROVIDE A 6" MINIMUM BEARING HEIGHT. ALTERNATIVELY, A 4" MINIMUM BEARING HEIGHT MAY BE USED WITH 1" THICK END PLATES.

NOTES:

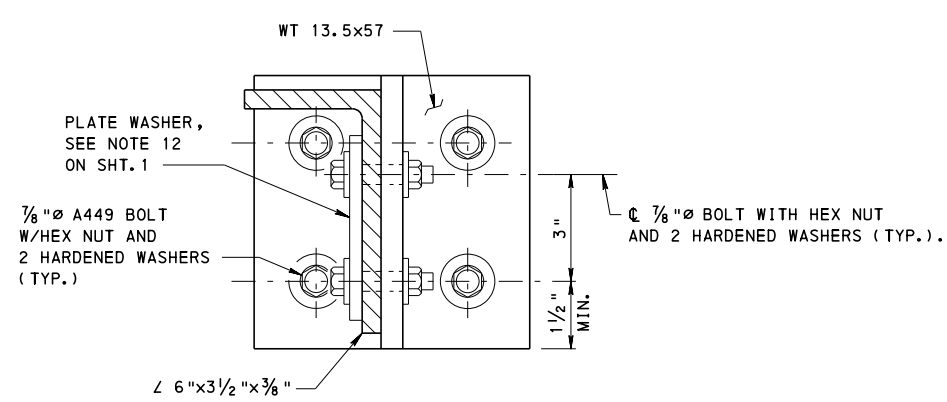
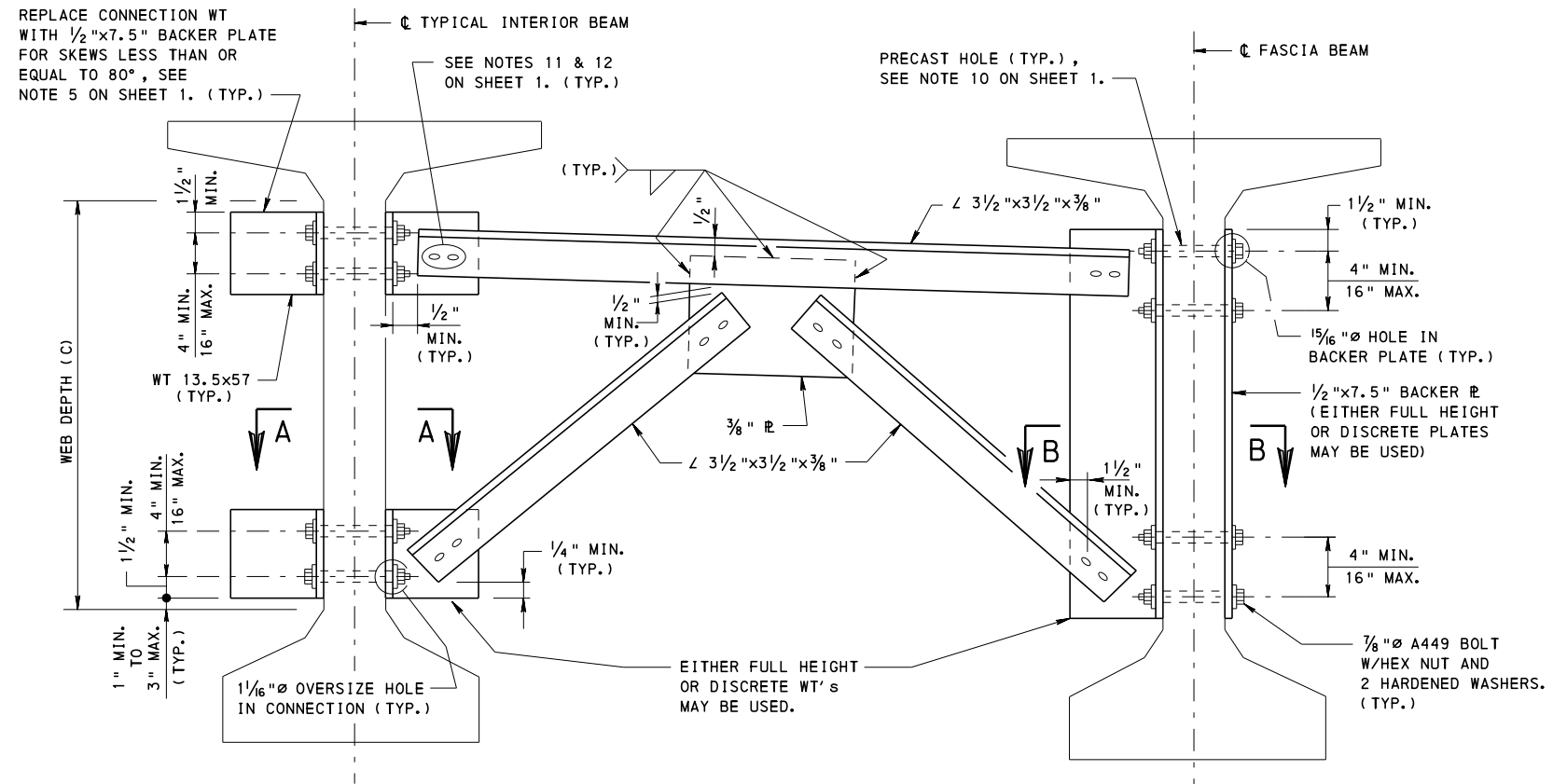
1. FOR SECTIONS A-A, B-B & C-C SEE SHEET 2.
2. USE DETAILS ON SHEET 3 FOR EXTERNAL BAYS WITH SPANS WITH VERTICAL CLEARANCE LESS THAN 16'-0" OVER VEHICULAR TRAFFIC.

CHANGE 2

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

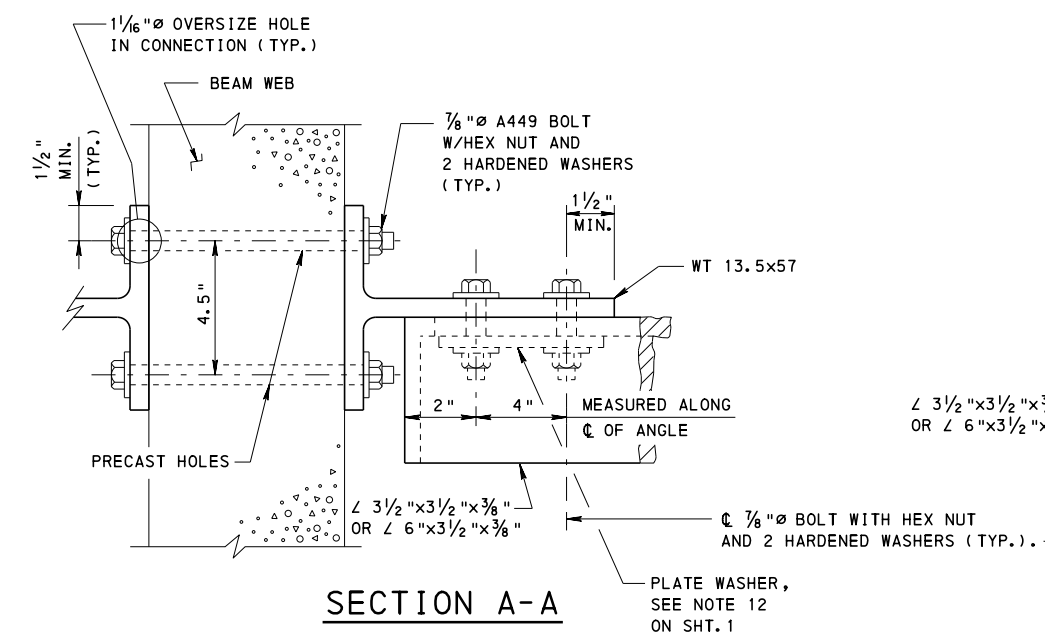
STANDARD
 STEEL MID-SPAN DIAPHRAGMS
 FOR P/S CONCRETE AASHTO I-BEAM
 AND PA BULB-TEE BEAM BRIDGES
 WEB DEPTH ≥ 40"

RECOMMENDED JAN. 31, 2019 <i>T. Ross R. Macosica</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>William J. ...</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 1 OF 4 BC-770M
--	--	--------------------------------

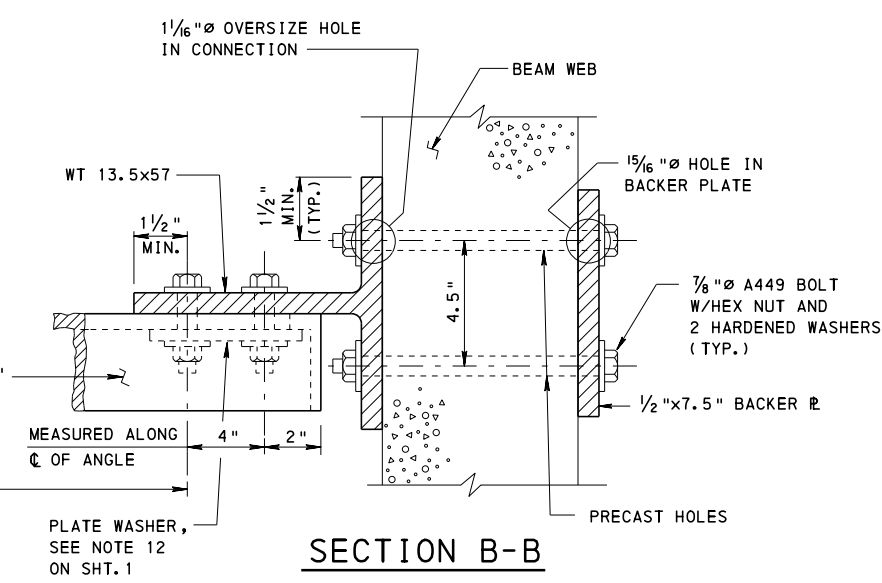


SECTION C-C
FOR SECTION C-C CUT LINES
SEE SHEET 1.

ALTERNATE DIAPHRAGM DETAIL FOR UTILITY ACCESS
THIS DETAIL MAY BE USED IN BAYS WITH UTILITIES



SECTION A-A

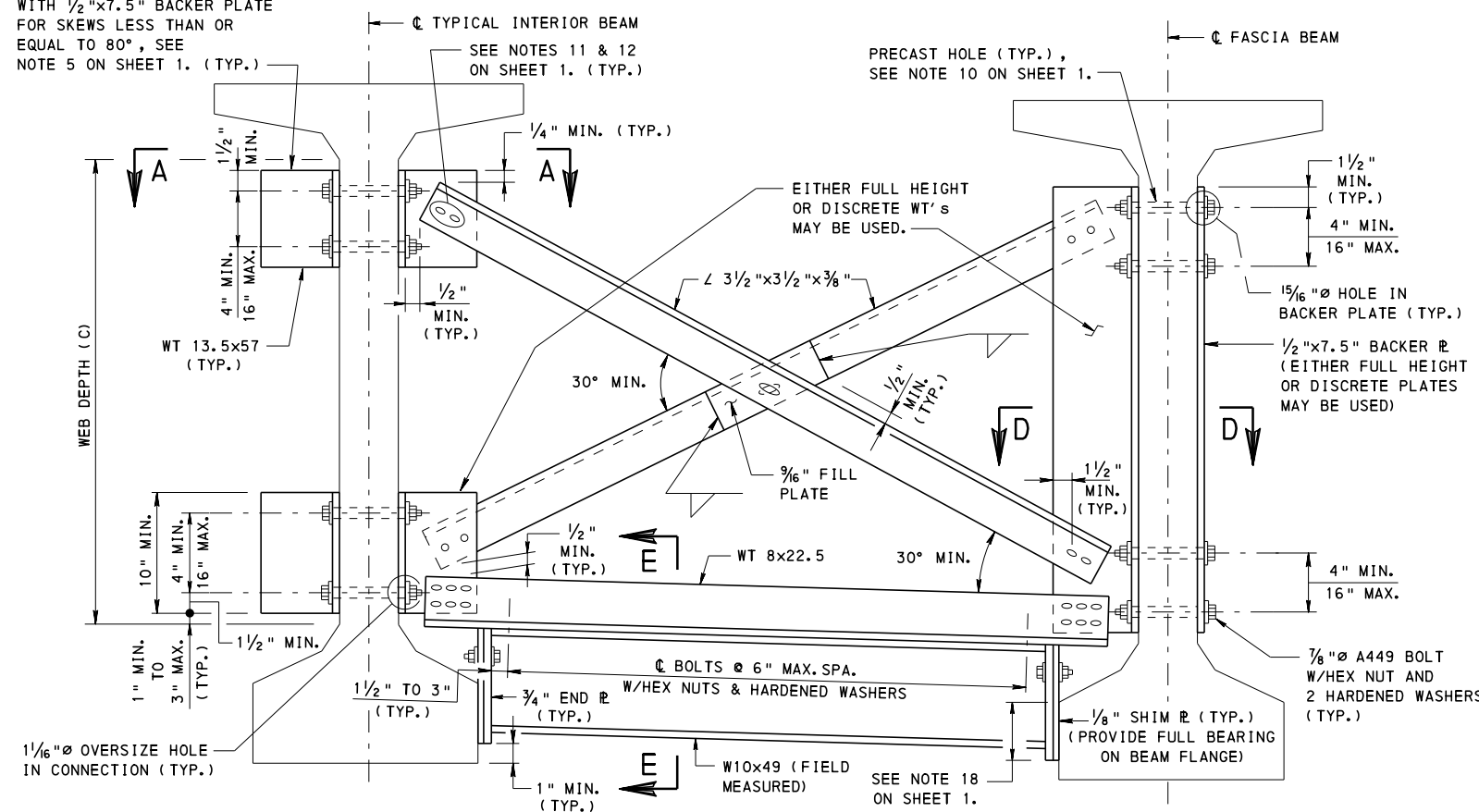


SECTION B-B

NOTE:
1. FOR GENERAL NOTES SEE SHEET 1.

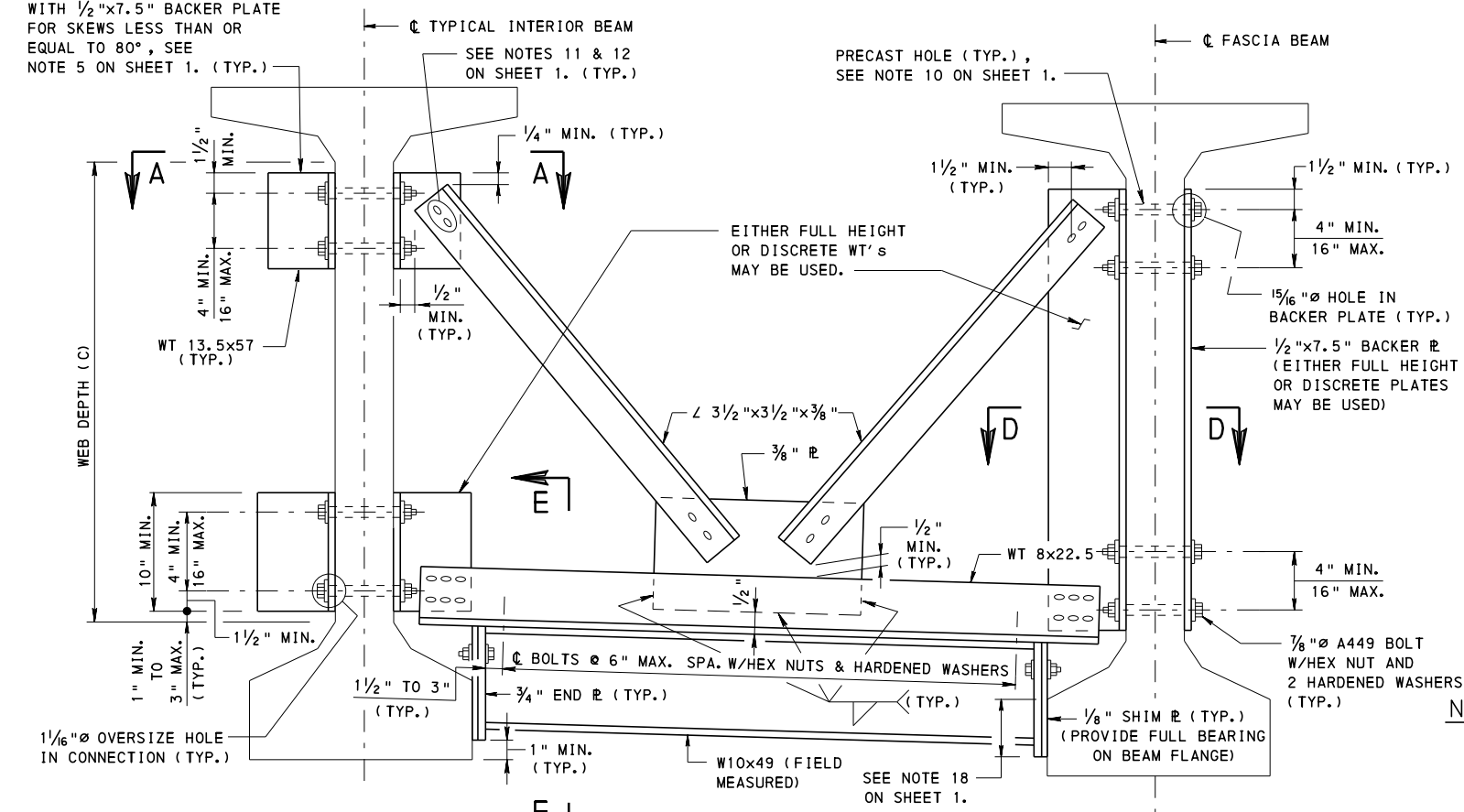
COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY		
STANDARD STEEL MID-SPAN DIAPHRAGMS FOR P/S CONCRETE AASHTO I-BEAM AND PA BULB-TEE BEAM BRIDGES WEB DEPTH ≥ 40"		
RECOMMENDED JAN. 31, 2019 <i>Ronald P. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. [Signature]</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 2 OF 4 BC-770M

REPLACE CONNECTION WT WITH 1/2"x7.5" BACKER PLATE FOR SKEWS LESS THAN OR EQUAL TO 80°, SEE NOTE 5 ON SHEET 1. (TYP.)

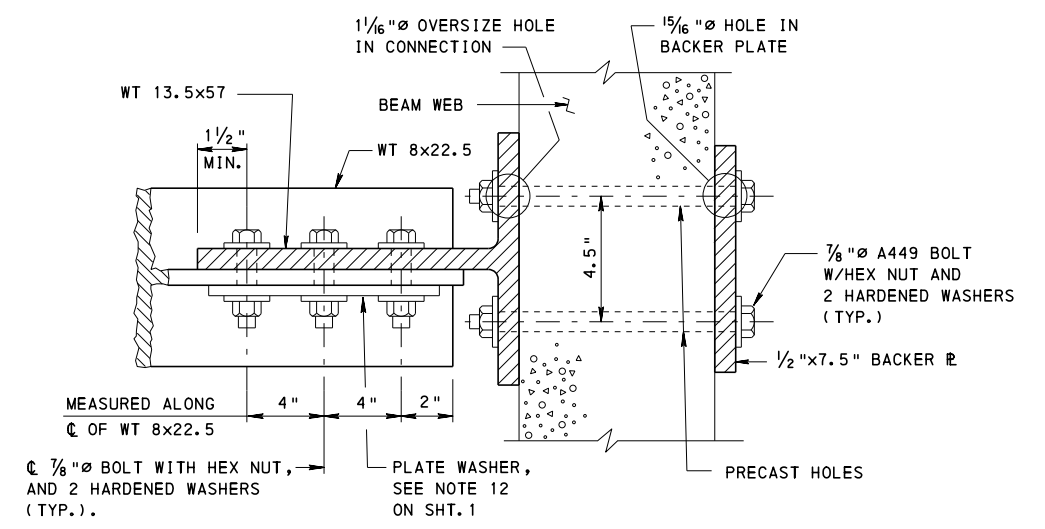


TYPICAL DIAPHRAGM DETAIL FOR EXTERIOR BAYS OVER TRAFFIC

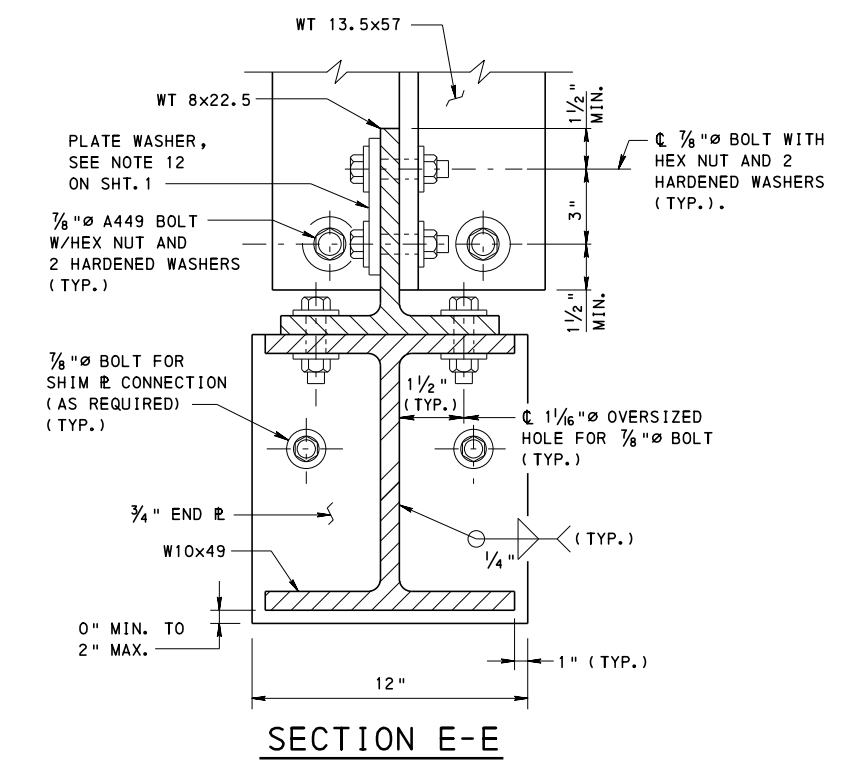
REPLACE CONNECTION WT WITH 1/2"x7.5" BACKER PLATE FOR SKEWS LESS THAN OR EQUAL TO 80°, SEE NOTE 5 ON SHEET 1. (TYP.)



ALTERNATE DIAPHRAGM DETAIL FOR EXTERIOR BAYS OVER TRAFFIC



SECTION D-D
L 3 1/2"x3 1/2"x3/8" DIAGONAL NOT SHOWN FOR CLARITY



SECTION E-E

- NOTES:**
- FOR GENERAL NOTES SEE SHEET 1.
 - FOR SECTION A-A SEE SHEET 2.

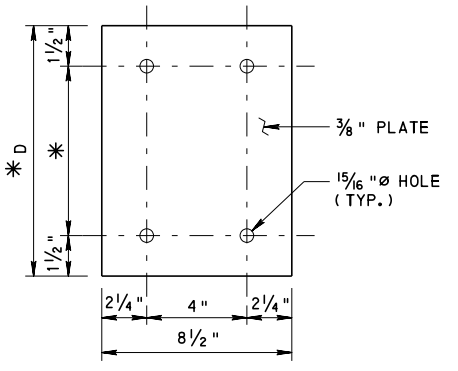
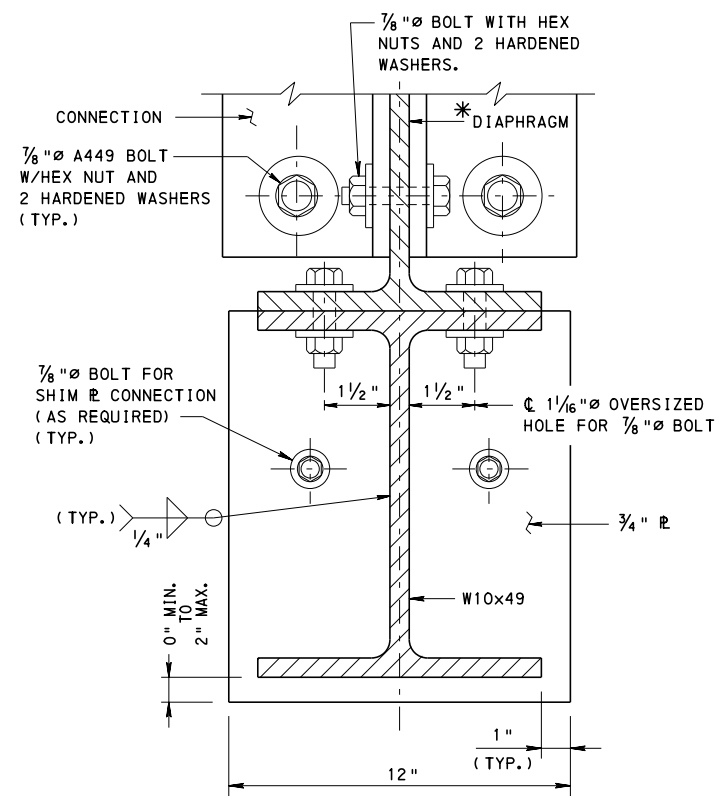
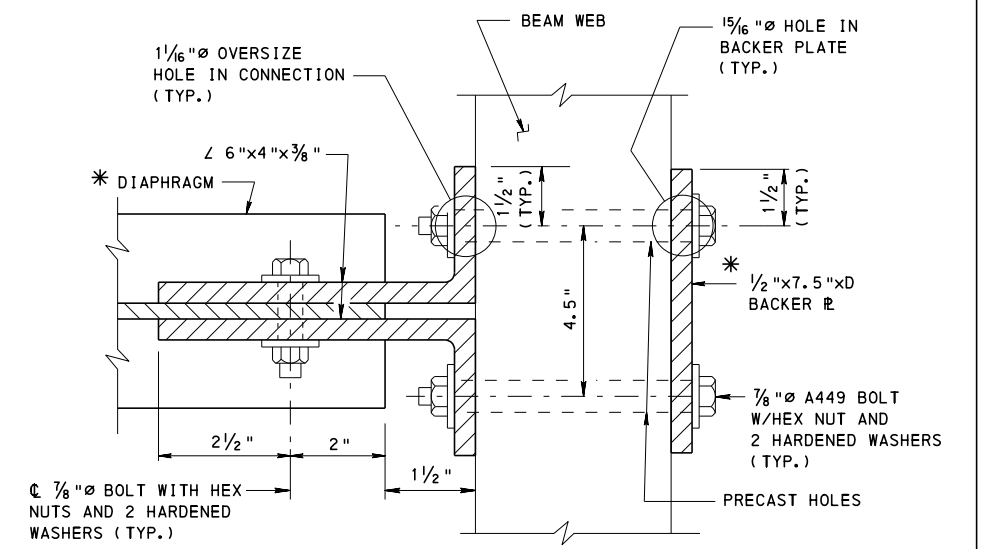
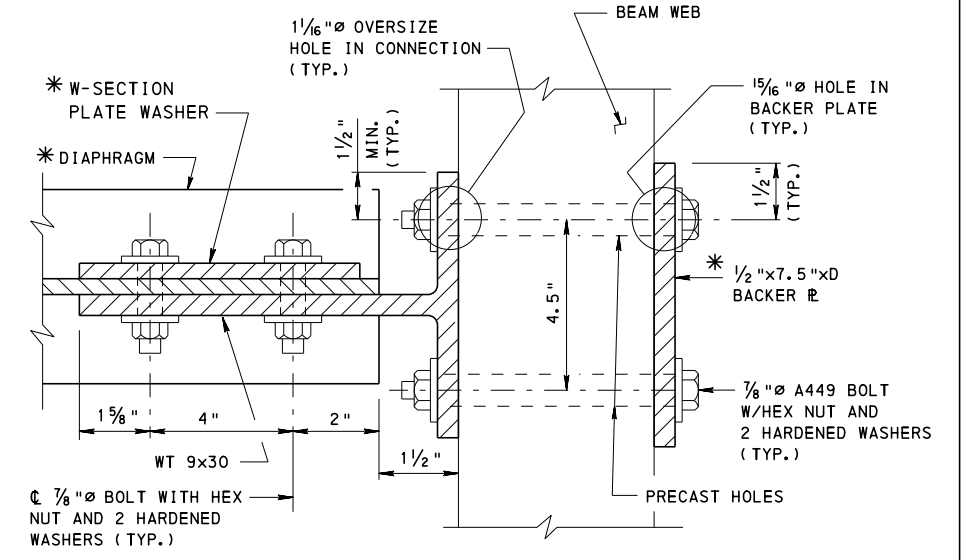
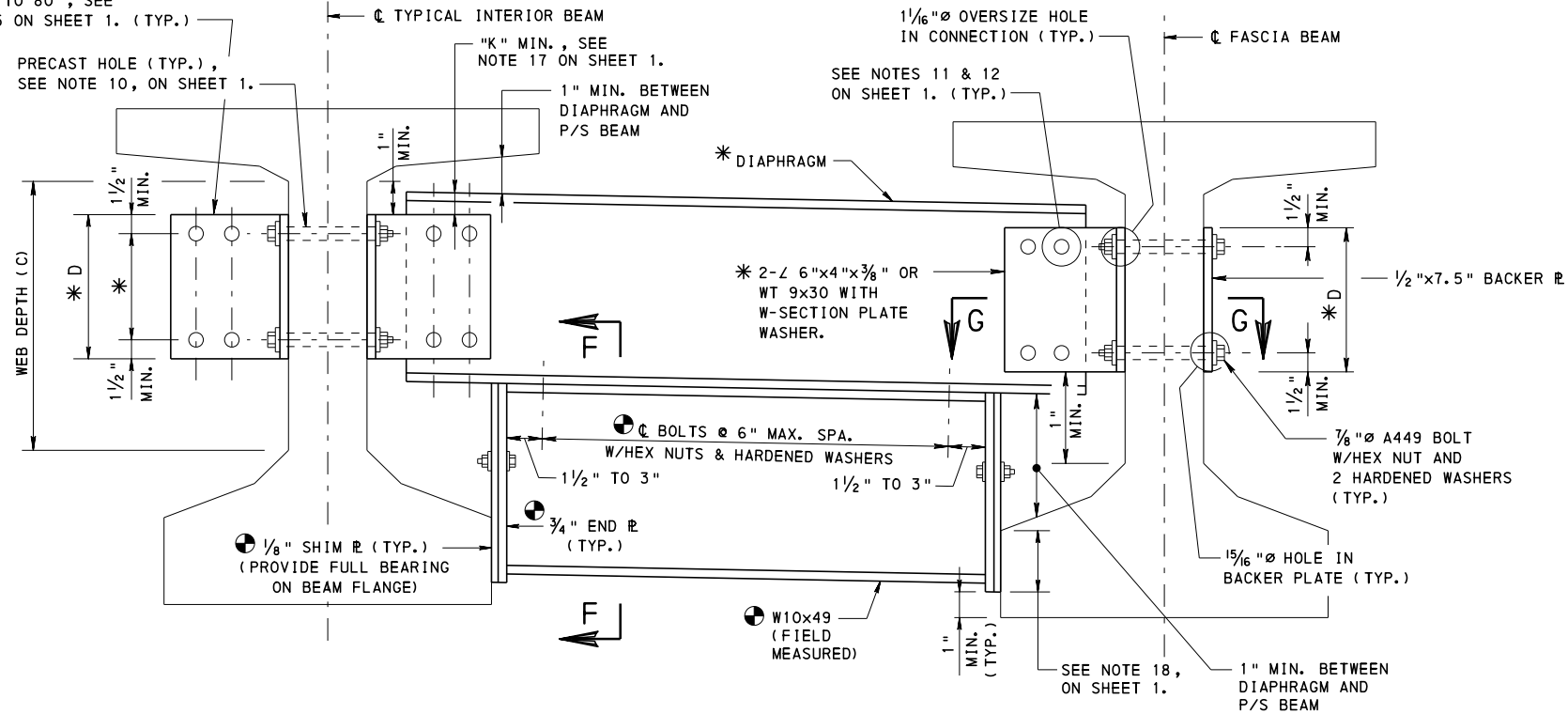
- LEGEND:**
- APPLICABLE ONLY TO EXTERNAL BAYS FOR SPANS WITH VERTICAL CLEARANCE LESS THAN 16'-0" OVER VEHICULAR TRAFFIC.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STEEL MID-SPAN DIAPHRAGMS
FOR P/S CONCRETE AASHTO I-BEAM
AND PA BULB-TEE BEAM BRIDGES
WEB DEPTH ≥ 40"

RECOMMENDED JAN. 31, 2019 <i>Romas P. Maciejka</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. [Signature]</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 3 OF 4 BC-770M
--	--	--------------------------------

REPLACE CONNECTION WT WITH 1/2"x7.5" BACKER PLATE FOR SKEWS LESS THAN OR EQUAL TO 80°, SEE NOTE 5 ON SHEET 1. (TYP.)



VARIABLE MEMBER SIZES				
P/S BEAM WEB DEPTH "C"	DIAPHRAGM	LENGTH "D"	ROWS OF BOLTS IN DIAPHRAGM	ROWS OF BOLTS IN P/S BEAM
8"	W8 x 35	6"	2	2
16" TO 24"	W12 x 40	9"	3	2
32" TO 40"	W21 x 62	15"	5	2
42" TO 56"	W27 x 84	18"	5	2
60" TO 72"	W36 x 135	18"	6	3

NOTE:

1. FOR GENERAL NOTES SEE SHEET 1.

LEGEND

- * - SEE "VARIABLE MEMBER SIZES TABLE"
- - APPLICABLE ONLY TO EXTERNAL BAYS FOR SPANS WITH VERTICAL CLEARANCE LESS THAN 16'-0" OVER VEHICULAR TRAFFIC.

SECTION G-G

NOTE: W8x35 DIAPHRAGMS REQUIRE WT 13.5x42 CONNECTIONS WITH TWO ROWS OF 3 BOLTS AT EACH END. DOUBLE ANGLE CONNECTION MAY NOT BE USED WITH W8x35 DIAPHRAGMS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STEEL MID-SPAN DIAPHRAGMS
FOR P/S CONCRETE AASHTO I-BEAM
AND PA BULB-TEE BEAM BRIDGES
ALL BEAM DEPTHS

TEMPORARY LATERAL STABILITY BRACING (TLSB) DESIGN CRITERIA FOR PRESTRESSED CONCRETE I-BEAM TYPE GIRDERS

GENERAL

- PURPOSE OF TLSB IS TO PROVIDE A STANDARD METHOD TO MAINTAIN P/S I-BEAMS IN AN UPRIGHT POSITION DURING THE ERECTION PHASE. THE BRACING DETAILS CONTAINED IN THIS STANDARD ARE CONCEPTUAL; THE CONTRACTOR MAY ELECT TO PROVIDE ALTERNATE DETAILS AS APPROPRIATE.
- PRIMARY BRACING SHALL BE DESIGNED TO PERMIT INSTALLATION, WHEN REQUIRED, PRIOR TO RELEASE OF CRANES.
- BRACING IS TO REMAIN IN PLACE UNTIL SUFFICIENT SUPPORT IS PROVIDED BY MID SPAN DIAPHRAGMS AND POSITIVE MOMENT REGION DECK SLABS.
- BOX BEAM TYPE GIRDERS ARE NOT INCLUDED IN THIS STANDARD.
- THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF THE BRACING SYSTEM.
- BRACING CALCULATIONS AND ERECTION DRAWINGS SHALL BE SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF PENNSYLVANIA, AND SUBMITTED IN ACCORDANCE WITH SECTION 105 OF PUBLICATION 408. CALCULATIONS SHALL INCLUDE VERIFICATION OF THE BEAM'S ABILITY TO CARRY THE BRACING-INDUCED FORCES.
- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408 AND ITS CHANGE NUMBER.
- THIS STANDARD SHALL BE REFERENCED ON THE APPROPRIATE CONTRACT PLAN SHEETS, TO ALERT THE CONTRACTOR OF THE POTENTIAL NEED TO MODIFY THE BEAM'S REINFORCEMENT BASED ON THE INTENDED BRACING METHODS.

BRACING REQUIREMENT CRITERIA

- BEAMS SHALL BE RESTRAINED BY PRIMARY BRACING WHEN ANY OF THE FOLLOWING CONDITIONS EXIST:
 - BEAMS ARE DETERMINED TO BE INHERENTLY UNSTABLE (SEE STABILITY CRITERIA BELOW)
 - BEAMS BEAR ON HIGH LOAD MULTIROTATIONAL (HMLR) BEARINGS
 - BEAM DEPTH EXCEEDS 66 INCHES
- SECONDARY BRACING SHALL BE USED FOR BEAMS WITH DEPTHS EXCEEDING 48 INCHES WHEN PRIMARY BRACING IS NOT REQUIRED.
- OTHERWISE NO LATERAL BRACING IS REQUIRED

STABILITY CRITERIA

- BEAMS SHALL BE CONSIDERED INHERENTLY STABLE IF THE VERTICAL REACTION AT THE BOTTOM OF THE BEAM IS LOCATED WITHIN THE MIDDLE 2/3 OF THE BEARING PAD. THE VERTICAL REACTION SHALL BE DETERMINED BY APPLYING THE LOADS DESCRIBED BELOW, AND SETTING THE SUM OF THE MOMENTS AT THE BOTTOM OF THE BEAM EQUAL TO ZERO. STABILITY SHALL BE CHECKED FOR THE 2 LOAD CASES DESCRIBED BELOW.
- LOAD CASE I: STABILITY TO RELEASE CRANES SHALL BE DETERMINED BASED ON THE FOLLOWING LOADS. (LOADS TO BE APPLIED TO PRODUCE THE MAXIMUM OVERTURNING MOMENT)
 - W_{WH} , WIND PRESSURE = 30 PSF ACTING HORIZONTALLY ABOUT THE DEPTH OF THE BEAM. RESULTANT FORCE ACTING AT MID DEPTH OF THE BEAM.
 - W_{WV} , WIND PRESSURE = 30 PSF ACTING UPWARD ABOUT ONE HALF OF TOP FLANGE OF THE BEAM. RESULTANT FORCE ACTING AT MID POINT OF LOAD.
 - P_H , BEAM TILT = HORIZONTAL LOAD RESULTING FROM BEAM TILT IN SAME DIRECTION AS WIND LOAD, EQUAL TO 2% OF THE BEAM WT. REACTION, P, AND ACTING AT THE MID-DEPTH OF THE BEAM.
 - e_{LB} , LATERAL BOW = ECCENTRICITY RESULTING FROM 2" LATERAL BOW WHICH ADDS TO WIND AND TILT LOADS, EQUAL TO THE 2/3 POINT OF THE 2" LATERAL BOW. TO BE USED FOR LOCATING THE BEAM WT. REACTION, P.
- LOAD CASE II: STABILITY DURING CONSTRUCTION, PRIOR TO MID SPAN DIAPHRAGM AND POSITIVE MOMENT REGION DECK SLAB COMPLETION, SHALL BE DETERMINED BASED ON THE FOLLOWING LOADS: (LOADS TO BE APPLIED TO PRODUCE THE MAX. OVERTURNING MOMENT)
 - W_{WH} , WIND PRESSURE * = 30 PSF ACTING HORIZONTALLY ABOUT THE DEPTH OF THE BEAM. RESULTANT FORCE ACTING AT MID DEPTH OF THE BEAM.
 - W_{WV} , WIND PRESSURE = 30 PSF ACTING UPWARD ABOUT ONE HALF OF TOP FLANGE OF THE BEAM. RESULTANT FORCE ACTING AT MID POINT OF LOAD.
 - e_{LB} , LATERAL BOW = ECCENTRICITY RESULTING FROM 1 1/2" LATERAL BOW WHICH ADDS TO WIND AND CONSTRUCTION LOADS, EQUAL TO THE 2/3 POINT OF THE 1 1/2" LATERAL BOW. TO BE USED FOR LOCATING THE BEAM WT. REACTION, P.
 - W_C , CONSTRUCTION LOAD = 20 PSF ACTING ACROSS 1/2 OF THE TOP FLANGE OF THE BEAM. RESULTANT FORCE ACTING ON THE EDGE OF THE BEAM. (LOAD INCLUDES - OVERHANG SYSTEM AND/OR DECK PANS.)

* THE APPLIED HORIZONTAL LOAD, ACTING AT MID-DEPTH AT THE END OF THE BEAM, SHALL BE TAKEN AS THE HORIZONTAL WIND LOAD ($W_{WH} * d * L / 2$), BUT NOT LESS THAN 2% OF THE TOTAL APPLIED VERTICAL LOAD [$0.02 * (P + W_C * d / 2 * L / 2)$]

INSTALLATION INSTRUCTIONS

PRIMARY BRACING:

- PRIMARY BRACING SHALL BE DESIGNED TO RESIST THE LOADS DESCRIBED FOR STABILITY CRITERIA.
- PRIMARY BRACING MUST BE INSTALLED PRIOR TO THE BEAM BEING RELEASED FROM THE CRANE.
- THE BRACING SYSTEM SHALL BE DESIGNED TO WITHSTAND THE ABOVE FORCES USING WORKING STRESS METHOD, WITH CONSIDERATION OF THE DEFLECTION OF THE BRACING SYSTEM.
- DRILLED ANCHORS SHALL BE LOAD TESTED TO 120% OF THE DESIGN LOAD. DESIGN LOAD AND TEST LOAD SHALL BE SHOWN ON THE ERECTION DRAWING.
- THE QUANTITY OF DRILLED ANCHORS TO BE LOAD TESTED SHALL BE 2 ANCHORS PER SUBSTRUCTURE UNIT.

SECONDARY BRACING:

- SECONDARY BRACING SHALL BE DESIGNED TO RESIST THE DESIGN HORIZONTAL WIND LOADS. DESIGN FOR STABILITY CRITERIA USING LFRD METHOD UNLESS OTHERWISE NOTED. HORIZONTAL WIND PRESSURE, W_{WH} , NEEDS TO BE APPLIED TO THE EXTERIOR AND INTERIOR BEAMS IN ACCORDANCE WITH "GUIDE SPECIFICATION FOR WIND LOADS ON BRIDGES DURING CONSTRUCTION", 1ST EDITION (2017)
- SECONDARY BRACING MAY BE INSTALLED AFTER CRANE IS RELEASED, BUT MUST BE INSTALLED PRIOR TO THE END OF A WORKDAY OR UPON COMPLETION OF A SPAN, WHICHEVER COMES FIRST.
- THE SECONDARY BRACING SYSTEM SHALL HAVE TWO FIXED CONNECTIONS TO EACH SUPPORT, PREFERABLY LOCATED AT THE FIRST AND LAST GIRDER ON EACH SUPPORT.
- DRILLED ANCHORS SHALL BE LOAD TESTED TO 120% OF THE DESIGN LOAD. DESIGN LOAD AND TEST LOAD SHALL BE SHOWN ON THE ERECTION DRAWING.
- THE QUANTITY OF DRILLED ANCHORS TO BE LOAD TESTED SHALL BE 2 ANCHORS PER SUBSTRUCTURE UNIT.
- DESIGN CRITERIA: BEAM SLIDING RESISTANCE AGAINST LATERAL WIND LOAD, CABLE STRENGTH, TURNBUCKLE STRENGTH, DRILLED ANCHOR STRENGTH AND WOOD STRENGTH.
- CABLES AND TURNBUCKLES SHALL BE DESIGNED USING THE WORKING STRESS METHOD. FOR THIS DESIGN APPROACH, THE LFRD WIND LOADS SHALL BE REDUCED BY A FACTOR OF 1.4.

BEARINGS

- BEARING PADS
 - THE LATERAL LOAD TRANSFERRED TO THE BEARING SHALL BE LESS THAN OR EQUAL TO 20% OF THE VERTICAL REACTION (BEAM WEIGHT ONLY).
 - IF THE ABOVE CRITERIA CAN NOT BE MET, BEAM MUST BE BRACED TO PREVENT SLIDING.
- GUIDED HLMR BEARINGS
 - THE LATERAL LOAD TRANSFERRED TO THE BEARING SHALL BE CHECKED AGAINST THE ALLOWABLE HORIZONTAL LOAD OF THE HLMR BEARING. SEE BD-613M FOR HLMR BEARING DESIGN TABLE.
 - IF THE ABOVE CRITERIA CAN NOT BE MET, BEAM MUST BE BRACED TO PREVENT SLIDING.
 - GUIDED HLMR BEARINGS SHALL BE LOCKED TO RESIST LONGITUDINAL MOVEMENT USING A GUIDED HLMR BEARING LOCK. ONLY ONE END OF BEAM IS TO BE LOCKED IN A LONGITUDINAL POSITION. OPPOSITE BEAM END IS TO HAVE FREEDOM OF MOVEMENT LONGITUDINALLY.
 - BEARING LOCK SHALL NOT BE REMOVED UNTIL FINAL RESTRAINTS ARE IN PLACE. (I.E. END DIAPHRAGM, OR SHEAR BLOCKS)
- NON-GUIDED HLMR BEARINGS
 - THE LATERAL LOAD TRANSFERRED TO THE BEARING SHALL BE RESISTED BY A NON-GUIDED HLMR BEARING LOCK.
 - BEARING LOCK SHALL BE INSTALLED TO RESIST LATERAL MOVEMENT WHILE ALLOWING LONGITUDINAL MOVEMENT, IF REQUIRED.
 - BEARING LOCK SHALL NOT BE REMOVED UNTIL FINAL RESTRAINTS ARE IN PLACE. (I.E. END DIAPHRAGM, OR SHEAR BLOCKS)

DESIGN LOAD COMMENTARY

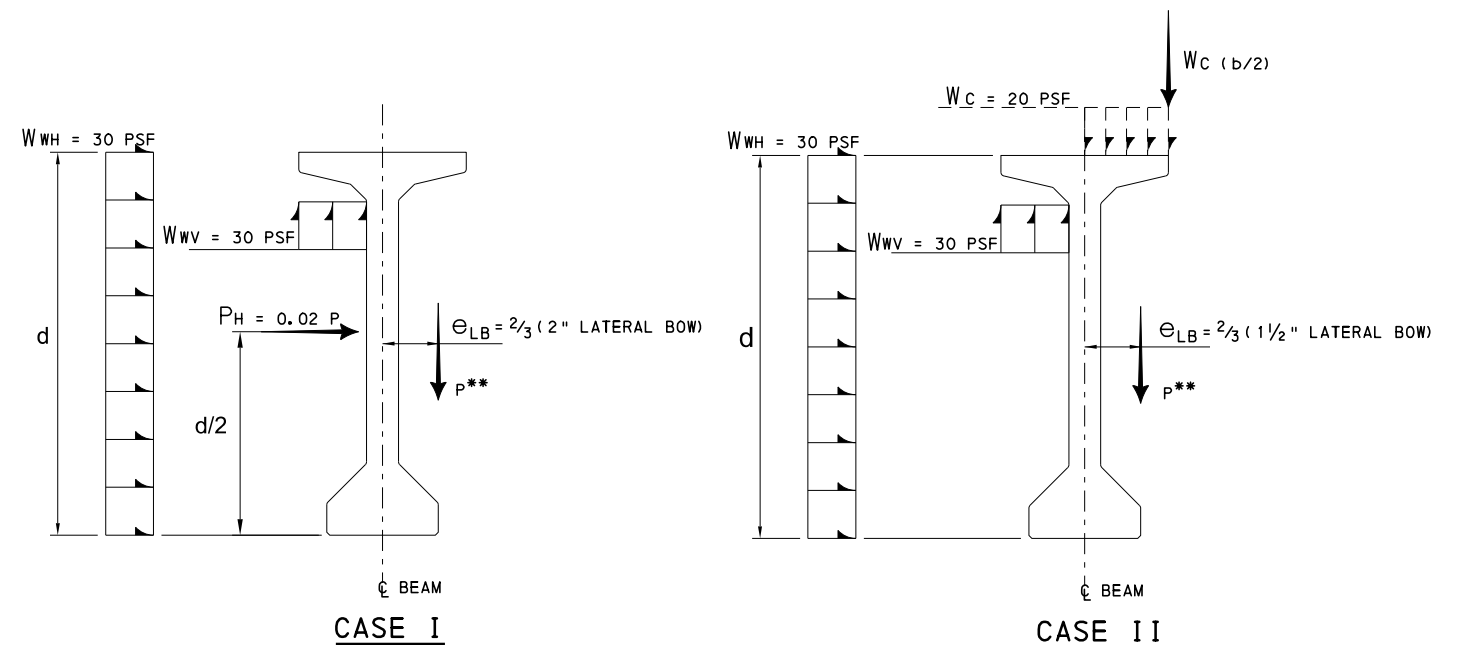
STABILITY CRITERIA:

1. LOAD CASE I

- WIND PRESSURE OF 30 PSF INCLUDES 5 PSF FOR MEMBERS OVER OR ADJACENT TO TRAFFIC OPENINGS.
- LATERAL BOW IS THE RESULTANT OF 1 1/2" MAXIMUM ALLOWABLE LATERAL SWEEP AND 1/2" SOLAR GAIN.

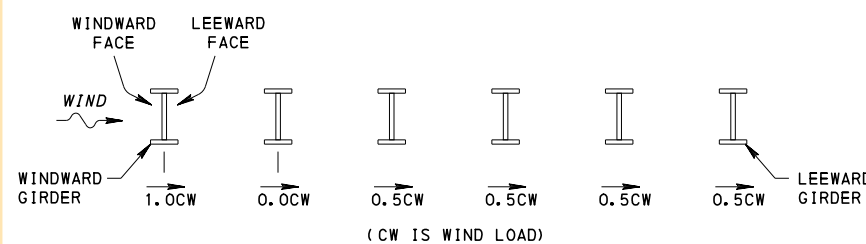
2. LOAD CASE II

- WIND PRESSURE OF 30 PSF INCLUDES 5 PSF FOR MEMBERS OVER OR ADJACENT TO TRAFFIC OPENINGS.
- LATERAL BOW IS THE RESULTANT OF 1" MAXIMUM ALLOWABLE LATERAL SWEEP AND 1/2" SOLAR GAIN.



** P = BEAM WEIGHT REACTION
= BEAM UNIT WEIGHT/FT x SPAN LENGTH/2

WIND PRESSURE DISTRIBUTION TO GIRDERS



NOTE:

REFER TO AASHTO "GUIDE SPECIFICATION FOR WIND LOADS ON BRIDGES DURING CONSTRUCTION", 1ST EDITION (2017)

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

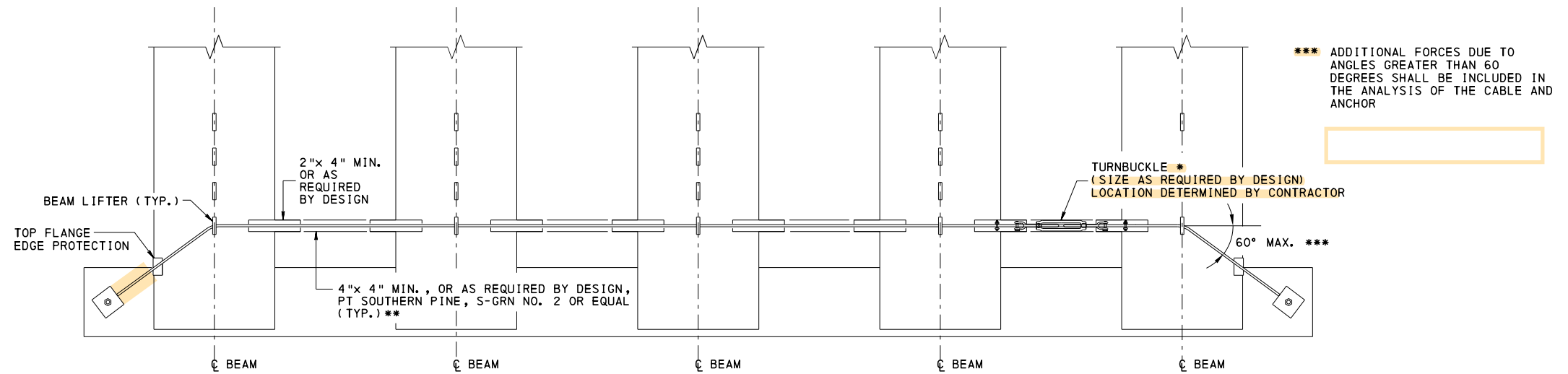
**STANDARD
PRESTRESSED CONCRETE BEAM BRACING
NOTES**

RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 1 OF 5
BC-772M

CHANGE 4

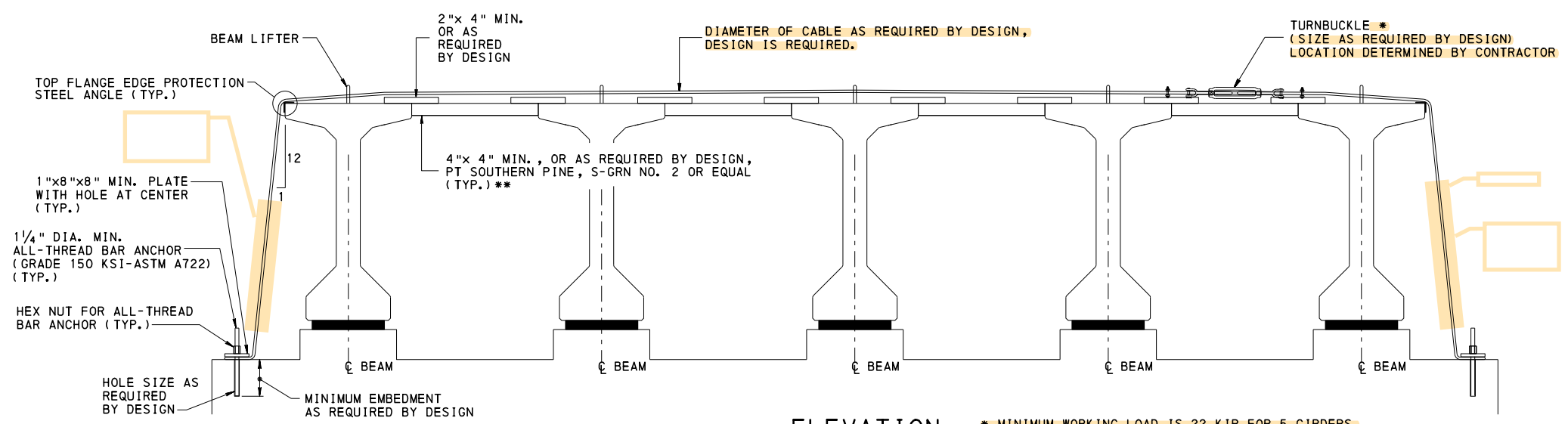


*** ADDITIONAL FORCES DUE TO ANGLES GREATER THAN 60 DEGREES SHALL BE INCLUDED IN THE ANALYSIS OF THE CABLE AND ANCHOR

** ADDITIONAL TIMBER BRACES MAY BE REQUIRED BETWEEN BEAMS FOR HIGHER LOAD CASES.

PLAN

* MINIMUM WORKING LOAD IS 22 KIP FOR 5 GIRDERS. MORE THAN 5 GIRDERS, DESIGN IS REQUIRED.



ELEVATION

* MINIMUM WORKING LOAD IS 22 KIP FOR 5 GIRDERS. MORE THAN 5 GIRDERS, DESIGN IS REQUIRED.

CONCEPTUAL SECONDARY BRACING DETAILS

INSTALLATION

SECONDARY BRACING INSTALLATION:

1. INSTALL ALL-THREAD BAR ANCHORS ON EXTERIOR SIDE OF EACH END OF ALL FASCIA BEAMS AS PER PRIMARY BRACING SPECIFICATION.
2. CENTER BEAM ABOUT CENTER LINE OF BEAM AND BEARING AND LOWER BOTH ENDS TO TOUCH SURFACE OF BEARINGS.
 - 2.a. CRANE TO MAINTAIN CONTROL OF BEAM.
3. SLOWLY RELEASE BEAM FROM CRANE WHILE CHECKING FOR PLUMBNESS AT WEB.
4. REPEAT FOR OPPOSITE BEAM END.
5. RE-CHECK BEAM FOR PLUMBNESS AT WEB.
6. RELEASE CRANES.
7. ATTACH AND TIE BACK FASCIA BEAM TO ABUTMENT/ PIER WITH CABLE AND TURNBUCKLE TAKING UP SLACK IN CABLE TO TAUGHT CONDITION.
8. ERECT FIRST INTERIOR BEAM.
9. INSTALL TIMBER BRACE.
10. REPEAT AS REQUIRED.
 - 10.a. ALL BEAMS TO BE SECURED TOGETHER BY CABLE AND TIMBER TO POINT OF LAST BEAM ERECTED OR COMPLETION OF SPAN.
 - 10.b. THE LAST BEAM PLACED DURING A WORK SHIFT WILL BE TIED BACK TO SUBSTRUCTURE AS AT FASCIA BEAM.
11. BRACING INSTALLATION COMPLETE

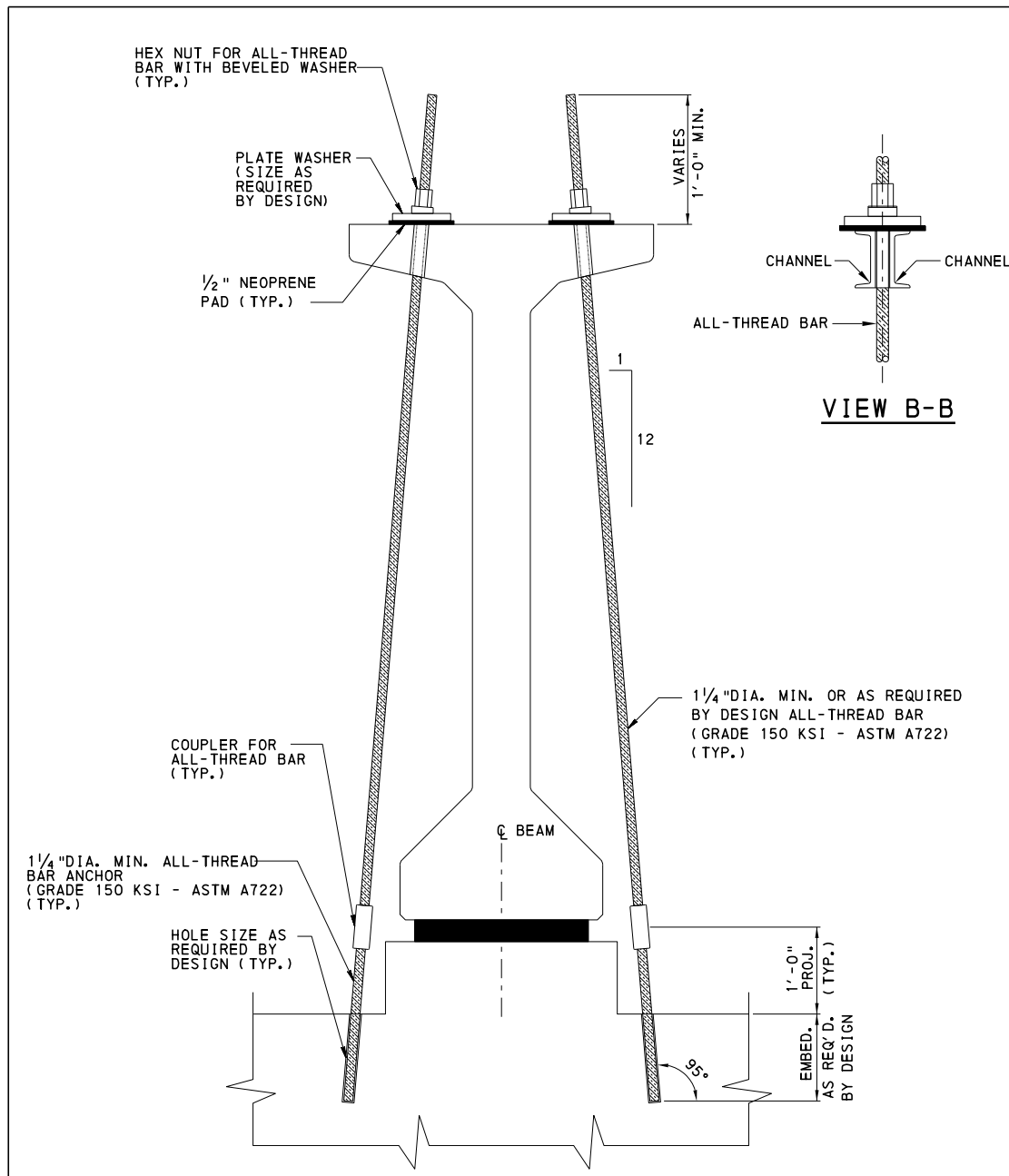
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
PRESTRESSED CONCRETE BEAM BRACING
CONCEPTUAL SECONDARY BRACING

RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF BRIDGE ENGINEER

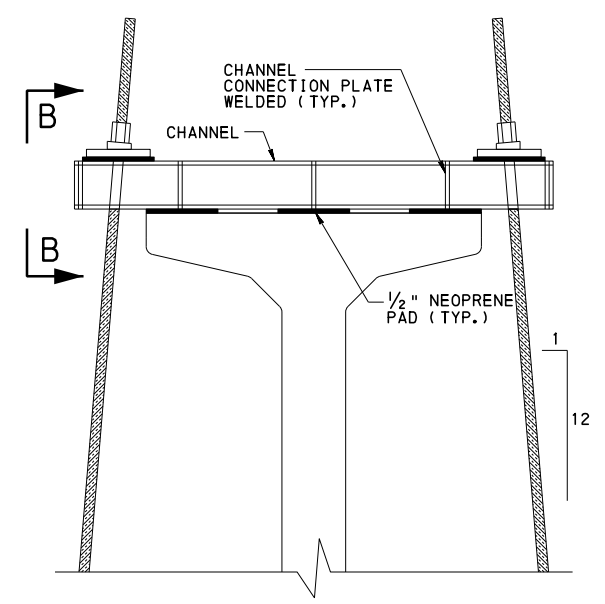
RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 2 OF 5
BC-772M

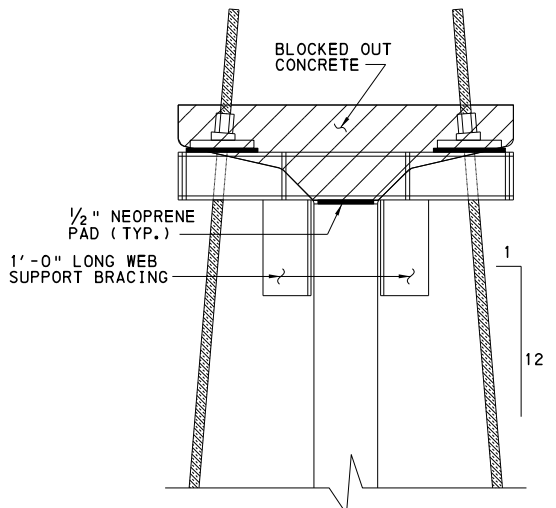


CONCEPTUAL PRIMARY BRACING DETAILS

N. T. S.



**ALTERNATE #1
(NO BEAM NOTCH)**



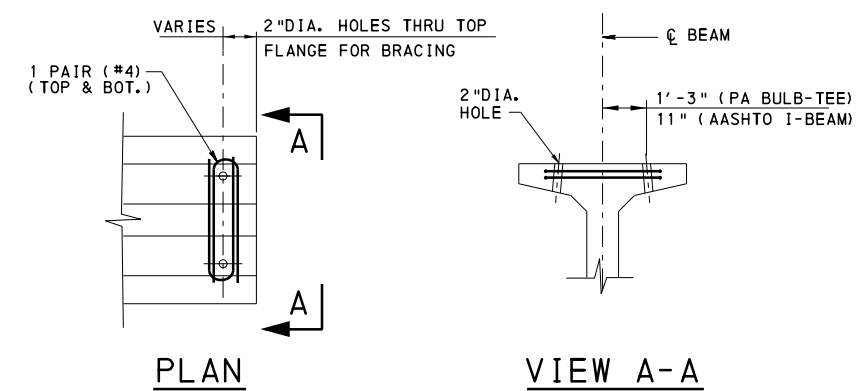
**ALTERNATE #2
(AT BEAM NOTCH)**

INSTALLATION

- ANCHOR INSTALLATION/ REMOVAL:**
1. HOLES IN ABUTS. & PIERS SHALL BE GENERALLY LOCATED ALONG CENTER LINE OF BEARING.
 1. a. HOLES SHALL BE AIR DRILLED.
 2. b. PACHOMETER SHALL BE USED TO LOCATE REINFORCEMENT PRIOR TO DRILLING.
 3. c. IF STEEL IS CONTACTED DURING THE DRILLING PROCESS, THE HOLE SHALL BE ABANDONED AND FILLED WITH AN APPROVED NON-SHRINK GROUT. HOLE WILL BE RELOCATED / REDRILLED WITHIN BRACING DESIGN CRITERIA.
 2. DRILLED HOLE SHALL BE PNEUMATICALLY CLEARED OF DEBRIS (ROCK DUST, WATER, ETC.)
 3. ALL-THREAD BARS SHALL BE ANCHORED IN HOLES DRILLED IN SUBSTRUCTURE BY USING AN APPROVED HIGH STRENGTH POLYESTER RESIN ANCHORING MATERIAL AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
 4. DRILLED ANCHORS SHALL BE LOAD TESTED AFTER MANUFACTURER'S SPECIFIED CURE TIME.
 5. DRILLED ANCHORS SHALL BE REMOVED BY MECHANICAL MEANS TO A DEPTH OF 2" (+/-) BELOW THE SURFACE.
 6. AFTER REMOVAL OF DRILLED ANCHORS, FILL HOLES WITH NON-SHRINK, NON-STAIN GROUT.
 7. FILL HOLES IN BEAM TOP FLANGE WITH APPROVED NON-SHRINK GROUT.
- PRIMARY BRACING INSTALLATION:**
1. COUPLE ALL-THREAD BARS TO THE DRILLED ANCHORS EMBEDDED IN SUBSTRUCTURE.
 1. a. MINIMUM LENGTH OF ALL-THREAD BAR SHALL BE DETAILED ON THE ERECTION DRAWINGS.
 2. CENTER BEAM ABOUT CENTERLINE OF BEAM AND BEARING AND LOWER BOTH ENDS TO WITHIN 1/4" OF BEARING SURFACE WHILE INSERTING ALL-THREAD BAR THROUGH HOLE OR CLAMP ASSEMBLY LOCATED AT BEAM TOP FLANGE.
 3. INSTALL NEOPRENE PADS, PLATE WASHERS, BEVELED WASHERS AND NUTS AS REQUIRED TO LOOSE CONDITION.
 4. MATE BEAM TO BEARINGS.
 4. a. CRANE TO MAINTAIN CONTROL OF BEAM.
 5. LAMINATED BEARING
 5. a. PROCEED TO STEP (7)
 6. HLMR BEARING
 6. a. INSTALL BEARING LOCK AS SPECIFIED BY HLMR BEARING TYPE AND SNUG FASTENERS.
 6. b. SHIM AS REQUIRED.
 7. SLOWLY RELEASE BEAM FROM CRANE WHILE CHECKING FOR PLUMBNESS AT WEB.
 8. TIGHTEN BEARING LOCKS (IF REQUIRED) AND SNUG TIGHT BRACING AT TOP FLANGE.
 9. RE-CHECK BEAM FOR PLUMBNESS AT WEB.
 10. RELEASE CRANE.
 11. BRACING INSTALLATION COMPLETE.

NOTE:

ALL-THREAD BAR ANCHORS MAY BE CAST INTO THE SUBSTRUCTURE AT THE CONTRACTOR'S OPTION.



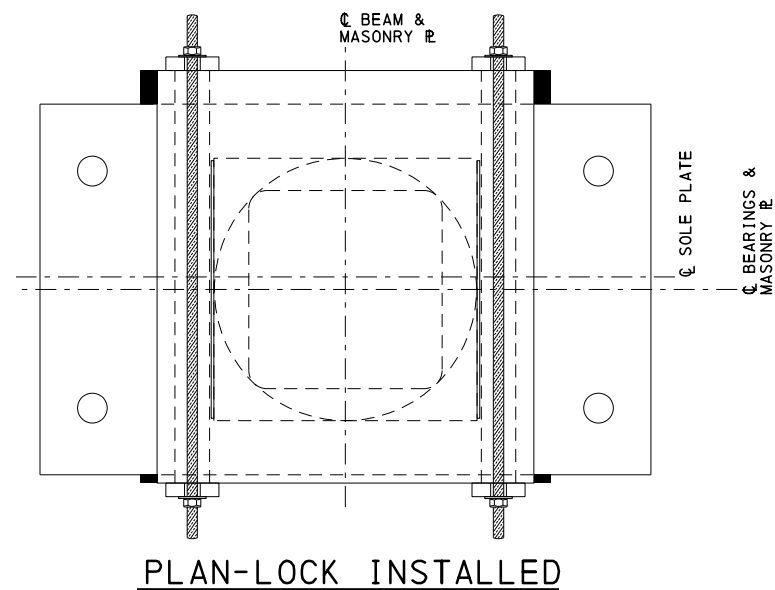
ADDITIONAL BEAM REINFORCEMENT FOR BRACING

N. T. S.

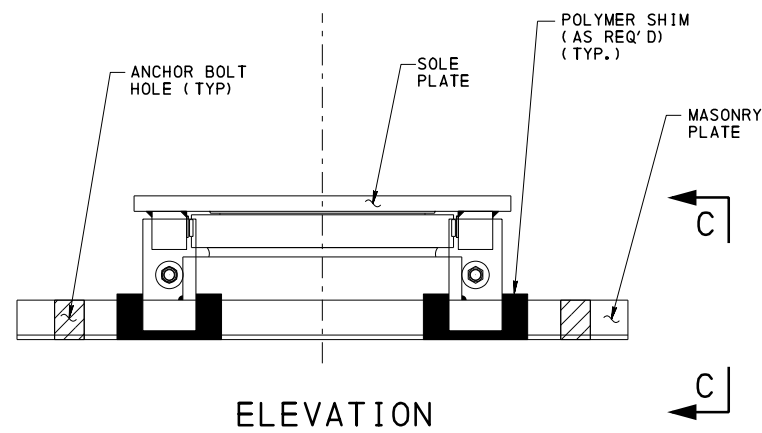
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

**STANDARD
PRESTRESSED CONCRETE BEAM BRACING
CONCEPTUAL PRIMARY BRACING**

RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 3 OF 5 BC-772M
--	---	--------------------------------



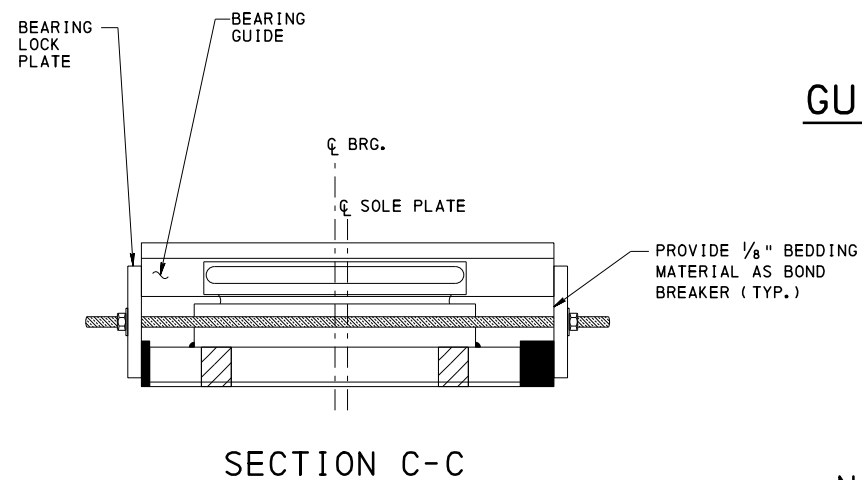
PLAN-Lock INSTALLED



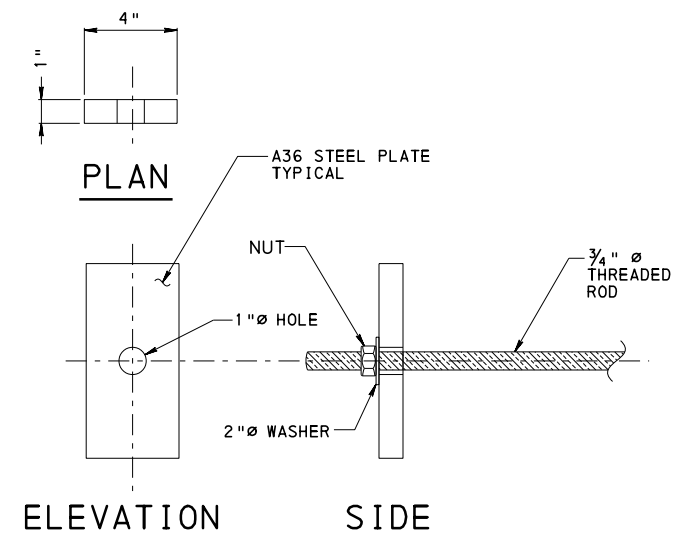
ELEVATION

CONCEPTUAL GUIDED HLMR BEARING LOCK

N.T.S.



SECTION C-C



GUIDED POT BEARING LOCK DETAILS

N.T.S.

NOTE:
 CONCEPTUAL DETAILS INDICATED ARE BASED ON "POT" HLMR BEARINGS.
 FOR OTHER HLMR BEARINGS, CONTRACTOR TO DEVELOP REQUIRED LOCK DETAILS AND SUBMIT WITH ERECTION DRAWINGS.


INSTALLATION

GUIDED HLMR BEARING LOCK INSTALLATION:

1. MATE BEAM TO BEARING SOLE PLATE.
 1. a. CRANE TO MAINTAIN CONTROL OF BEAM.
2. PLACE BEARING LOCK AND SNUG FASTENERS.
3. SHIM CENTER LINE OF BEARING SOLE PLATE STATION AHEAD OR BEHIND AS DESIGNATED BY DESIGN TO AIR TEMPERATURE AT ERECTION, TO A LOCKED CONDITION.
 3. a. ONLY ONE END OF BEAM IS TO BE LOCKED IN A LONGITUDINAL POSITION. OPPOSITE BEAM END IS TO HAVE FREEDOM OF MOVEMENT LONGITUDINALLY.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BRIDGE OFFICE

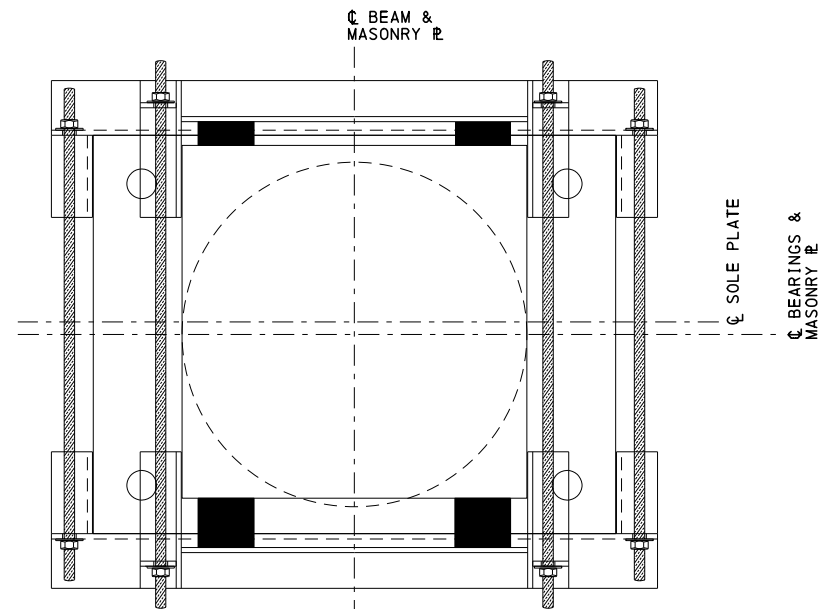
STANDARD
 PRESTRESSED CONCRETE BEAM BRACING
 CONCEPTUAL GUIDED HLMR
 BEARING LOCK

RECOMMENDED NOV. 23, 2022

 CHIEF BRIDGE ENGINEER

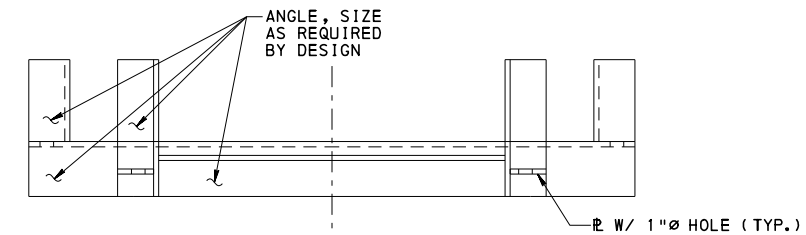
RECOMMENDED NOV. 23, 2022

 CHIEF ENGINEER, HIGHWAY ADMIN

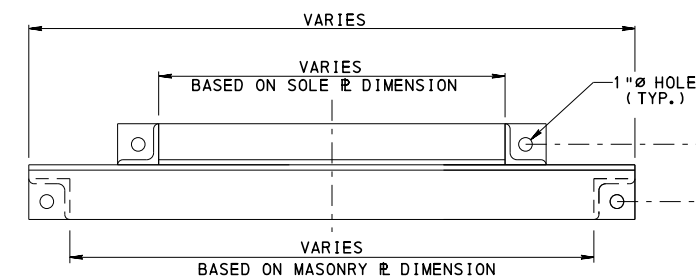
SHEET 4 OF 5
 BC-772M



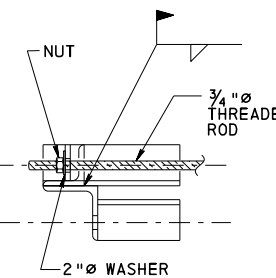
PLAN - LOCK INSTALLED



PLAN



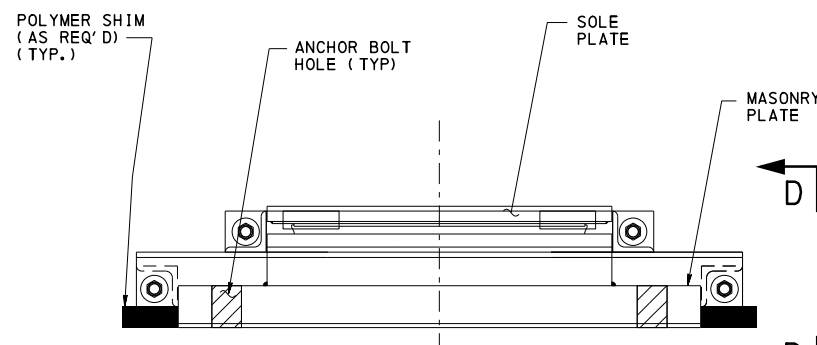
ELEVATION



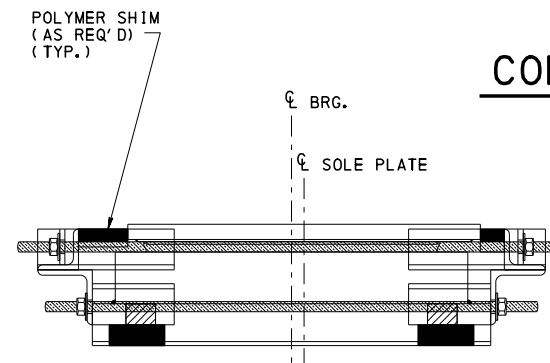
SIDE

CONCEPTUAL NON-GUIDED HLMR BEARING LOCK DETAILS

N.T.S.



ELEVATION



SECTION D-D

CONCEPTUAL NON-GUIDED HLMR BEARING LOCK

N.T.S.

NOTE:
 CONCEPTUAL DETAILS INDICATED ARE BASED ON "POT" HLMR BEARINGS.
 FOR OTHER HLMR BEARINGS, CONTRACTOR TO DEVELOP REQUIRED LOCK DETAILS AND SUBMIT WITH ERECTION DRAWINGS.


INSTALLATION

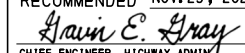
NON-GUIDED POT BEARING LOCK INSTALLATION:

1. MATE BEAM TO BEARING SOLE PLATE.
 1. a. CRANE TO MAINTAIN CONTROL OF BEAM.
2. PLACE BEARING LOCK AND SNUG FASTENERS.
3. SHIM CENTER LINE OF BEARING SOLE PLATE STATION AHEAD OR BEHIND AS DESIGNATED BY DESIGN TO AIR TEMPERATURE AT ERECTION, TO A LOCKED CONDITION.
 3. a. ONLY ONE END OF BEAM IS TO BE LOCKED IN A LONGITUDINAL POSITION. OPPOSITE BEAM END IS TO HAVE FREEDOM OF MOVEMENT LONGITUDINALLY.

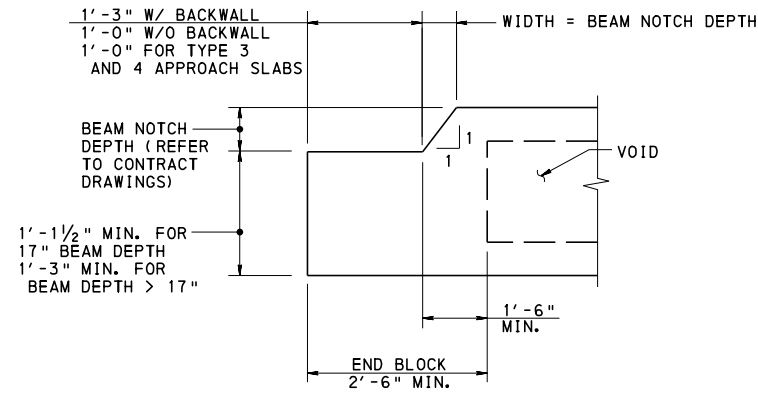
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BRIDGE OFFICE

STANDARD
 PRESTRESSED CONCRETE BEAM BRACING
 CONCEPTUAL NON-GUIDED
 HLMR BEARING LOCK

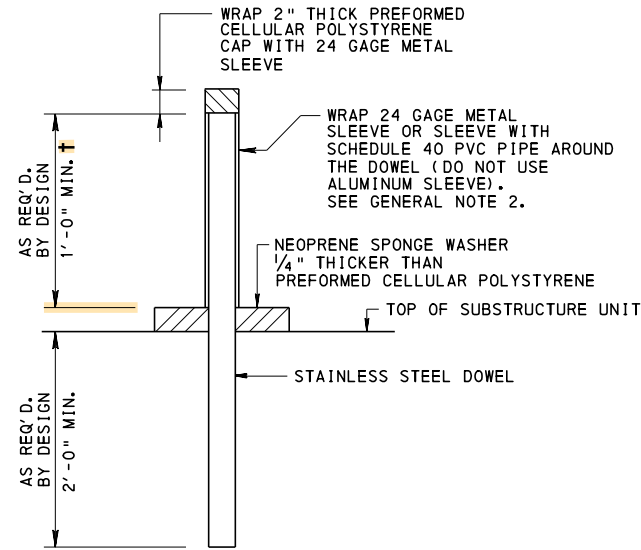
RECOMMENDED NOV. 23, 2022

 CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022

 CHIEF ENGINEER, HIGHWAY ADMIN

SHEET 5 OF 5
 BC-772M



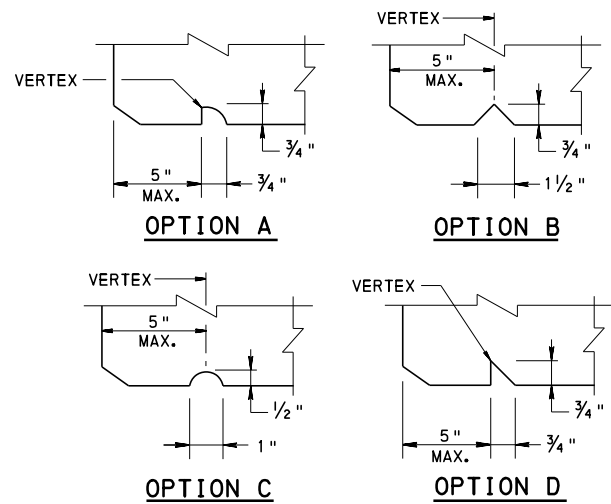
**BEAM NOTCH DETAIL
SPREAD BOX BEAM**



DOWEL DETAIL

(FOR DOWELS IN DIAPHRAGMS)

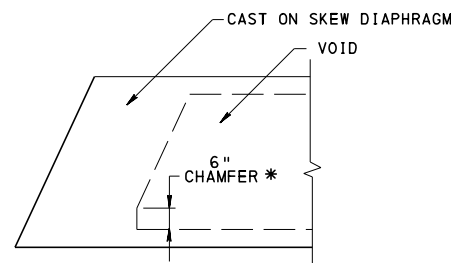
† 6" MIN FOR 17" DEEP BEAM & 10" MIN FOR 21" DEEP BEAM



ACCEPTABLE DRIP NOTCH DETAILS

NOTE:

LOCATE THE VERTEX OF THE DRIP NOTCH AT THE MIDPOINT BETWEEN THE STRANDS

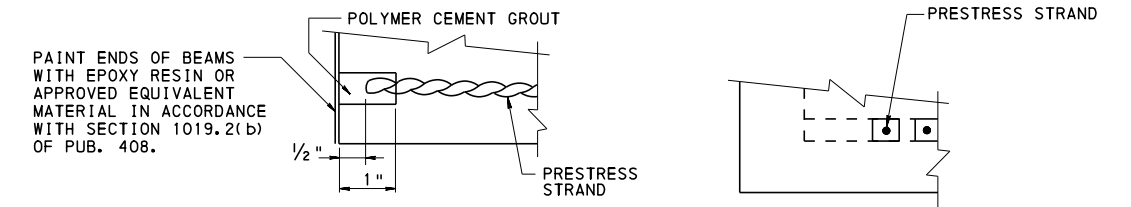


* NO CHAMFER REQUIRED FOR SKEWS 75° TO 90°

**CHAMFER DETAIL FOR
SKEWED END BLOCK**

GENERAL NOTES:

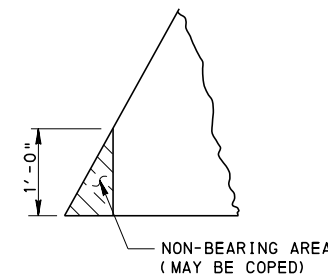
1. INCLUDE APPLICABLE DETAILS SHOWN ON THESE SHEETS ON FABRICATOR'S SHOP DRAWINGS.
2. ASPHALT-SATURATED PAPER OR SCHEDULE 40 P.V.C. PIPE ARE PERMITTED TO BE USED AS ALTERNATE BOND BREAKER MATERIALS IN LIEU OF THE METAL SLEEVE. OTHER BOND BREAKER MATERIALS MAY BE USED AROUND THE DOWEL ONLY WITH THE APPROVAL OF THE DISTRICT STRUCTURE CONTROL ENGINEER.
3. USE PREFORMED CELLULAR POLYSTYRENE CONFORMING TO ASTM C578, TYPE 1, EXCEPT LIMIT THE WATER ABSORPTION TO 2% BY VOLUME.
4. USE POLYMER CEMENT GROUT FROM A MANUFACTURER LISTED IN BULLETIN 15 UNDER MISCELLANEOUS POLYMER MODIFIED AND SPECIAL CEMENTS, MORTARS AND CONCRETES. APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
5. STRAND RECESS CAN BE OMITTED IF BEAM ENDS ARE TO BE INCORPORATED IN A CONTINUITY DIAPHRAGM (BRIDGES MADE CONTINUOUS FOR LIVE LOADS) OR INTEGRAL ABUTMENT (EMBEDDED IN 6" OR MORE OF CAST IN PLACE CONCRETE BEYOND THE END OF THE BEAM), SEE PUBLICATION 408 SECTION 1107.03(c) 6. i.5. ONLY PAINT BEAM ENDS WITH EPOXY RESIN OR APPROVED EQUIVALENT MATERIAL IN ACCORDANCE WITH PUBLICATION 408 SECTION 1019.2(b) IF SPECIFIED.



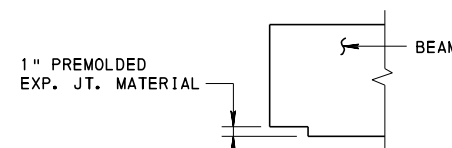
NOTES:

1. RECESS CAN BE MADE FOR A SINGLE STRAND OR A GROUP OF STRANDS.
2. CLEAN THE STRANDS FROM ALL FOREIGN MATERIALS SUCH AS RUST, SLAG, ETC. PRIOR TO APPLICATION OF POLYMER CEMENT GROUT OR EPOXY RESIN.
3. PAINT BEAM ENDS PRIOR TO SHIPMENT OR STORAGE.

GROUTED RECESS FOR STRANDS AT BEAM ENDS



PLAN



ELEVATION

**TYPICAL CORNER
BLOCKOUT-SKEWS < 85°**

NOTES:

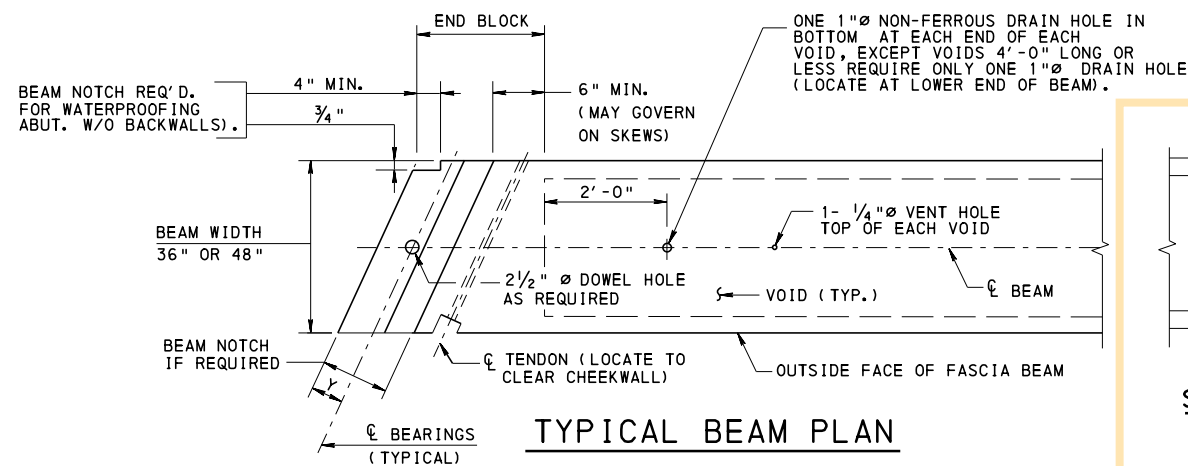
- (1) MODIFY IF REQUIRED TO ACCOMMODATE BEARING PAD ARRANGEMENT FOR SHARP SKEWS.
- (2) NOT PERMITTED IN CONJUNCTION WITH DAPPING.

CHANGE 4

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
MISCELLANEOUS PRESTRESS DETAILS

RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 1 OF 3 BC-775M
--	---	-------------------------

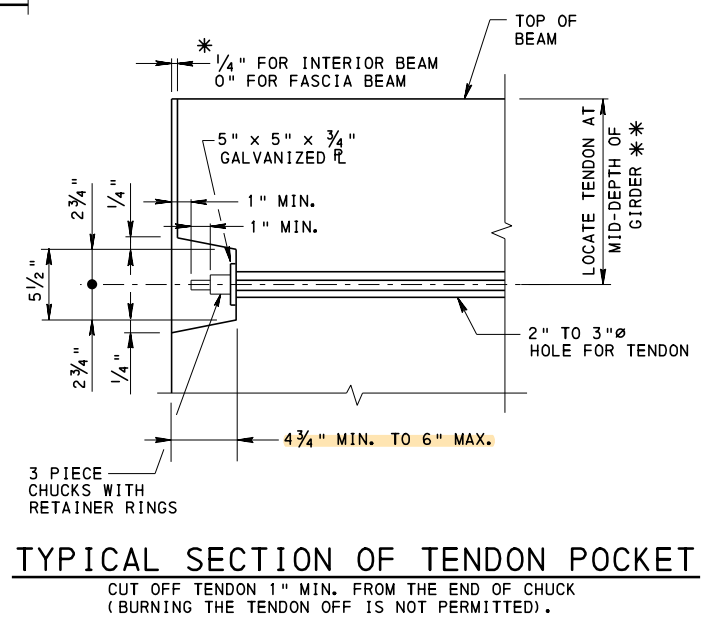
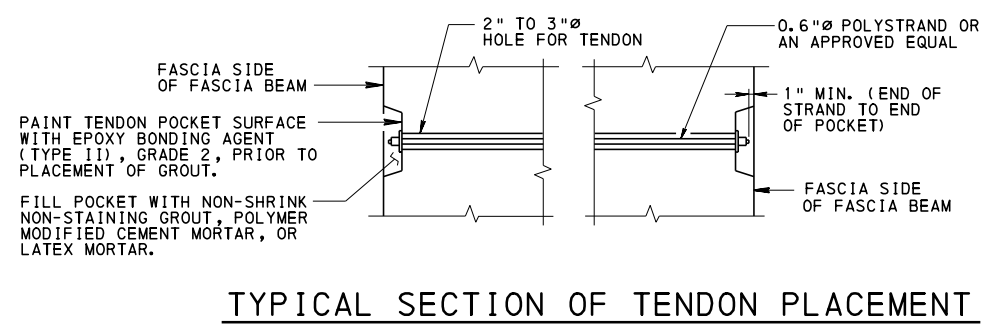
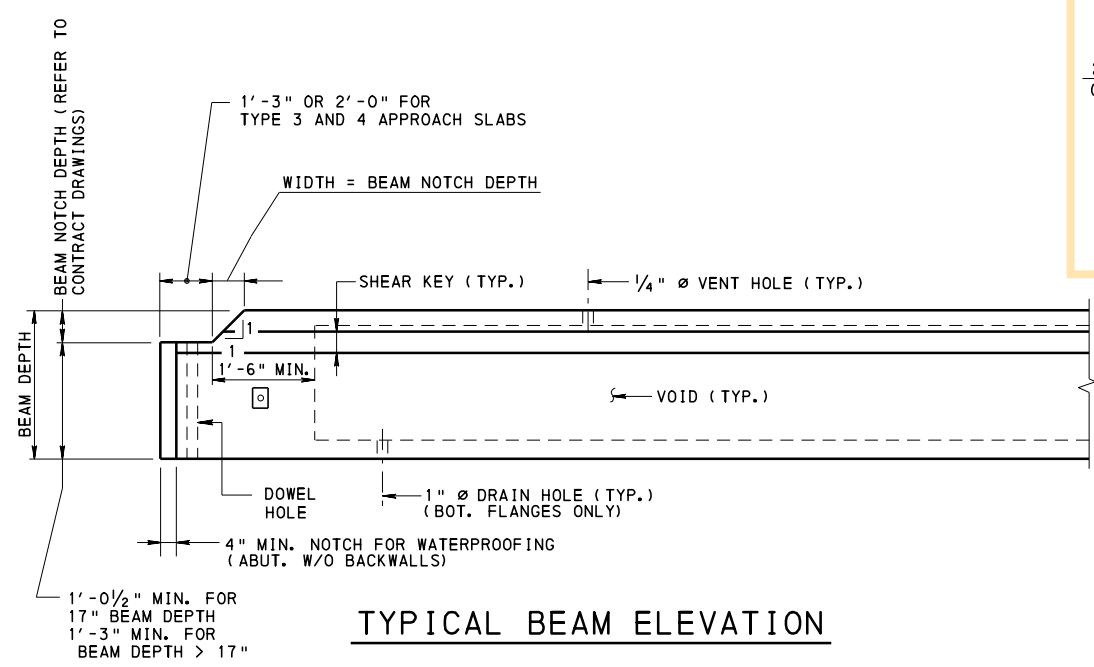
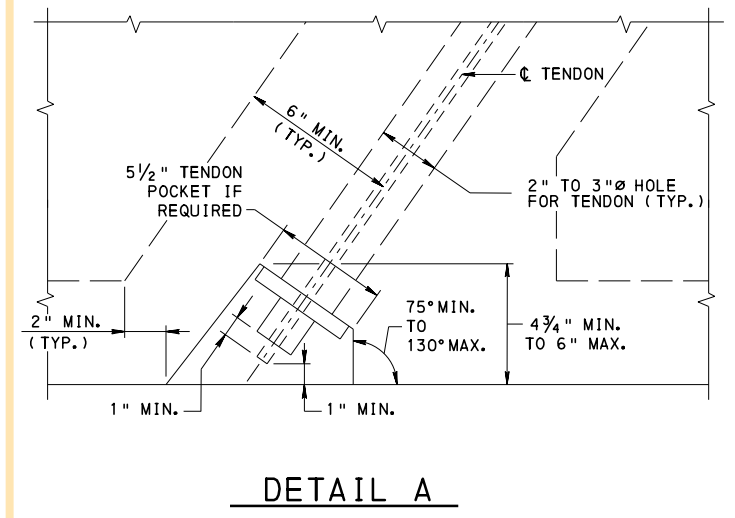
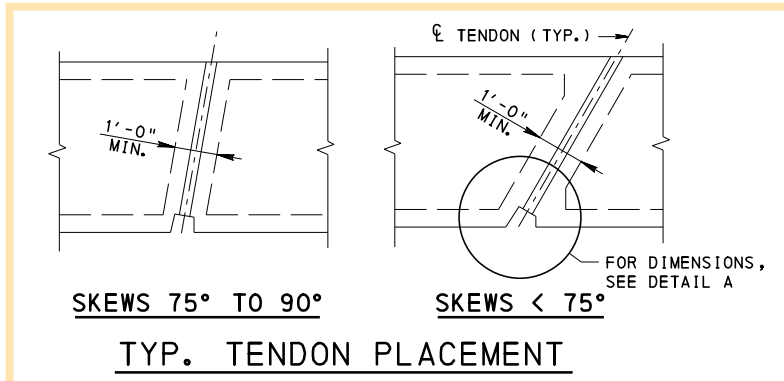


NOTE:

"Y" = 9" MIN. (ABUTMENTS WITHOUT BACKWALLS AND WITH PAVING NOTCH)

"Y" = 6" MIN. (PIERS WITH AN EXPANSION DAM)

"Y" = 6" MIN. (ABUTMENTS WITH BACKWALLS)



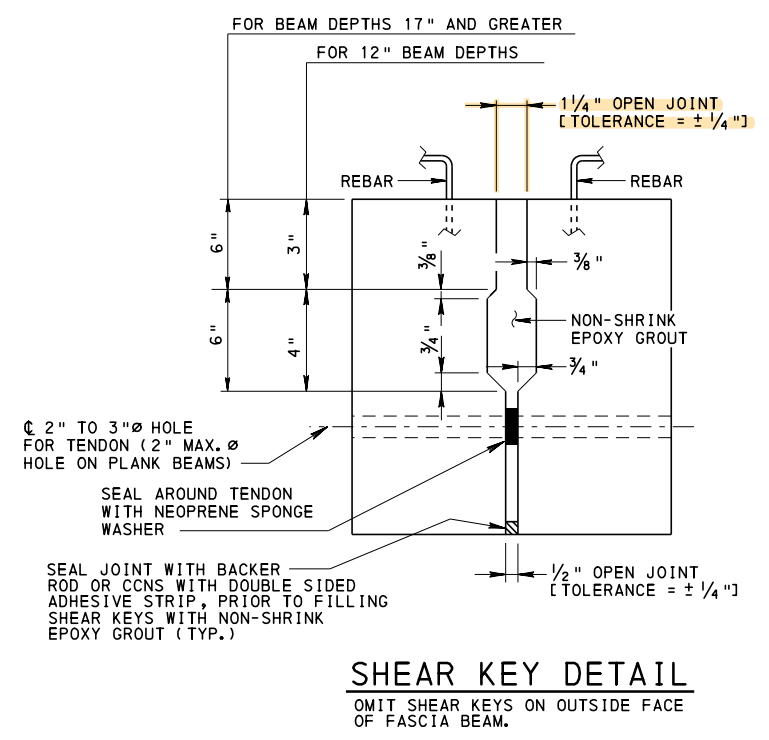
LEGEND

* DENOTES STAGED CONSTRUCTION

** SHIFTING OF TENDON BY UP TO 1 1/2" IS PERMITTED TO AVOID LOSS OF STRAND POSITIONS.

ADJACENT BOX BEAM PRESTRESS DETAIL NOTES:

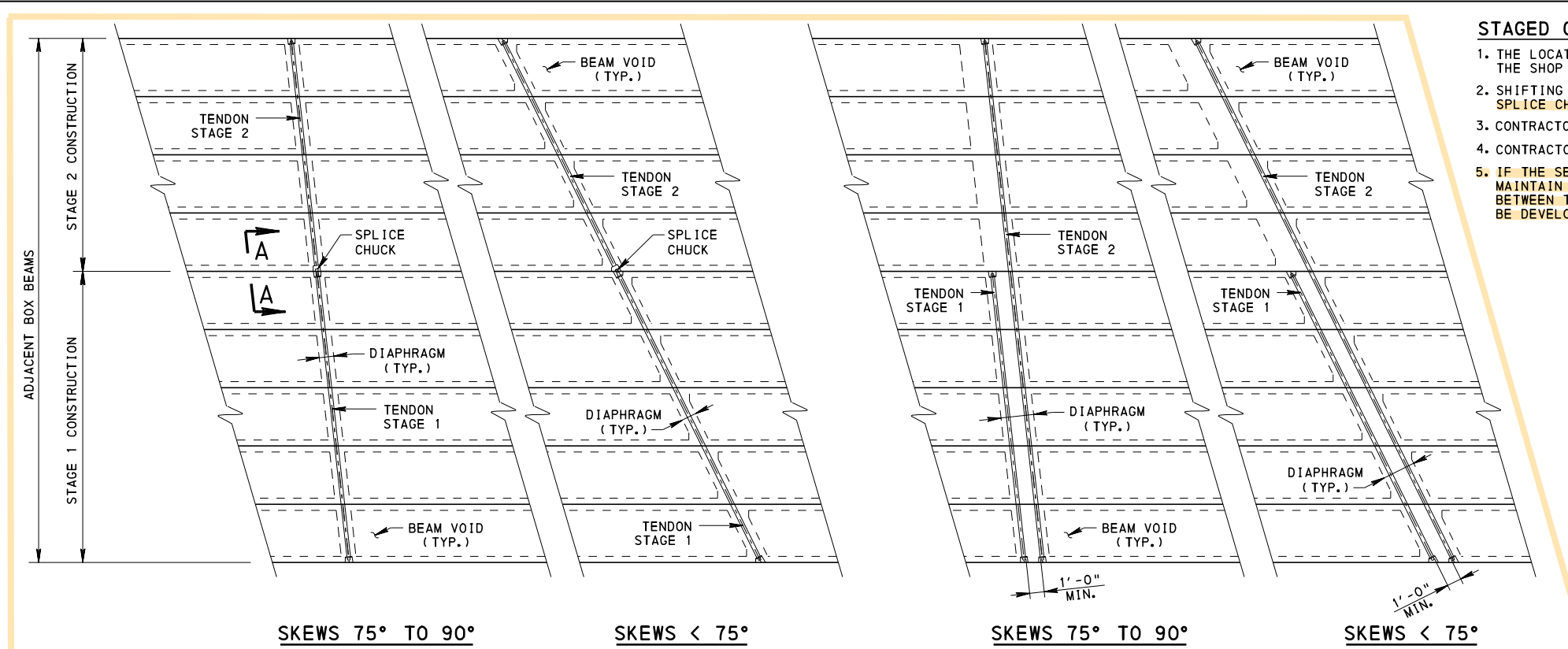
1. WHEN THE COMMON EDGES OF TWO ADJOINING BEAMS ARE NOT AT THE SAME ELEVATION, ADJUST THE LOCATION OF THE SHEAR KEY SO THAT THE MAXIMUM ELEVATION DIFFERENCE BETWEEN THE BOTTOM OF THE SHEAR KEYS IS 1" FOR 12" BEAM DEPTHS AND 2" FOR OTHER BEAM DEPTHS. APPLIES TO BRIDGES IN SUPERELEVATION TRANSITION ONLY.
2. TENDONS TO BE 0.6"Ø STRANDS, 270 ksi POLYSTRAND OR AN APPROVED EQUAL AND TO BE TENSIONED TO A FORCE OF 40,000 lbs 24 HOURS AFTER THE PLACEMENT OF THE SHEAR KEYS BUT NOT BEFORE THE GROUT HAS OBTAINED ITS MINIMUM STRENGTH OF 2500 psi. TIGHTEN TENDON AT CENTERLINE OF SPAN FIRST AND THEN PROGRESS TOWARD ENDS OF BEAM. ALTERNATE LEFT AND RIGHT OF CENTERLINE FOR BEAMS WITH 5 TENDONS.
3. TENSION THE TENDONS IN ACCORDANCE WITH SECTION 1108.03(e) OF PUB. 408. SECTION 1108.01 OF PUB. 408 DOES NOT APPLY TO POST-TENSIONING OF ADJACENT BOX BEAMS.
4. PLUG 1/4"Ø VENT HOLE WITH NON-SHRINK GROUT AFTER REMOVAL OF BEAMS FROM THE FORMS.
5. FORM TENDON HOLES WITH NONMETALLIC PIPE.
6. PROVIDE SILICONE SEALANT MATERIAL IN ACCORDANCE WITH SECTION 705.4(d) OF PUB. 408.
7. FOR SHEAR KEY CLEANING AND GROUTING, SEE SECTION 1080.3(d) OF PUB. 408. OMIT SOAKING JOINTS WITH WATER, SPADING GROUT AND OVERFILLING THE SHEAR KEYS DUE TO THE USE OF NON-SHRINK EPOXY GROUT.
8. PROVIDE NON-SHRINK EPOXY GROUT IN ACCORDANCE WITH SECTION 910.2(b) AND 1080.2(g) OF PUB. 408 FOR SHEAR KEYS. USE EPOXY GROUT WITHIN THE SHELF LIFE AND TEMPERATURE LIMITATIONS SET BY THE MANUFACTURER. CURE THE EPOXY GROUT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. DO NOT PERMIT CONSTRUCTION ACTIVITY OR OTHER LOADINGS ON BRIDGE FOR AT LEAST 24 HOURS AFTER SHEAR KEY EPOXY GROUT HAS BEEN PLACED. FOR VEHICULAR LOADING, SECTION 1080.3(d) 5 OF PUB.408 APPLIES.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BRIDGE OFFICE

STANDARD
MISCELLANEOUS PRESTRESS DETAILS
ADJACENT BOX BEAM

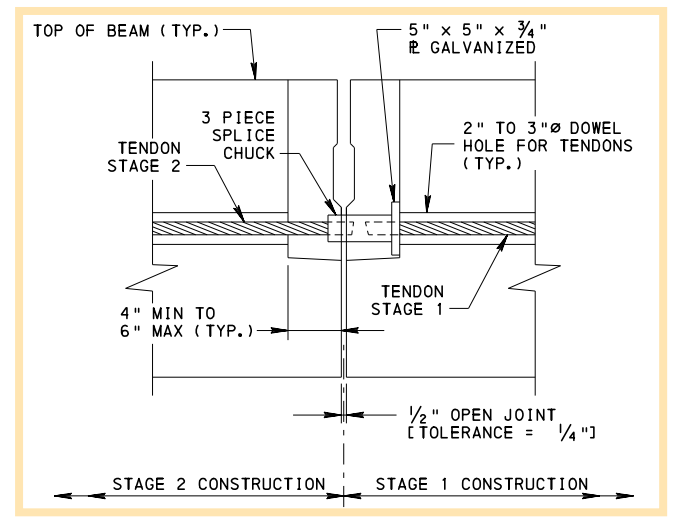
RECOMMENDED NOV. 23, 2022 <i>L. W. Gray</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Gavin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 2 OF 3 BC-775M
---	---	-------------------------



PARTIAL PLAN - BEAMS FOR STAGED CONSTRUCTION
SPLICE CHUCK ALTERNATE

PARTIAL PLAN - BEAMS FOR STAGED CONSTRUCTION
DOUBLE DUCT ALTERNATE

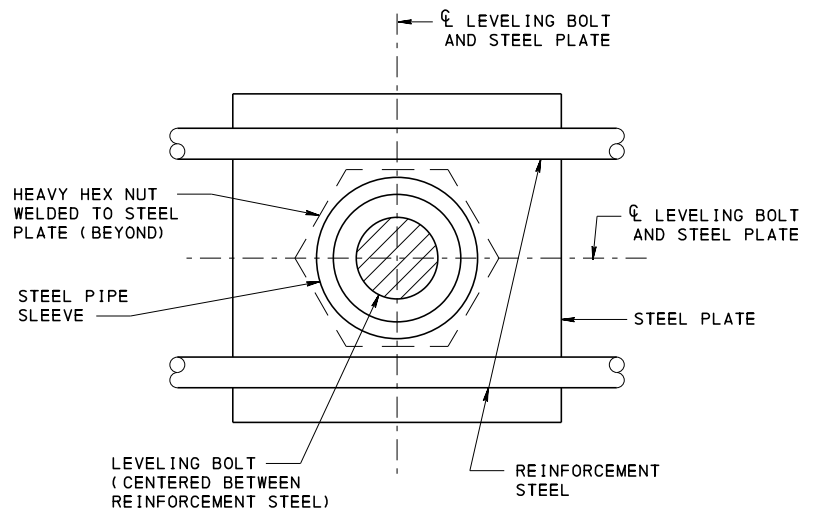
- STAGED CONSTRUCTION NOTE:**
1. THE LOCATION OF THE TRANSVERSE TENDONS FOR STAGED CONSTRUCTION MUST BE SHOWN ON THE SHOP DRAWINGS TO ACCOUNT FOR DIFFERENCES IN CAMBER OF THE BEAMS IN EACH STAGE.
 2. SHIFTING OF TENDON BY UP TO 1/2" PERMITTED TO AVOID LOSS OF STRAND POSITIONS. **SPLICE CHUCK POCKET PROHIBITS ALL STRAND LOCATIONS ABOVE TENDON.**
 3. CONTRACTOR IS RESPONSIBLE TO VERIFY POST-TENSIONING TUBE ALIGNMENT BETWEEN STAGES.
 4. CONTRACTOR TO PROTECT SPLICE CHUCK FOR TIME LAPSE BETWEEN PHASES.
 5. **IF THE SECONDARY POST-TENSIONING DUCT IS OMITTED, A TEMPORARY MECHANISM TO MAINTAIN THE OPEN JOINT BETWEEN BEAMS, WHICH ALLOWS FOR THE VERTICAL DEFLECTION BETWEEN THE ACTIVE CONSTRUCTION STAGE AND THE COMPLETED CONSTRUCTION STAGE, MUST BE DEVELOPED TO PREVENT CLOSURE OF THE SHEAR KEY JOINT DURING POST-TENSIONING.**



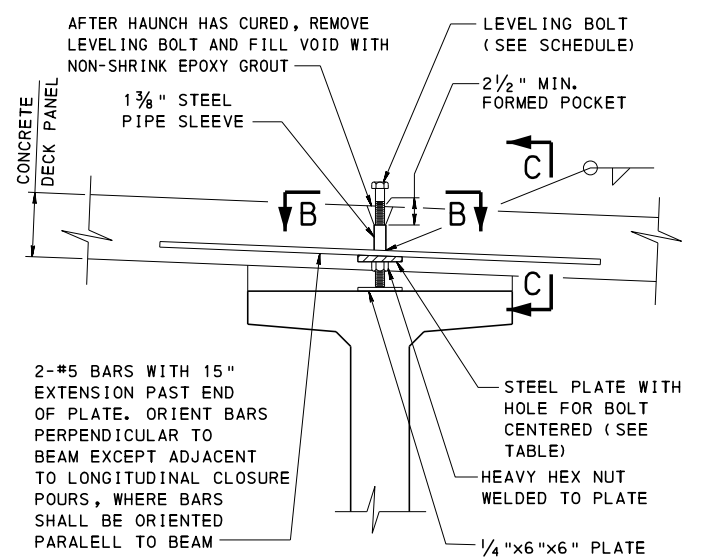
SECTION A-A

VERTICAL ADJUSTMENT DEVICE NOTES:

1. VERTICAL ADJUSTMENT DEVICES SHALL BE DESIGNED TO RESIST TWO TIMES THE ANTICIPATED PANEL DEAD LOAD POINT SUPPORT FORCE.
2. ALTERNATE LEVELING DEVICES MAY BE SUBSTITUTED BY THE CONTRACTOR WITH THE APPROVAL FROM THE ENGINEER.
3. IF BOLT IS OILED OR GREASED TO FACILITATE LEVELING AND REMOVAL, ADEQUATELY CLEAN AND REMOVE DEBRIS PRIOR TO FILLING VOIDS WITH GROUT.



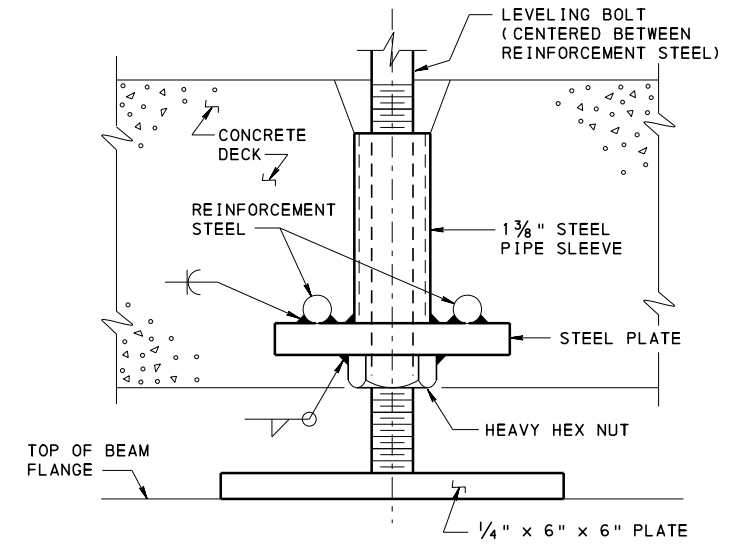
SECTION B-B



VERTICAL ADJUSTMENT DEVICE

(VERTICAL ADJUSTMENT ON STEEL BEAM/GIRDER SIMILAR)
 (HAUNCH DETAILS NOT SHOWN FOR CLARITY)
 (MIN. OF 2 LOCATIONS PER BEAM PER PANEL)

VERTICAL ADJUSTMENT SCHEDULE		
SERVICE LOAD	BOLT DIA.	STEEL PLATE WITH HOLE FOR BOLT CENTERED
10 KIPS	1"	4"x4"x5/8"
20 KIPS	1 1/4"	4"x4"x7/8"



SECTION C-C

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BRIDGE OFFICE

STANDARD
 MISCELLANEOUS PRESTRESS DETAILS
 ADJACENT BOX BEAM AND
 VERTICAL ADJUSTMENT DEVICE DETAILS

GENERAL NOTES

1. DESIGN SPECIFICATIONS:
 - PENNDOT DESIGN MANUAL PART 4, STRUCTURES, APRIL 2015 EDITION.
 - 1989 AASHTO "GUIDE SPECIFICATIONS FOR STRUCTURAL DESIGN OF SOUND BARRIERS", INCLUDING THE 1992 AND 2002 INTERIMS.
 - 1992 AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES", 15TH EDITION, INCLUDING THE 1993 AND 1994 INTERIMS.
 - 2001 AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS", 4TH EDITION, INCLUDING THE INTERIMS THROUGH 2006.
 - DESIGN IS IN ACCORDANCE WITH THE WORKING STRESS DESIGN METHOD. (NO INCREASE IN ALLOWABLE UNIT STRESSES ARE PERMITTED EXCEPT FOR GROUP III LOADINGS WHICH PERMITS A 33% OVERSTRESS.)
2. CONSTRUCTION SPECIFICATIONS AND WORKMANSHIP:
 - PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH THE CURRENT VERSION OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, AASHTO/AWS/D1.5M/D1.5 2008. - BRIDGE WELDING CODE AND THE CONTRACT SPECIAL PROVISIONS. (USE AWS/D1.1/D1.1M 2008. FOR WELDING NOT COVERED IN AASHTO/AWS/D1.5M/D1.5 2008.)
3. WALL HEIGHTS MUST EQUAL OR EXCEED THE ACOUSTICAL PROFILE.
4. PANEL HEIGHTS:
 - 2'-0" MINIMUM TO 9'-0" MAXIMUM
 - PROVIDE STACKED PANELS WHEN THE WALL HEIGHT EXCEEDS 9'-0"
5. HORIZONTAL PANEL JOINTS:
 - MINIMIZE THE NUMBER OF HORIZONTAL PANEL JOINTS.
 - PROVIDE UNIFORM STEPS.
 - IF STEPS ARE REQUIRED, THE ELEVATION DIFFERENCE BETWEEN ADJACENT PANELS IS NOT PERMITTED TO BE LESS THAN 6" OR GREATER THAN 2'-0".
6. PROVIDE STEEL CABLES IN THE PRECAST CONCRETE PANELS AS INDICATED ON THE CONTRACT DRAWINGS. (REFER TO BC-779M FOR DETAILS)
7. INSTALL PANELS TRULY VERTICAL.
8. PROVIDE CONCRETE COVER IN ACCORDANCE WITH THIS STANDARD AND DESIGN MANUAL PART 4.
9. FILL ALL LIFTING INSERTS WITH NON-SHRINK GROUT. GROUT TO MATCH PANEL.
10. SEAL ALL OPEN JOINTS WITH CAULKING COMPOUND AND/OR JOINT SEALING MATERIAL. (COLOR TO MATCH PANEL).
11. REFER TO PUBLICATION 408, SECTION 1086.3(f) FOR FABRICATION AND ERECTIONS TOLERANCES.
12. CHAMFER EXPOSED CONCRETE EDGES ON PANELS 1/2" x 1/2", EXCEPT AS NOTED.
13. ALL DIMENSIONS SHOWN ARE HORIZONTAL, EXCEPT AS NOTED.
14. DIMENSIONS SHOWN ARE FOR A NORMAL TEMPERATURE OF 68 DEGREES F.
15. REINFORCEMENT IN SOME SECTIONS IS NOT SHOWN FOR CLARITY.
16. COORDINATE, LOCATE, AND CONDUCT ALL WORK RELATED TO PUBLIC AND PRIVATE UTILITIES IN ACCORDANCE WITH PUBLICATION 408, SECTION 105.06 AND 107.12, AND THE CONTRACT SPECIAL PROVISIONS.
17. IF NEEDED DETAIL IS NOT FOUND IN THE SOUND BARRIER STANDARDS OR ON THE CONTRACT DRAWINGS A SPECIAL SUBMISSION REQUESTING APPROVAL FOR SPECIFIC DETAILS MUST BE MADE TO THE CHIEF BRIDGE ENGINEER.

ARCHITECTURAL SURFACE TREATMENTS

1. THE AVERAGE ARCHITECTURAL SURFACE TREATMENT THICKNESS, PER SIDE OF PANEL, IS PERMITTED TO VARY FROM 0 TO 1/2 INCH, BUT THE TOTAL AVERAGE ARCHITECTURAL SURFACE TREATMENT, ON BOTH SIDES OF THE PANEL, MUST NOT BE GREATER THAN 1/2 INCH UNLESS OTHERWISE INDICATED ON THE CONTRACT DRAWINGS.
2. IF A SMOOTH ARCHITECTURAL SURFACE TREATMENT IS PROVIDED, THE TREATMENT MAY EXTEND TO THE EDGES OF PANELS AS LONG AS THE PANEL FITS BETWEEN THE FLANGES OF THE POST.
3. STAMPED FINISHES MAY BE PERMITTED IF ACCEPTED BY THE DISTRICT BRIDGE ENGINEER.
4. REFER TO PUBLICATION 408, SECTION 1086.3 AND/OR THE CONTRACT DOCUMENTS FOR ARCHITECTURAL SURFACE TREATMENT TOLERANCES.
5. REFER TO CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION.

INDEX OF SHEETS

SHT. NO.	SHEET TITLE
1	GENERAL NOTES - 1
2	GENERAL NOTES - 2
3	GEOMETRY AND LAYOUT
4	PRECAST CONCRETE PANEL DETAILS - 1
5	PRECAST CONCRETE PANEL DETAILS - 2
6	PRECAST CONCRETE PANEL DETAILS - 3
7	PRECAST CONCRETE PANEL DETAILS - 4

CHANGE 2

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE PANELS

GENERAL NOTES - 1

BC-736M	REINFORCEMENT BAR FABRICATION DETAILS
BC-777M	GROUND MOUNTED SOUND BARRIERS - PRECAST CONCRETE POSTS
BC-778M	GROUND MOUNTED SOUND BARRIERS - STEEL POSTS
BC-779M	STRUCTURE MOUNTED SOUND BARRIER WALLS

REFERENCE DRAWINGS

RECOMMENDED JAN. 31, 2019 <i>T. Romeo R. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>William J. [Signature]</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 1 OF 7 BC-776M
--	--	--------------------------------

NOTES TO FABRICATOR

1. PROVIDE SHOP DRAWINGS IN ACCORDANCE WITH PUBLICATION 408, SECTION 105.02(d) AND 1086.
2. THE FOLLOWING INFORMATION MUST BE SHOWN ON THE SHOP DRAWINGS (IF APPLICABLE):
 - GENERAL NOTES
 - FABRICATION NOTES
 - TRANSPORTATION NOTES
 - LIFTING AND ERECTION NOTES
 - INSTALLATION NOTES
 - ELEVATION VIEW INDICATING THE FOLLOWING MINIMUM INFORMATION:
 - OVERALL WALL LENGTH
 - POST SPACINGS
 - POST AND PANEL CODES/DESIGNATIONS
 - HORIZONTAL JOINT LOCATIONS (IF PERMITTED)
 - ELEVATIONS FOR THE FOLLOWING ITEMS:
 - ACOUSTIC PROFILE ELEVATIONS
 - TOP OF WALL ELEVATIONS
 - HORIZONTAL JOINT ELEVATIONS (IF PERMITTED)
 - TOP OF POSTS ELEVATIONS
 - TOP OF BASE PLATE ELEVATIONS
 - TOP OF CAISSON ELEVATIONS
 - TOP OF SPREAD FOOTING ELEVATIONS
 - FINISHED GROUND ELEVATIONS
 - INDIVIDUAL POST DETAILS
 - INDIVIDUAL PANEL DETAILS
 - CONNECTION DETAILS
 - BASE PLATE DETAILS
 - ANCHOR BOLT DETAILS
 - LIFTING INSERT DETAILS
 - MATERIAL LISTS
 - REINFORCEMENT BAR SCHEDULES
 - ANY OTHER INFORMATION REQUIRED TO FABRICATE AND CONSTRUCT THE SOUND BARRIER WALL
3. THE SHOP DRAWINGS FOR THE PRECAST CONCRETE SOUND BARRIER PANELS AND THE PRECAST CONCRETE OR FABRICATED STRUCTURAL STEEL POSTS MUST BE SUBMITTED CONCURRENTLY.
4. PRECAST CONCRETE PANELS:
 - THE FABRICATOR MUST ENSURE THAT THE PANELS ARE ADEQUATELY DESIGNED FOR STRESSES DUE TO STRIPPING, HANDLING, ERECTION AND TRANSPORTATION. PROVIDE AND SUBMIT DESIGN CALCULATIONS, AS REQUIRED.
5. LIFTING INSERTS:
 - PREPARE AND SUBMIT DESIGN CALCULATIONS FOR POST AND PANEL LIFTING INSERTS FOR ACTUAL STRENGTH OF CONCRETE AT TIME OF STRIPPING, TRANSPORTATION AND ERECTION.
 - PROVIDE LIFTING INSERTS WITH A MINIMUM CAPACITY OF AT LEAST TWO TIMES THE CALCULATED LOAD ON THE INSERT.
 - PROVIDE A MINIMUM OF TWO LIFTING INSERTS OR A MAXIMUM OF FOUR LIFTING INSERTS IN THE PRECAST CONCRETE PANELS.
 - PROVIDE GALVANIZED INSERTS.
6. IF REQUIRED, PREPARE AND SUBMIT TEMPORARY BRACING CALCULATIONS AND DETAILS.
7. PREPARE AND SUBMIT CATALOG CUTS IN ACCORDANCE WITH PUBLICATION 408, SECTION 1086.3.
8. #4 GRADE 60 REINFORCEMENT BARS MAY BE SUBSTITUTED FOR WELDED WIRE FABRIC WITH AN EQUIVALENT AREA AT NO ADDITIONAL COST TO THE DEPARTMENT.
9. PANELS MUST BE STORED, TRANSPORTED, HANDLED, AND ERECTED ON EDGES AT ALL TIMES. PANELS SHOULD NOT BE LAID FLAT.
10. FABRICATORS MUST BE PRE-APPROVED BY PENNDOT PER BULLETIN #15.

MATERIAL NOTES

1. PRECAST CONCRETE SOUND BARRIER PANELS:
 - PROVIDE CLASS AA CEMENT CONCRETE, MODIFIED IN THE PRECAST CONCRETE PANELS.
 - $f'c = 5,000$ PSI
 - DENSITY OF CONCRETE = UNIT WEIGHT OF CONCRETE = 150 LB./CU.FT.
 - PROVIDE A MINIMUM CONCRETE STRENGTH OF 4,000 PSI BEFORE STRIPPING THE PANELS FROM THE FORMS.
2. REINFORCEMENT STEEL:
 - PROVIDE GRADE 60 DEFORMED REINFORCING BARS THAT MEET THE REQUIREMENTS OF ASTM A615, ASTM A996 OR ASTM A706. DO NOT WELD REINFORCING BARS UNLESS SPECIFIED. DO NOT USE RAIL STEEL A996 REINFORCEMENT BARS WHERE BENDING OR WELDING OF REINFORCEMENT BARS IS INDICATED.
 - $f_s = 24,000$ PSI
 - PROVIDE UNCOATED, EPOXY COATED, OR GALVANIZED REINFORCEMENT IN THE PANELS AS SPECIFIED ON THE CONTRACT DRAWINGS.
 - PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH FOR REINFORCING BARS OF 30 DIAMETERS OR IN ACCORDANCE WITH THE CURRENT AASHTO SPECIFICATIONS AS MODIFIED BY THE DESIGN MANUAL PART 4, WHICHEVER IS GREATER.
3. WELDED WIRE FABRIC:
 - PROVIDE GRADE 65 PLAIN WELDED WIRE FABRIC THAT MEET THE REQUIREMENTS OF ASTM A185 IN THE PRECAST CONCRETE PANELS.
 - $f_s = 24,000$ PSI
 - PROVIDE UNCOATED, EPOXY COATED, OR GALVANIZED WELDED WIRE FABRIC IN THE PANELS AS SPECIFIED ON THE CONTRACT DRAWINGS.
 - PROVIDE MINIMUM LAP FOR WELDED WIRE FABRIC IN ACCORDANCE WITH CURRENT AASHTO SPECIFICATIONS AS MODIFIED BY THE DESIGN MANUAL PART 4.
 - DO NOT MIX THE USE OF WELDED WIRE FABRIC AND REINFORCEMENT STEEL IN THE PANEL, EXCEPT AS INDICATED.
4. PLAIN NEOPRENE BEARING PADS AND ELASTOMERIC PADS:
 - PROVIDE PLAIN NEOPRENE PADS WITH A DUROMETER HARDNESS OF 50 (+/-)5 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1113.02.
5. NON-SHRINK GROUT:
 - PROVIDE NON-SHRINK GROUT IN ACCORDANCE WITH PUBLICATION 408, SECTION 1080.2(c).
 - PLACE NON-SHRINK GROUT AFTER THE BASE PLATE IS LEVELED ON THE LEVELING NUTS.
 - PACK GROUT INTO PLACE. DO NOT POUR OR INJECT GROUT.
 - NON-SHRINK GROUT TO MATCH FINAL COLOR OF PANEL.
6. CAULKING COMPOUND:
 - PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.8(b).
 - CAULKING COMPOUND TO MATCH FINAL COLOR OF PANEL.
7. JOINT SEALING MATERIAL:
 - PROVIDE JOINT SEALING MATERIAL IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.4(d).
 - JOINT SEALING MATERIAL TO MATCH FINAL COLOR OF PANEL.
8. JOINT BACKING MATERIAL (BACKER ROD):
 - PROVIDE BACKER ROD MATERIAL IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.9.
9. ANTIGRAFFITI COATING:
 - APPLY ANTIGRAFFITI COATING IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIAL PROVISIONS.
10. PENETRATING CONCRETE STAIN:
 - APPLY STAIN IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIAL PROVISIONS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE PANELS

GENERAL NOTES - 2

RECOMMENDED JAN. 31, 2019

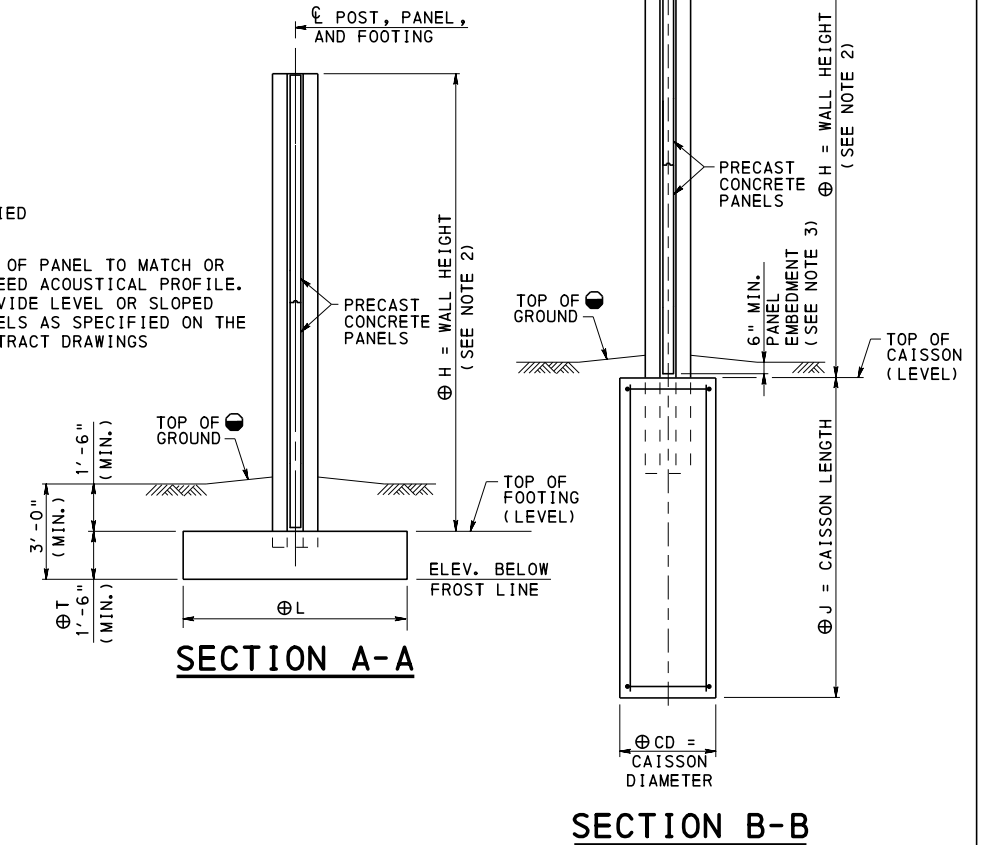
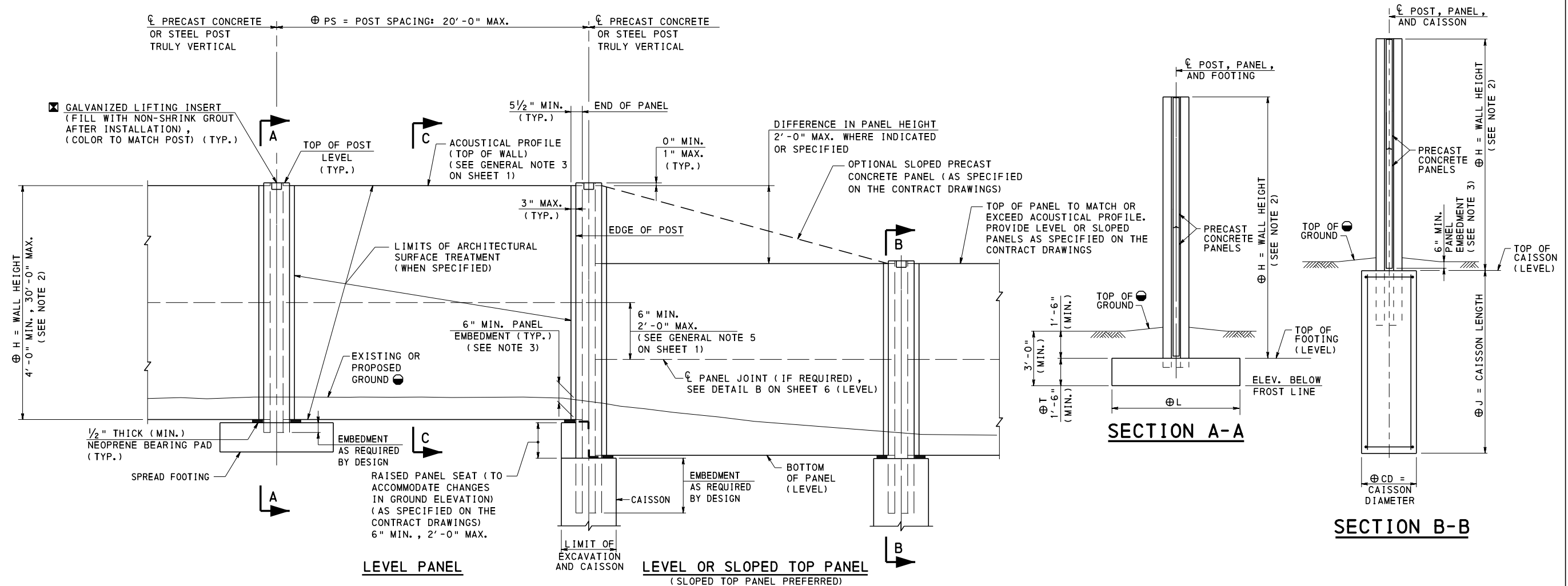
T. Romeo R. Maciora
CHIEF BRIDGE ENGINEER

RECOMMENDED JAN. 31, 2019

William J. Bales
ACTING DIR. BUR. OF PROJECT DELIVERY

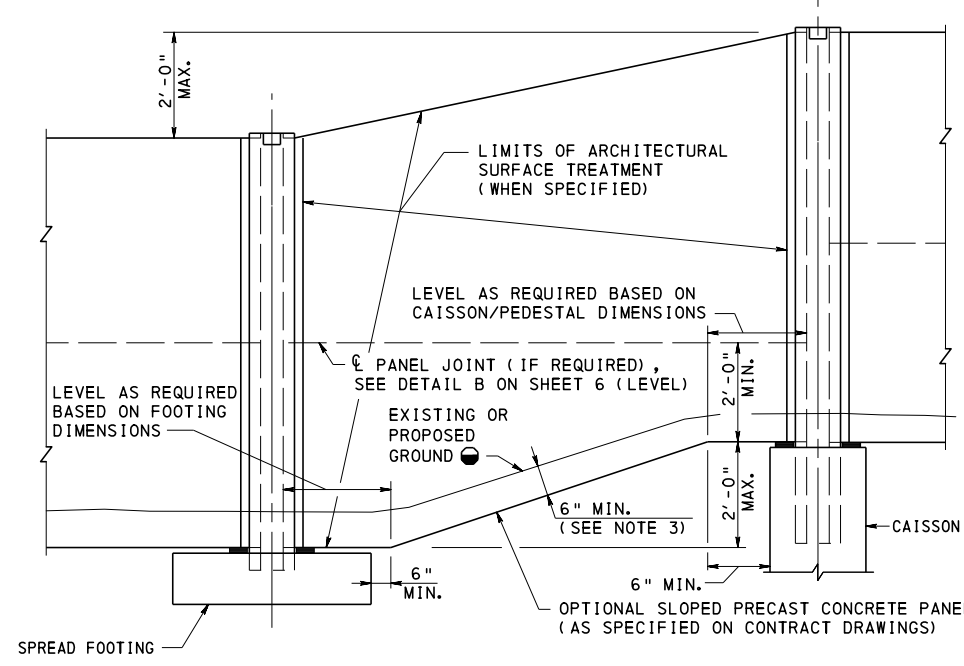
SHEET 2 OF 7

BC-776M



GROUND MOUNTED SOUND BARRIER ELEVATION

(PRECAST CONCRETE POST SHOWN, STEEL POST SIMILAR)



OPTIONAL SLOPED BOTTOM PANEL ELEVATION

(USE IN PLACE OF RAISED PANEL SEAT)

LEGEND:

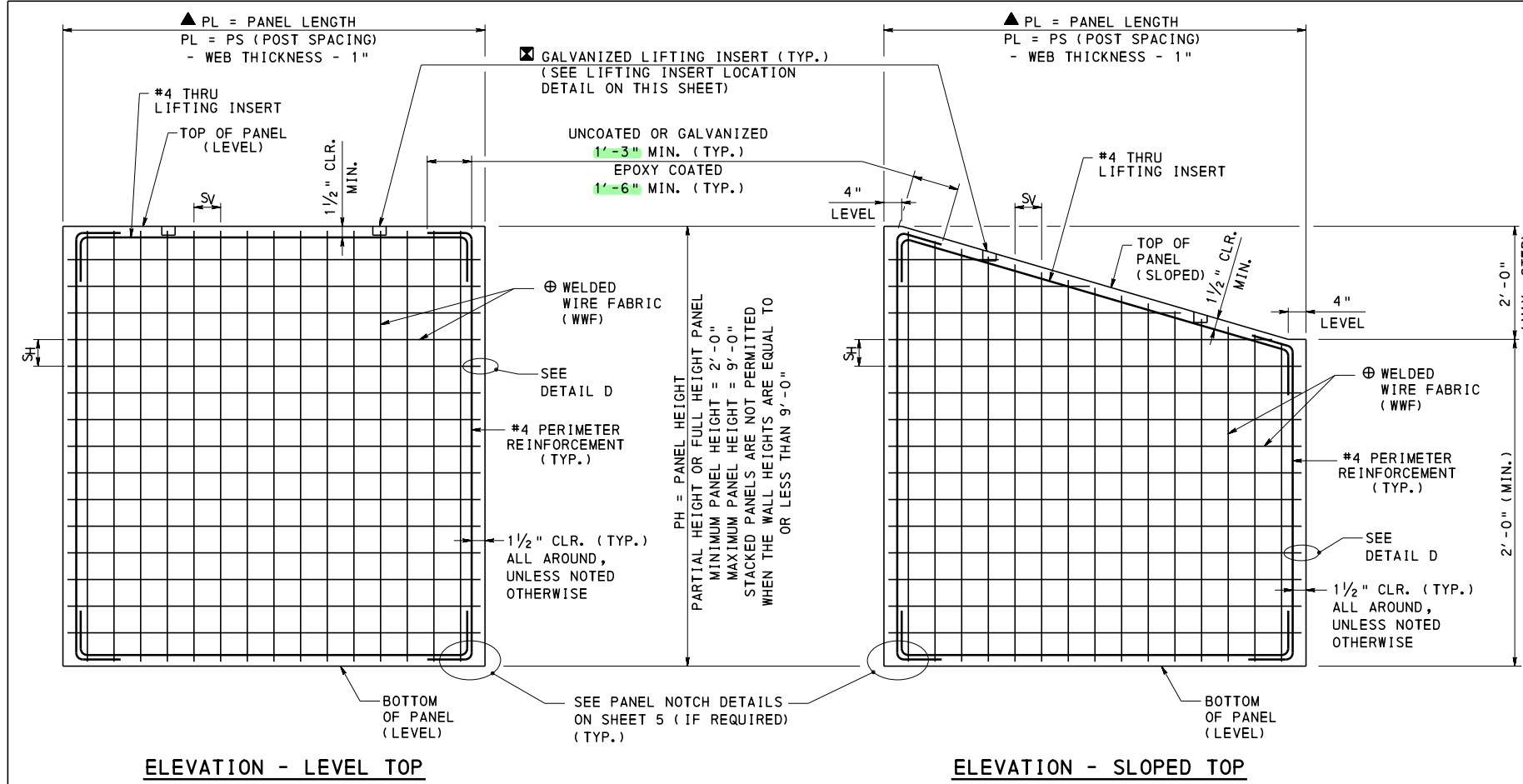
- ☒ FABRICATOR TO VERIFY ADEQUACY OF LIFTING INSERTS
- ⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS
- GRADE GROUND TO DRAIN AWAY FROM WALL. FILL DEPTH ON EACH SIDE OF WALL TO BE WITHIN 1'-0" DIFFERENCE.

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. WALL HEIGHT IS DEFINED AS FOLLOWS:
 - POST WITH BASE PLATE: H = HEIGHT FROM TOP OF BASE PLATE TO TOP OF WALL
 - POST WITHOUT BASE PLATE: H = HEIGHT FROM TOP OF FOOTING/CAISSON TO TOP OF WALL
3. PANEL EMBEDMENT MAY NEED TO BE INCREASED TO ACCOMMODATE BASE PLATES AND ANCHOR BOLT PROJECTIONS.
4. FOR SECTION C-C, REFER TO SHEET 6.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

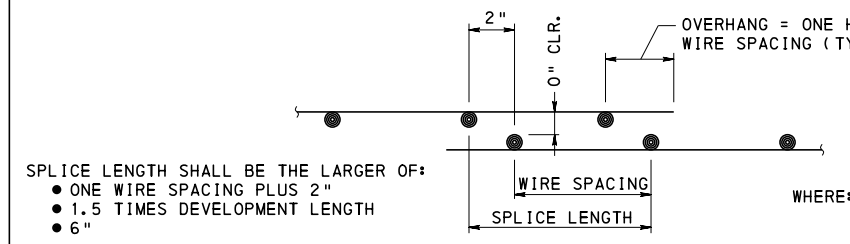
**STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE PANELS
GEOMETRY AND LAYOUT**



ELEVATION - LEVEL TOP

ELEVATION - SLOPED TOP

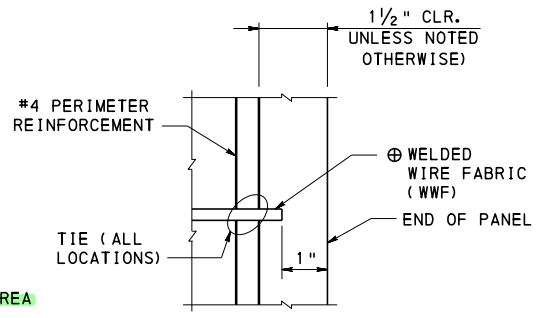
PRECAST CONCRETE PANEL



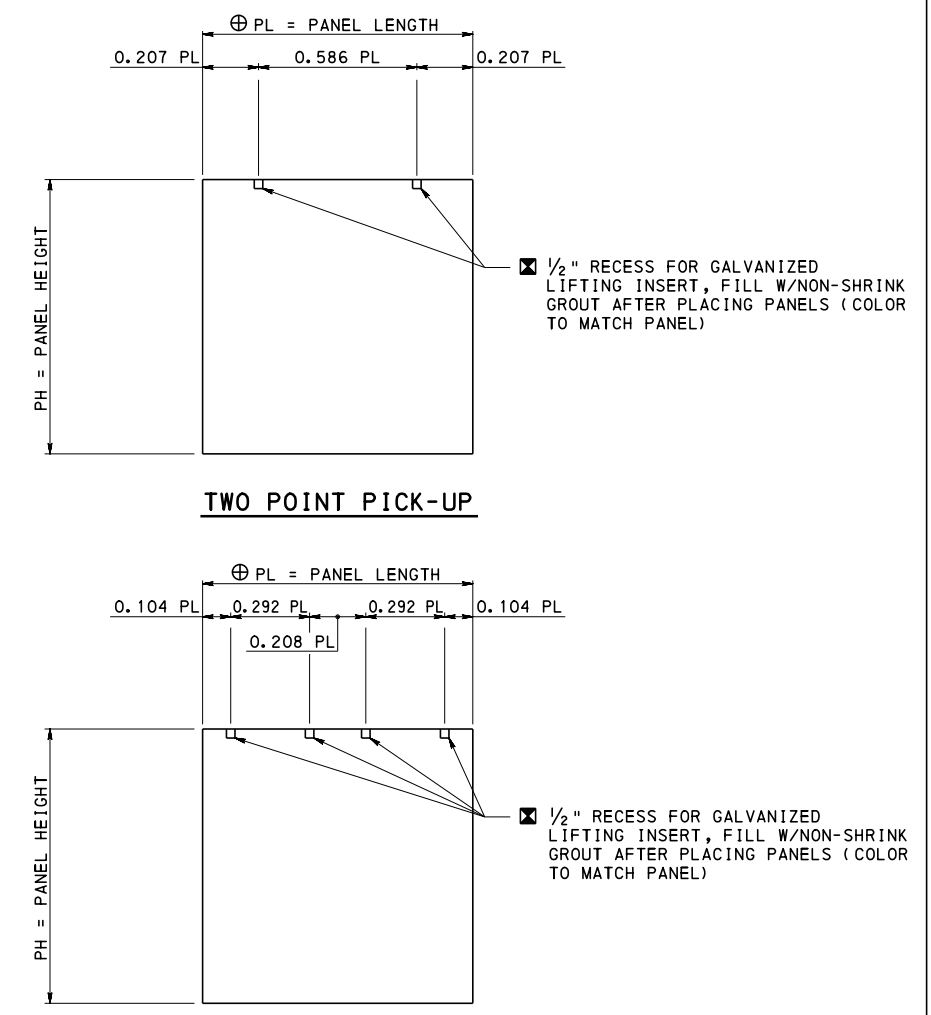
WWF SPLICE DETAIL
(IF REQUIRED)

LEGEND FOR WELDED WIRE FABRIC
WWF AxB-WCxWD

- WHERE:
- A = SPACING OF HORIZONTAL BARS (S_H)
 - B = SPACING OF VERTICAL BARS (S_V)
 - C = HORIZONTAL WIRE CROSS SECTIONAL AREA
IN SQ. INCHES MULTIPLIED BY 100
 - D = VERTICAL WIRE CROSS SECTIONAL AREA
IN SQ. INCHES MULTIPLIED BY 100
 - WWF = WELDED WIRE FABRIC



DETAIL D



TWO POINT PICK-UP

FOUR POINT PICK-UP

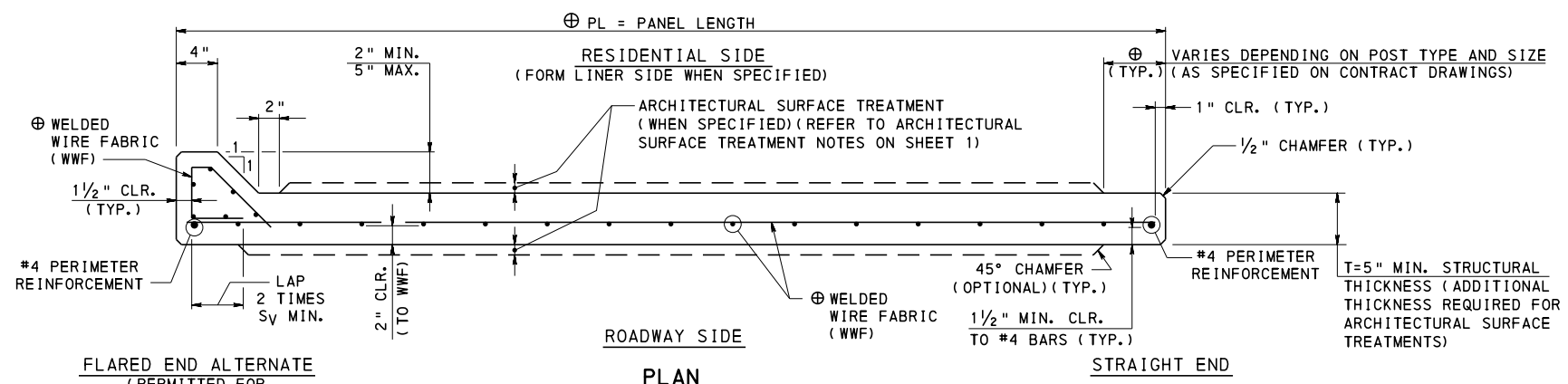
PRECAST CONCRETE PANEL LIFTING INSERT LOCATION DETAIL

LEGEND:

- ⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS
- ☒ FABRICATOR TO VERIFY ADEQUACY OF LIFTING INSERTS
- ▲ PANEL LENGTH MAY NEED ADJUSTED TO ACCOMMODATE ANGLED AND CORNER POSTS

NOTES:

- FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.



FLARED END ALTERNATE
(PERMITTED FOR STEEL POSTS ONLY)

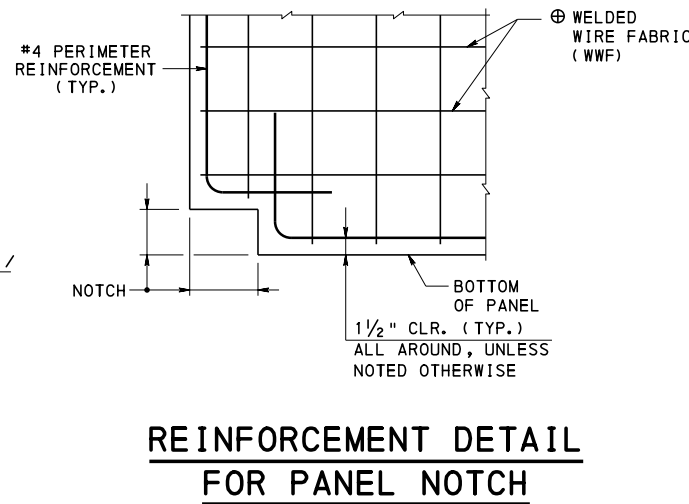
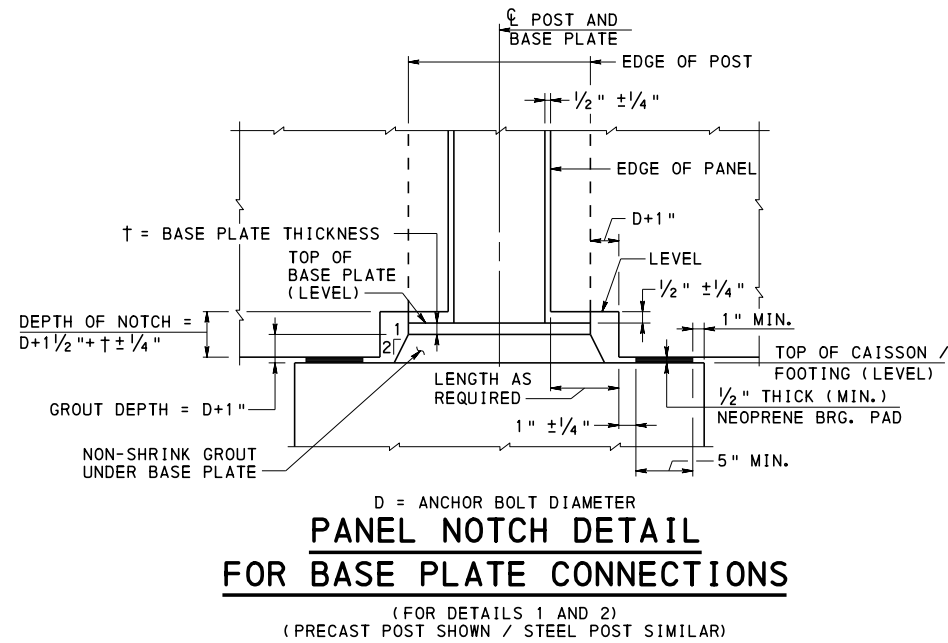
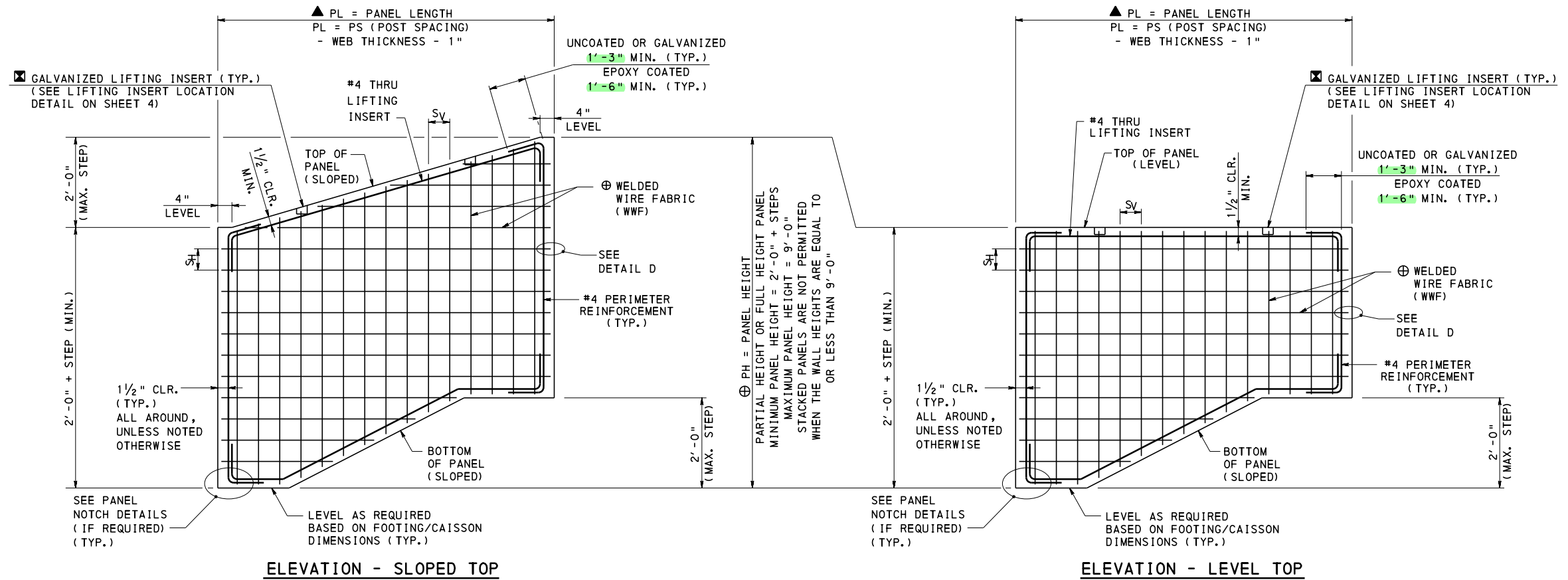
PLAN

PRECAST CONCRETE PANEL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE PANELS

PRECAST CONCRETE PANEL DETAILS - 1



NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. FOR DETAIL D, REFER TO SHEET 4.

LEGEND:

- ⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS
- ☒ FABRICATOR TO VERIFY ADEQUACY OF LIFTING INSERTS
- ▲ PANEL LENGTH MAY NEED ADJUSTED TO ACCOMMODATE ANGLED AND CORNER POSTS

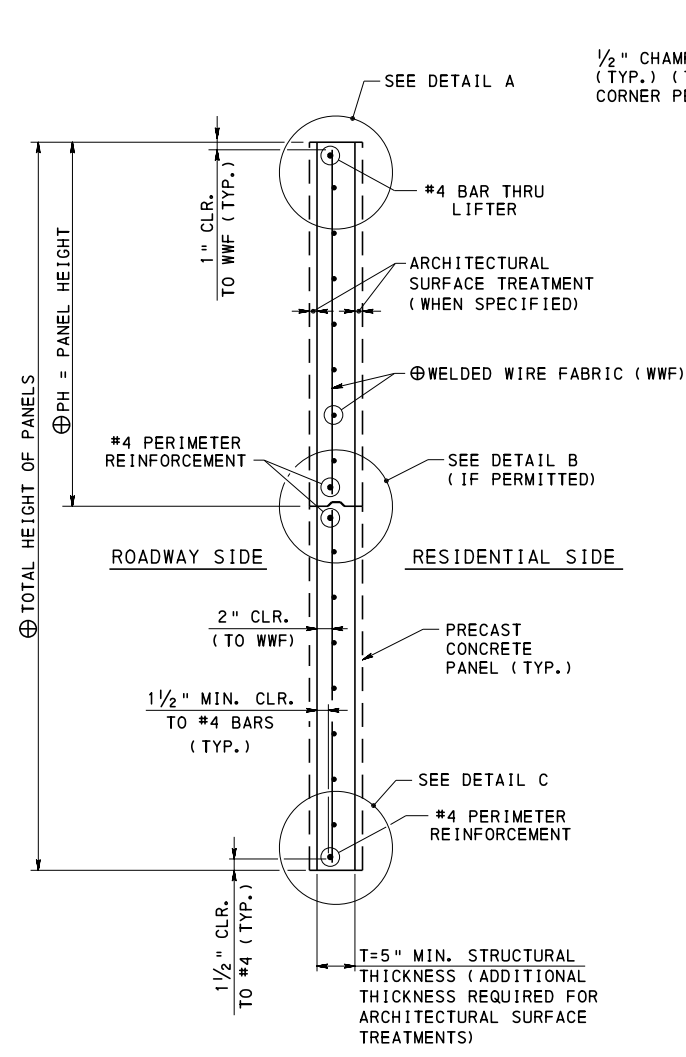
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE PANELS
PRECAST CONCRETE PANEL DETAILS - 2**

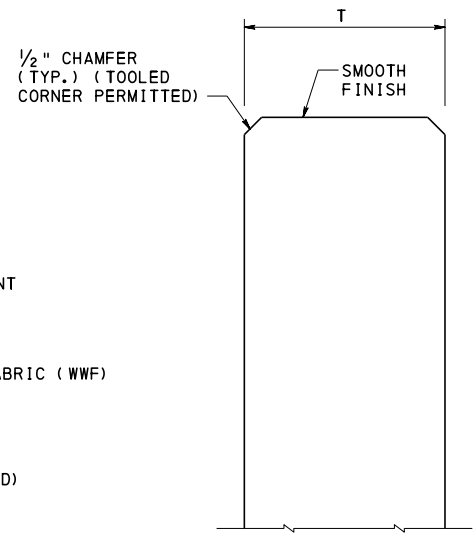
RECOMMENDED JAN. 31, 2019
T. Romeo R. Maciora
CHIEF BRIDGE ENGINEER

RECOMMENDED JAN. 31, 2019
William J. [Signature]
ACTING DIR. BUR. OF PROJECT DELIVERY

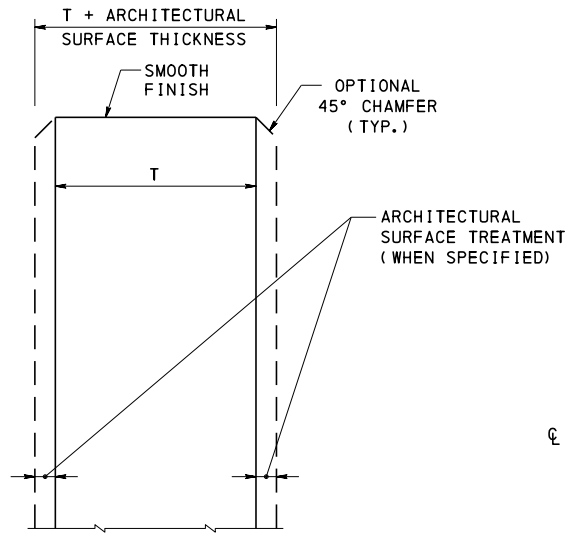
SHEET 5 OF 7
BC-776M



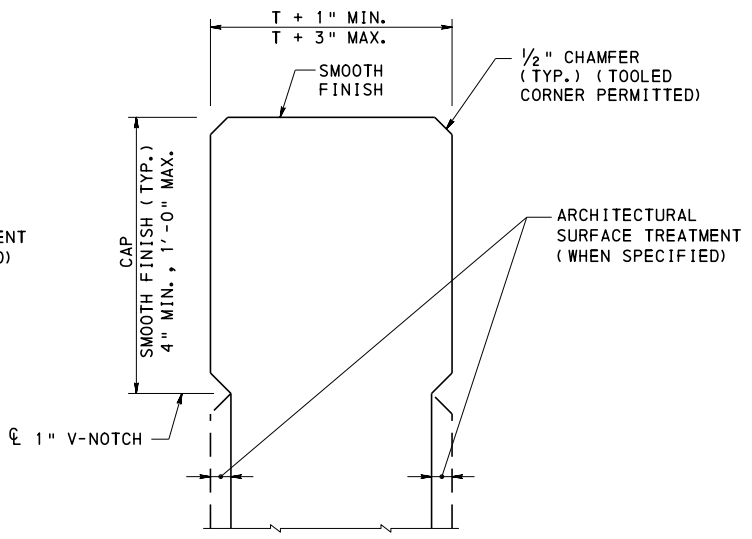
SECTION C-C
WITH ARCHITECTURAL
SURFACE TREATMENT



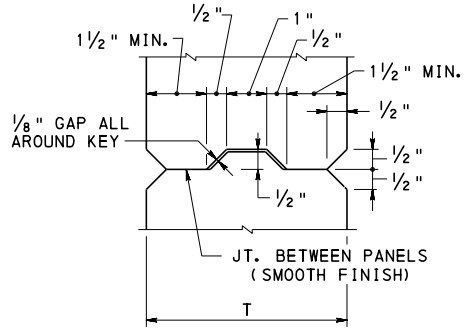
DETAIL A
NO ARCHITECTURAL
SURFACE TREATMENT



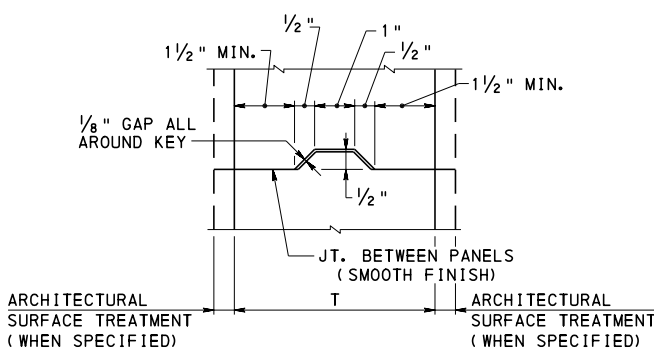
DETAIL A
WITH ARCHITECTURAL
SURFACE TREATMENT



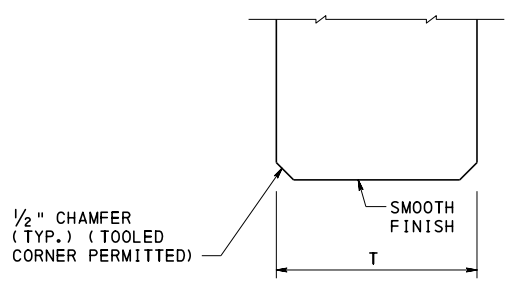
DETAIL A
WITH ARCHITECTURAL
SURFACE TREATMENT AND CAP



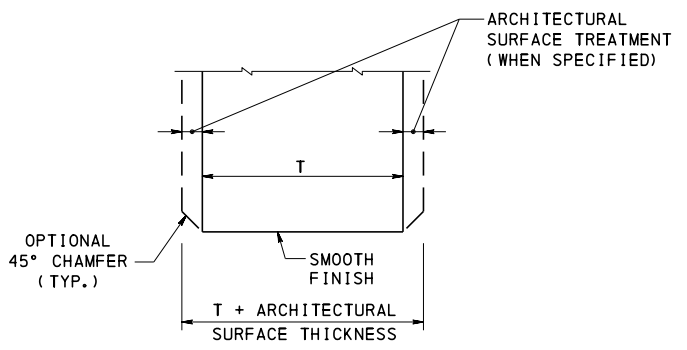
DETAIL B
NO ARCHITECTURAL
SURFACE TREATMENT



DETAIL B
WITH ARCHITECTURAL
SURFACE TREATMENT



DETAIL C
NO ARCHITECTURAL
SURFACE TREATMENT



DETAIL C
WITH ARCHITECTURAL
SURFACE TREATMENT

- NOTES:**
- FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
 - REFER TO SHEET 3 FOR LOCATION OF SECTION C-C.

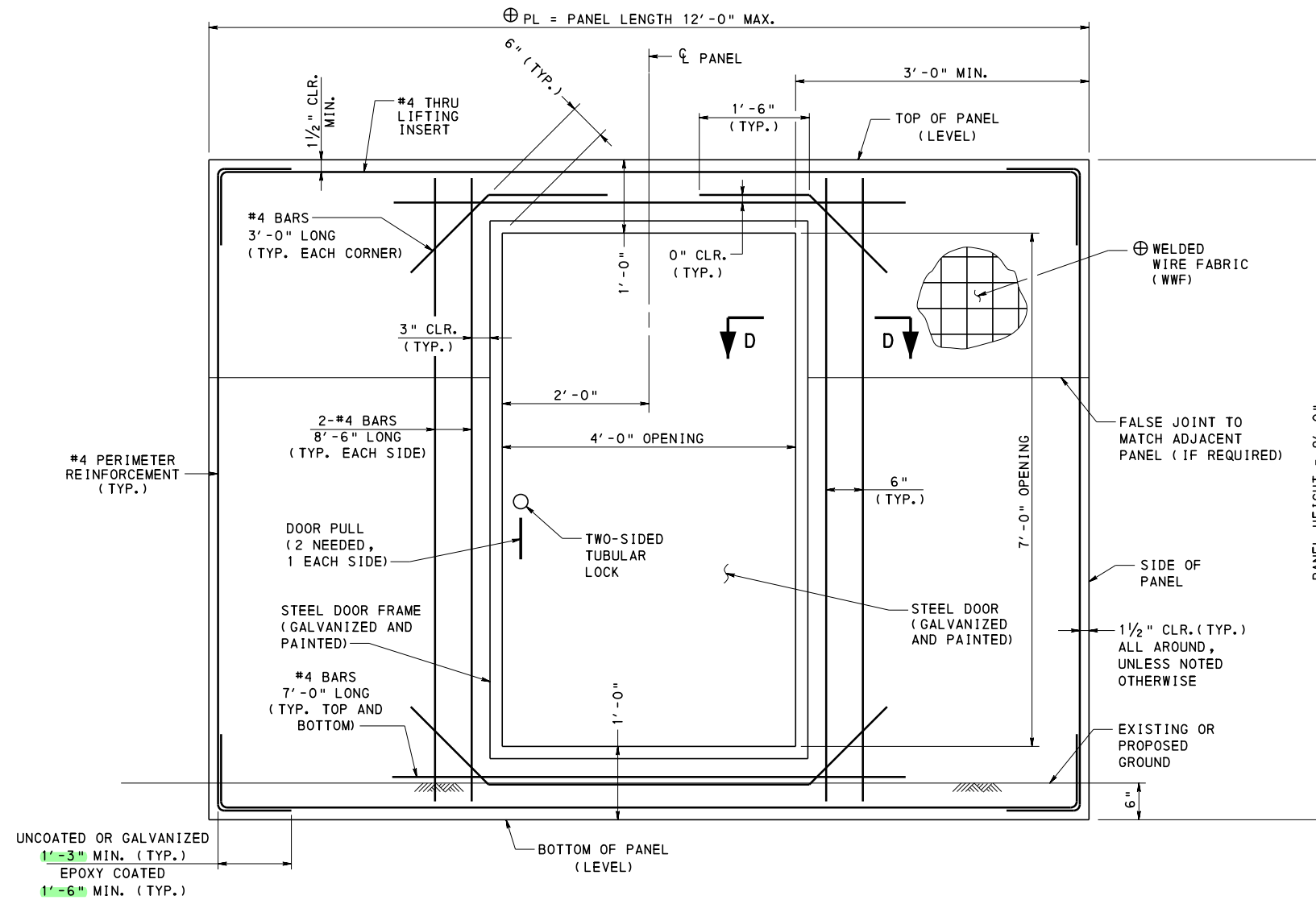
LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

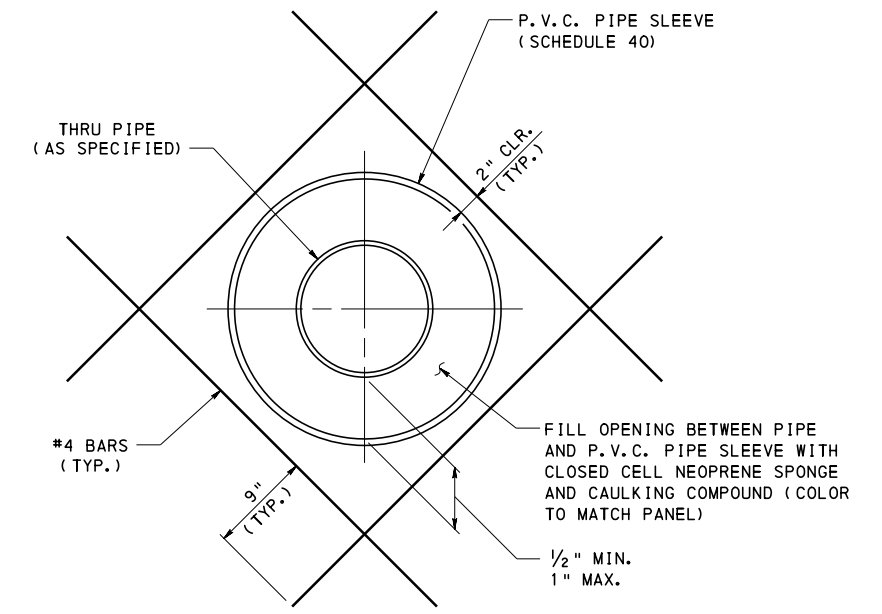
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE PANELS

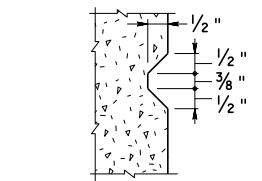
PRECAST CONCRETE PANEL DETAILS - 3



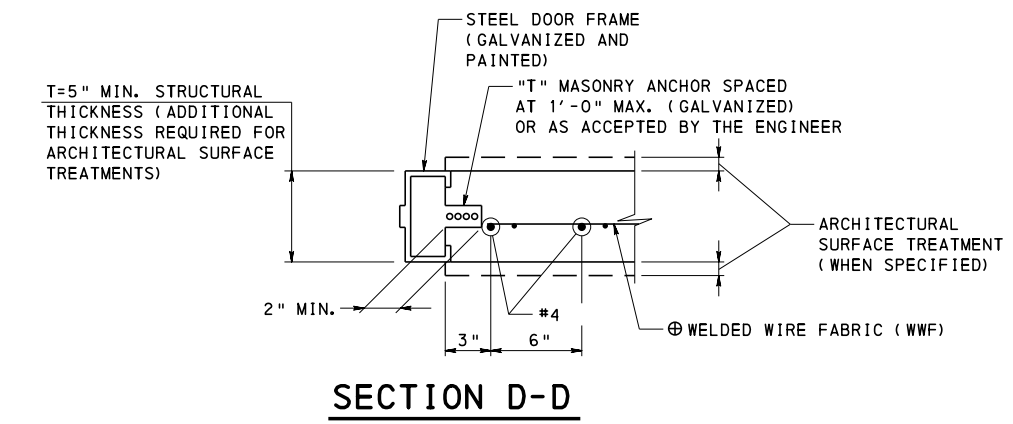
ACCESS DOOR DETAIL



SLEEVE DETAIL AT OPENINGS



FALSE JOINT
(WHERE AND WHEN SPECIFIED)



SECTION D-D

ACCESS DOOR NOTES:

1. REFER TO CONTRACT DRAWINGS FOR LOCATION OF ACCESS DOOR (IF REQUIRED) AND PROVIDE DETAILS ON THE SHOP DRAWINGS.
2. STEEL DOOR AND DOOR FRAME TO BE GALVANIZED AND PAINTED TO MATCH COLOR OF PANEL AS SPECIFIED IN THE SPECIAL PROVISIONS.
3. IF ACCESS DOOR IS REQUIRED IN THE SOUND BARRIER WALL, PROVIDE A 12'-0" MAXIMUM POST SPACING.
4. PROVIDE A 1 3/4" THICK EXTERIOR DOOR WITH A SMALL CELL HONEYCOMB OR A POLYURETHANE CORE. CORE TO BE COVERED WITH GALVANIZED STEEL WITH A 16 GAUGE THICKNESS.
5. MOUNT DOORS USING THREE HINGES.
6. PROVIDE A GALVANIZED STEEL DOOR FRAME WITH A 14 GAUGE THICKNESS.
7. ATTACH DOOR FRAME TO PRECAST CONCRETE PANEL USING GALVANIZED STEEL "T" MASONRY ANCHORS OR AN ACCEPTABLE ALTERNATE APPROVED BY THE ENGINEER.
8. DOOR FRAME WIDTH TO BE FLUSH WITH THE STRUCTURAL THICKNESS OF THE PRECAST CONCRETE PANEL.
9. PROVIDE STAINLESS STEEL DOOR PULLS (TWO NEEDED, ONE PER SIDE). MOUNT DOOR PULLS USING STAINLESS STEEL THRU-BOLTS OR AN ACCEPTABLE ALTERNATE APPROVED BY THE ENGINEER. CENTER DOOR PULLS AT 3'-0" ABOVE THE FINISHED GRADE.
10. PROVIDE A WEATHER-RESISTANT TWO-SIDED TUBULAR LOCKING DEVICE WITH A STAINLESS STEEL FINISH. KEY LOCKS AS SPECIFIED IN THE SPECIAL PROVISIONS OR AS DIRECTED BY THE ENGINEER.

LEGEND:
⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

NOTES:
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE PANELS

PRECAST CONCRETE PANEL DETAILS - 4

RECOMMENDED JAN. 31, 2019 <i>T. Renee R. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>William J. ...</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 7 OF 7 BC-776M
--	--	--------------------------------

GENERAL NOTES

1. DESIGN SPECIFICATIONS:
 - PENNDOT DESIGN MANUAL PART 4, STRUCTURES APRIL 2015 EDITION.
 - 1989 AASHTO "GUIDE SPECIFICATIONS FOR STRUCTURAL DESIGN OF SOUND BARRIERS", INCLUDING THE 1992 AND 2002 INTERIMS.
 - 2002 AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES", 17TH EDITION.
 - 2001 AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", 4TH EDITION, INCLUDING THE INTERIMS THROUGH 2006.
 - DESIGN IS IN ACCORDANCE WITH THE WORKING STRESS DESIGN METHOD. (NO INCREASE IN ALLOWABLE UNIT STRESSES ARE PERMITTED EXCEPT FOR GROUP III LOADINGS WHICH PERMITS A 33% OVERSTRESS.)
2. CONSTRUCTION SPECIFICATIONS AND WORKMANSHIP:
 - PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH THE CURRENT VERSION OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, AASHTO/AWS/D1.5 - BRIDGE WELDING CODE AND THE CONTRACT SPECIAL PROVISIONS. (USE AASHTO/AWS/D1.1 FOR WELDING NOT COVERED IN AASHTO/AWS/D1.5.)
3. WALL HEIGHTS MUST EQUAL OR EXCEED THE ACOUSTICAL PROFILE.
4. INSTALL ANCHOR BOLTS, POSTS, AND PANELS TRULY VERTICAL.
5. PROVIDE CONCRETE COVER IN ACCORDANCE WITH THIS STANDARD AND DESIGN MANUAL PART 4.
6. A HIGHER STRENGTH CONCRETE, FOR CAST-IN-PLACE CONCRETE, MAY BE SUBSTITUTED FOR A LOWER CLASS CONCRETE AT NO ADDITIONAL COST TO THE DEPARTMENT.
7. FILL ALL LIFTING INSERTS WITH NON-SHRINK GROUT. (COLOR TO MATCH PANEL)
8. SEAL ALL OPEN JOINTS WITH CAULKING COMPOUND AND/OR JOINT SEALING MATERIAL. (COLOR TO MATCH PANEL).
9. REFER TO PUBLICATION 408, SECTION 1086.3(f) FOR FABRICATION AND ERECTIONS TOLERANCES.
10. REFER TO PUBLICATION 408, SECTION 1006.3(a) FOR CAISSON SHAFT TOLERANCES.
11. CHAMFER EXPOSED CONCRETE EDGES ON PRECAST POSTS 1/2" x 1/2", EXCEPT AS NOTED.
12. CHAMFER EXPOSED CONCRETE EDGES ON CAST-IN-PLACE CONCRETE 1" x 1", EXCEPT AS NOTED.
13. RAKE-FINISH ALL HORIZONTAL CONSTRUCTION JOINTS, EXCEPT AS NOTED.
14. ALL DIMENSIONS SHOWN ARE HORIZONTAL, EXCEPT AS NOTED.
15. DIMENSIONS SHOWN ARE FOR A NORMAL TEMPERATURE OF 68 DEGREES F.
16. REINFORCEMENT IN SOME SECTIONS IS NOT SHOWN FOR CLARITY.
17. SPREAD FOOTINGS:
 - CONSTRUCT EMBANKMENTS AND/OR CUT EXISTING GRADE TO THE TOP OF FOOTING ELEVATIONS.
 - EXCAVATE FOR FOOTING CONSTRUCTION.
 - CONSTRUCT FOOTING.
 - SPREAD FOOTINGS MAY BE ORDERED BY THE REPRESENTATIVE TO BE AT ANY ELEVATION OR ANY DIMENSIONS NECESSARY TO PROVIDE A PROPER FOUNDATION. IF SPREAD FOOTINGS ARE ADJUSTED, PANEL HEIGHTS AND POST DESIGNS WILL NEED TO BE ADJUSTED.
 - USE CLASS C CEMENT CONCRETE OR NO. 2A COARSE AGGREGATE BELOW SPREAD FOOTING WHEN SPECIFIED OR DIRECTED.
18. CAISSONS:
 - CONSTRUCT EMBANKMENTS AND/OR CUT EXISTING GRADE TO THE TOP OF CAISSON ELEVATIONS PRIOR TO CONSTRUCTION OF CAISSONS.
 - THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE DRILLED OPENING INTACT AND FOR MAINTAINING THE STABILITY OF THE GROUND CUT SLOPE OR FILLED EMBANKMENT DURING DRILLING AND INSTALLATION OF CAISSONS.
 - TEMPORARY CASING MAY BE REQUIRED DURING CAISSON CONSTRUCTION IN ORDER TO MAINTAIN AN OPEN SHAFT. IF CASING IS USED, MAINTAIN CONCRETE LEVELS ABOVE THE BOTTOM OF CASING AT ALL TIMES DURING CASING EXTRACTION TO PREVENT CAVED MATERIAL FROM CONTAMINATING THE CONCRETE.
 - IF GROUNDWATER FLOW ENTERS THE CAISSON EXCAVATION DURING CONSTRUCTION, PLACE CONCRETE BY TREMIE METHODS TO ABOVE THE GROUND WATER ELEVATION IN ONE CONTINUOUS OPERATION. FILL REMAINDER OF CAISSON WITH CLASS A CONCRETE. PLACE EPOXY BONDING COMPOUND BETWEEN POURS, AS REQUIRED.
19. COORDINATE, LOCATE, AND CONDUCT ALL WORK RELATED TO PUBLIC AND PRIVATE UTILITIES IN ACCORDANCE WITH PUBLICATION 408, SECTION 105.06 AND 107.12, AND THE CONTRACT SPECIAL PROVISIONS.
20. FOR ADDITIONAL INFORMATION REFER TO BC-776M.
21. IF NEEDED DETAIL IS NOT FOUND IN THE SOUND BARRIER STANDARDS OR ON THE CONTRACT DRAWINGS A SPECIAL SUBMISSION REQUESTING APPROVAL FOR SPECIFIC DETAILS MUST BE MADE TO THE CHIEF BRIDGE ENGINEER.

MATERIAL NOTES

1. CAST-IN-PLACE CONCRETE:
 - PROVIDE CLASS A CEMENT CONCRETE IN THE CAST-IN-PLACE FOOTINGS, PEDESTALS, AND CAISSONS.
 - $f'c = 3,000$ PSI
 - UNIT WEIGHT OF CONCRETE = 150 LB. / CU. FT.
2. PRECAST CONCRETE POSTS:
 - PROVIDE CLASS AA CEMENT CONCRETE, MODIFIED IN THE PRECAST CONCRETE POSTS.
 - $f'c = 5,000$ PSI
 - UNIT WEIGHT OF CONCRETE = 150 LB. / CU. FT.
 - PROVIDE A MINIMUM CONCRETE STRENGTH OF 4,000 PSI BEFORE STRIPPING THE POSTS FROM THE FORMS.
 - PROVIDE SMOOTH FINISH ON ALL FACES OF THE PRECAST POST, UNLESS OTHERWISE SPECIFIED ON THE CONTRACT DRAWINGS.
3. REINFORCEMENT STEEL:
 - PROVIDE GRADE 60 DEFORMED REINFORCING BARS THAT MEET THE REQUIREMENTS OF ASTM A615, ASTM A996, OR ASTM A706. DO NOT WELD REINFORCING BARS UNLESS SPECIFIED. DO NOT USE RAIL STEEL A996 REINFORCEMENT BARS IN FOOTINGS, CAISSONS, OR WHERE BENDING OR WELDING OF REINFORCEMENT BARS IS INDICATED.
 - $f_s = 24,000$ PSI
 - PROVIDE UNCOATED REINFORCEMENT IN THE FOOTINGS AND CAISSONS.
 - PROVIDE UNCOATED, EPOXY COATED, OR GALVANIZED REINFORCEMENT IN THE POSTS, RAISED PANEL SEATS, AND PEDESTALS AS SPECIFIED ON THE CONTRACT DRAWINGS.
 - PROVIDE EPOXY COATED OR GALVANIZED THREADED REINFORCEMENT BARS IN THE PRECAST CONCRETE POST WITH BASE PLATES.
 - PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH FOR REINFORCING BARS OF 30 DIAMETERS OR IN ACCORDANCE WITH THE CURRENT AASHTO SPECIFICATIONS AS MODIFIED BY THE DESIGN MANUAL PART 4, WHICHEVER IS GREATER.
 - DO NOT SPLICE VERTICAL POST REINFORCEMENT.
 - MECHANICAL CONNECTIONS, WHICH MEETS THE REQUIREMENTS OF PUBLICATION 408, SECTION 1002, MAY BE USED UPON ACCEPTANCE FROM THE REPRESENTATIVE.
4. WELDED WIRE FABRIC:
 - PROVIDE GRADE 70 DEFORMED WELDED WIRE FABRIC THAT MEET THE REQUIREMENTS OF ASTM A497 IN THE PRECAST CONCRETE POSTS.
 - $f_s = 24,000$ PSI
 - PROVIDE UNCOATED, EPOXY COATED, OR GALVANIZED WELDED WIRE FABRIC IN THE POSTS.
 - PROVIDE MINIMUM LAP FOR WELDED WIRE FABRIC IN ACCORDANCE WITH CURRENT AASHTO SPECIFICATIONS AS MODIFIED BY THE DESIGN MANUAL PART 4.
 - DO NOT MIX THE USE OF WELDED WIRE FABRIC AND REINFORCEMENT STEEL, EXCEPT AS INDICATED.
5. FABRICATED STRUCTURAL STEEL:
 - PROVIDE STRUCTURAL STEEL CONFORMING TO AASHTO M270 GRADE 36 (ASTM A709, GRADE 36) UNLESS OTHERWISE NOTED.
 - GALVANIZE PLATES AND HARDWARE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s).
 - REPAIR DAMAGED GALVANIZING IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s) 2.
6. ANCHOR BOLTS, NUTS, AND WASHERS:
 - PROVIDE ANCHOR BOLTS CONFORMING TO ASTM F1554, GRADE 36 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c) 3.
 - PROVIDE HEAVY HEX NUTS CONFORMING TO ASTM A563 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c) 3g.
 - PROVIDE OVERSIZE WASHERS CONFORMING TO AASHTO M270 GRADE 36 (ASTM A709, GRADE 36).
 - PROVIDE LOCK WASHERS AND FLAT WASHERS CONFORMING TO ASTM F436 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c) 3b.
 - GALVANIZE ALL ANCHOR BOLTS AND HARDWARE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s).
7. PLAIN NEOPRENE BEARING PADS AND ELASTOMERIC PADS:
 - PROVIDE PLAIN NEOPRENE PADS WITH A DUROMETER HARDNESS OF 50 (+/-) 5 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1113.02.
8. EPOXY BONDING COMPOUND:
 - PROVIDE EPOXY BONDING COMPOUND IN ACCORDANCE WITH PUBLICATION 408, SECTION 706.1.
9. NON-SHRINK GROUT:
 - PROVIDE NON-SHRINK GROUT IN ACCORDANCE WITH PUBLICATION 408, SECTION 1080.2(c).
 - PLACE NON-SHRINK GROUT AFTER THE BASE PLATE IS LEVELED ON THE LEVELING NUTS.
 - PACK GROUT INTO PLACE. DO NOT POUR OR INJECT GROUT.
 - NON-SHRINK GROUT TO MATCH FINAL COLOR OF PANEL.
10. CAULKING COMPOUND:
 - PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.8(b).
 - CAULKING COMPOUND TO MATCH FINAL COLOR OF PANEL.
11. JOINT SEALING MATERIAL:
 - PROVIDE JOINT SEALING MATERIAL IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.4(c).
 - JOINT SEALING MATERIAL TO MATCH FINAL COLOR OF PANEL.
12. JOINT BACKING MATERIAL (BACKER ROD):
 - PROVIDE BACKER ROD MATERIAL IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.9.
13. ANTIGRAFFITI COATING:
 - APPLY ANTIGRAFFITI COATING IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIAL PROVISIONS.
14. PENETRATING CONCRETE STAIN:
 - APPLY STAIN IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIAL PROVISIONS.

NOTES TO FABRICATOR

1. REFER TO BC-776M FOR NOTES TO FABRICATOR.

INDEX OF SHEETS	
SHT. NO.	SHEET TITLE
1	GENERAL NOTES
2	GEOMETRY AND LAYOUT
3	POST DETAILS
4	PANEL SEAT DETAILS
5	DETAIL 1
6	DETAIL 2
7	DETAIL 3
8	DETAIL 4
9	DETAIL 5
10	DETAIL 6
11	DETAIL 7
12	DETAIL 8

DESCRIPTION OF DETAILS	
DETAIL	DESCRIPTION
1	PRECAST CONCRETE POST WITH BASE PLATE CONNECTION TO CAISSON
2	PRECAST CONCRETE POST WITH BASE PLATE CONNECTION TO SPREAD FOOTING
3	PRECAST CONCRETE POST EMBEDDED IN CAISSON
4	PRECAST CONCRETE POST EMBEDDED IN SPREAD FOOTING (WITH OR WITHOUT PEDESTAL)
5	PRECAST CONCRETE ANGLED POST EMBEDDED IN CAISSON
6	PRECAST CONCRETE CORNER POST EMBEDDED IN CAISSON
7	PRECAST CONCRETE ANGLED POST EMBEDDED IN SPREAD FOOTING (WITH OR WITHOUT PEDESTAL)
8	PRECAST CONCRETE CORNER POST EMBEDDED IN SPREAD FOOTING (WITH OR WITHOUT PEDESTAL)

CHANGE 2

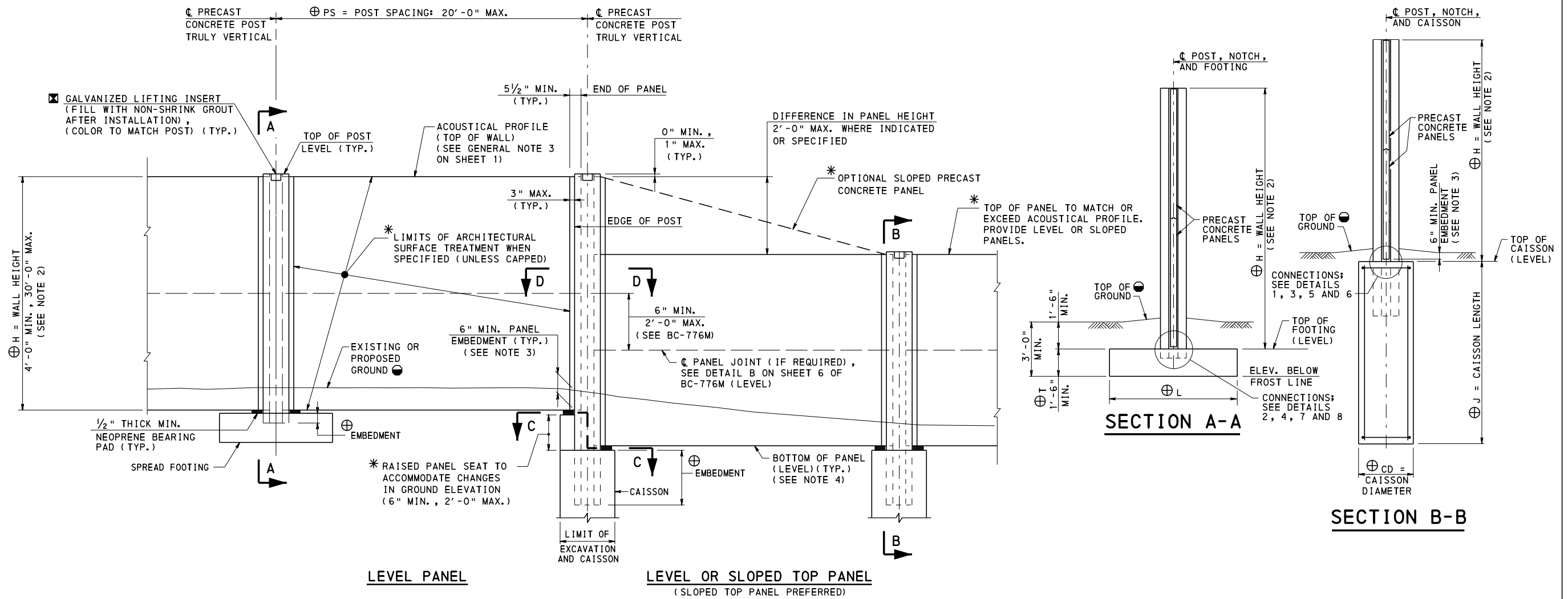
BC-734M	ANCHOR SYSTEMS
BC-735M	WALL CONSTRUCTION AND EXPANSION JOINT DETAILS
BC-736M	REINFORCEMENT BAR FABRICATION DETAILS
BC-776M	GROUND MOUNTED SOUND BARRIERS - PRECAST CONCRETE PANELS
BC-778M	GROUND MOUNTED SOUND BARRIERS - STEEL POSTS
BC-779M	STRUCTURE MOUNTED SOUND BARRIER WALLS
RC-11M	CLASSIFICATION OF EARTHWORK FOR STRUCTURES
REFERENCE DRAWINGS	

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

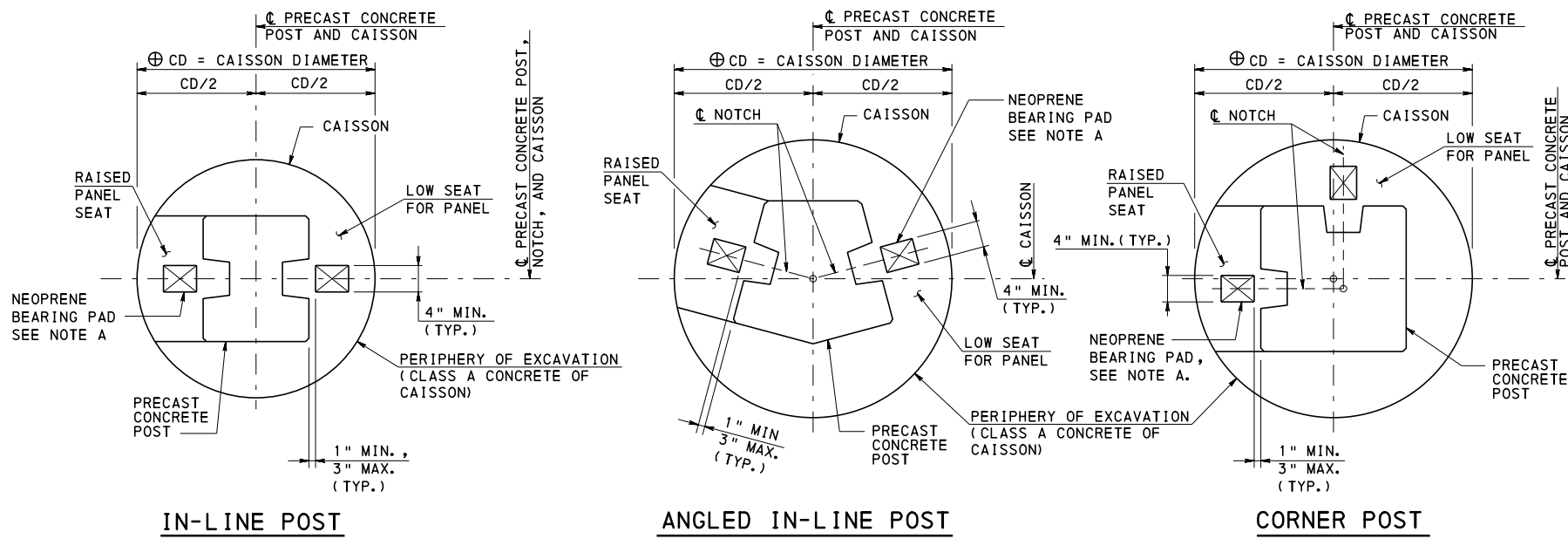
STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

GENERAL NOTES

RECOMMENDED JAN. 31, 2019	RECOMMENDED JAN. 31, 2019	SHEET 1 OF 12
<i>T. Romeo P. Maciora</i> CHIEF BRIDGE ENGINEER	<i>William J. ...</i> ACTING DIR. BUR. OF PROJECT DELIVERY	BC-777M



GROUND MOUNTED SOUND BARRIER ELEVATION



NOTE A:
NEOPRENE BEARING PAD 1/2" MIN. THICKNESS BY 5" MIN. LENGTH BY 4" MIN. WIDTH, 50 DUROMETER, ATTACH TO CONCRETE SEAT WITH APPROVED ADHESIVE (TYP.)

SECTION C-C
(WITHOUT BASE PLATES)
(CONCRETE CAISSON SHOWN, SPREAD FOOTING SIMILAR)

LEGEND:

- ☒ FABRICATOR TO VERIFY ADEQUACY OF LIFTING INSERTS
- ⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS
- GRADE GROUND TO DRAIN AWAY FROM WALL. FILL DEPTH ON EACH SIDE OF WALL TO BE WITHIN 1'-0" DIFFERENCE.
- * AS SPECIFIED ON THE CONTRACT DRAWINGS.

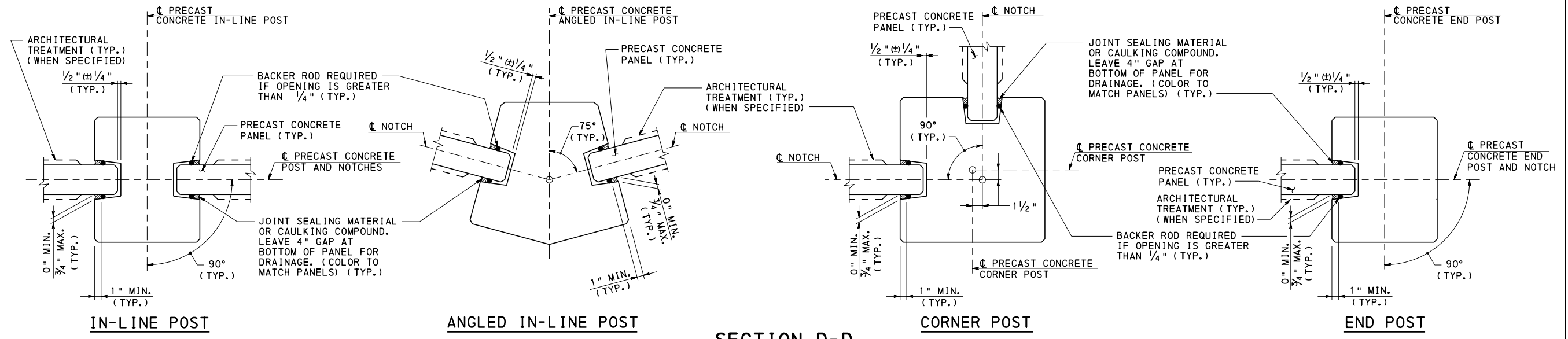
NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. WALL HEIGHT IS DEFINED AS FOLLOWS:
 - POST WITH BASE PLATE:
H = HEIGHT FROM TOP OF BASE PLATE TO TOP OF WALL
 - POST WITHOUT BASE PLATE:
H = HEIGHT FROM TOP OF FOOTING/CAISSON TO TOP OF WALL
3. PANEL EMBEDMENT MAY NEED TO BE INCREASED TO ACCOMMODATE BASE PLATES AND ANCHOR BOLT PROJECTIONS.
4. FOR OPTIONAL SLOPED BOTTOM PANEL REFER TO BC-776M, SHEET 3.
5. FOR SECTION D-D, REFER TO SHEET 3.

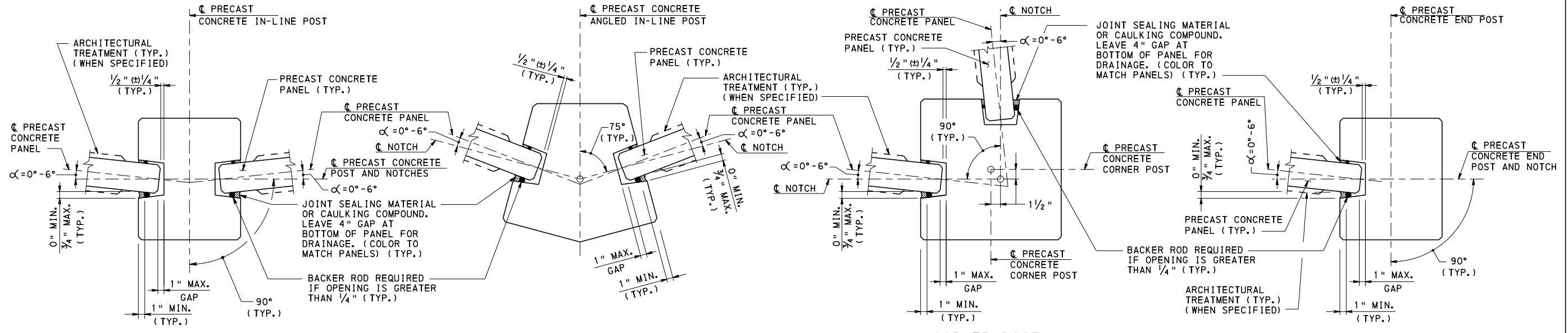
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

GEOMETRY AND LAYOUT



**SECTION D-D
POST TYPES WITH STRAIGHT PANELS**



**SECTION D-D
POST TYPES WITH ANGLED PANELS**

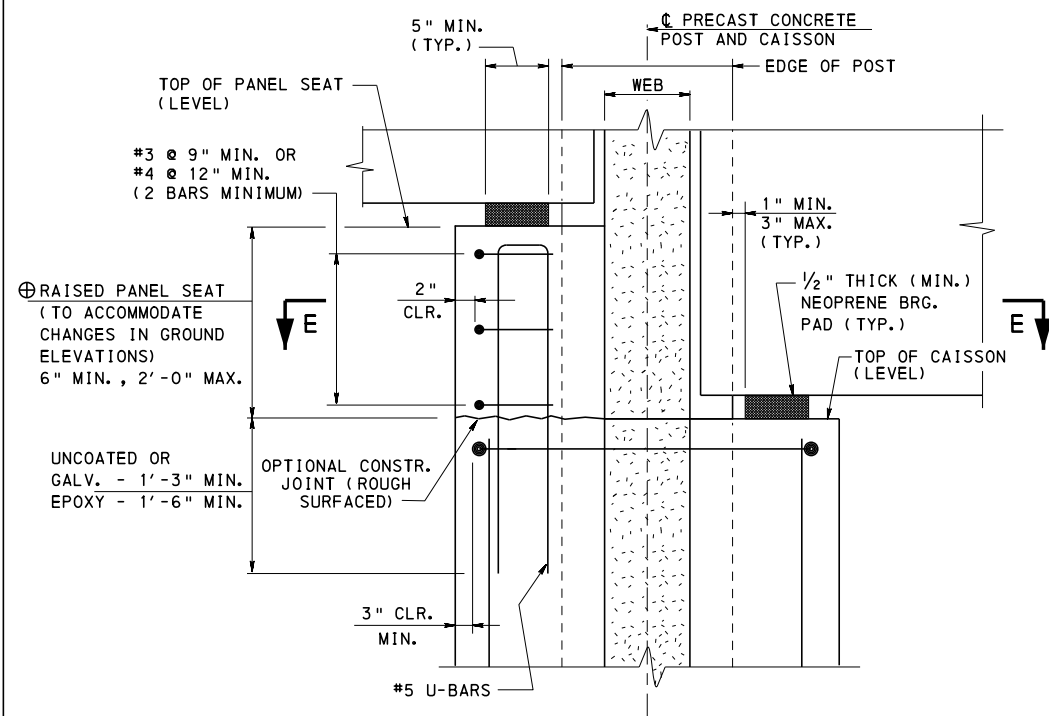
α = PANEL ORIENTATION IN RELATIONSHIP TO CENTERLINE OF NOTCH.

- NOTES:**
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
 2. REFER TO SHEET 2 FOR LOCATION OF SECTION D-D.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS
POST DETAILS**

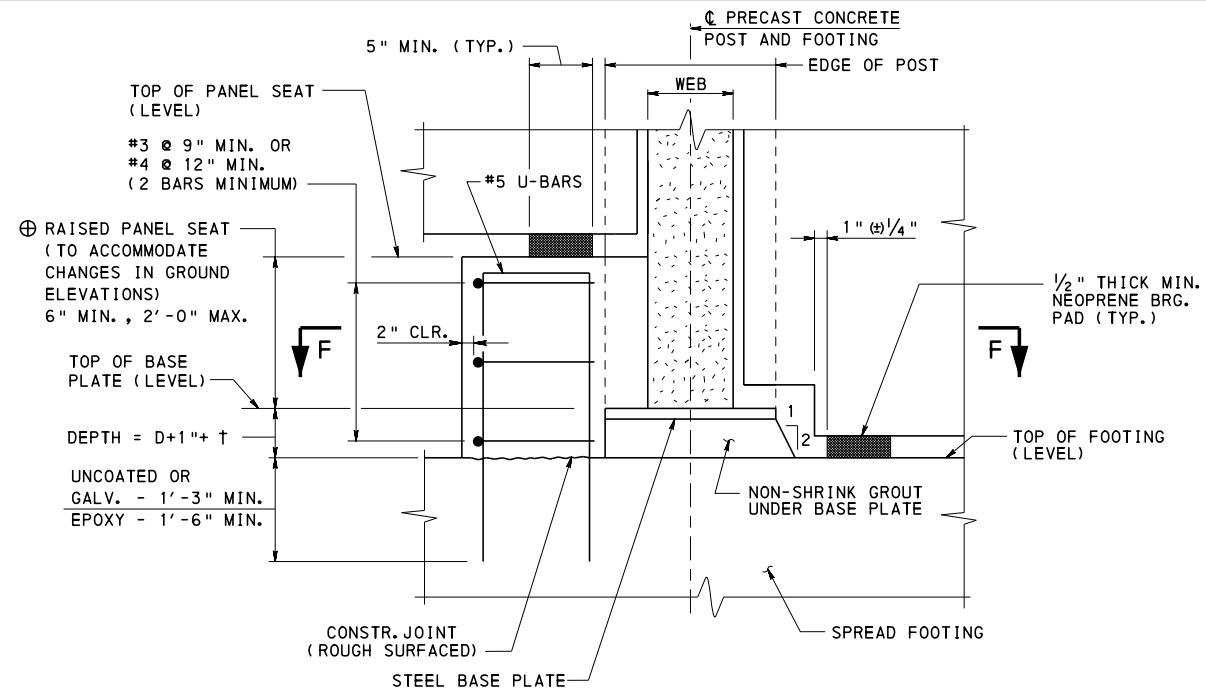
RECOMMENDED JAN. 31, 2019 <i>T. Romeo P. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. [Signature]</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 3 OF 12 BC-777M
--	--	---------------------------------



RAISED PANEL SEAT TYPICAL PANEL SEAT

**PANEL SEAT ELEVATION
WITHOUT BASE PLATE**

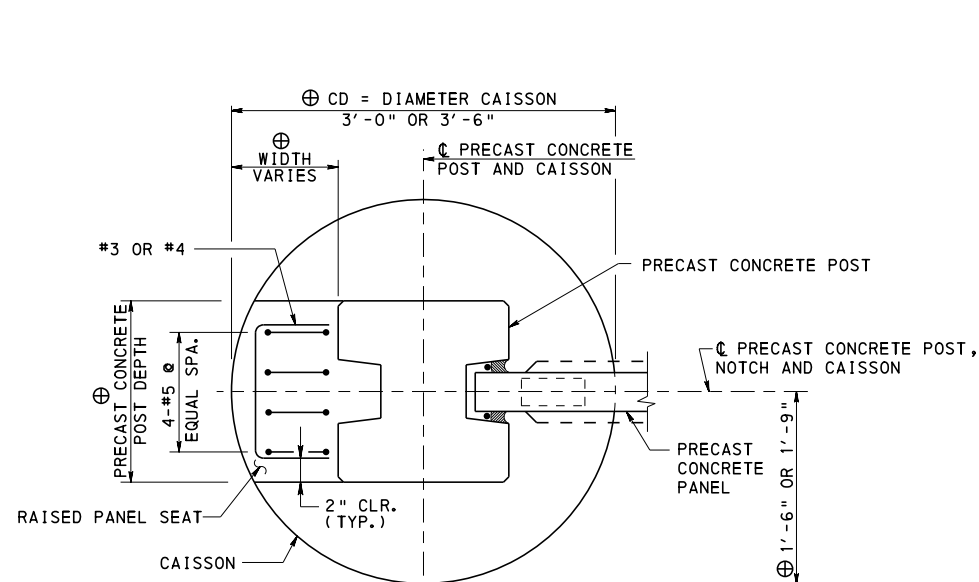
(DETAIL FOR CAISSON SHOWN
DETAIL FOR FOOTING IS SIMILAR)



RAISED PANEL SEAT TYPICAL PANEL SEAT

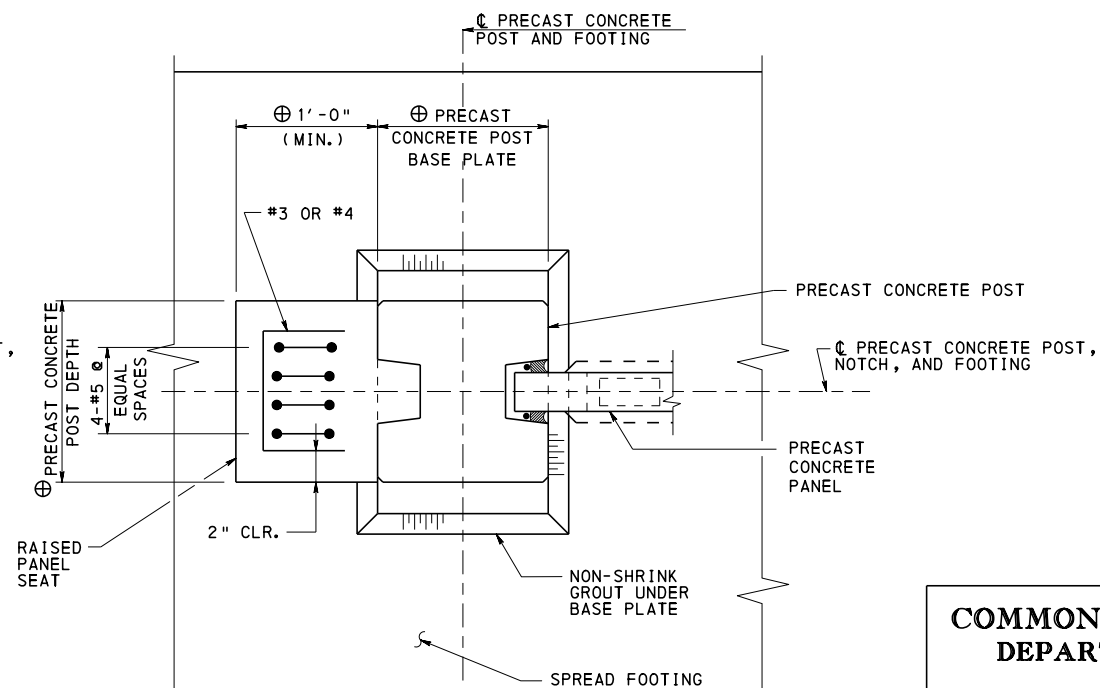
**PANEL SEAT ELEVATION
WITH BASE PLATE**

(DETAIL FOR FOOTING SHOWN
DETAIL FOR CAISSON IS SIMILAR)



RAISED PANEL SEAT TYPICAL PANEL SEAT

SECTION E-E



RAISED PANEL SEAT TYPICAL PANEL SEAT

SECTION F-F

LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

† BASE PLATE THICKNESS

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. RAISED PANEL SEATS, IF REQUIRED, TO BE DETAILED ON THE CONTRACT DRAWINGS.
3. DETAILS FOR ANGLED POST AND CORNER POST NOT SHOWN, BUT SIMILAR TO DETAILS SHOWN. PROVIDE DETAILS ON CONTRACT DRAWINGS.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

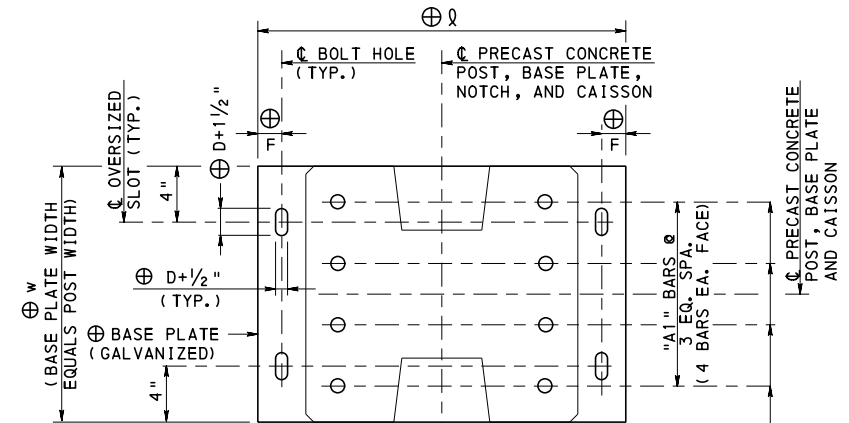
**STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS**

PANEL SEAT DETAILS

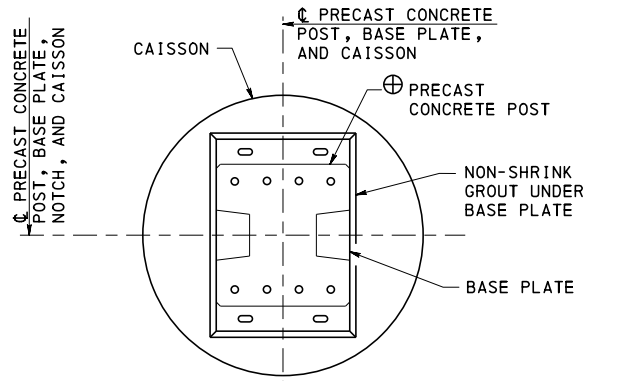
RECOMMENDED JAN. 31, 2019
T. R. Maciora
CHIEF BRIDGE ENGINEER

RECOMMENDED JAN. 31, 2019
Alvin J. ...
ACTING DIR. BUR. OF PROJECT DELIVERY

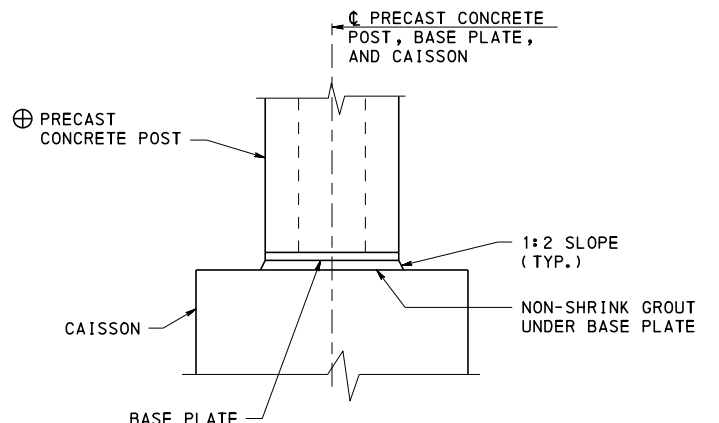
SHEET 4 OF 12
BC-777M



PLAN

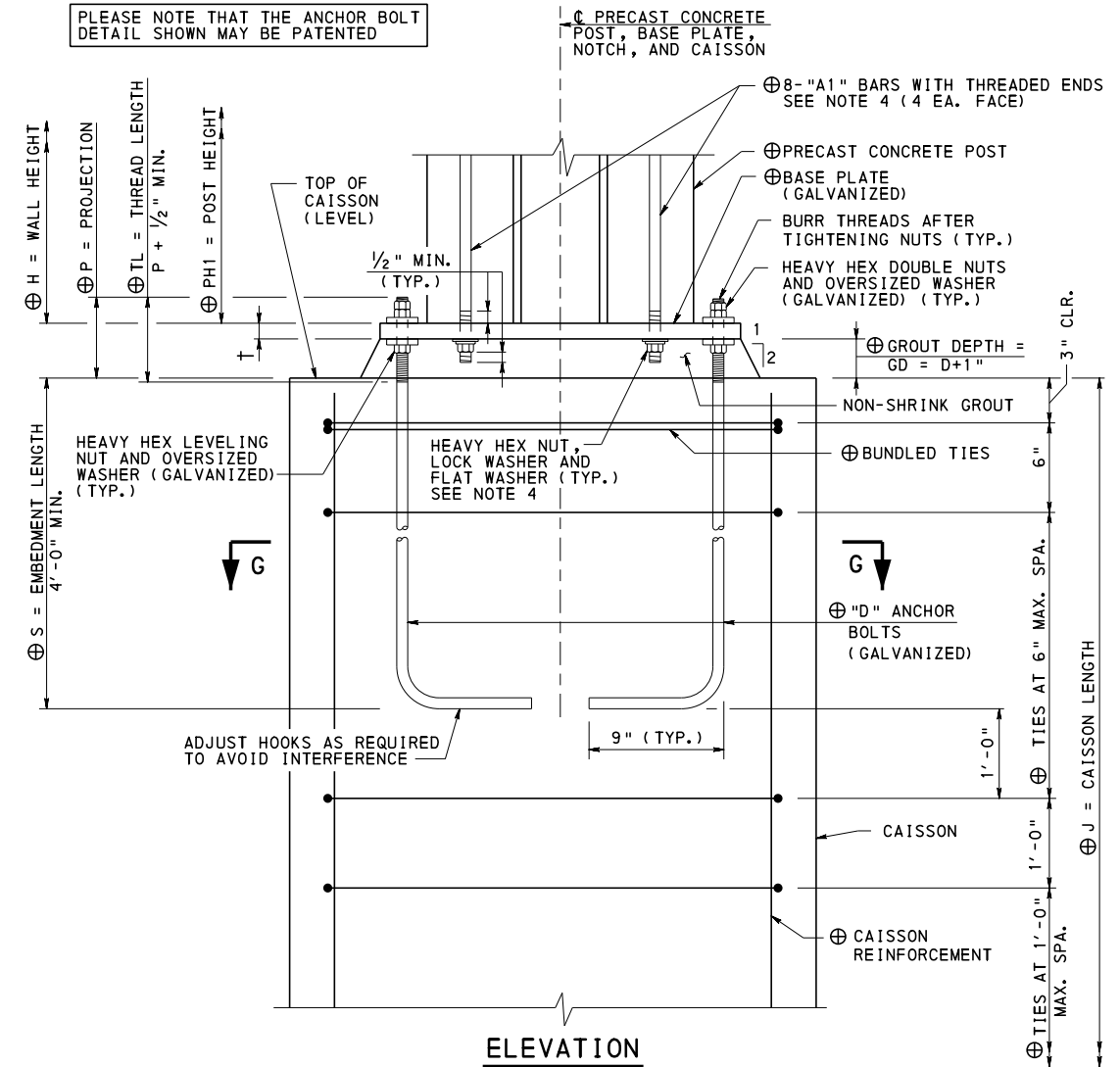


PANEL SEAT PLAN

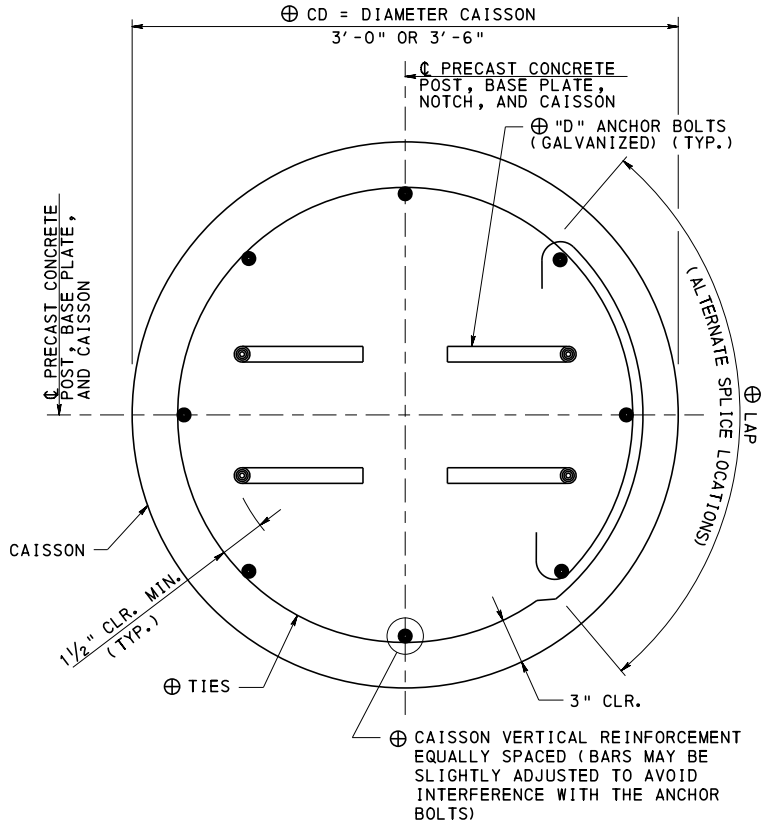


PANEL SEAT ELEVATION

PLEASE NOTE THAT THE ANCHOR BOLT DETAIL SHOWN MAY BE PATENTED



ELEVATION



SECTION G-G

NOTES:

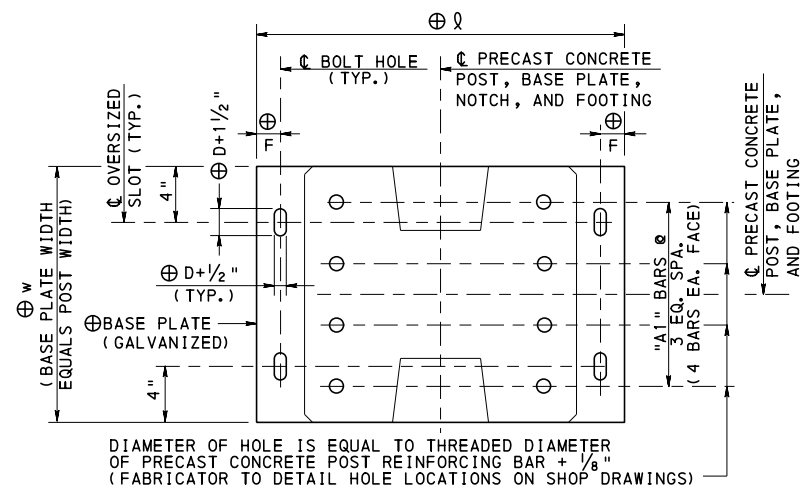
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR PANEL SEAT DETAILS REFER TO SHEET 4.
3. FOR OVERSIZED WASHER DETAIL REFER TO SHEET 6.
4. POST "A1" BARS AND HARDWARE OPTIONS:
 - A. GALVANIZED BARS - IF THE THREADED BAR IS HOT DIP GALVANIZED, INCLUDING THE THREADED PORTION, USE NUTS AND WASHERS THAT ARE HOT-DIP GALVANIZED. IF THREADING IS PERFORMED AFTER GALVANIZING, COAT THE THREADED AREA WITH A COLD GALVANIZING REPAIR COMPOUND PER ASTM A780 AND USE EITHER MECHANICALLY GALVANIZED OR HOT DIP GALVANIZED WASHERS AND MECHANICALLY (ONLY) GALVANIZED NUTS. (WASHER - ASTM F436; NUT-ASTM A563).
 - B. EPOXY COATED BARS - COAT THREADS WITH COLD GALVANIZING REPAIR COMPOUND PER ASTM A780. USE EITHER MECHANICALLY GALVANIZED OR HOT DIP GALVANIZED WASHERS AND MECHANICALLY (ONLY) GALVANIZED NUTS. (WASHER - ASTM F436; NUT - ASTM A563)

LEGEND:

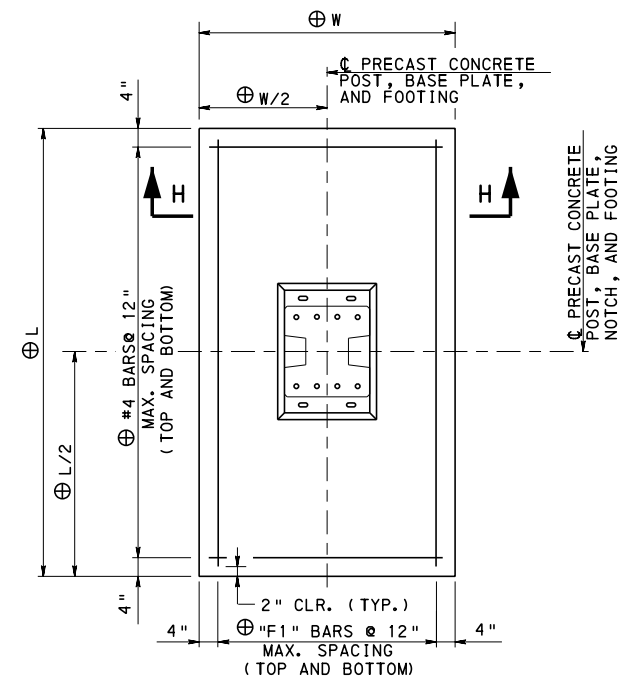
⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS

**DETAIL 1
PRECAST CONCRETE POST WITH
BASE PLATE CONNECTION
TO CAISSON**

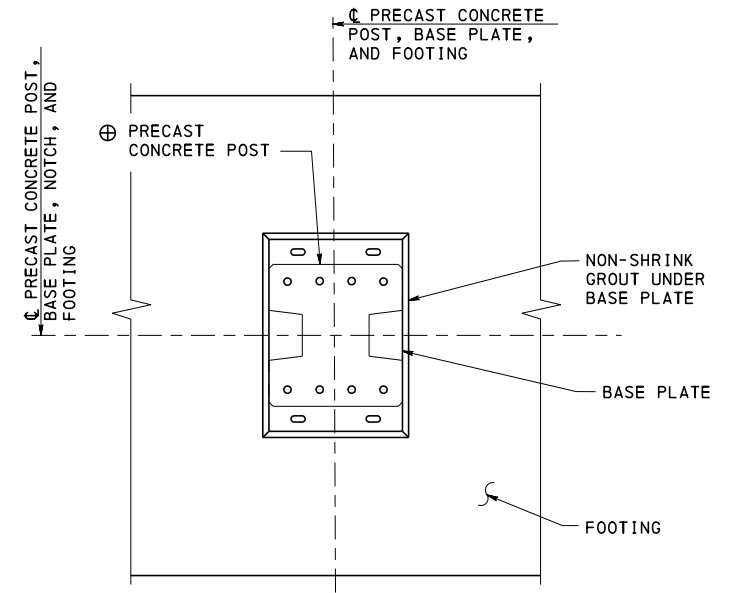
COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY		
STANDARD GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE POSTS		
DETAIL 1		
RECOMMENDED JAN. 31, 2019 <i>T. Ross P. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>William J. ...</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 5 OF 12 BC-777M



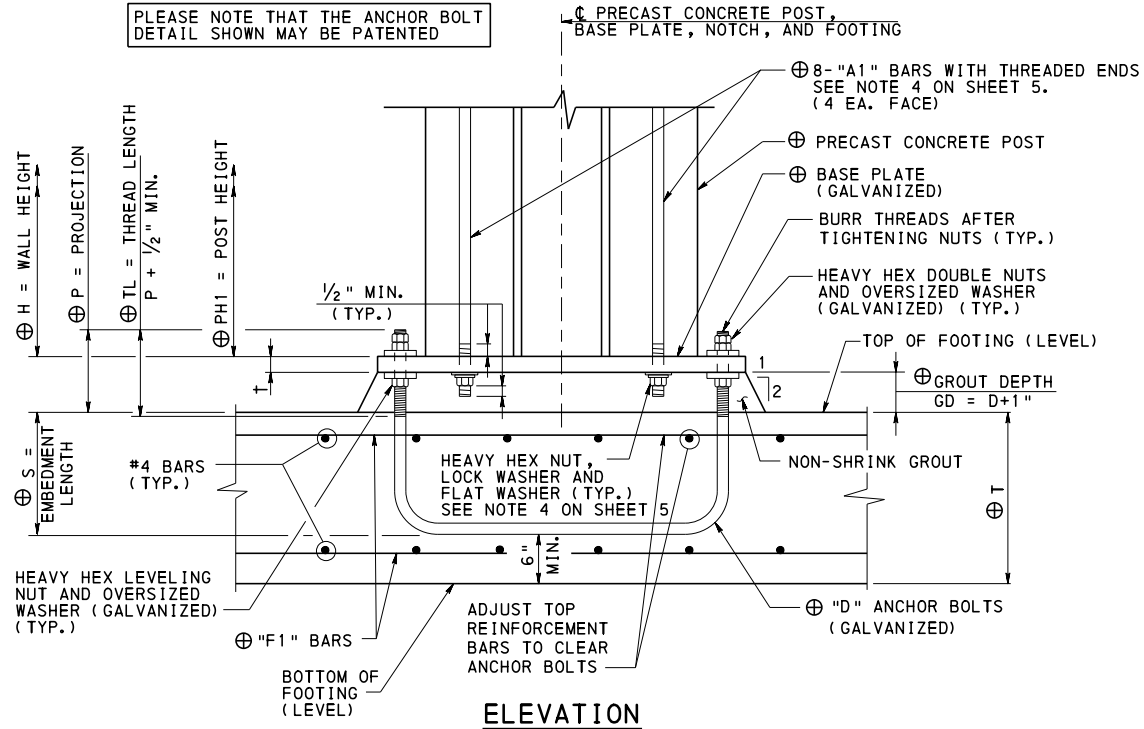
PLAN



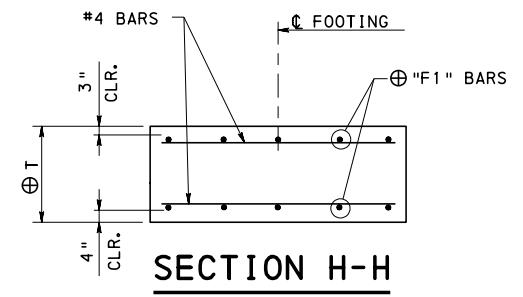
SPREAD FOOTING PLAN



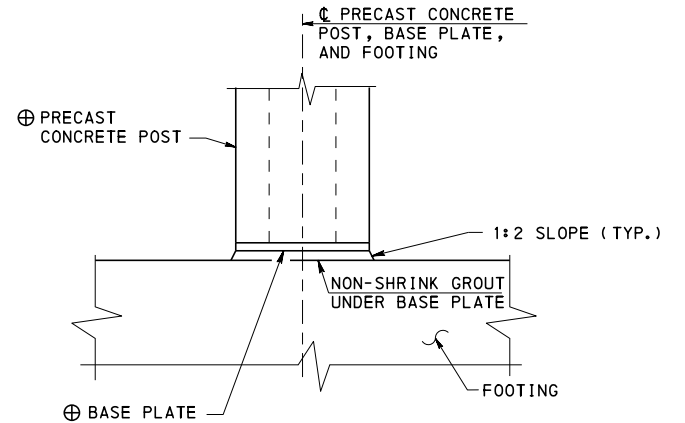
PANEL SEAT PLAN



**DETAIL 2
PRECAST CONCRETE POST WITH
BASE PLATE CONNECTION
TO SPREAD FOOTING**



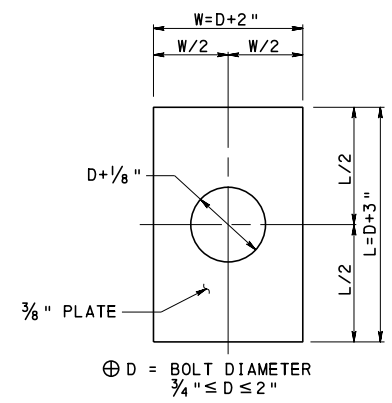
SECTION H-H



PANEL SEAT ELEVATION

- NOTES:**
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
 2. FOR PANEL SEAT DETAILS REFER TO SHEET 4.

LEGEND:
⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS

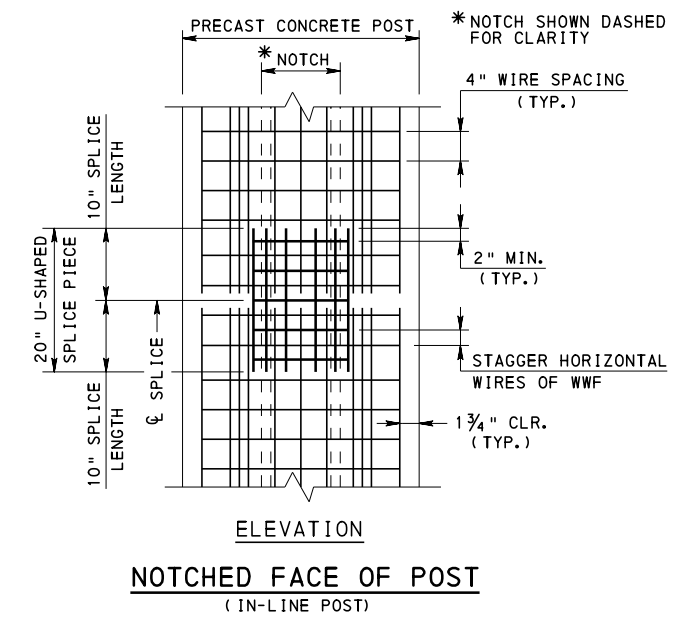
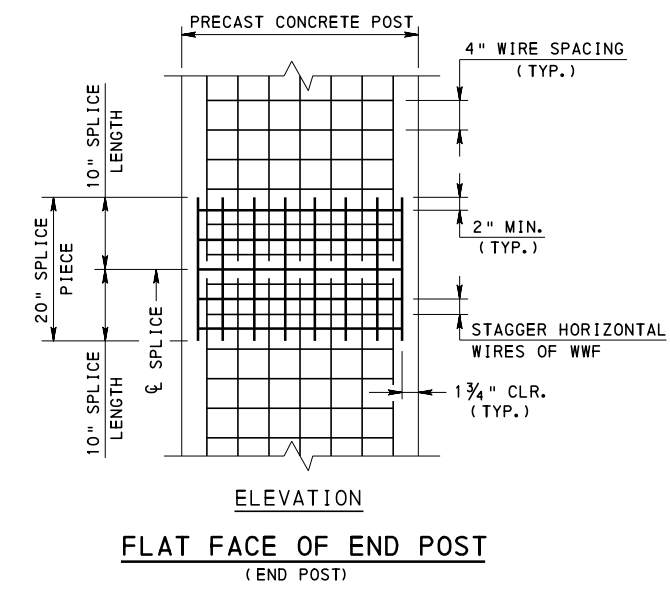
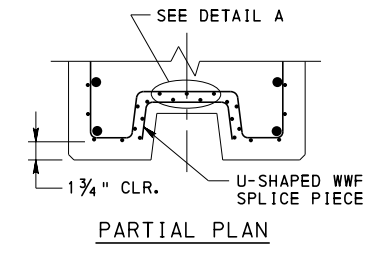
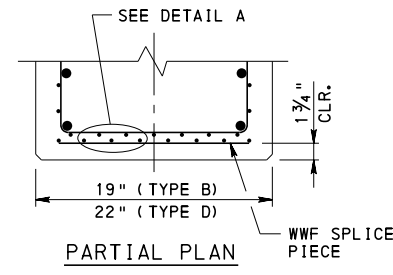
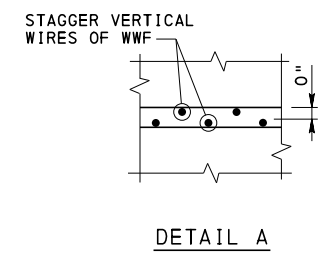
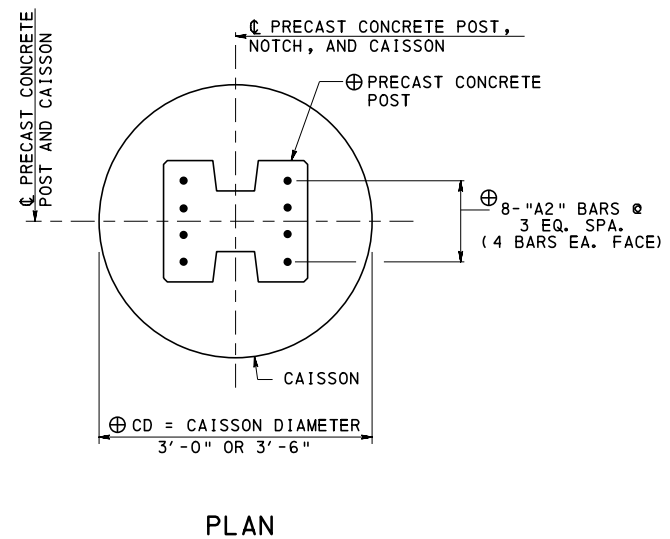


OVERSIZED WASHER DETAIL

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS
DETAIL 2**

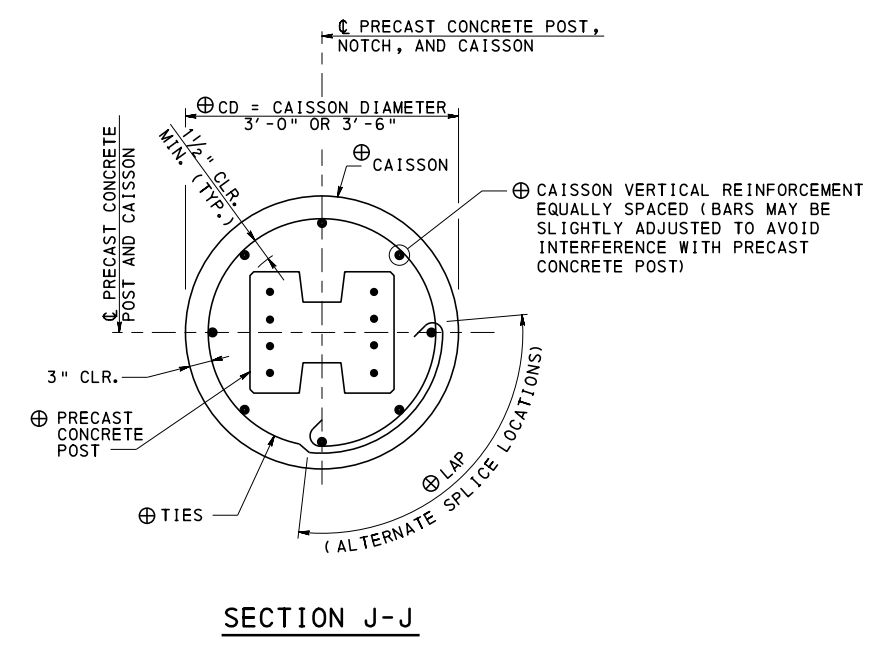
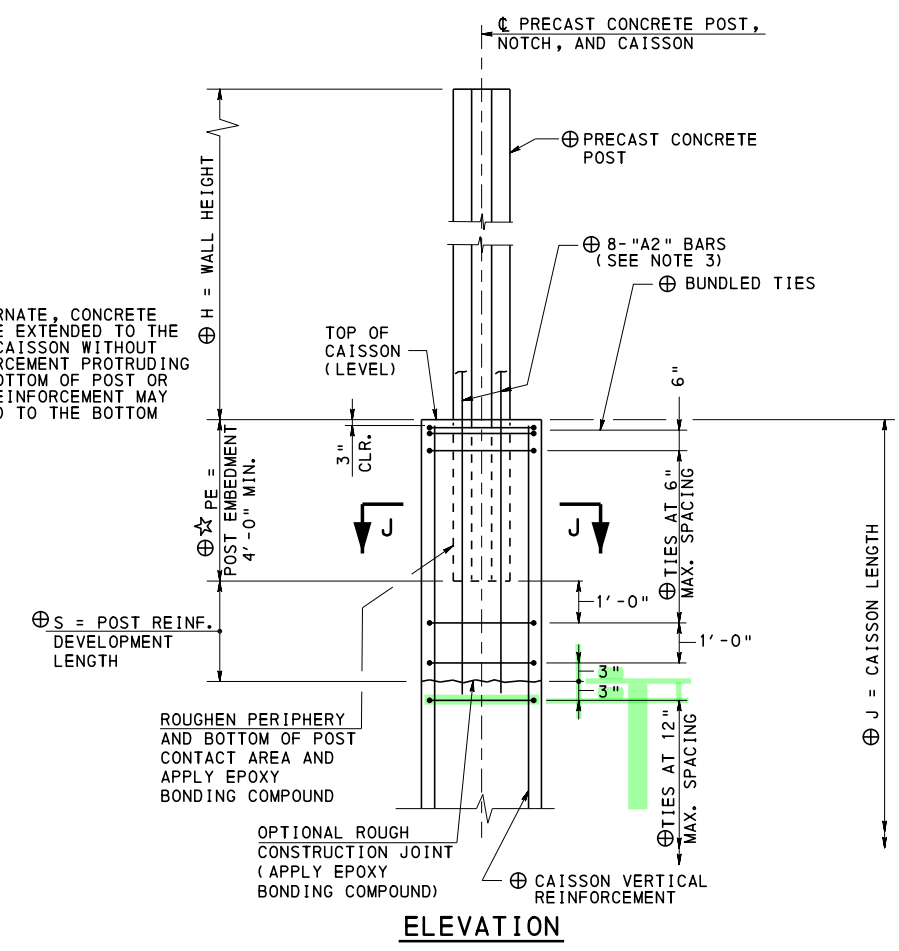
RECOMMENDED JAN. 31, 2019 <i>T. Romeo P. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. [Signature]</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 6 OF 12 BC-777M
--	--	---------------------------------



WWF VERTICAL SPLICE DETAIL FOR PRECAST CONCRETE POST
(IF REQUIRED)

- VERTICAL SPLICE NOTES:**
1. SPLICE SHOWN IS FOR WWF 4x4-W4.0xW4.0.
 2. STAGGER THE VERTICAL SPLICE LOCATIONS OF THE WWF TO AVOID ALIGNING THE SPLICES ON OPPOSING FACES OF THE POST.
 3. STAGGER THE L-SHAPE CORNER PIECE WITH THE REGULAR WWF ALONG THE LENGTH FOR CORNER POST IF VERTICAL SPLICE IS REQUIRED.
 4. PRIMARY VERTICAL REINFORCEMENT SPLICE NOT SHOWN FOR CLARITY.

★ AS AN ALTERNATE, CONCRETE POST MAY BE EXTENDED TO THE BOTTOM OF CAISSON WITHOUT THE REINFORCEMENT PROTRUDING FROM THE BOTTOM OF POST OR THE POST REINFORCEMENT MAY BE EXTENDED TO THE BOTTOM OF CAISSON



LEGEND:
⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS

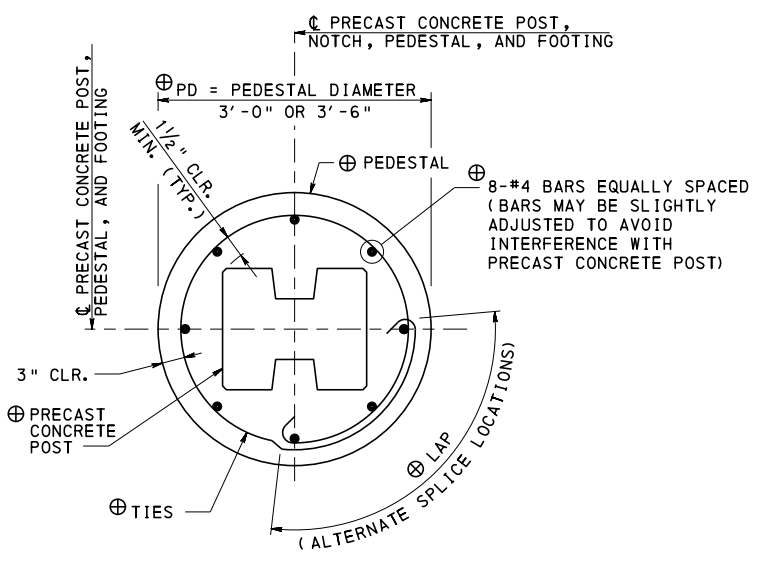
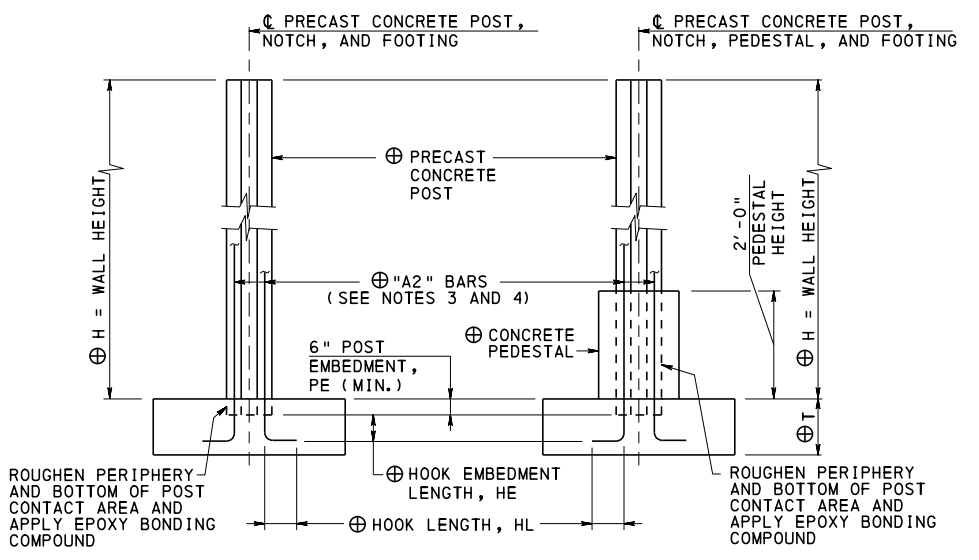
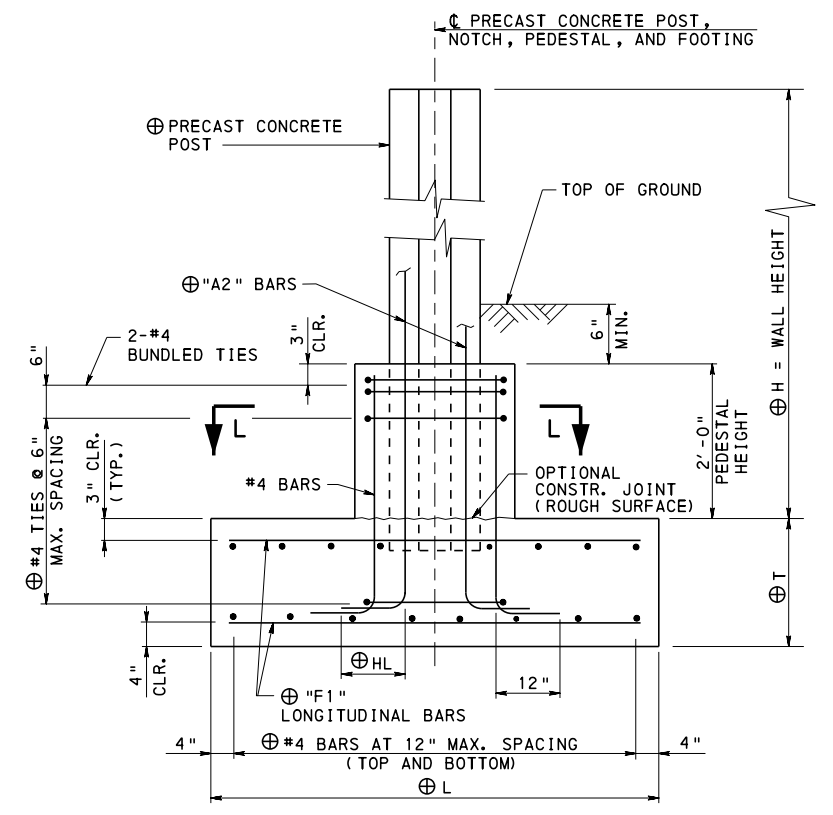
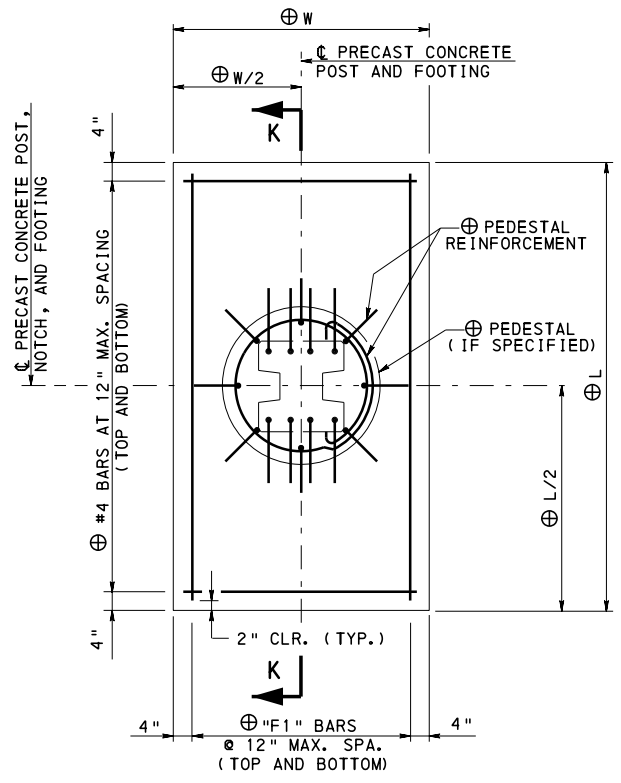
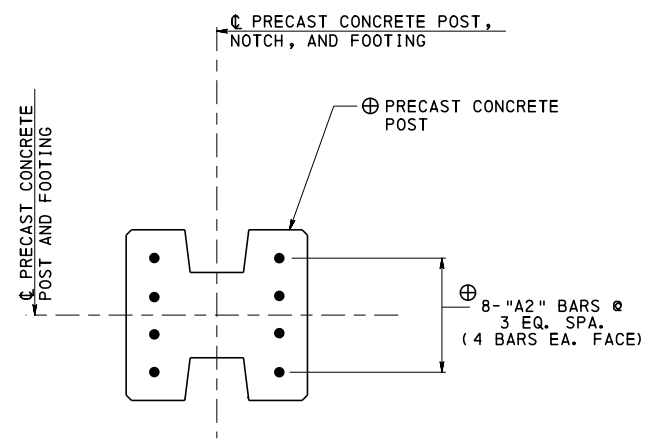
- NOTES:**
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
 2. FOR PANEL SEAT DETAILS REFER TO SHEET 4.
 3. PROVIDE UNCOATED, EPOXY COATED OR GALVANIZED BARS IN ACCORDANCE WITH THE CONTRACT DRAWINGS.

**DETAIL 3
PRECAST CONCRETE POST
EMBEDDED IN CAISSON**

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS
DETAIL 3**

RECOMMENDED JAN. 31, 2019 <i>T. Ross P. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. ...</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 7 OF 12 BC-777M
---	--	---------------------------------



SECTION K-K (WITH PEDESTAL)
ADJUST FOOTING TOP REINFORCING SPACING TO CLEAR POST.

LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

NOTES:

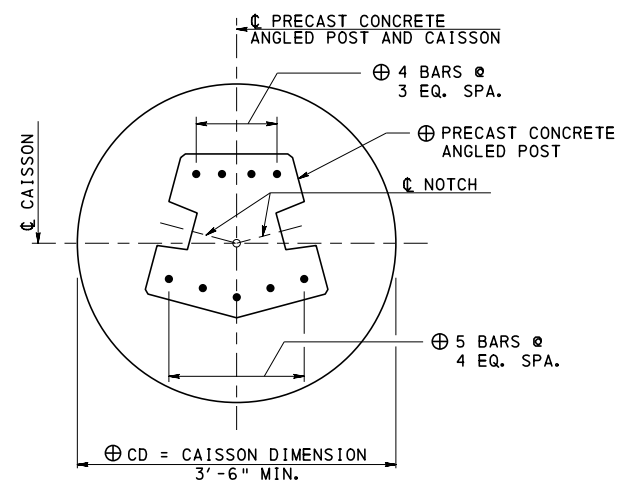
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR PANEL SEAT DETAILS REFER TO SHEET 4.
3. PROVIDE UNCOATED OR EPOXY COATED BARS IN ACCORDANCE WITH THE CONTRACT DRAWINGS. GALVANIZED BARS NOT PERMITTED.
4. BARS MAY BE BENT AFTER FABRICATION OF POST. TOUCH-UP EPOXY COATED BARS WITH AN APPROVED EPOXY PAINT.

DETAIL 4
PRECAST CONCRETE POST
EMBEDDED IN SPREAD FOOTING
(WITH OR WITHOUT PEDESTAL)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

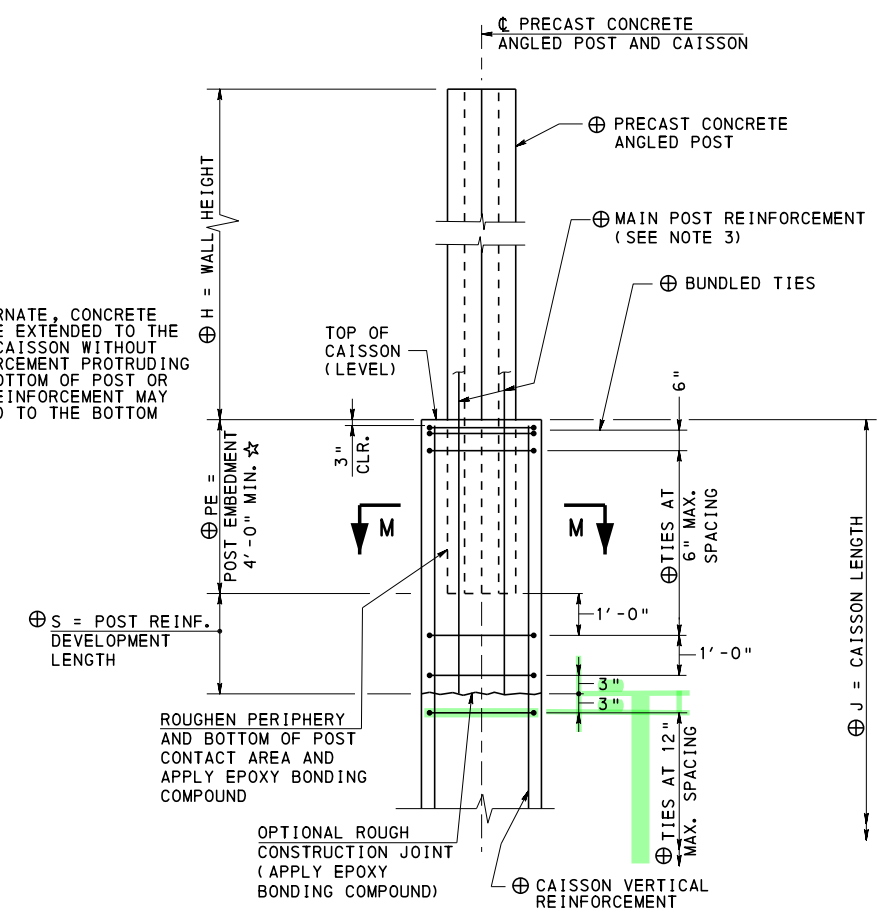
STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

DETAIL 4

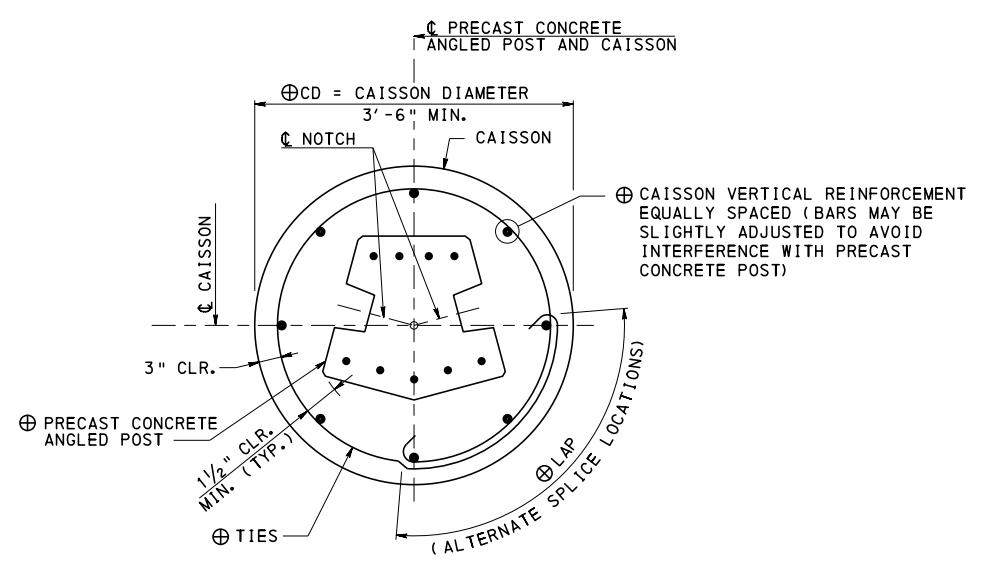


PLAN

★ AS AN ALTERNATE, CONCRETE POST MAY BE EXTENDED TO THE BOTTOM OF CAISSON WITHOUT THE REINFORCEMENT PROTRUDING FROM THE BOTTOM OF POST OR THE POST REINFORCEMENT MAY BE EXTENDED TO THE BOTTOM OF CAISSON



ELEVATION



SECTION M-M

LEGEND:

⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS

NOTES:

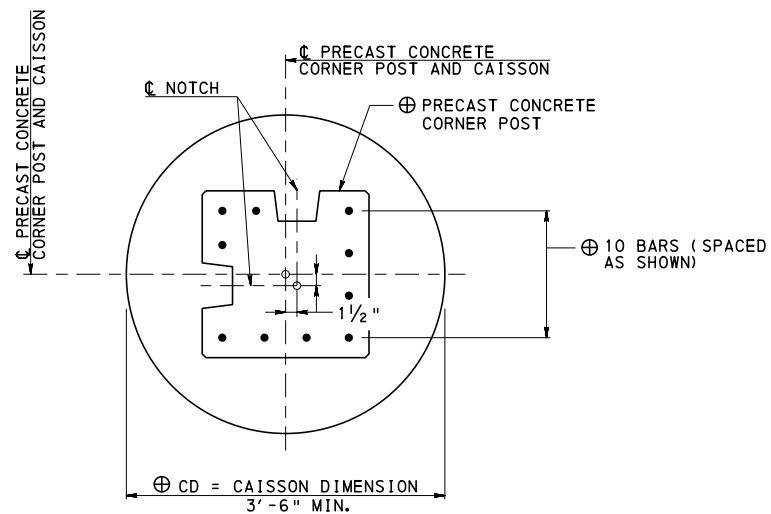
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR PANEL SEAT DETAILS REFER TO SHEET 4.
3. PROVIDE UNCOATED, EPOXY COATED, OR GALVANIZED BARS IN ACCORDANCE WITH THE CONTRACT DRAWINGS.

**DETAIL 5
PRECAST CONCRETE ANGLED POST - TYPE E
EMBEDDED IN CAISSON**

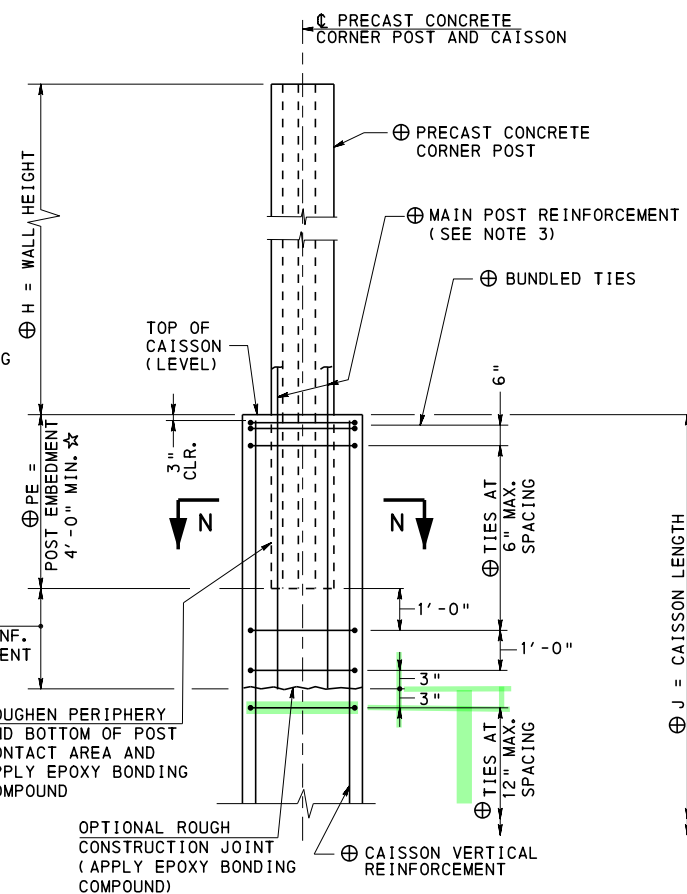
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS**

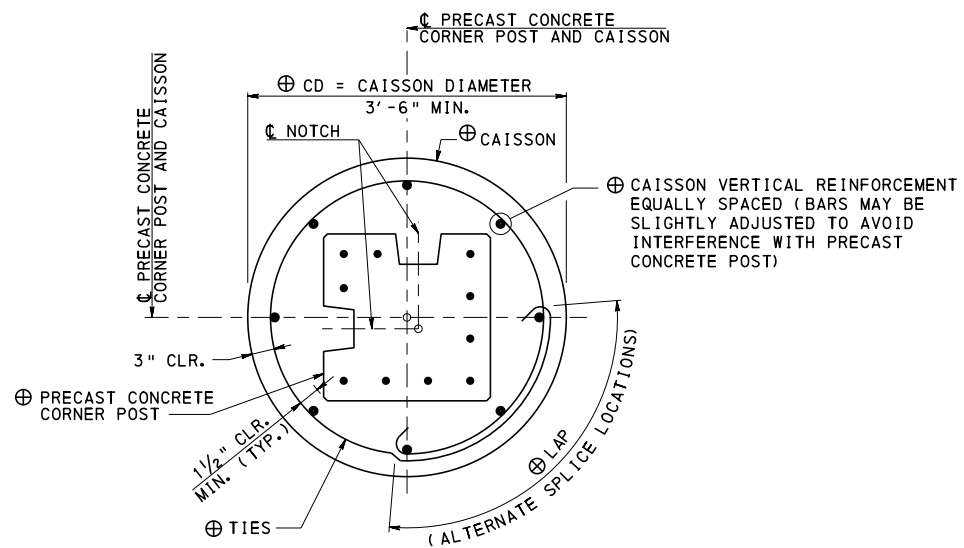
DETAIL 5



PLAN



ELEVATION



SECTION N-N

★ AS AN ALTERNATE, CONCRETE POST MAY BE EXTENDED TO THE BOTTOM OF CAISSON WITHOUT THE REINFORCEMENT PROTRUDING FROM THE BOTTOM OF POST OR THE POST REINFORCEMENT MAY BE EXTENDED TO THE BOTTOM OF CAISSON

LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

NOTES:

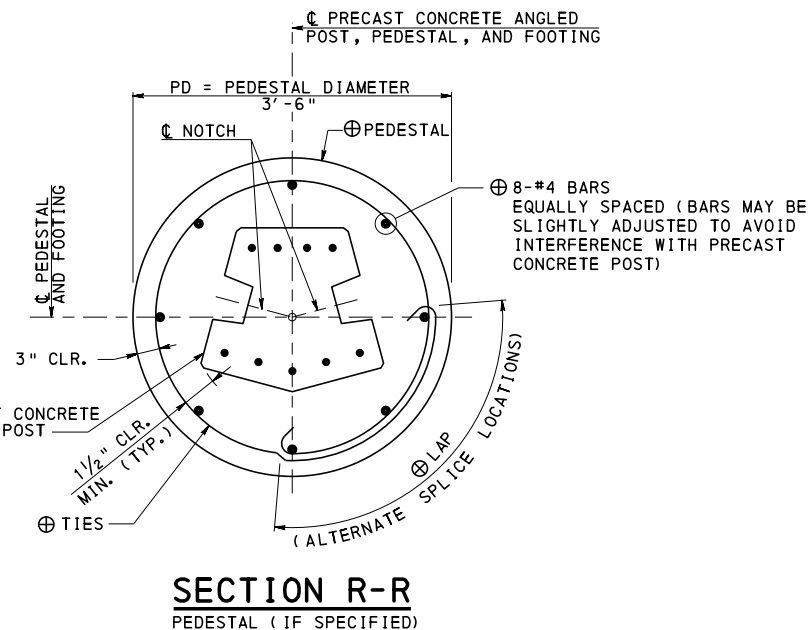
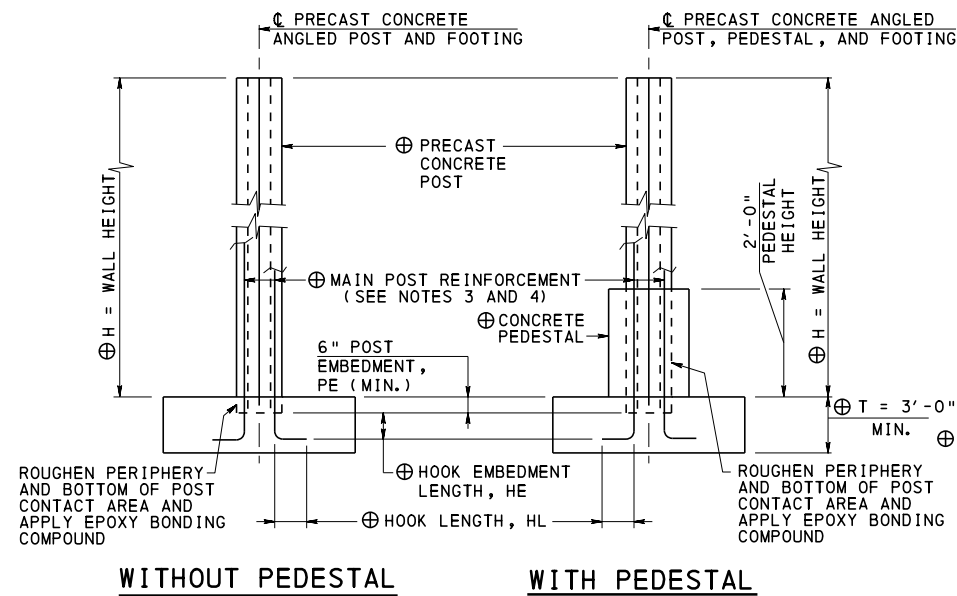
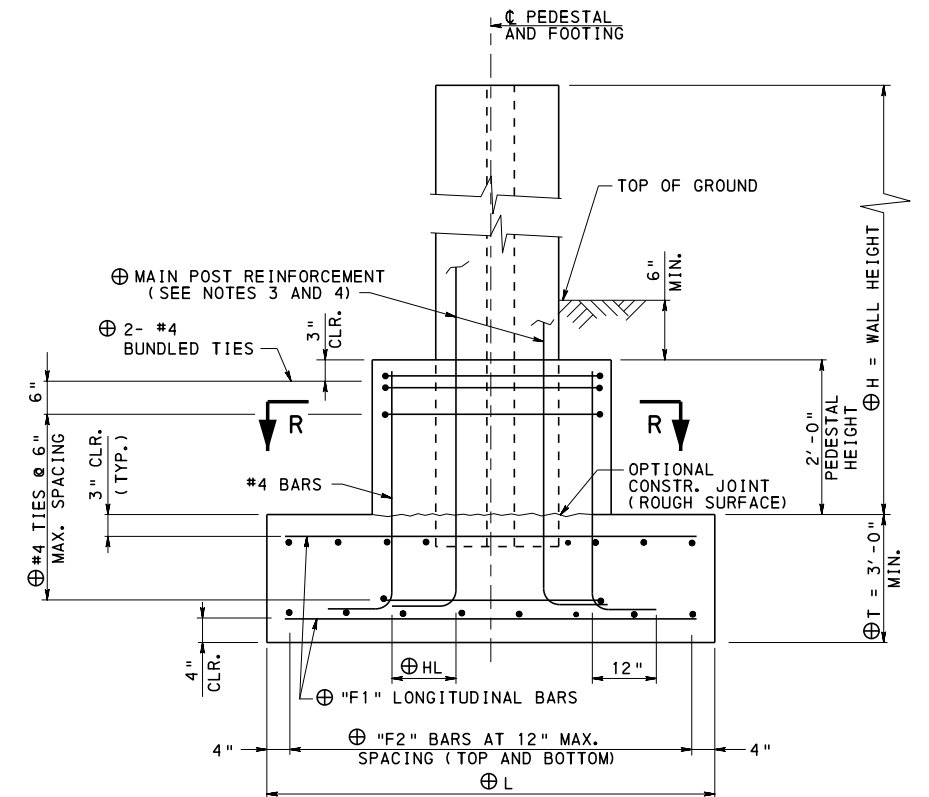
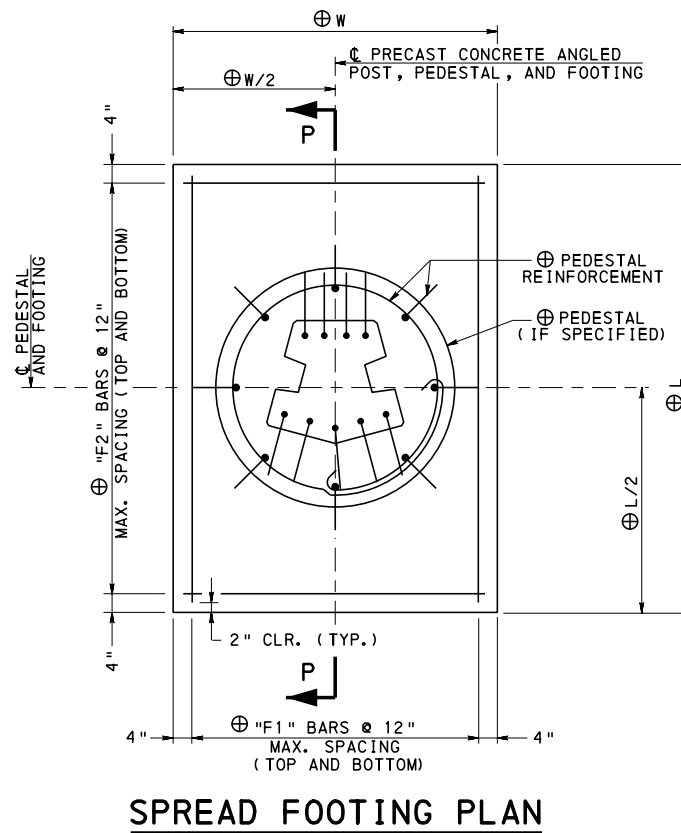
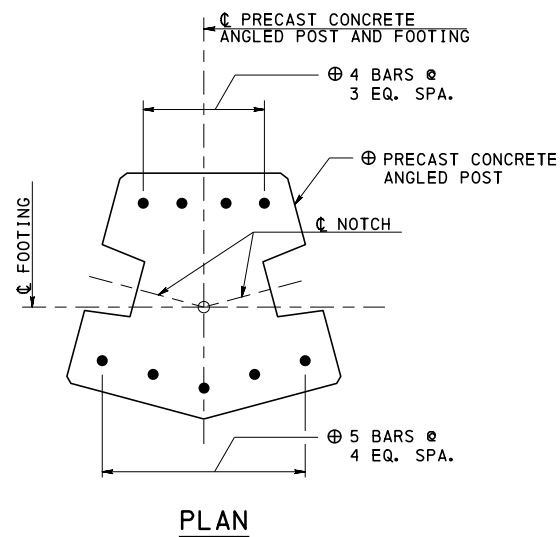
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR PANEL SEAT DETAILS REFER TO SHEET 4.
3. PROVIDE UNCOATED, EPOXY COATED, OR GALVANIZED BARS IN ACCORDANCE WITH THE CONTRACT DRAWINGS.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS**

DETAIL 6

**DETAIL 6
PRECAST CONCRETE CORNER POST
EMBEDDED IN CAISSON**



SECTION P-P (WITH PEDESTAL)
ADJUST FOOTING TOP REINFORCING SPACING TO CLEAR POST.

LEGEND:

⊕ AS REQUIRED BY DESIGN, REFER TO CONTRACT DRAWINGS

NOTES:

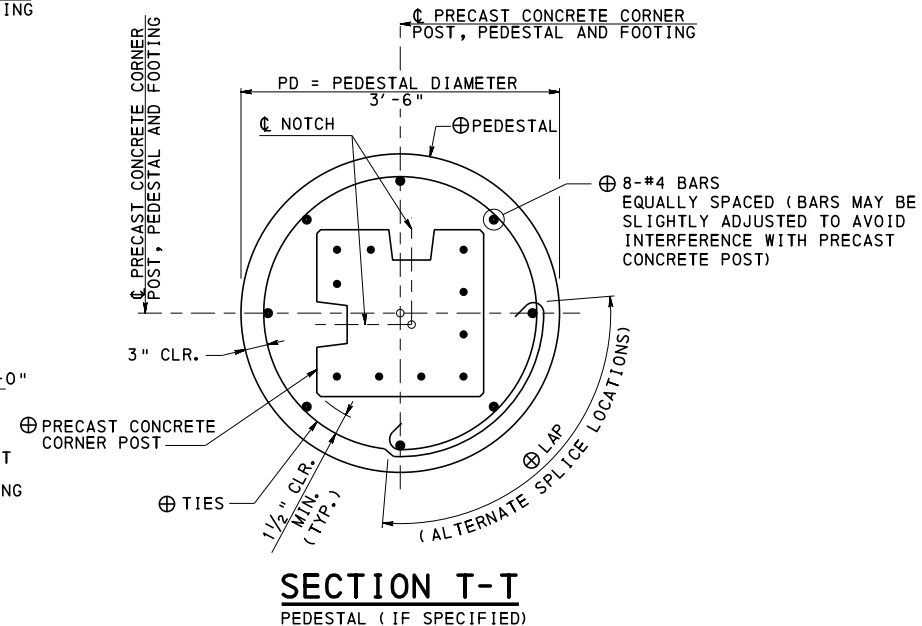
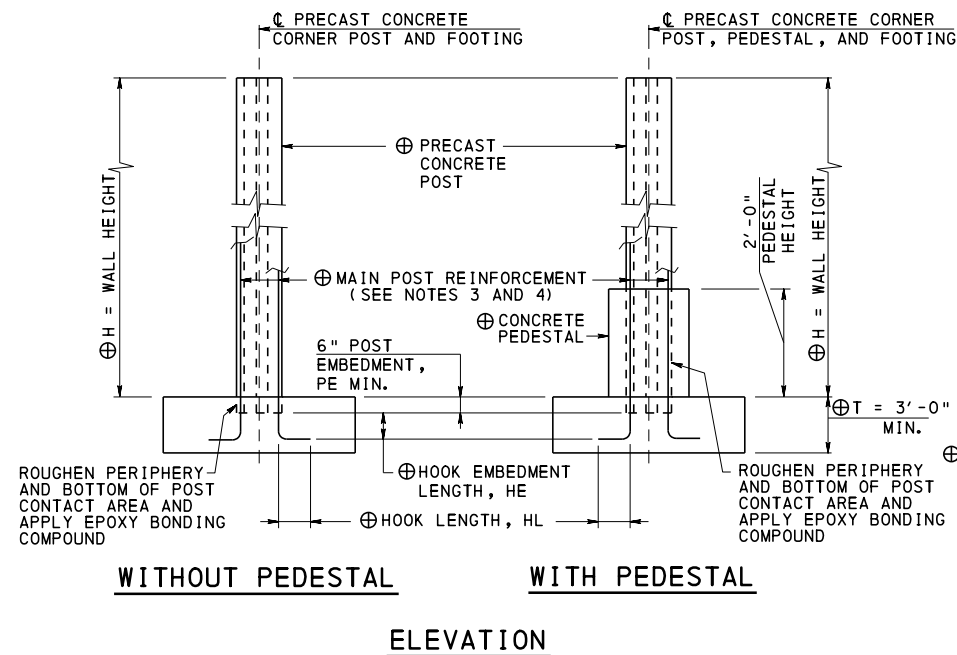
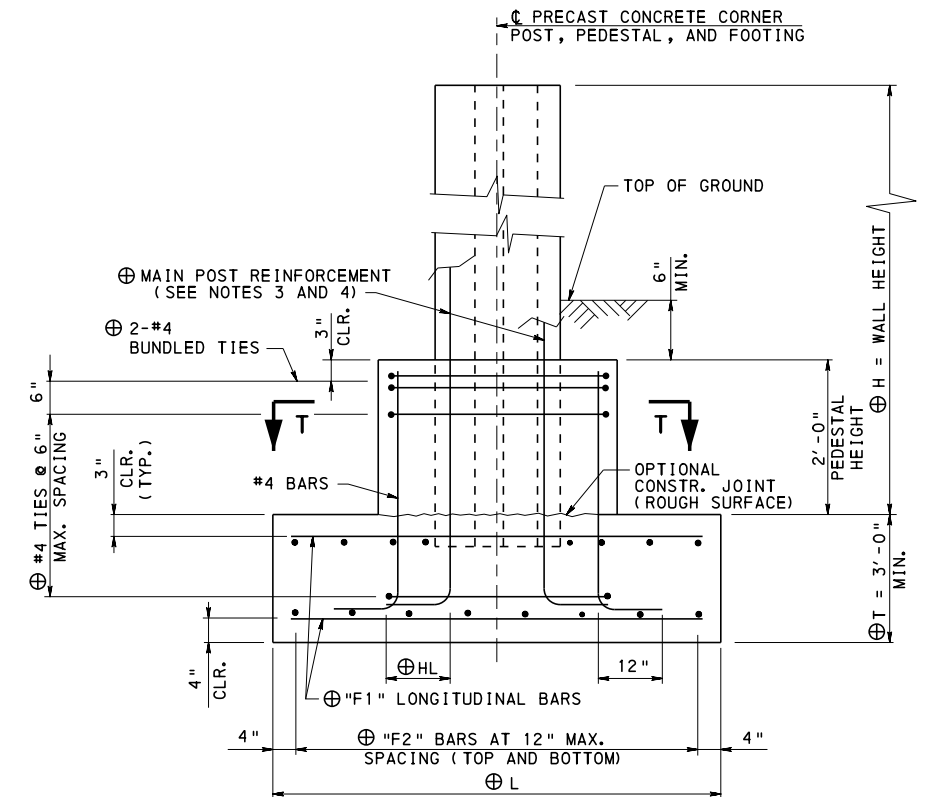
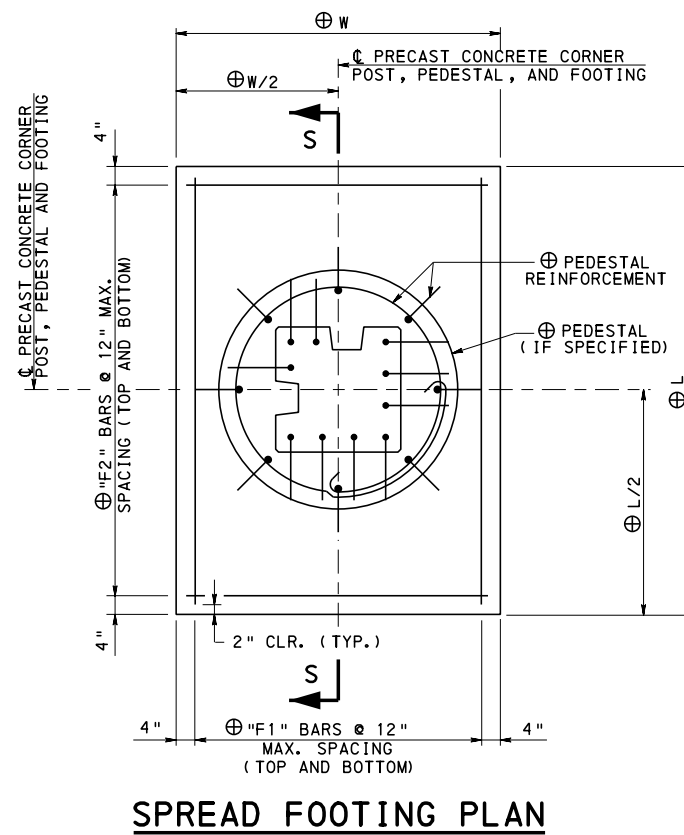
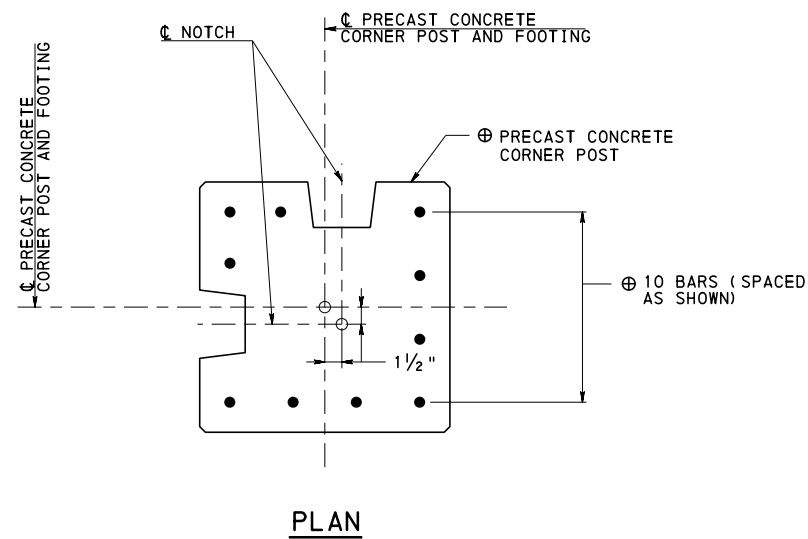
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR PANEL SEAT DETAILS REFER TO SHEET 4.
3. PROVIDE UNCOATED OR EPOXY COATED BARS IN ACCORDANCE WITH THE CONTRACT DRAWINGS. GALVANIZED BARS NOT PERMITTED.
4. BARS MAY BE BENT AFTER FABRICATION OF POST. TOUCH-UP EPOXY COATED BARS WITH AN APPROVED EPOXY PAINT.

DETAIL 7
PRECAST CONCRETE ANGLED POST - TYPE E
EMBEDDED IN SPREAD FOOTING
(WITH OR WITHOUT PEDESTAL)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

DETAIL 7



SECTION S-S (WITH PEDESTAL)
ADJUST FOOTING TOP REINFORCING SPACING TO CLEAR POST.

LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR PANEL SEAT DETAILS REFER TO SHEET 4.
3. PROVIDE UNCOATED OR EPOXY COATED BARS IN ACCORDANCE WITH THE CONTRACT DRAWINGS. GALVANIZED BARS NOT PERMITTED.
4. BARS MAY BE BENT AFTER FABRICATION OF POST. TOUCH-UP EPOXY COATED BARS WITH AN APPROVED EPOXY PAINT.

DETAIL 8
PRECAST CONCRETE CORNER POST - TYPE F
EMBEDDED IN SPREAD FOOTING
(WITH OR WITHOUT PEDESTAL)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

DETAIL 8

GENERAL NOTES

1. DESIGN SPECIFICATIONS:
 - PENNDOT DESIGN MANUAL PART 4, STRUCTURES APRIL 2015 EDITION.
 - 1989 AASHTO "GUIDE SPECIFICATIONS FOR STRUCTURAL DESIGN OF SOUND BARRIERS", INCLUDING THE 1992 AND 2002 INTERIMS.
 - 2002 AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES", 17TH EDITION.
 - 2001 AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", 4TH EDITION, INCLUDING THE INTERIMS THROUGH 2006.
 - DESIGN IS IN ACCORDANCE WITH THE WORKING STRESS DESIGN METHOD. (NO INCREASE IN ALLOWABLE UNIT STRESSES ARE PERMITTED EXCEPT FOR GROUP III LOADINGS WHICH PERMITS A 33% OVERSTRESS.)
2. CONSTRUCTION SPECIFICATIONS AND WORKMANSHIP:
 - PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH THE CURRENT VERSION OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, AASHTO/AWS/D1.5 - BRIDGE WELDING CODE AND THE CONTRACT SPECIAL PROVISIONS. (USE AASHTO/AWS D1.1 FOR WELDING NOT COVERED IN AASHTO/AWS/D1.5.
3. WALL HEIGHTS MUST EQUAL OR EXCEED THE ACOUSTICAL PROFILE.
4. INSTALL ANCHOR BOLTS, POSTS, AND PANELS TRULY VERTICAL.
5. PROVIDE CONCRETE COVER IN ACCORDANCE WITH THIS STANDARD AND DESIGN MANUAL, PART 4.
6. A HIGHER STRENGTH CONCRETE, FOR CAST-IN-PLACE CONCRETE, MAY BE SUBSTITUTED FOR A LOWER CLASS CONCRETE AT NO ADDITIONAL COST TO THE DEPARTMENT.
7. SEAL ALL OPEN JOINTS WITH CAULKING COMPOUND AND/OR JOINT SEALING MATERIAL. (COLOR TO MATCH PANEL.)
8. REFER TO PUBLICATION 408, SECTION 1086.3(f) FOR FABRICATION AND ERECTIONS TOLERANCES.
9. REFER TO PUBLICATION 408, SECTION 1006.3(d) FOR CAISSON SHAFT TOLERANCES.
10. CHAMFER EXPOSED CONCRETE EDGES ON CAST-IN-PLACE CONCRETE 1" x 1", EXCEPT AS NOTED.
11. ALL FILLET WELDS SHOWN ARE MINIMUM SIZE UNLESS NOTED OTHERWISE.
12. RAKE-FINISH ALL HORIZONTAL CONSTRUCTION JOINTS, EXCEPT AS NOTED.
13. ALL DIMENSIONS SHOWN ARE HORIZONTAL, EXCEPT AS NOTED.
14. DIMENSIONS SHOWN ARE FOR A NORMAL TEMPERATURE OF 20 DEGREES C (68 DEGREES F).
15. REINFORCEMENT IN SOME SECTIONS IS NOT SHOWN FOR CLARITY.
16. SPREAD FOOTINGS:
 - CONSTRUCT EMBANKMENTS AND/OR CUT EXISTING GRADE TO THE TOP OF FOOTING ELEVATIONS.
 - EXCAVATE FOR FOOTING CONSTRUCTION.
 - CONSTRUCT FOOTING.
 - SPREAD FOOTINGS MAY BE ORDERED BY THE REPRESENTATIVE TO BE AT ANY ELEVATION OR ANY DIMENSIONS NECESSARY TO PROVIDE A PROPER FOUNDATION. IF SPREAD FOOTINGS ARE ADJUSTED PANEL HEIGHTS AND POST DESIGNS WILL NEED TO BE ADJUSTED.
 - USE CLASS C CEMENT CONCRETE OR NO. 2A COARSE AGGREGATE BELOW SPREAD FOOTING WHEN SPECIFIED OR DIRECTED.
17. CAISSONS:
 - CONSTRUCT EMBANKMENTS AND/OR CUT EXISTING GRADE TO THE TOP OF CAISSON ELEVATIONS PRIOR TO CONSTRUCTION OF CAISSONS.
 - THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE DRILLED OPENING INTACT AND FOR MAINTAINING THE STABILITY OF THE GROUND CUT SLOPE OR FILLED EMBANKMENT DURING DRILLING AND INSTALLATION OF CAISSONS.
 - TEMPORARY CASING MAY BE REQUIRED DURING CAISSON CONSTRUCTION IN ORDER TO MAINTAIN AN OPEN SHAFT. IF CASING IS USED, MAINTAIN CONCRETE LEVELS ABOVE THE BOTTOM OF CASING AT ALL TIMES DURING CASING EXTRACTION TO PREVENT CAVED MATERIAL FROM CONTAMINATING THE CONCRETE.
 - IF GROUNDWATER FLOW ENTERS THE CAISSON EXCAVATION DURING CONSTRUCTION, PLACE CONCRETE BY TREMIE METHODS TO ABOVE THE GROUND WATER ELEVATION IN ONE CONTINUOUS OPERATION. FILL REMAINDER OF CAISSON WITH CLASS A CONCRETE. PLACE EPOXY BONDING COMPOUND BETWEEN POURS, AS REQUIRED.
18. COORDINATE, LOCATE, AND CONDUCT ALL WORK RELATED TO PUBLIC AND PRIVATE UTILITIES IN ACCORDANCE WITH PUBLICATION 408, SECTION 105.06 AND 107.12, AND THE CONTRACT SPECIAL PROVISIONS.
19. FOR ADDITIONAL INFORMATION REFER TO BC-776M.
20. IF A NEEDED DETAIL IS NOT FOUND IN THE SOUND BARRIER STANDARDS OR ON THE CONTRACT DRAWINGS A SPECIAL SUBMISSION REQUESTING APPROVAL FOR SPECIFIC DETAILS MUST BE MADE TO THE CHIEF BRIDGE ENGINEER.

MATERIAL NOTES

1. CAST-IN-PLACE CONCRETE:
 - PROVIDE CLASS A CEMENT CONCRETE IN THE CAST-IN-PLACE FOOTINGS, PEDESTALS, AND CAISSONS.
 - $f'_c = 3,000$ PSI
 - UNIT WEIGHT OF CONCRETE = 150 LB. / CU. FT.
2. REINFORCEMENT STEEL:
 - PROVIDE GRADE 60 DEFORMED REINFORCING BARS THAT MEET THE REQUIREMENTS OF ASTM A 615, ASTM A 996, OR ASTM A 706. DO NOT WELD REINFORCING BARS UNLESS SPECIFIED. DO NOT USE RAIL STEEL ASTM A 996 REINFORCEMENT BARS IN FOOTINGS, CAISSONS, OR WHERE BENDING OR WELDING OF REINFORCEMENT BARS IS INDICATED.
 - $f_s = 24,000$ PSI
 - PROVIDE UNCOATED REINFORCEMENT IN THE FOOTINGS AND CAISSONS.
 - PROVIDE UNCOATED, EPOXY COATED, OR GALVANIZED REINFORCEMENT IN THE RAISED PANEL SEATS AND PEDESTALS AS SPECIFIED ON THE CONTRACT DRAWINGS.
 - PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH FOR REINFORCING BARS OF 30 DIAMETERS OR IN ACCORDANCE WITH THE CURRENT AASHTO SPECIFICATIONS AS MODIFIED BY THE DESIGN MANUAL, PART 4, WHICHEVER IS GREATER.
 - MECHANICAL CONNECTIONS, WHICH MEET THE REQUIREMENTS OF PUBLICATION 408, SECTION 1002, MAY BE USED UPON ACCEPTANCE FROM THE ENGINEER.
3. FABRICATED STRUCTURAL STEEL:
 - PROVIDE STRUCTURAL STEEL CONFORMING TO AASHTO M 270, GRADE 36 (ASTM A 709, GRADE 36) UNLESS OTHERWISE NOTED.
 - PROVIDE STRUCTURAL STEEL TUBING CONFORMING TO ASTM A 53, GRADE B, TYPE E FOR THE STEEL ANGLED AND CORNER POSTS. ($F_y = 35$ KSI)
 - WEATHERING STEEL (ASTM A 558) IS NOT PERMITTED.
 - PROVIDE MINIMUM WELD SIZE OF $\frac{3}{8}$ ".
 - NON-DESTRUCTIVE TESTING IS REQUIRED FOR STEEL POST TO BASE PLATE WELDS. PROVIDE TESTING IN ACCORDANCE WITH AASHTO/AWS D1.5 FOR MAIN MEMBER.
 - GALVANIZE AND PAINT STEEL POSTS, PLATES, AND HARDWARE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s) AND 1060.2(b).
 - CLEAN AND PREPARE GALVANIZED SURFACES FOR PAINTING IN ACCORDANCE WITH PUBLICATION 408, SECTION 1060.3(b) 4.
 - REPAIR DAMAGED GALVANIZING IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s) 2.
4. WELDED STUDS:
 - PROVIDE $\frac{7}{8}$ " x 4" STUDS CONFORMING TO ASTM A 108 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(e).
5. ANCHOR BOLTS, NUTS, AND WASHERS:
 - PROVIDE ANCHOR BOLTS CONFORMING TO ASTM F 1554, GRADE 36 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c) 3.
 - PROVIDE HEAVY HEX NUTS CONFORMING TO ASTM A 563A IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c) 3g.
 - PROVIDE OVERSIZE WASHERS CONFORMING TO AASHTO M 270, GRADE 36 (ASTM A 709, GRADE 36).
 - PROVIDE LOCK WASHERS AND FLAT WASHERS CONFORMING TO ASTM F 436 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c) 2b.
 - GALVANIZE ALL ANCHOR BOLTS AND HARDWARE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s).
6. PLAIN NEOPRENE BEARING PADS:
 - PROVIDE PLAIN NEOPRENE PADS WITH A DUROMETER HARDNESS OF 50 (+ / -) 5 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1113.02.
7. EPOXY BONDING COMPOUND:
 - PROVIDE EPOXY BONDING COMPOUND IN ACCORDANCE WITH PUBLICATION 408, SECTION 706.1.
8. NON-SHRINK GROUT:
 - PROVIDE NON-SHRINK GROUT IN ACCORDANCE WITH PUBLICATION 408, SECTION 1080.2(c).
 - PLACE NON-SHRINK GROUT AFTER THE BASE PLATE IS LEVELED ON THE LEVELING NUTS AND AFTER THE PANELS ARE INSTALLED.
 - PACK GROUT INTO PLACE. DO NOT POUR OR INJECT GROUT.
 - NON-SHRINK GROUT TO MATCH FINAL COLOR OF PANEL.
9. CAULKING COMPOUND:
 - PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.8(b).
 - CAULKING COMPOUND TO MATCH FINAL COLOR OF PANEL.
10. JOINT SEALING MATERIAL:
 - PROVIDE JOINT SEALING MATERIAL IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.4(d).
 - JOINT SEALING MATERIAL TO MATCH FINAL COLOR OF PANEL.
11. JOINT BACKING MATERIAL (BACKER ROD):
 - PROVIDE BACKER ROD MATERIAL IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.9.
12. ANTIGRAFFITI COATING:
 - APPLY ANTIGRAFFITI COATING IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIAL PROVISIONS.
13. PENETRATING CONCRETE STAIN:
 - APPLY STAIN IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIAL PROVISIONS.
14. CLOSED CELL NEOPRENE SPONGE:
 - PROVIDE CLOSED CELL NEOPRENE SPONGE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1085.2(m).

INDEX OF SHEETS

SHT. NO.	SHEET TITLE
1	GENERAL NOTES
2	GEOMETRY AND LAYOUT
3	POST DETAILS
4	PANEL SEAT DETAILS
5	DETAIL 1
6	DETAIL 2
7	DETAIL 3
8	DETAIL 4
9	DETAIL 5
10	DETAIL 6

DESCRIPTION OF DETAILS

DETAIL	DESCRIPTION
1	STEEL POST WITH BASE PLATE CONNECTION TO CAISSON
2	STEEL POST WITH BASE PLATE CONNECTION TO SPREAD FOOTING
3	STEEL POST EMBEDDED IN CAISSON
4	STEEL POST EMBEDDED IN SPREAD FOOTING WITH PEDESTAL
5	CORNER/ANGLED STEEL PIPE POST EMBEDDED IN CAISSON
6	CORNER/ANGLED STEEL PIPE POST EMBEDDED IN SPREAD FOOTING WITH PEDESTAL

NOTES TO FABRICATOR

1. REFER TO BC-776M FOR NOTES TO FABRICATOR.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

STANDARD
 GROUND MOUNTED SOUND BARRIERS
 STEEL POSTS

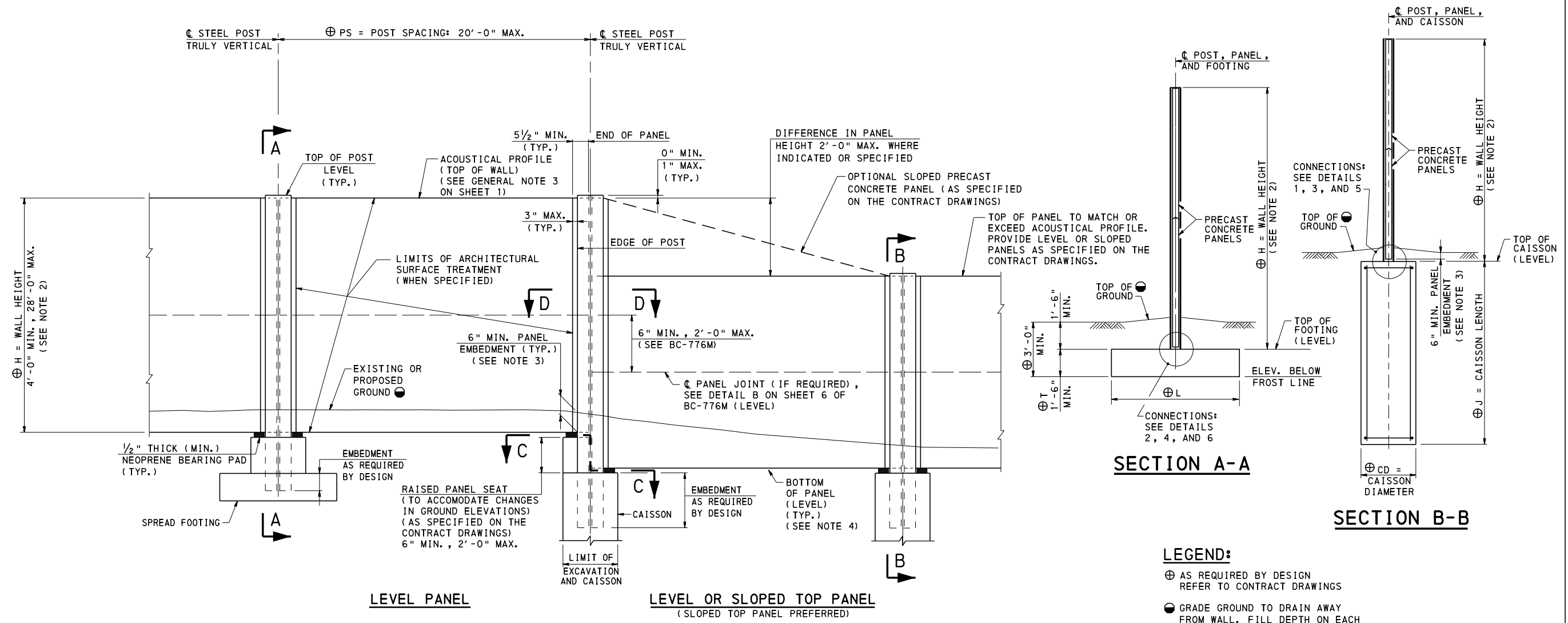
GENERAL NOTES

BC-734M	ANCHOR SYSTEMS
BC-735M	WALL CONSTRUCTION AND EXPANSION JOINT DETAILS
BC-736M	REINFORCEMENT BAR FABRICATION DETAILS
BC-776M	GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE PANELS
BC-777M	GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE POSTS
BC-779M	STRUCTURE MOUNTED SOUND BARRIER WALLS
RC-11M	CLASSIFICATION OF EARTHWORK FOR STRUCTURES
REFERENCE DRAWINGS	

RECOMMENDED SEPT. 30, 2016
Thomas P. Maiore
 CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Bruce S. Thompson
 DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 1 OF 10
BC-778M



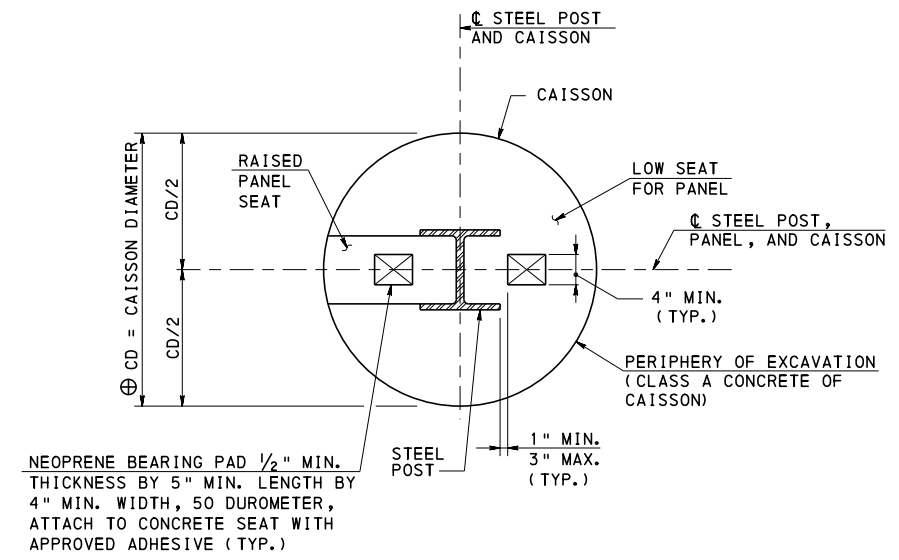
GROUND MOUNTED SOUND BARRIER ELEVATION

LEGEND:

- ⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS
- GRADE GROUND TO DRAIN AWAY FROM WALL. FILL DEPTH ON EACH SIDE OF WALL TO BE WITHIN 1'-0" DIFFERENCE.

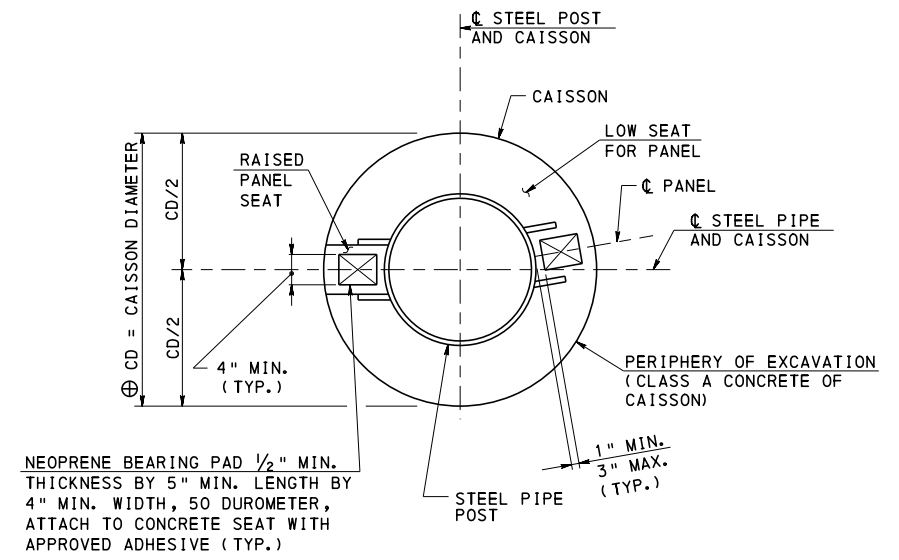
NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. WALL HEIGHT IS DEFINED AS FOLLOWS:
 - POST WITH BASE PLATE: H = HEIGHT FROM TOP OF BASE PLATE TO TOP OF WALL.
 - POST WITHOUT BASE PLATE: H = HEIGHT FROM TOP OF FOOTING/CAISSON TO TOP OF WALL.
3. PANEL EMBEDMENT MAY NEED TO BE INCREASED TO ACCOMMODATE BASE PLATES AND ANCHOR BOLT PROJECTIONS.
4. FOR OPTIONAL SLOPED BOTTOM PANEL REFER TO BC-776M, SHEET 3.
5. FOR SECTION D-D, REFER TO SHEET 3.



SECTION C-C (STEEL H-BEAM)

(CONCRETE CAISSON SHOWN (WITHOUT BASE PLATES), PEDESTAL AND SPREAD FOOTING SIMILAR)



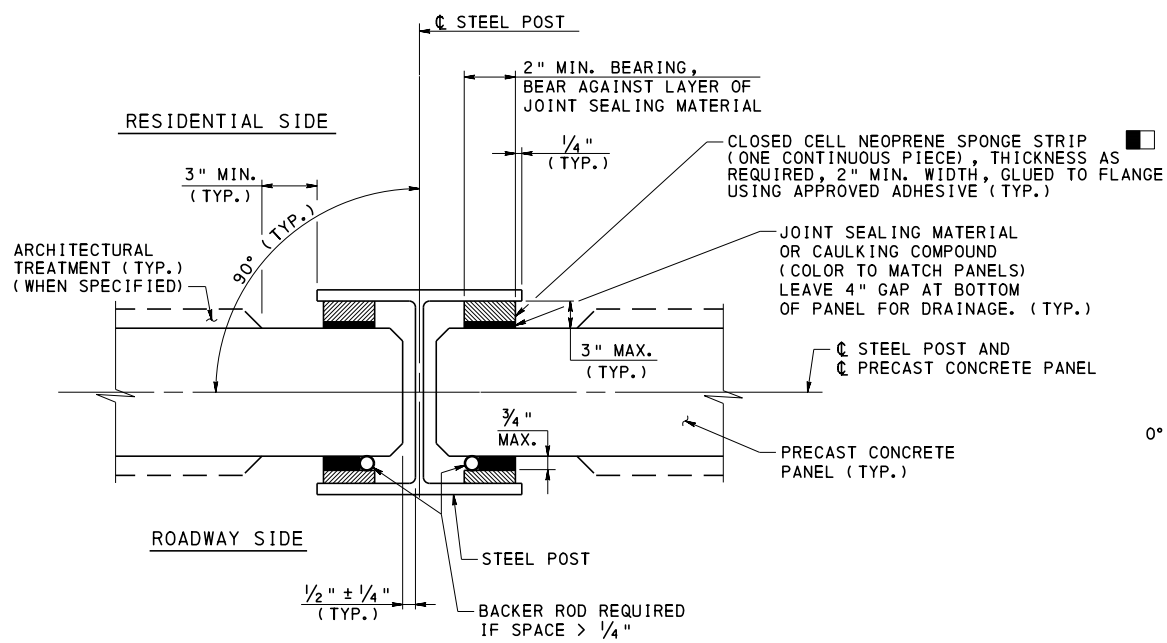
SECTION C-C (STEEL PIPE POST)

(CONCRETE CAISSON SHOWN, PEDESTAL SIMILAR)

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

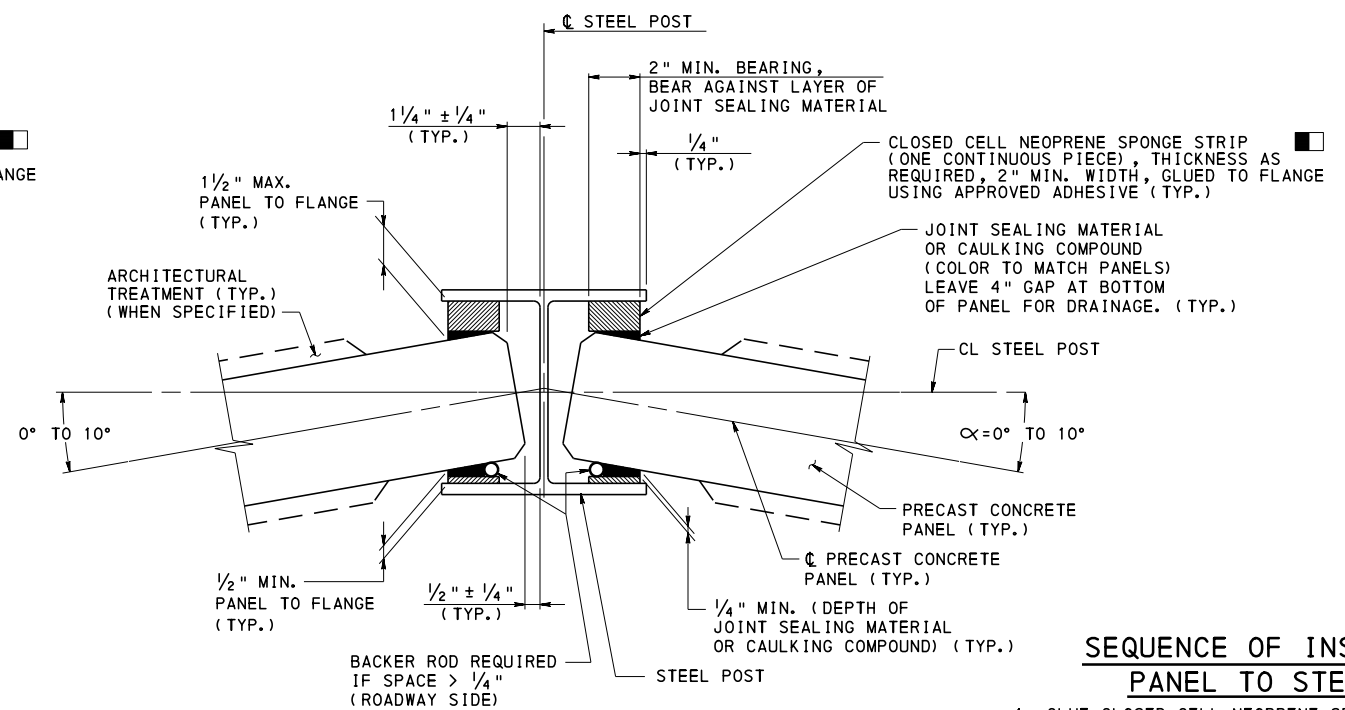
**STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS**

GEOMETRY AND LAYOUT



SECTION D-D (STEEL H-BEAM)
STRAIGHT PANELS

(CENTERLINE OF PANEL DOES NOT HAVE TO BE AT CENTERLINE OF POST)



SECTION D-D (STEEL H-BEAM)
ANGLED PANELS

α = PANEL ORIENTATION IN RELATIONSHIP TO CENTERLINE OF POST.

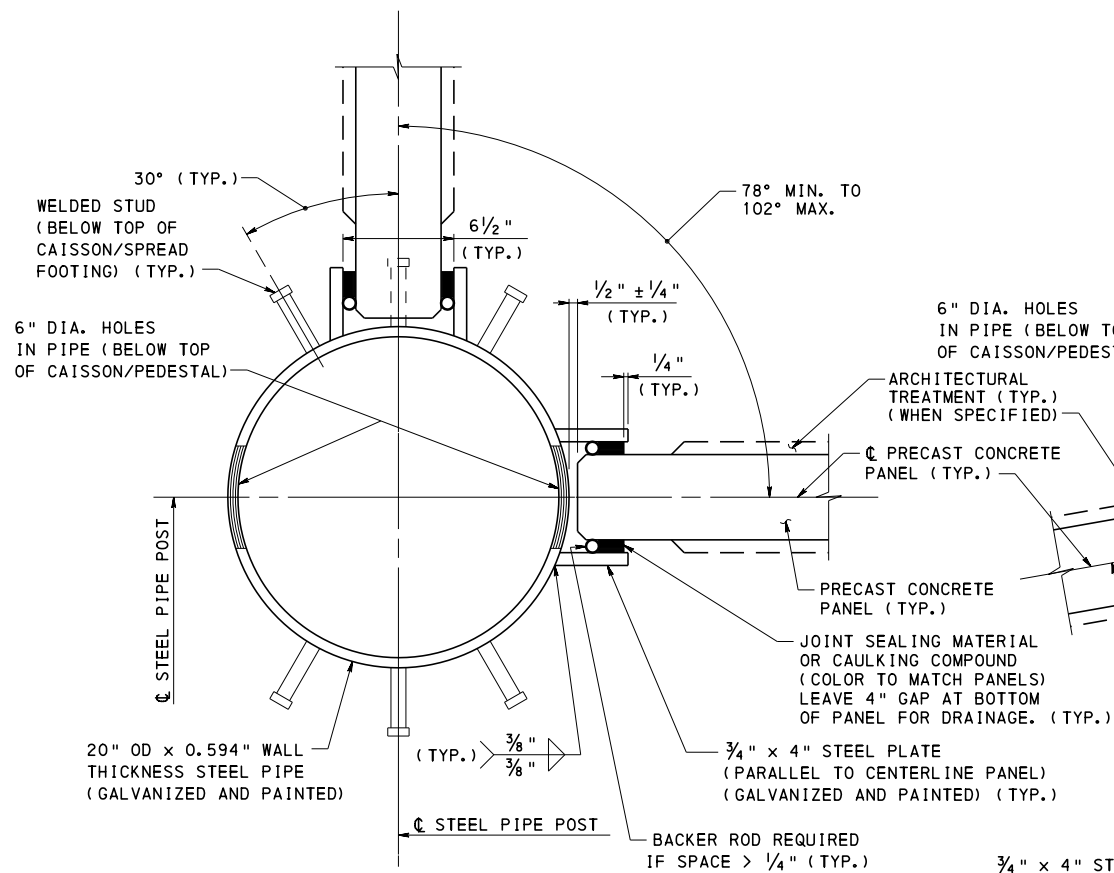
**SEQUENCE OF INSTALLATION
 PANEL TO STEEL POST**

1. GLUE CLOSED CELL NEOPRENE SPONGE STRIP TO POST ON RESIDENTIAL SIDE OF BARRIER USING AN APPROVED ADHESIVE. APPLY 1/4" MINIMUM JOINT SEALING MATERIAL OR CAULKING COMPOUND TO FACE OF ELASTOMERIC PAD. STOP PAD 4" ABOVE BOTTOM OF PANEL FOR DRAINAGE.
2. ERECT PRECAST PANEL. ADD JOINT SEALING MATERIAL OR CAULKING COMPOUND AND WEDGE TIGHT AGAINST POST AND CLOSED CELL NEOPRENE SPONGE STRIP ON RESIDENTIAL SIDE OF BARRIER.
3. GLUE CLOSED CELL NEOPRENE SPONGE STRIP TO POST ON ROADWAY SIDE OF BARRIER.
4. INSERT BACKER RODS IF OPENINGS ARE GREATER THAN 1/4" AND APPLY JOINT SEALING MATERIAL OR CAULKING COMPOUND.
5. WHERE NO CLOSED CELL NEOPRENE SPONGE STRIP IS REQUIRED, SEAL PANEL TO POST WITH JOINT SEALING MATERIAL OR CAULKING COMPOUND, LEAVE 4" UNSEALED GAP AT BOTTOM OF PANEL FOR DRAINAGE.

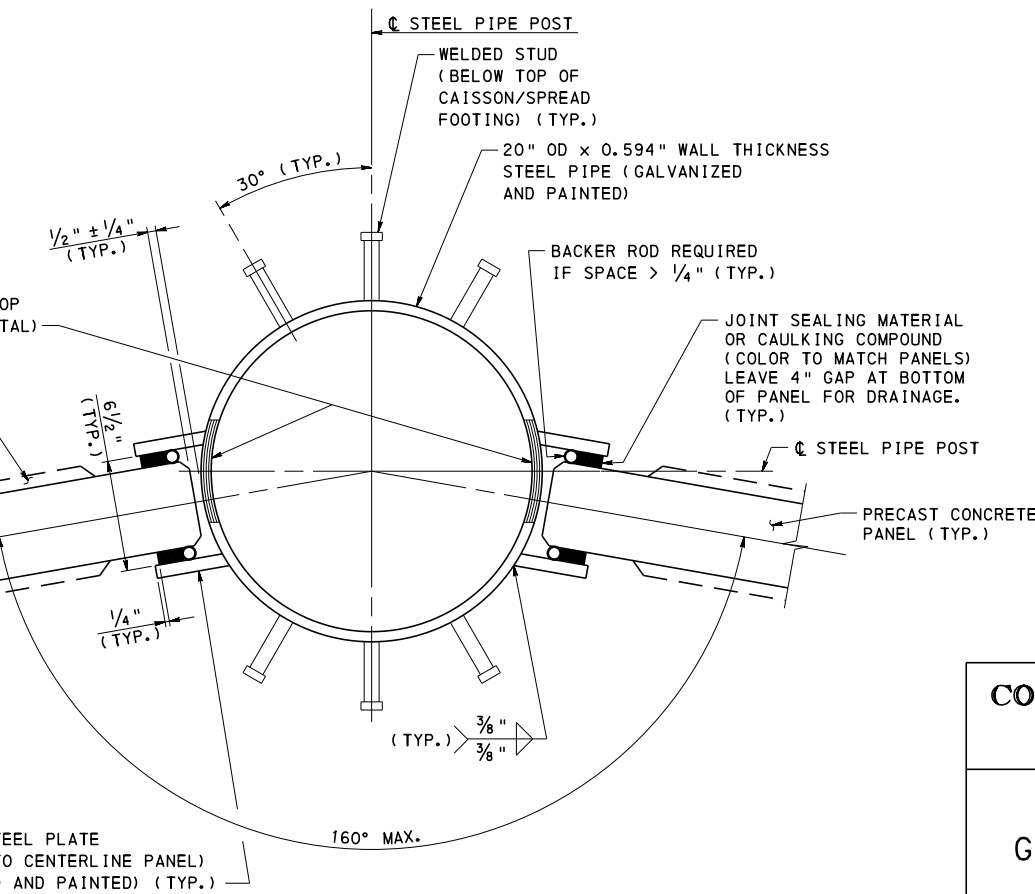
■ CLOSED CELL NEOPRENE SPONGE STRIP NOT REQUIRED IF JOINT BETWEEN PANEL AND FLANGE IS LESS THAN 3/4". ZERO, ONE, OR TWO CLOSED CELL NEOPRENE SPONGE STRIPS MAY BE REQUIRED DEPENDING UPON SIZE OF STEEL POST. GLUING TWO CLOSED CELL NEOPRENE SPONGE STRIPS TOGETHER, USING AN APPROVED ADHESIVE, TO OBTAIN REQUIRED THICKNESS IS PERMITTED. WHERE NO CLOSED CELL NEOPRENE SPONGE STRIP IS REQUIRED, SEAL PANEL TO FLANGE. BACKER ROD IS REQUIRED UNLESS THE JOINT BETWEEN THE PANEL AND FLANGE OR THE CLOSED CELL NEOPRENE SPONGE STRIP IS LESS THAN 1/4".

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR ADDITIONAL STEEL PIPE POST DETAILS REFER TO SHEETS 9 AND 10.



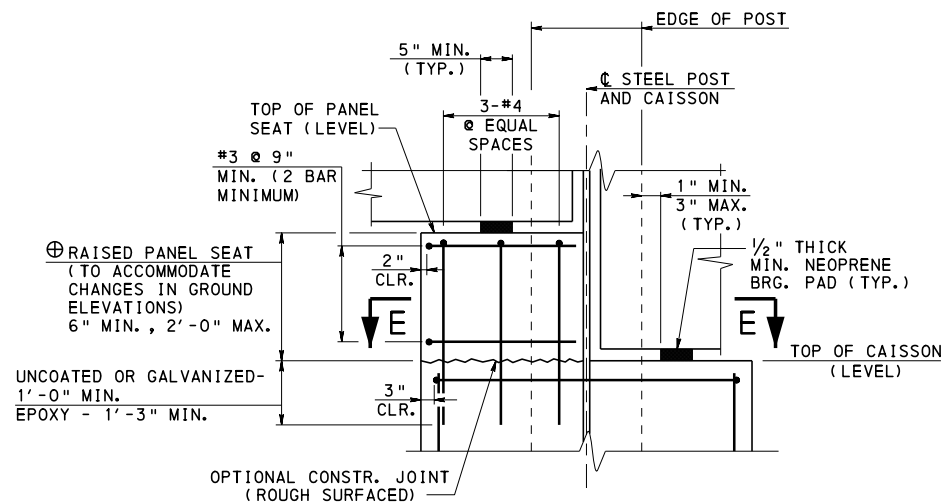
SECTION D-D (STEEL PIPE POST)
CORNER PANELS



SECTION D-D (STEEL PIPE POST)
ANGLED PANELS

**COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY**

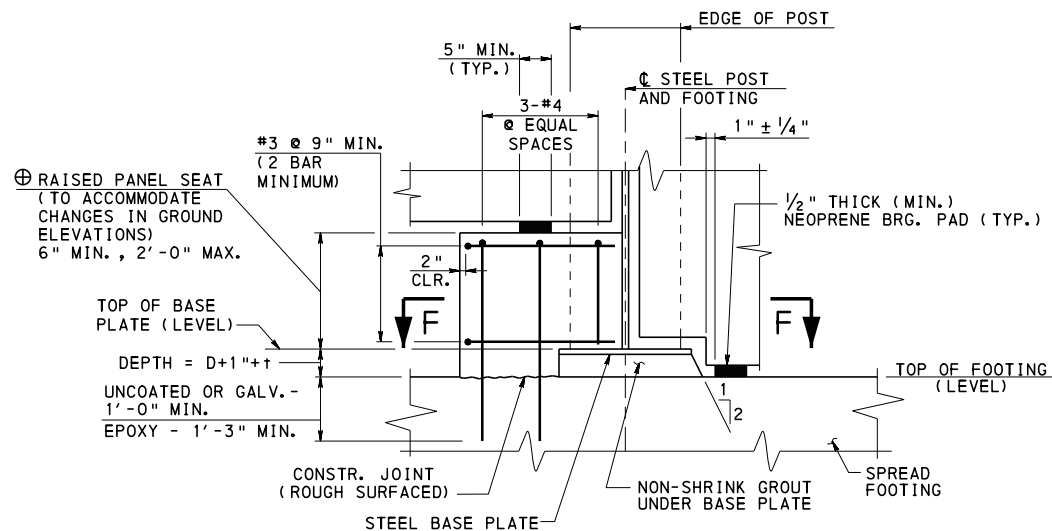
**STANDARD
 GROUND MOUNTED SOUND BARRIERS
 STEEL POSTS
 POST DETAILS**



RAISED PANEL SEAT TYPICAL PANEL SEAT

PANEL SEAT ELEVATION WITHOUT BASE PLATE

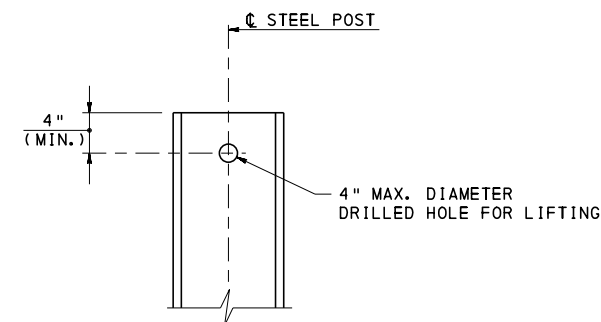
(DETAIL FOR CAISSON SHOWN
DETAIL FOR FOOTING IS SIMILAR)



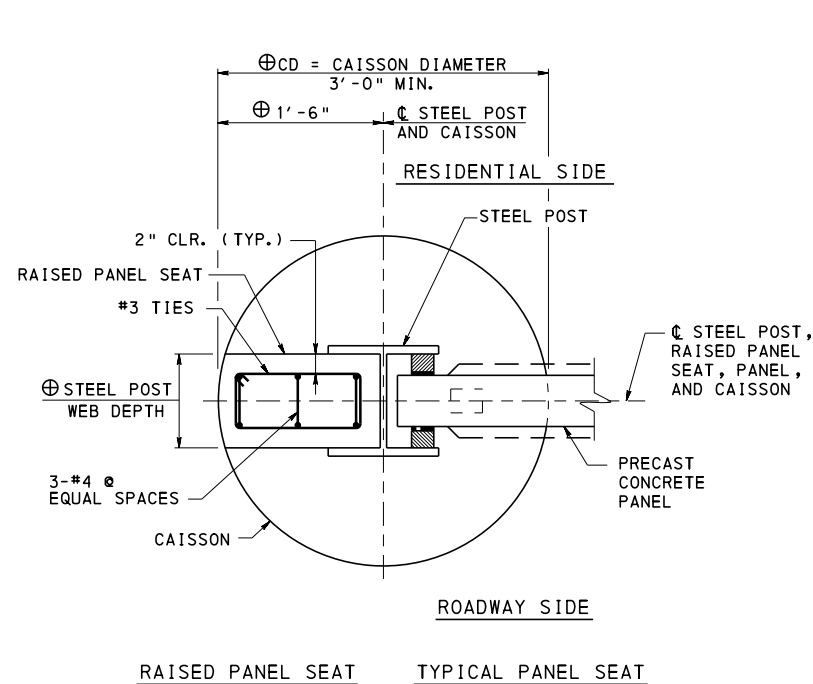
RAISED PANEL SEAT TYPICAL PANEL SEAT

PANEL SEAT ELEVATION WITH BASE PLATE

(DETAIL FOR FOOTING SHOWN
DETAIL FOR CAISSON IS SIMILAR)

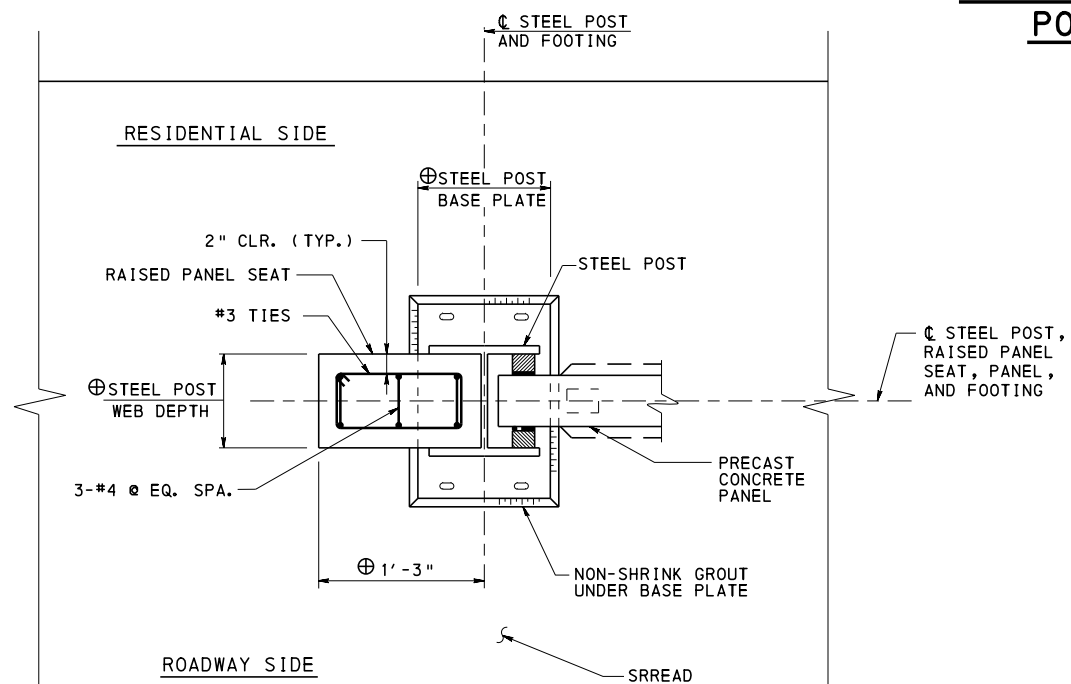


LIFTING HOLE IN STEEL POST (OPTIONAL)



RAISED PANEL SEAT TYPICAL PANEL SEAT

SECTION E-E



RAISED PANEL SEAT TYPICAL PANEL SEAT

SECTION F-F

LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. RAISED PANEL SEATS (IF REQUIRED) TO BE DETAILED ON THE CONTRACT DRAWINGS.
3. DETAILS FOR STEEL PIPE POST NOT SHOWN BUT SIMILAR TO DETAILS SHOWN. REFER TO CONTRACT DRAWINGS FOR DETAILS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS

PANEL SEAT DETAILS

RECOMMENDED SEPT. 30, 2016

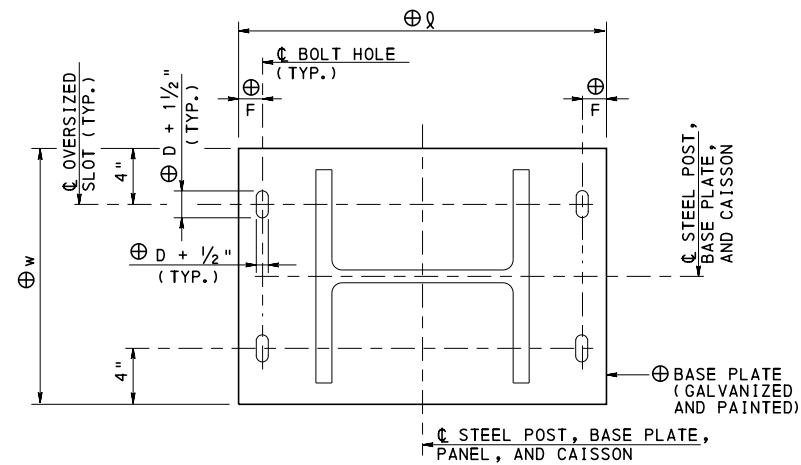
Thomas P. Maiore
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016

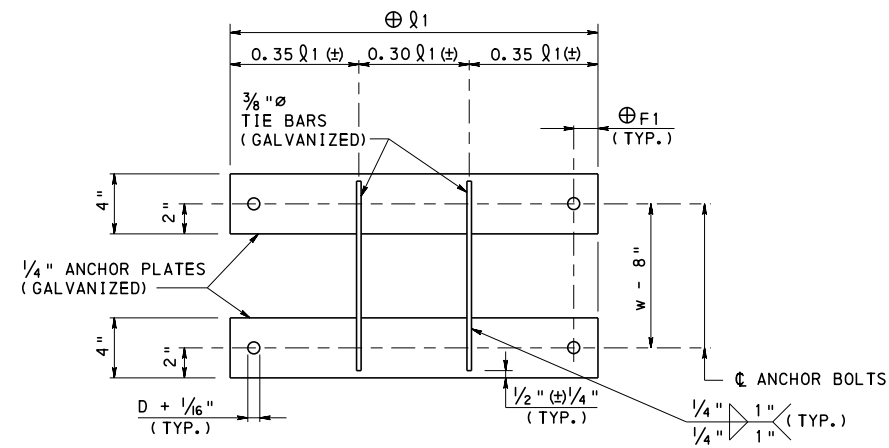
Brenda S. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 4 OF 10

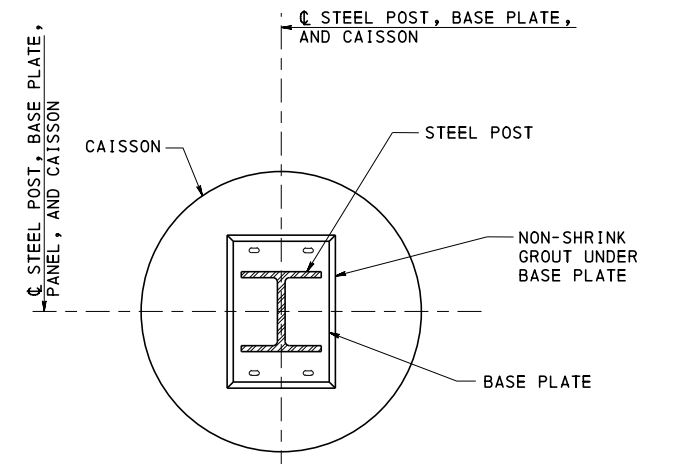
BC-778M



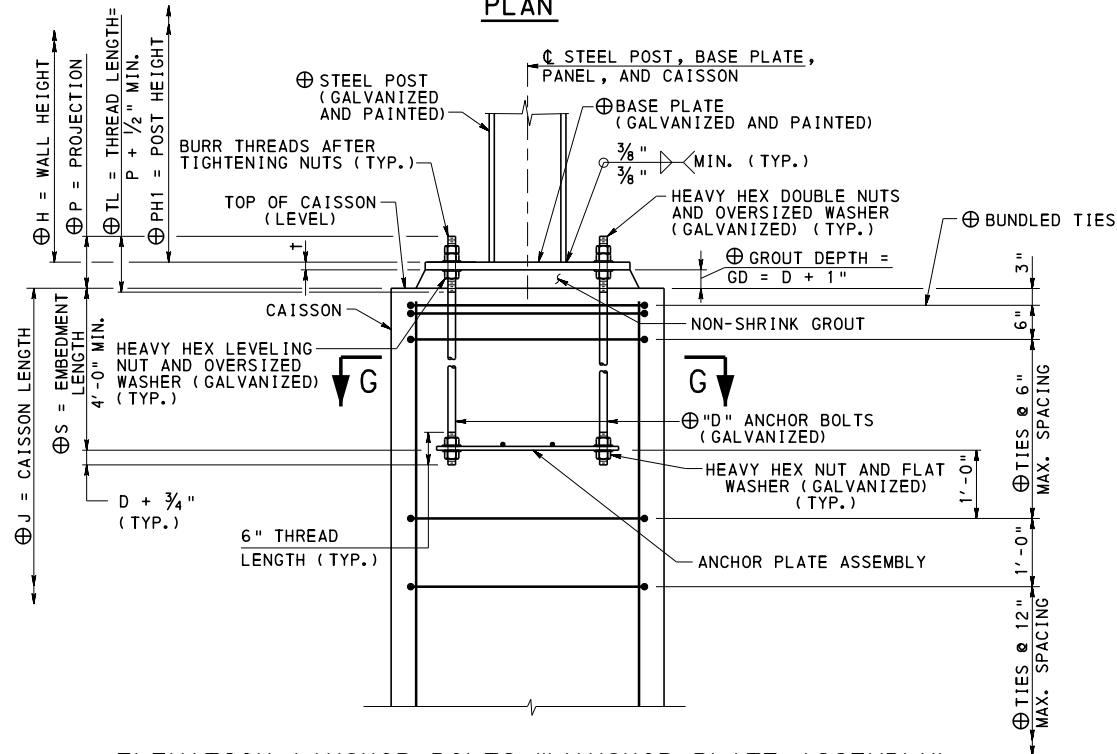
PLAN



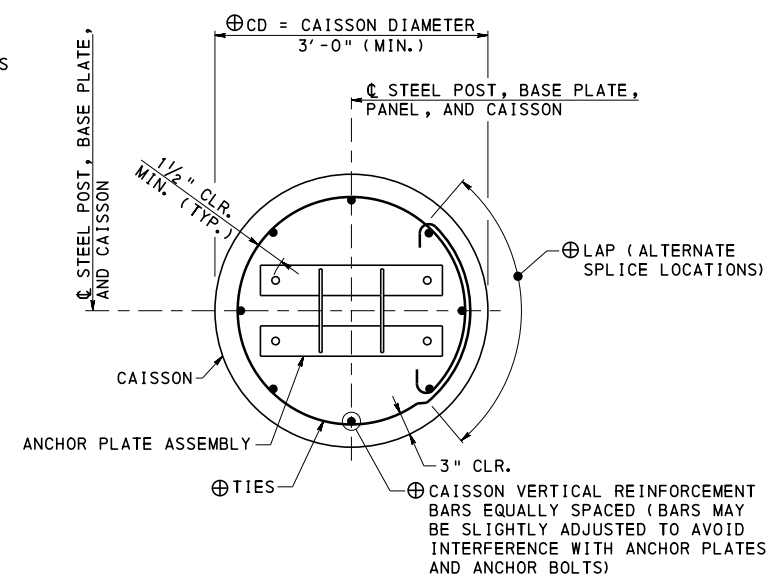
PLAN - ANCHOR PLATE ASSEMBLY



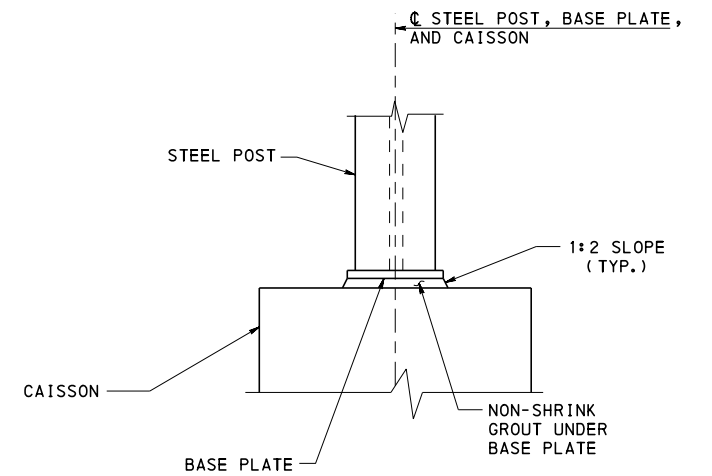
PANEL SEAT PLAN



ELEVATION (ANCHOR BOLTS W/ANCHOR PLATE ASSEMBLY)



SECTION G-G



PANEL SEAT ELEVATION

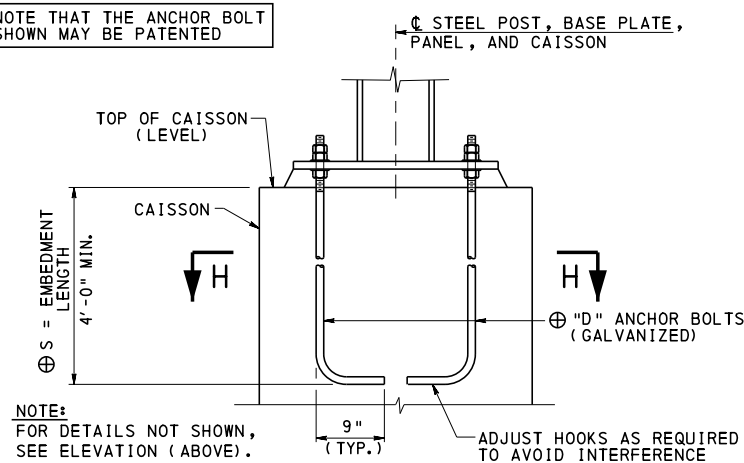
LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR PANEL SEAT DETAILS REFER TO SHEET 4.
3. FOR OVERSIZED WASHER DETAIL REFER TO SHEET 6.

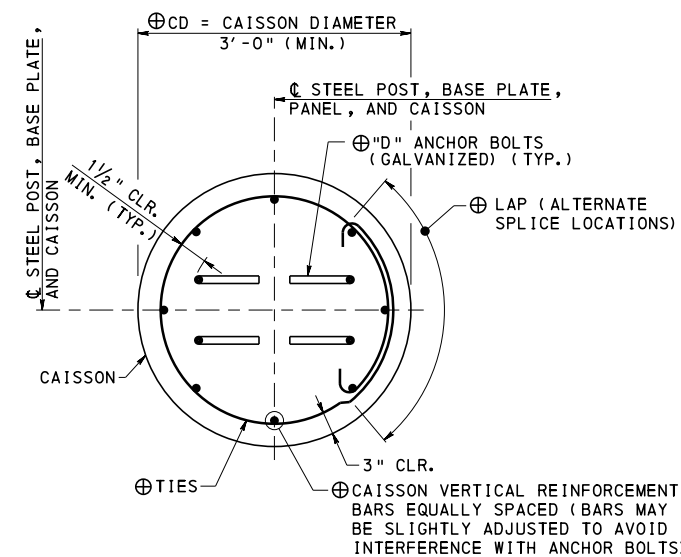
PLEASE NOTE THAT THE ANCHOR BOLT DETAIL SHOWN MAY BE PATENTED



ELEVATION (ANCHOR BOLTS W/HOOKS)

CAISSON REINFORCEMENT NOT SHOWN FOR CLARITY

**DETAIL 1
STEEL POST WITH BASE PLATE
CONNECTION TO CAISSON**



SECTION H-H

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

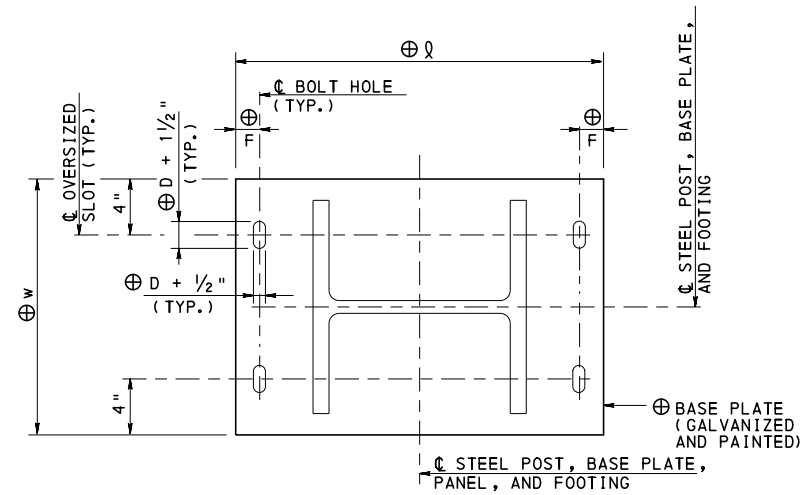
**STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS**

DETAIL 1

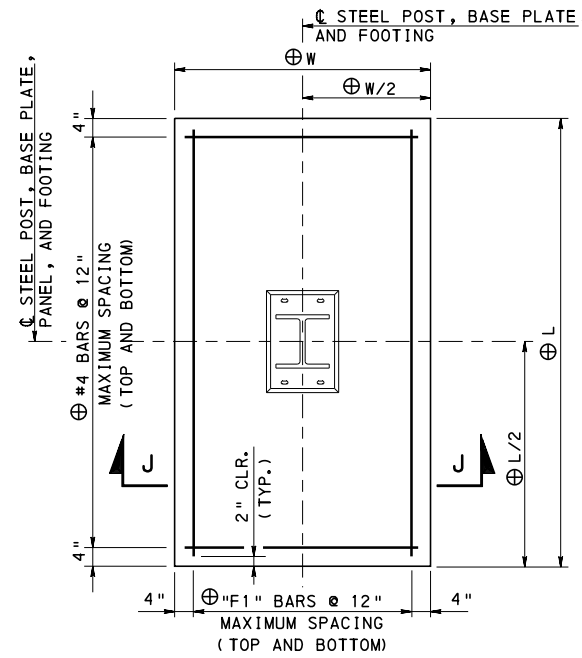
RECOMMENDED SEPT. 30, 2016
Thomas P. Maiore
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brenda Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

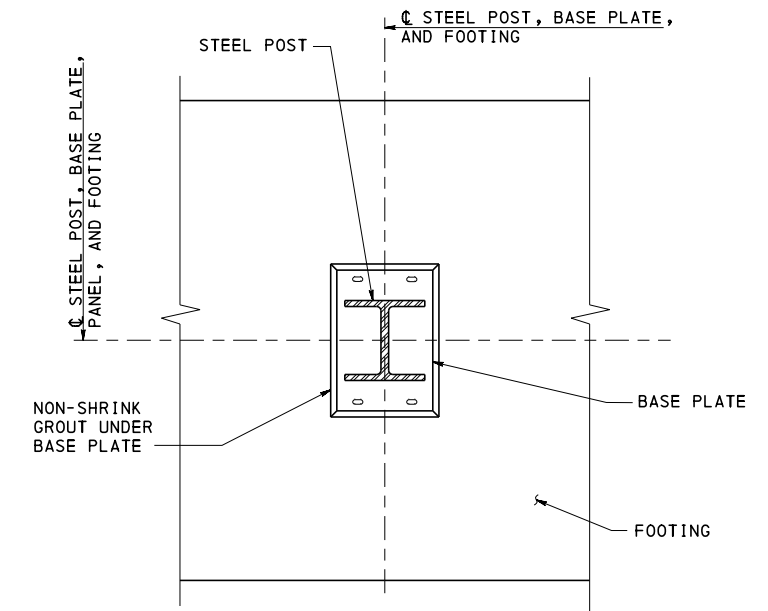
SHEET 5 OF 10
BC-778M



PLAN

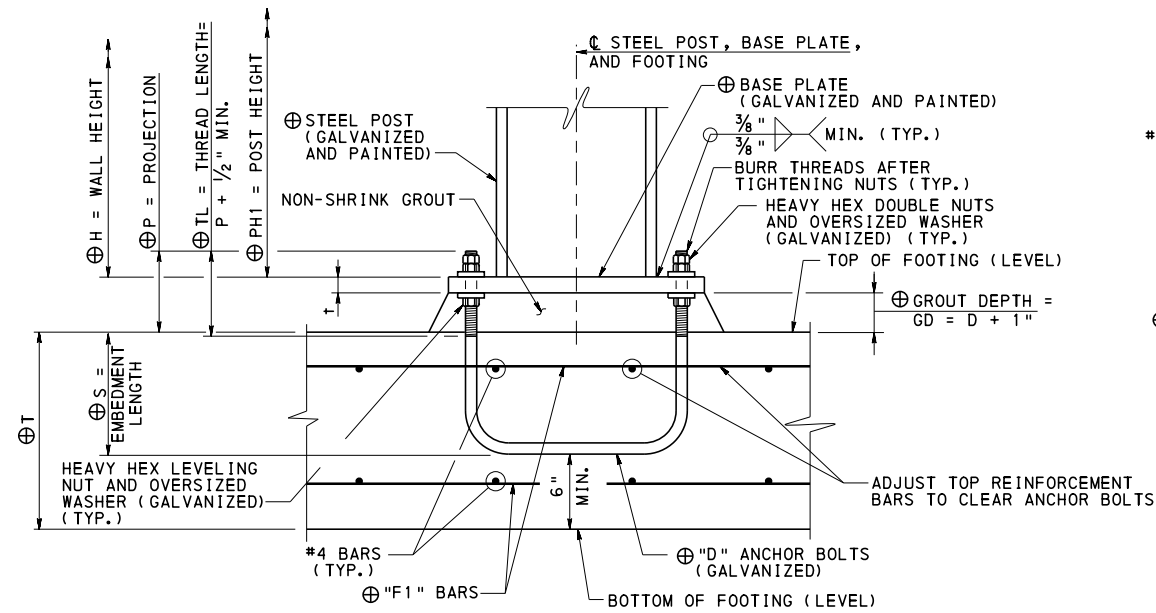


SPREAD FOOTING PLAN



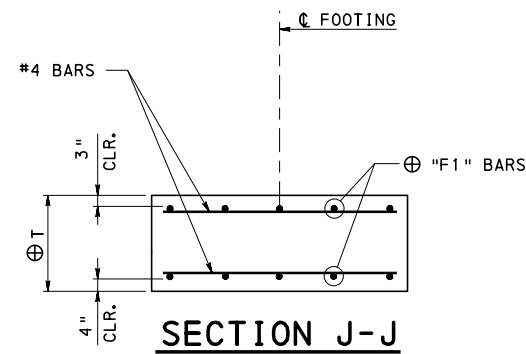
PANEL SEAT PLAN

PLEASE NOTE THAT THE ANCHOR BOLT DETAIL SHOWN MAY BE PATENTED.

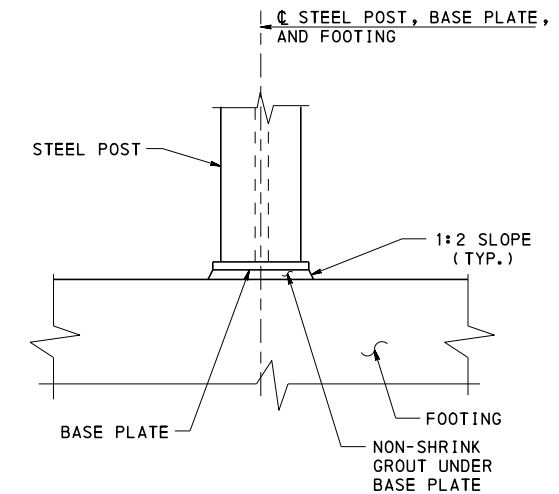


ELEVATION

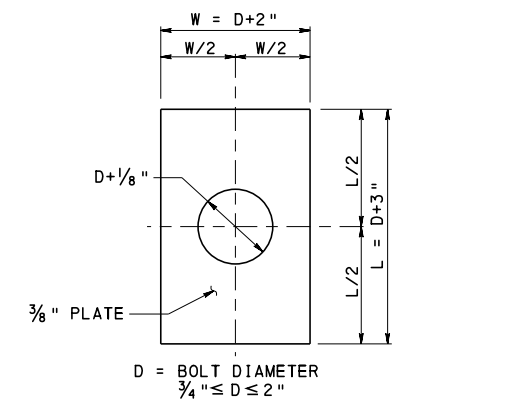
**DETAIL 2
STEEL POST WITH BASE PLATE
CONNECTION TO SPREAD FOOTING**



SECTION J-J



PANEL SEAT ELEVATION



OVERSIZED WASHER DETAIL

LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR PANEL SEAT DETAILS REFER TO SHEET 4.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

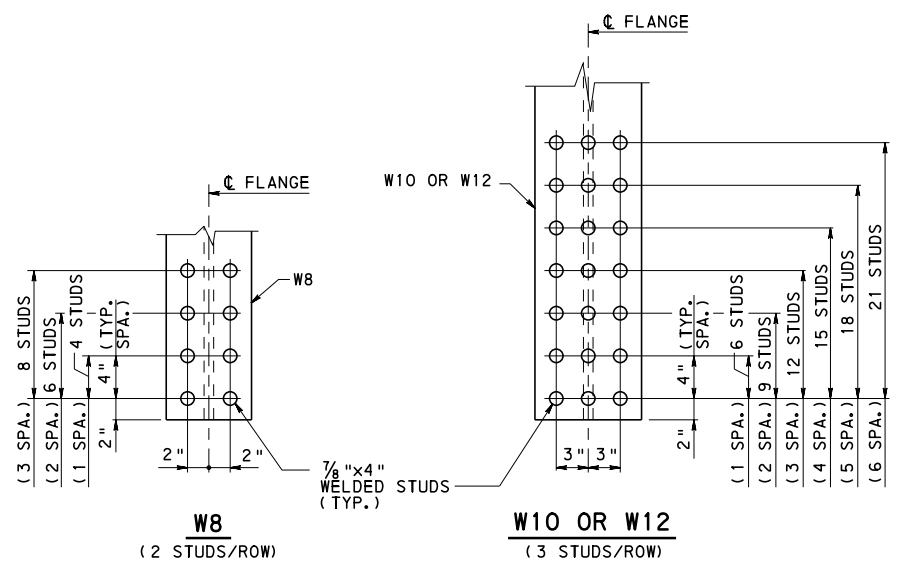
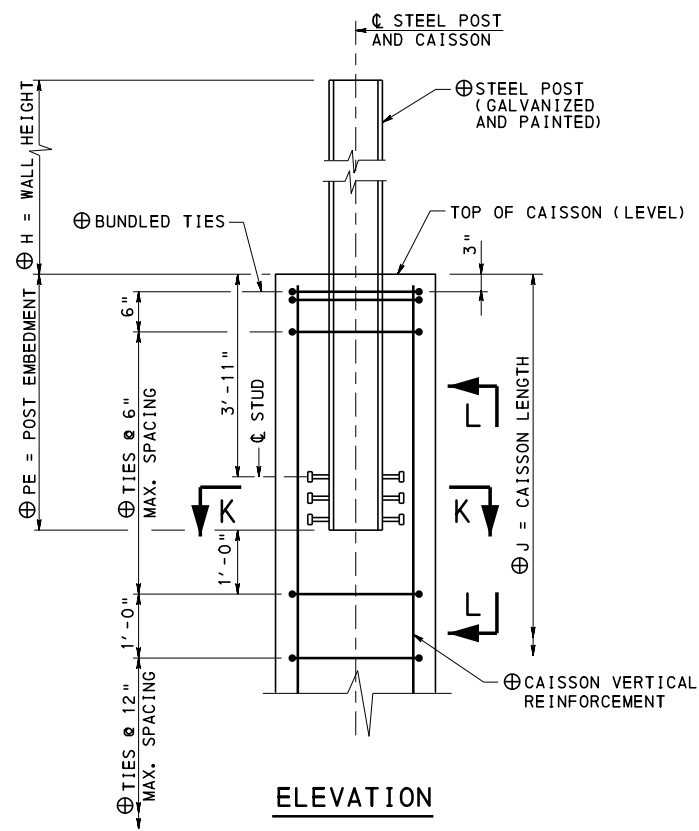
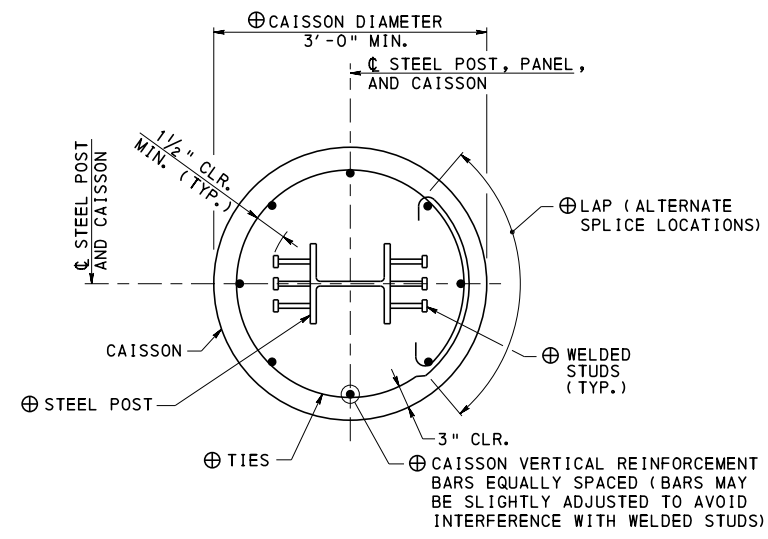
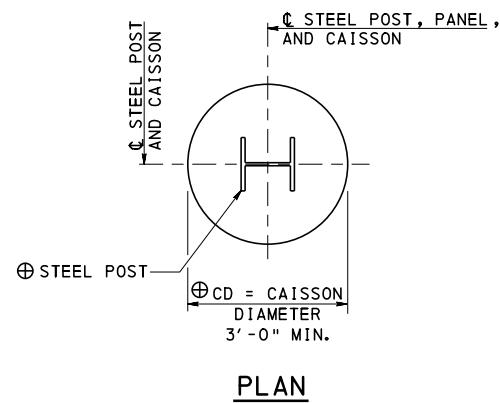
**STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS**

DETAIL 2

RECOMMENDED SEPT. 30, 2016
Thomas P. Maiore
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brenda Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 6 OF 10
BC-778M



**DETAIL 3
STEEL POST
EMBEDDED IN CAISSON**

SECTION K-K

**SECTION L-L
WELDED STUDS
(REQUIRED ON BOTH FLANGES)**

LEGEND:
⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

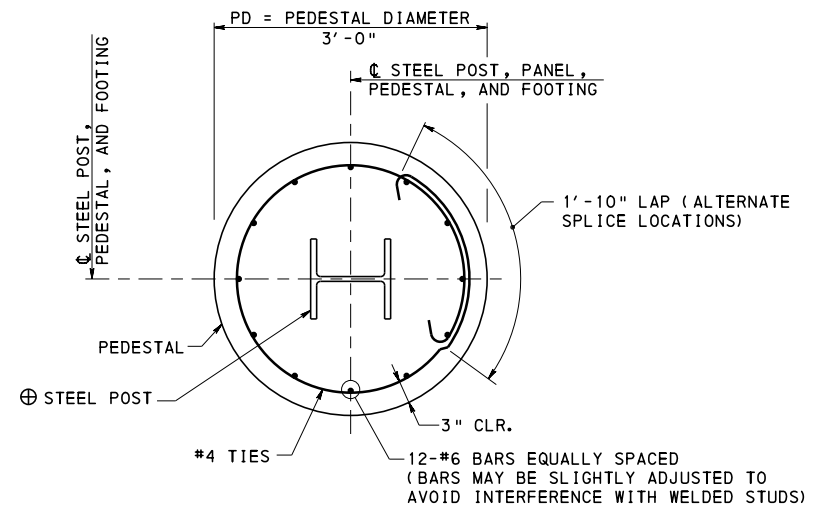
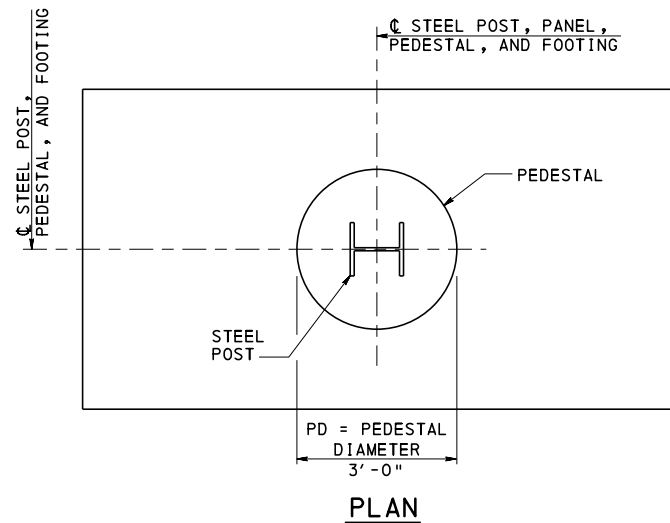
NOTES:
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR PANEL SEAT DETAILS REFER TO SHEET 4.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

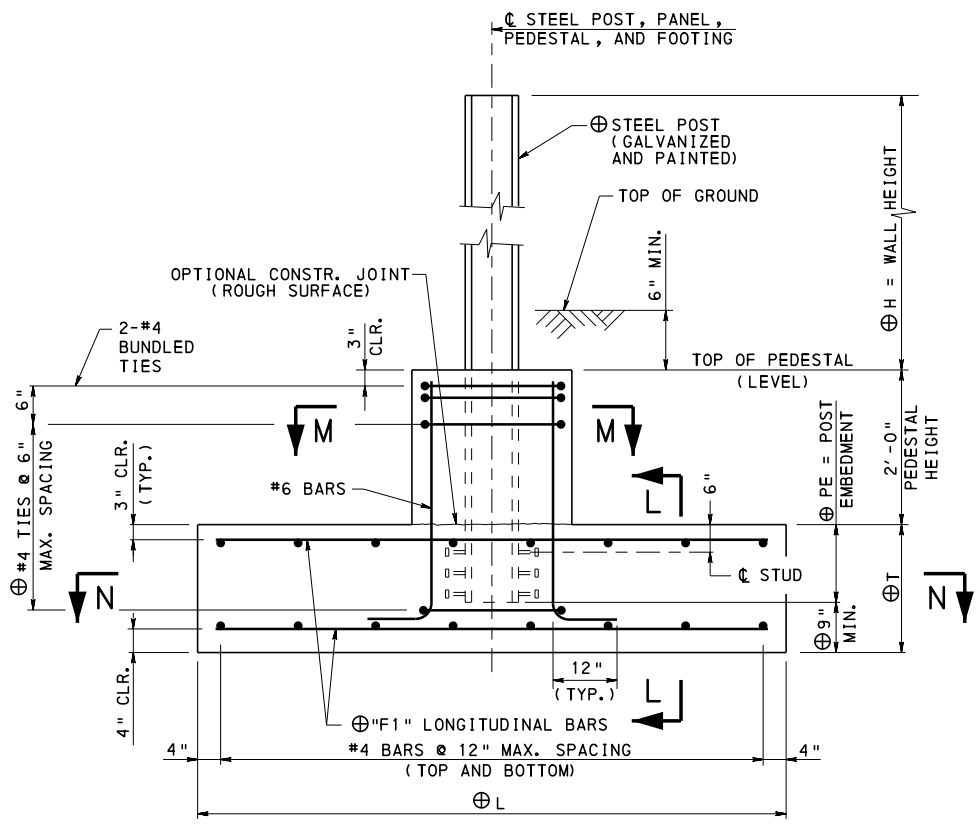
**STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS**

DETAIL 3

RECOMMENDED <u>SEPT. 30, 2016</u>	RECOMMENDED <u>SEPT. 30, 2016</u>	SHEET 7 OF 10
<i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	<i>Brenda Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	BC-778M

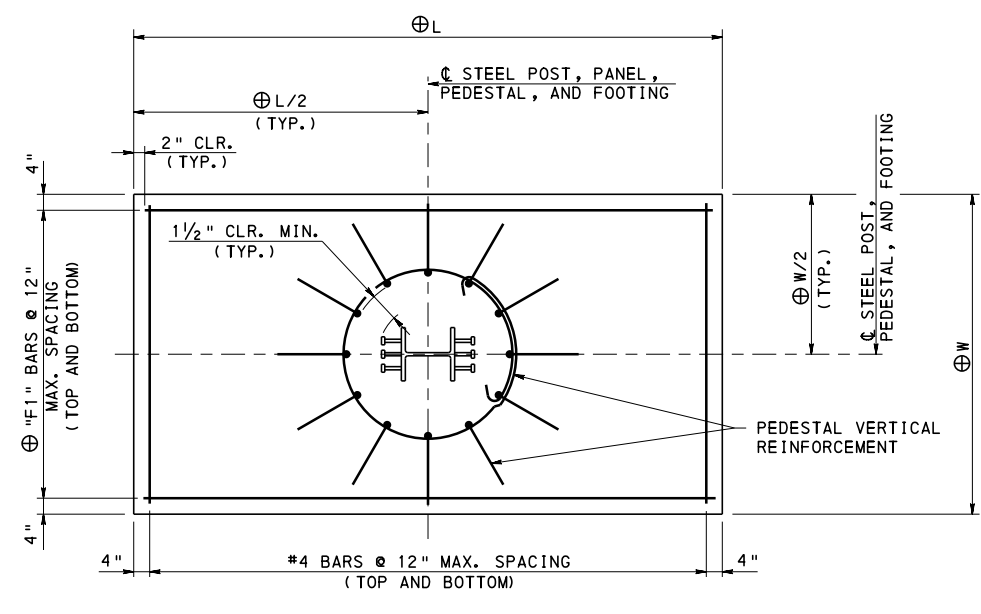


SECTION M-M



ELEVATION
ADJUST FOOTING TOP REINFORCEMENT SPACING TO CLEAR POST.

DETAIL 4
STEEL POST EMBEDDED IN
SPREAD FOOTING WITH PEDESTAL

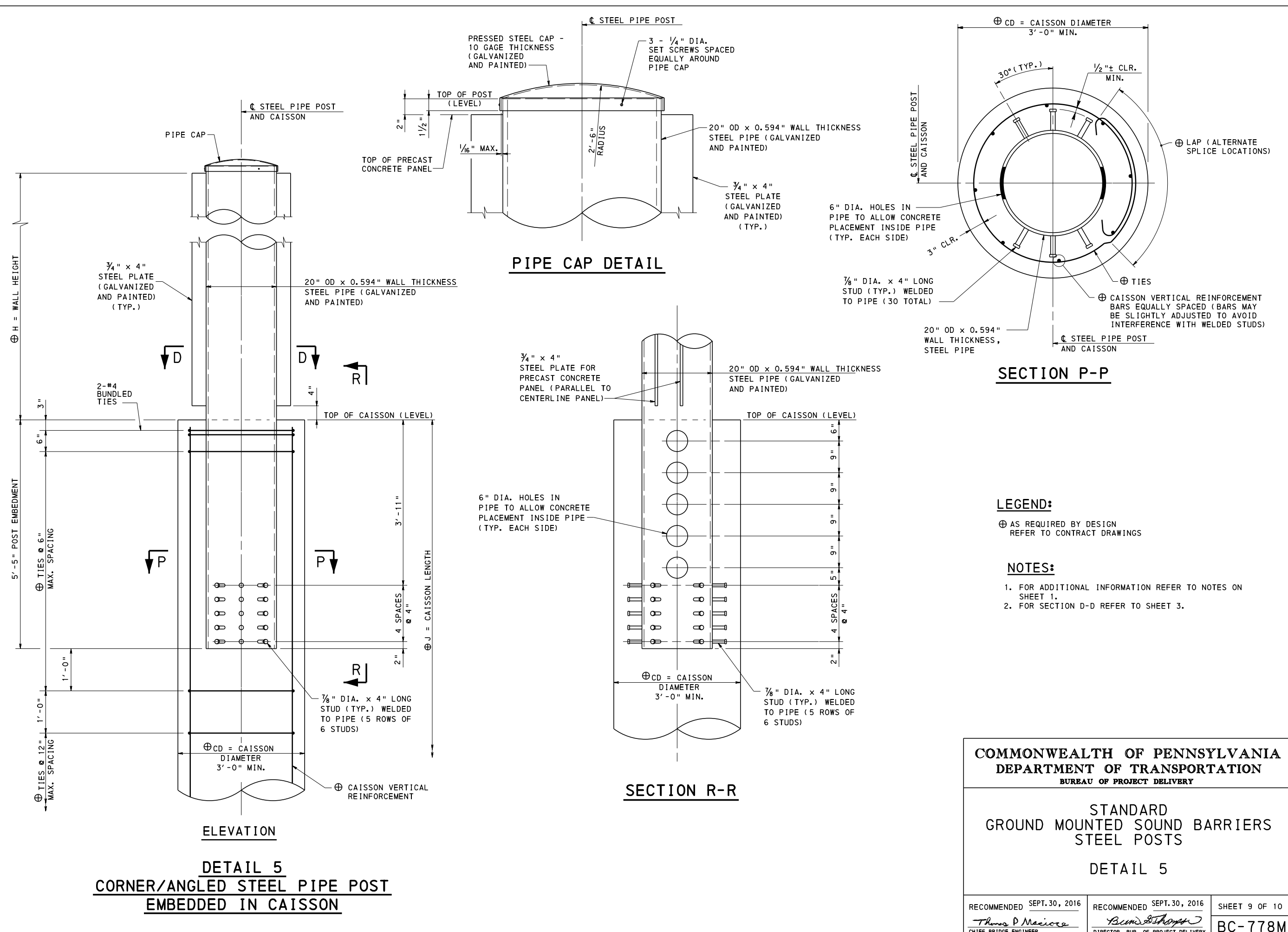


SECTION N-N

LEGEND:
⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

NOTES:
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR SECTION L-L REFER TO SHEET 7.
3. FOR PANEL SEAT DETAILS REFER TO SHEET 4.

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY		
STANDARD GROUND MOUNTED SOUND BARRIERS STEEL POSTS		
DETAIL 4		
RECOMMENDED <u>SEPT. 30, 2016</u> <i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED <u>SEPT. 30, 2016</u> <i>Brenda Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 8 OF 10 BC-778M



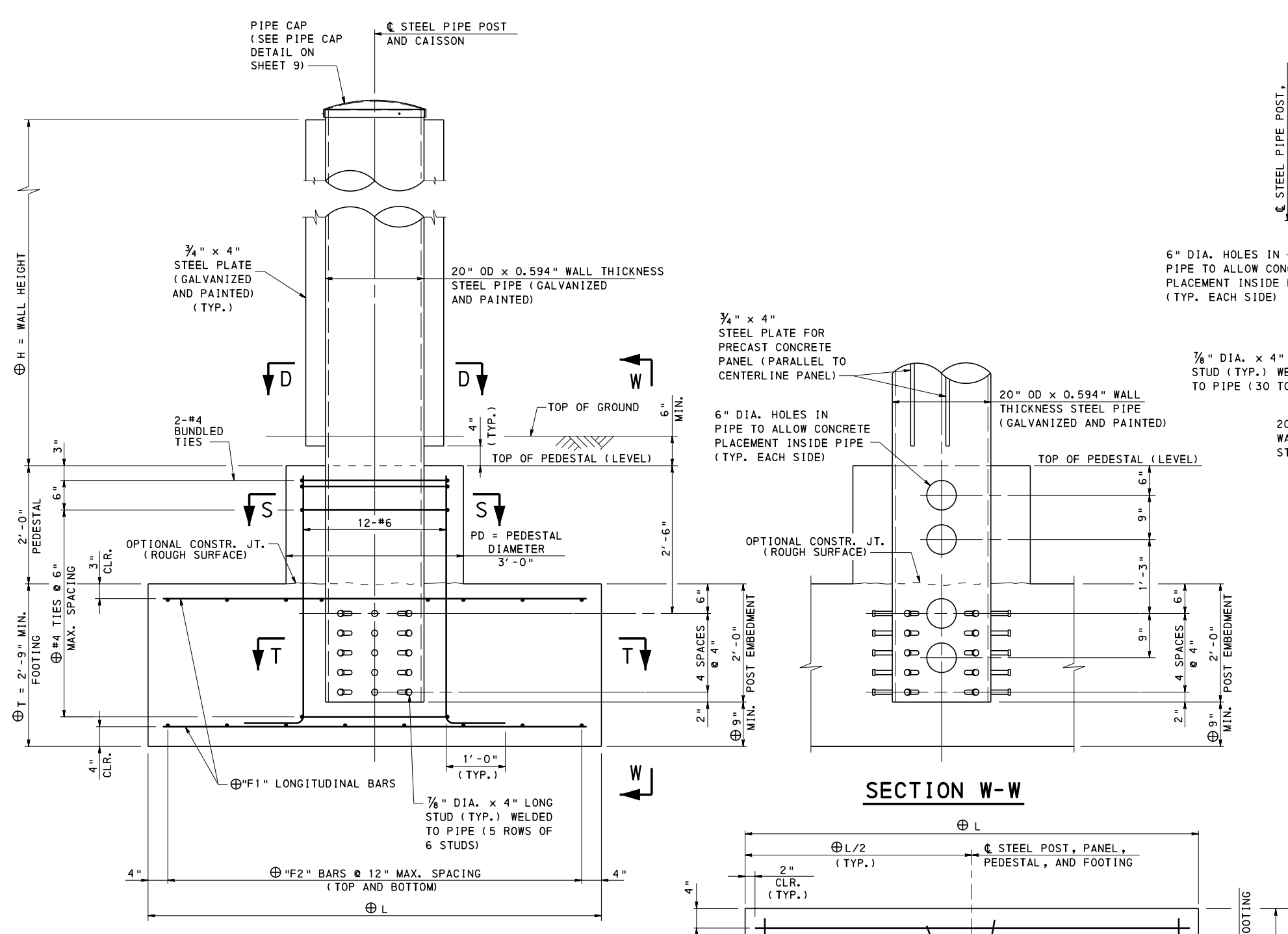
DETAIL 5
CORNER/ANGLED STEEL PIPE POST
EMBEDDED IN CAISSON

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

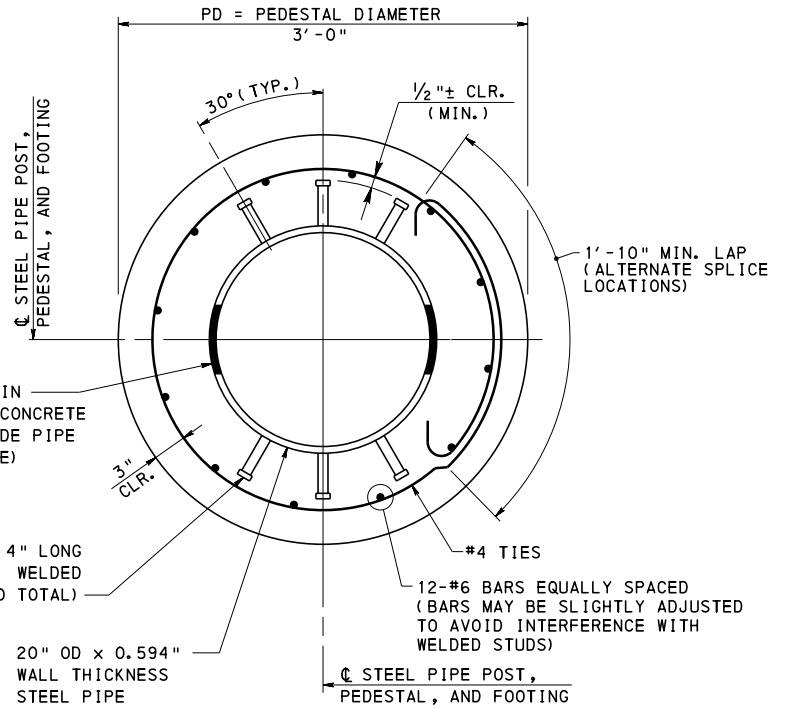
STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS

DETAIL 5

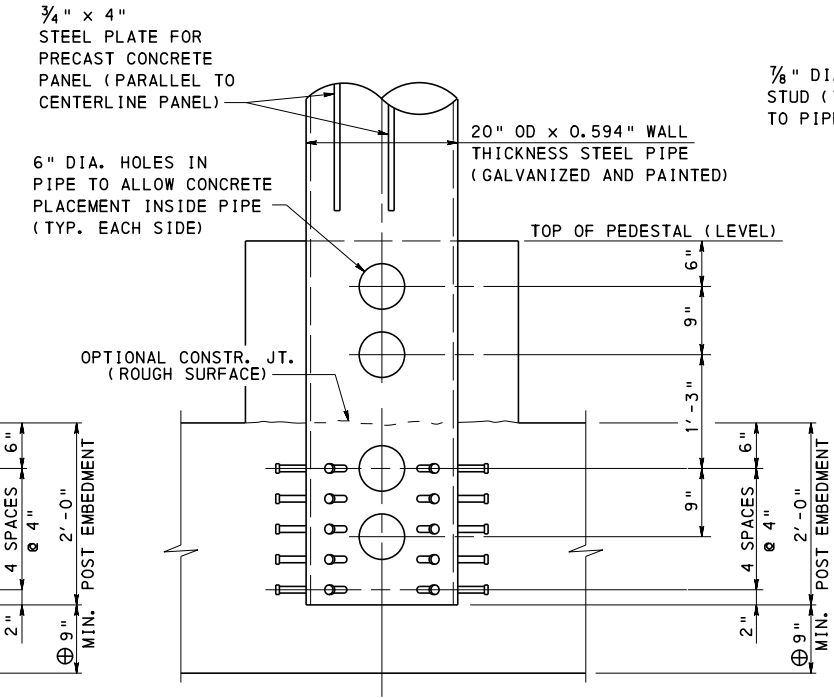
RECOMMENDED <u>SEPT. 30, 2016</u>	RECOMMENDED <u>SEPT. 30, 2016</u>	SHEET 9 OF 10
<i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	<i>Brenda Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	BC-778M



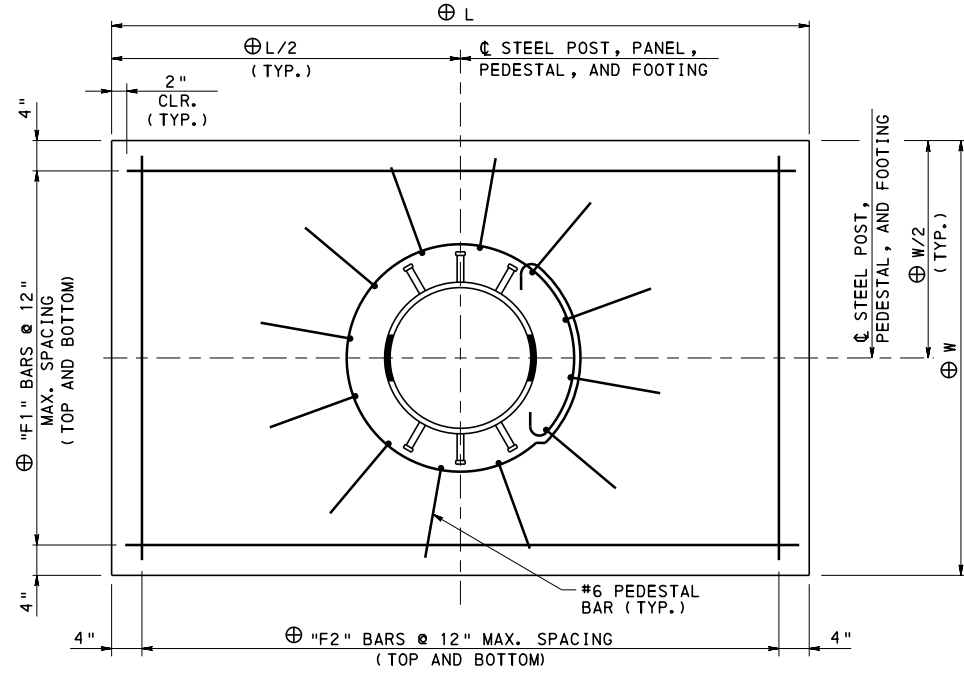
ELEVATION
 ADJUST FOOTING TOP REINFORCEMENT SPACING TO CLEAR POST.
DETAIL 6
CORNER/ANGLED STEEL PIPE POST EMBEDDED
IN SPREAD FOOTING WITH PEDESTAL



SECTION S-S



SECTION W-W



SECTION T-T

LEGEND:

⊕ AS REQUIRED BY DESIGN
 REFER TO CONTRACT DRAWINGS

NOTES:

- FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
- FOR SECTION D-D REFER TO SHEET 3.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS

DETAIL 6

GENERAL NOTES

1. DESIGN SPECIFICATIONS:
 - PENNDOT DESIGN MANUAL, PART 4, STRUCTURES, APRIL 2015 EDITION.
 - 1989 AASHTO "GUIDE SPECIFICATIONS FOR STRUCTURAL DESIGN OF SOUND BARRIERS", INCLUDING THE 1992 AND 2002 INTERIMS.
 - 2002 AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES", 17TH EDITION.
 - 2001 AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", 4TH EDITION, INCLUDING INTERIMS THROUGH 2006.
 - DESIGN IS IN ACCORDANCE WITH THE WORKING STRESS DESIGN METHOD. (NO INCREASE IN ALLOWABLE UNIT STRESSES ARE PERMITTED EXCEPT FOR GROUP III LOADINGS WHICH PERMITS A 33% OVERSTRESS.)
2. CONSTRUCTION SPECIFICATIONS AND **WORK QUALITY**:
 - PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH THE CURRENT VERSION OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, AASHTO/AWS D1.5 - BRIDGE WELDING CODE AND THE CONTRACT SPECIAL PROVISIONS. (USE AASHTO/AWS D1.1 FOR WELDING NOT COVERED IN AASHTO/AWS D1.5.)
3. WALL HEIGHTS MUST EQUAL OR EXCEED THE ACOUSTICAL PROFILE.
4. PANEL HEIGHTS:
 - BARRIERS MOUNTED ON BRIDGES:
 - 2'-0" MINIMUM TO 10'-0" MAXIMUM
 - PROVIDE A MAXIMUM POST SPACING OF 8'-0" WHEN PANEL HEIGHT IS GREATER THAN 9'-0" AND LESS THAN OR EQUAL TO 10'-0"
 - STACKED PANELS NOT PERMITTED
 - BARRIERS MOUNTED ON RETAINING WALLS AND MOMENT SLABS:
 - 2'-0" MINIMUM TO 9'-0" MAXIMUM
 - PROVIDE STACKED PANELS WHEN THE WALL HEIGHT EXCEEDS 9'-0"
5. PANEL JOINTS:
 - PROVIDE FULL HEIGHT PANELS ON BARRIERS MOUNTED ON BRIDGES.
 - MINIMIZE THE NUMBER OF PANEL JOINTS.
 - PROVIDE UNIFORM STEPS.
 - IF STEPS ARE REQUIRED, THE ELEVATION DIFFERENCE BETWEEN ADJACENT PANELS IS NOT PERMITTED TO BE LESS THAN 6" OR GREATER THAN 2'-0" AND MAY NOT OCCUR MORE FREQUENTLY THAN ONCE EVERY 50'-0" OF WALL LENGTH.
6. PRECAST CONCRETE POSTS ARE NOT PERMITTED FOR STRUCTURE MOUNTED SOUND BARRIERS, PROVIDE STEEL POSTS.
7. SLIP FORMING IS NOT PERMITTED FOR CONCRETE BARRIERS WITH STRUCTURE MOUNTED SOUND BARRIER WALLS.
8. INSTALL ANCHOR BOLTS, POSTS, AND PANELS TRULY VERTICAL.
9. PROVIDE STEEL CABLES IN THE PRECAST CONCRETE PANELS AS INDICATED ON THE CONTRACT DRAWINGS.
10. PROVIDE CONCRETE COVER IN ACCORDANCE WITH THIS STANDARD AND DESIGN MANUAL, PART 4.
11. A HIGHER STRENGTH CONCRETE, FOR CAST-IN-PLACE CONCRETE, MAY BE SUBSTITUTED FOR A LOWER CLASS CONCRETE AT NO ADDITIONAL COST TO THE DEPARTMENT.
12. FILL ALL LIFTING INSERTS WITH NON-SHRINK GROUT. COLOR TO MATCH PANEL.
13. SEAL ALL OPEN JOINTS WITH CAULKING COMPOUND AND/OR JOINT SEALING MATERIAL. (COLOR TO MATCH PANEL).
14. REFER TO PUBLICATION 408, SECTION 1086.3(f) FOR FABRICATION AND ERECTIONS TOLERANCES.
15. CHAMFER EXPOSED CONCRETE EDGES ON THE PRECAST PANELS 1/2" x 1/2", EXCEPT AS NOTED.
16. ALL FILLET WELDS SHOWN ARE MINIMUM SIZE UNLESS NOTED OTHERWISE.
17. ALL DIMENSIONS SHOWN ARE HORIZONTAL, EXCEPT AS NOTED.
18. DIMENSIONS SHOWN ARE FOR A NORMAL TEMPERATURE OF 68 DEGREES F.
19. REINFORCEMENT IN SOME SECTIONS IS NOT SHOWN FOR CLARITY.
20. COORDINATE, LOCATE, AND CONDUCT ALL WORK RELATED TO PUBLIC AND PRIVATE UTILITIES IN ACCORDANCE WITH PUBLICATION 408, SECTION 105.06 AND 107.12, AND THE CONTRACT SPECIAL PROVISIONS.
21. IF A NEEDED DETAIL IS NOT FOUND IN THE SOUND BARRIER STANDARDS OR ON THE CONTRACT DRAWINGS, A SPECIAL SUBMISSION REQUESTING APPROVAL FOR SPECIFIC DETAILS MUST BE MADE TO THE CHIEF BRIDGE ENGINEER.
22. PROVIDE VERTICAL V-NOTCHES ON BARRIER FRONT AND REAR FACES AT ALL POST ANCHOR BOLT LOCATIONS FOR SOUND BARRIERS MOUNTED ON TOP OF BARRIERS ON BRIDGES, RETAINING WALLS AND MOMENT SLABS. SEE DETAIL ON SHEET 8.

NOTES TO FABRICATOR

1. PROVIDE SHOP DRAWINGS IN ACCORDANCE WITH PUBLICATION 408, SECTION 105.02(d) AND 1086.3(b).
2. THE FOLLOWING INFORMATION MUST BE SHOWN ON THE SHOP DRAWINGS (IF APPLICABLE):
 - GENERAL NOTES
 - FABRICATION NOTES
 - TRANSPORTATION NOTES
 - LIFTING AND ERECTION NOTES
 - INSTALLATION NOTES
 - ELEVATION VIEW INDICATING THE FOLLOWING MINIMUM INFORMATION:
 - OVERALL WALL LENGTH
 - POST SPACINGS
 - POST AND PANEL CODES/DESIGNATIONS
 - HORIZONTAL JOINT LOCATIONS (IF PERMITTED)
 - ELEVATIONS FOR THE FOLLOWING ITEMS:
 - ACOUSTIC PROFILE ELEVATIONS
 - TOP OF WALL ELEVATIONS
 - TOP OF POST ELEVATIONS
 - TOP OF BASE PLATE ELEVATIONS
 - FINISHED GROUND ELEVATIONS
 - LOCATIONS OF STEEL PIPE AND BOLTS FOR STEEL CABLE CONNECTION
 - INDIVIDUAL POST DETAILS
 - INDIVIDUAL PANEL DETAILS
 - CONNECTION DETAILS
 - CABLE DETAILS
 - BASE PLATE DETAILS
 - ANCHOR BOLT DETAILS
 - LIFTING INSERT DETAILS
 - MATERIAL LISTS
 - REINFORCEMENT BAR SCHEDULES
 - ANY OTHER INFORMATION REQUIRED TO FABRICATE AND CONSTRUCT THE SOUND BARRIER WALL
3. THE SHOP DRAWINGS FOR THE PRECAST CONCRETE SOUND BARRIER PANELS AND THE FABRICATED STRUCTURAL STEEL POSTS MUST BE SUBMITTED CONCURRENTLY.
4. PRECAST CONCRETE PANELS:
 - THE FABRICATOR MUST ENSURE THAT THE PANELS ARE ADEQUATELY DESIGNED FOR STRESSES DUE TO STRIPPING, HANDLING, ERECTION, AND TRANSPORTATION. PROVIDE AND SUBMIT DESIGN CALCULATIONS, AS REQUIRED.
5. LIFTING INSERTS:
 - PREPARE AND SUBMIT DESIGN CALCULATIONS FOR THE PANEL LIFTING INSERTS FOR ACTUAL STRENGTH OF CONCRETE AT TIME OF STRIPPING, TRANSPORTATION AND ERECTION.
 - PROVIDE LIFTING INSERTS WITH A MINIMUM CAPACITY OF AT LEAST TWO TIMES THE CALCULATED LOAD ON THE INSERT.
 - PROVIDE A MINIMUM OF TWO LIFTING INSERTS OR A MAXIMUM OF FOUR LIFTING INSERTS IN THE PRECAST CONCRETE PANELS.
 - PROVIDE GALVANIZED INSERTS.
6. IF REQUIRED, PREPARE AND SUBMIT TEMPORARY BRACING CALCULATIONS AND DETAILS.
7. PREPARE AND SUBMIT CATALOG CUTS IN ACCORDANCE WITH PUBLICATION 408, SECTION 1086.3(d).
8. #4 GRADE 60 REINFORCEMENT BARS MAY BE SUBSTITUTED FOR WELDED WIRE FABRIC WITH AN EQUIVALENT AREA AT NO ADDITIONAL COST TO THE DEPARTMENT.
9. PANELS MUST BE STORED, TRANSPORTED, HANDLED, AND ERECTED ON EDGES AT ALL TIMES. PANELS SHOULD NOT BE LAID FLAT.
10. FABRICATORS MUST BE PRE-APPROVED BY PENNDOT PER BULLETIN #15.

INDEX OF SHEETS

SHT. NO.	SHEET TITLE
1	GENERAL NOTES - 1
2	GENERAL NOTES - 2
3	GEOMETRY AND LAYOUT - BARRIER MOUNTED
4	GEOMETRY AND LAYOUT - WALL MOUNTED
5	PRECAST CONCRETE PANEL DETAILS - 1
6	PRECAST CONCRETE PANEL DETAILS - 2
7	DETAILS - 1
8	DETAILS - 2
9	STEEL CABLE CONNECTION DETAIL

CHANGE 2

CHANGE 3

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
GENERAL NOTES - 1

BC-735M	WALL CONSTRUCTION & EXPANSION JOINT DETAILS
BC-736M	REINFORCEMENT BAR FABRICATION DETAILS
BC-752M	CONCRETE DECK SLAB DETAILS
BC-776M	GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE PANELS
BC-777M	GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE POSTS
BC-778M	GROUND MOUNTED SOUND BARRIERS STEEL POSTS
BC-799M	MECHANICALLY STABILIZED EARTH RETAINING WALLS

REFERENCE DRAWINGS

RECOMMENDED FEB. 19, 2021 <i>Thomas P. Mociore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED FEB. 19, 2021 <i>Bruce Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 1 OF 9 BC-779M
--	--	--------------------------------

MATERIAL NOTES

1. CAST-IN-PLACE CONCRETE:
 - PROVIDE CLASS A CEMENT IN THE CAST-IN-PLACE FOOTINGS AND CAISSONS, OR AS SPECIFIED ON THE CONTRACT DRAWINGS.
 $f'_c = 3,000$ PSI
 - PROVIDE CLASS AA CEMENT CONCRETE IN THE CAST-IN-PLACE BARRIERS AND MOMENT SLABS OR AS SPECIFIED ON THE CONTRACT DRAWINGS.
 $f'_c = 3,500$ PSI
 - UNIT WEIGHT OF CONCRETE = 150 LB./CU. FT.
2. PRECAST CONCRETE SOUND BARRIER PANELS:
 - PROVIDE CLASS AA CEMENT CONCRETE, MODIFIED IN THE PRECAST CONCRETE PANELS.
 $f'_c = 5,000$ PSI
 - UNIT WEIGHT OF NORMAL CONCRETE = 150 LB./CU. FT.
 - UNIT WEIGHT OF LIGHT WEIGHT CONCRETE = 115 LB./CU. FT.)
 - PROVIDE A MINIMUM CONCRETE STRENGTH OF 4,000 PSI BEFORE STRIPPING THE PANELS FROM THE FORMS.
 - PROVIDE LOW-DENSITY LIGHTWEIGHT (TYP.) CONCRETE IN THE PANELS, IF SPECIFIED ON THE CONTRACT DRAWINGS.
3. REINFORCEMENT STEEL:
 - PROVIDE GRADE 60 DEFORMED REINFORCING BARS CONFORMING TO ASTM A615, ASTM A996, OR ASTM A706. DO NOT WELD REINFORCING BARS UNLESS SPECIFIED. DO NOT USE RAIL STEEL ASTM A996 REINFORCEMENT BARS IN BARRIERS, FOOTINGS, CAISSONS, OR WHERE BENDING OR WELDING OF REINFORCEMENT BARS IS INDICATED.
 $f_s = 24,000$ PSI
 - PROVIDE EPOXY COATED REINFORCEMENT IN THE BARRIERS AND MOMENT SLABS OR AS SPECIFIED ON THE CONTRACT DRAWINGS.
 - PROVIDE UNCOATED, EPOXY COATED, OR GALVANIZED REINFORCEMENT IN THE PANELS AS SPECIFIED ON THE CONTRACT DRAWINGS.
 - PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH FOR REINFORCING BARS OF 30 DIAMETERS OR IN ACCORDANCE WITH THE CURRENT AASHTO SPECIFICATIONS AS MODIFIED BY THE DESIGN MANUAL, PART 4, WHICHEVER IS GREATER.
4. WELDED WIRE FABRIC:
 - PROVIDE GRADE 65 PLAIN WELDED WIRE FABRIC CONFORMING TO ASTM A185 IN THE PRECAST CONCRETE PANELS.
 $f_s = 24,000$ PSI
 - PROVIDE UNCOATED, EPOXY COATED, OR GALVANIZED WELDED WIRE FABRIC IN THE PANELS AS SPECIFIED ON THE CONTRACT DRAWINGS.
 - PROVIDE MINIMUM LAP FOR WELDED WIRE FABRIC IN ACCORDANCE WITH CURRENT AASHTO SPECIFICATIONS AS MODIFIED BY THE DESIGN MANUAL, PART 4.
 - DO NOT MIX THE USE OF WELDED WIRE FABRIC AND REINFORCEMENT STEEL, EXCEPT AS INDICATED.
5. FABRICATED STRUCTURAL STEEL:
 - PROVIDE STRUCTURAL STEEL CONFORMING TO AASHTO M270 GRADE 36 (ASTM A709, GRADE 36) UNLESS OTHERWISE NOTED.
 - WEATHERING STEEL (ASTM A588) IS NOT PERMITTED.
 - PROVIDE MINIMUM BASE PLATE THICKNESS OF $\frac{3}{4}$ ".
 - PROVIDE MINIMUM WELD SIZE OF $\frac{3}{8}$ ".
 - NON-DESTRUCTIVE TESTING IS REQUIRED FOR STEEL POST TO BASE PLATE WELDS. PROVIDE TESTING IN ACCORDANCE WITH AASHTO/AWS D1.5 FOR MAIN MEMBER.
 - GALVANIZE AND PAINT STEEL POSTS, PLATES, AND HARDWARE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s) AND 1060.2(b).
 - CLEAN AND PREPARE GALVANIZED SURFACES FOR PAINTING IN ACCORDANCE WITH PUBLICATION 408, SECTION 1060.3(b)4.
 - REPAIR DAMAGED GALVANIZING IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s)2.
6. ANCHOR BOLTS, NUTS, AND WASHERS:
 - PROVIDE ANCHOR BOLTS CONFORMING TO ASTM F1554, GRADE 36 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c)3.
 - PROVIDE MINIMUM ANCHOR BOLT DIAMETER OF $\frac{3}{4}$ ".
 - PROVIDE HEAVY HEX LOCK NUTS AND HEAVY HEX NUTS CONFORMING TO ASTM A 563A IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c)3a.
 - PROVIDE FLAT WASHERS CONFORMING TO ASTM F436 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c)3b.
 - GALVANIZE AND PAINT ALL ANCHOR BOLTS AND HARDWARE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s) AND 1060.2(b).
7. BOLTS, NUTS AND WASHERS FOR STEEL CABLE CONNECTIONS:
 - PROVIDE BOLTS CONFORMING TO ASTM A307, GRADE A, IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c)1.
 - PROVIDE HEAVY HEX NUTS CONFORMING TO ASTM A307, GRADE A, IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c)1a.
 - PROVIDE FLAT WASHERS AND LOCK WASHERS CONFORMING TO ASTM F436 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c)2b.
 - GALVANIZE ALL BOLTS AND HARDWARE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s).
8. STEEL CABLES AND ACCESSORIES:
 - PROVIDE $\frac{3}{8}$ ", 7 x 19 GALVANIZED STEEL FLEXIBLE WIRE ROPE. MINIMUM BREAKING STRENGTH EQUALS 8 KIPS.
 - STEEL ROPE MUST BE PLACED STRAIGHT AND TAUT BETWEEN CONNECTION POINTS AND WOVEN BETWEEN THE WELDED WIRE FABRIC.
 - PROVIDE THIMBLES AS MANUFACTURED BY BREWER-TITCHENER #745-S OR AN APPROVED EQUAL.
 - PROVIDE GALVANIZED WIRE ROPE CLIPS. TIGHTEN CLIPS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
 - PROVIDE GALVANIZED STEEL PIPE (SCHEDULE 40) CONFORMING TO ASTM A53 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(j)1.
 - GALVANIZE STEEL PIPE ACCORDING TO ASTM A153 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s).
9. PLAIN NEOPRENE BEARING PADS:
 - PROVIDE PLAIN NEOPRENE PADS WITH A DUROMETER HARDNESS OF 50 (+/-) 5 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1113.02.
10. CLOSED CELL NEOPRENE SPONGE:
 - PROVIDE CLOSED CELL NEOPRENE SPONGE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1085.2(m).
11. NON-SHRINK GROUT:
 - PROVIDE NON-SHRINK GROUT IN ACCORDANCE WITH PUBLICATION 408, SECTION 1080.2(c).
 - PLACE NON-SHRINK GROUT AFTER THE BASE PLATE IS LEVELLED ON THE LEVELING NUTS AND AFTER THE PANELS ARE INSTALLED.
 - PACK GROUT INTO PLACE. DO NOT POUR OR INJECT GROUT.
 - NON-SHRINK GROUT TO MATCH FINAL COLOR OF PANEL.
12. CAULKING COMPOUND:
 - PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.7(b).
 - CAULKING COMPOUND TO MATCH FINAL COLOR OF PANEL.
13. JOINT SEALING MATERIAL:
 - PROVIDE JOINT SEALING MATERIAL IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.4(c).
 - JOINT SEALING MATERIAL TO MATCH FINAL COLOR OF PANEL.
14. JOINT BACKING MATERIAL (BACKER ROD):
 - PROVIDE BACKER ROD MATERIAL IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.8.
15. ANTIGRAFFITI COATING:
 - APPLY ANTIGRAFFITI COATING IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIAL PROVISIONS.
16. PENETRATING CONCRETE STAIN:
 - APPLY STAIN IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIAL PROVISIONS.

ARCHITECTURAL SURFACE TREATMENTS

1. THE AVERAGE ARCHITECTURAL SURFACE TREATMENT, PER SIDE OF PANEL, IS PERMITTED TO VARY FROM 0 TO $1\frac{1}{2}$ ", BUT THE TOTAL AVERAGE ARCHITECTURAL SURFACE TREATMENT, ON BOTH SIDES OF THE PANEL, MUST NOT BE GREATER THAN $1\frac{1}{2}$ " UNLESS OTHERWISE INDICATED ON THE CONTRACT DRAWINGS.
2. IF A SMOOTH ARCHITECTURAL SURFACE TREATMENT IS PROVIDED, THE TREATMENT MAY EXTEND TO THE EDGES OF PANELS AS LONG AS THE PANEL FITS BETWEEN THE FLANGES OF THE POST.
3. STAMPED FINISHES MAY BE PERMITTED IF ACCEPTED BY THE DISTRICT BRIDGE ENGINEER.
4. REFER TO PUBLICATION 408, SECTION 1086.3 AND/OR THE CONTRACT DOCUMENTS FOR ARCHITECTURAL SURFACE TREATMENT TOLERANCES.
5. REFER TO CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

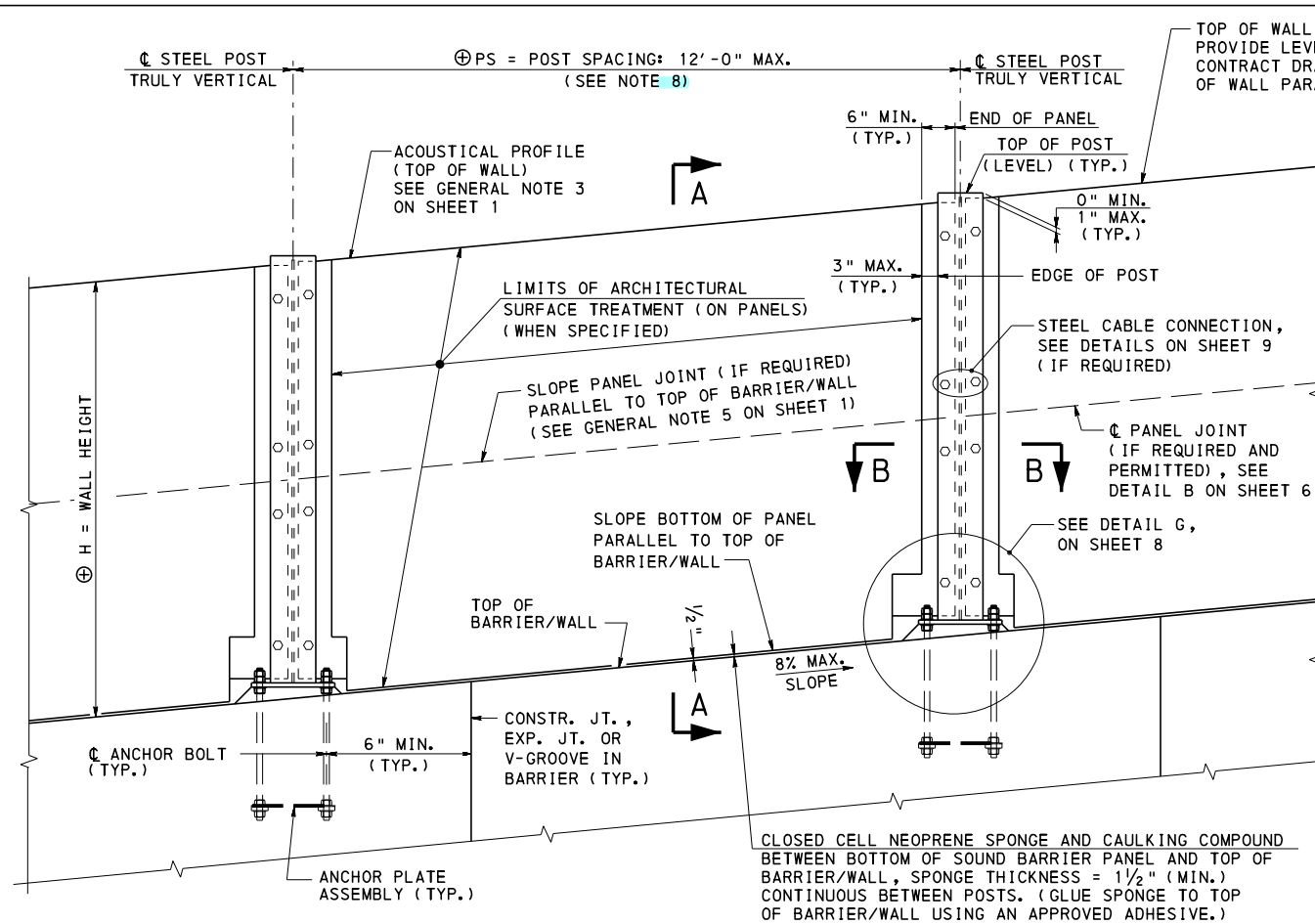
STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
GENERAL NOTES - 2

RECOMMENDED FEB. 19, 2021
Thomas P. Mociore
CHIEF BRIDGE ENGINEER

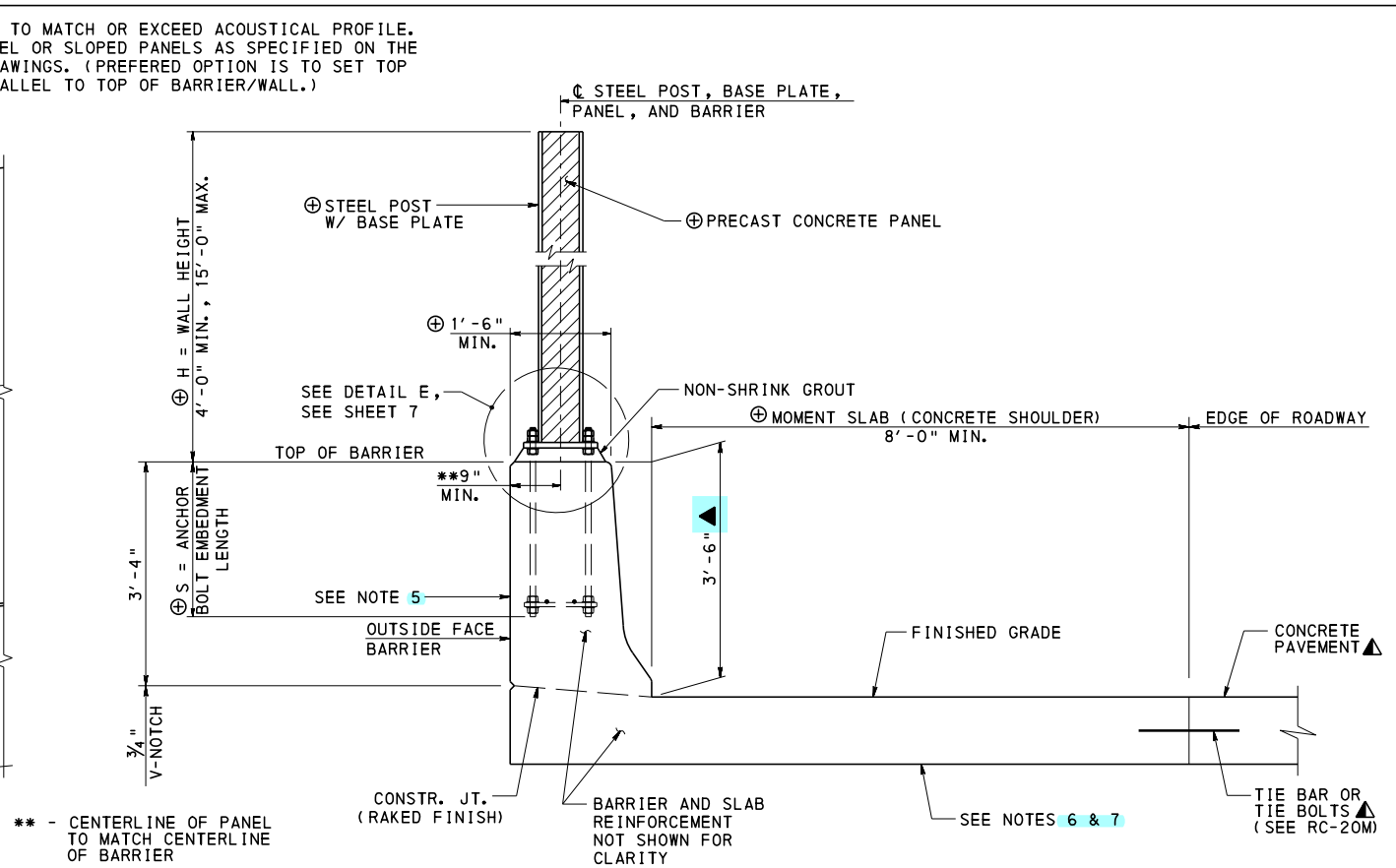
RECOMMENDED FEB. 19, 2021
Bruce Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 2 OF 9

BC-779M



BARRIER MOUNTED/RETAINING WALL MOUNTED SOUND BARRIER ELEVATION
(TOP OF BARRIER/WALL SLOPED)



BARRIER MOUNTED SOUND BARRIER ON MOMENT SLAB

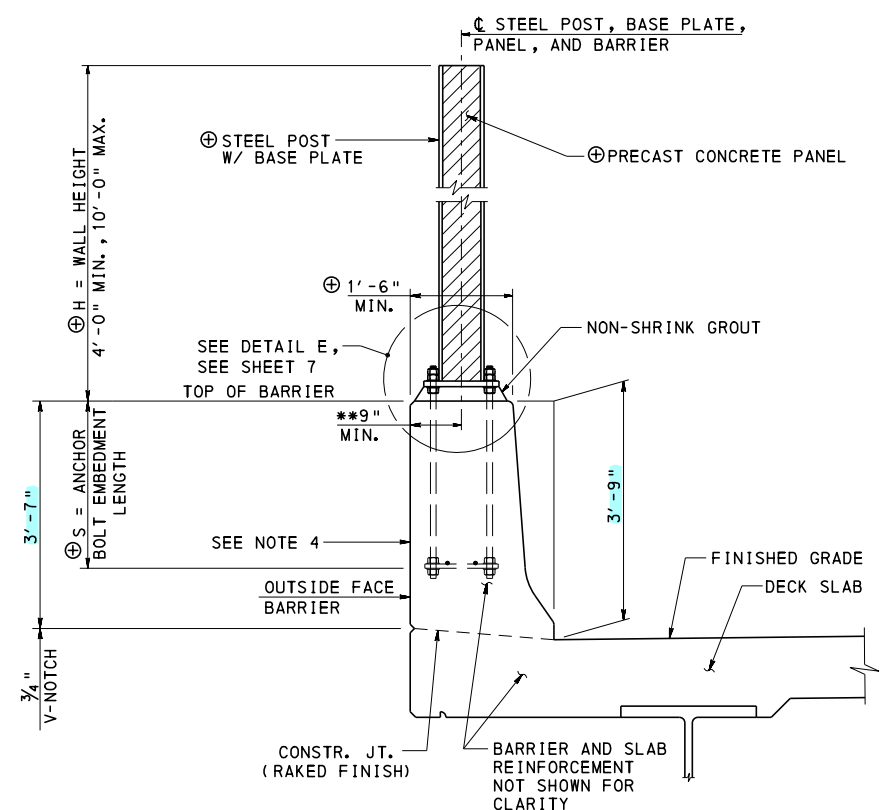
TYPICAL SECTION

NOTES:

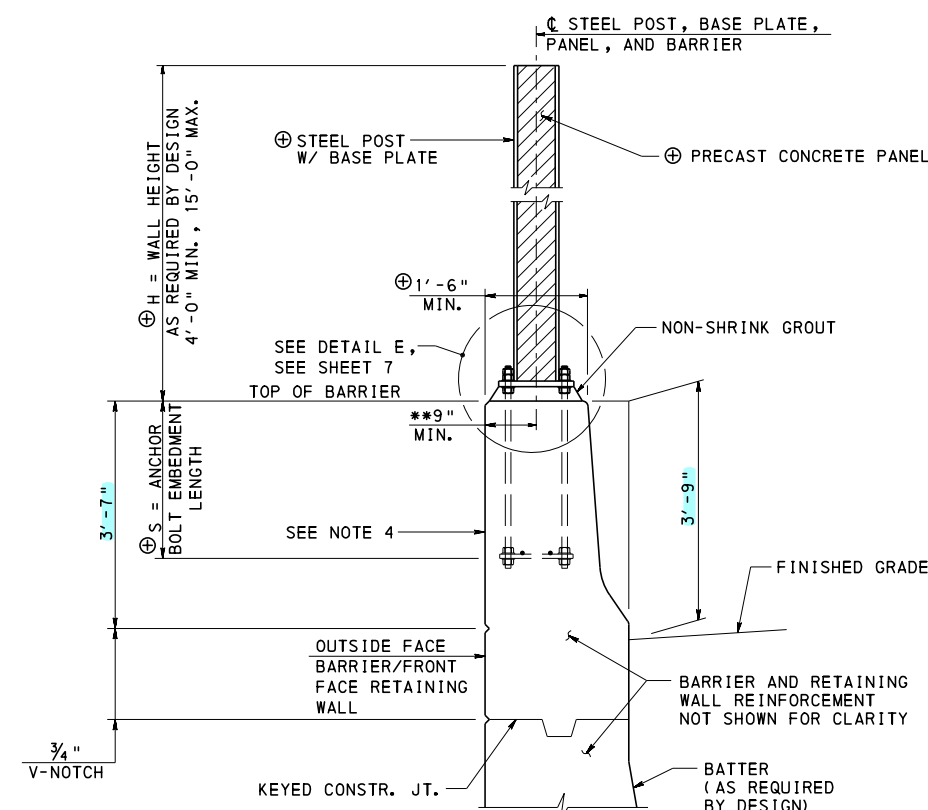
- FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
- FOR SECTION A-A, SEE SHEET 6.
- FOR SECTION B-B, SEE SHEET 7.
- 45" F-SHAPE CONCRETE BARRIER SHOWN, 42" F-SHAPE CONCRETE BARRIER AND 42" VERTICAL WALL CONCRETE BARRIER SIMILAR.
- 42" F-SHAPE CONCRETE BARRIER SHOWN, 42" VERTICAL WALL CONCRETE BARRIER SIMILAR.
- MOMENT SLAB ON MECHANICALLY STABILIZED EARTH WALLS SIMILAR, REFER TO CONTRACT DRAWINGS AND BC-799M FOR ADDITIONAL DETAILS.
- CONCRETE SHOULDER SHOWN, BITUMINOUS CONCRETE SHOULDER SIMILAR, REFER TO CONTRACT DRAWINGS AND BC-799M FOR ADDITIONAL DETAILS.
- MAXIMUM POST SPACING IS 8'-0" FOR BRIDGE MOUNTED SOUND BARRIER WHEN PANEL HEIGHT IS GREATER THAN 9'-0" AND LESS THAN OR EQUAL TO 10'-0".

LEGEND:

- ▲ ROADWAY ITEM
- ⊕ AS REQUIRED BY DESIGN, REFER TO CONTRACT DRAWINGS
- ▲ 45" F-SHAPE CONCRETE BARRIER NOT PERMITTED ON MOMENT SLAB.



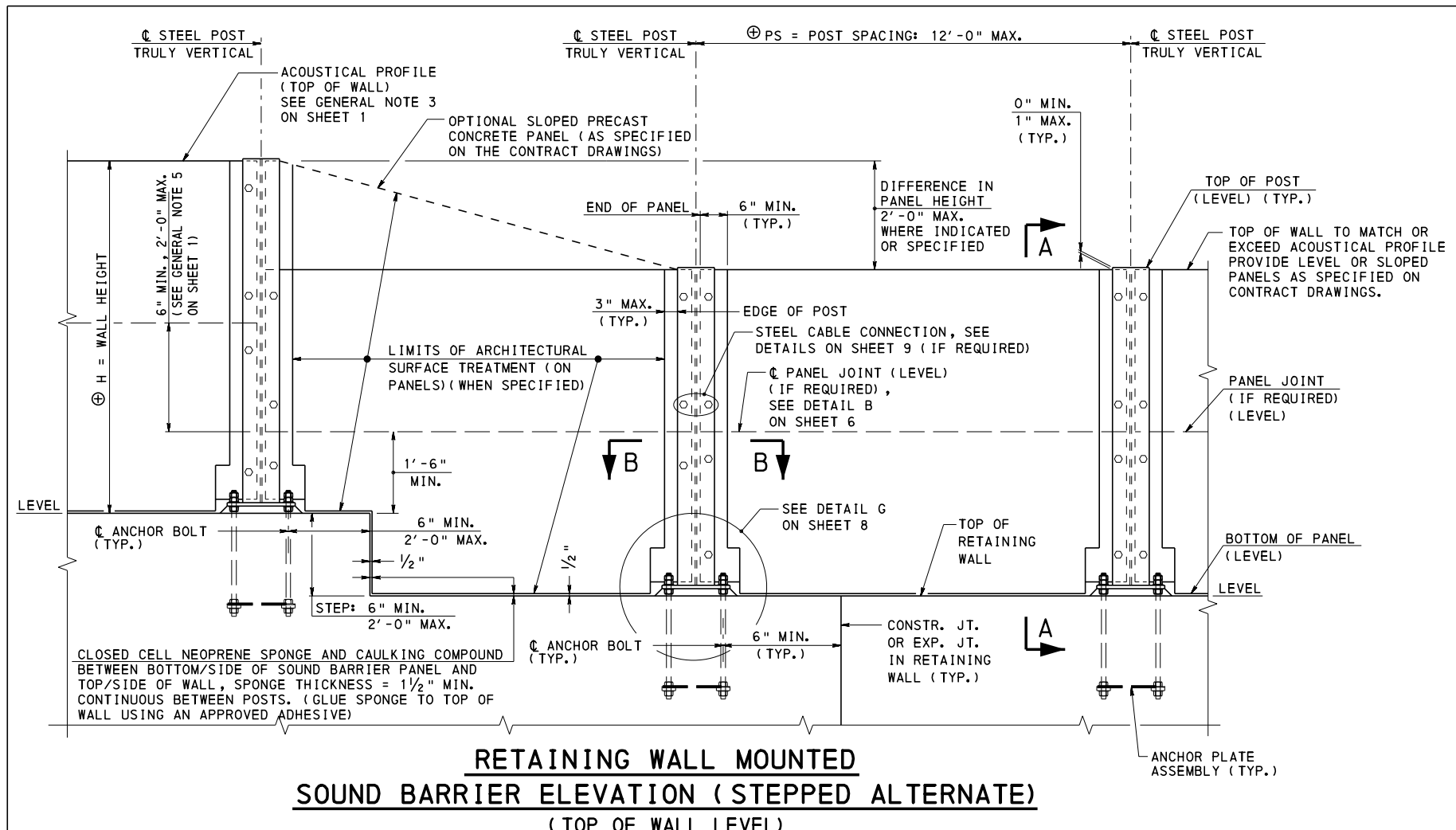
BARRIER MOUNTED SOUND BARRIER ON BRIDGE
TYPICAL SECTION



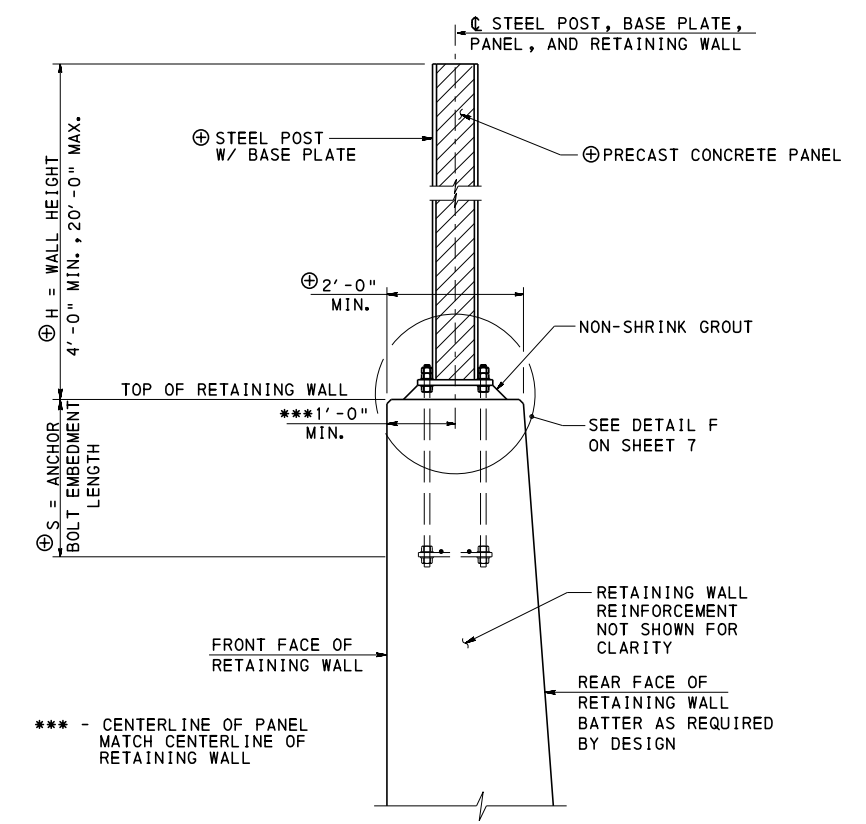
BARRIER MOUNTED SOUND BARRIER ON RETAINING WALL
TYPICAL SECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
GEOMETRY AND LAYOUT - BARRIER MOUNTED



**RETAINING WALL MOUNTED
SOUND BARRIER ELEVATION (STEPPED ALTERNATE)**
(TOP OF WALL LEVEL)



**RETAINING WALL MOUNTED SOUND BARRIER
TYPICAL SECTION**

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. FOR SECTION A-A, SEE SHEET 6.
3. FOR SECTION B-B, SEE SHEET 7.

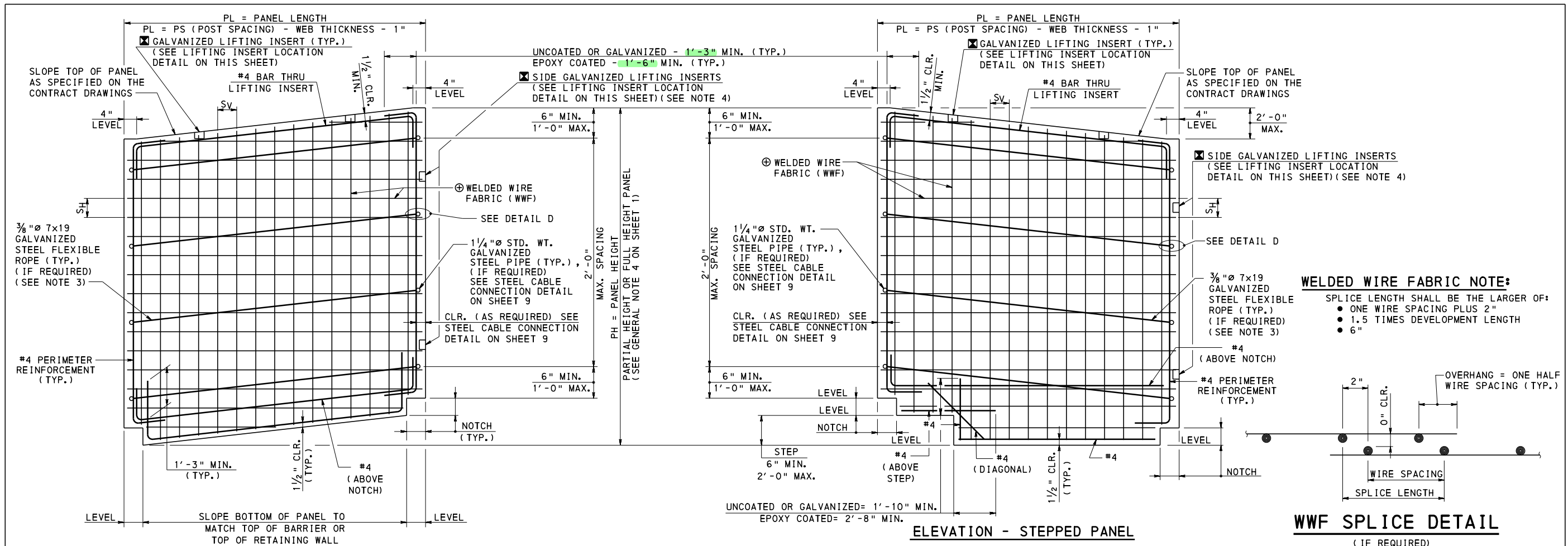
LEGEND:

⊕ AS REQUIRED BY DESIGN, REFER TO CONTRACT DRAWINGS

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
GEOMETRY AND LAYOUT - WALL MOUNTED**

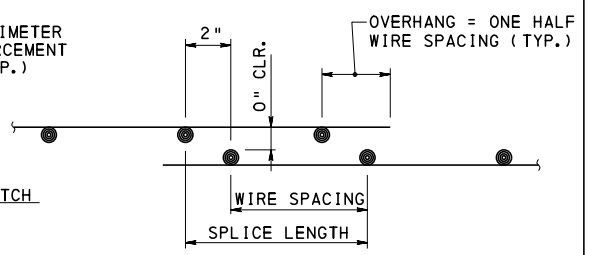
RECOMMENDED FEB. 19, 2021 <i>Thomas P. Mociore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED FEB. 19, 2021 <i>Bruno J. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 4 OF 9 BC-779M
--	---	--------------------------------



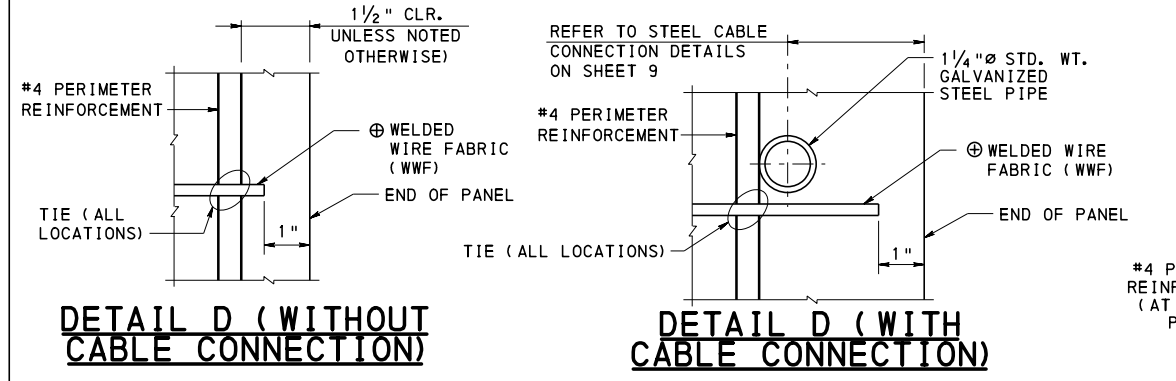
**ELEVATION - SLOPE PANEL
PRECAST CONCRETE PANEL**

**ELEVATION - STEPPED PANEL
PRECAST CONCRETE PANEL**

WELDED WIRE FABRIC NOTE:
 SPLICE LENGTH SHALL BE THE LARGER OF:
 • ONE WIRE SPACING PLUS 2"
 • 1.5 TIMES DEVELOPMENT LENGTH
 • 6"

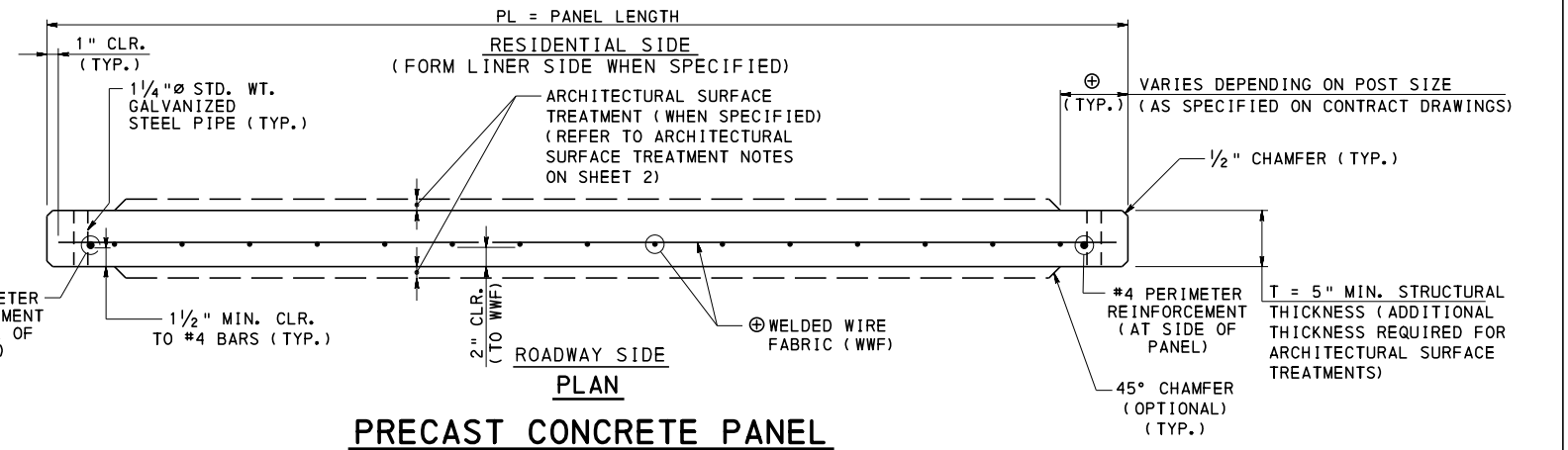


**WF SPLICE DETAIL
(IF REQUIRED)**

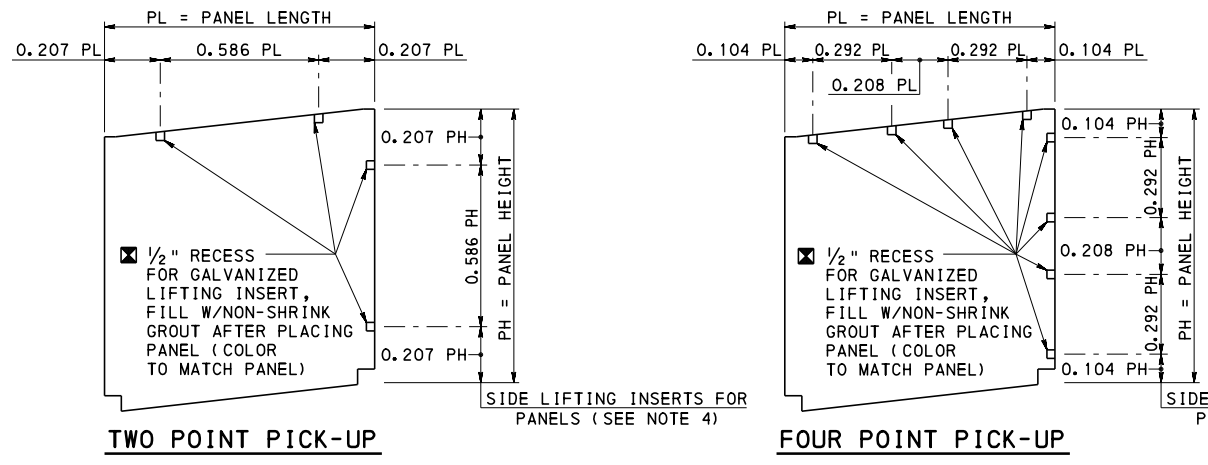


**DETAIL D (WITHOUT
CABLE CONNECTION)**

**DETAIL D (WITH
CABLE CONNECTION)**



**PLAN
PRECAST CONCRETE PANEL**



**PRECAST CONCRETE PANEL
LIFTING INSERT LOCATION DETAIL**

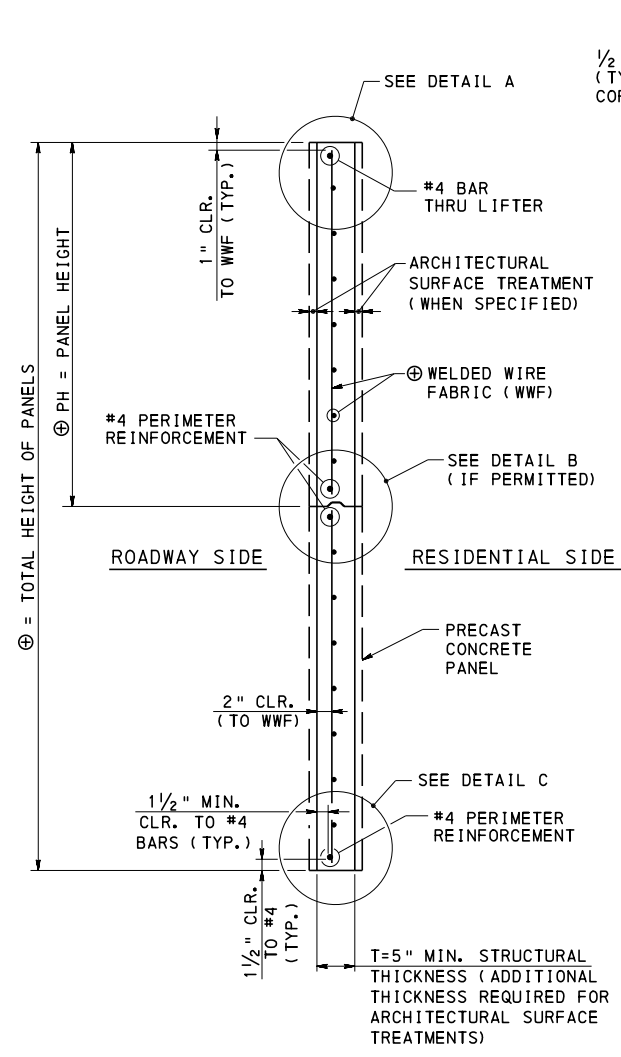
LEGEND:
 ⊕ AS REQUIRED BY DESIGN, REFER TO CONTRACT DRAWINGS
 ⊠ FABRICATOR TO VERIFY ADEQUACY OF LIFTING INSERTS

NOTES:
 1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
 2. IF STACKED PANELS ARE REQUIRED REFER TO DETAIL B ON SHEET 6.
 3. STEEL ROPE IS PERMITTED TO BE LEVEL OR SLOPED. PROVIDE LEVEL STEEL ROPE IF BOTH TOP AND BOTTOM OF PANEL IS LEVEL.
 4. LIFTING INSERTS ARE REQUIRED ON THE SIDE OF THE CONCRETE PANEL FOR STRIPPING WHEN THE PANEL HEIGHT IS GREATER THAN 9'-0" AND LESS THAN OR EQUAL TO 10'-0".

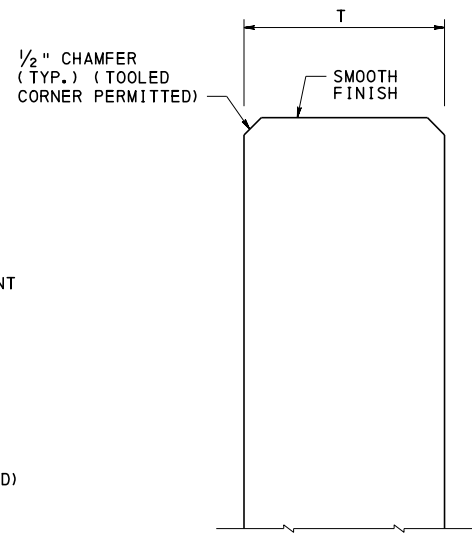
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
PRECAST CONCRETE PANEL DETAILS - 1**

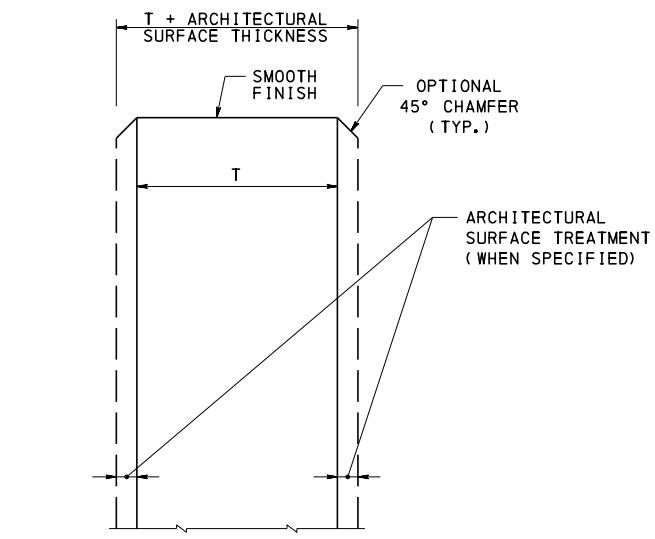
RECOMMENDED FEB. 19, 2021 <i>Thomas P. Mociore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED FEB. 19, 2021 <i>Bruce Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 5 OF 9 BC-779M
--	--	--------------------------------



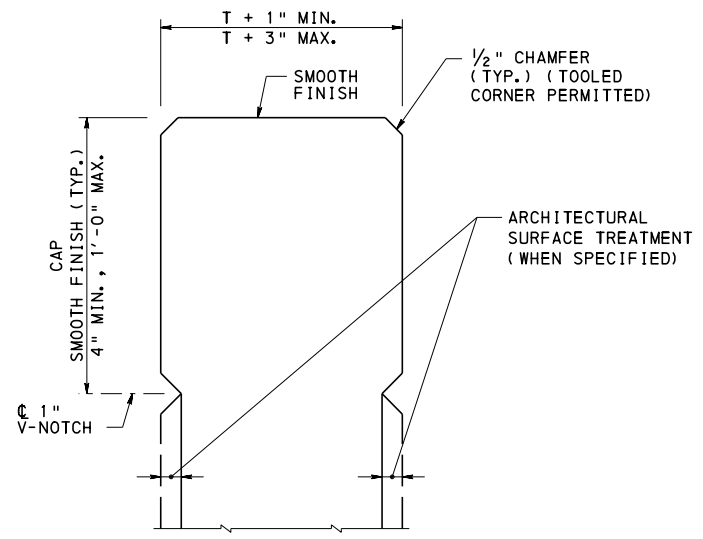
SECTION A-A
WITH ARCHITECTURAL
SURFACE TREATMENT



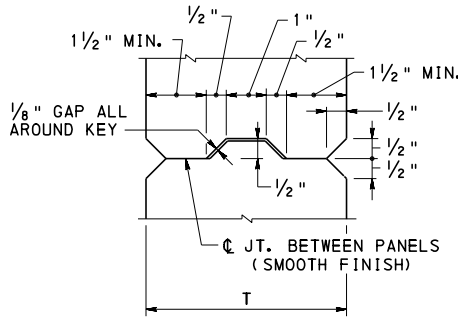
DETAIL A
NO ARCHITECTURAL
SURFACE TREATMENT



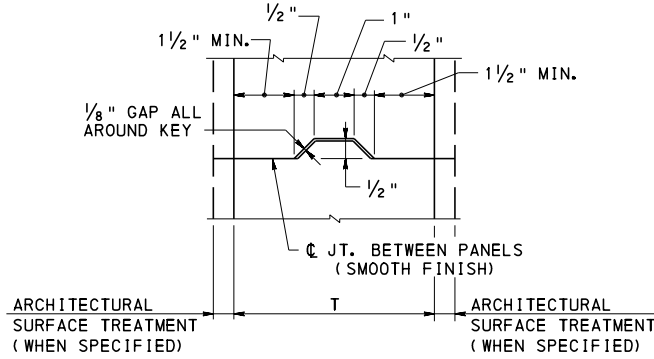
DETAIL A
WITH ARCHITECTURAL
SURFACE TREATMENT AND NO CAP



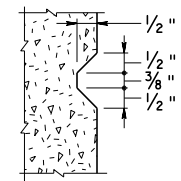
DETAIL A
WITH ARCHITECTURAL
SURFACE TREATMENT AND CAP



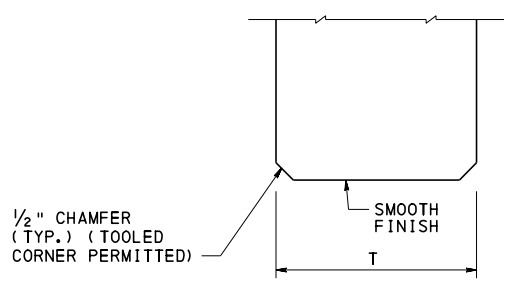
DETAIL B
NO ARCHITECTURAL
SURFACE TREATMENT



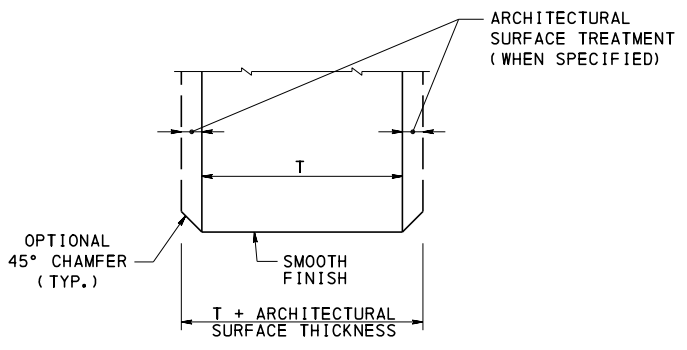
DETAIL B
WITH ARCHITECTURAL
SURFACE TREATMENT



FALSE JOINT
(WHERE SPECIFIED)



DETAIL C
NO ARCHITECTURAL
SURFACE TREATMENT



DETAIL C
WITH ARCHITECTURAL
SURFACE TREATMENT

NOTES:

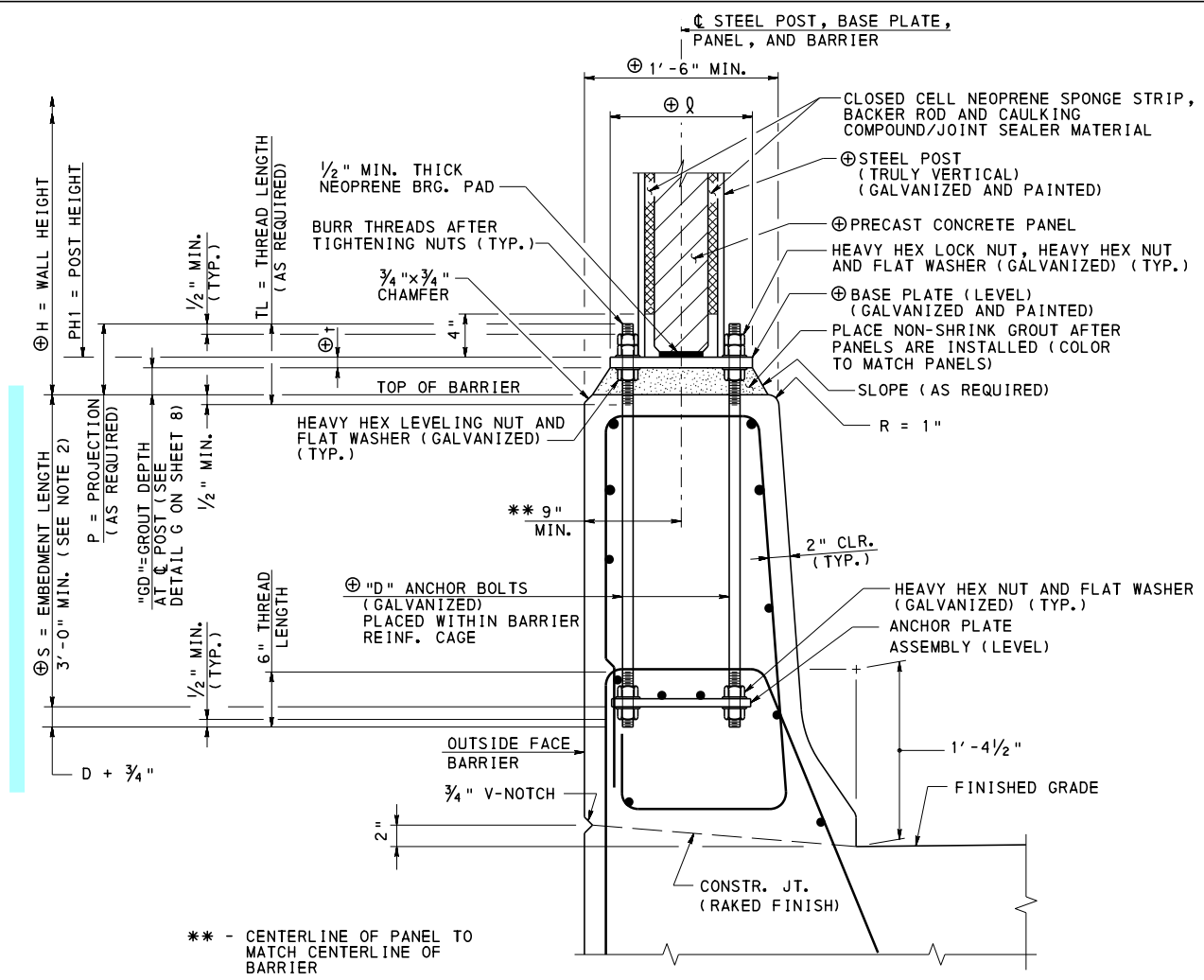
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. REFER TO SHEETS 3 AND 4 FOR LOCATION OF SECTION A-A.
3. FOR SLEEVE DETAIL AT OPENINGS AND DOOR DETAILS, REFER TO BC-776M.

LEGEND:

⊕ AS REQUIRED BY DESIGN, REFER TO CONTRACT DRAWINGS

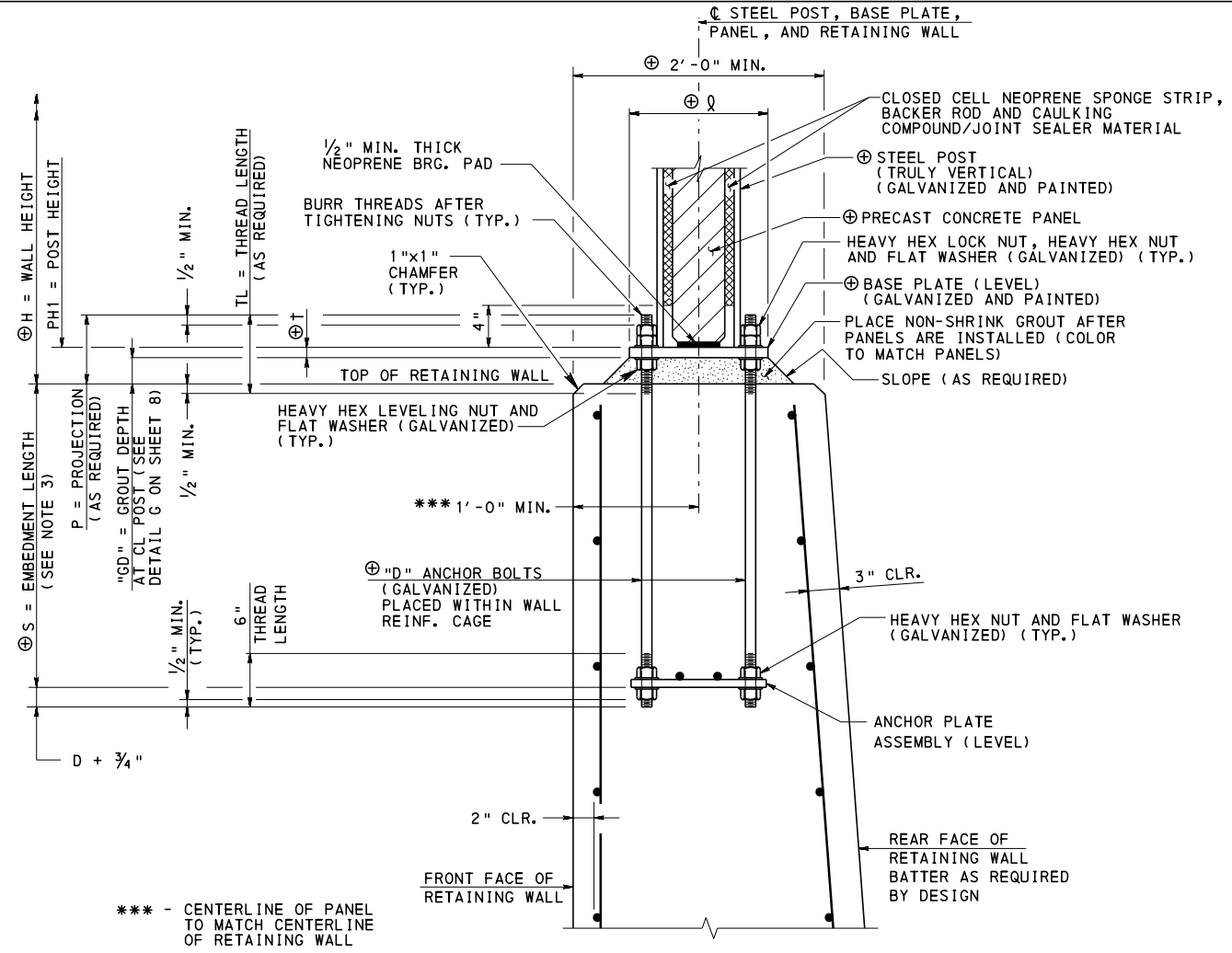
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
PRECAST CONCRETE PANEL DETAILS - 2



DETAIL E

NOTE:
 45" F-SHAPE CONCRETE BARRIER SHOWN,
 42" F-SHAPE CONCRETE BARRIER AND 42"
 VERTICAL WALL CONCRETE BARRIER SIMILAR.



DETAIL F

NOTES:

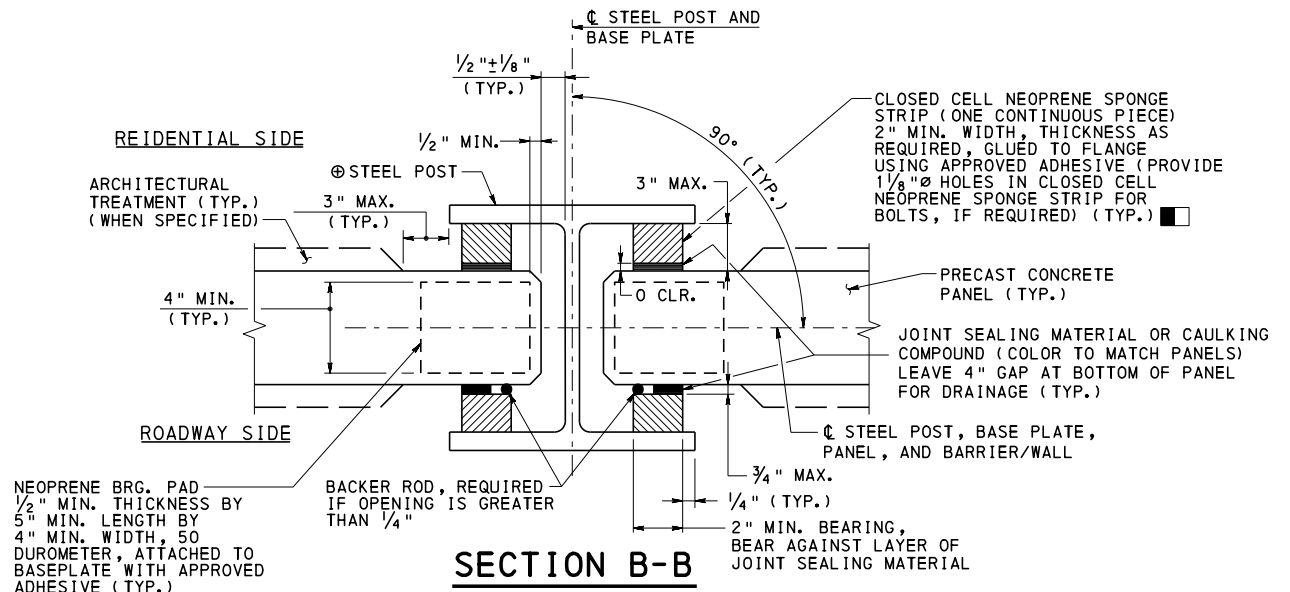
- FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
- ANCHOR PLATES MUST BE WITHIN CAGE FORMED BY LOWER BARRIER REINFORCEMENT EXTENDING OUT OF DECK SLAB, MOMENT SLAB OR RETAINING WALL.
- EMBEDMENT OF ANCHOR BOLTS MUST EXTEND TO A DEPTH WHERE THE VERTICAL WALL REINFORCEMENT IS FULLY DEVELOPED.
- REFER TO SHEETS 3 AND 4 FOR LOCATION OF SECTION B-B.
- REFER TO SHEET 3 FOR LOCATION OF DETAIL E.
- REFER TO SHEET 4 FOR LOCATION OF DETAIL F.

**SEQUENCE OF INSTALLATION
 PANEL TO STEEL POST**

- INSTALL POST AND BASE PLATE ASSEMBLY ON THE LEVELING NUTS AT CORRECT ELEVATION.
- GLUE NEOPRENE BEARING PADS TO BASE PLATE USING AN APPROVED ADHESIVE.
- GLUE CLOSED CELL NEOPRENE SPONGE STRIP TO POST ON RESIDENTIAL SIDE OF BARRIER USING AN APPROVED ADHESIVE. APPLY 1/4" MIN. JOINT SEALING MATERIAL TO FACE OF CLOSED CELL NEOPRENE SPONGE STRIP. STOP CLOSED CELL NEOPRENE SPONGE STRIP 4" ABOVE BASE PLATE FOR DRAINAGE.
- ERECT PRECAST PANEL USING THE LEVELING NUTS TO ADJUST POST AND BASE PLATE ASSEMBLY TO ALIGN HOLES FOR STEEL CABLE CONNECTION. ADD JOINT SEALING MATERIAL OR CAULKING COMPOUND AND WEDGE TIGHT AGAINST POST AND PANEL ON RESIDENTIAL SIDE OF BARRIER.
- GLUE CLOSED CELL NEOPRENE SPONGE STRIP TO POST ON ROADWAY SIDE OF BARRIER.
- INSERT BACKER RODS IF OPENINGS ARE GREATER THAN 1/4" AND APPLY JOINT SEALING MATERIAL OR CAULKING COMPOUND.
- WHERE NO CLOSED CELL NEOPRENE SPONGE STRIP IS REQUIRED, SEAL PANEL TO POST WITH JOINT SEALING MATERIAL OR CAULKING COMPOUND. ALLOW 4" UNSEALED GAP AT BOTTOM OF PANEL FOR DRAINAGE.
- INSTALL BOLTS (FOR STEEL CABLE CONNECTION) THRU FLANGES AND PANEL (IF REQUIRED).
- PLACE NON-SHRINK GROUT UNDER BASE PLATE.

LEGEND:

- ⊕ AS REQUIRED BY DESIGN, REFER TO CONTRACT DRAWINGS
- CLOSED CELL NEOPRENE SPONGE STRIP NOT REQUIRED IF JOINT BETWEEN PANEL AND FLANGE IS LESS THAN 3/4". ZERO, ONE, OR TWO STRIPS MAY BE REQUIRED DEPENDING UPON SIZE OF STEEL POST. GLUING TWO CLOSED CELL NEOPRENE SPONGE STRIPS TOGETHER, USING AN APPROVED ADHESIVE, TO OBTAIN REQUIRED THICKNESS IS PERMITTED. WHERE NO CLOSED CELL NEOPRENE SPONGE STRIP IS REQUIRED, SEAL PANEL TO FLANGE. BACKER ROD IS REQUIRED UNLESS THE JOINT BETWEEN THE PANEL AND FLANGE OR CLOSED CELL NEOPRENE SPONGE STRIP IS LESS THAN 1/4".



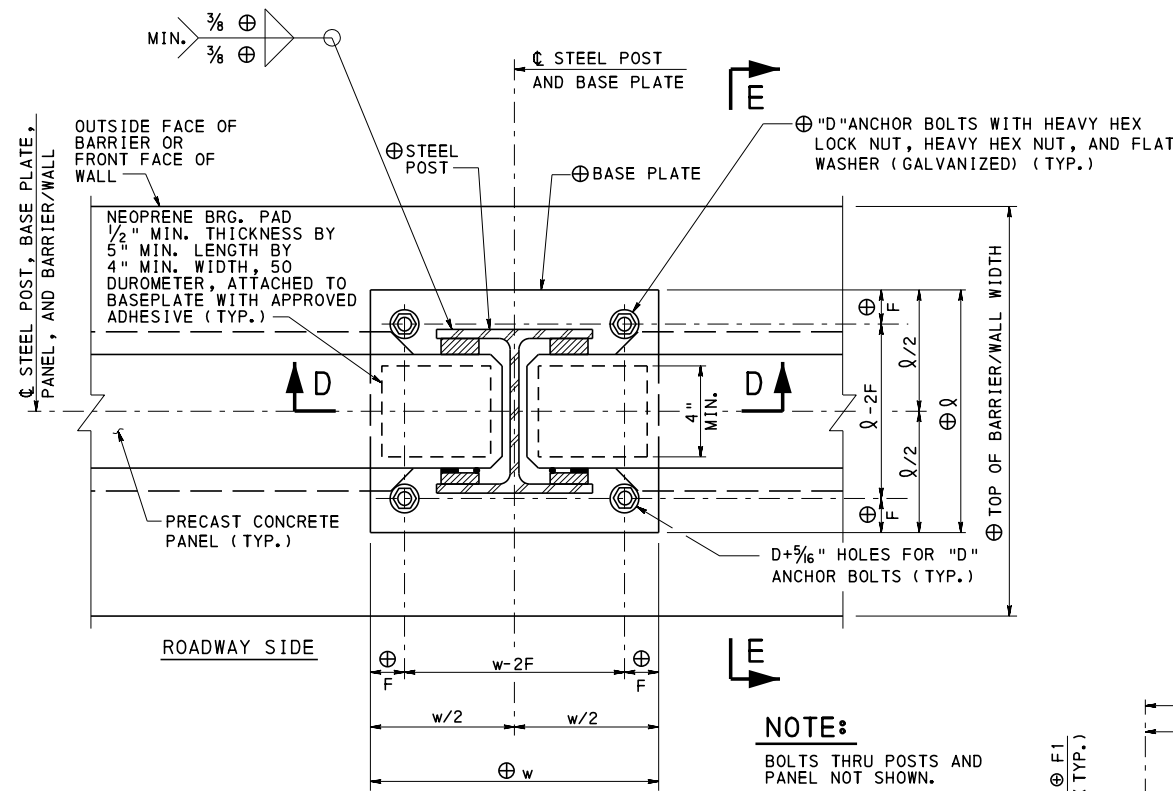
SECTION B-B

NOTE: BOLTS FOR CABLE CONNECTION NOT SHOWN. REFER TO SHEET 9 FOR DETAILS.

**COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY**

**STANDARD
 STRUCTURE MOUNTED SOUND BARRIER WALLS
 DETAILS - 1**

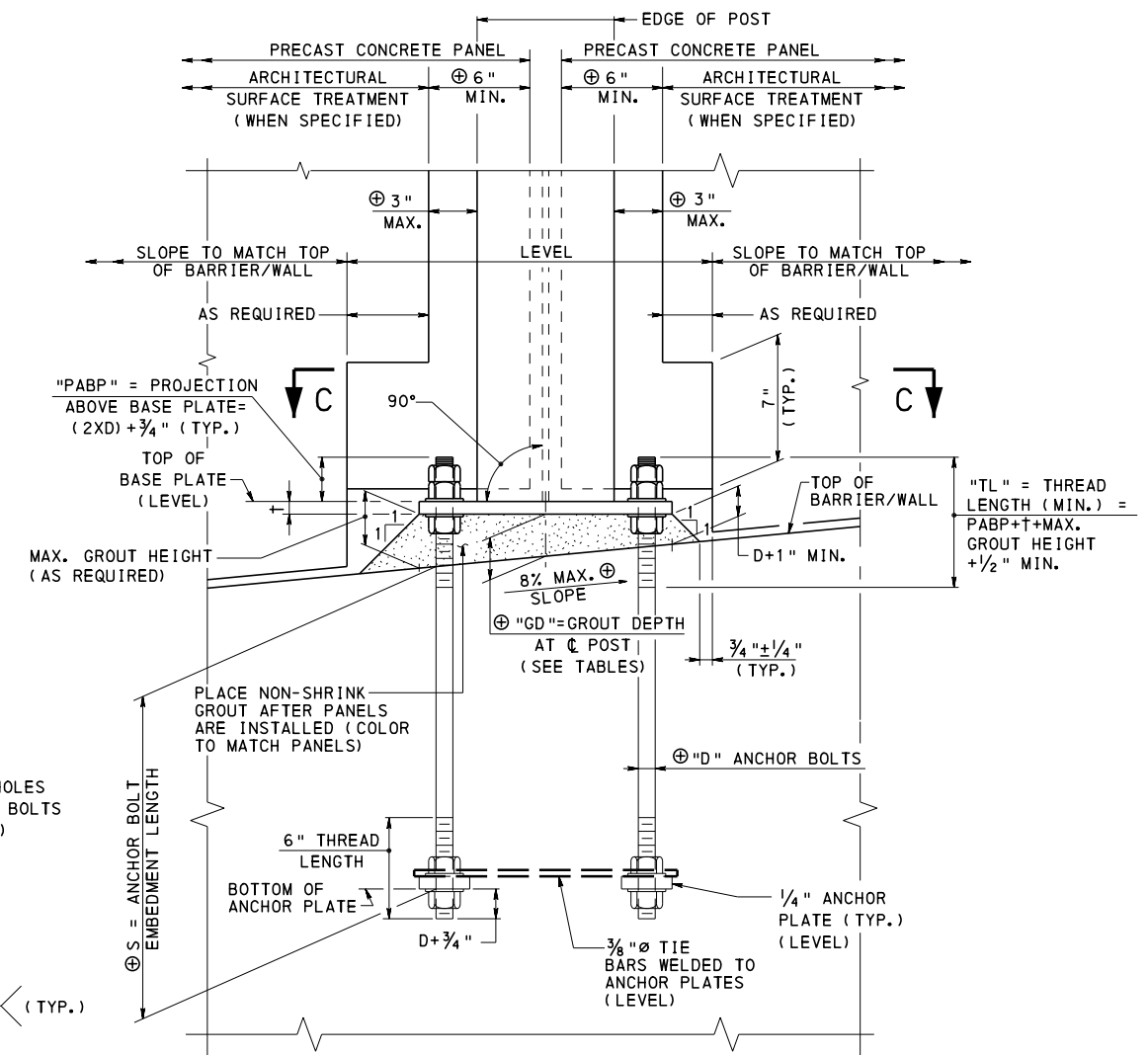
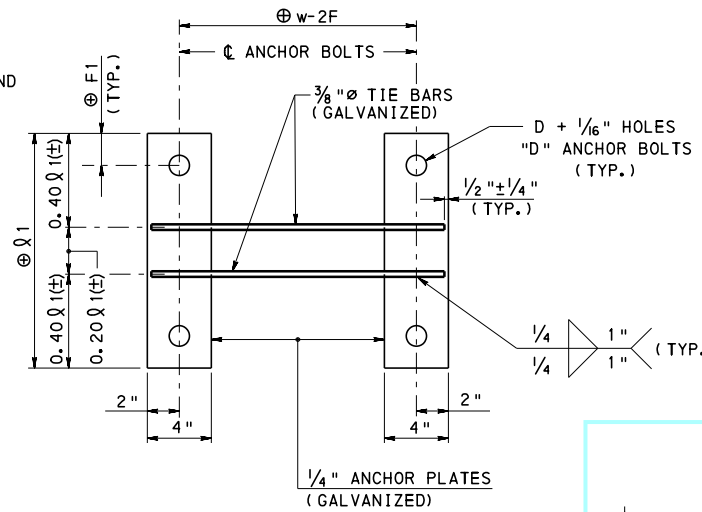
RECOMMENDED FEB. 19, 2021	RECOMMENDED FEB. 19, 2021	SHEET 7 OF 9
<i>Thomas P. Mociore</i> CHIEF BRIDGE ENGINEER	<i>Bruce Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	BC-779M



"GD" = GROUT DEPTH AT \O POST

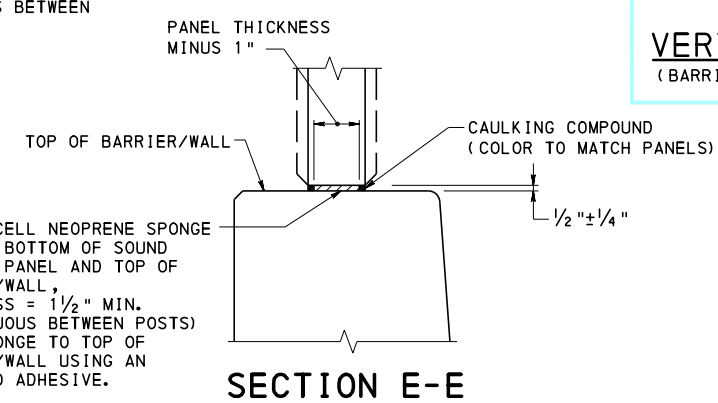
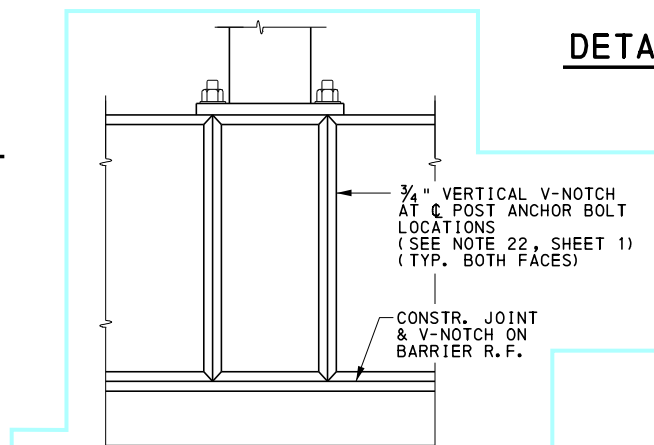
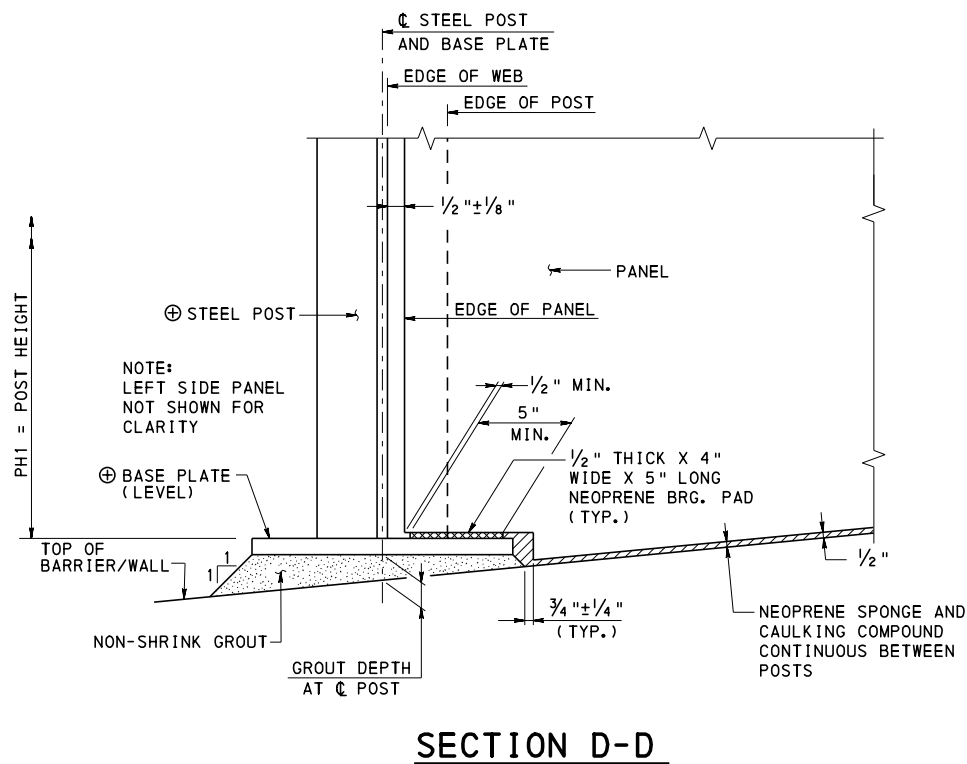
"S1" - SLOPE OF BARRIER/WALL	"GD"
LEVEL	D+1"
$0 < S1 \leq 2\%$	D+1 $\frac{1}{4}$ "
$2\% < S1 \leq 4\%$	D+1 $\frac{1}{2}$ "
$4\% < S1 \leq 6\%$	D+1 $\frac{3}{4}$ "
$6\% < S1 \leq 8\%$	D+2"

NOTE:
BOLTS THRU POSTS AND PANEL NOT SHOWN.



LEGEND:
 \oplus AS REQUIRED BY DESIGN, REFER TO CONTRACT DRAWINGS
 \uparrow BASE PLATE THICKNESS

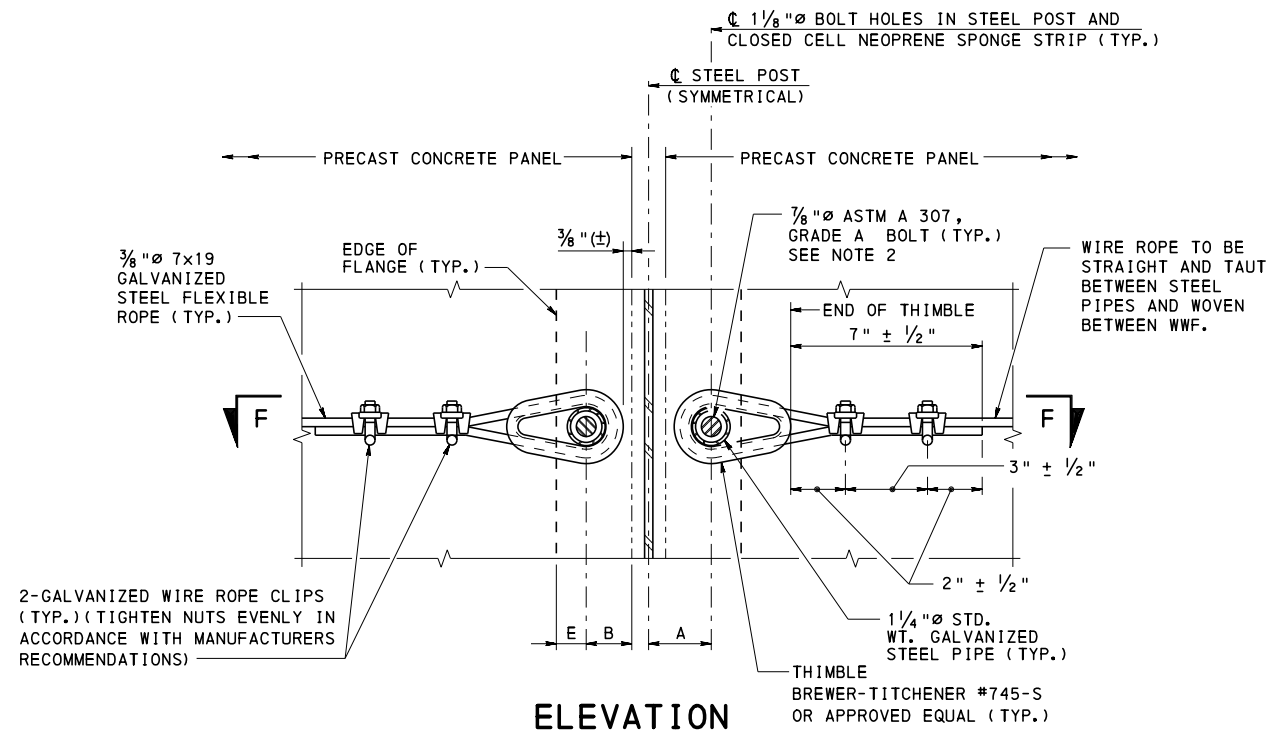
NOTES:
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

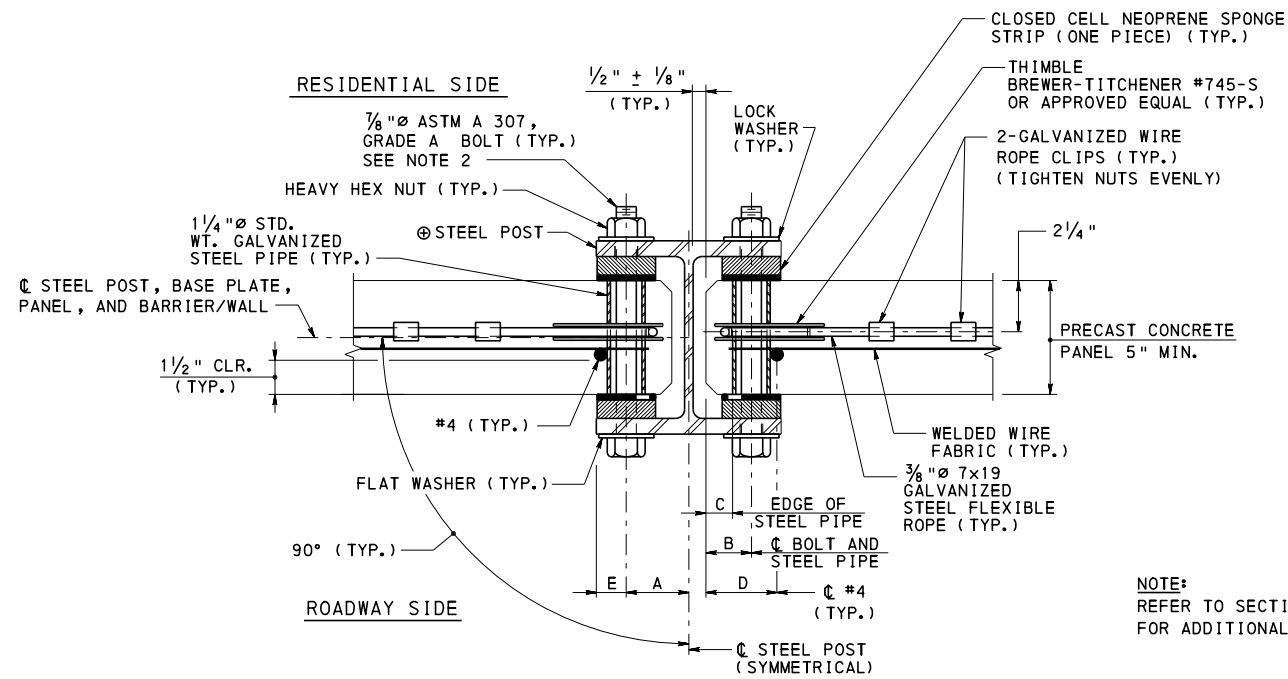
STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
DETAILS - 2

RECOMMENDED FEB. 19, 2021 <i>Thomas P. Mociore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED FEB. 19, 2021 <i>Burt D. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 8 OF 9 BC-779M
--	--	--------------------------------

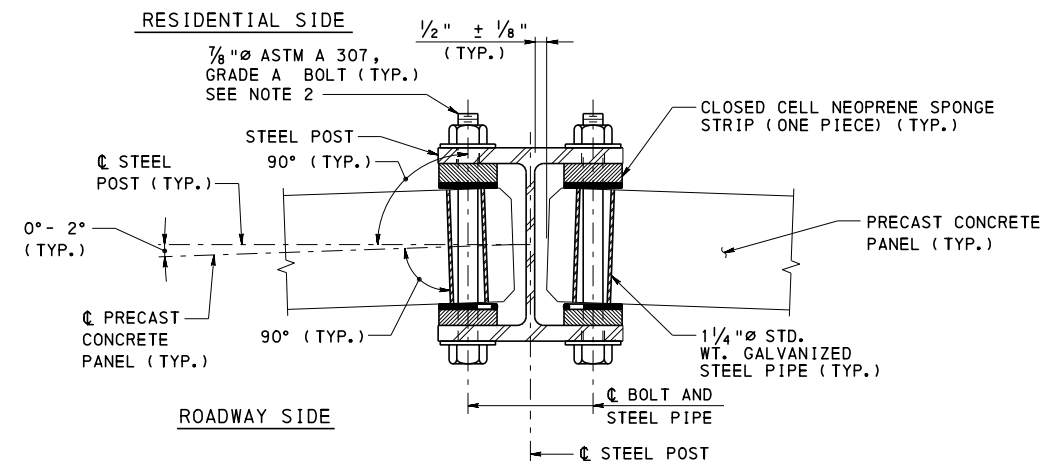


ELEVATION

STEEL CABLE CONNECTION DIMENSIONS						
POST SIZE	A	B	C	D	E	F
W8x48	2 3/4"	2"	1 3/16"	3/8"	1 5/16"	10 1/2"
W10x68	3 1/4"	2 1/2"	1 1/16"	3 5/8"	1 13/16"	12 1/2"
W10x88	3 5/8"	2 1/2"	1 1/16"	3 5/8"	1 13/16"	13"



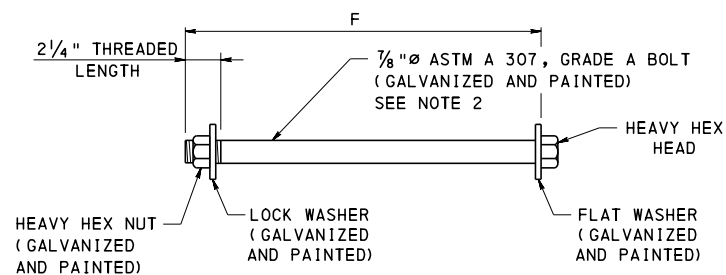
**SECTION F-F
(STRAIGHT PANELS)**



**SECTION F-F
(ANGLED PANELS)**

NOTE:
REFER TO SECTION B-B ON SHEET 7
FOR ADDITIONAL INFORMATION.

STEEL CABLE CONNECTION DETAIL



BOLT DETAIL

LEGEND:
⊕ AS REQUIRED BY DESIGN,
REFER TO CONTRACT DRAWINGS

NOTES:
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. 3/4" DIAMETER BOLTS ARE PERMITTED TO BE SUBSTITUTED ON A LIMITED BASIS IF THE 7/8" DIAMETER BOLTS DO NOT FIT THROUGH THE HOLES IN THE STEEL POST AND THE PIPE SLEEVE IN THE PRECAST CONCRETE PANEL. NO MORE THAN 50% OF THE CONNECTIONS ON ONE SIDE OF A PANEL ARE PERMITTED TO CONTAIN THE SMALLER BOLT DIAMETER.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
STEEL CABLE CONNECTION DETAIL

RECOMMENDED FEB. 19, 2021 <i>Thomas P. Mociore</i> CHIEF BRIDGE ENGINEER	RECOMMENDED FEB. 19, 2021 <i>Bruce Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 9 OF 9 BC-779M
--	--	-------------------------

GENERAL NOTES

1. DESIGN SPECIFICATIONS:
 - PENNDOT DESIGN MANUAL, PART 4, STRUCTURES APRIL 2015 EDITION
 - 1989 AASHTO "GUIDE SPECIFICATIONS FOR STRUCTURAL DESIGN OF SOUND BARRIERS", INCLUDING THE 1992 AND 2002 INTERIMS.
 - 2002 AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES", 17TH EDITION,
 - 2001 AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", 4TH EDITION, INTERIMS THROUGH 2006.
 - DESIGN IS IN ACCORDANCE WITH THE WORKING STRESS DESIGN METHOD. (NO INCREASE IN ALLOWABLE UNIT STRESSES ARE PERMITTED EXCEPT FOR GROUP III LOADINGS WHICH PERMITS A 33% OVERSTRESS).
2. CONSTRUCTION SPECIFICATIONS AND WORKMANSHIP:
 - PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH THE CURRENT VERSION OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, AASHTO/AWS D1.5 - BRIDGE WELDING CODE AND THE CONTRACT SPECIAL PROVISIONS. (USE AASHTO/AWS D1.1 FOR WELDING NOT COVERED IN AASHTO/AWS D1.5).
3. WALL HEIGHTS MUST EQUAL OR EXCEED THE ACOUSTICAL PROFILE.
4. STANDARD PANEL HEIGHTS:
 - 4'-0" MINIMUM TO 12'-0" MAXIMUM.
 - PROVIDE STACKED PANELS WHEN THE WALL HEIGHT EXCEEDS 12'-0".
5. END PANEL HEIGHTS:
 - 6'-0" MINIMUM TO 22'-0" MAXIMUM.
 - PROVIDE SINGLE END PANELS, STACKED PANELS ARE NOT PERMITTED.
6. HORIZONTAL PANELS JOINT:
 - MINIMIZE THE NUMBER OF HORIZONTAL PANEL JOINTS.
 - PROVIDE UNIFORM STEPS.
 - IF STEPS ARE REQUIRED, THE ELEVATION DIFFERENCE BETWEEN ADJACENT PANELS IS NOT PERMITTED TO BE LESS THAN 6" OR GREATER THAN 2'-0".
7. PROVIDE A MINIMUM OF TWO CABLE CONNECTIONS FOR EACH PANEL-TO-PANEL CONNECTION.
8. INSTALL ANCHOR BOLTS AND PANELS TRULY VERTICAL.
9. PROVIDE CONCRETE COVER IN ACCORDANCE WITH THIS STANDARD AND DESIGN MANUAL PART 4.
10. A HIGHER STRENGTH CONCRETE, FOR CAST-IN-PLACE CONCRETE, MAY BE SUBSTITUTED FOR A LOWER CLASS CONCRETE AT NO ADDITIONAL COST TO THE DEPARTMENT.
11. FILL ALL LIFTING INSERTS WITH NON-SHRINK GROUT. COLOR TO MATCH PANEL.
12. SEAL ALL OPEN JOINTS WITH CAULKING COMPOUND AND/OR JOINT SEALING MATERIAL. (COLOR TO MATCH PANEL).
13. REFER TO PUBLICATION 408, SECTION 1086.3 (f) FOR FABRICATION AND ERECTIONS TOLERANCES.
14. CHAMFER EXPOSED CONCRETE EDGES ON PRECAST PANELS 1/2" x 1/2", EXCEPT AS NOTED.
15. CHAMFER EXPOSED CONCRETE EDGES ON CAST-IN-PLACE CONCRETE 1" x 1", EXCEPT AS NOTED.
16. RAKE-FINISH ALL HORIZONTAL CONSTRUCTION JOINTS, EXCEPT AS NOTED.
17. ALL DIMENSIONS SHOWN ARE HORIZONTAL, EXCEPT AS NOTED.
18. DIMENSIONS SHOWN ARE FOR A NORMAL TEMPERATURE OF 68 DEGREES F.
19. REINFORCEMENT IN SOME SECTIONS IS NOT SHOWN FOR CLARITY.
20. SPREAD FOOTINGS MAY BE ORDERED BY THE REPRESENTATIVE TO BE AT ANY ELEVATION OR ANY DIMENSIONS NECESSARY TO PROVIDE A PROPER FOUNDATION. IF SPREAD FOOTINGS ARE ADJUSTED PANEL HEIGHTS AND WALL DESIGN WILL NEED TO BE MODIFIED.
21. USE CLASS C CEMENT CONCRETE OR NO. 2A COARSE AGGREGATE BELOW SPREAD FOOTING WHEN SPECIFIED OR DIRECTED.
22. COORDINATE, LOCATE, AND CONDUCT ALL WORK RELATED TO PUBLIC AND PRIVATE UTILITIES IN ACCORDANCE WITH PUBLICATION 408, SECTION 105.06 AND 107.12, AND THE CONTRACT SPECIAL PROVISIONS.
23. IF NEEDED DETAIL IS NOT FOUND IN THE SOUND BARRIER STANDARDS OR ON THE CONTRACT DRAWINGS, A SPECIAL SUBMISSION REQUESTING APPROVAL FOR SPECIFIC DETAILS MUST BE MADE TO THE CHIEF BRIDGE ENGINEER.

NOTES TO FABRICATOR

1. PROVIDE SHOP DRAWINGS IN ACCORDANCE WITH PUBLICATION 408, SECTION 105.02(d) AND 1086.
2. THE FOLLOWING INFORMATION MUST BE SHOWN ON THE SHOP DRAWINGS (IF APPLICABLE):
 - GENERAL NOTES
 - FABRICATION NOTES
 - TRANSPORTATION NOTES
 - LIFTING AND ERECTION NOTES
 - INSTALLATION NOTES
 - PLAN VIEW INDICATING THE WALL GEOMETRY
 - ELEVATION VIEW INDICATING THE FOLLOWING MINIMUM INFORMATION:
 - OVERALL WALL LENGTH
 - PANEL CODES/DESIGNATIONS
 - HORIZONTAL JOINT ELEVATIONS (IF PERMITTED)
 - ELEVATIONS FOR THE FOLLOWING ITEMS:
 - ACOUSTIC PROFILE ELEVATIONS
 - TOP OF WALL ELEVATIONS
 - TOP AND BOTTOM OF SPREAD FOOTING ELEVATIONS
 - FINISHED GROUND ELEVATIONS
 - PANEL CONNECTION LOCATIONS
 - INDIVIDUAL PANEL DETAILS
 - CONNECTION DETAILS
 - CABLE DETAILS
 - LIFTING INSERT DETAILS
 - MATERIAL LISTS
 - REINFORCEMENT BAR SCHEDULES
 - ANY OTHER INFORMATION REQUIRED TO FABRICATE AND CONSTRUCT THE SOUND BARRIER WALL
3. PRECAST CONCRETE PANELS:
 - THE FABRICATOR MUST ENSURE THAT THE PANELS ARE ADEQUATELY DESIGNED FOR STRESSES DUE TO STRIPPING, HANDLING, ERECTION, AND TRANSPORTATION. PROVIDE AND SUBMIT DESIGN CALCULATIONS, AS REQUIRED.
4. LIFTING INSERTS:
 - PREPARE AND SUBMIT DESIGN CALCULATIONS FOR THE PANEL LIFTING INSERTS FOR ACTUAL STRENGTH OF CONCRETE AT TIME OF STRIPPING, TRANSPORTATION AND ERECTION.
 - PROVIDE LIFTING INSERTS WITH A MINIMUM CAPACITY OF AT LEAST TWO TIMES THE CALCULATED LOAD ON THE INSERT.
 - PROVIDE A MINIMUM OF TWO LIFTING INSERTS OR A MAXIMUM OF FOUR LIFTING INSERTS IN THE PRECAST CONCRETE STANDARD PANELS.
 - PROVIDE A MINIMUM OF TWO LIFTING INSERTS OR A MAXIMUM OF EIGHT LIFTING INSERTS IN THE PRECAST CONCRETE END PANELS.
 - PROVIDE GALVANIZED INSERTS.
5. IF REQUIRED, PREPARE AND SUBMIT TEMPORARY BRACING CALCULATIONS AND DETAILS.
6. PREPARE AND SUBMIT CATALOG CUTS IN ACCORDANCE WITH PUBLICATION 408, SECTION 1086.3.
7. #4 GRADE 60 REINFORCEMENT BARS MAY BE SUBSTITUTED FOR WELDED WIRE FABRIC WITH AN EQUIVALENT AREA AT NO ADDITIONAL COST TO THE DEPARTMENT.
8. PANELS MUST BE STORED, TRANSPORTED, HANDLED, AND ERECTED ON EDGES AT ALL TIMES. PANELS SHOULD NOT BE LAID FLAT.
9. FABRICATORS MUST BE PRE-APPROVED BY PENNDOT PER BULLETIN #15.

INDEX OF SHEETS

SHT. NO.	SHEET TITLE
1	GENERAL NOTES - 1
2	GENERAL NOTES - 2
3	GEOMETRY AND LAYOUT
4	PRECAST CONCRETE STANDARD PANEL DETAILS
5	PRECAST CONCRETE END PANEL DETAILS
6	PRECAST CONCRETE PANEL DETAILS - 1
7	PRECAST CONCRETE PANEL DETAILS - 2
8	PRECAST CONCRETE PANEL DETAILS - 3

CHANGE 2

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

STANDARD
 OFFSET SOUND BARRIER WALLS
 GENERAL NOTES - 1

BC-734M	ANCHOR SYSTEMS
BC-735M	WALL CONSTRUCTION AND EXPANSION JOINT DETAILS
BC-736M	REINFORCEMENT BAR FABRICATION DETAILS
BC-776M	GROUND MOUNTED SOUND BARRIERS - PRECAST CONCRETE PANELS
RC-11M	CLASSIFICATION OF EARTHWORK FOR STRUCTURES
REFERENCE DRAWINGS	

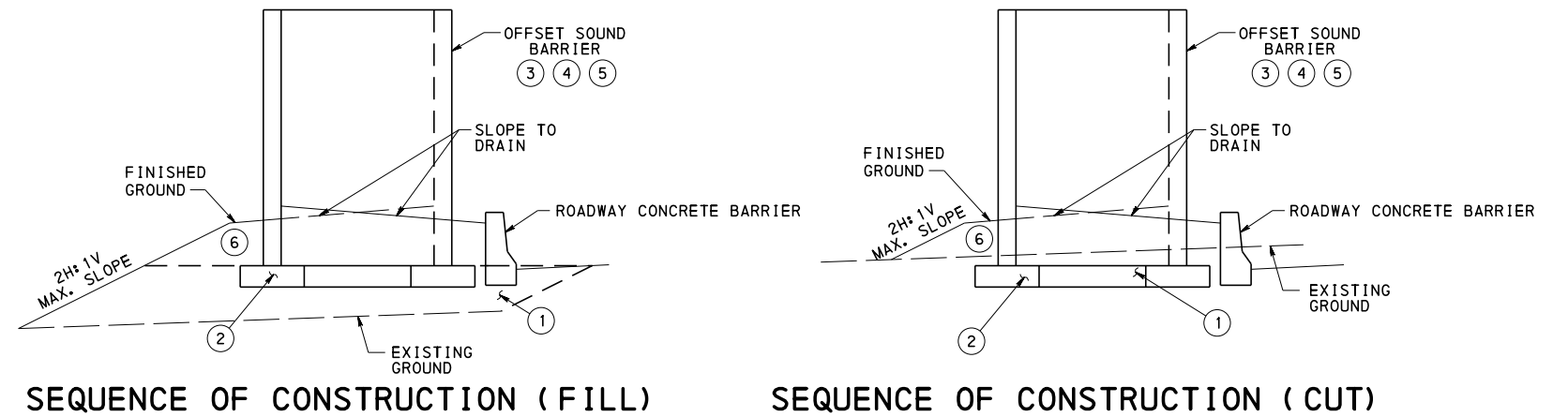
RECOMMENDED JAN. 31, 2019 <i>T. Rocco R. Maciara</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>William J. Bates</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 1 OF 8 BC-780M
--	--	--------------------------------

MATERIAL NOTES

- CAST-IN-PLACE CONCRETE:
 - PROVIDE CLASS A CEMENT CONCRETE IN THE CAST-IN-PLACE FOOTINGS.
 - $f'_c = 3,000$ PSI
 - UNIT WEIGHT OF CONCRETE = 150 LB./CU. FT.
- PRECAST CONCRETE SOUND BARRIER PANELS:
 - PROVIDE CLASS AA CEMENT CONCRETE, MODIFIED IN THE PRECAST CONCRETE PANELS.
 - $f'_c = 5,000$ PSI
 - UNIT WEIGHT OF CONCRETE = 150 LB./CU. FT.
 - PROVIDE A MINIMUM CONCRETE STRENGTH OF 4,000 PSI BEFORE STRIPPING THE PANELS FROM THE FORMS.
- REINFORCEMENT STEEL:
 - PROVIDE GRADE 60 DEFORMED REINFORCING STEEL BARS THAT MEET THE REQUIREMENTS OF ASTM A615, ASTM A996, OR ASTM A706. DO NOT WELD REINFORCING STEEL BARS UNLESS SPECIFIED. DO NOT USE RAIL STEEL A996 REINFORCEMENT BARS IN FOOTINGS OR WHERE BENDING OR WELDING OF REINFORCEMENT BARS IS INDICATED.
 - $f_s = 24,000$ PSI
 - PROVIDE UNCOATED REINFORCEMENT BARS IN THE FOOTING.
 - PROVIDE UNCOATED, EPOXY COATED, OR GALVANIZED REINFORCEMENT IN THE PANELS AS SPECIFIED ON THE CONTRACT DRAWINGS.
 - PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH FOR REINFORCING BARS OF 30 DIAMETERS OR IN ACCORDANCE WITH THE CURRENT AASHTO SPECIFICATIONS AS MODIFIED BY THE DESIGN MANUAL PART 4, WHICHEVER IS GREATER.
- WELDED WIRE FABRIC:
 - PROVIDE GRADE 65 PLAIN WELDED WIRE FABRIC THAT MEET THE REQUIREMENTS OF ASTM A185 IN THE PRECAST CONCRETE PANELS.
 - $f_s = 24,000$ PSI
 - PROVIDE UNCOATED, EPOXY COATED, OR GALVANIZED WELDED WIRE FABRIC IN THE PANELS AS SPECIFIED ON THE CONTRACT DRAWINGS.
 - PROVIDE MINIMUM LAP FOR WELDED WIRE FABRIC IN ACCORDANCE WITH CURRENT AASHTO SPECIFICATIONS AS MODIFIED BY THE DESIGN MANUAL PART 4.
 - DO NOT MIX THE USE OF WELDED WIRE FABRIC AND REINFORCEMENT STEEL, EXCEPT AS INDICATED.
- FABRICATED STRUCTURAL STEEL:
 - PROVIDE STRUCTURAL STEEL CONFORMING TO AASHTO M270 GRADE 36
 - ASTM A709, GRADE 36 UNLESS OTHERWISE NOTED.
 - GALVANIZE STEEL ANGLES AND HARDWARE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s)
 - REPAIR DAMAGED GALVANIZING IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s) 2.
- ANCHOR BOLTS, NUTS, AND WASHERS:
 - PROVIDE ANCHOR BOLTS CONFORMING TO ASTM F1554, GRADE 36 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c) 3.
 - WITH PUBLICATION 408, SECTION 1105.02(c) 3.
 - PROVIDE HEAVY HEX NUTS CONFORMING TO ASTM A563A IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c) 3a.
 - PROVIDE WASHERS CONFORMING TO ASTM F436 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c) 3b.
 - GALVANIZE ALL ANCHOR BOLTS AND HARDWARE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s).
- BOLTS, NUTS AND WASHERS:
 - PROVIDE BOLTS CONFORMING TO ASTM A 307 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c) 1.
 - PROVIDE HEAVY HEX NUTS CONFORMING TO ASTM A 563 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c) 1a.
 - PROVIDE WASHERS CONFORMING TO ASTM F436 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c) 2b.
 - GALVANIZE ALL BOLTS AND HARDWARE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s).
- STEEL CABLES AND ACCESSORIES:
 - PROVIDE $\frac{3}{8}$ " - 7 x 19 STAINLESS STEEL (302 OR 304) FLEXIBLE WIRE ROPE (AIRCRAFT CABLE) IN ACCORDANCE WITH MIL-W-83420. MINIMUM BREAKING STRENGTH EQUALS 12 KIP.
 - PROVIDE $\frac{5}{8}$ " OUTSIDE DIAMETER STAINLESS STEEL (302 OR 304) INTERNALLY THREADED TERMINALS SWAGED TO CABLE IN ACCORDANCE WITH MIL-T-6117.
 - PROVIDE $\frac{1}{2}$ " - 13 UNC STAINLESS STEEL (304) HEX HEAD CAP SCREWS. PROVIDE LENGTH AS REQUIRED.
 - PROVIDE $\frac{3}{8}$ " INSIDE DIAMETER x $1\frac{3}{4}$ " OUTSIDE DIAMETER STAINLESS STEEL (304) WASHERS UNDER $\frac{3}{8}$ " INSIDE DIAMETER x 1" OUTSIDE DIAMETER STAINLESS STEEL (304) WASHERS.
 - PROVIDE PVC PIPE (SCHEDULE 40) CONFORMING TO ASTM D1785 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1101.09(b) 1.
- PLAIN NEOPRENE BEARING PADS:
 - PROVIDE PLAIN NEOPRENE PADS WITH A DUROMETER HARDNESS OF 50 (+/-) 5 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1113.02.
- CLOSED CELL NEOPRENE SPONGE:
 - PROVIDE CLOSED CELL NEOPRENE SPONGE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1085.2(m).
- NON-SHRINK GROUT:
 - PROVIDE NON-SHRINK GROUT IN ACCORDANCE WITH PUBLICATION 408, SECTION 1080.2(c).
 - PACK GROUT INTO PLACE. DO NOT POUR OR INJECT GROUT.
 - NON-SHRINK GROUT TO MATCH FINAL COLOR OF PANEL.
- CAULKING COMPOUND:
 - PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.8(b).
 - CAULKING COMPOUND TO MATCH FINAL COLOR OF PANEL.
- JOINT SEALING MATERIAL:
 - PROVIDE JOINT SEALING MATERIAL IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.4(a).
 - JOINT SEALING MATERIAL TO MATCH FINAL COLOR OF PANEL.
- ANTI-GRAFFITI COATING:
 - APPLY ANTI-GRAFFITI COATING IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIAL PROVISIONS.
- PENETRATING CONCRETE STAIN:
 - APPLY STAIN IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIAL PROVISIONS.

CONSTRUCTION AND INSTALLATION PROCEDURES

- CONSTRUCT EMBANKMENTS AND/OR CUT EXISTING GRADE TO THE TOP OF FOOTING ELEVATIONS. EXCAVATE FOR FOOTING CONSTRUCTION. IF FILL IS REQUIRED, PLACE COMPACTED FILL MATERIAL TO THE TOP OF FOOTING ELEVATION, IN ACCORDANCE WITH CONTRACT DOCUMENTS, AND THEN EXCAVATE FOR FOOTING CONSTRUCTION. FILL MATERIAL MAY NEED TO BE IN PLACE A MINIMUM TIME DURATION PRIOR TO EXCAVATION AS REQUIRED BY THE CONTRACT DRAWINGS.
- CONSTRUCT FOOTING. FOOTING MAY BE POURED NEXT TO EXCAVATION.
- PANEL INSTALLATION:
 - CHECK TOP OF FOOTING FOR SMOOTHNESS. GRIND IF NECESSARY SO THAT DISCREPANCIES CAN BE ACCOMMODATED WITH NON-SHRINK GROUT.
 - FLATNESS TOLERANCES: $\frac{1}{4}$ " WITHIN PANEL LENGTH
 - IMMEDIATELY PRIOR TO PANEL INSTALLATION, PLACE A LAYER OF NON-SHRINK GROUT TO PROVIDE FULL BEARING UNDER THE PANELS. RETOOL GROUT AFTER PANEL HAS BEEN SET.
 - GROUT THICKNESS: $\frac{1}{4}$ " +/- $\frac{1}{8}$ "
 - GROUT WIDTH: $1\frac{1}{2}$ " +/- $\frac{1}{2}$ "
 - PLACE FIRST PANEL ON TO THE FOOTING AND INSTALL TEMPORARY BRACING, IF REQUIRED. ADJUST PANEL UNTIL ALL FACES ARE PLUMB.
 - SET THE SECOND PANEL, MATING THE BALL AND SOCKET EDGES TOGETHER. ADJUST PANEL UNTIL ALL FACES ARE LEVEL AND PLUMB. INSTALL A MINIMUM OF TWO CABLE TIES PRIOR TO RELEASING PANEL FROM CRANE. INSTALL CAP SCREWS, WITH WASHERS, A MINIMUM OF SIX FULL TURNS INTO THE TERMINAL TO ACHIEVE DESIGN STRENGTH. ENSURE CABLE IS NOT OVER TIGHTENED, CABLE TO BE TAUT, NOT STRESSED. INSTALL REMAINING CABLE TIES AS REQUIRED.
 - IF THE CABLE TIE IS NOT TAUT OR IF SIX FULL TURNS CANNOT BE MADE, BACK OUT SCREWS AND REPLACE WITH A DIFFERENT LENGTH SCREW.
 - CONTINUE SETTING BOTTOM PANELS.
 - STACKED PANELS: PLACE STACKED PANELS IN A STAIR STEP PATTERN WITH THE LOWER COURSE LEADING. THE FIRST PANEL PLACED ON AN UPPER COURSE MUST BE BRACED WITH A SECOND CRANE. THE TONGUE AND GROOVE PANEL EDGES DO NOT SERVE AS A SHEAR KEY.
 - GLUE THE NEOPRENE PADS AND CLOSED CELL NEOPRENE SPONGE TO THE TOP OF THE LOWER COURSE PANEL WITH AN APPROVED ADHESIVE.
 - SET THE FIRST PANEL ON THE SECOND COURSE IN PLACE ALIGNED WITH THE PANEL BELOW AND ADJUST UNTIL ALL FACES ARE LEVEL AND PLUMB.
 - SET THE SECOND PANEL ON THE SECOND COURSE, MATING THE BALL AND SOCKET EDGES TOGETHER AND ADJUST UNTIL ALL FACES ARE LEVEL AND PLUMB.
 - INSTALL CABLE TIES, AS INDICATED IN NOTE D, BEFORE RELEASING PANEL FROM CRANE.
 - ADDITIONAL COURSES: REPEAT STEPS SHOWN ABOVE.
 - AFTER 2 PANELS ARE SET IN A COURSE THEY ARE FREE STANDING.
 - PROCEED SEQUENTIALLY SETTING ALL PANELS FOR THE LENGTH OF THE WALL.
 - FILL ALL LIFTING INSERTS WITH NON-SHRINK GROUT.
- SEAL ALL OPEN JOINTS, HORIZONTAL JOINTS BETWEEN PANELS, AND OPENINGS IN THE PVC PIPES WITH JOINT SEALING MATERIAL/CAULKING COMPOUND (COLOR TO MATCH PANEL).
- APPLY ANTI-GRAFFITI COATING AND/OR PENETRATING CONCRETE STAIN, IF SPECIFIED.
- COMPLETE BACKFILL OPERATION ON BOTH SIDES OF THE WALL. MAXIMUM FILL DIFFERENTIAL BETWEEN SIDES OF PANELS IS LIMITED TO 2'-0" UNLESS OTHERWISE SPECIFIED.



ARCHITECTURAL SURFACE TREATMENTS

- THE AVERAGE ARCHITECTURAL SURFACE TREATMENT THICKNESS, PER SIDE OF PANEL, IS PERMITTED TO VARY FROM 0 TO $\frac{1}{2}$ INCH, BUT THE TOTAL AVERAGE ARCHITECTURAL SURFACE TREATMENT, ON BOTH SIDES OF THE PANEL, MUST NOT BE GREATER THAN $\frac{1}{2}$ INCH UNLESS OTHERWISE INDICATED ON THE CONTRACT DRAWINGS.
- STAMPED FINISHES MAY BE PERMITTED IF ACCEPTED BY THE DISTRICT BRIDGE ENGINEER.
- REFER TO PUBLICATION 408, SECTION 1086.3 AND/OR THE CONTRACT DOCUMENTS FOR ARCHITECTURAL SURFACE TOLERANCES.
- REFER TO CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION.

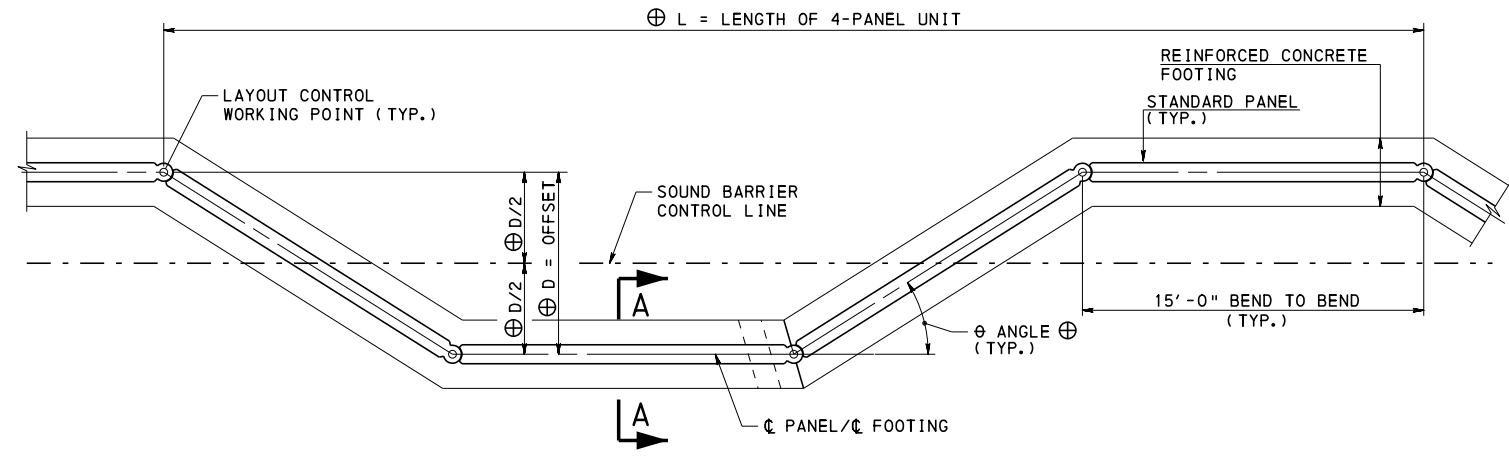
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
OFFSET SOUND BARRIER WALLS
GENERAL NOTES - 2

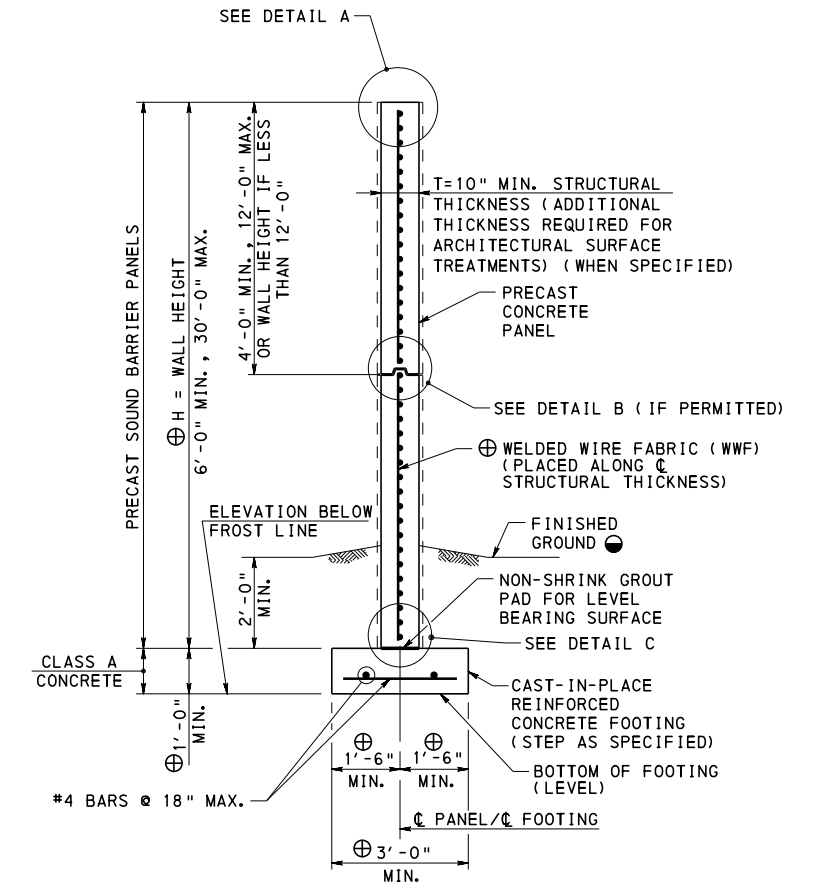
RECOMMENDED JAN. 31, 2019
T. Ross R. Macivica
CHIEF BRIDGE ENGINEER

RECOMMENDED JAN. 31, 2019
William R. Bales
ACTING DIR. BUR. OF PROJECT DELIVERY

SHEET 2 OF 8
BC-780M



PLAN - OFFSET SOUND BARRIER
(END PANEL NOT SHOWN)



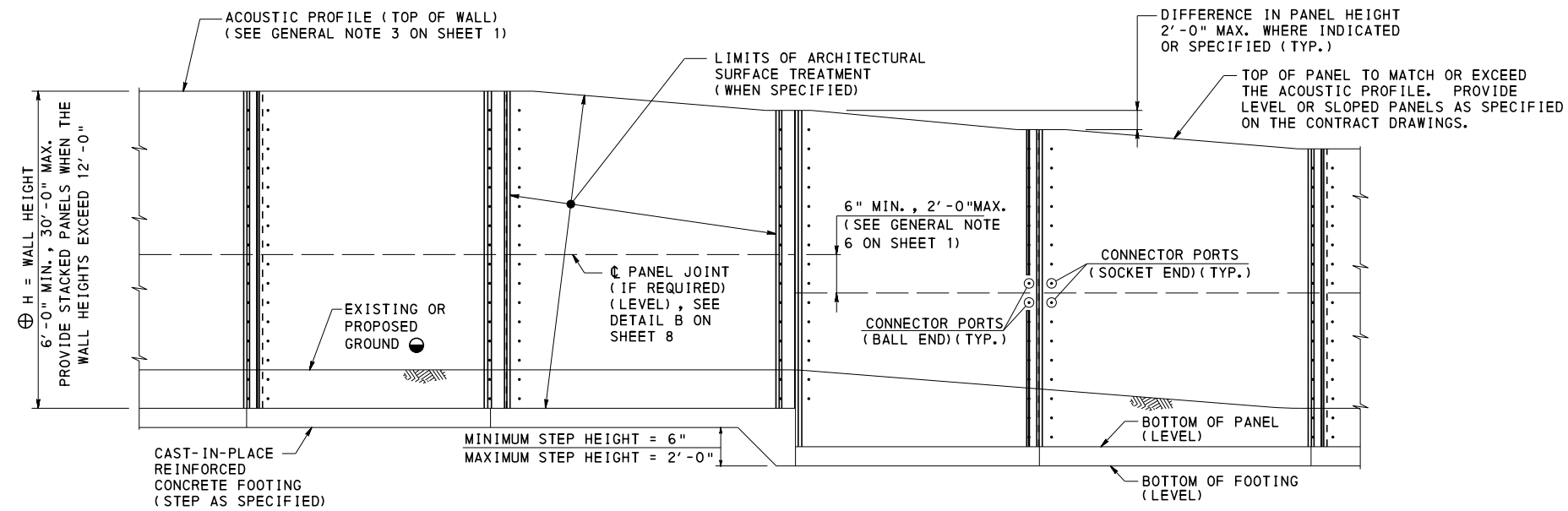
SECTION A-A

LEGEND:

- ⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS.
- GRADE GROUND TO DRAIN WATER AWAY FROM WALL. FILL HEIGHT ON EACH SIDE OF WALL TO BE WITHIN 2'-0" DIFFERENCE.

NOTES:

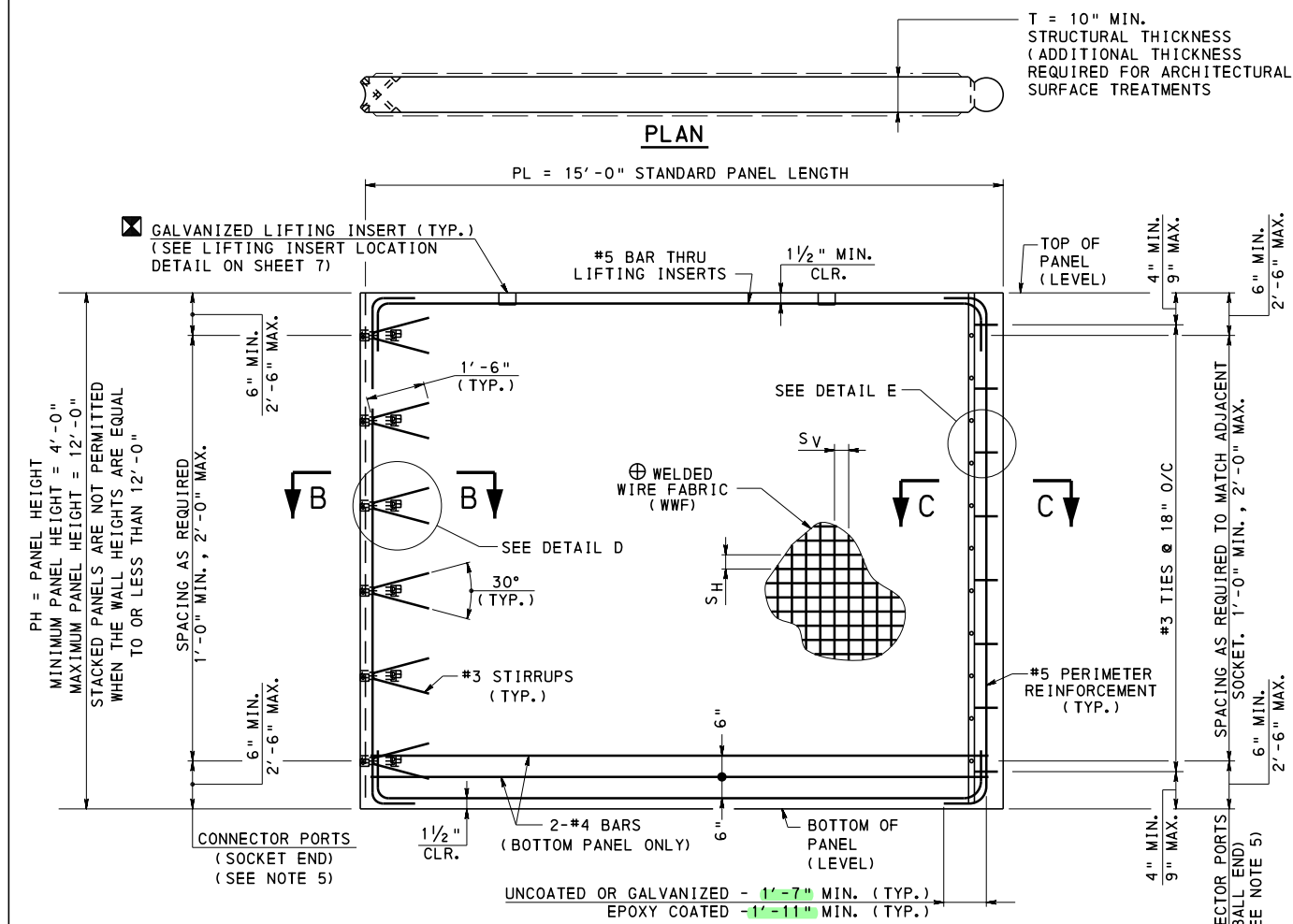
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. FOR DETAILS A, B, AND C REFER TO SHEET 8.



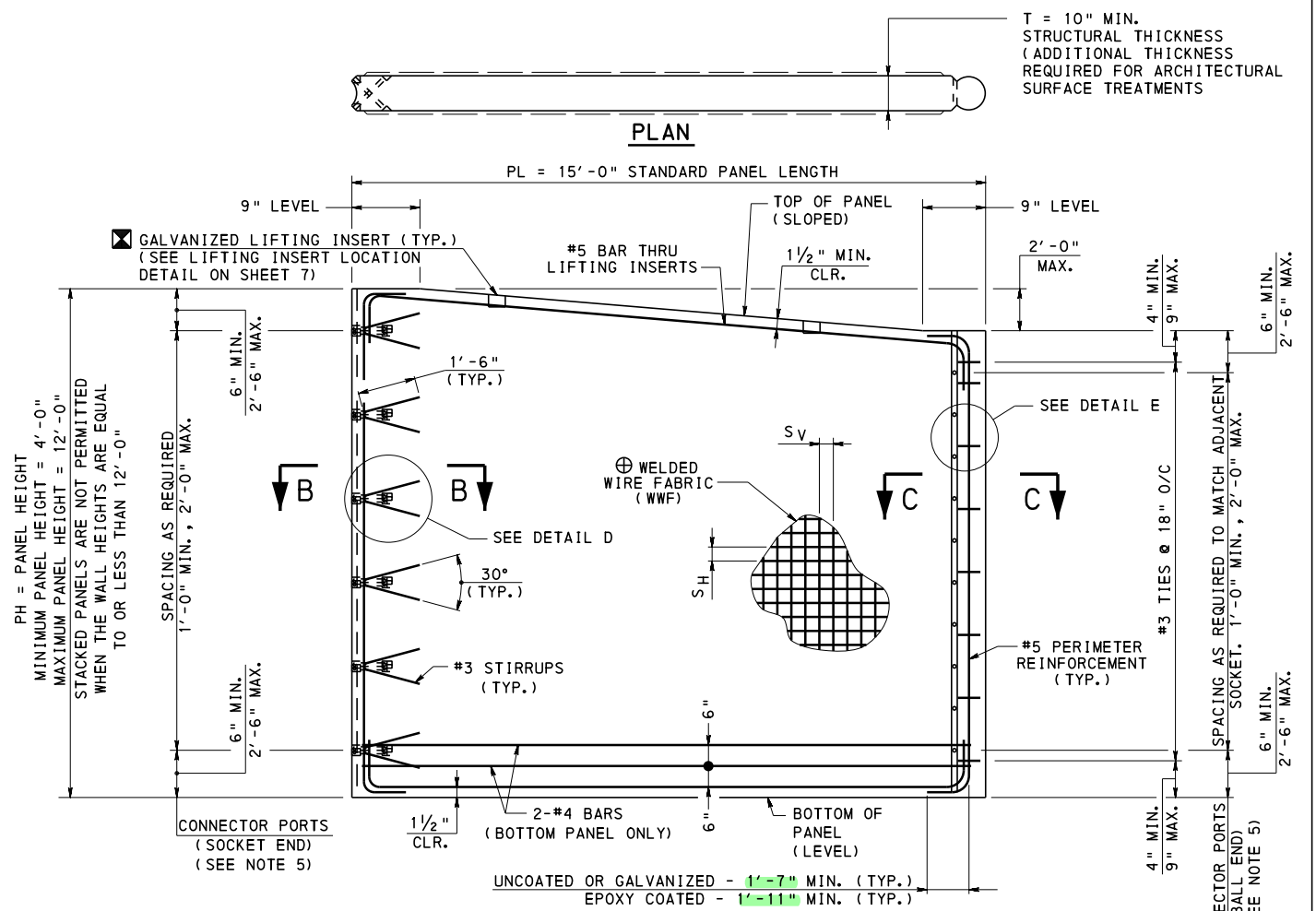
ELEVATION - OFFSET SOUND BARRIER
(END PANEL NOT SHOWN)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
OFFSET SOUND BARRIER WALLS
GEOMETRY AND LAYOUT

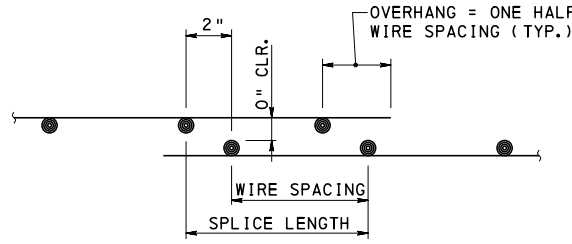


ELEVATION
STANDARD PANEL



ELEVATION
STANDARD SLOPED PANEL

SPLICE LENGTH SHALL BE THE LARGER OF:
 • ONE WIRE SPACING PLUS 2"
 • 1.5 TIMES DEVELOPMENT LENGTH
 • 6"



WWF SPLICE DETAIL
(IF REQUIRED)

LEGEND FOR WELDED WIRE FABRIC

WWF AxB-WCxWD
 WHERE A = SPACING OF HORIZONTAL BARS (S_H)
 B = SPACING OF VERTICAL BARS (S_V)
 C = HORIZONTAL WIRE CROSS SECTIONAL AREA
 IN SQ. INCHES MULTIPLIED BY 100.
 D = VERTICAL WIRE CROSS SECTIONAL AREA
 IN SQ. INCHES MULTIPLIED BY 100.
 WWF = WELDED WIRE FABRIC

LEGEND:

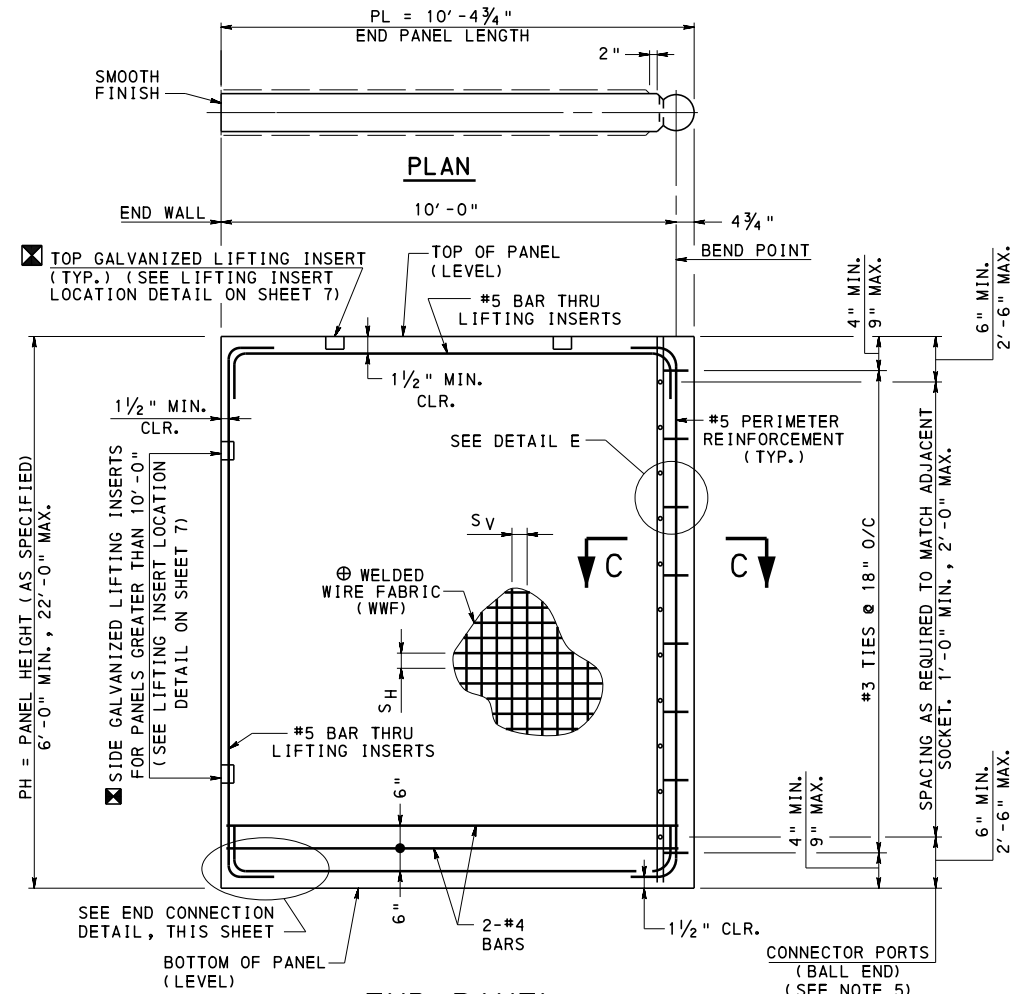
- ⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS
- ☒ FABRICATOR TO VERIFY ADEQUACY OF LIFTING INSERTS

NOTES:

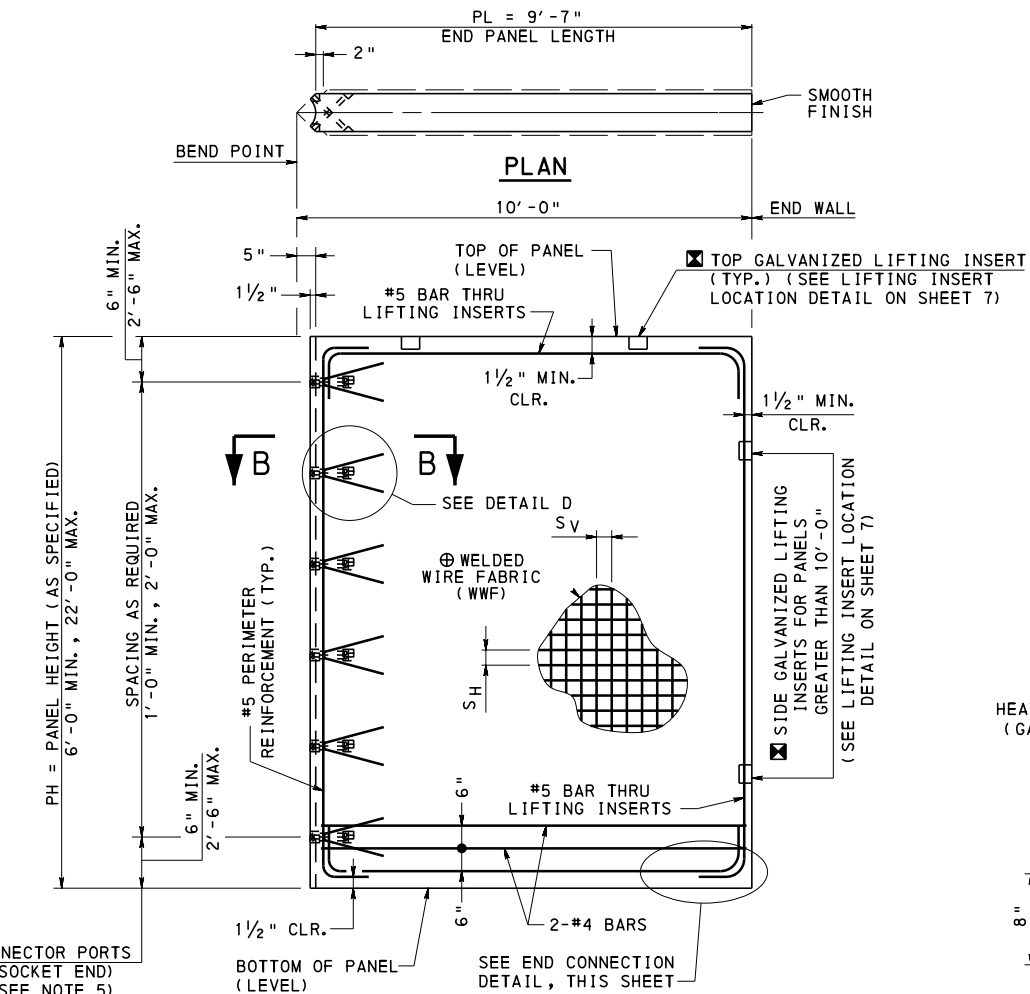
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. FOR SECTION B-B AND C-C REFER TO SHEET 6.
3. FOR DETAILS D AND E REFER TO SHEET 6.
4. WELDED WIRE FABRIC TO BE PLACED ALONG @ STRUCTURAL THICKNESS.
5. LOCATION OF CONNECTOR PORTS MUST BE DETAILED ON THE SHOP DRAWINGS. PORTS LOCATIONS TO MATCH ADJACENT PANELS. PROVIDE A MINIMUM OF TWO CABLE CONNECTIONS FOR EACH PANEL TO PANEL CONNECTION (PER SIDE OF PANEL).
6. IF STACKED PANELS ARE REQUIRED, REFER TO DETAIL B ON SHEET 8.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

STANDARD
OFFSET SOUND BARRIER WALLS
PRECAST CONCRETE STANDARD PANEL DETAILS

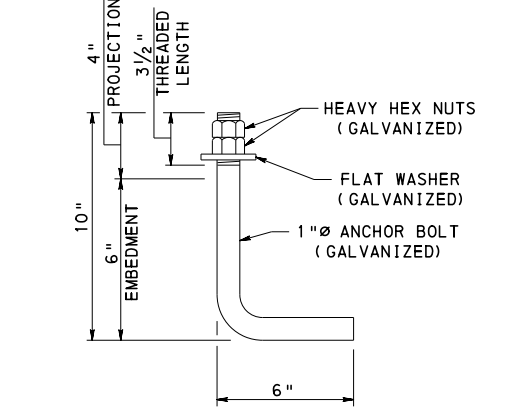


END PANEL (FULL HEIGHT) (BALL END)

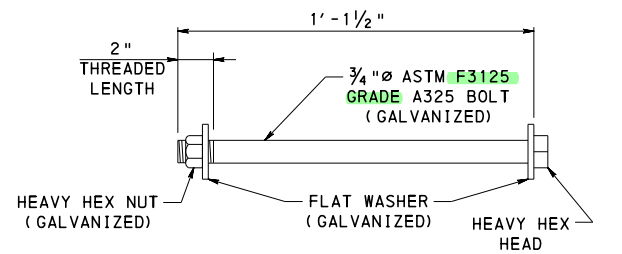


END PANEL (FULL HEIGHT) (SOCKET END)

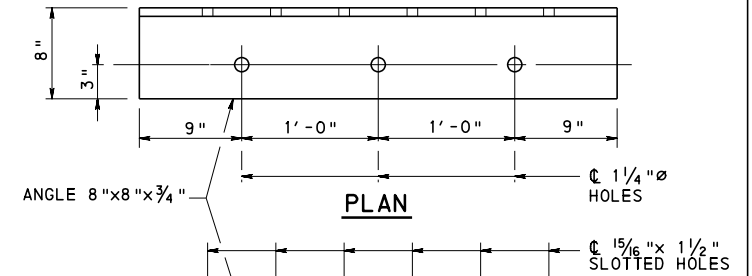
NOTE: FOR INFORMATION NOT SHOWN, SEE STANDARD PANEL DETAILS ON SHEET 4.



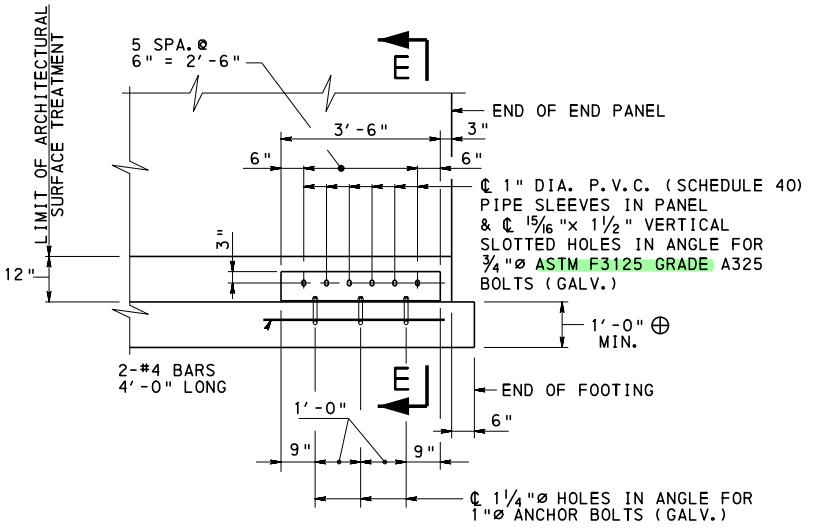
ANCHOR BOLT DETAIL FOR END PANEL CONNECTION



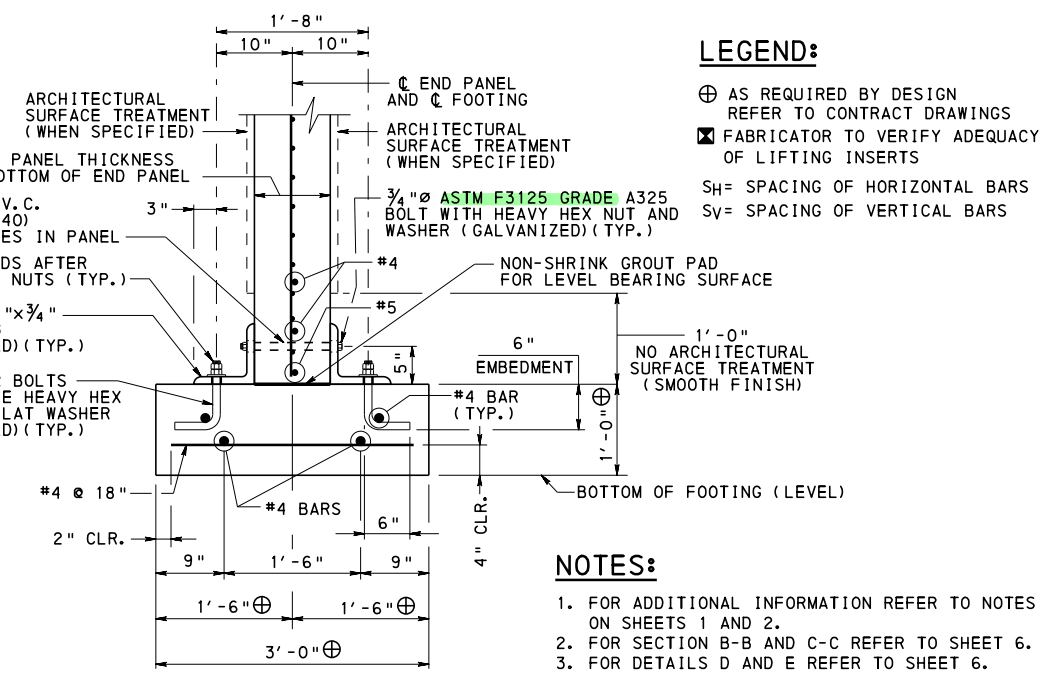
THRU BOLT DETAIL FOR END PANEL CONNECTION



ANGLE DETAIL



ELEVATION



SECTION E-E

LEGEND:
 ⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS
 ⊠ FABRICATOR TO VERIFY ADEQUACY OF LIFTING INSERTS
 SH= SPACING OF HORIZONTAL BARS
 SV= SPACING OF VERTICAL BARS

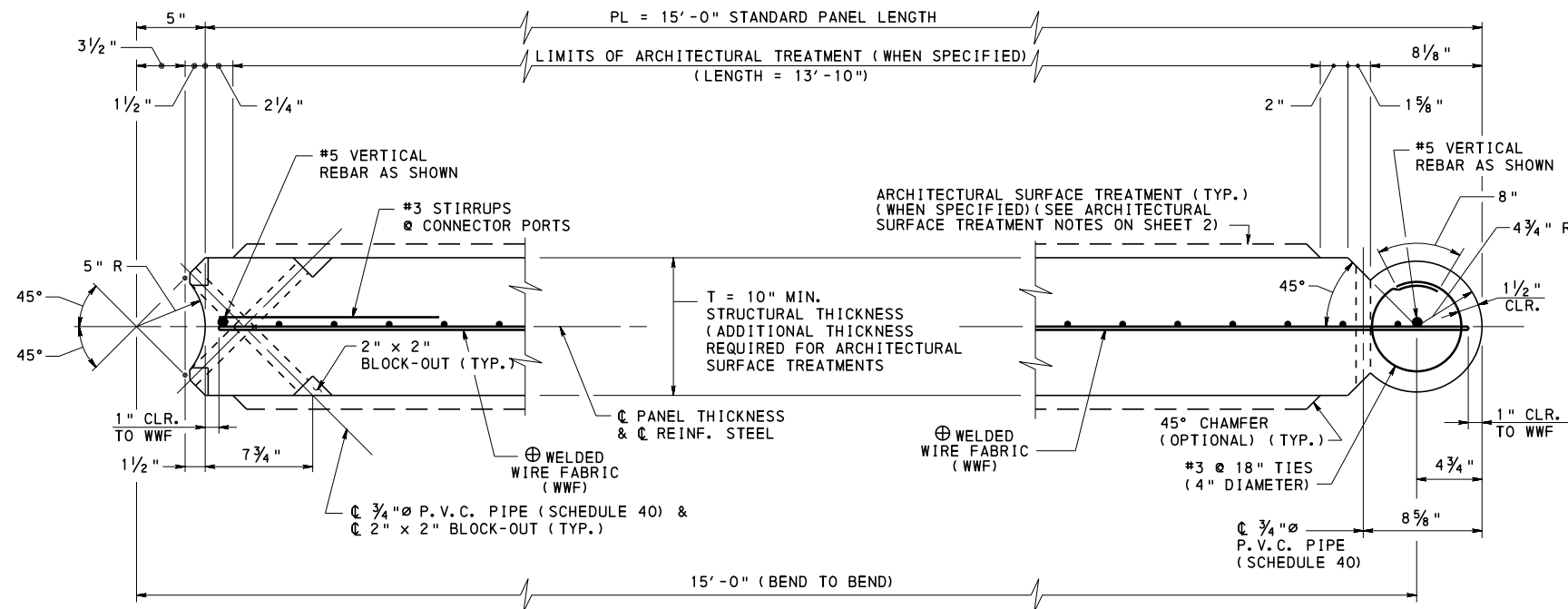
- NOTES:**
- FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
 - FOR SECTION B-B AND C-C REFER TO SHEET 6.
 - FOR DETAILS D AND E REFER TO SHEET 6.
 - WELDED WIRE FABRIC TO BE PLACED ALONG STRUCTURAL THICKNESS.
 - LOCATION OF CONNECTOR PORTS MUST BE DETAILED ON THE SHOP DRAWINGS. PORTS LOCATIONS TO MATCH ADJACENT PANELS. PROVIDE A MINIMUM OF THREE CABLE CONNECTIONS FOR THE END PANEL TO ADJACENT PANEL(S) CONNECTION.
 - PROVIDE SINGLE END PANELS, STACKED PANELS NOT PERMITTED.

END PANEL CONNECTION DETAILS

**COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY**

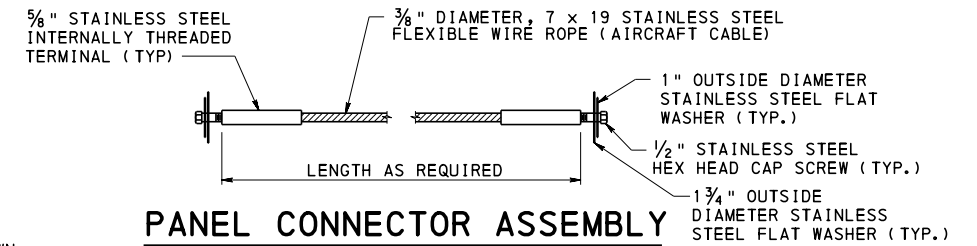
**STANDARD
 OFFSET SOUND BARRIER WALLS
 PRECAST CONCRETE END PANEL DETAILS**

RECOMMENDED JAN. 31, 2019 <i>T. Ross R. Maciura</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>William J. ...</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 5 OF 8 BC-780M
---	--	--------------------------------



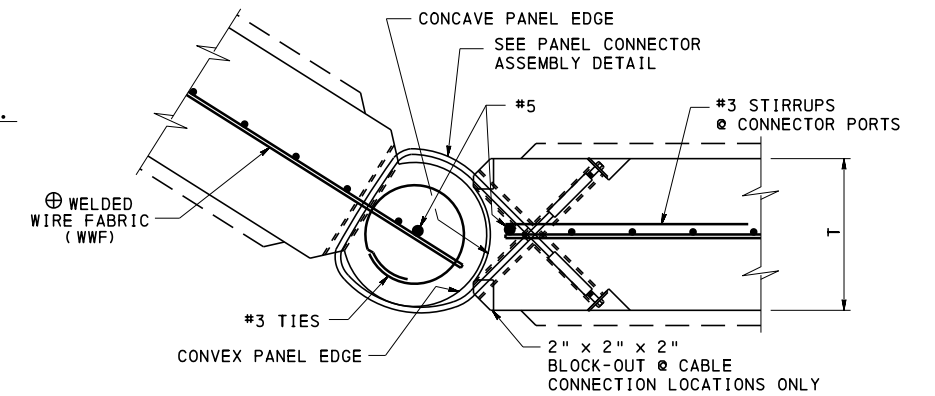
SECTION B-B

SECTION C-C

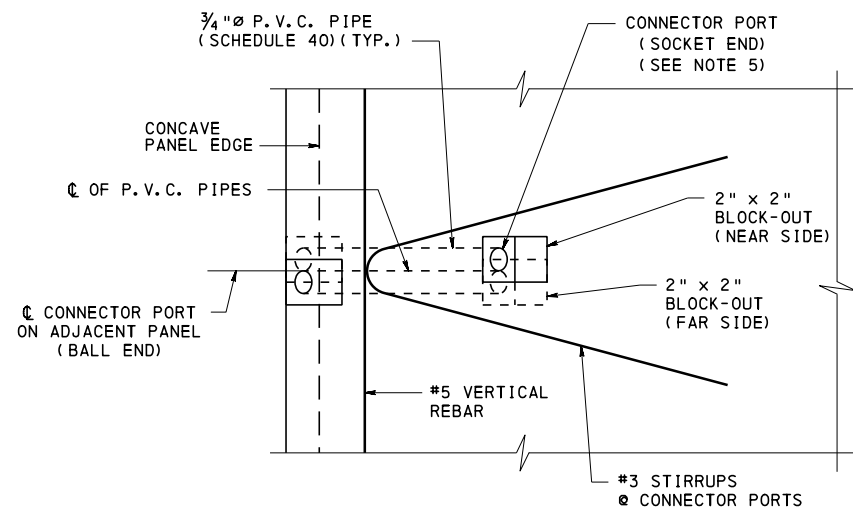


PANEL CONNECTOR ASSEMBLY

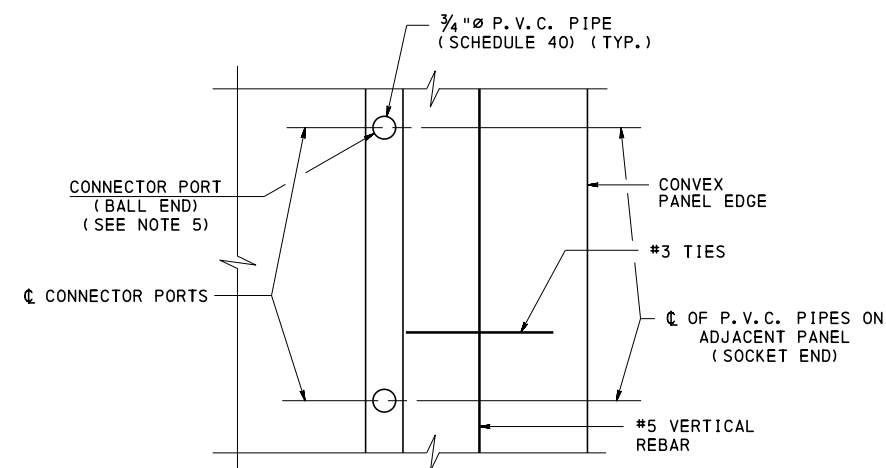
NOTE: INSTALL CAP SCREWS A MINIMUM OF SIX FULL TURNS INTO TERMINAL.



PANEL JOINT



DETAIL D



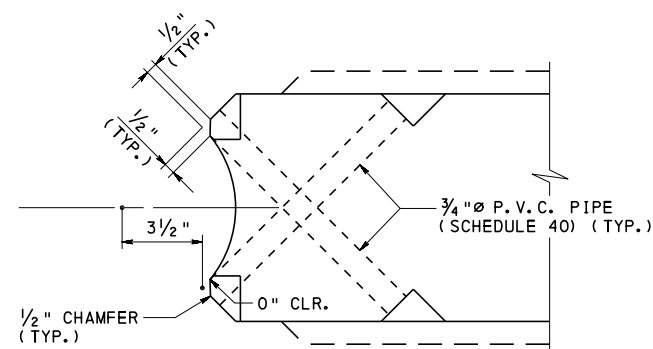
DETAIL E

LEGEND:

⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS

NOTES:

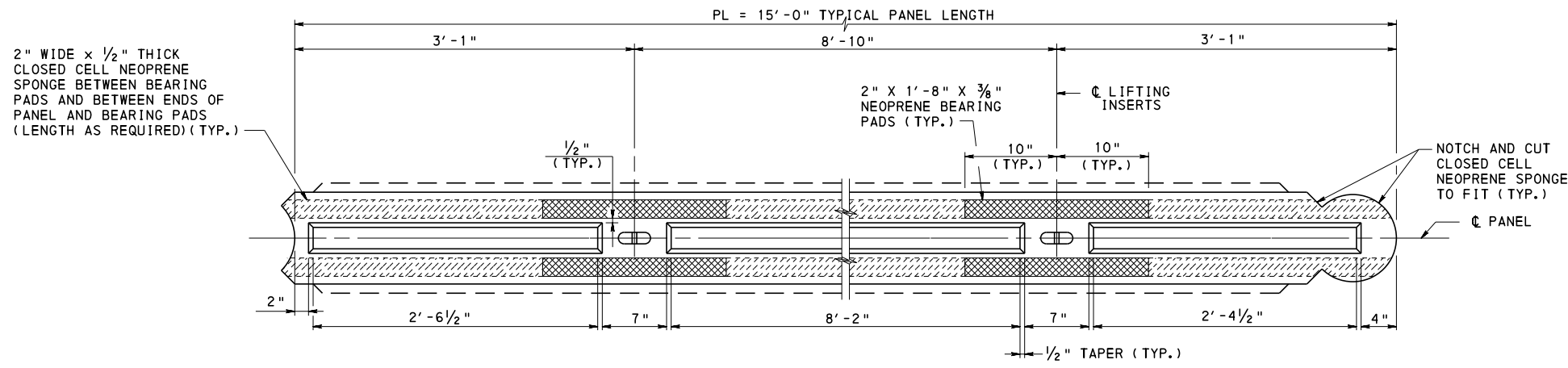
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. FOR LOCATION OF SECTIONS B-B AND C-C REFER TO SHEETS 4 AND 5.
3. FOR LOCATION OF DETAILS D AND E REFER TO SHEETS 4 AND 5.
4. WELDED WIRE FABRIC TO BE PLACED ALONG ϕ STRUCTURAL THICKNESS.
5. LOCATION OF CONNECTOR PORTS MUST BE DETAILED ON THE SHOP DRAWINGS. PORTS LOCATIONS TO MATCH ADJACENT PANELS. PROVIDE A MINIMUM OF TWO CABLE CONNECTIONS FOR EACH PANEL TO PANEL CONNECTION (PER SIDE OF PANEL).



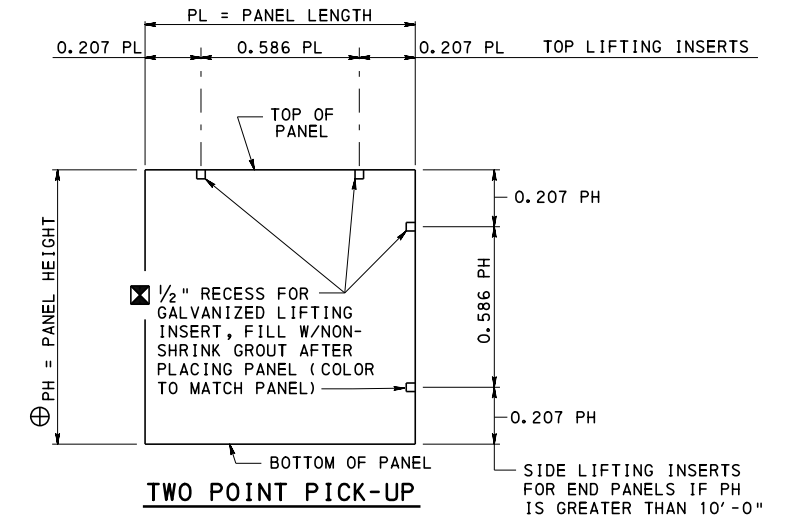
SOCKET END CHAMFERS

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

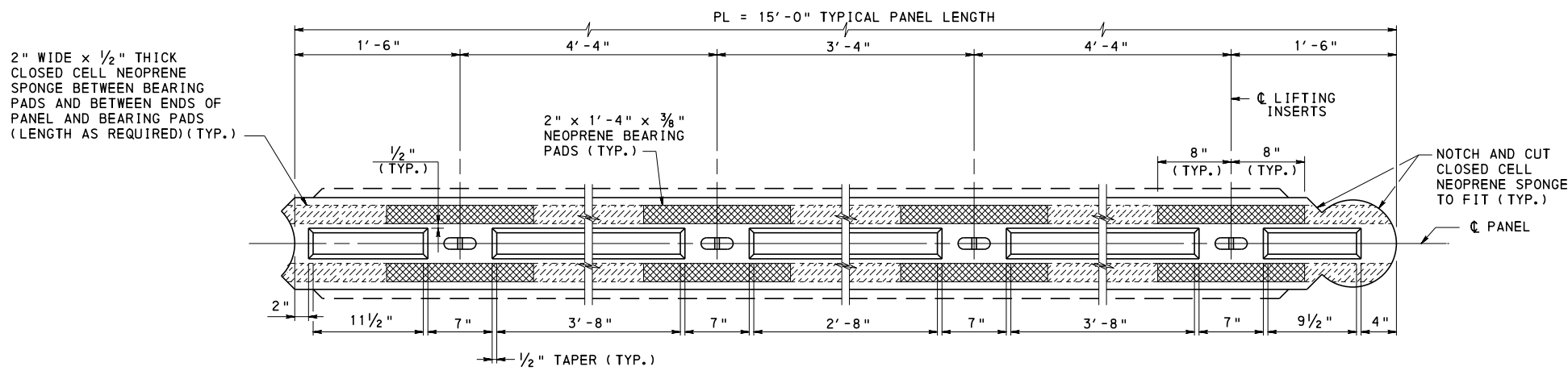
**STANDARD
OFFSET SOUND BARRIER WALLS
PRECAST CONCRETE PANEL DETAILS - 1**



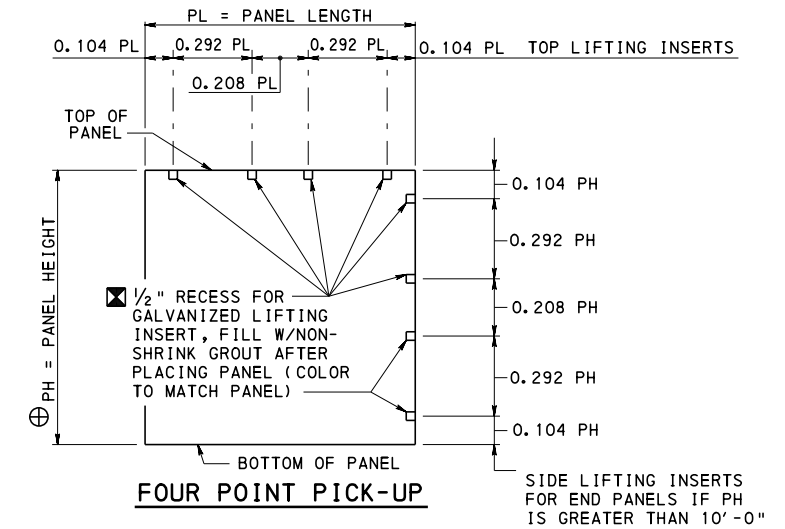
**TOP OF PANEL AT JOINT PLAN VIEW
TWO POINT PICK-UP**



TWO POINT PICK-UP



**TOP OF PANEL AT JOINT PLAN VIEW
FOUR POINT PICK-UP**



FOUR POINT PICK-UP

**PRECAST CONCRETE PANEL
LIFTING INSERT LOCATION DETAIL**

NOTE: LIFTING INSERTS FOR SLOPED END PANELS ARE TO BE LOCATED BY THE FABRICATOR BASED ON HOW THE PANEL IS FABRICATED AND ERECTED.

LEGEND:

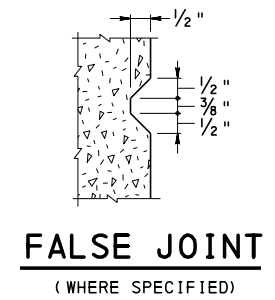
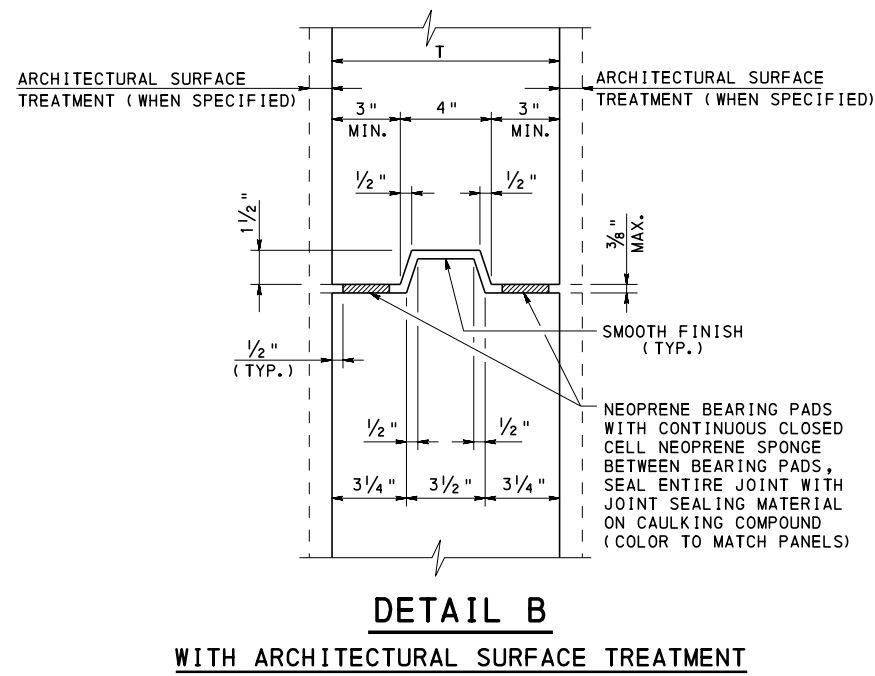
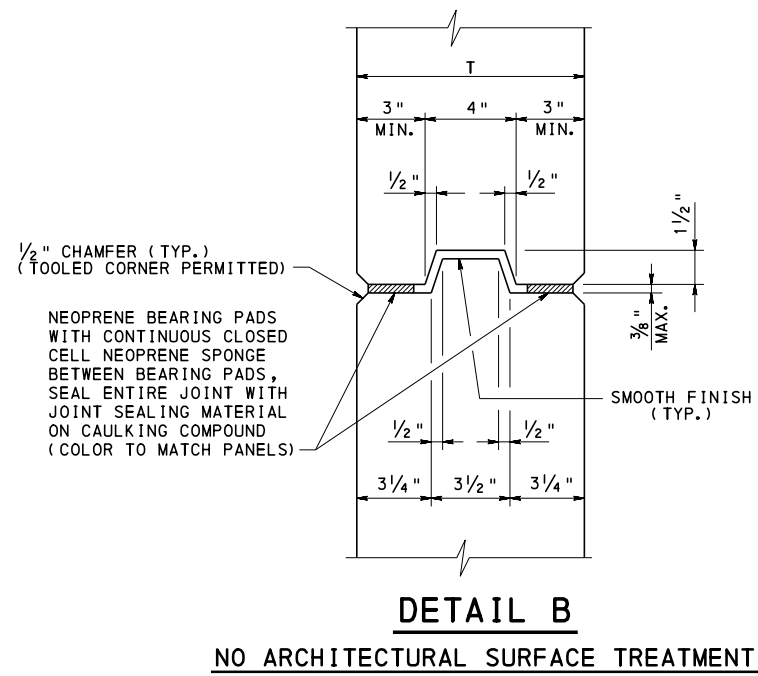
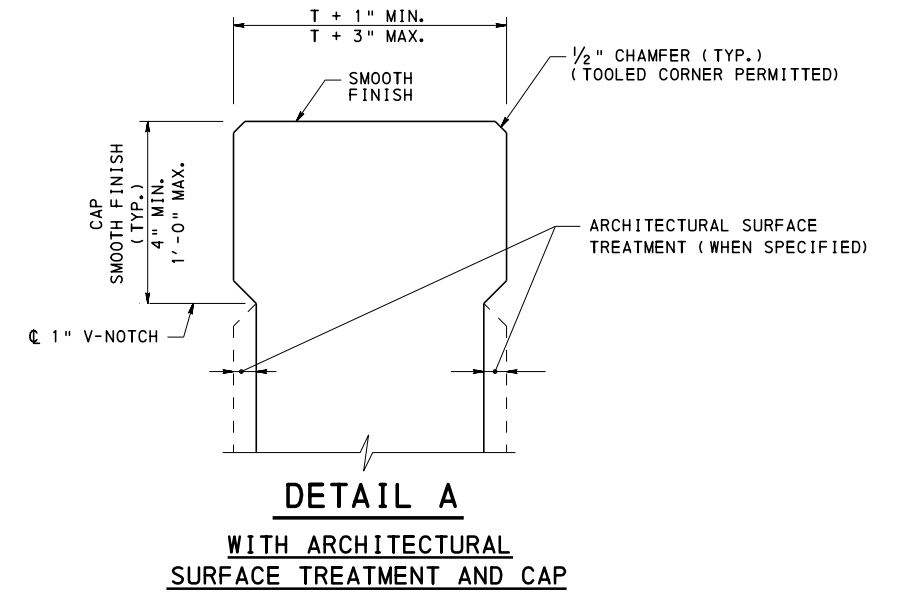
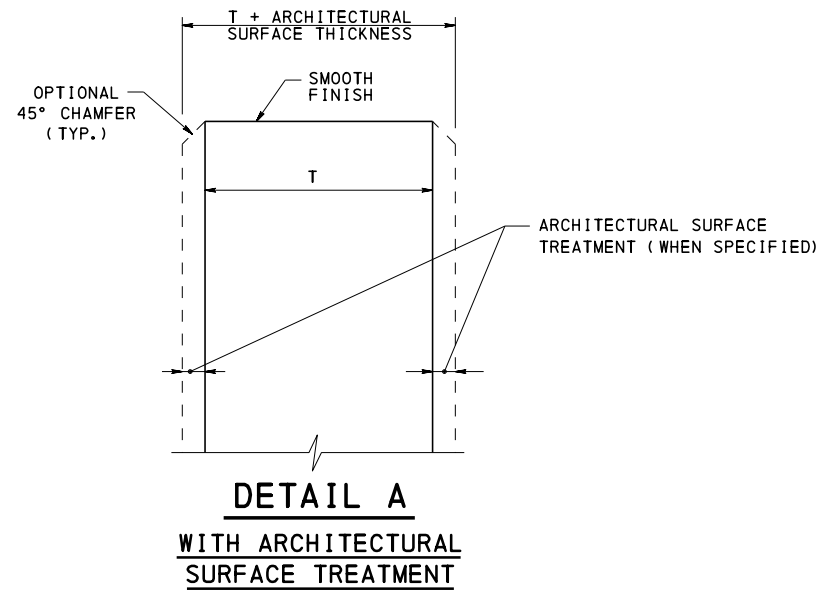
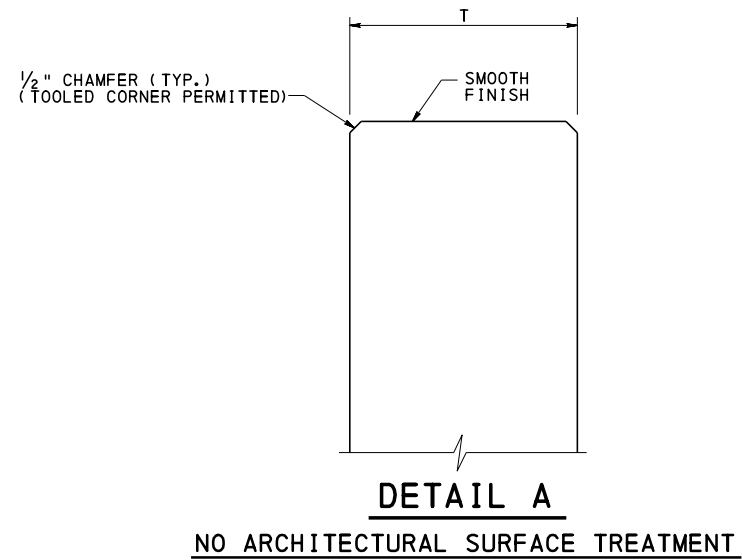
- ☒ FABRICATOR TO VERIFY ADEQUACY OF LIFTING INSERTS
- ⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. GLUE THE CLOSED CELL NEOPRENE SPONGE AND BEARING PADS TO PANEL WITH AN APPROVED ADHESIVE.

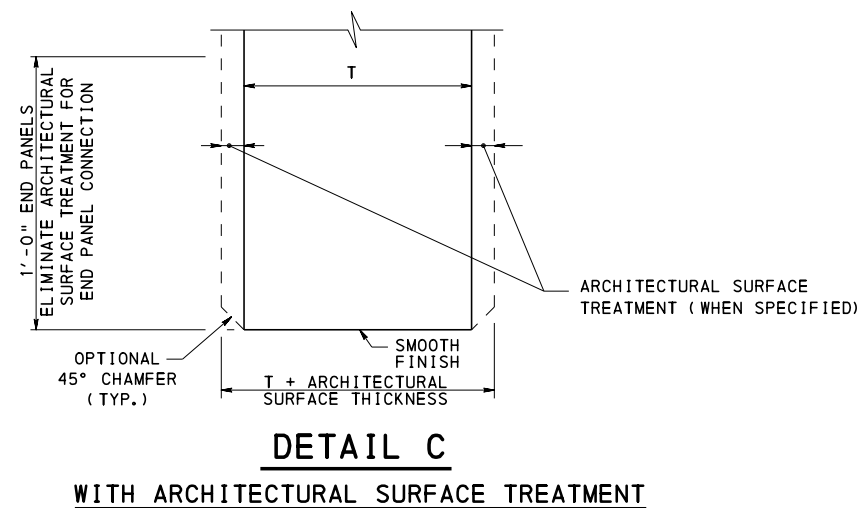
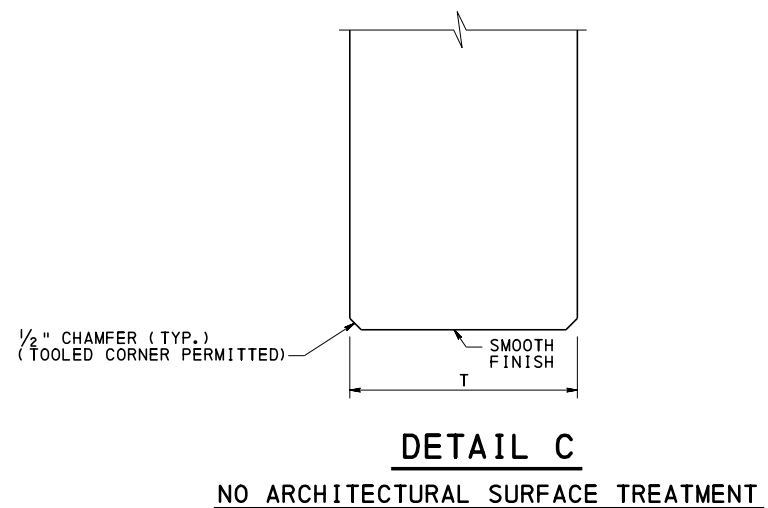
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
OFFSET SOUND BARRIER WALLS
PRECAST CONCRETE PANEL DETAILS - 2**



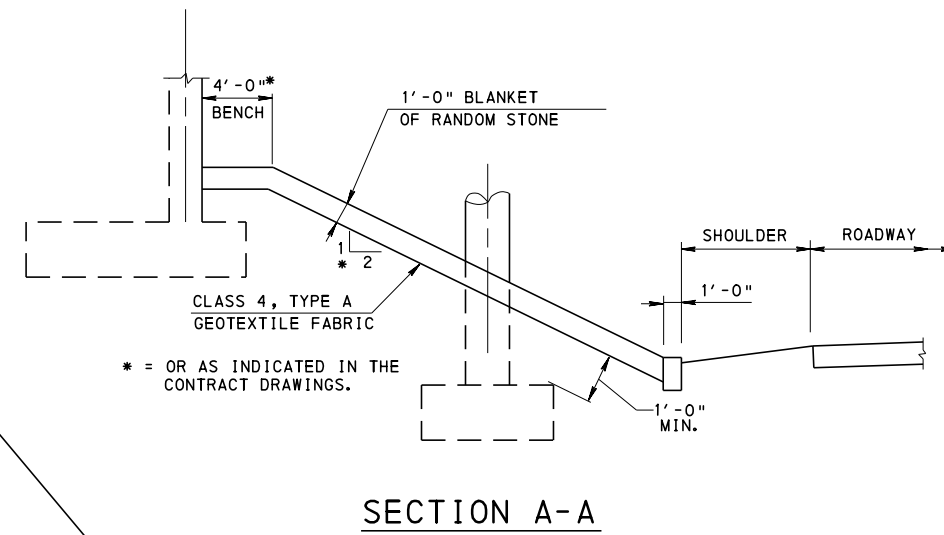
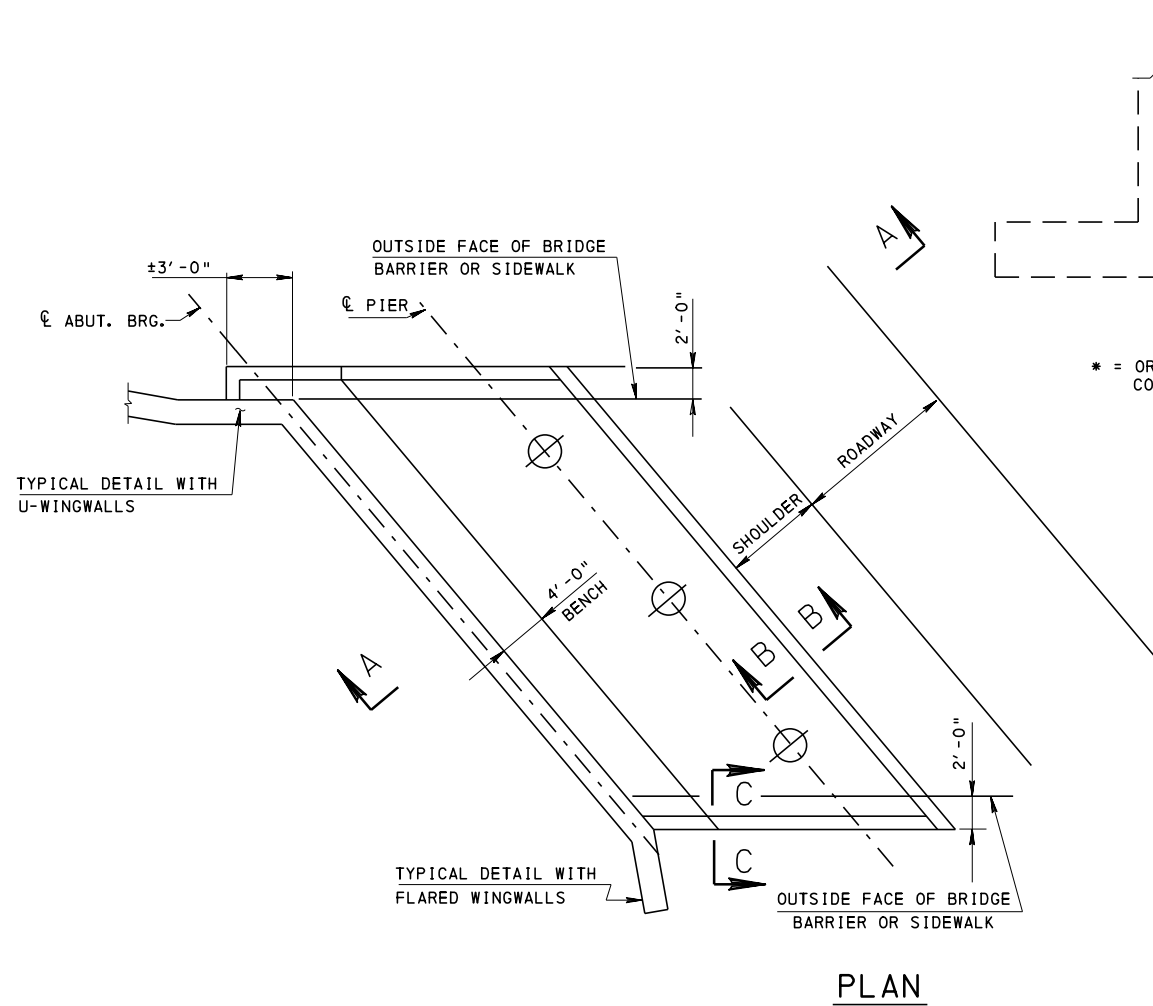
NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. FOR SLEEVE DETAIL AT OPENINGS AND DOOR DETAILS REFER TO BC-776M.



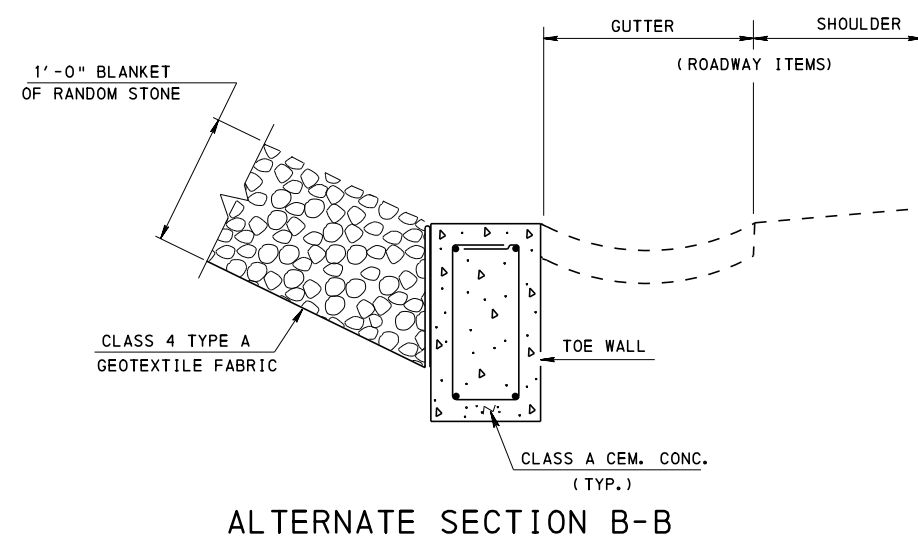
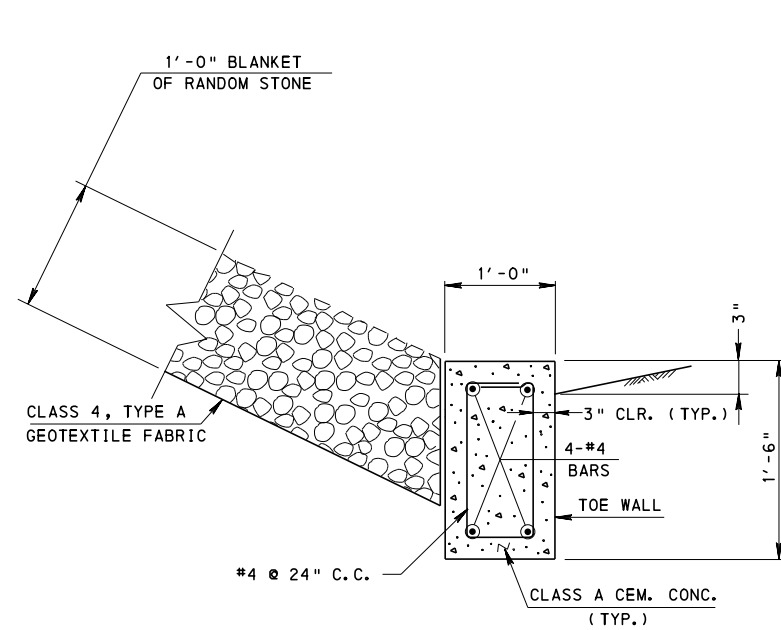
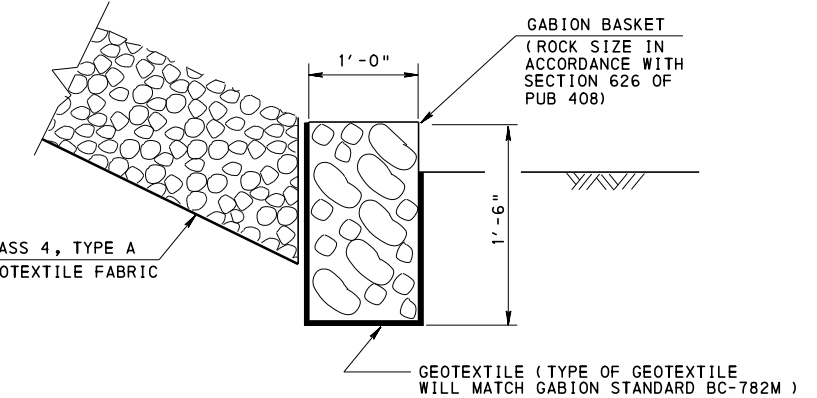
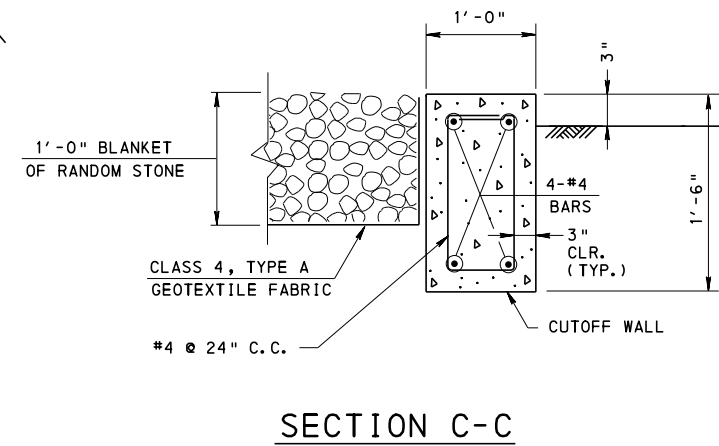
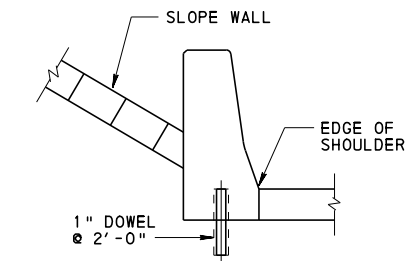
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
OFFSET SOUND BARRIER WALLS
PRECAST CONCRETE PANEL DETAILS - 3



NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP AND CONSTRUCT RANDOM STONE SLOPE WALL IN ACCORDANCE WITH SECTION 675 OF PUBLICATION 408.
2. PROTECT STONE SLOPE WALL FROM DOWNSPOUT DRAINAGE WITH CONCRETE SPLASH BLOCK PROTECTION, SEE BC-751M FOR DETAILS.
3. ALL REINFORCEMENT STEEL BARS SHOWN MEET THE REQUIREMENTS OF ASTM A615, A996 OR A706.

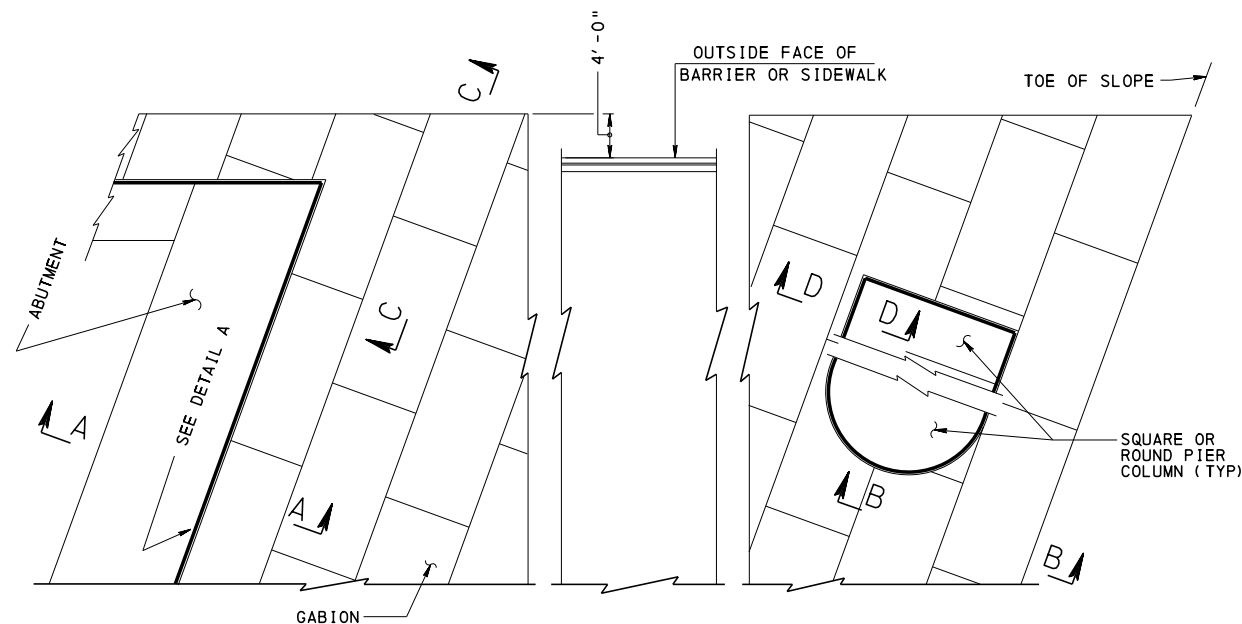


THE CLASS 4, TYPE A GEOTEXTILE DETAIL IS SAME FOR ABUTMENT SECTION.

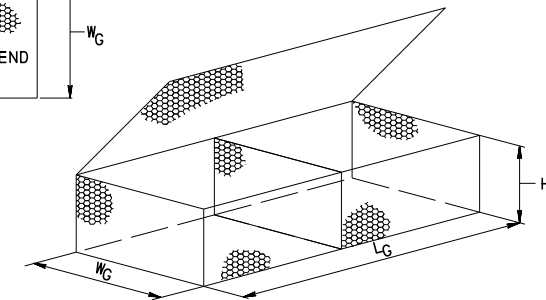
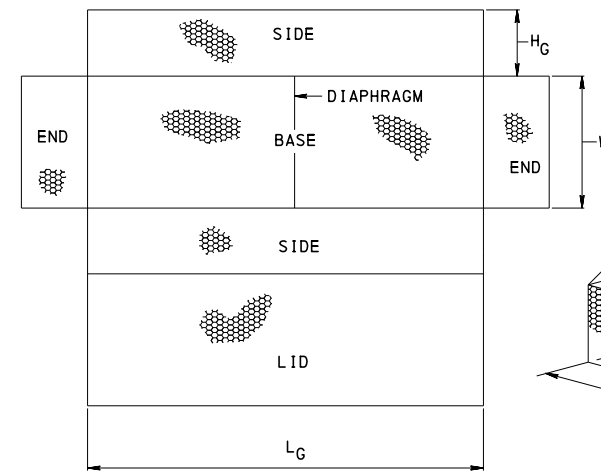
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
RANDOM STONE SLOPE WALL

BC-751M	BRIDGE DRAINAGE	RECOMMENDED SEPT.30, 2016	RECOMMENDED SEPT.30, 2016	SHEET 1 OF 1
BC-782M	GABION SLOPE WALL DETAILS	<i>Thomas P. Maiore</i> CHIEF BRIDGE ENGINEER	<i>Brenda S. Thompson</i> DIRECTOR, BUR. OF PROJECT DELIVERY	BC-781M
REFERENCE DRAWINGS				



PLAN

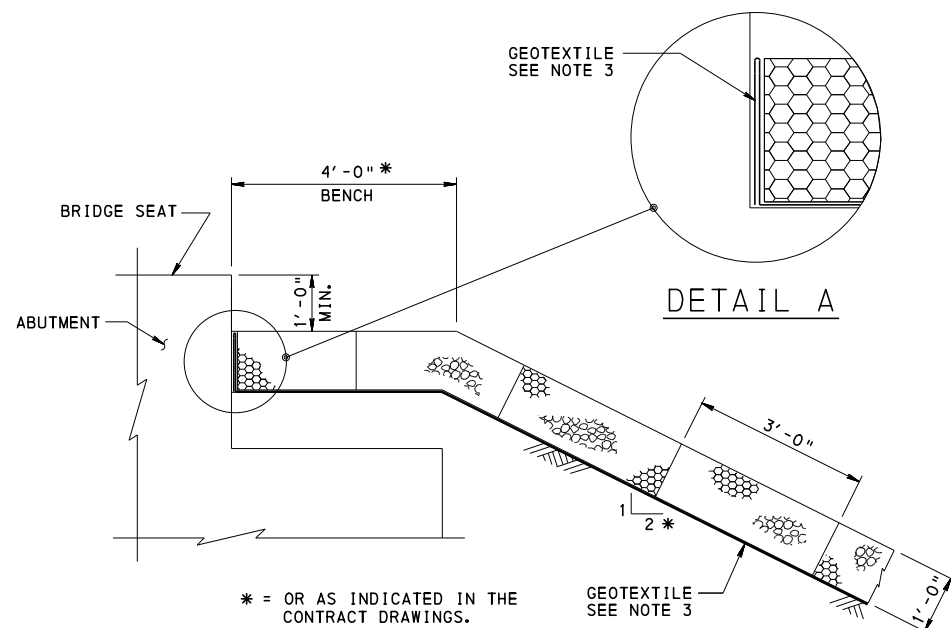


GABION SIZES

W _G	L _G	H _G
3'-0"	6'-0"	1'-0"
3'-0"	12'-0"	1'-0"

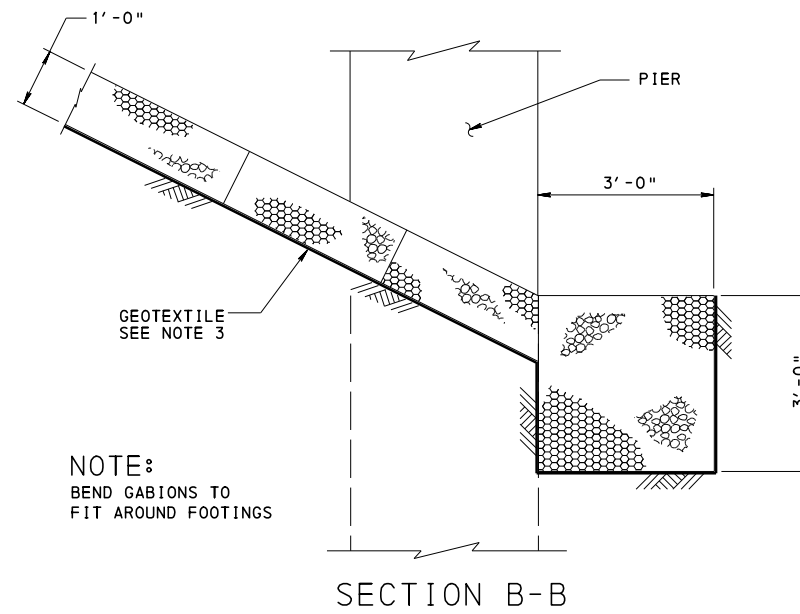
ADDITIONAL SIZES MAY BE AVAILABLE ON A SPECIAL ORDER BASIS.

WIRE MESH BASKETS



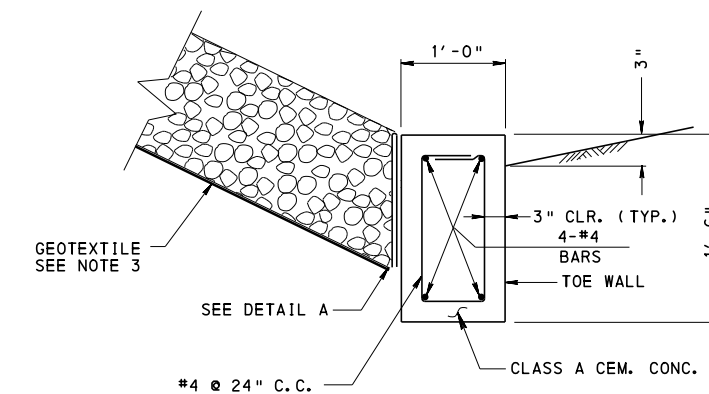
DETAIL A

* = OR AS INDICATED IN THE CONTRACT DRAWINGS.



SECTION B-B

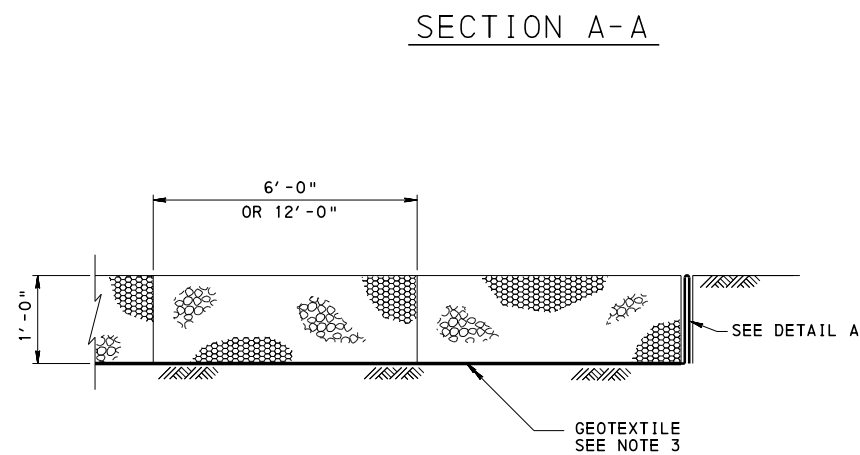
NOTE:
BEND GABIONS TO FIT AROUND FOOTINGS



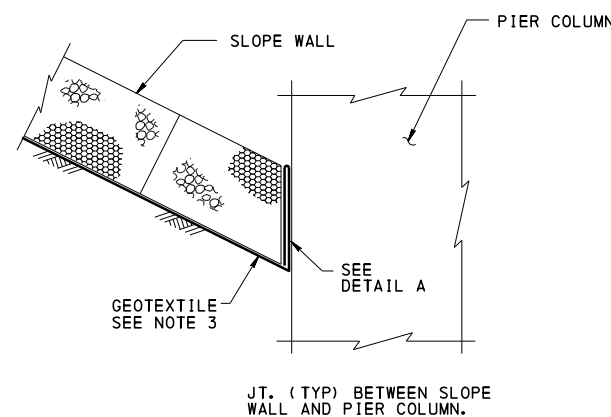
ALTERNATE SECTION B-B

NOTES:

1. ALL REINFORCEMENT STEEL BARS SHOWN MEET THE REQUIREMENTS OF ASTM A 615, A 996 OR A 706. EPOXY COAT ALL REINFORCEMENT.
2. PROVIDE MATERIAL AND WORKMANSHIP IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATIONS AS OUTLINED IN THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408.
3. INSTALL CLASS 4 TYPE A GEOTEXTILE MATERIAL ALONG ALL INTERFACE AREAS WITH SOIL AND/OR CONCRETE CONTACT



SECTION C-C



SECTION D-D

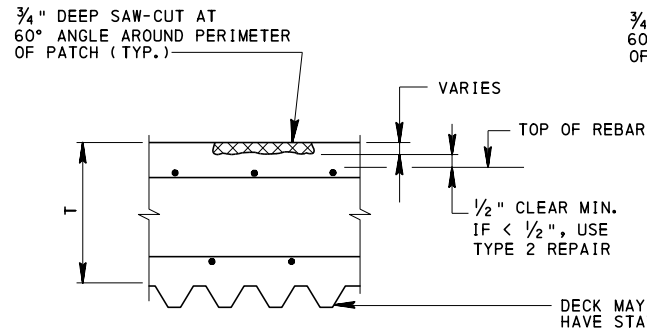
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GABION SLOPE WALL
DETAILS

RECOMMENDED SEPT.30, 2016
Thomas P. Maiore
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT.30, 2016
Brenda S. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 1 OF 1
BC-782M

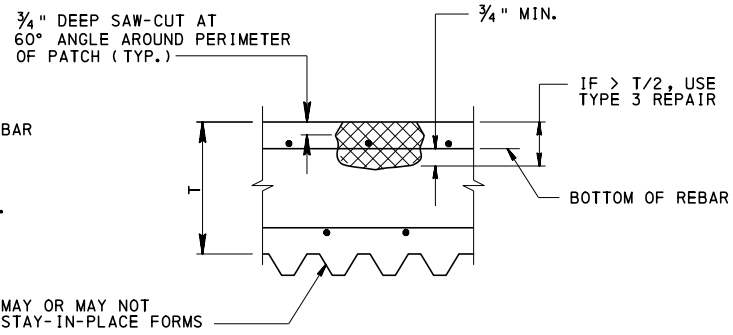


DECK REPAIR TYPE 1**

** TYPE 1 REPAIR IS TO BE RARELY USED. USE TYPE 2 REPAIRS IN MOST SITUATIONS.

DECK REPAIR TYPE 1 NOTES:

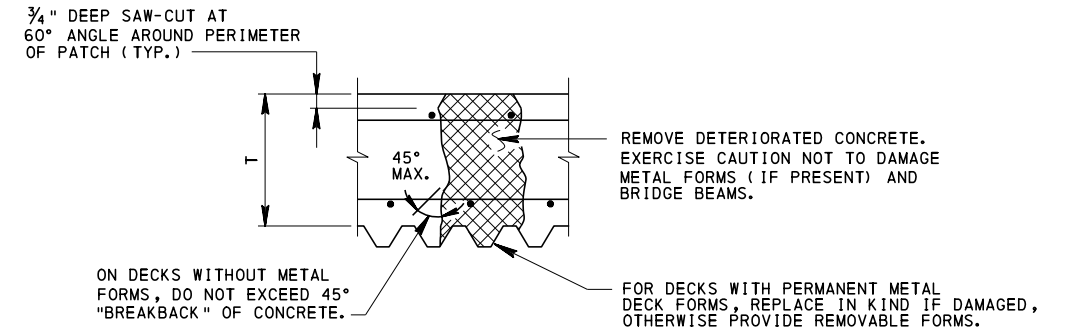
- BRIDGE DECKS WITH A SINGLE LAYER OF REINFORCEMENT ARE SIMILAR (ADJ. BOX BEAMS).
- DECK REPAIR TYPE 2 OR TYPE 3 MAY BE REQUIRED WITHIN THE AREA OF A DECK REPAIR TYPE 1.



DECK REPAIR TYPE 2

DECK REPAIR TYPE 2 NOTES:

- DECK REPAIR TYPE 3 MAY BE REQUIRED WITHIN THE AREA OF A DECK REPAIR TYPE 2.



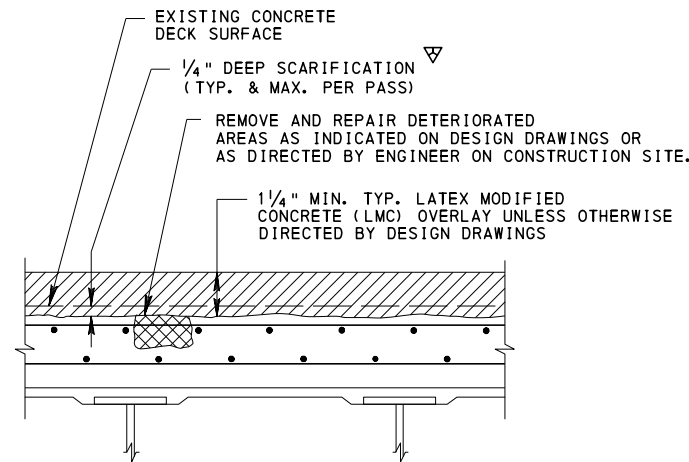
DECK REPAIR TYPE 3

GENERAL NOTES

- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
- PROVIDE REINFORCEMENT BARS CONFORMING TO THE REQUIREMENTS OF ASTM A 615, A 616 OR A 706.
- PROVIDE LAP SPLICE LENGTHS AND EMBEDMENT LENGTHS IN ACCORDANCE WITH BC-736M.
- CLEAN ALL EXISTING REINFORCEMENT BARS TO BE RETAINED WITH A WIRE BRUSH OR SAND BLAST, STRAIGHTEN AND COAT WITH AN APPROVED EPOXY PAINT FOR EPOXY COATED EXISTING REINFORCEMENT STEEL OR NEAT CEMENT FOR (NON EPOXY COATED) EXISTING REINFORCEMENT STEEL.
- PROVIDE EPOXY COATED REBARS AS REQUIRED. REMOVE AND REPLACE IN KIND (EXCEPT ALWAYS USE EPOXY COATED) ALL PORTIONS OF DAMAGED OR HEAVILY CORRODED REINFORCEMENT BARS BY SATISFACTORILY SPLICING TO THE REMAINING REINFORCEMENT BARS.
- APPLY AN EPOXY BONDING COMPOUND CONFORMING TO THE REQUIREMENTS OF SECTION 1040.3(e)1 OF PUB. 408.
- CONSTRUCTION, EQUIPMENT, SURFACE PREPARATION AND PATCHING MATERIAL FOR CONCRETE BRIDGE DECK REPAIR MUST CONFORM TO SECTION 1040 OF PUB. 408.
- CONSTRUCTION, EQUIPMENT, SURFACE PREPARATION, PLACING AND FINISHING FOR LATEX MODIFIED CONCRETE OVERLAY MUST CONFORM TO SECTION 1042 OF PUB. 408.
- TYPE OF REPAIRS DEPICTED ON THIS STANDARD ASSUME THAT THE STRUCTURAL INTEGRITY OF THE DECK IS NOT COMPROMISED BY THE REPAIRS.
- IF BRIDGE BEAMS ARE DAMAGED DURING DECK REPAIR, BEAMS MUST BE REPAIRED OR REPLACED AT NO EXPENSE TO THE DEPARTMENT.

LEGEND

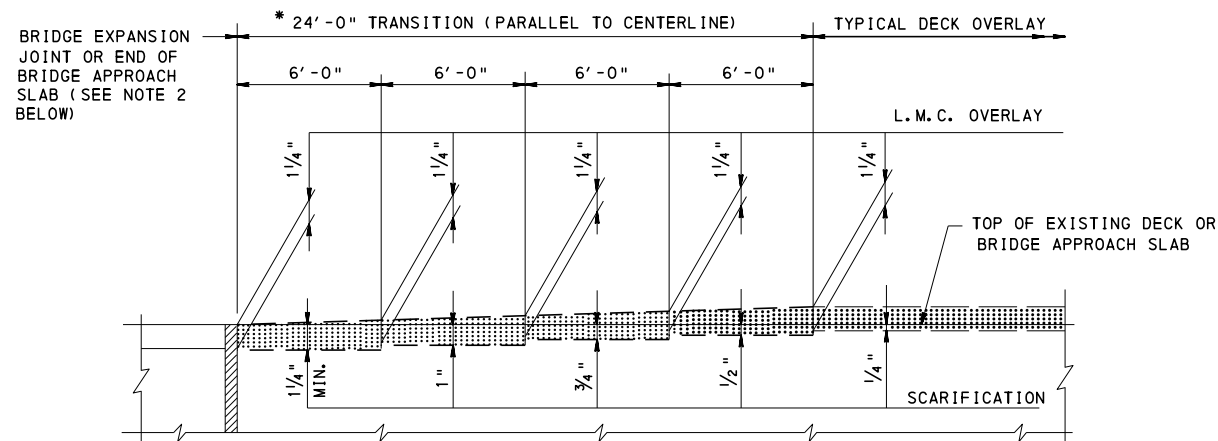
- T = THICKNESS OF CONCRETE DECK SLAB.
- [Cross-hatched symbol] - REMOVE DETERIORATED CONCRETE.



DETAILS FOR LATEX MODIFIED CONCRETE OVERLAY

(TRANSVERSE SECTION)

▽ IF DEEPER SCARIFICATION IS NEEDED, SCARIFY IN MULTIPLE PASSES.



VERTICAL TRANSITION DETAIL FOR 1 1/4" LATEX MODIFIED CONCRETE BRIDGE DECK OVERLAY

(LONGITUDINAL SECTION)
(ADJUST SCARIFICATION FOR OVERLAY THICKNESS OTHER THAN 1 1/4")

* TRANSITION LENGTH MORE THAN 24'-0" REQUIRES DISTRICT BRIDGE ENGINEER'S APPROVAL.

NOTE:

- PROVIDE THE TRANSITION ENTIRELY ON THE BRIDGE APPROACH SLAB, IF PRESENT.
- IF A FLEXIBLE APPROACH PAVEMENT (BITUMINOUS) EXISTS, PROVIDE ADDITIONAL BITUMINOUS WEARING SURFACE FOR A SMOOTH TRANSITION TO THE BRIDGE AND MAINTAIN CONSTANT DEPTH ON THE LATEX OVERLAY.

DECK REPAIRS AND LATEX MODIFIED CONCRETE OVERLAY

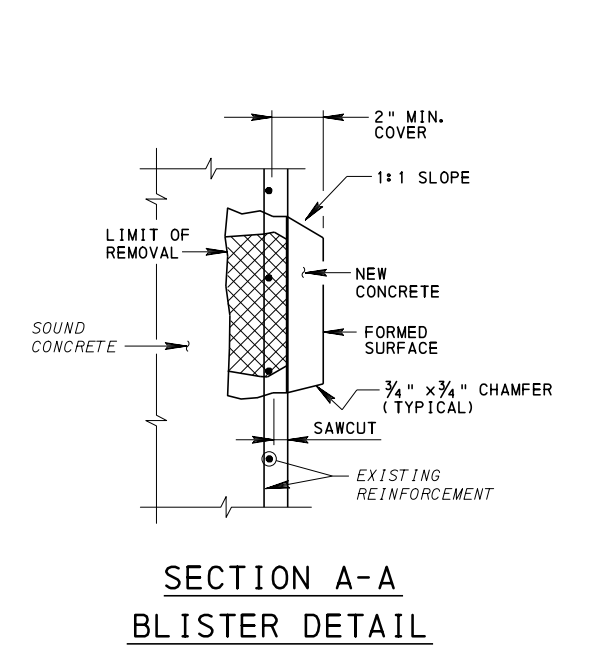
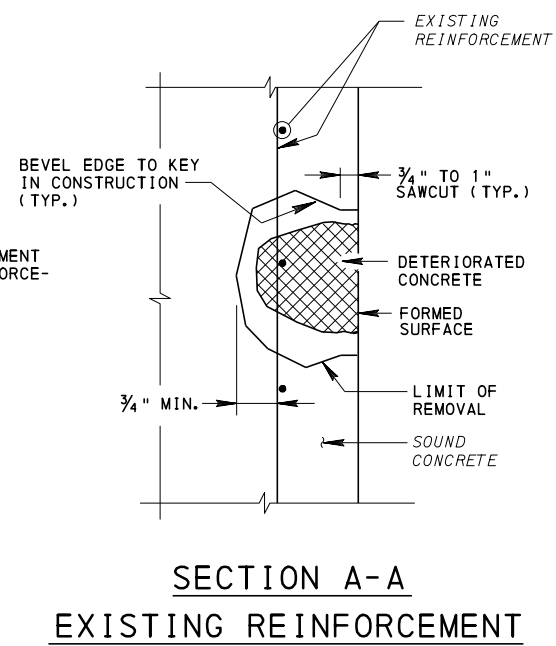
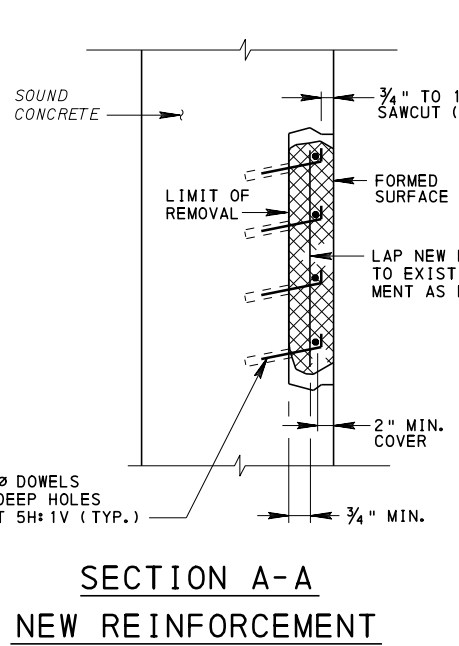
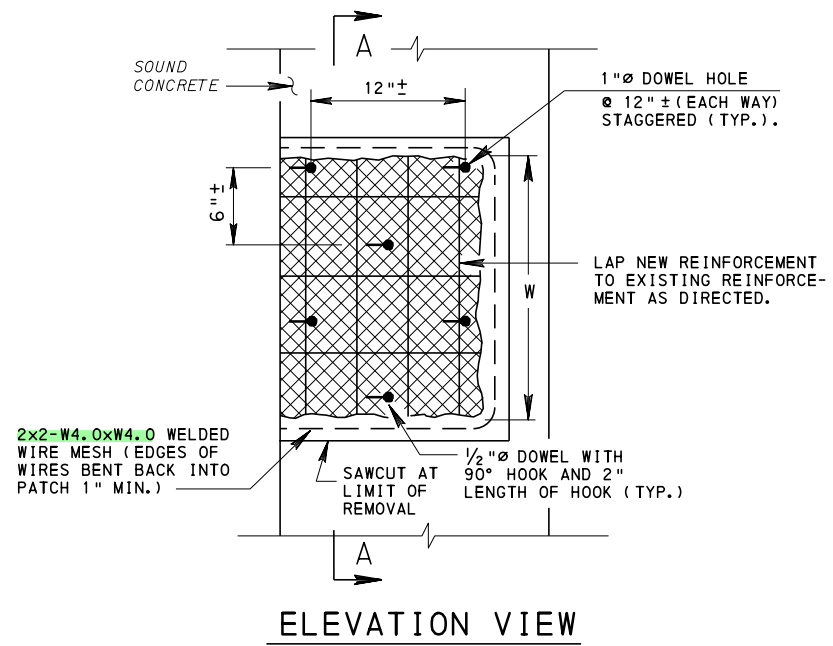
FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
REINFORCED CONCRETE REPAIR
BRIDGE DECKS**

BC-736M	REINFORCEMENT BAR FABRICATION DETAILS	RECOMMENDED JAN. 31, 2019 <i>T. Romeo R. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>William J. Bates</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 1 OF 4 BC-783M
---------	---------------------------------------	--	--	--------------------------------

CHANGE 2



NOTE: CONCRETE REPAIR TYPE 2 DETAIL FOR AREAS WITH EXISTING REINFORCEMENT HAVING LESS THAN 2" OF COVER.

CONCRETE REPAIR TYPE 2

NOTE: REPAIR TYPE 2 IS USED WHEN DEPTH OF DETERIORATED CONCRETE IS GREATER THAN 3/4" AND EXISTING REINFORCEMENT SPACED ≤ 12" ON CENTERS.

REINFORCED CONCRETE REPAIR TYPE 1 NOTES:

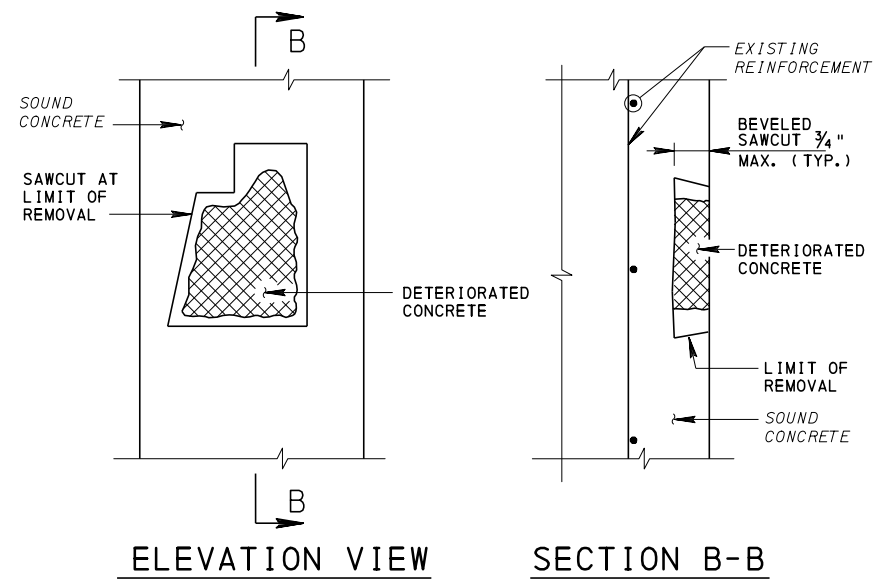
1. SQUARE OFF DETERIORATED CONCRETE TO SOUND CONCRETE WITH A SAWCUT OF 3/4" MAXIMUM.
2. REMOVE ALL LOOSE AND DELAMINATED CONCRETE TO PROVIDE A SOUND BOND BETWEEN EXISTING CONCRETE AND PATCHING MATERIAL.
3. APPLY A RAPID HARDENING CONCRETE PATCHING MATERIAL FROM A MANUFACTURER LISTED IN BULLETIN 15 UNDER MISCELLANEOUS POLYMER MODIFIED AND SPECIAL CEMENTS, MORTARS AND CONCRETES, IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
4. CONCRETE REPAIRS INDICATED ARE PAYABLE UNDER 1040.3(f)2.

REINFORCED CONCRETE REPAIR TYPE 2 NOTES:

1. SQUARE OFF DETERIORATED CONCRETE TO SOUND CONCRETE WITH A SAWCUT OF 3/4" MINIMUM TO 1" MAXIMUM BUT NOT TO THE DEPTH OF THE REINFORCEMENT STEEL. BACK BEVEL EDGE BEYOND SAWCUT.
2. USE HAND TOOLS TO REMOVE ALL LOOSE AND DELAMINATED CONCRETE THAT PROVIDES A SOUND BOND BETWEEN EXISTING CONCRETE AND NEW CONCRETE. PNEUMATIC HAMMERS WITH IMPACT RATINGS OF 30 FT/LB OR LESS MAY BE USED IF REQUIRED.
3. IF DETERIORATED CONCRETE EXTENDS BEYOND THE PRIMARY REINFORCEMENT, REMOVE THE CONCRETE TO AT LEAST 3/4" BEHIND THE REINFORCEMENT.
4. APPLY AN EPOXY BONDING COMPOUND BETWEEN THE EXISTING AND THE NEW CLASS AA CEMENT CONCRETE.
5. W REPRESENTS LEAST DIMENSION OF DETERIORATED CONCRETE.
6. USE DOWELS ONLY WHEN W DIMENSION OF DETERIORATED CONCRETE IS GREATER THAN 2'-0" AND NEW OR EXISTING REINFORCEMENT CANNOT ADEQUATELY BE DEVELOPED BY LAPPING WITH EXISTING REINFORCEMENT.
7. USE A PACHOMETER TO LOCATE EXISTING REINFORCEMENT WHEN DRILLING DOWEL HOLES TO AVOID DRILLING THRU EXISTING BARS.
8. AN APPROVED EPOXY ANCHORING SYSTEM IN 90° HOLES MAY REPLACE GROUT IN SLOPED HOLES. USE A 6" MINIMUM EMBEDMENT AND IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.
9. A #4 DEFORMED REINFORCEMENT BENT "L" BAR MAY REPLACE THE 1/2" Ø DOWEL HOOK.
10. ALTERNATE WIRE MESH MAY BE SUBSTITUTED FOR 2x2-W4.0xW4.0, PROVIDED WIRE SPACING DOES NOT EXCEED 4" AND AN EQUIVALENT STEEL AREA IS PROVIDED. NEW REINFORCEMENT BARS MAY BE OMITTED IF WIRE MESH STEEL AREA EXCEEDS EXISTING REINFORCEMENT.
11. CLEAN EXISTING REINFORCEMENT BY MECHANICAL MEANS.
12. LAP EQUIVALENT NEW REINFORCEMENT TO THE EXISTING REINFORCEMENT AS DIRECTED.
13. REINFORCEMENT BARS TO BE EPOXY COATED.
14. CONCRETE REPAIRS INDICATED ARE PAYABLE UNDER 1040.3(f)2.

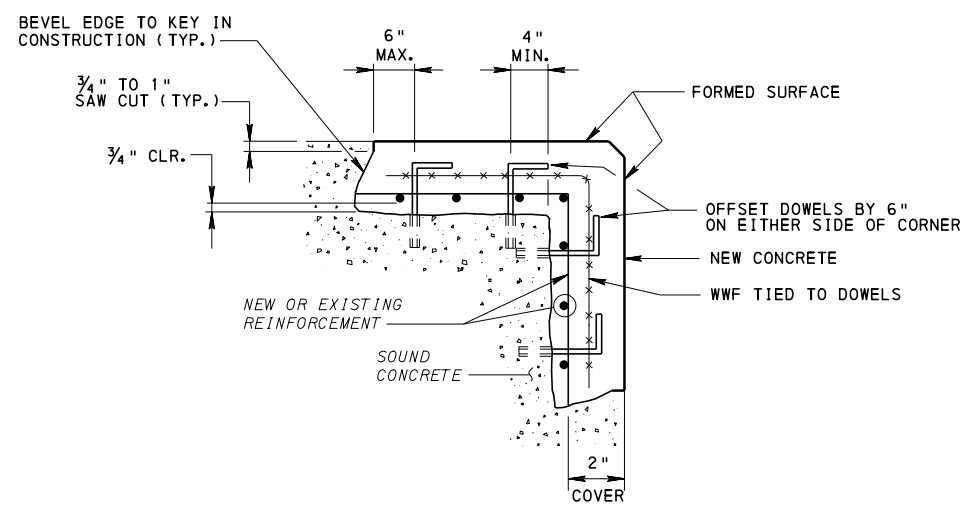
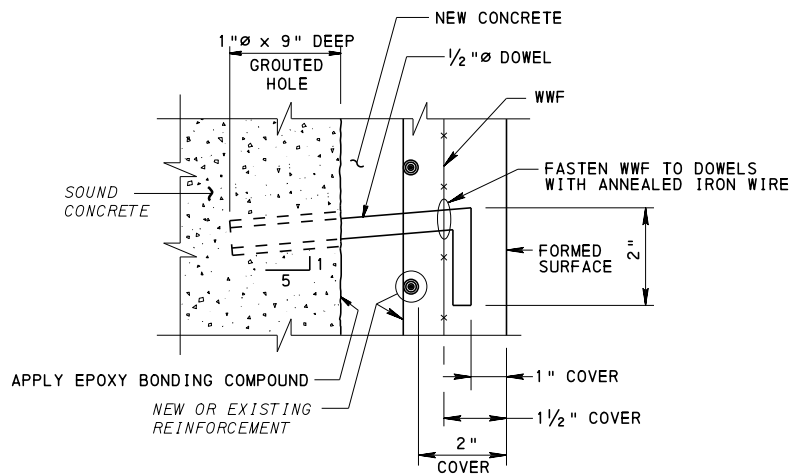
LEGEND

- REMOVE DETERIORATED CONCRETE.



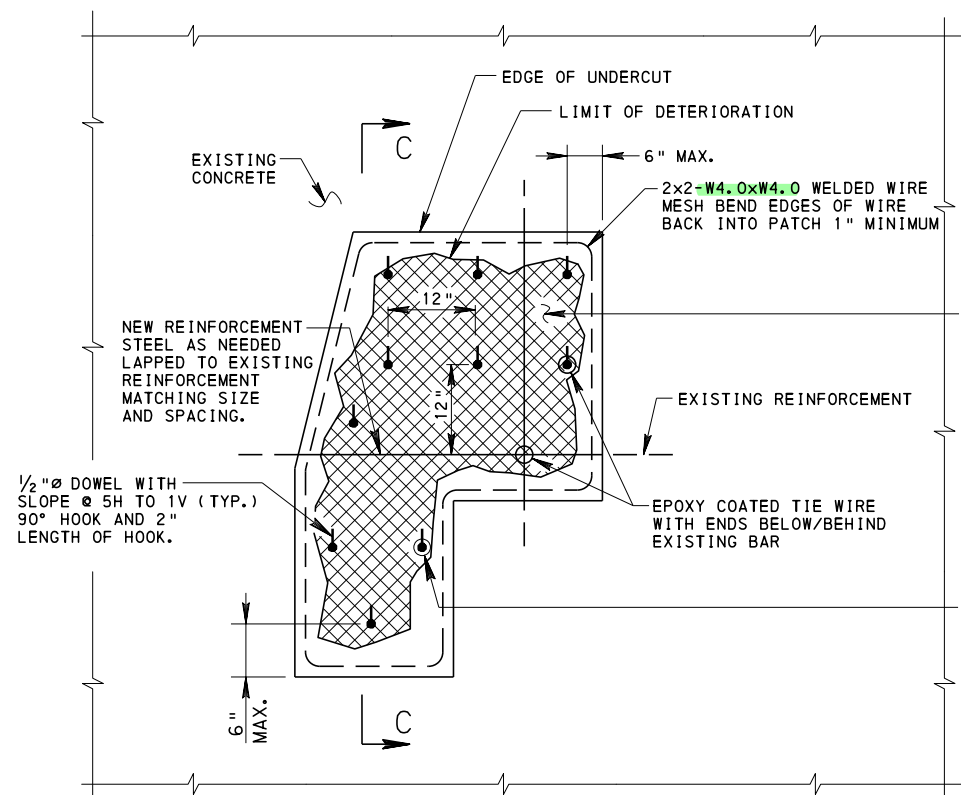
CONCRETE REPAIR TYPE 1

NOTE: REPAIR TYPE 1 IS USED WHEN DEPTH OF DETERIORATED CONCRETE IS LESS THAN OR EQUAL TO 3/4".

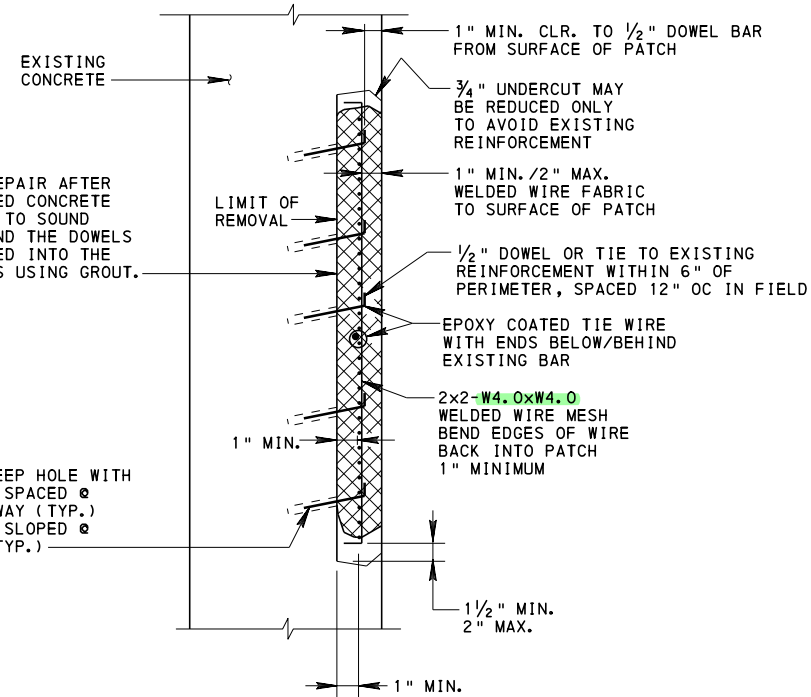


**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

**STANDARD
REINFORCED CONCRETE REPAIR**



ELEVATION VIEW



SECTION C-C

NOTE: PROVIDE EPOXY COATED WIRE TIE TO CONNECT EXISTING REINFORCEMENT AND 2x2-W4.0xW4.0 WELDED WIRE MESH ALONG THE PERIMETER OF THE REMOVAL AREA AT A MAXIMUM SPACING OF 6" FROM THE EDGE OF THE REMOVAL. PROVIDE TIES AT 12" SPACING IN BOTH HORIZONTAL AND VERTICAL DIRECTIONS ALONG THE PERIMETER AND WITHIN THE AREA OF REMOVAL. IF EXISTING REINFORCEMENT IS SPACED AT GREATER THAN 12" SPACING OR NOT LOCATED TO PROVIDE TIE LOCATIONS AS LISTED ABOVE, PROVIDE 1/2" GROUDED DOWELS AS SHOWN ON THE DRAWING TO PROVIDE TIE LOCATIONS AT THE SAME SPACINGS.

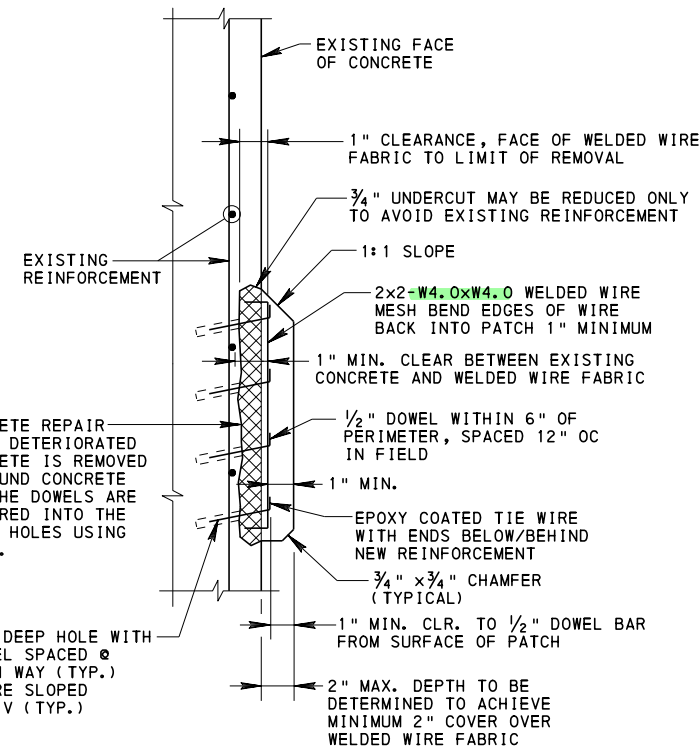
USE ONLY AN APPROVED POLYMER MODIFIED AND SPECIAL CEMENTS, MORTARS AND CONCRETES AS LISTED IN BULLETIN 15.

CONCRETE REPAIR TYPE 2A

NOTE: REPAIR TYPE 2A IS USED WHEN DEPTH OF DETERIORATION IS GREATER THAN 3/4" AND EXISTING REINFORCEMENT IS SPACED GREATER THAN 12" ON CENTERS.

REINFORCED CONCRETE REPAIR TYPE 2A NOTES:

1. SQUARE OFF DETERIORATED CONCRETE TO SOUND CONCRETE WITH A SAWCUT OF 3/4" MINIMUM BUT NOT TO THE DEPTH OF THE REINFORCEMENT STEEL.
2. REMOVE ALL LOOSE AND DELAMINATED CONCRETE TO PROVIDE A SOUND BOND BETWEEN EXISTING CONCRETE AND NEW CONCRETE.
3. IF DETERIORATED CONCRETE EXTENDS BEYOND THE PRIMARY REINFORCEMENT, REMOVE THE CONCRETE TO AT LEAST 1" BEHIND THE REINFORCEMENT.
4. APPLY AN EPOXY BONDING COMPOUND BETWEEN THE EXISTING AND THE NEW CONCRETE.
5. WIRE MESH MAY BE SUBSTITUTED FOR NEW REINFORCEMENT IF INDICATED ON DESIGN DRAWINGS.
6. CLEAN EXISTING REINFORCEMENT BY MECHANICAL MEANS.
7. NEW REINFORCEMENT TO BE EPOXY COATED.
8. CONCRETE REPAIR TYPE 2A ARE PAYABLE AS CONCRETE REPAIRS TYPE 2.



**SECTION C-C
BLISTER DETAIL**

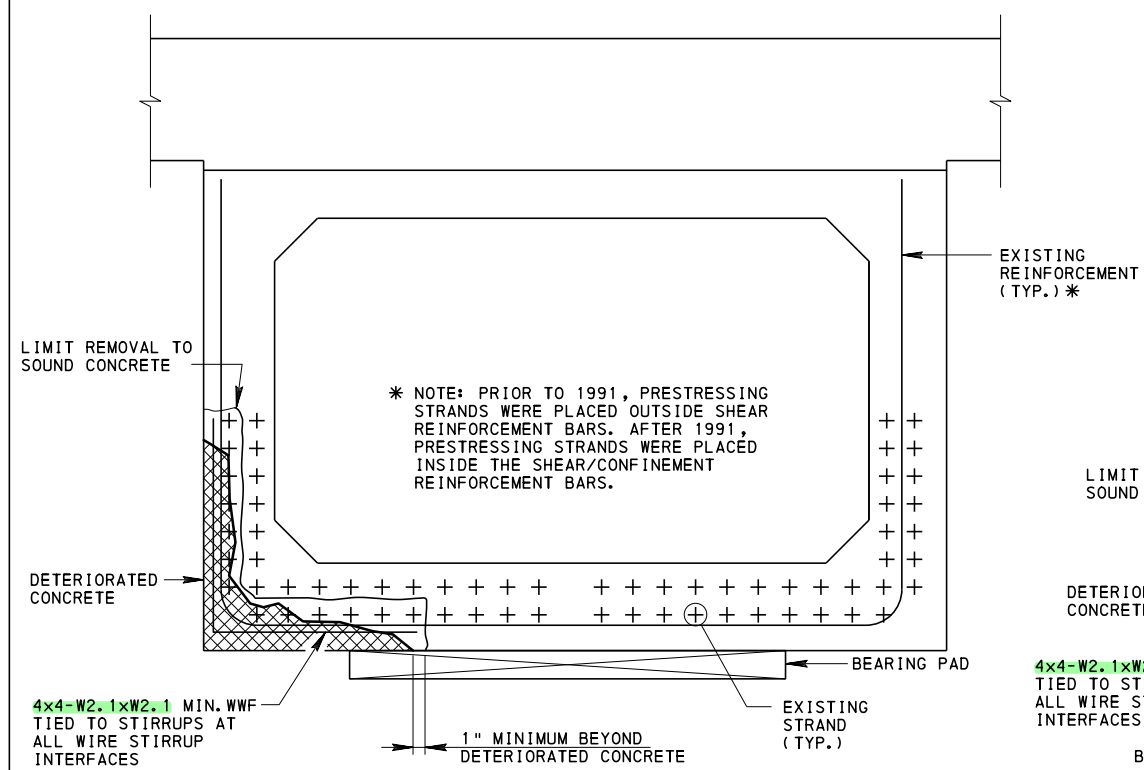
NOTE: SHALLOW REMOVAL CONDITION IF PATCH CANNOT ENGAGE EXISTING REINFORCEMENT.

LEGEND

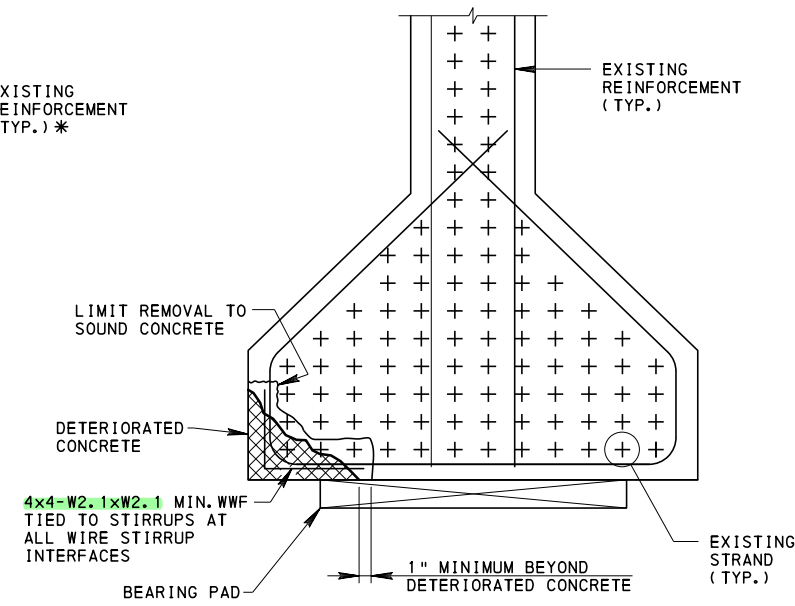
- REMOVE DETERIORATED CONCRETE.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

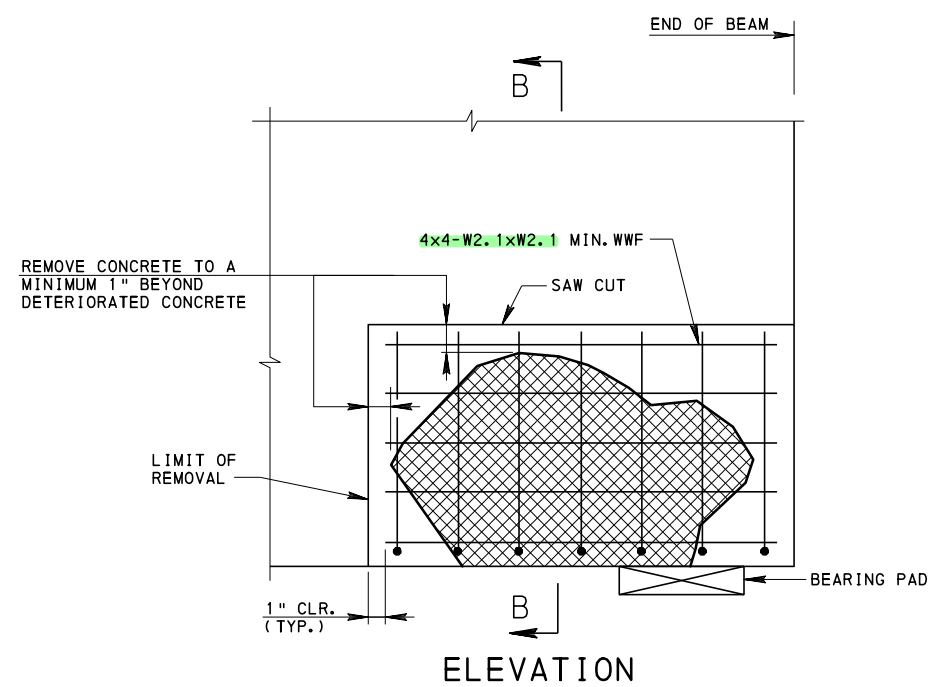
**STANDARD
REINFORCED CONCRETE REPAIR**



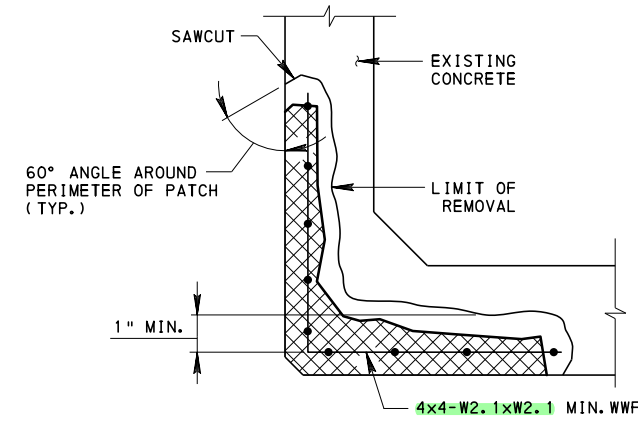
**CONCRETE REPAIR - PRESTRESSED
CONCRETE SPREAD BOX BEAM
(ADJACENT BOX BEAM SIMILAR)**



**CONCRETE REPAIR - PRESTRESSED
CONCRETE I-BEAM**



ELEVATION



SECTION B-B

**CONCRETE REPAIR - PRESTRESSED
CONCRETE BOX BEAM
(PRESTRESSED CONCRETE I BEAM SIMILAR)**

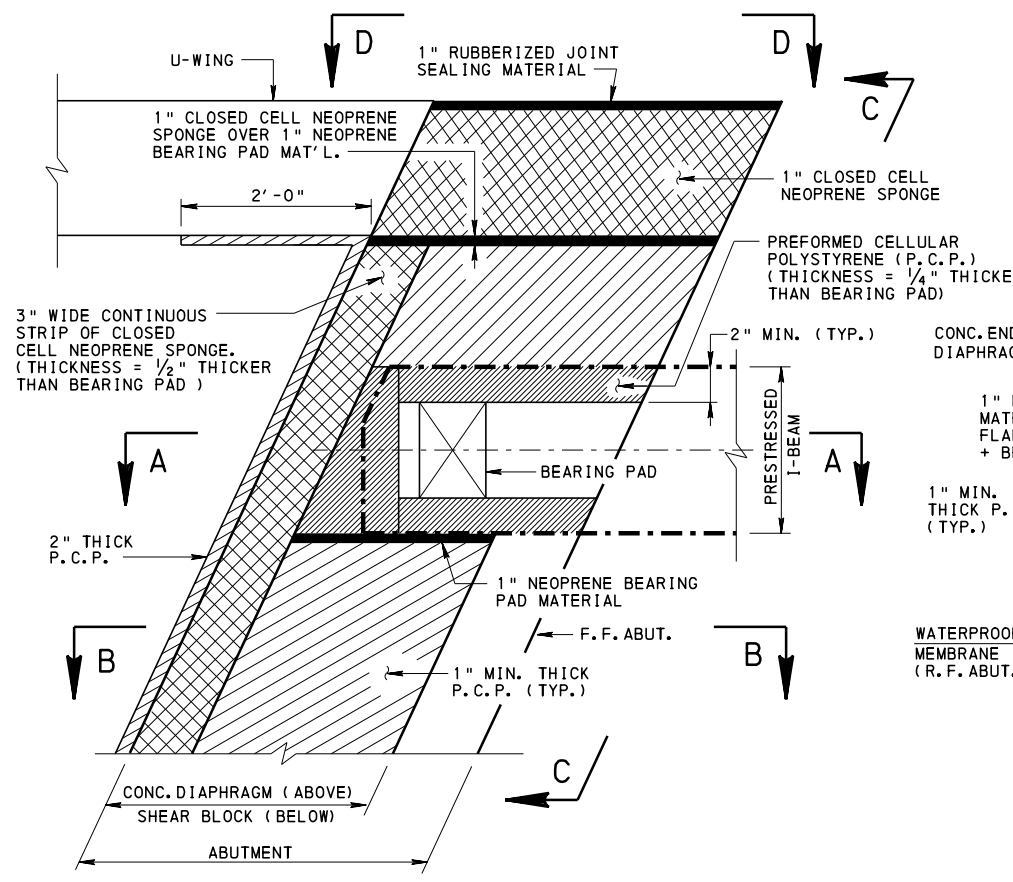
**REINFORCED CONCRETE REPAIR
PRESTRESSED CONCRETE BEAM NOTES:**

1. REMOVE ALL LOOSE AND DELAMINATED CONCRETE TO PROVIDE A SOUND BOND BETWEEN EXISTING CONCRETE AND REPAIR MATERIAL. LIMIT REMOVAL TO A MINIMUM OF 1" BEYOND THE VISIBLE DETERIORATED AREA TO EXPOSE SOUND CONCRETE.
2. REMOVE DETERIORATED CONCRETE ADJACENT TO AND AROUND THE PRESTRESSING STRANDS AS REQUIRED TO EXPOSE SOUND CONCRETE. DO NOT DAMAGE PRESTRESSING STRANDS DURING CONCRETE REMOVAL. USE SURFACE PREPARATION EQUIPMENT IN ACCORDANCE WITH SECTION 1040.3(c) OF PUBLICATION 408, HOWEVER, THE WEIGHT OF PNEUMATIC HAMMERS MUST NOT EXCEED A NOMINAL 15-POUND CLASS.
3. SQUARE OFF DETERIORATED CONCRETE TO SOUND CONCRETE WITH A SAW CUT OR GRINDER. DEPTH OF CUT TO BE A MINIMUM OF 1/4", BUT NOT TO EXCEED 5/8" OR THE DEPTH OF THE REINFORCEMENT, WHICHEVER IS SMALLER.
4. CLEAN ALL EXISTING REINFORCEMENT BARS TO BE RETAINED AND PRESTRESSING STRANDS BY MECHANICAL MEANS TO NEAR WHITE APPEARANCE. COAT EXISTING REINFORCEMENT BARS AND STRANDS WITH APPROVED BONDING COMPOUND IF NO CORROSION WAS PRESENT PRIOR TO CLEANING. COAT EXISTING REINFORCEMENT BARS AND STRANDS WITH APPROVED GALVANIZED SPRAY CONTAINING A MINIMUM OF 92% ZINC WHEN CORROSION WAS PRESENT PRIOR TO CLEANING.
5. PROVIDE A SOUND CONCRETE SURFACE WITH EXPOSED AGGREGATE WITH A MINIMUM SURFACE PROFILE OF 1/8" OR AS REQUIRED BY REPAIR MATERIAL MANUFACTURER'S RECOMMENDATIONS.
6. DRILL AND INSERT 3/8" DIAMETER GALVANIZED STEEL EXPANSION ANCHOR PINS ON 4" CENTERS FOR REPAIR AREAS WITH DEPTHS GREATER THAN 3 INCHES WHEN REINFORCEMENT BARS ARE NOT PREVALENT (SPACING GREATER THAN 8"). LOCATE EXPANSION ANCHOR PINS AT MIDPOINT OF CLEAR SPACING BETWEEN PRESTRESSING STRANDS.
7. APPLY MECHANICAL ANCHORAGE USING GALVANIZED 4x4-W2.1xW2.1 MIN. WELDED WIRE FABRIC TIED TO EXISTING REINFORCEMENT WHEN DETERIORATED CONCRETE IS GREATER THAN 1'-0" IN ANY DIRECTION. PROVIDE 1" CLEAR DISTANCE TO LIMIT OF REMOVAL.
8. AREA TO BE REPAIRED MUST BE CLEAN, SOUND AND FREE OF CONTAMINANTS PRIOR TO APPLICATION OF BONDING AGENT AND REPAIR MATERIAL.
9. REPAIR CRACKS IN EXISTING CONCRETE AFTER REMOVING DETERIORATED CONCRETE AND PRIOR TO CONSTRUCTING CONCRETE REPAIR. USE EPOXY INJECTION CRACK REPAIR IN ACCORDANCE WITH PUBLICATION 408, SECTION 1091.
10. APPLY AN APPROVED BONDING AGENT, AS LISTED IN BULLETIN 15 THAT IS COMPATIBLE WITH THE APPROVED REPAIR MATERIAL, UNLESS THE MANUFACTURER'S INSTRUCTIONS EXPRESSLY STATE THAT A BONDING AGENT IS NOT REQUIRED.
11. APPLY A RAPID HARDENING CONCRETE PATCHING MATERIAL FROM A MANUFACTURER LISTED IN BULLETIN 15 UNDER MISCELLANEOUS POLYMER MODIFIED AND SPECIAL CEMENTS, MORTARS AND CONCRETES, IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
12. APPLY REPAIR MATERIAL THAT HAS A COMPRESSIVE STRENGTH EQUAL TO OR GREATER THAN THAT OF THE ORIGINAL CONCRETE (IF KNOWN), BUT NOT LESS THAN 4,500 PSI AND 5,500 PSI AT 7 AND 28 DAYS, RESPECTIVELY.
13. CURE REPAIR MATERIAL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS FOR A MINIMUM OF 24 HOURS. IMPLEMENT ADDITIONAL CURING PROTECTIONS IN ACCORDANCE WITH PUBLICATION 408, SECTION 1001.3(P)4 AND SECTION 1001.3(P)5, AS REQUIRED.
14. PROVIDE REPAIR MATERIAL WITH MINIMUM 200 PSI BOND STRENGTH TO THE EXISTING CONCRETE AS TESTED IN ACCORDANCE WITH ASTM D4541 PULL-OFF TEST.
15. A CONCRETE BLISTER MAY BE USED FOR AREAS WITH EXISTING REINFORCEMENT HAVING INADEQUATE COVER OR FOR ACCESS FOR CONCRETE PLACEMENT IN FORMS. REFER TO BLISTER DETAIL, SHEET 2. DO NOT REDUCE VERTICAL UNDERCLEARANCE WITHOUT DISTRICT BRIDGE ENGINEER APPROVAL.
16. FOR ADJACENT BOX BEAMS, INSERT 1/2" JOINT MATERIAL BETWEEN BEAMS AND PUMP CONCRETE INTO FORM THROUGH PORT AT BOTTOM FLANGE FORM. PROVIDE 1" VENTS AT TOP OF REPAIR AREA.
17. APPLY AN APPROVED PENETRATING SEALER AFTER REPAIR MATERIAL HAS CURED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
18. APPLY CONCRETE REPAIR TYPE 2 TO CONCRETE DIAPHRAGMS AS NEEDED, SEE SHEET 2 FOR REPAIR.
19. FOR GENERAL NOTES, SEE SHEET 1.

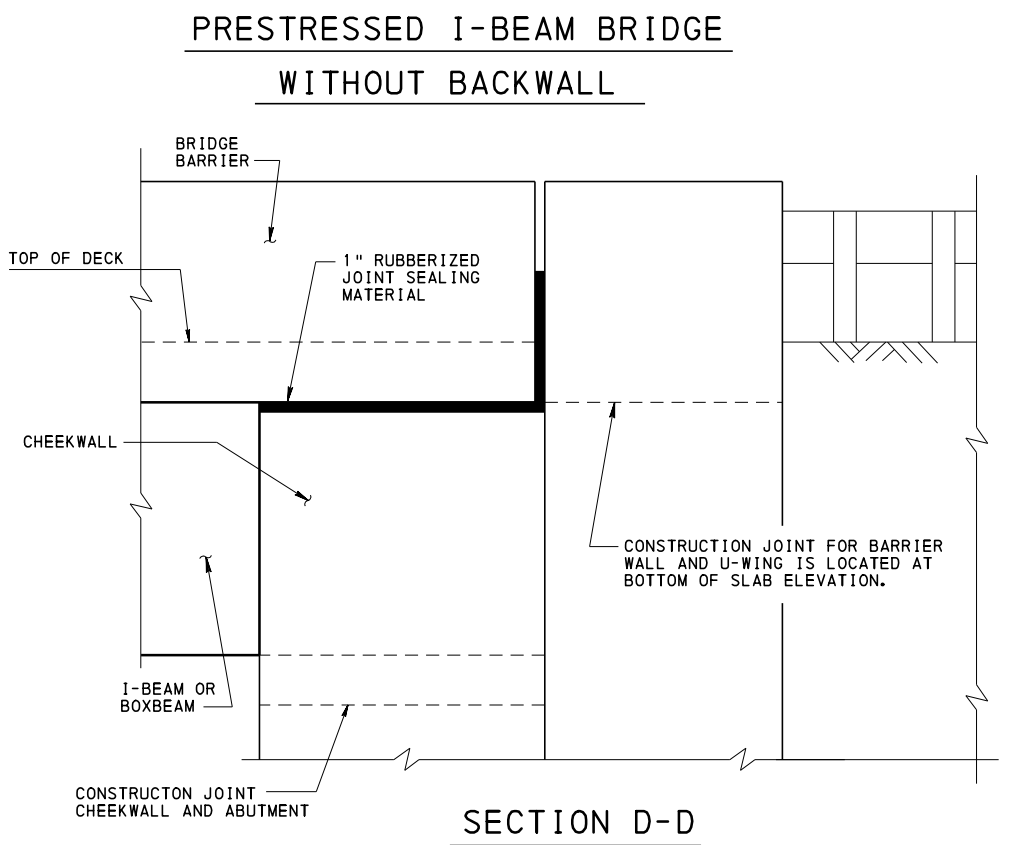
LEGEND

- REMOVE DETERIORATED CONCRETE.

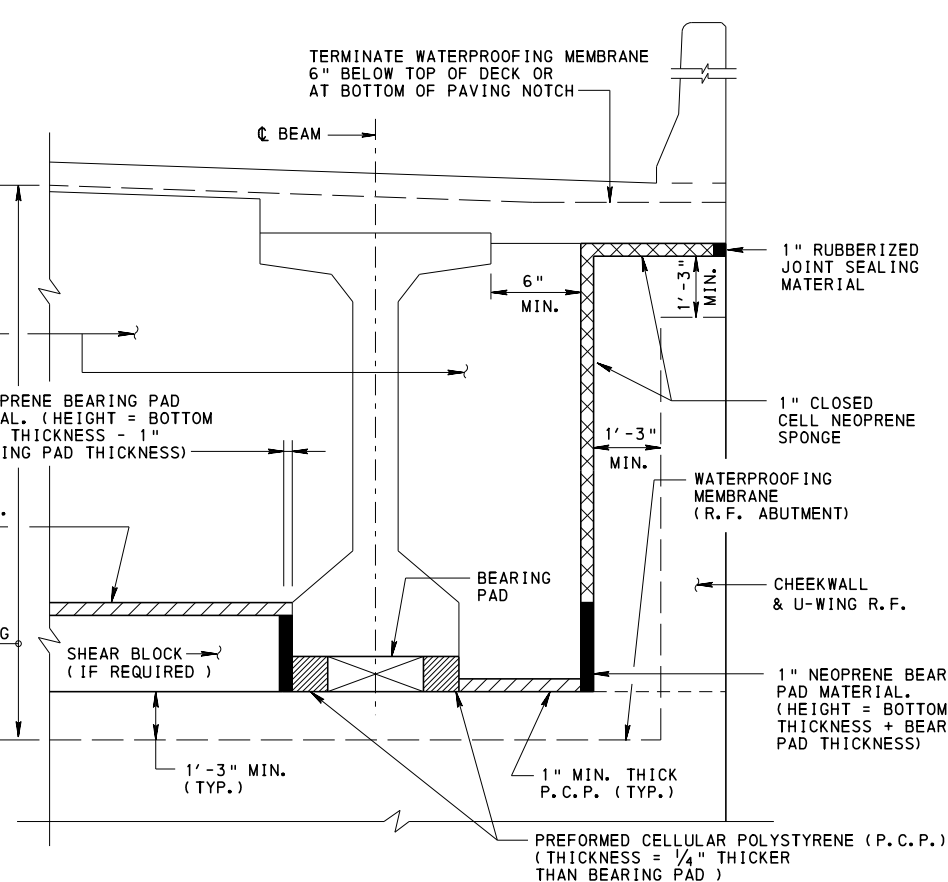
COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY		
STANDARD REINFORCED CONCRETE REPAIR PRESTRESSED CONCRETE BEAM		
RECOMMENDED JAN. 31, 2019 <i>T. Rocco R. Maciora</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>William J. ...</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 4 OF 4 BC-783M



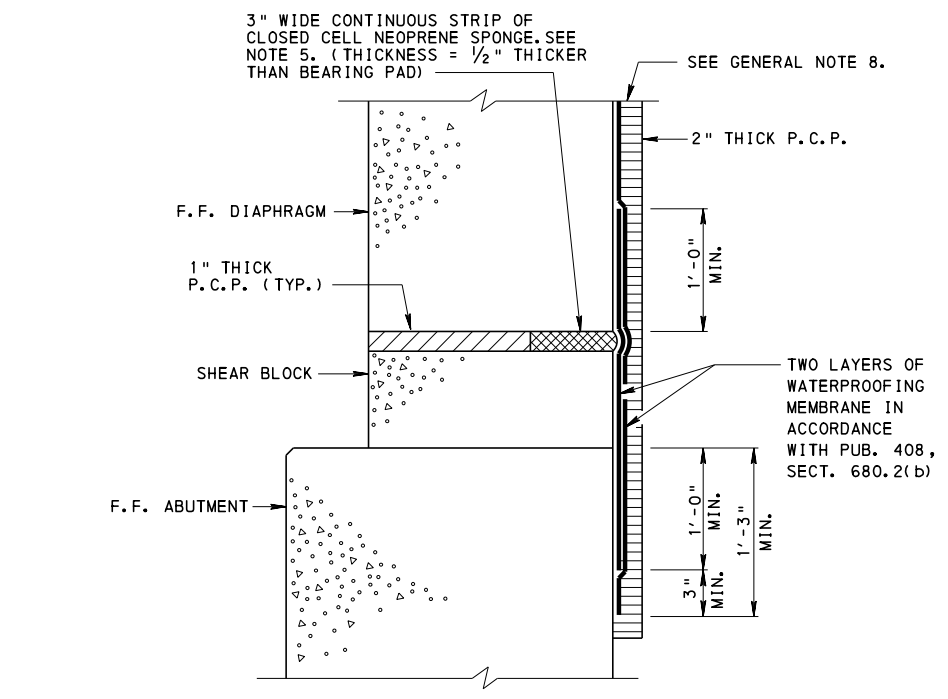
U-WING ABUTMENT PLAN - FULL DEPTH END DIAPHRAGM



SECTION D-D
TYPICAL FOR STEEL AND PRESTRESSED BRIDGES
(EXCEPT FOR CHANNEL BEAM BRIDGES)

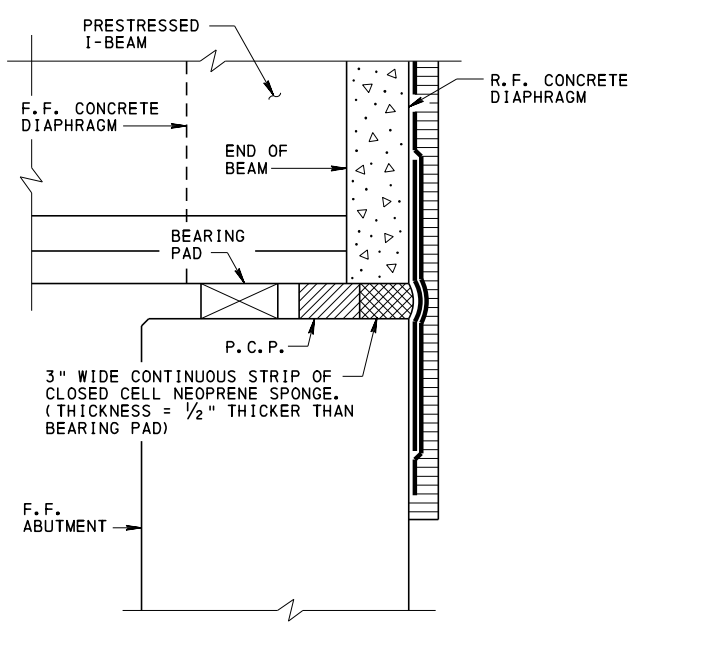


SECTION C-C



SECTION B-B

- NOTES:**
- PLANS AND DETAILS ARE APPLICABLE FOR COMPOSITE BRIDGE DECKS.
 - DOWEL, SHEAR BLOCK AND BACKWALL REQUIREMENTS ARE LISTED IN DESIGN STANDARDS.
 - PREFORMED CELLULAR POLYSTYRENE (P.C.P.) MUST MEET ASTM C578, TYPE 1, MATERIAL REQUIREMENTS EXCEPT THE MAXIMUM ALLOWABLE WATER ABSORPTION TO BE 2%. SUPPLIERS ARE LISTED IN BULLETIN 15 UNDER SECTION 1107.02 (m) BOX BEAM VOID FORM.
 - SHIP AND INSTALL THE 3" WIDE CLOSED CELL NEOPRENE SPONGE IN ONE CONTINUOUS PIECE. SPLICE AS REQUIRED IN THE FABRICATION SHOP ONLY USING AN APPROVED SPONGE ADHESIVE CONTAINING 26% (+/-2%) NEOPRENE SOLIDS OR EQUAL. USE MANUFACTURER'S RECOMMENDATIONS FOR FIELD SPLICE IF REQUIRED.
 - CUT CLOSED CELL NEOPRENE SPONGE WITH CONVEX CURVE.
 - WATERPROOFING IDENTICAL TO PARTIAL PLAN FOR SPREAD BOX BEAMS (WITHOUT DOWELS).
 - R.F. DENOTES REAR FACE. F.F. DENOTES FRONT FACE.
 - EXTEND 2" THICK TYPE 1 P.C.P. TO BOTTOM OF THE PAVING NOTCH OR TO TOP OF SUBBASE FOR CONCRETE PAVEMENT AND 1" BELOW TOP OF SUBBASE FOR ASPHALT PAVEMENTS.
 - PROVIDE WATERPROOFING MEMBRANE IN ACCORDANCE WITH SECTION 680.2(b) ADHESIVE BACKED PREFORMED MEMBRANE.
 - PROVIDE NEOPRENE BEARING PAD MATERIAL WITH A DUROMETER OF 50 (+/-5).
 - PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.



SECTION A-A

NOTE:
FOR ADDITIONAL INFORMATION REFER
TO DETAILS ON SHEET 12.

LEGEND:
P.C.P. = PREFORMED CELLULAR POLYSTYRENE
(SEE NOTE 3)

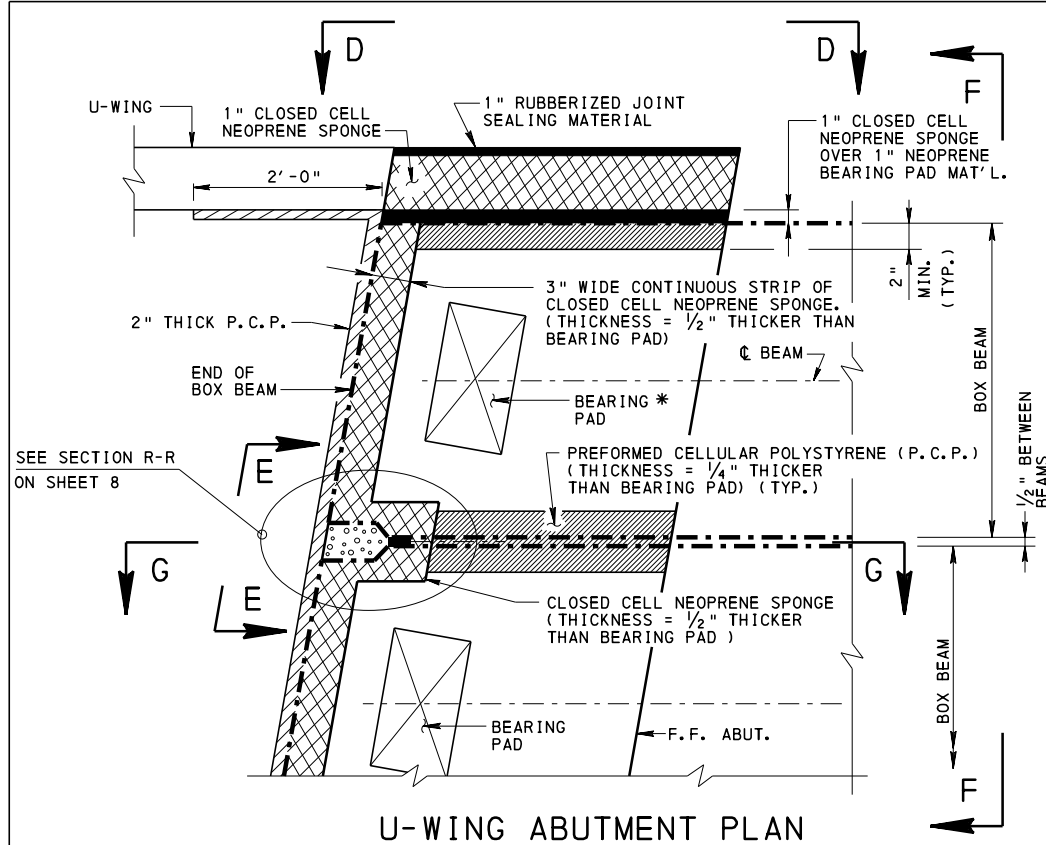
BC-735M	WALL CONSTR. & EXP. JOINT DETAILS
BC-775M	MISCELLANEOUS PRESTRESS DETAILS
REFERENCE DRAWINGS	

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

**STANDARD
TYPICAL WATERPROOFING AND
EXPANSION DETAILS - ABUTMENT
PRESTRESSED I-BEAM
BRIDGES**

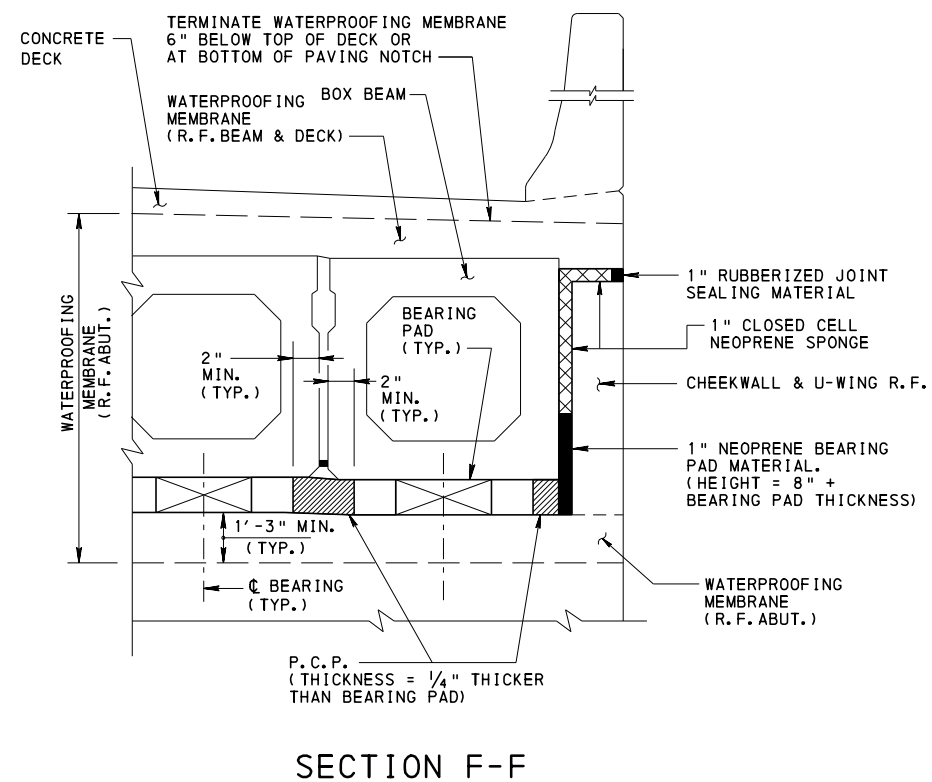
RECOMMENDED NOV. 23, 2022 <i>L. W. Gray</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Grain E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 1 OF 12 BC-788M
---	---	---------------------------------

- CHANGE 2
- CHANGE 4

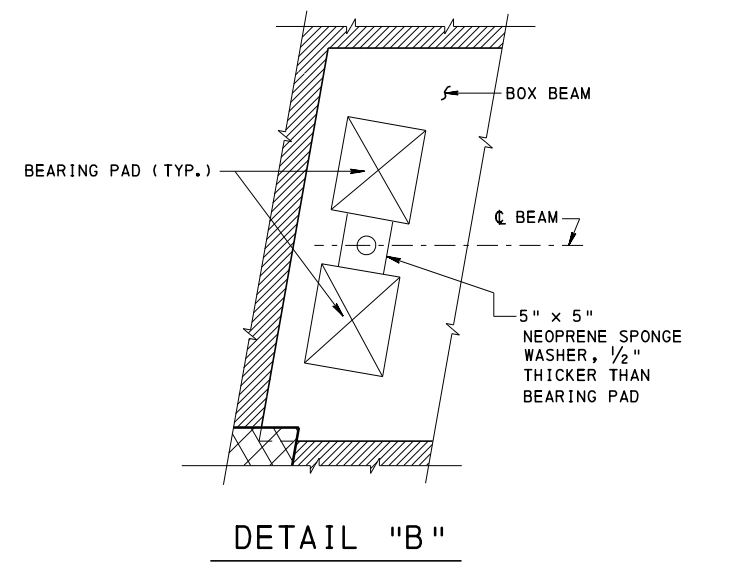


**U-WING ABUTMENT PLAN
PRESTRESSED ADJACENT BOX BEAMS**

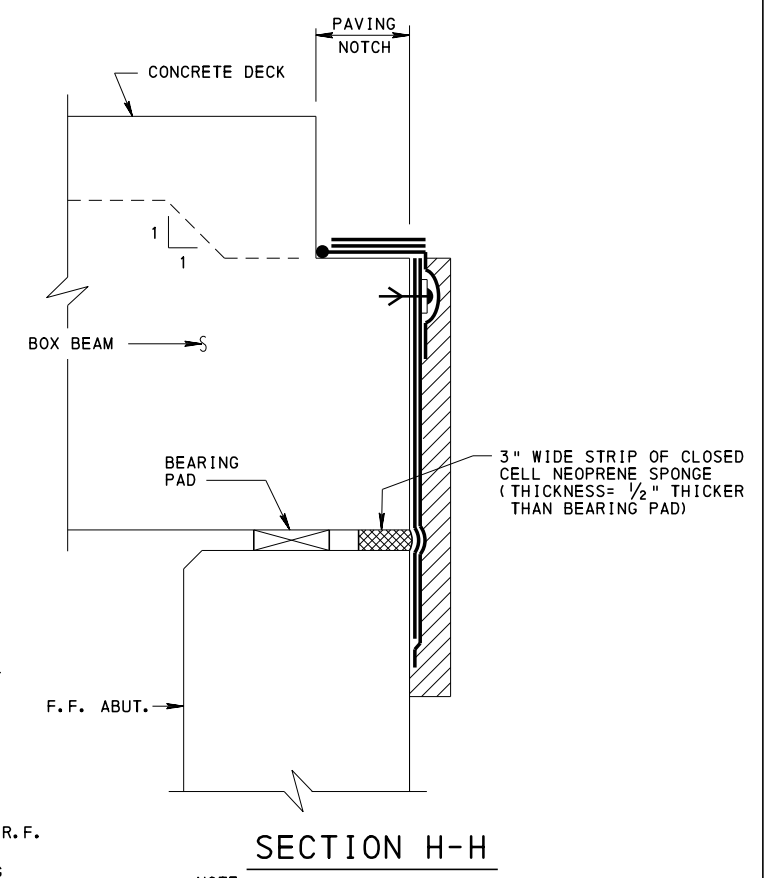
* EXPANSION CONDITION SHOWN, FOR FIXED CONDITION SEE DETAIL "B" THIS SHEET



SECTION F-F

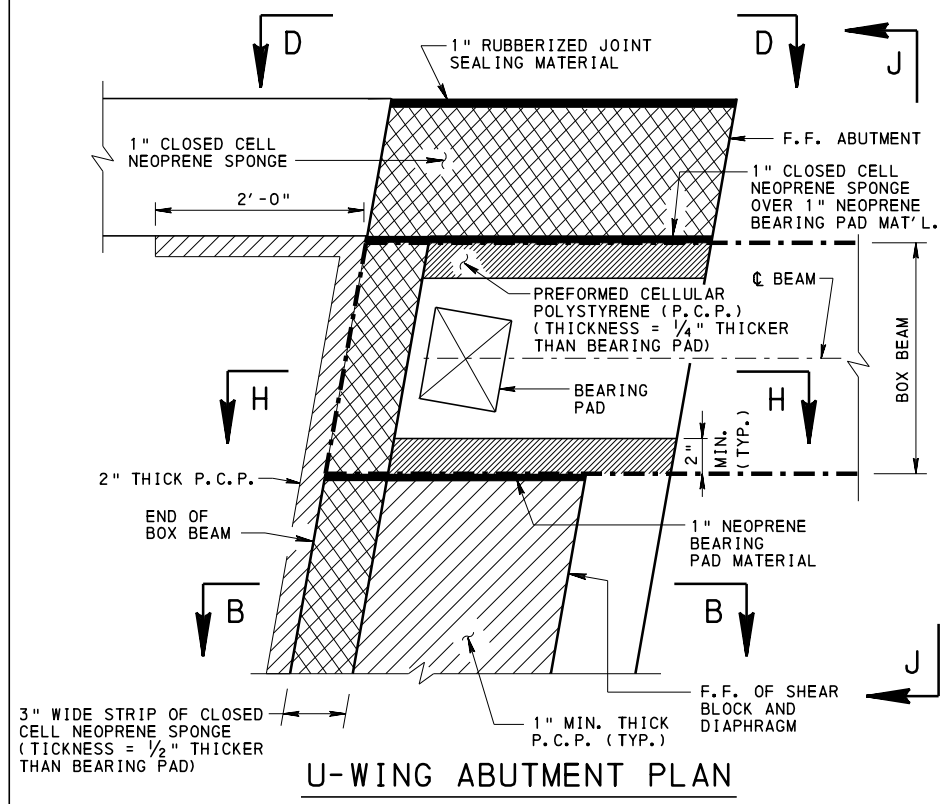


DETAIL "B"

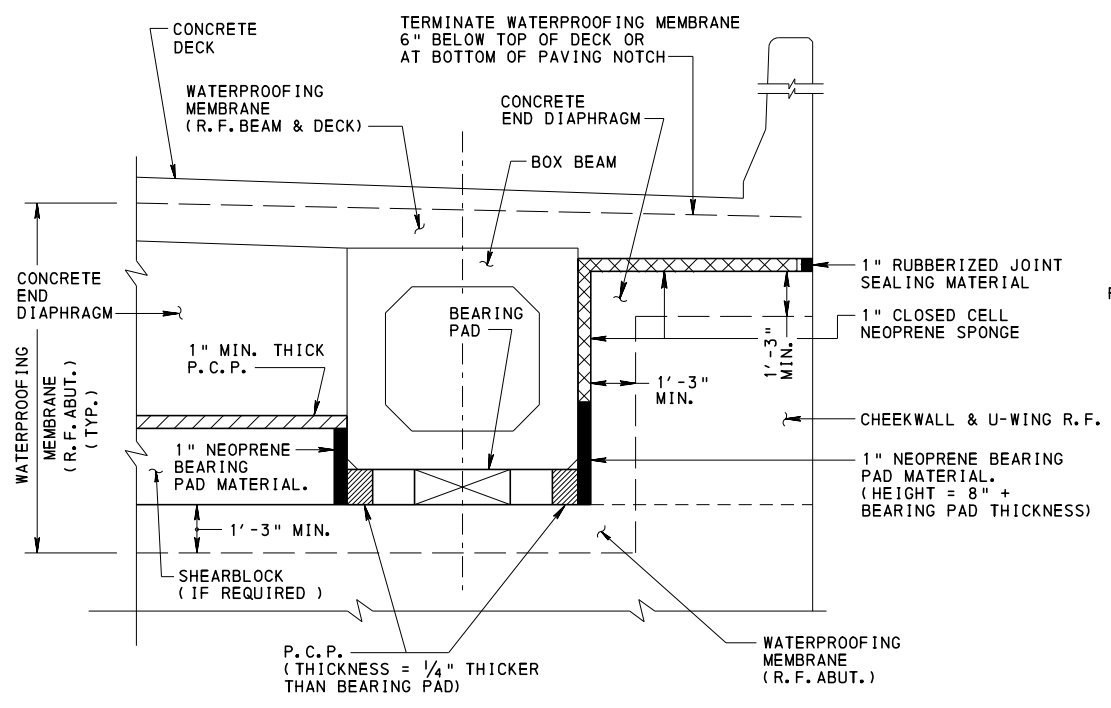


SECTION H-H

NOTE:
FOR ADDITIONAL INFORMATION REFER
TO DETAILS ON SHEET 12.



**U-WING ABUTMENT PLAN
FULL DEPTH END DIAPHRAGM
PRESTRESSED SPREAD BOX BEAMS**



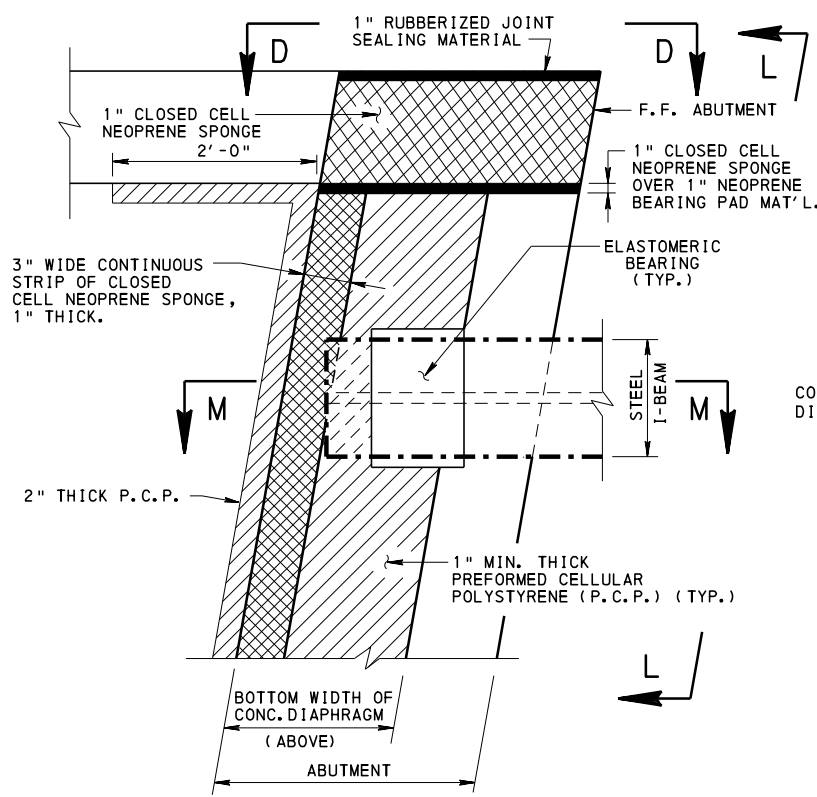
SECTION J-J

NOTES:

1. FOR ADDITIONAL NOTES, SEE SHEET 1.
2. FOR SECTION E-E, SEE SHEET 4.
3. FOR SECTION B-B, SEE SHEET 1.
4. FOR SECTION D-D, SEE SHEET 1.
5. FOR SECTION G-G, SEE SHEET 8.

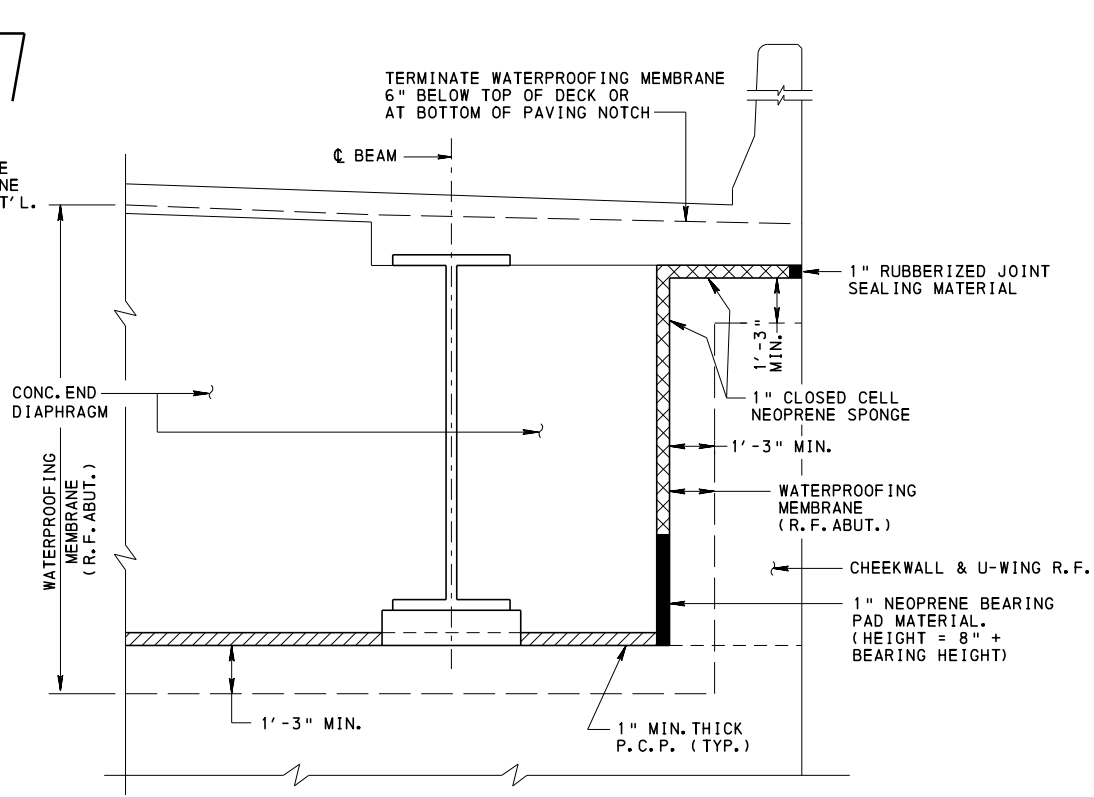
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

**STANDARD
TYPICAL WATERPROOFING AND
EXPANSION DETAILS - ABUTMENT
PRESTRESSED BOX BEAM
BRIDGES**

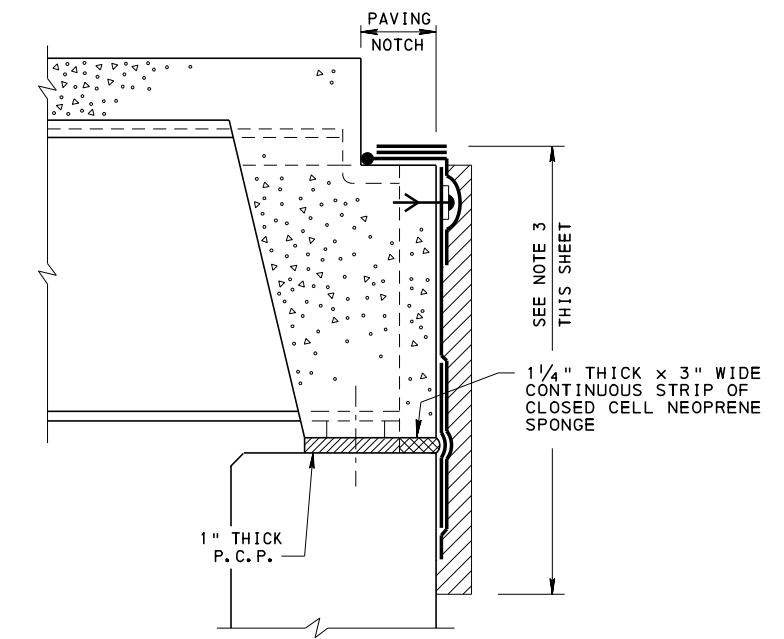


PLAN

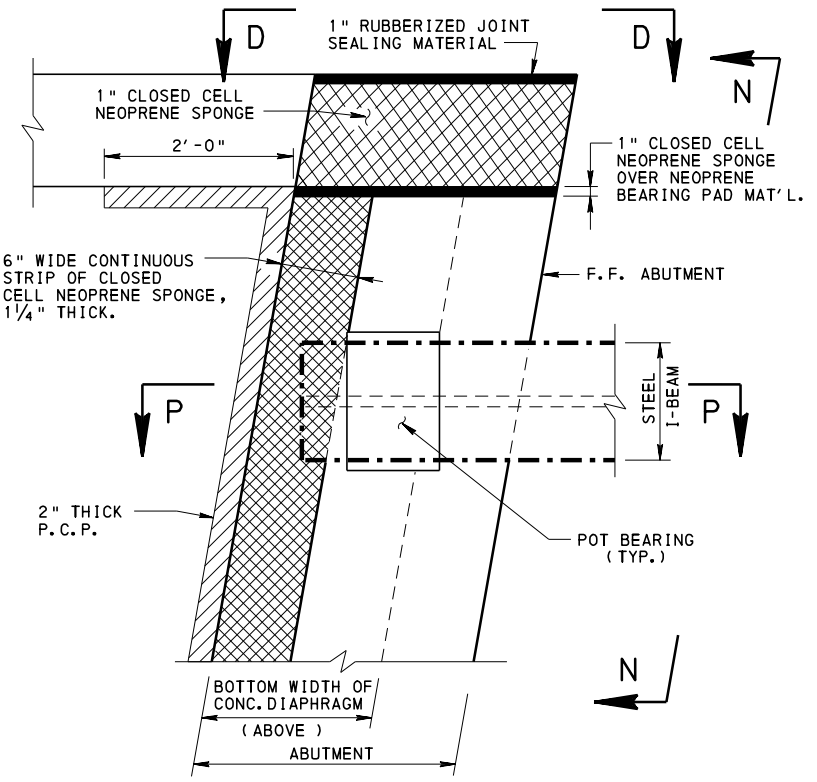
U-WING ABUTMENT WITHOUT BACKWALL
FULL DEPTH END DIAPHRAGM
AND ELASTOMERIC BEARING



SECTION L-L

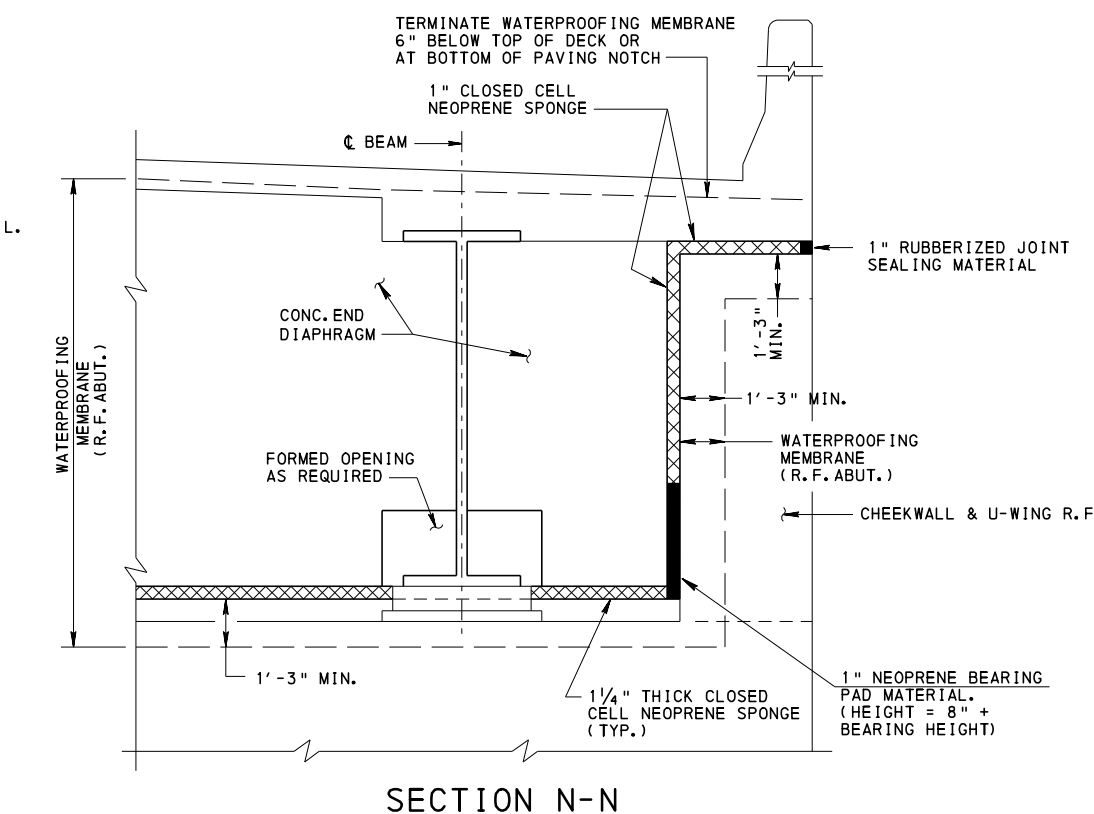


SECTION M-M

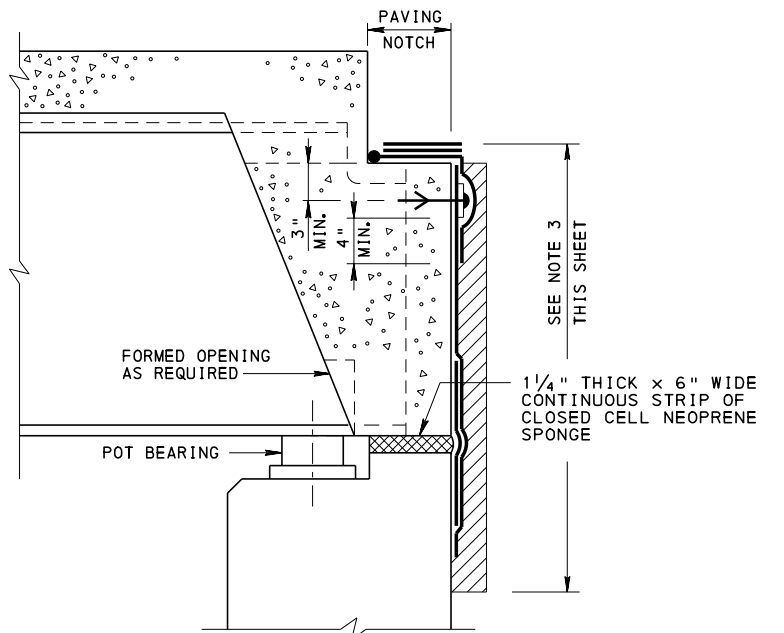


PLAN

U-WING ABUTMENT WITHOUT BACKWALL
FULL DEPTH END DIAPHRAGM
AND POT BEARING



SECTION N-N



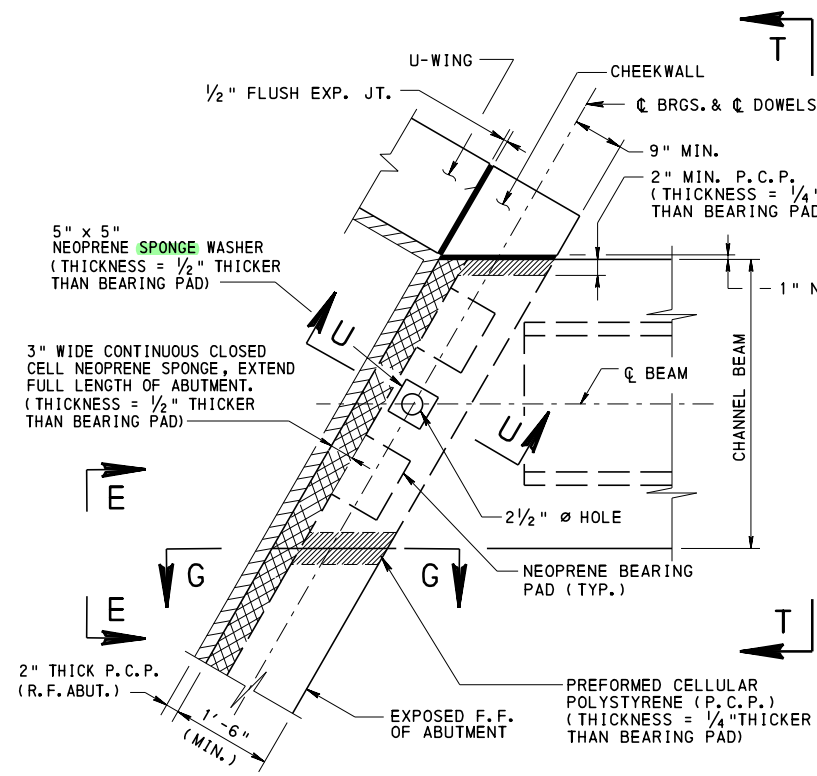
SECTION P-P

NOTES:

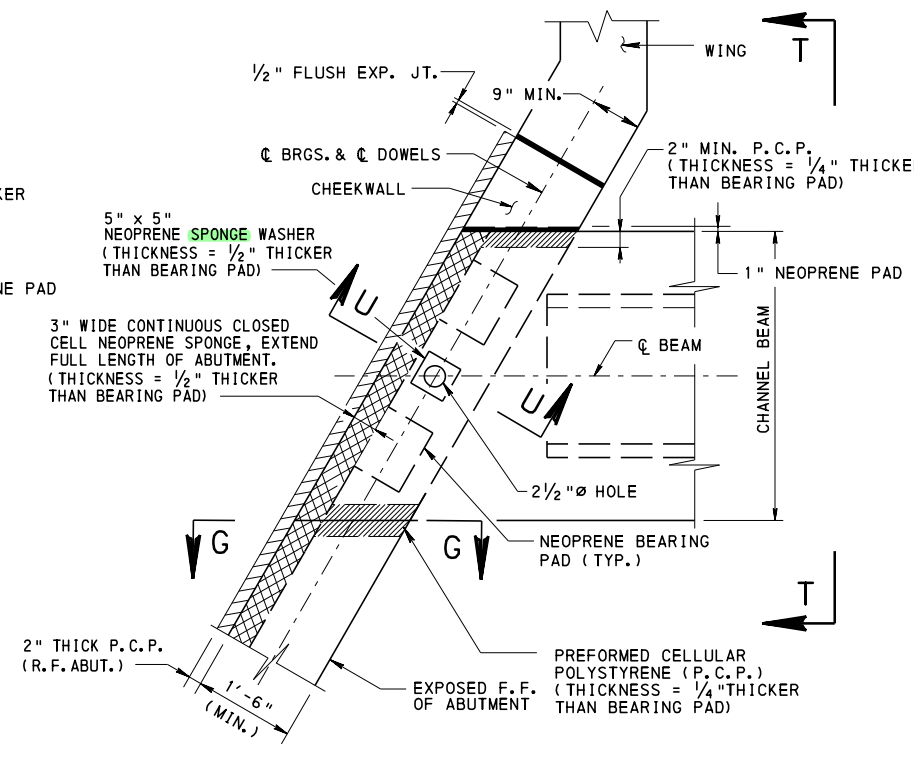
1. FOR ADDITIONAL NOTES, SEE SHEET 1.
2. FOR SECTION D-D, SEE SHEET 1.
3. FOR ADDITIONAL INFORMATION, REFER TO DETAILS ON SHEET 12.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

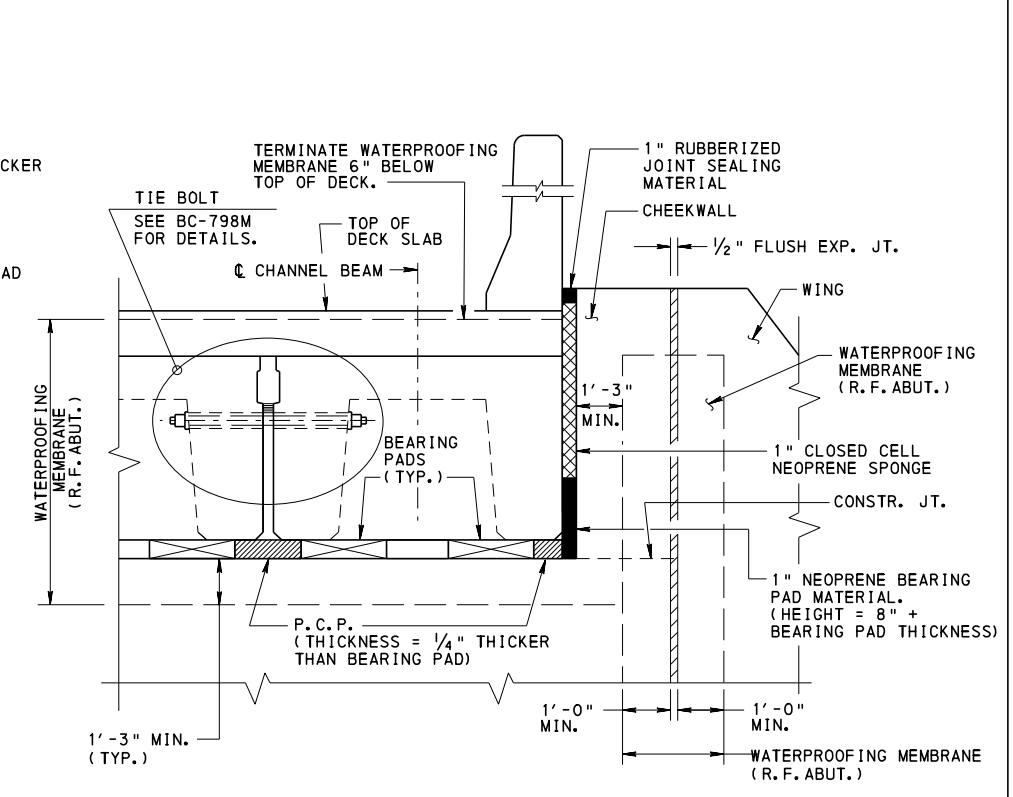
STANDARD
TYPICAL WATERPROOFING AND
EXPANSION DETAILS - ABUTMENT
STEEL I-BEAM
BRIDGES



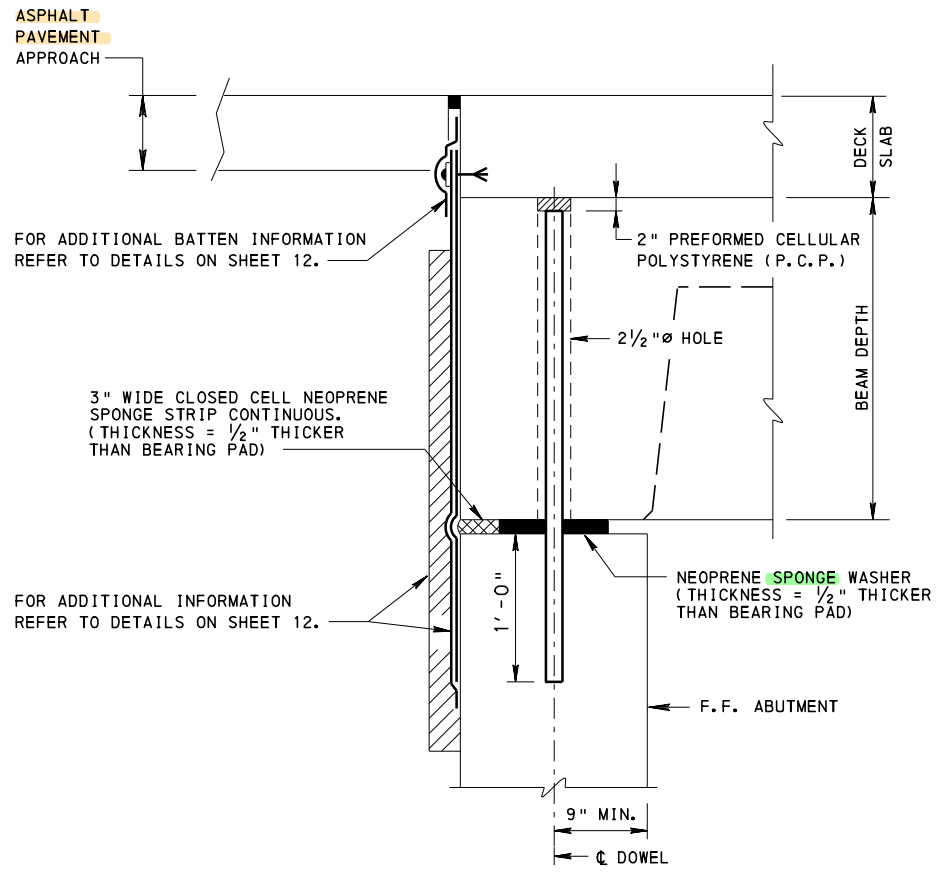
**ABUTMENT PLAN - U-WING
PRECAST CHANNEL BEAM BRIDGES**



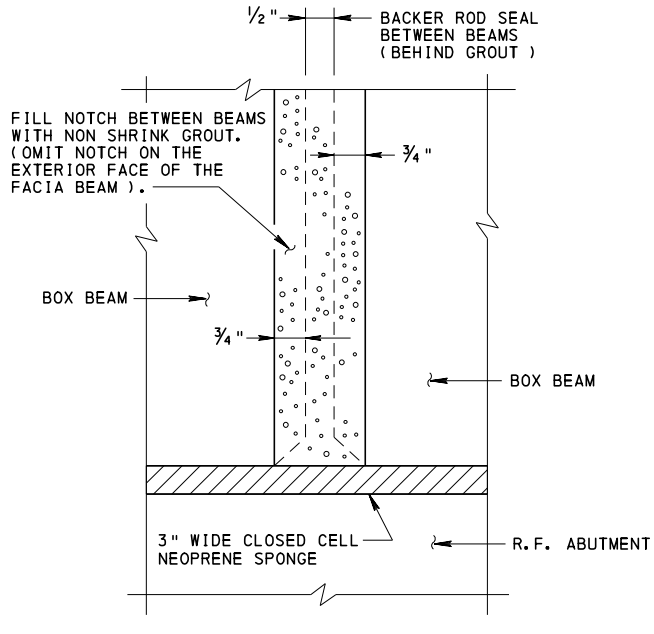
**ABUTMENT PLAN - FLARED WING
PRECAST CHANNEL BEAM BRIDGES**



SECTION T-T
NOTE: FLARED WING SHOWN U-WING SIMILAR



SECTION U-U



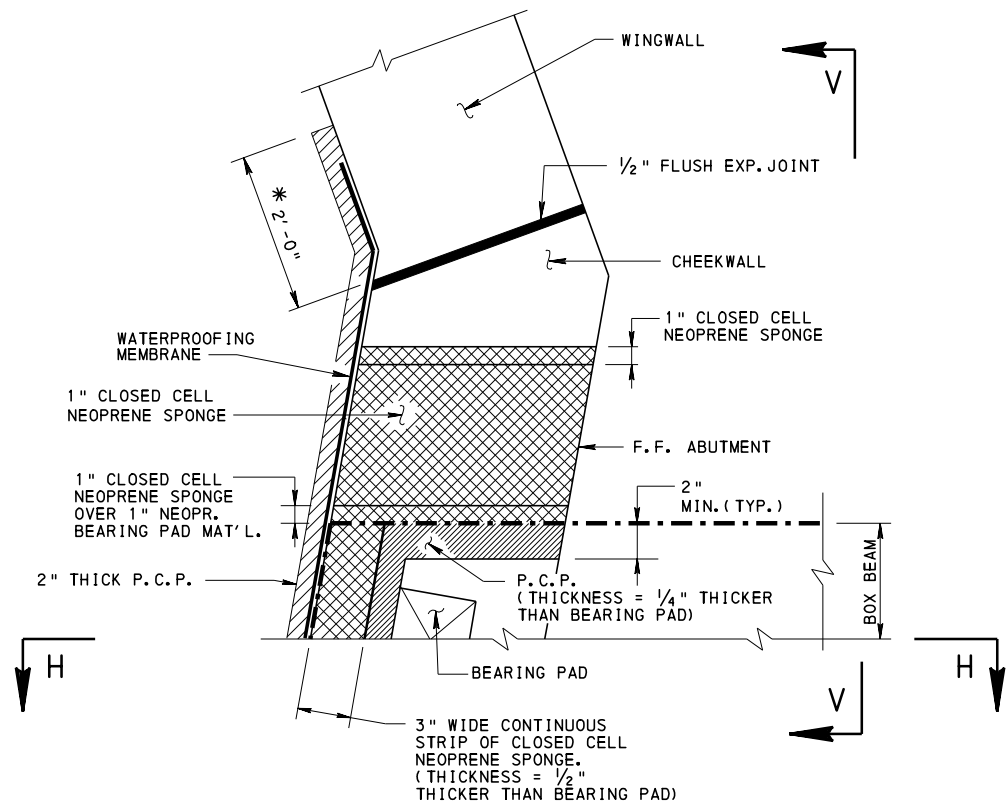
SECTION E-E

- NOTES:**
1. FOR ADDITIONAL NOTES, SEE SHEET 1.
 2. FOR SHEAR KEY DETAIL SEE STANDARD DRAWING BC-775M
 3. FOR SECTION G-G, SEE SHEET 8.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

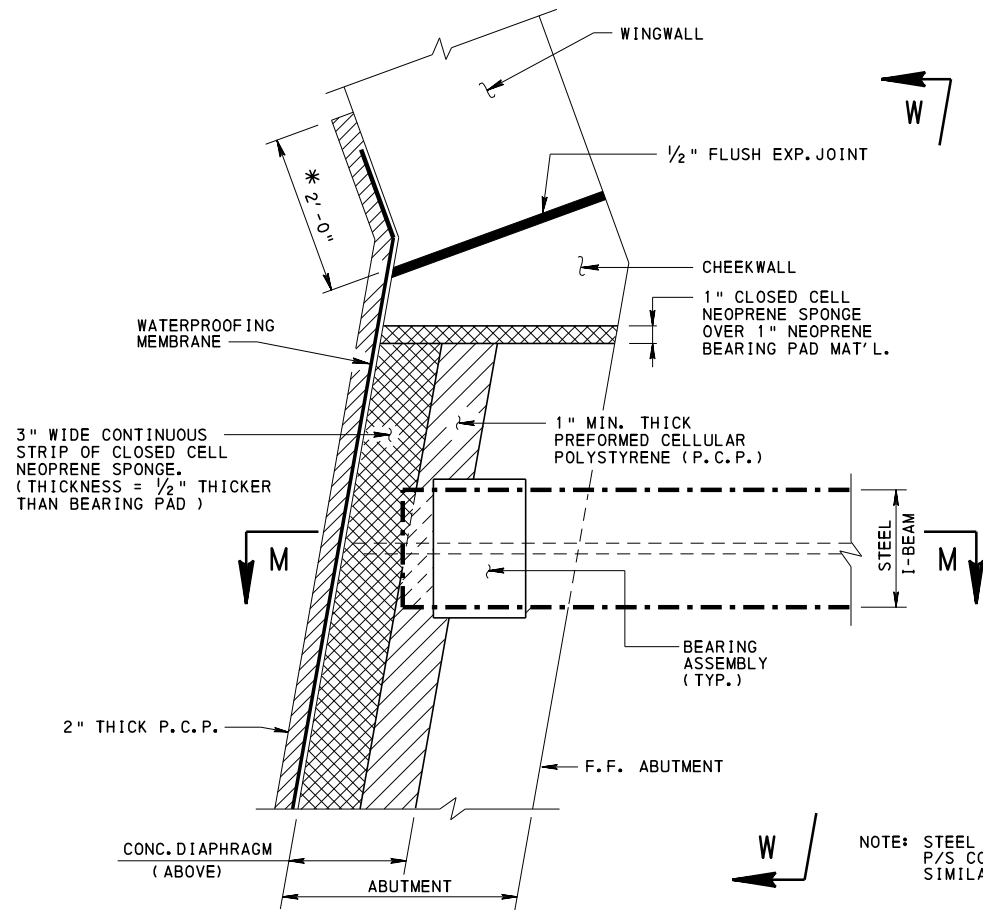
**STANDARD
TYPICAL WATERPROOFING AND
EXPANSION DETAILS - ABUTMENT
PRECAST CHANNEL BEAM
BRIDGES**

RECOMMENDED NOV. 23, 2022 <i>L. W. [Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Gavin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 4 OF 12 BC-788M
--	---	---------------------------------



BOX BEAMS WITHOUT BACKWALL

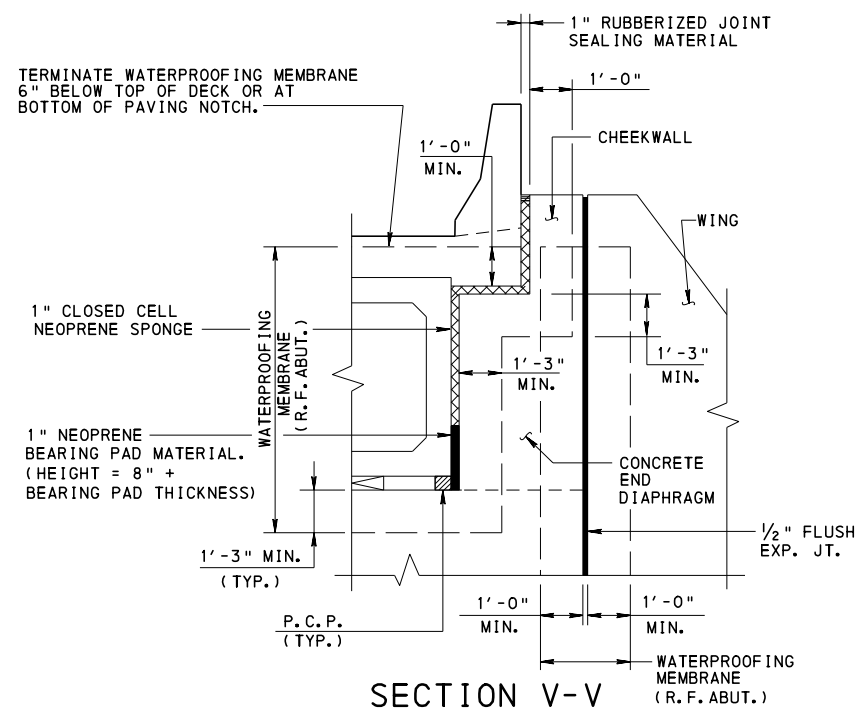
* SEE WATERPROOFING MEMBRANE DETAIL ON SHEET 12



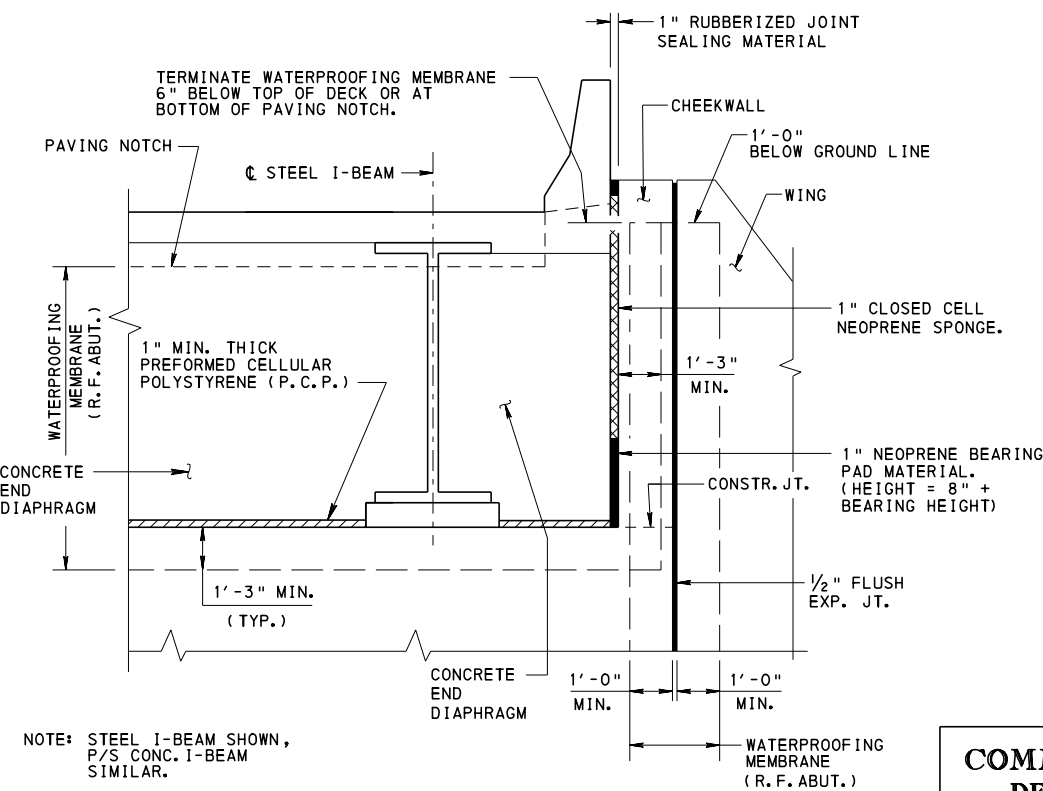
PRESTRESSED AND STEEL I-BEAM WITHOUT BACKWALL

* SEE WATERPROOFING MEMBRANE DETAIL ON SHEET 12

WINGWALL ABUTMENT - FULL DEPTH END DIAPHRAGM



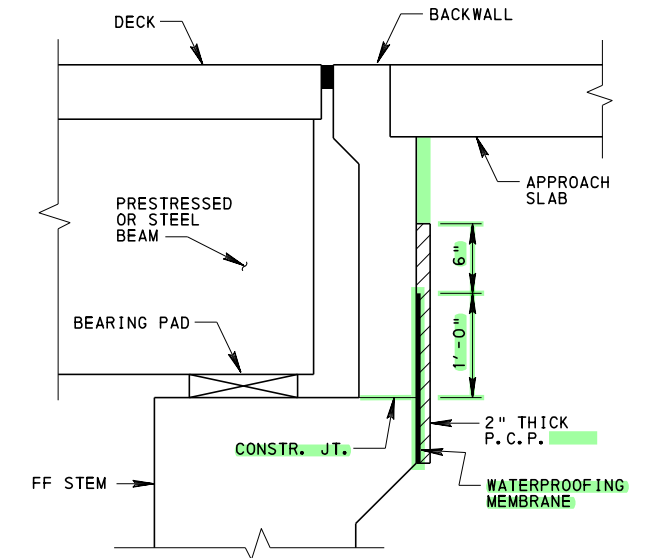
**SECTION V-V
BOX BEAMS**



SECTION W-W

STEEL I-BEAM AND P/S I-BEAM

USE THIS DETAIL FOR U-WINGS ALSO



**SECTION-ABUTMENT WITH BACKWALL
PRESTRESSED AND STEEL I-BEAM**

NOTES:

1. FOR ADDITIONAL NOTES, SEE SHEET 1.
2. FOR SECTION H-H, SEE SHEET 2.
3. FOR SECTION M-M, SEE SHEET 3.

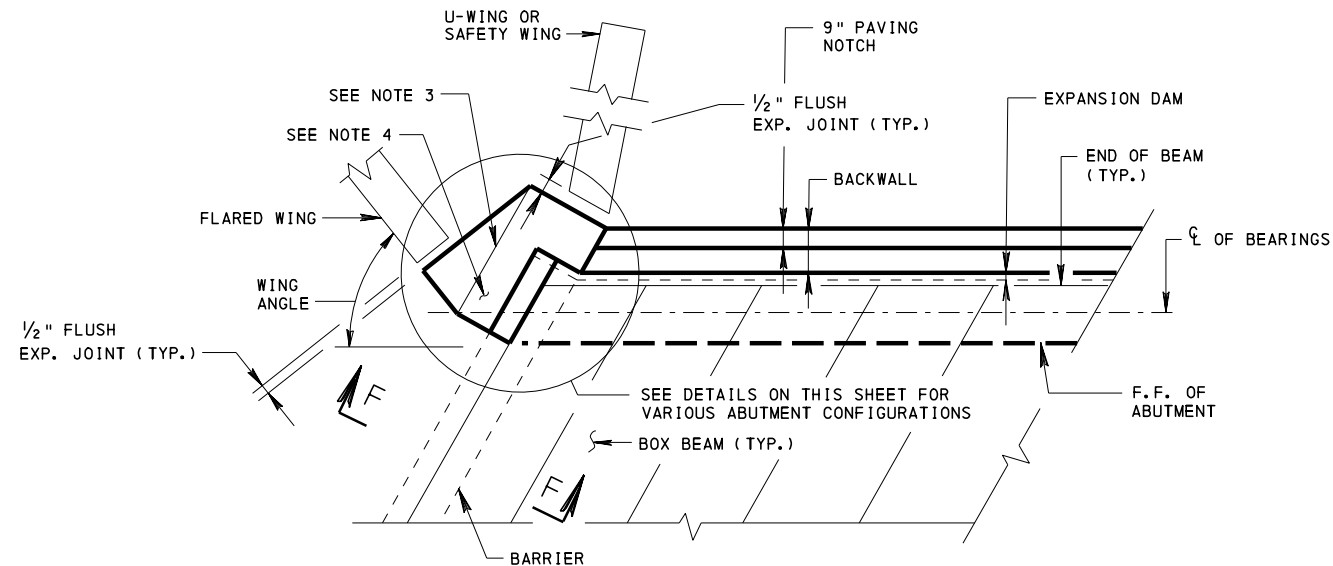
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

**STANDARD
TYPICAL WATERPROOFING AND
EXPANSION DETAILS - ABUTMENT**

RECOMMENDED NOV. 23, 2022
L. L. W.
CHIEF BRIDGE ENGINEER

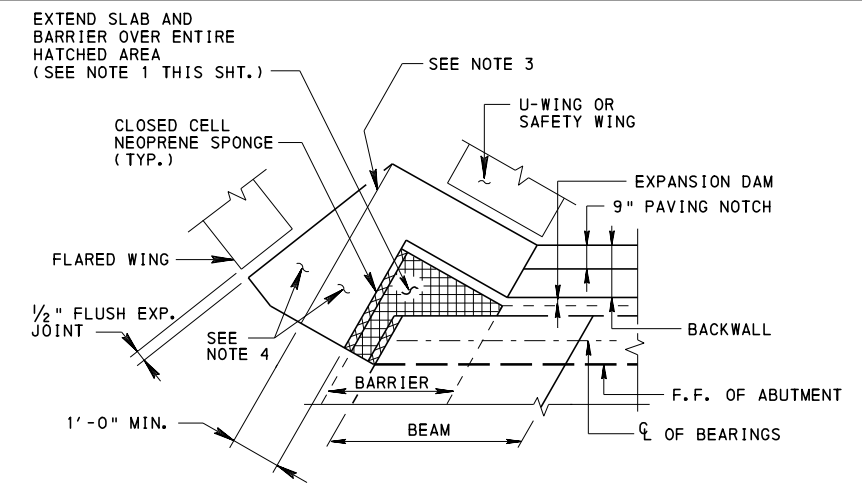
RECOMMENDED NOV. 23, 2022
Gavin E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 5 OF 12
BC-788M

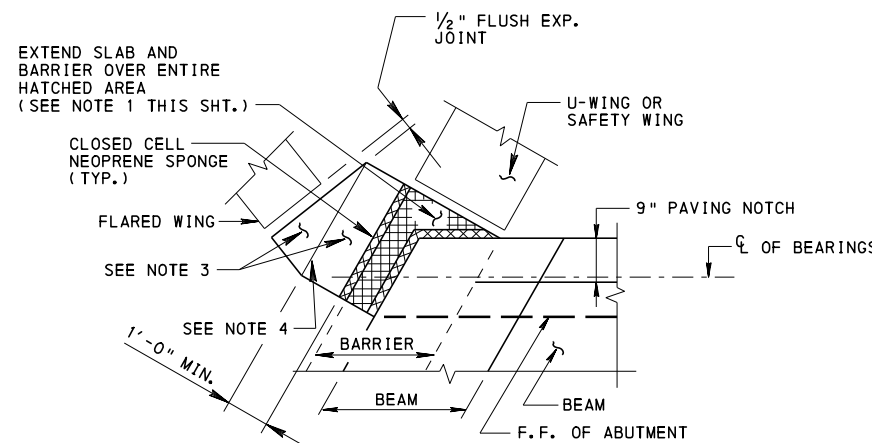


ADJACENT BOX BEAMS (SKEWED)

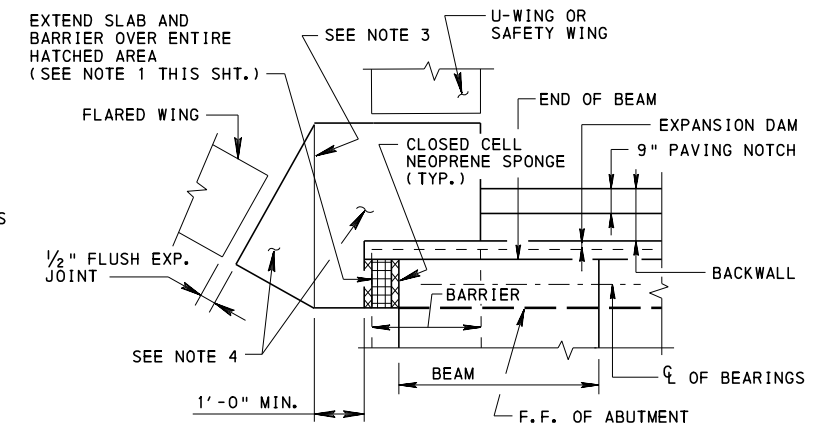
**GENERAL SCHEMATIC
ABUTMENT PLAN WITH BACKWALL
FLARED AND U-WINGS**



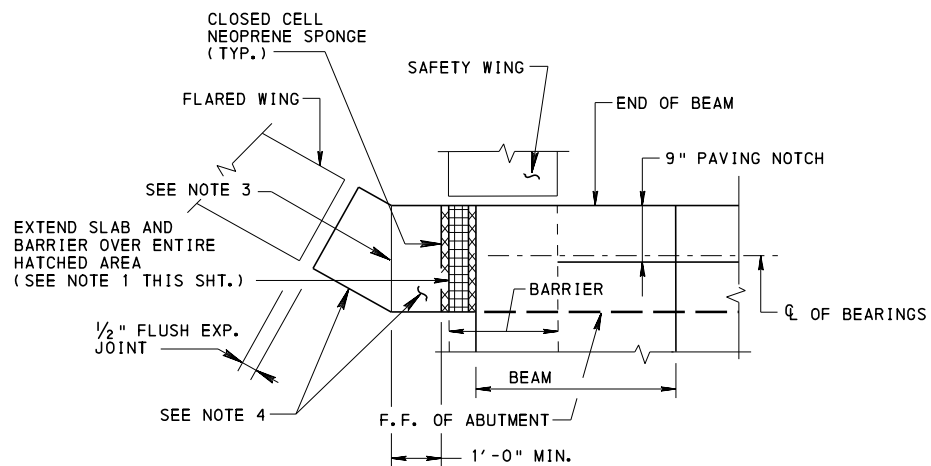
**DETAIL FOR SKEWED ABUTMENT
WITH BACKWALL
FLARED AND U-WINGS**



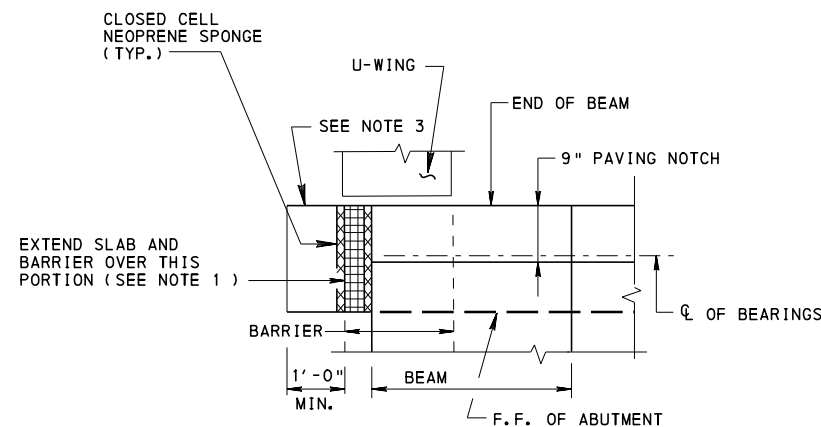
**DETAIL FOR SKEWED ABUTMENT
WITHOUT BACKWALL
FLARED AND U-WINGS**



**DETAIL FOR 90° ABUTMENT
WITH BACKWALL
FLARED AND U-WINGS**



**DETAIL FOR 90° ABUTMENT
WITHOUT BACKWALL
FLARED WING**



**DETAIL FOR 90° ABUTMENT
WITHOUT BACKWALL
U-WINGS**

DETAIL NOTES:

1. PLACE 1" CLOSED CELL NEOPRENE SPONGE UNDER SLAB.
2. SEE SHEET 2 FOR SECTION F-F.
3. LIMIT OF CURTAIN WALL FOR U-WINGS.
4. CURTAIN WALL FOR FLARED WINGS AND INCLUDES THE CURTAIN WALL FOR U-WINGS PLUS ANY ADDITIONAL CONCRETE NEEDED TO FRAME INTO THE FLARED WINGWALL.

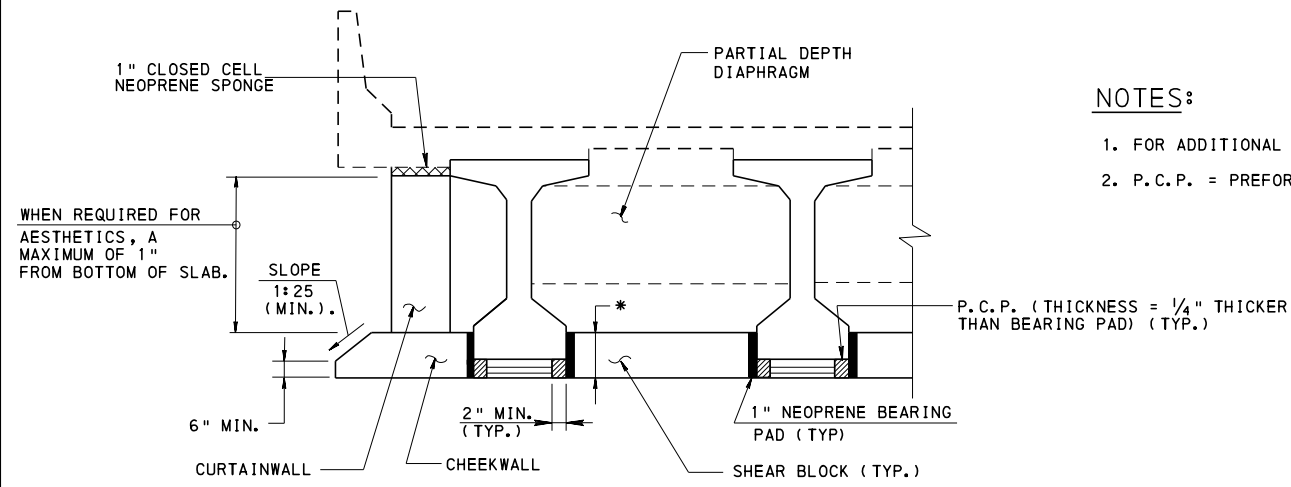
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

**STANDARD
TYPICAL WATERPROOFING AND
EXPANSION DETAILS - ABUTMENT**

RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF BRIDGE ENGINEER

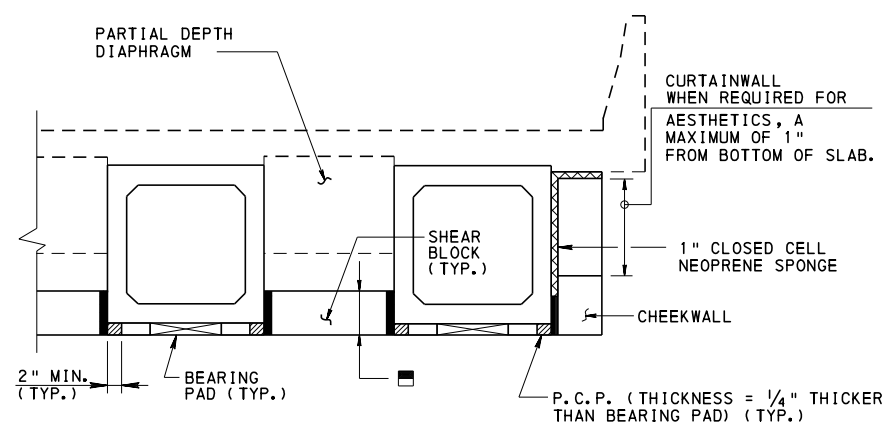
RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 6 OF 12
BC-788M



* BEARING PAD THICKNESS + FLANGE THICKNESS - 1" FOR CHEEKWALLS AND SHEAR BLOCKS

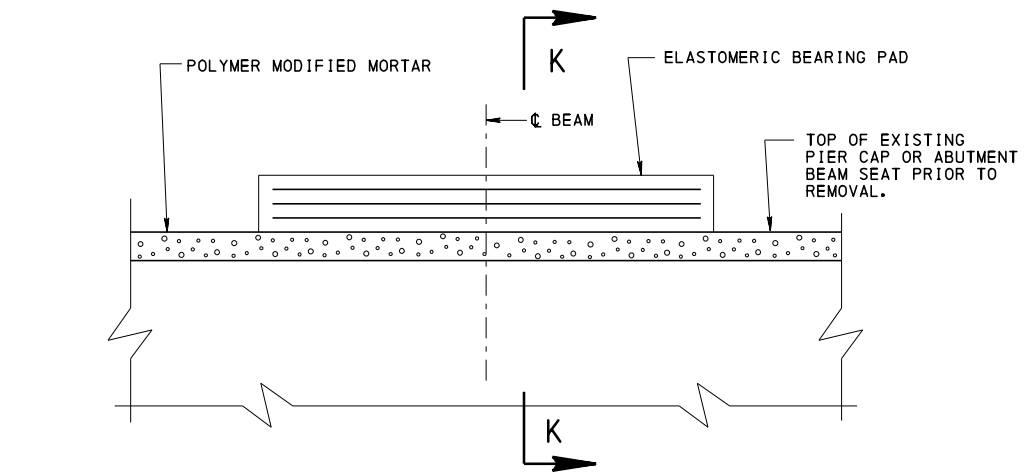
PRESTRESSED I-BEAM SECTION AT PIER



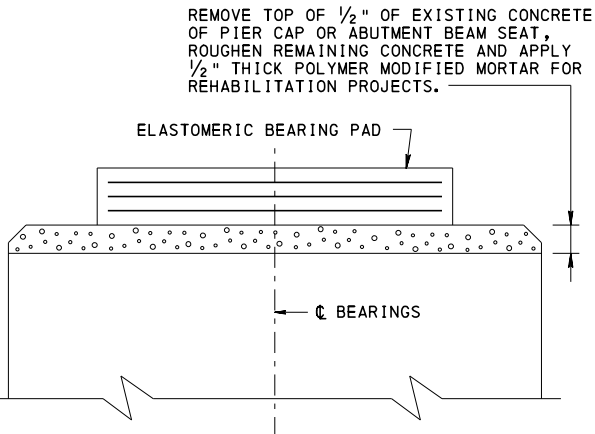
■ BEARING PAD THICKNESS + 8" FOR CHEEKWALLS AND SHEAR BLOCKS

BOX BEAM SECTION AT PIER

CHEEKWALL CONDITION FOR BOX BEAMS SIMILAR



**TYPICAL PIER AND ABUTMENT EXPANSION BEARING
STEEL OR PRESTRESSED REHABILITATION
SLOPED TO DRAIN**

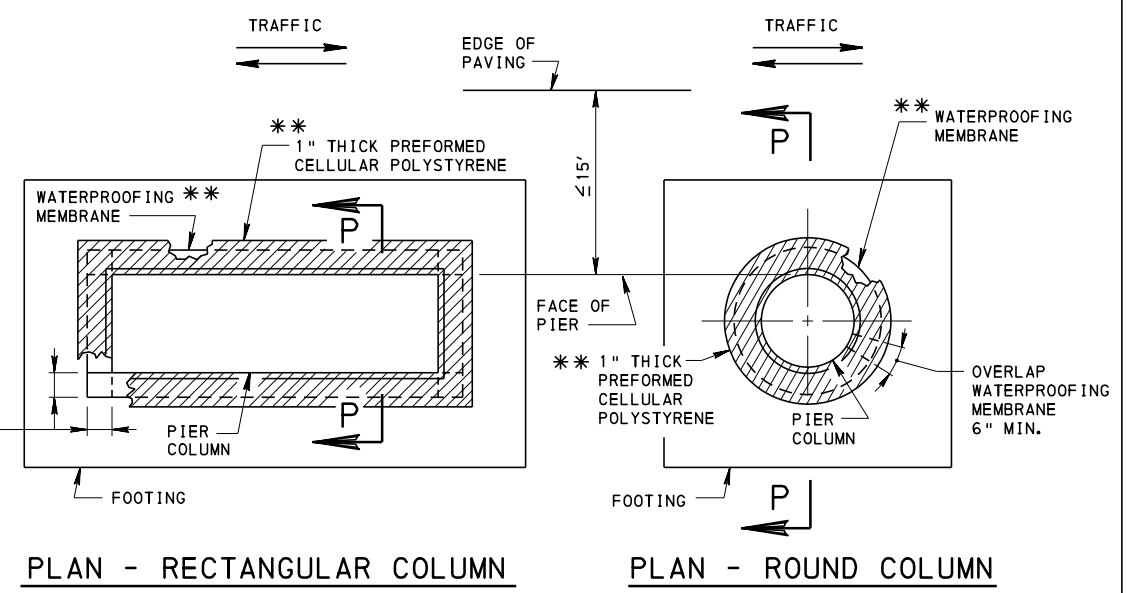


**SECTION K-K
SLOPED TO DRAIN**

NOTES:

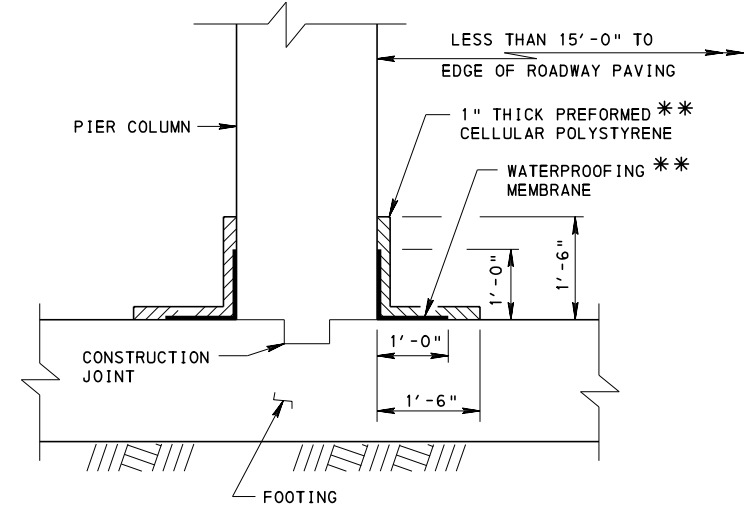
1. FOR ADDITIONAL NOTES SEE SHEET 1.
2. P.C.P. = PREFORMED CELLULAR POLYSTYRENE.

EXTEND WATERPROOFING MEMBRANE 1'-0" BEYOND FACE OF PIER AND OVERLAP 1'-0" WITH MEMBRANE ON ADJACENT FACE OF PIER (TYP.)



PLAN - RECTANGULAR COLUMN

PLAN - ROUND COLUMN



SECTION P-P

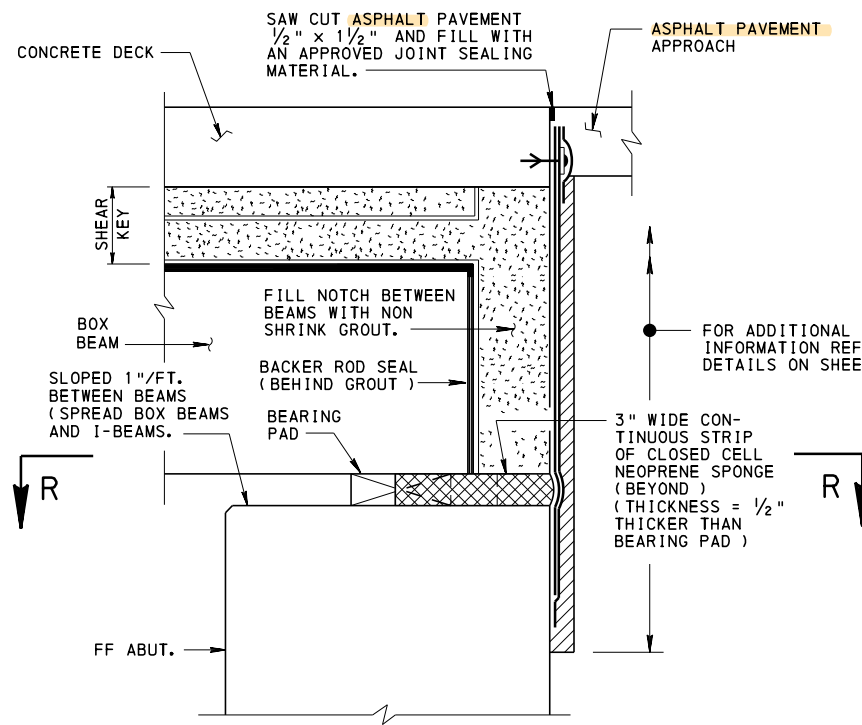
PIER WATERPROOFING DETAILS

** WATERPROOFING MEMBRANE AND 1" THICK PREFORMED CELLULAR POLYSTYRENE TO BE USED AROUND THE PIER COLUMNS WHEN THE DISTANCE FROM EDGE OF PAVING TO THE PIER COLUMN FACE IS ≤ 15 FEET. ALSO PROVIDE WATERPROOFING WHENEVER PIER FOOTING IS SUBJECT TO HIGH GROUND WATER LEVEL SUCH AS IN OR NEAR A WATERWAY.

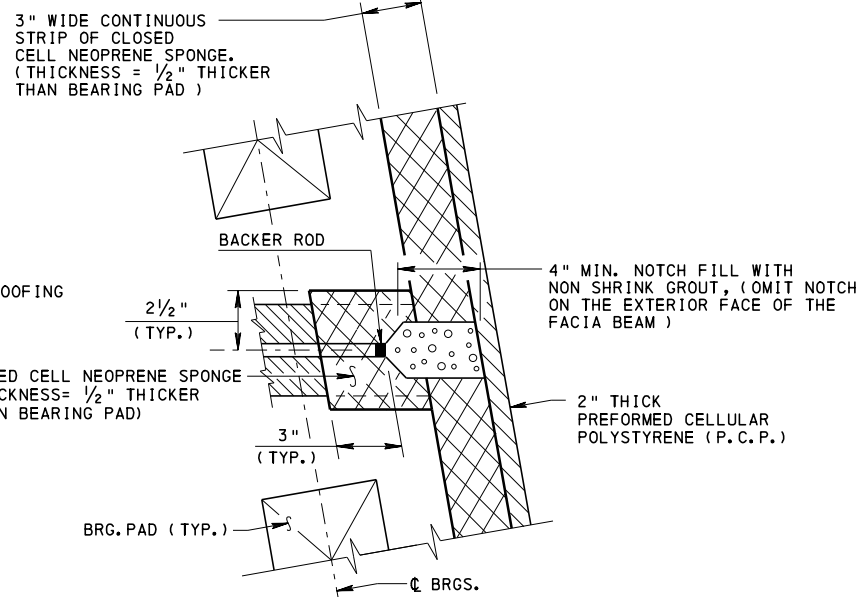
PIER WATERPROOFING INSTALLATION NOTE:
INSTALL 2'-0" WIDE WATERPROOFING MEMBRANE TO FIT PIER COLUMN AND TOP OF FOOTING AS SHOWN, RUN MEMBRANE CONTINUOUS ALONG APPLICABLE FACE OF PIER COLUMN. USE AN ADHESIVE BACKED, PREFORMED WATERPROOFING MEMBRANE PER PUB. 408, SECTION 680.2 (b). PROVIDE 1'-6" MINIMUM PREFORMED CELLULAR POLYSTYRENE IN EACH DIRECTION OVER WATERPROOFING MEMBRANE AS PROTECTION.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

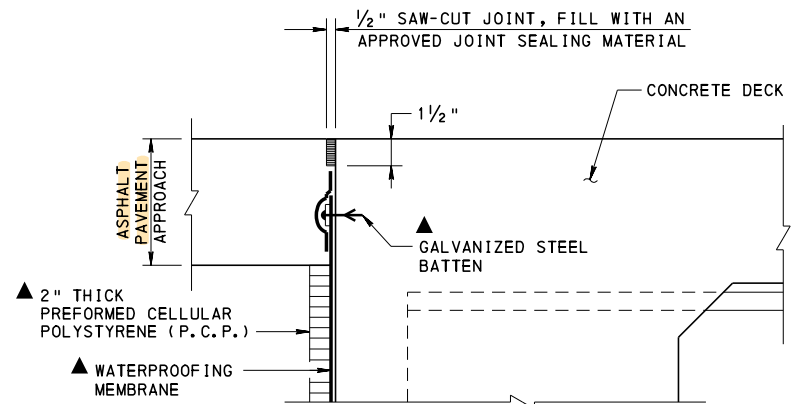
**STANDARD
TYPICAL WATERPROOFING AND
EXPANSION DETAILS - PIER
PRESTRESSED CONCRETE
I-BEAM AND BOX BEAM BRIDGES**



SECTION G-G

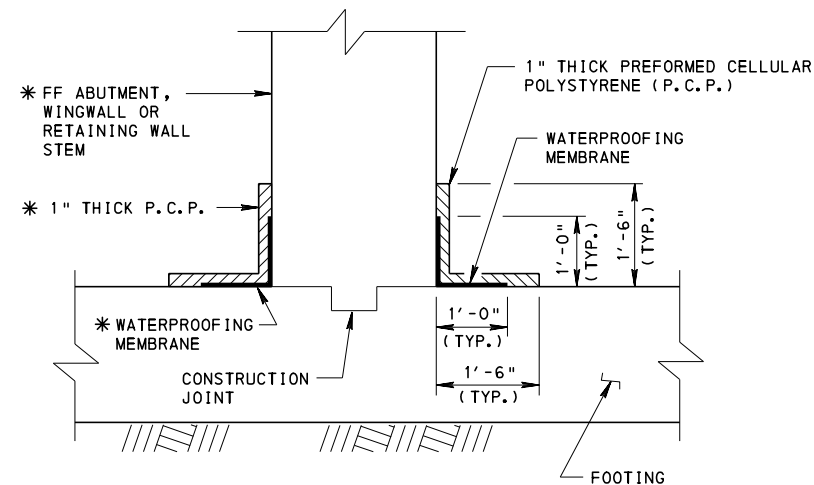


SECTION R-R
(ADJACENT BOX BEAMS)



ASPHALT PAVEMENT APPROACH AT STRUCTURE

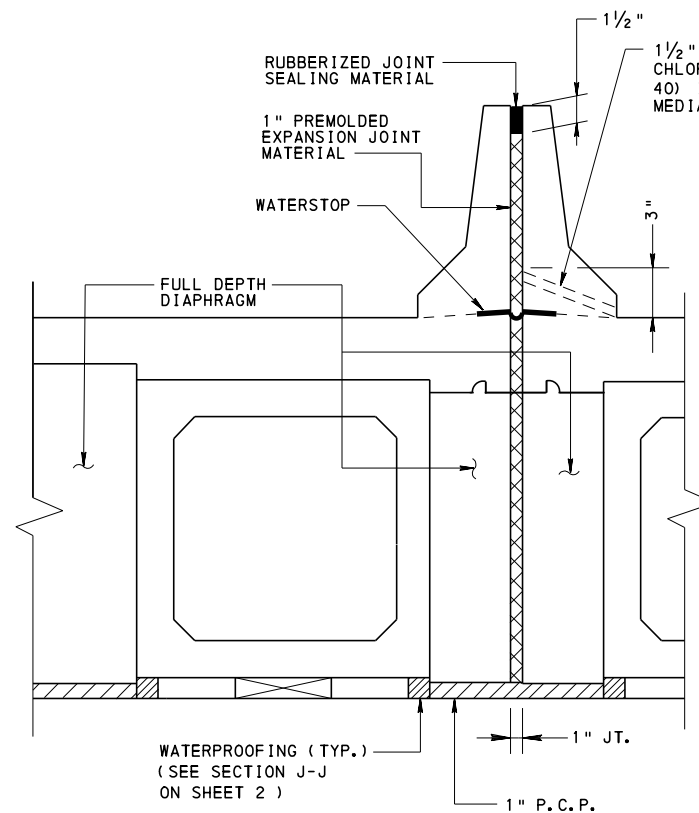
▲ FOR ADDITIONAL INFORMATION REFER TO DETAILS ON SHEET 12.



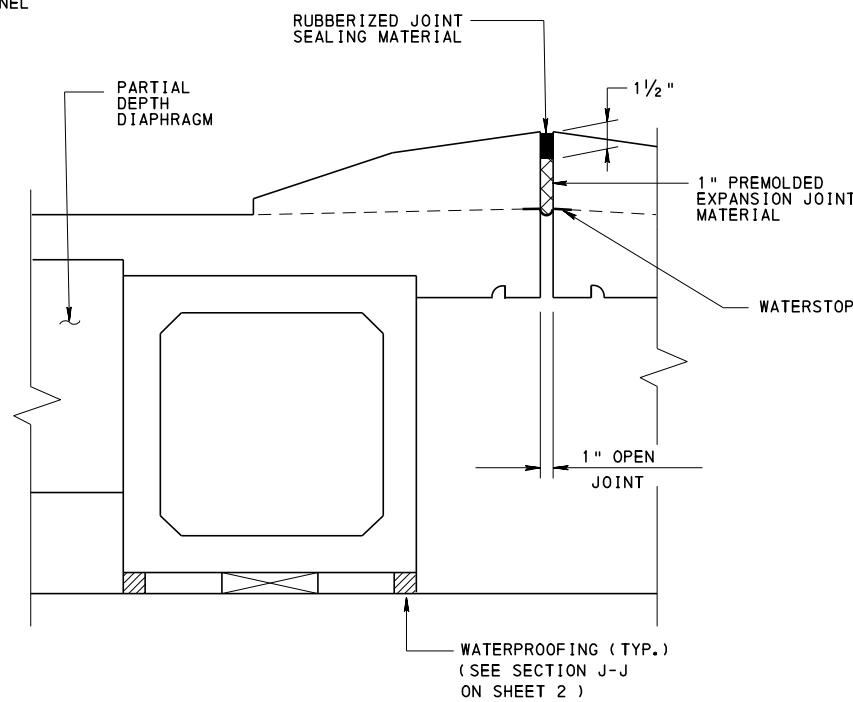
SECTION
ABUTMENT, WINGWALL OR RETAINING WALL
WATERPROOFING DETAIL

* WATERPROOFING MEMBRANE AND 1" THICK PREFORMED CELLULAR POLYSTYRENE TO BE USED ON FRONT FACE OF ABUTMENT, WINGWALL OR RETAINING WALL STEM ONLY WHERE THE DISTANCE FROM EDGE OF PAVING TO THE FRONT FACE OF THE RESPECTIVE STEM IS ≤ 5 FEET. ALSO PROVIDE WATERPROOFING WHENEVER FOOTING IS SUBJECT TO HIGH GROUND WATER LEVEL SUCH AS IN OR NEAR A WATERWAY.

INSTALLATION NOTE:
INSTALL 2'-0" WIDE WATERPROOFING MEMBRANE TO FIT APPLICABLE FACE(S) OF THE ABUTMENT, WINGWALL OR RETAINING WALL STEM AND TOP OF FOOTING AS SHOWN. RUN MEMBRANE CONTINUOUS FOR ENTIRE LENGTH OF RESPECTIVE WALL OR STEM. USE AN ADHESIVE BACKED, PREFORMED WATERPROOFING MEMBRANE PER PUB. 408, SECTION 680.2 (b). PROVIDE 1'-6" MINIMUM PREFORMED CELLULAR POLYSTYRENE IN EACH DIRECTION OVER WATERPROOFING MEMBRANE AS PROTECTION.



FULL DEPTH DIAPHRAGM
WITHOUT BACKWALL AT
ABUTMENT WITH MEDIAN BARRIER
RAISED MEDIAN SIMILAR



PARTIAL DEPTH DIAPHRAGM
PIER OR ABUTMENT
WITH MEDIAN
CONCRETE BARRIER SIMILAR

TYPICAL STRUCTURE SECTIONS - MEDIAN

NOTES:

1. FOR ADDITIONAL NOTES, SEE SHEET 1.
2. FOR CONCRETE DIAPHRAGM REINFORCEMENT DETAILS, SEE CONTRACT PLANS.
3. PROVIDE CONTINUOUS WATERSTOP.

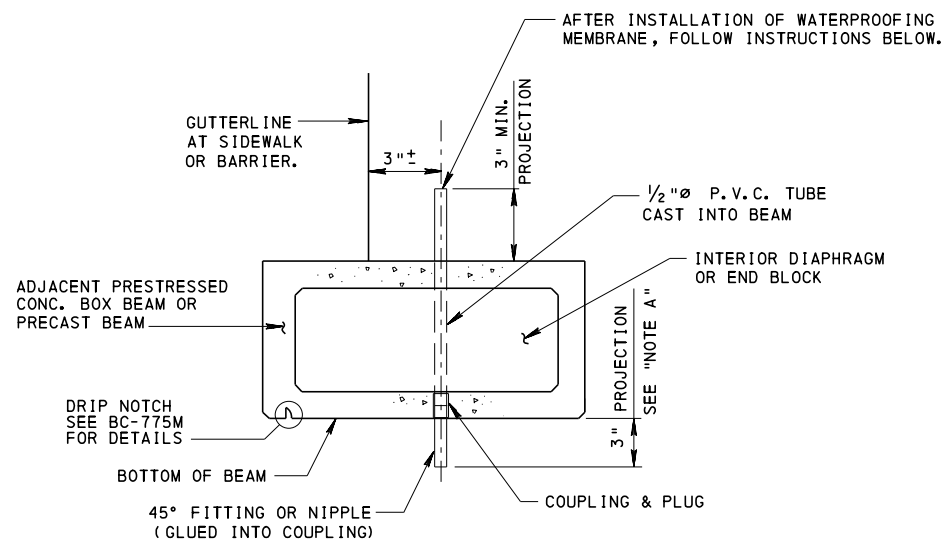
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
TYPICAL WATERPROOFING AND
EXPANSION DETAILS - MISCELLANEOUS
P/S CONCRETE
I-BEAM AND BOX BEAM BRIDGES

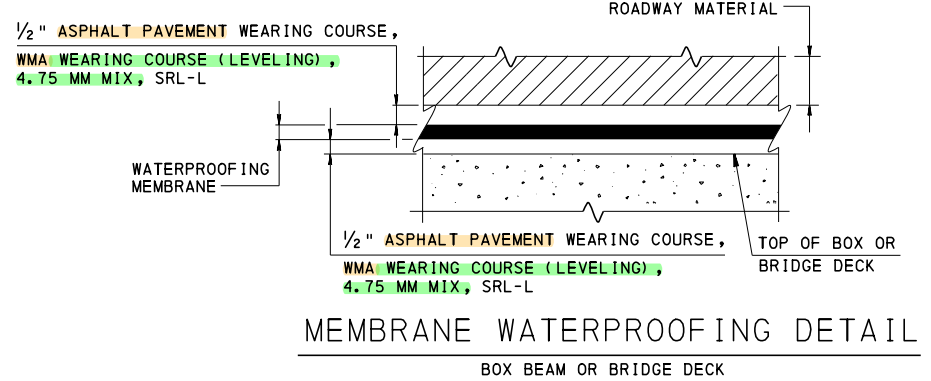
RECOMMENDED NOV. 23, 2022
L. W. Gray
CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022
Grain E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 8 OF 12
BC-788M



TYPICAL DRAIN DETAIL
PRESTRESSED CONCRETE BEAM SHOWN,
PRECAST BEAM SIMILAR



MEMBRANE WATERPROOFING DETAIL
BOX BEAM OR BRIDGE DECK

NOTES:

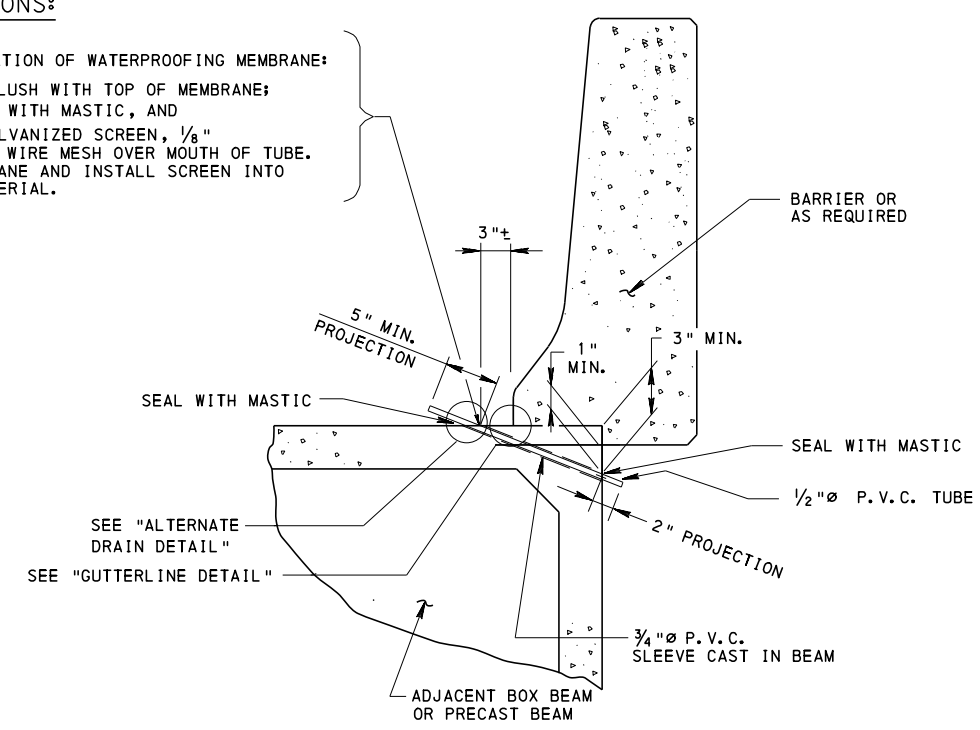
1. DETAILS SHOWN TO BE USED FOR PRESERVATION PROJECTS ONLY.
2. SPACE 1/2" Ø P.V.C. TUBES, WHERE PRACTICABLE AS FOLLOWS:
 - A) AT 20 FT. CENTERS (MAX.), OR
 - B) IN THE INTERIOR DIAPHRAGMS OR END DIAPHRAGMS.
 - C) IF THE BRIDGE IS SUPERELEVATED ONE TUBE IS TO BE PLACED AT THE LOW END AND LOW SIDE OF THE STRUCTURE, AHEAD OF ABUTMENT AND PIER(S) IF MORE THAN SINGLE SPAN.
 - D) USE 45° FITTING TURNED AWAY FROM SUBSTRUCTURE UNIT WHEN THE CLEARANCE IS LESS THAN 2'-0".
3. PROVIDE MASTIC IN ACCORDANCE WITH SECTION 680.2(d) OF PUB. 408.

NOTE A:

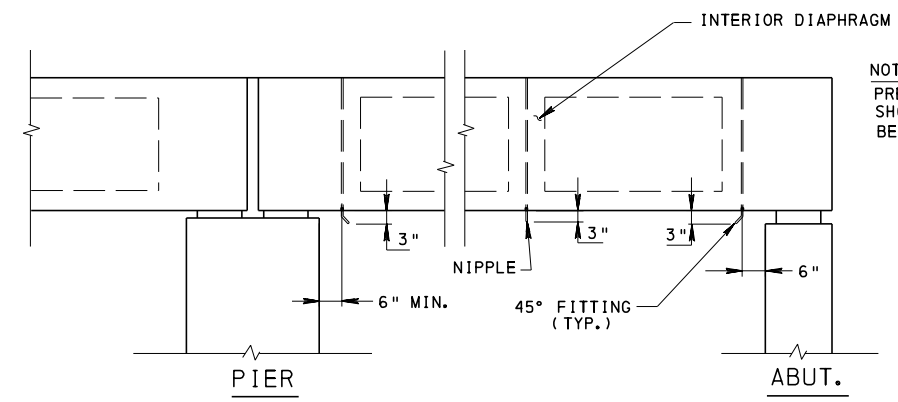
COUPLING AND PLUG; REMOVE PLUG AFTER FABRICATION OF BEAM AND INSERT 3" NIPPLE (INCIDENTAL TO PRECAST OR P/S CONCRETE BRIDGE BEAM(S)), TO BE DETAILED ON FABRICATOR'S SHOP DRAWINGS.

INSTRUCTIONS:

- AFTER INSTALLATION OF WATERPROOFING MEMBRANE:
1. CUT TUBE FLUSH WITH TOP OF MEMBRANE;
 2. SEAL EDGES WITH MASTIC, AND
 3. PROVIDE GALVANIZED SCREEN, 1/8" GALVANIZED WIRE MESH OVER MOUTH OF TUBE. HEAT MEMBRANE AND INSTALL SCREEN INTO MELTED MATERIAL.

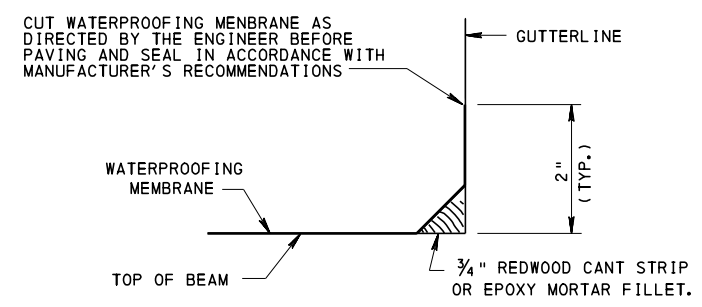


MEMBRANE DRAIN DETAIL AT CURB



TYPICAL LONGITUDINAL SECTION
ALTERNATE DRAINS

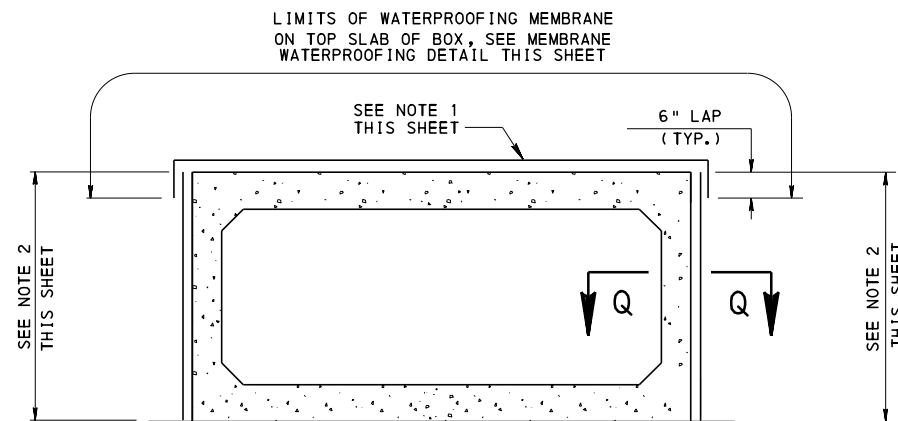
NOTE:
PRESTRESSED BEAMS SHOWN, PRECAST BEAMS SIMILAR



GUTTERLINE DETAIL

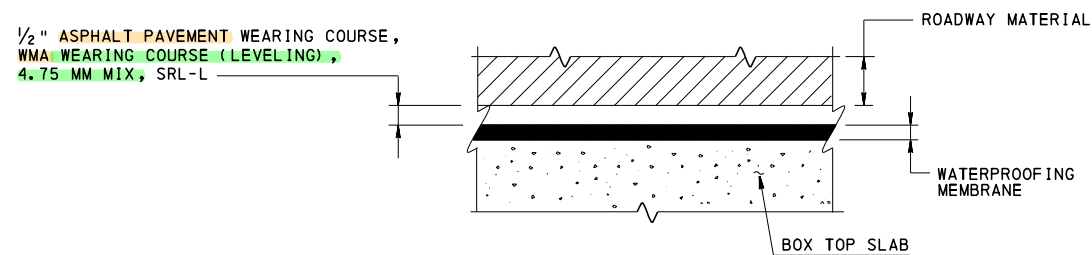
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
TYPICAL WATERPROOFING AND EXPANSION DETAILS-MISCELLANEOUS PRESTRESSED OR PRECAST BRIDGE



TYP. PRECAST BOX SECTION

NO SCALE

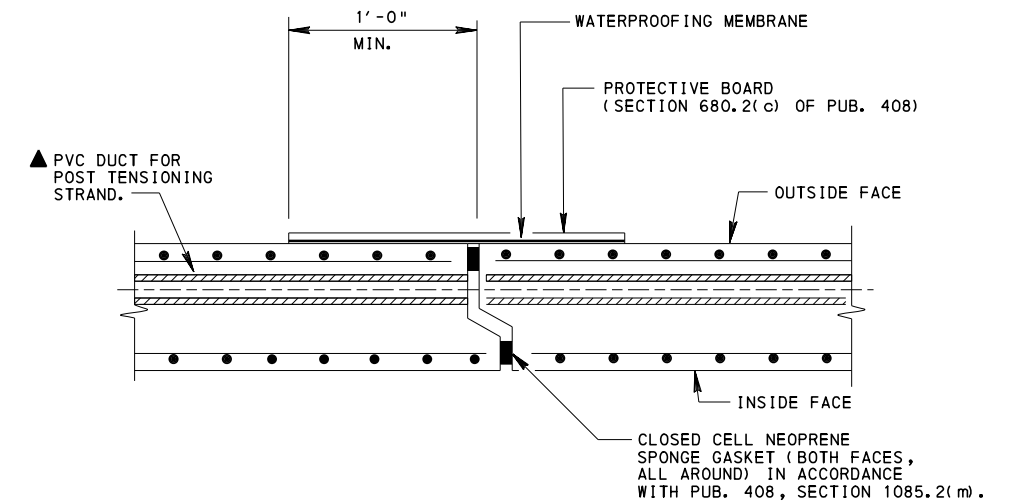


MEMBRANE WATERPROOFING DETAIL

PRECAST BOX CULVERT

NOTES:

1. PROVIDE APPROVED WATERPROOFING MEMBRANE FOR THE ENTIRE TOP WIDTH AND LENGTH OF THE BOX AND 2'-0" WIDTH ± ALONG THE SIDE JOINTS.
2. LIMITS OF WATERPROOFING AT SIDE OF PRECAST BOX SECTION JOINTS 2'-0" WIDTH ± . PLACE THIS BEFORE THE TOP SLAB WATERPROOFING.



SECTION Q-Q
JOINT DETAIL

SEAL AROUND EACH DUCT JOINT WITH A NEOPRENE SPONGE DONUT.

▲ POST TENSIONING DUCTS MAY BE PLACED WITHIN THE WALL OR SLAB ANYWHERE BETWEEN LAYERS OF REINFORCEMENT TO AVOID THE SLOPED PORTION OF THE JOINT SO AS TO PROMOTE SEALING OF THE DUCT.

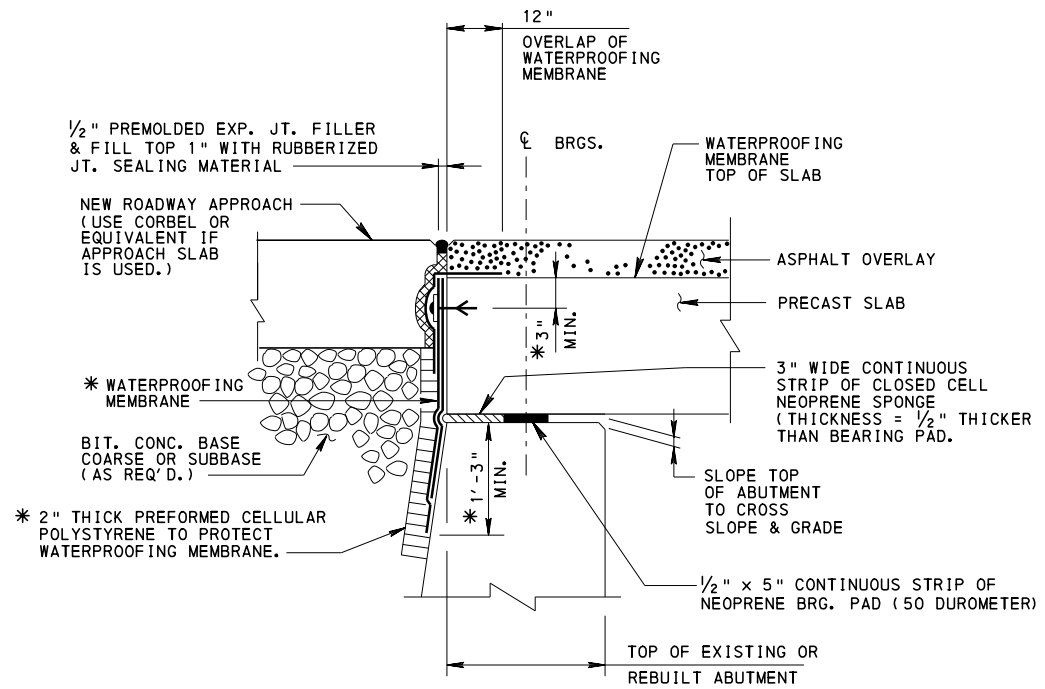
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
TYPICAL WATERPROOFING AND
EXPANSION DETAILS
PRECAST R.C. BOX CULVERTS

RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF BRIDGE ENGINEER

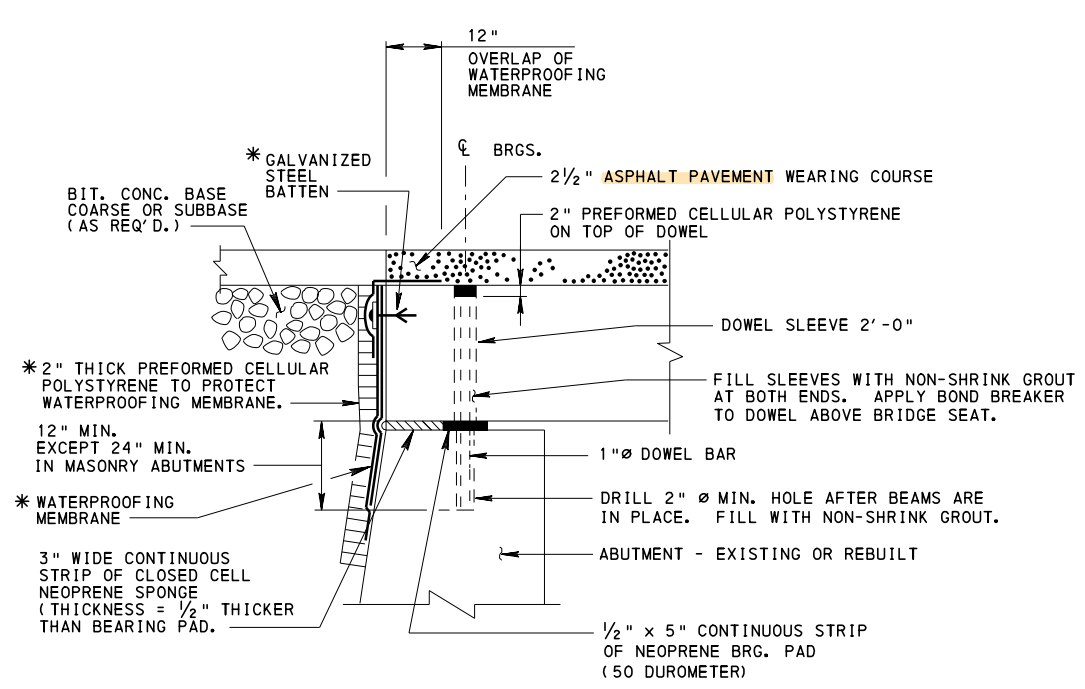
RECOMMENDED NOV. 23, 2022
[Signature]
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 10 OF 12
BC-788M

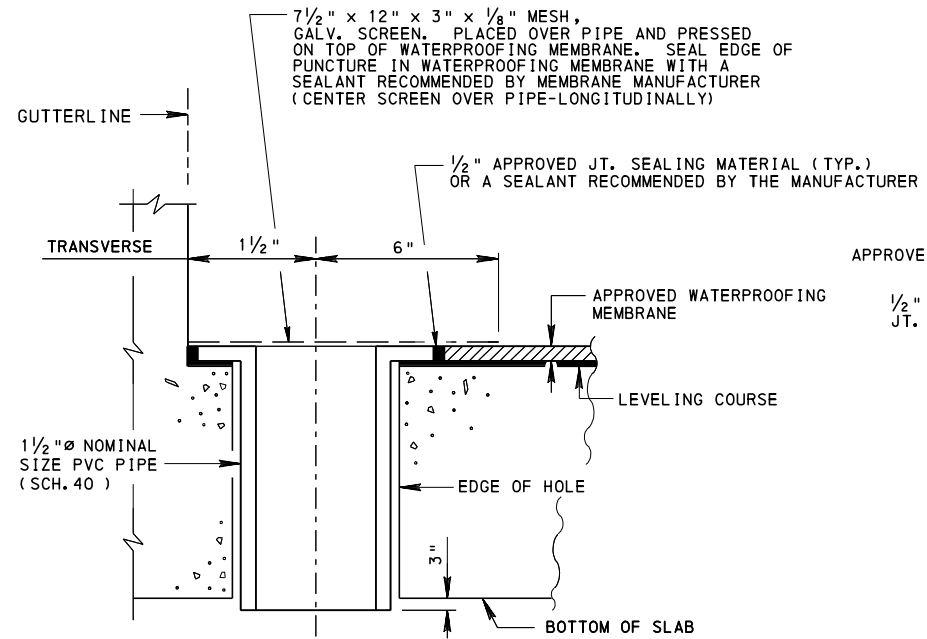


SECTION AT ABUTMENT (TYP.)
FOR PRECAST R.C. SLAB BRIDGE SPAN LENGTHS > 12'-0"
REHABILITATION PROJECTS ONLY

* NOTE:
FOR ADDITIONAL INFORMATION
REFER TO DETAILS ON SHEET 12.

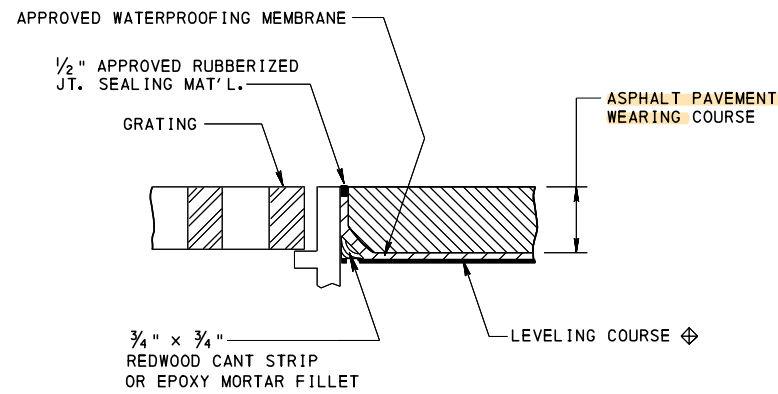


PANEL ANCHOR DETAIL
FOR PRECAST R.C. SLAB BRIDGE SPAN LENGTHS < 12'-0"
REHABILITATION PROJECTS ONLY

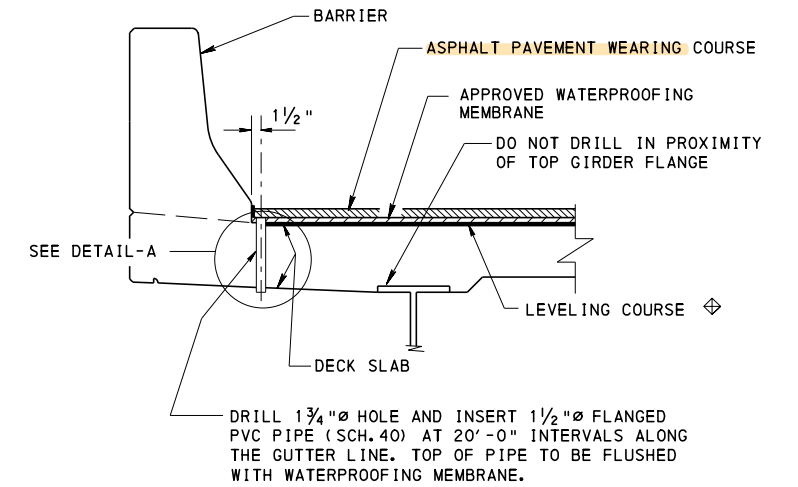


DRAIN PIPE THROUGH DECK SLAB
⊕ (SAME DETAIL @ CURB & MEDIAN BARRIER, IF APPLICABLE)

DETAIL-A



WATERPROOFING MEMBRANE AT SCUPPER

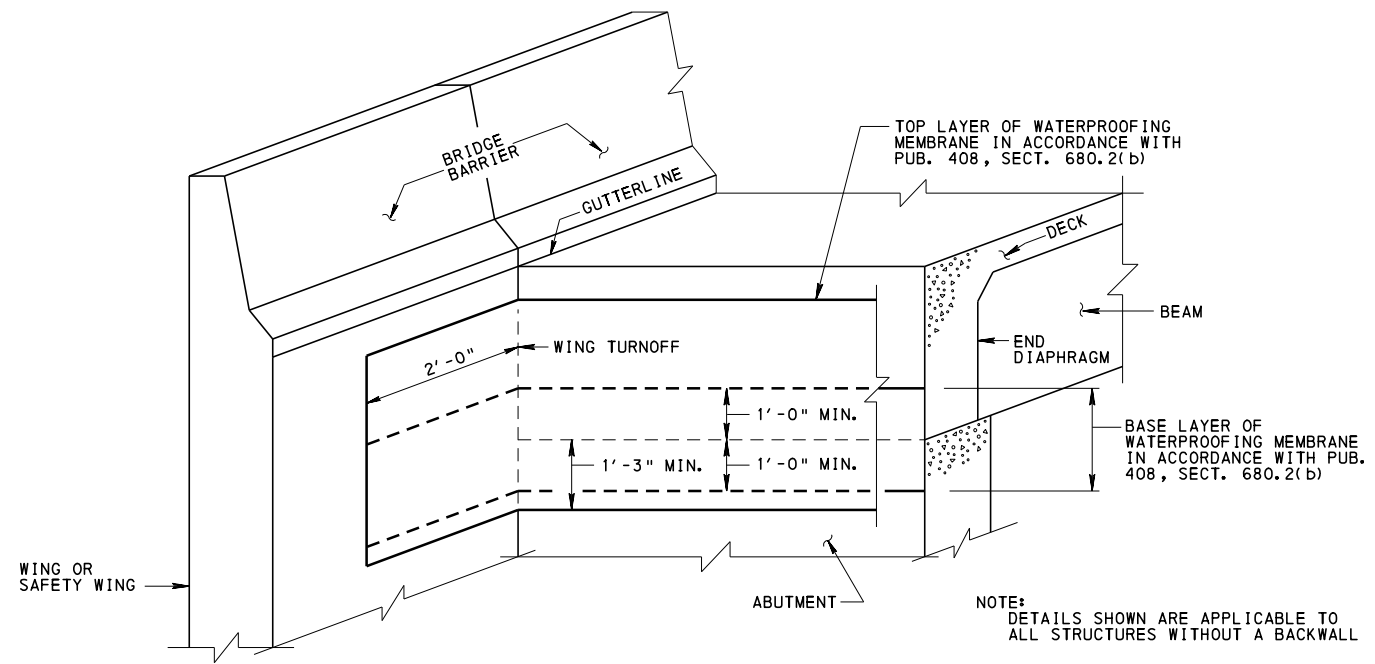


BARRIER SECTION
(SAME DETAIL AT CURB)

ASPHALT PAVEMENT OVERLAY AND WATERPROOFING MEMBRANE DETAILS AT DECK DRAINS
REHABILITATION PROJECTS ONLY

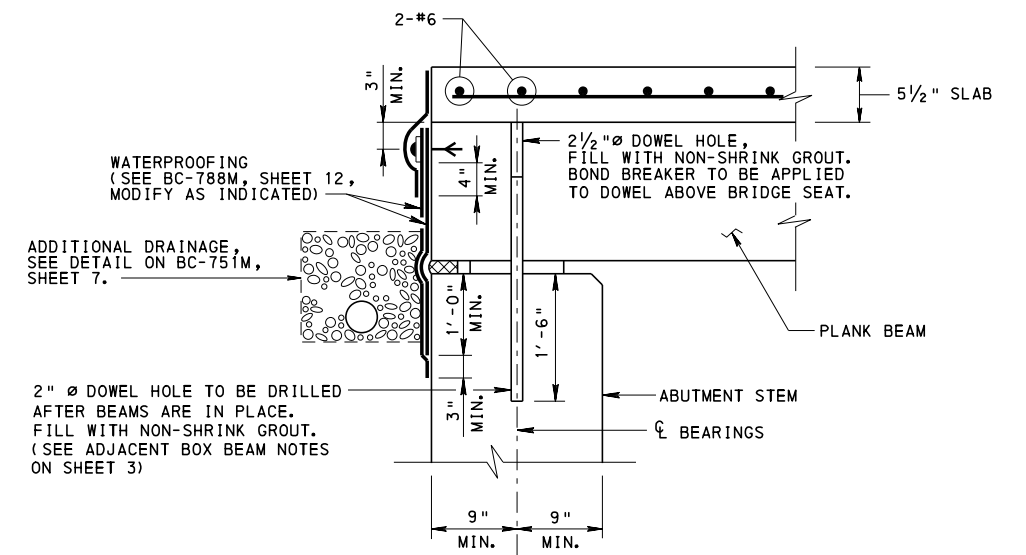
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
TYPICAL WATERPROOFING AND
EXPANSION DETAILS
R.C. BRIDGE DECK



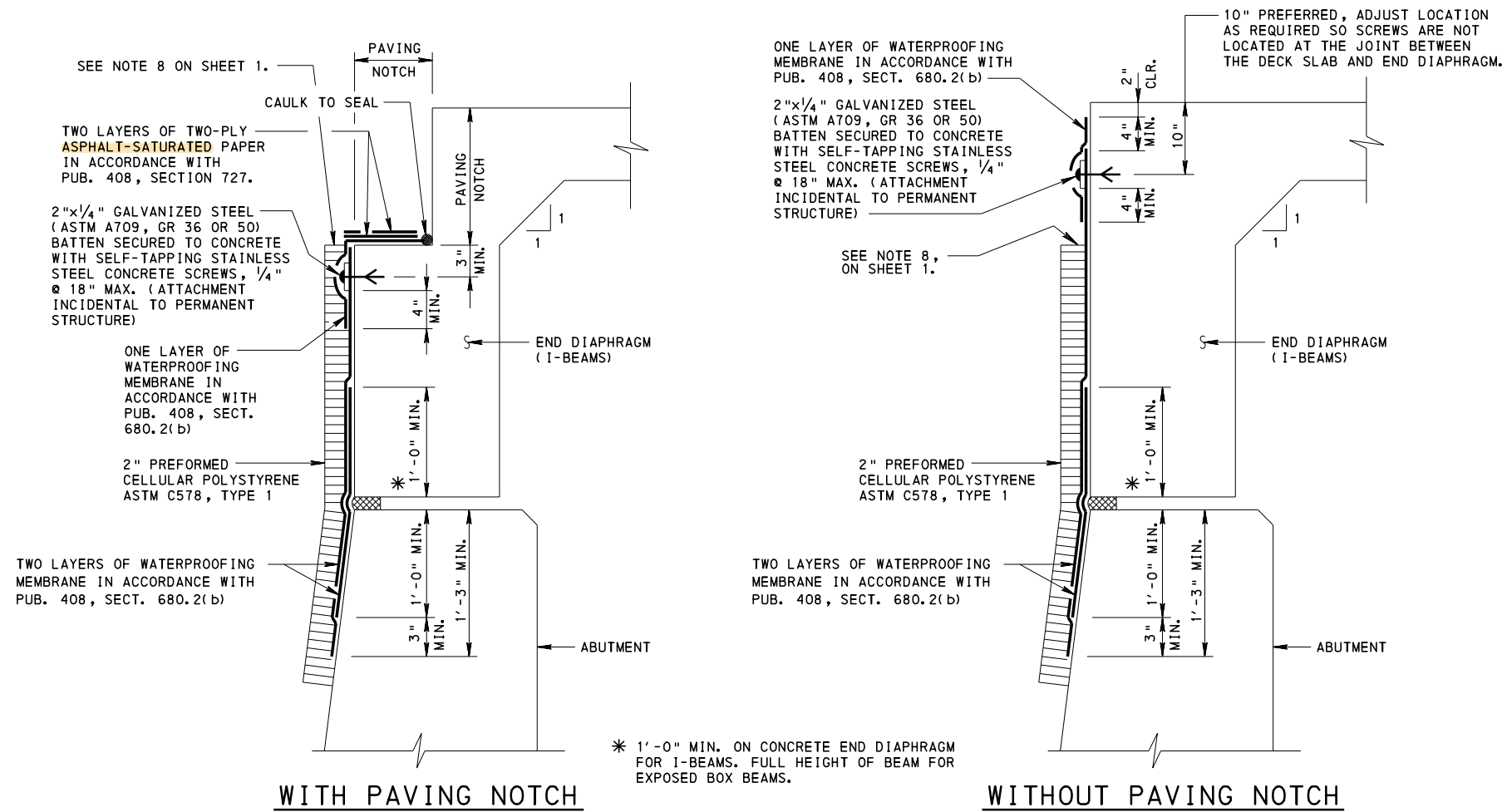
MEMBRANE WATERPROOFING DETAIL

BATTEN AND BATTEN WATERPROOFING NOT SHOWN



TYPICAL LONGITUDINAL SECTION

FOR PLANK BEAMS



WATERPROOFING DETAIL AT ABUTMENT WITHOUT BACKWALL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
MISCELLANEOUS
WATERPROOFING DETAILS

GENERAL NOTES

DESCRIPTION - THIS WORK IS GROUTING OF STEEL POST-TENSIONING TENDONS IN CONCRETE STRUCTURES. THIS SPECIFICATION APPLIES TO ALL GROUTED POST-TENSIONING OPERATIONS IN BRIDGE SUPERSTRUCTURE AND SUBSTRUCTURE, INCLUDING BOX-GIRDERS, I-GIRDERS, SEGMENTAL GIRDERS, SPLICED GIRDERS, PIER CAPS, AND PIERS.

MATERIAL

USE MATERIALS MEETING THE REQUIREMENTS CLASS C (PRE-PACKAGED). THIXOTROPIC GROUT AS SPECIFIED IN THE CURRENT EDITION OF POST TENSIONING INSTITUTE'S GUIDE SPECIFICATION FOR GROUTED POST-TENSIONING (PTI/ASBI M 50) AND POST-TENSIONING INSTITUTE'S SPECIFICATION FOR GROUTING OF POST-TENSIONED STRUCTURES (PTI M 55).

USE PRE-PACKAGED GROUT MATERIALS WITHIN 6 MONTHS OF THE MANUFACTURE DATE OR PER MANUFACTURER'S RECOMMENDATIONS FOR SHELF-LIFE, WHICHEVER IS LESS.

USE GROUT FROM ONE PLANT FOR A GIVEN PROJECT LOCATION.

FILLERS ARE NOT PERMITTED IN GROUT.

EQUIPMENT

PROVIDE THE NECESSARY STRESSING AND GROUTING EQUIPMENT TO PERFORM THE WORK PER PTI M50/M55. USE OF HIGH-SPEED SHEAR COLLOIDAL MIXER IS REQUIRED. VERIFY ALL EQUIPMENT CALIBRATIONS PRIOR TO USE.

CONSTRUCTION

A. GROUTING PERSONNEL QUALIFICATIONS:

PROVIDE PERSONNEL MEETING THE FOLLOWING MINIMUM REQUIREMENTS TO PERFORM GROUTING OPERATIONS:

1. A FOREMAN CERTIFIED AS AN AMERICAN SEGMENTAL BRIDGE INSTITUTE (ASBI) CERTIFIED TECHNICIAN AND PTI LEVEL 2 BONDED PT-FIELD SPECIALIST.
2. MINIMUM OF 25% OF THE PERSONEL PERFORMING THE GROUTING OPERATIONS MUST BE CERTIFIED AS PTI LEVEL 1 BONDED PT-FIELD INSTALLATION.

B. TENDON INSTALLATION:

USE POST-TENSION TENDON DUCT MATERIAL PER PTI M 50 AND M 55. POST-TENSION TENDON INSTALLATION SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF PTI M 50 AND M 55. PRIOR TO GROUTING OPERATIONS, PERFORM PRESSURE TESTING OF INSTALLED TENDONS PER PTI M 50 AND M 55.

PROVIDE THE MINIMUM INNER DIAMETER OF INLETS AND OUTLETS WITH AT LEAST 3/4 IN FOR STRAND TENDONS AND 3/8 IN FOR SINGLE BAR TENDONS. PLACE INLETS AND OUTLETS AT LOCATIONS RECOMMENDED BY THE DESIGN OR CONSTRUCTION ENGINEER AND AT THE FOLLOWING LOCATIONS:

- AT THE ANCHORAGE AREA OF THE TENDON.
- AT THE HIGHEST POINTS OF THE DUCT, WHEN THE VERTICAL DISTANCE BETWEEN THE HIGHEST AND LOWEST POINT IS MORE THAN 20 IN.
- WHERE OUTLETS ARE PLACED AT THE HIGH POINTS, AT A DISTANCE NOT TO EXCEED 36 IN BOTH DIRECTIONS FROM THE HIGH-POINT OUTLETS.
- AN ADDITIONAL OUTLET AT A SHORT DISTANCE DOWNSTREAM (AT APPROXIMATELY THE LOCATION WHERE THERE HAS BEEN A VERTICAL DROP OF A DISTANCE EQUAL TO ONE HALF DUCT DIAMETER) OF A HIGH POINT OUTLET.
- AT MAJOR CHANGES IN THE CROSS-SECTION OF THE DUCT, SUCH AS COUPLERS AND ANCHORAGES.
- AT ALL LOW POINTS (FREE-DRAINING).
- PRIMARY INLET: AT OR NEAR THE LOWEST POINT OF THE TENDON.

PROVIDE INLETS AND OUTLETS WITH POSITIVE SHUT-OFFS AND CHECK TO BE SURE THEY CAN BE PROPERLY OPENED AND CLOSED.

C. GROUTING PLAN:

SUBMIT A GROUTING PLAN TO THE ENGINEER FOR REVIEW AND ACCEPTANCE AT LEAST 4 WEEKS PRIOR TO GROUTING. PERFORM A MOCK-UP TEST WITH THE EQUIPMENT AND MATERIALS THAT WILL BE USED ON THE JOB AND SUBMIT RESULTS WITH THE GROUTING PLAN. INCLUDE THE FOLLOWING IN THE GROUTING PLAN:

1. NAMES, EXPERIENCE AND QUALIFICATIONS OF GROUTING CREW AND SUPERVISOR;
2. ASBI CERTIFICATION DOCUMENTATION FOR THE TECHNICIAN AND BACKUP.
3. TYPE OF EQUIPMENT (TYPE, SPEED, CAPACITY, INCLUDING BACK-UP EQUIPMENT).
4. TARGETED FLOW RATE DURING PUMPING AND METHOD OF CONTROLLING RATE.
5. TYPE OF GROUT AND WATER CONTENT THAT WILL BE USED FOR INITIAL ON-SITE MIX.
6. ESTIMATED QUANTITY OF GROUT FOR EACH TENDON GROUP.
7. MATERIAL SUPPLIER NAME AND AVAILABLE DATA SHEETS.
8. LIST OF ON-SITE TESTING AND FREQUENCY.
9. INLET AND VENTION DETAILS (TYPE, LOCATION, SIZE).
10. PLANS FOR PROTECTION OF TENDONS PRIOR TO GROUTING (PRIOR TO INSTALLATION AND AFTER INSTALLATION).
11. PROVIDE A PLAN (ADDITIONAL PROTECTION) IF TENDONS WILL REMAIN UNGROUTED MORE THAN 7 DAYS.
12. AIR TESTING PROCEDURE.
13. GROUT MIXING AND PUMPING PROCEDURES.
14. ORDER OF TENDON GROUTING.
15. DIRECTION OF GROUTING AND SEQUENCE OF VENT SHUTOFF.
16. PROCEDURES FOR BLOCKAGES (INCLUDING MEANS OF FLUSHING IF NECESSARY)
17. PROCEDURES FOR INSPECTION OF TENDONS AFTER GROUTING.
18. PROCEDURES FOR FILLING ANY VOIDS.
19. SAMPLE GROUTING RECORD FORMS.
20. RESULTS OF TENDON MOCK-UP.

D. PRE-GROUTING OPERATIONS:

1. PLACE A PERMANENT PLASTIC END CAP WITH A VENT OVER EACH ANCHOR HEAD IMMEDIATELY AFTER STRAND TAILS ARE CUT.
2. BEFORE GROUTING BEGINS, CHECK AND PREPARE DUCTS BY BLOWING THROUGH OIL-FREE AND WATER-FREE COMPRESSED AIR. OPEN AND CLOSE EACH VENT IN TURN TO BLOW OUT MOISTURE.
3. INSPECTION TO ENSURE THAT ALL MATERIALS ARE OF THE SPECIFIED TYPE AND QUANTITY.
4. INSPECTION TO ENSURE THAT ALL EQUIPMENT IS IN SATISFACTORY CONDITION.
5. INSPECTION OF DUCTS TO ENSURE THAT THEY ARE FREE OF WATER, DEBRIS, AND OTHER OBSTRUCTIONS.
6. INSPECTION OF DUCTS TO ENSURE THAT THERE WILL BE NO GROUT LEAKAGE BETWEEN ADJACENT DUCTS IN THE JOINT AREAS OR AT COUPLERS FOR EXTERNAL TENDONS.
7. TEMPERATURE MEASUREMENT OF AIR, WATER, AND PREPACKAGED GROUT TO ENSURE THAT THEY ARE WITHIN THE ACCEPTABLE LIMITS.
8. INSPECTION OF ALL PREPACKAGED GROUT OR CEMENT PACKAGES FOR EVIDENCE OF AGE AND DAMPNESS, SUCH AS LUMPS AND HARDENED PIECES.
9. COMMENCE GROUTING OPERATIONS ONLY AFTER THE ENGINEER'S ACCEPTANCE TO PROCEED IS RECEIVED.

E. GROUTING OPERATION:

1. PERFORM GROUTING OPERATIONS IN ACCORDANCE WITH PTI M 50 AND M55.
2. AT A MINIMUM, MONITOR AND CONDUCTION QUALITY TESTING TO VERIFY MATERIAL PROPERTIES PER PRODUCTION TESTS AS SPECIFIED IN PTI M 55.
3. FOLLOW PTI M 50 AND M 55 FOR REQUIRED PRE-GROUTING OPERATIONS AND POST-GROUTING OPERATION, MIXING CONDITIONS AND TEMPERATURES, GROUTING OPERATIONS AND PROCEDURES, AND POST GROUTING OPERATIONS AND VERIFICATION TESTING.

GROUT ONLY WHEN BOTH THE AMBIENT AIR TEMPERATURE AND SUBSTRATE TEMPERATURE ARE AT LEAST 41 DEGREES F DURING THE GROUTING OPERATION AND FOR 3 HOURS THEREAFTER. ADDITIONALLY, GROUT TEMPERATURE MUST BE MAINTAINED ABOVE 35 DEGREES F FOR 3 CONSECUTIVE DAYS AFTER GROUTING.

F. MINIMUM QUALITY CONTROL TESTING:

NOTIFY THE DEPARTMENT'S REPRESENTATIVE PRIOR TO PERFORMING QUALITY CONTROL TESTING. QUALITY CONTROL TESTING IS TO BE PERFORMED BY THE ASBI/PTI GROUT TECHNICIAN. PERFORM QUALITY CONTROL TESTING TO CONFIRM THE PRODUCTION GROUT, AT MINIMUM, MEETS OR EXCEED THE REQUIREMENTS IN TABLE F.1.

THE TESTING OF PRODUCTION GROUT SHALL BE CARRIED OUT AS DESCRIBED IN THE SECTION (TESTING, QUALITY CONTROL AND QUALITY ASSURANCE) OF PTI M 55 WITH THE FOLLOWING MINIMUM NUMBER OF TESTS:

1. A MINIMUM OF ONE PRESSURE BLEED TEST (SECTION 4.4.6) SHALL BE PERFORMED PER PROJECT DURING FIELD TRIAL TESTING. ADDITIONAL TESTS ARE REQUIRED FOR EACH TRUCK LOAD OF PREPACKAGED GROUT DELIVERED TO THE PROJECT, AND EVERY 20 TONS (40,000 lb) OF UNMIXED MATERIALS BEFORE THE ADDITION OF WATER. THE SAMPLE OF GROUT FOR THE TEST IS TO BE TAKEN AT THE MIXER.
2. A WET DENSITY TEST SHALL BE PERFORMED AT THE MIXER INITIALLY AND EVERY TWO HOURS, AND AT THE LAST OUTLET OF EACH TENDON PER MINIMUM VALUE IN 4.4.8.
3. MINIMUM OF TWO FLUIDITY TESTS (FLOW CONE), ONE AT THE MIXER AND ONE AT THE DUCT OUTLET AS PER SECTION 4.4.5, REPEAT TESTING EVERY 2 HOURS OF GROUTING OPERATIONS. THE EFFLUX TIME SHALL BE WITHIN 5 SECONDS OF THE VALUES ESTABLISHED DURING LABORATORY TESTING. IF AN EXPANSIVE ADMIXTURE IS USED IN THE GROUT FOR EXTERNAL TENDONS USING PLASTIC DUCTS, THEN ONE VOLUME CHANGE TEST (SECTION 2.4.4) PER DAY SHALL BE CARRIED OUT.
4. A MINIMUM OF ONE CHLORIDE ION CONCENTRATION TEST SHALL BE PERFORMED PER PROJECT DURING FIELD TRIAL TESTING. ADDITIONAL TESTS ARE REQUIRED FOR EVERY 20 TONS (40,000 lb) OF UNMIXED MATERIALS DELIVERED TO THE PROJECT BEFORE THE ADDITION OF WATER.

TEST	FREQUENCY	PERFORMANCE CRITERIA	TEST METHOD
GROUT STRENGTH TEST (AVERAGE OF 3 CUBES)	1 PER DAY	= 3,000 PSI AT 7 DAYS = 5,000 PSI AT 28 DAYS	ASTM C942
FLUIDITY TEST	1 EVERY* 2 HOURS	WITHIN * 5 SEC OF VALUES ESTABLISHED DURING LABORATORY TESTING	ASTM C939**
SCHUPACK PRESSURE BLEED TEST	1 PER DAY*		ASTM 1741
API MUD BALANCE TEST	2 PER DAY***	VALUE SHALL BE BETWEEN THE VALUES OBTAINED DURING PRE-QUALIFICATION TESTING AND MINIMUM AND MAXIMUM WATER DOSAGE.	
CHANGE IN VOLUME TESTS (IF EXPANSIVE AGENT IS USED)	1 PER DAY	0%- +0.1% IN 24 HRS. MAX +0.2% AT 28 DAYS	ASTM 1090

* TAKEN AT THE INLET.

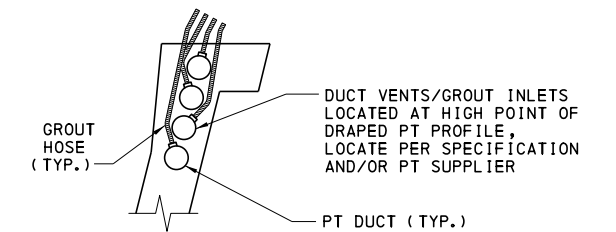
** USE EITHER THE STANDARD ASTM C939 FLOW CONE TEST OR THE MODIFIED TEST DEPENDING ON WHICH WAS APPROVED AND USED INITIALLY IN THE LABORATORY TESTING.

*** OR WHEN THERE IS A VISUAL OR APPARENT CHANGE IN THE CHARACTERISTICS OF THE GROUT. IN ADDITION TO THE TWO PER DAY, TAKE AN ADDITIONAL SAMPLE FROM THE DUCT OUTLET TO ENSURE THAT EXTRA WATER IS NOT PRESENT IN THE TENDON.

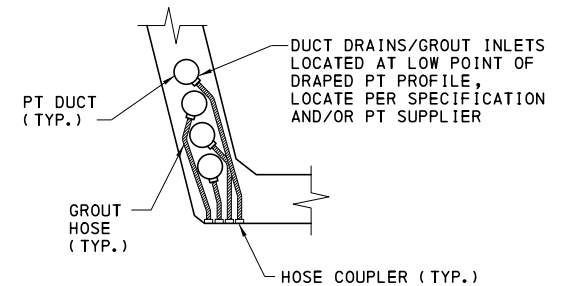
G. MIXING CONDITIONS:

1. HOT WEATHER. EMPLOY HOT-WEATHER MIXING AND PROTECTION METHODS WHEN THE AMBIENT AIR TEMPERATURE EXCEEDS 90°F. COOL-MIX WATER TO MAINTAIN GROUT TEMPERATURE AT 80°F OR BELOW AT THE TIME OF GROUTING. ICE MAY BE NECESSARY AND IF USED MUST BE ADDED TO THE MIX WATER TO LOWER THE WATER TEMPERATURE PRIOR TO MIXING. DO NOT ALLOW ICE IN THE GROUT MIXTURE.
2. COLD WEATHER. MAINTAIN A DAILY RECORD OF MINIMUM AND MAXIMUM AMBIENT AIR TEMPERATURES DURING COLD WEATHER. RECORD THE TEMPERATURE OF THE GROUT DRY INGREDIENTS AND THE STRUCTURE SURROUNDING THE DUCTS TO BE GROUTED.

WHEN AMBIENT AIR TEMPERATURE HAS BEEN BELOW (32°F) AFTER DUCT PLACEMENT AND PRIOR TO GROUTING, BLOW DRY AIR THROUGH THE DUCTS TO EXPEL ANY TRAPPED WATER, FROST, OR ICE. GROUT ONLY WHEN BOTH THE AMBIENT AIR TEMPERATURE AND SUBSTRATE TEMPERATURE ARE AT LEAST 41 DEGREES F DURING THE GROUTING OPERATION AND FOR 3 HOURS THEREAFTER. ADDITIONALLY, GROUT TEMPERATURE MUST BE MAINTAINED ABOVE 35 DEGREES F FOR 3 CONSECUTIVE DAYS AFTER GROUTING.



TOP DUCT VENT DETAIL



BOTTOM DUCT DRAIN DETAIL

NOTE: DUCT DRAIN FOR U-GIRDER SHOWN, I-GIRDER SIMILAR.

CHANGE 2

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY**

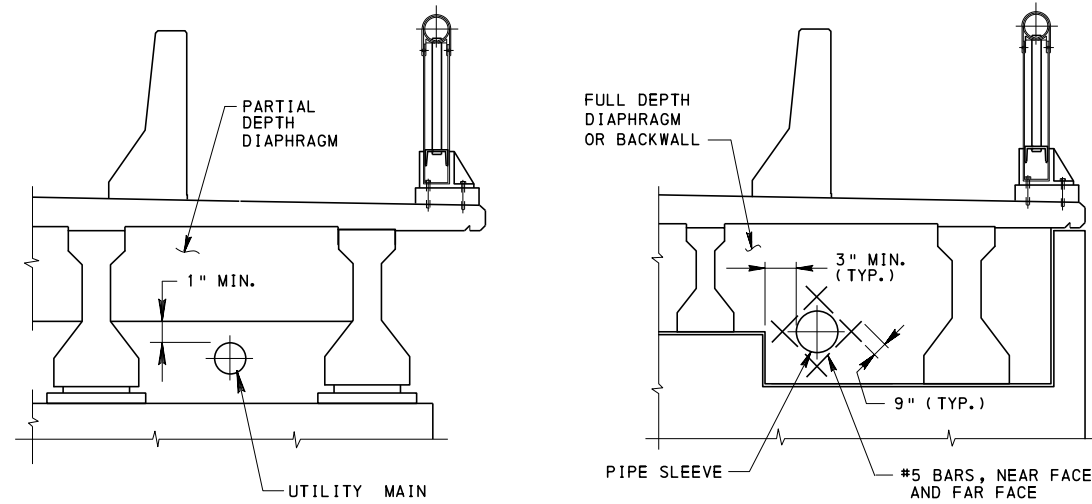
**STANDARD
POST-TENSIONING OF
CONCRETE GIRDERS
GROUTING SPECIFICATIONS**

RECOMMENDED JAN. 31, 2019
T. Ross R. Maciora
CHIEF BRIDGE ENGINEER

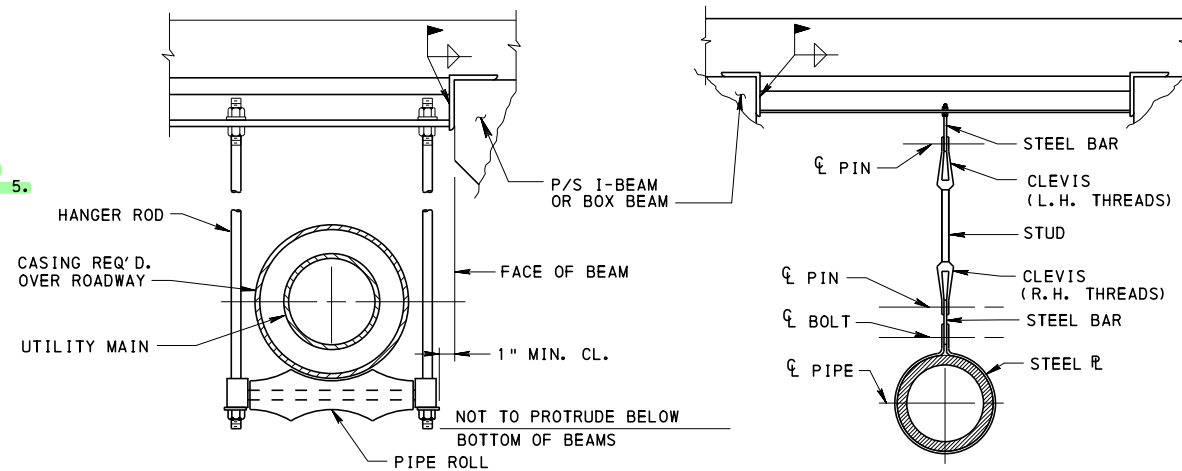
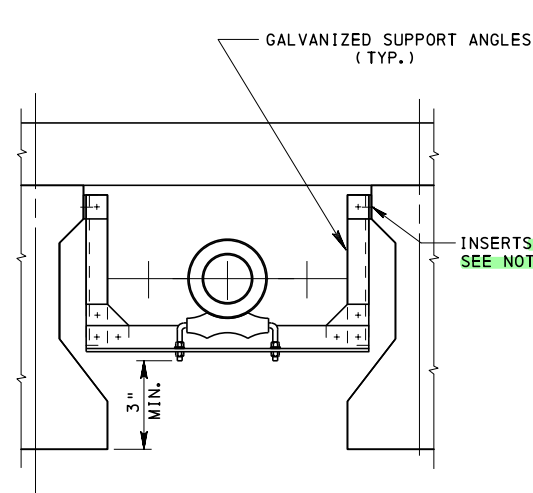
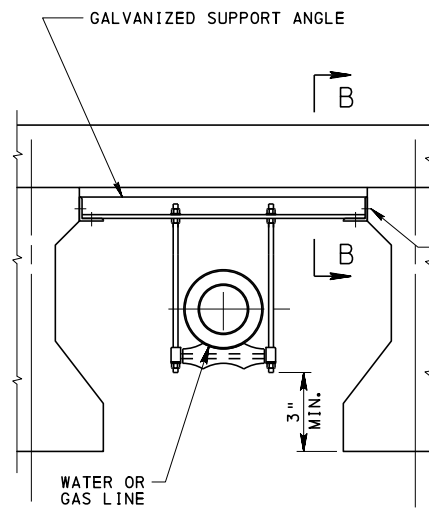
RECOMMENDED JAN. 31, 2019
Robert J. ...
ACTING DIR. BUR. OF PROJECT DELIVERY

SHEET 1 OF 1
BC-790M

REFERENCE DRAWINGS

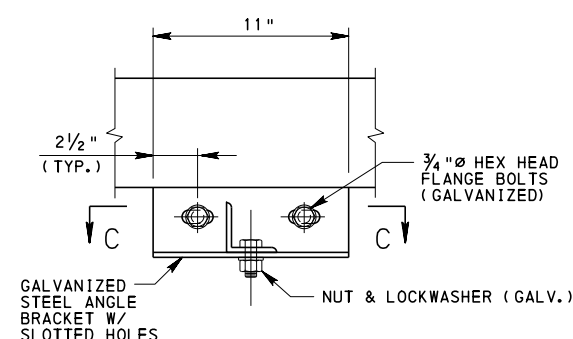


LOCATION OF SLEEVES OR CASINGS

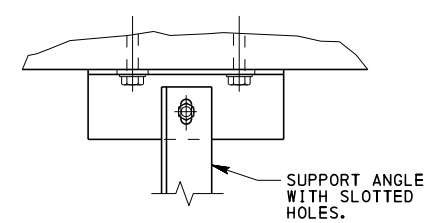


- GENERAL NOTES:**
1. NO UTILITIES MAY PROTRUDE BELOW THE BOTTOM OF THE BEAMS (EXCEPTIONS AT END SPANS NOT OVER TRAFFIC, SUBJECT TO APPROVAL).
 2. NO UTILITIES MAY BE HUNG UNDER THE OVERHANG OR FROM THE DECK, EXCEPT WHERE THERE IS NO OTHER FEASIBLE SOLUTION. THIS IS SUBJECT TO THE BRIDGE ENGINEER'S APPROVAL.
 3. DRILLING IN P/S BEAMS OR FIELD WELDING OF STEEL BEAMS MUST BE EVALUATED ON A CASE BY CASE BASIS AND APPROVED BY THE BRIDGE ENGINEER.
 4. ALL HANGERS, SUPPORTS AND THEIR ASSOCIATED HARDWARE TO BE EITHER GALVANIZED OR ZINC RICH PRIMER AND APPLY FINISH COAT TO MATCH STEEL BEAM COLOR.
 5. **INSERTS TO BE GALVANIZED OR COMPLETELY ZINC-ELECTROPLATED.**

CHANGE 2



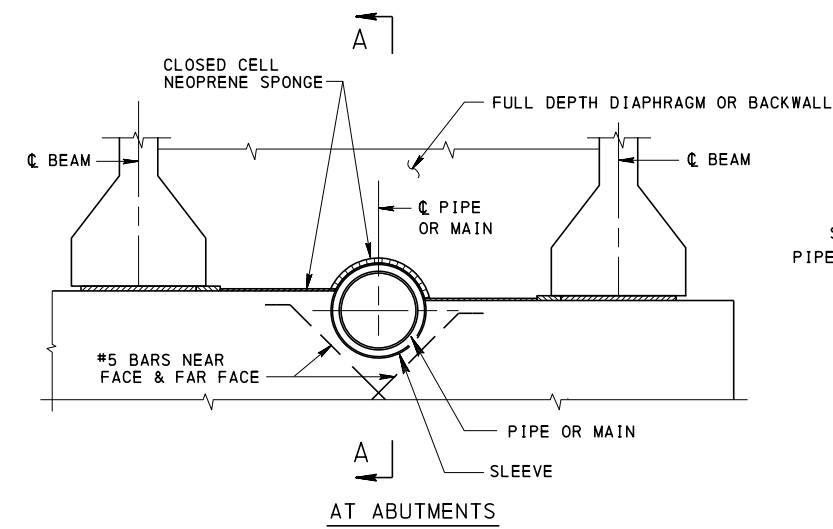
SECTION B-B



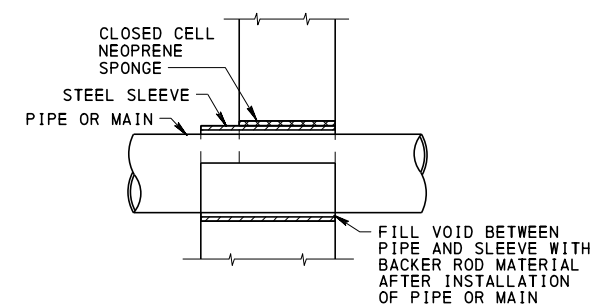
SECTION C-C

UTILITIES SUPPORTED BY I-BEAMS

- SPREAD BOX BEAMS ARE SIMILAR.
- INSERTS ARE NOT PERMITTED FOR CONNECTION TO FLANGES OF BULB-TEE BEAMS.



CASINGS AND SLEEVES

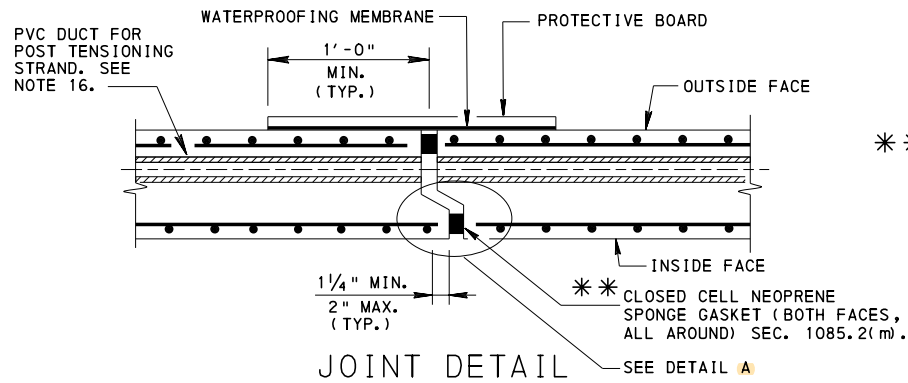


SECTION A-A

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF PROJECT DELIVERY

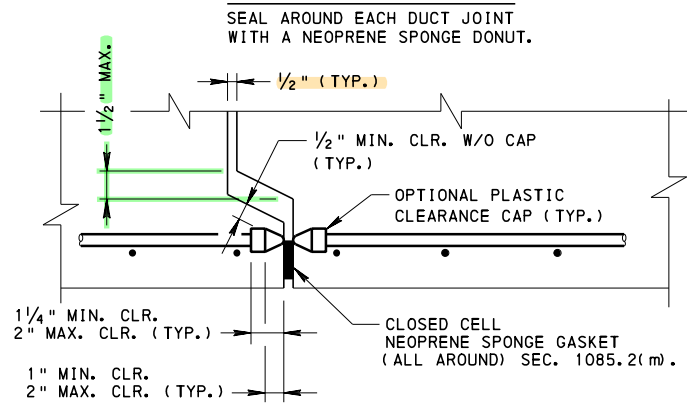
STANDARD
 UTILITY ATTACHMENT &
 SUPPORT DETAILS
 PRESTRESSED BRIDGES

RECOMMENDED JAN. 31, 2019 <i>T. Renee P. Macivica</i> CHIEF BRIDGE ENGINEER	RECOMMENDED JAN. 31, 2019 <i>Alvin J. [Signature]</i> ACTING DIR. BUR. OF PROJECT DELIVERY	SHEET 1 OF 1 BC-794M
---	--	--------------------------------



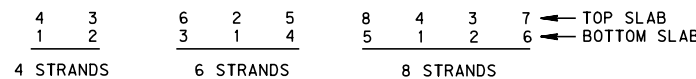
*** TOTAL NEOPRENE WIDTH SHALL BE DESIGNED FOR THE CROSS-SECTION STRESS FROM POST-TENSION FORCES. TOTAL NEOPRENE WIDTH SHALL BE DIVIDED BETWEEN THE INSIDE AND OUTSIDE FACES. DIVIDE THE TOTAL WIDTH BY 2 AND ROUND TO THE NEAREST INCH.

WALL SIZE IN	REQUIRED TOTAL NEOPRENE WIDTH	
	POST-TENSIONING CROSS SECTION STRESS PSI	
	10-50	50-100
< = 10"	4"	4"
10.5" TO 12.5"	5"	6"
13" TO 15"	6"	8"
15.5" TO 17.5"	7"	10"
18" TO 20"	8"	12"
20.5" TO 23.5"	9"	14"
> = 24"	10"	16"



DETAIL A

POST TENSIONING SEQUENCE:

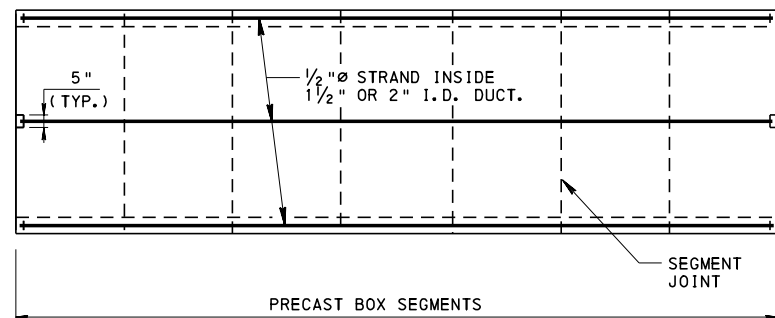


NOTES:

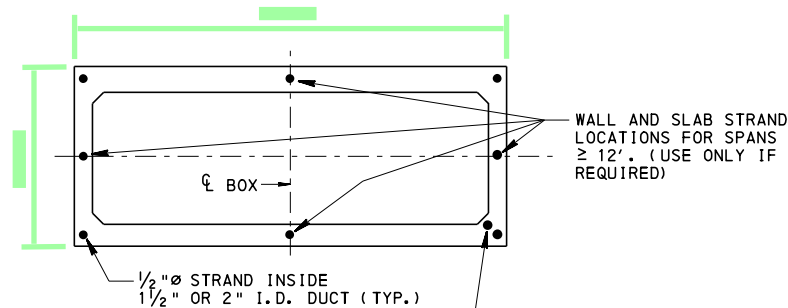
- COMPLETE TENSIONING IN THREE PASSES: 1/3, 1/2 AND FULL POST TENSIONING FORCE.
- FIRST AND SECOND TENSIONINGS MAY BE ALTERED AS REQUIRED TO MAINTAIN PROPER ALIGNMENT OF THE CULVERT.
- WHERE MORE THAN EIGHT STRANDS ARE REQUIRED, TENSION ADDITIONAL STRANDS SIMILARLY AROUND THE CENTRAL AXIS.

DUCT NOTES:

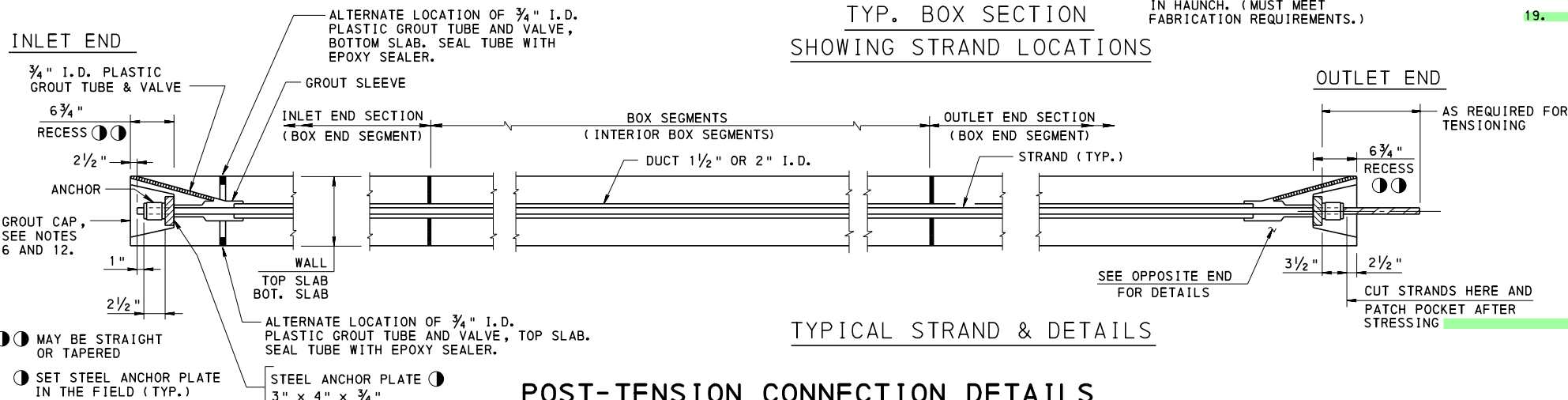
- PRECISE ALIGNMENT OF DUCTS AT JOINTS IS CRITICAL.
- ALL DUCTS (SHEATHING) TO BE 1 1/2" OR 2" INSIDE DIAMETER.
- GROUT TUBES & VENTS TO BE 3/4" INSIDE DIAMETER.



PLAN VIEW



TYP. BOX SECTION SHOWING STRAND LOCATIONS



TYPICAL STRAND & DETAILS

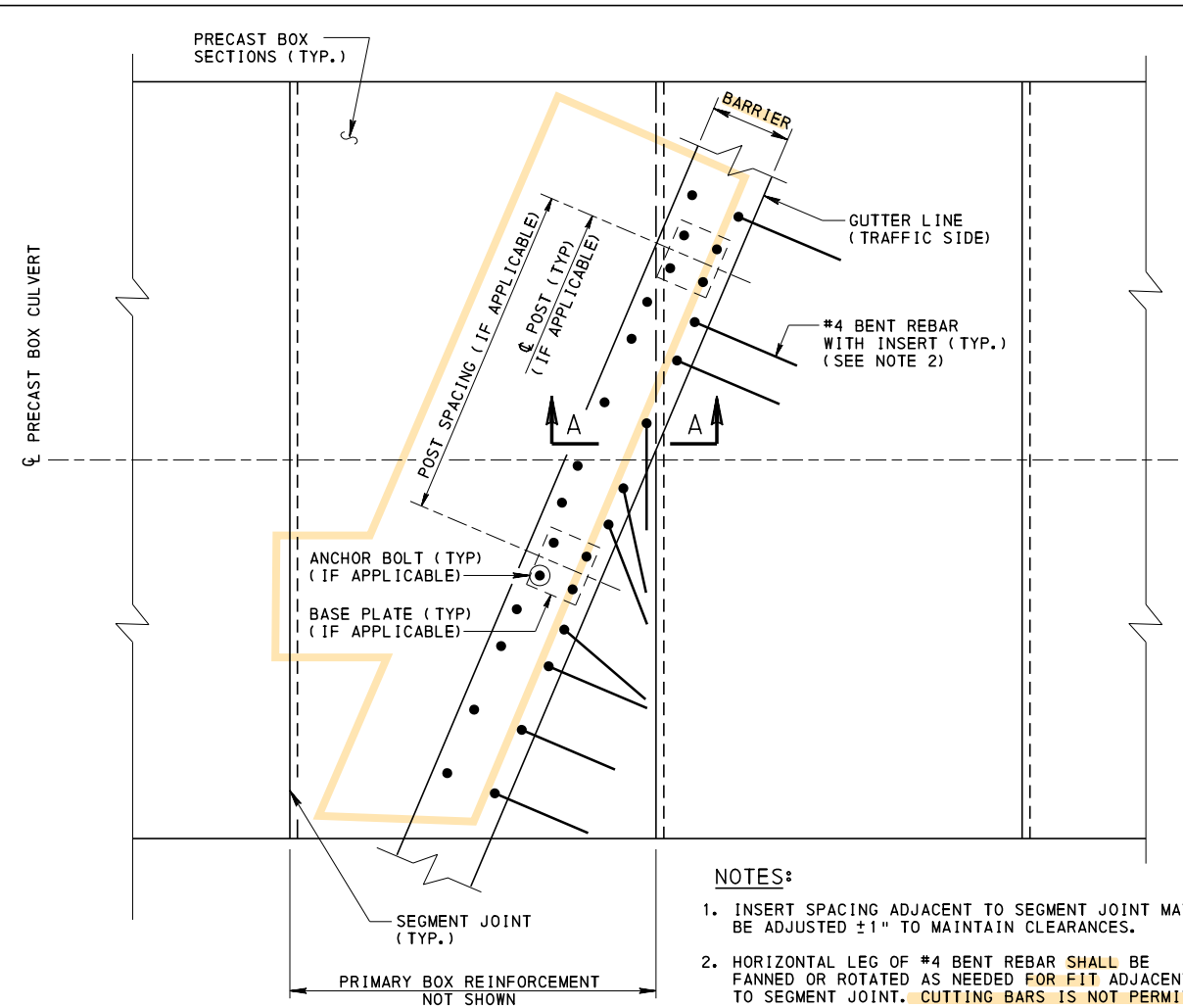
INSTRUCTIONS FOR POST-TENSIONING

- ALWAYS USE POST-TENSIONING WHEN END WALLS ARE NOT USED. USE THIS DETAIL WITH PRECAST OR CAST-IN-PLACE END WALLS AS PER DESIGN DRAWINGS.
- SHOW ALL DETAILS ON SHOP DRAWINGS.
- PROVIDE 1/2" DIAMETER POLY STRANDS OR APPROVED EQUAL HAVING A YIELD STRENGTH OF 270 KSI.
- SNUG FIT ALL JOINTS BEFORE POST-TENSIONING.
- INSTALL STRANDS IN PRECAST SECTIONS. STRESS EACH STRAND TO AN EFFECTIVE FORCE OF 10 PSI OVER THE CROSS SECTION OF ANY SECTION. CHECK RAM AREA AND CALIBRATION CURVES OF EQUIPMENT FURNISHED FOR GAGE PRESSURES.
- AFTER STRESSING, GROUT ALL STRAND DUCTS. REFER TO PUB. 408 SEC. 1085 FOR TIME LIMITATIONS ASSOCIATED WITH GROUTING.
- PLACE GROUT MIX INTO TUBING USING PRESSURE GROUT.
- PROVIDE POST TENSIONING OPERATIONS AND MATERIALS IN ACCORDANCE WITH PUBLICATION 408, SECTION 1108. SHOP DRAWINGS ARE REQUIRED.
- SUBMIT POST TENSIONING COMPUTATIONS WITH SHOP DRAWINGS SHOWING THE STRAND PATTERN AND REQUIRED POST-TENSIONING FORCE. BASE DESIGN UPON THE FOLLOWING CRITERIA:
 - THE TOTAL POST TENSION FORCE IS THE SUM OF THE FORCE REQUIRED TO OVERCOME SOIL FRICTION PLUS THE FORCE REQUIRED TO CREATE A PRESSURE OF 10 PSI OVER THE CROSS SECTION OF THE CULVERT.
 - MAXIMUM TOTAL POST TENSION FORCE SHOULD NOT CREATE A PRESSURE GREATER THAN 100 PSI OVER THE CROSS SECTION OF ANY SEGMENT.
 - MINIMUM TOTAL POST TENSION FORCE IS 100 KIPS.
 - MAXIMUM LOAD ON A 1/2" DIAMETER STRAND IS 29 KIP. USE 0.6" DIAMETER STRAND WITH HIGHER LOAD WHEN PERMITTED.
 - USE A COEFFICIENT OF SOIL FRICTION OF 0.6.
 - PLACE STRANDS SYMMETRICALLY ABOUT BOTH AXES OF THE CULVERT CROSS SECTION.
 - USE A MINIMUM OF 4 STRANDS.
 - MAXIMUM STRAND SPACING IS 8'-0", EXCEPT FOR CULVERTS LESS THAN 12'-0" SPAN.
 - MINIMUM STRAND SPACING IS 2'-0".
 - PLACE CORNER STRANDS AT THE LOCATION OF CENTERLINES BETWEEN WALL AND SLAB OR AT A MAXIMUM DISTANCE OF 2'-0" FROM THIS LOCATION.
 - LOCATE STRANDS SO AS TO NOT INTERFERE WITH REINFORCEMENT DETAILS.
- PROVIDE SEALS OR GASKETS AROUND THE DUCTS AT THE JOINTS TO MAKE THE JOINTS GROUT TIGHT.
- ALL POST-TENSIONING MUST BE WITNESSED BY THE ENGINEER.
- AFTER POST-TENSIONING IS APPROVED, CUT STRANDS TO PROVIDE A MINIMUM OF 2 1/2" CLEAR FROM OUTSIDE FACE OF CONCRETE AND COAT RECESS WITH EPOXY BONDING COMPOUND. FILL ALL RECESSES WITH AN APPROVED PRODUCT LISTED IN BULLETIN 15 UNDER MISCELLANEOUS POLYMER MODIFIED AND SPECIAL CEMENTS, MORTARS AND CONCRETES TO FORM A SEAL AND CAP.
- POST-TENSION AND GROUT BEFORE BACKFILLING AND PLACING TRAFFIC OVER THE BOX.
- ALL POST TENSIONING CHUCKS MUST BE OF THE REUSABLE TYPE. OPERATORS MUST EXERCISE PROPER PRECAUTIONS WHEN RE-ALIGNING WEDGES AFTER RELEASE OF TENDONS AND PRIOR TO RETENSIONING AND RE-SEATING.
- KEEP JOINT CLEAN AT POST-TENSIONING STAGE.
- POST TENSIONING DUCTS MAY BE PLACED WITHIN THE WALLS OR SLAB ANYWHERE BETWEEN THE LAYERS OF REINFORCEMENT TO AVOID THE SLOPED PORTION OF THE JOINT SO AS TO PROMOTE SEALING OF THE DUCT.
- REMOVE A MINIMAL AMOUNT OF POLYSTRAND TO ACCOMMODATE INTERMEDIATE SPLICES AT BOX ENDS.
- ALTERNATE POST-TENSIONING SEQUENCE VARYING FROM DETAILS SHOWN ON THIS STANDARD MUST BE DETAILED ON SHOP DRAWINGS AND ACCEPTED BY DISTRICT BRIDGE ENGINEER.
- POST TENSIONING DUCTS MUST BE ADEQUATELY SECURED TO PREVENT DEFLECTION DURING CONCRETE PLACEMENT. DUCTS THAT ARE NOT STRAIGHT MUST BE ACCEPTED BY CHIEF STRUCTURAL MATERIALS ENGINEER.

- CHANGE 2
- CHANGE 4
- CHANGE 5

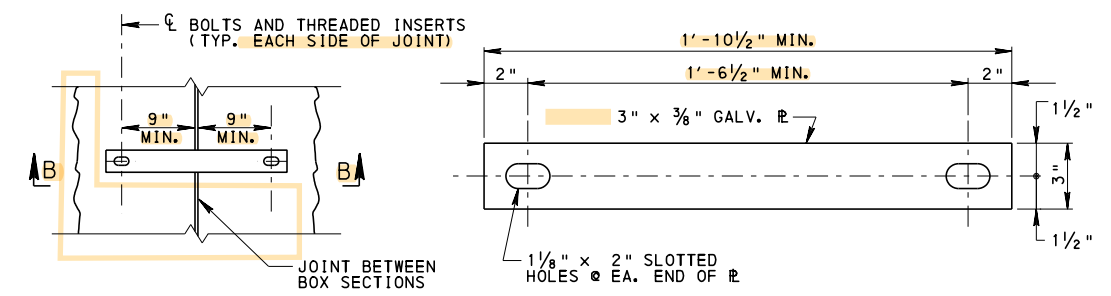
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

STANDARD
MECHANICAL CONNECTION DETAILS
PRECAST BOX CULVERT

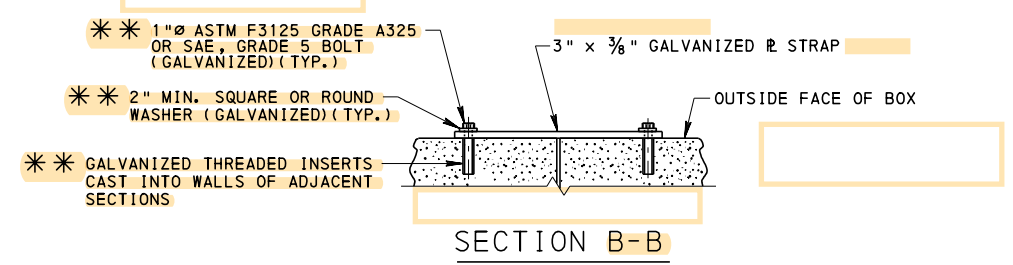


- NOTES:**
1. INSERT SPACING ADJACENT TO SEGMENT JOINT MAY BE ADJUSTED $\pm 1"$ TO MAINTAIN CLEARANCES.
 2. HORIZONTAL LEG OF #4 BENT REBAR SHALL BE FANNED OR ROTATED AS NEEDED FOR FIT ADJACENT TO SEGMENT JOINT. CUTTING BARS IS NOT PERMITTED.

PLAN VIEW - BARRIER VERTICAL REINFORCEMENT AT SEGMENT JOINT

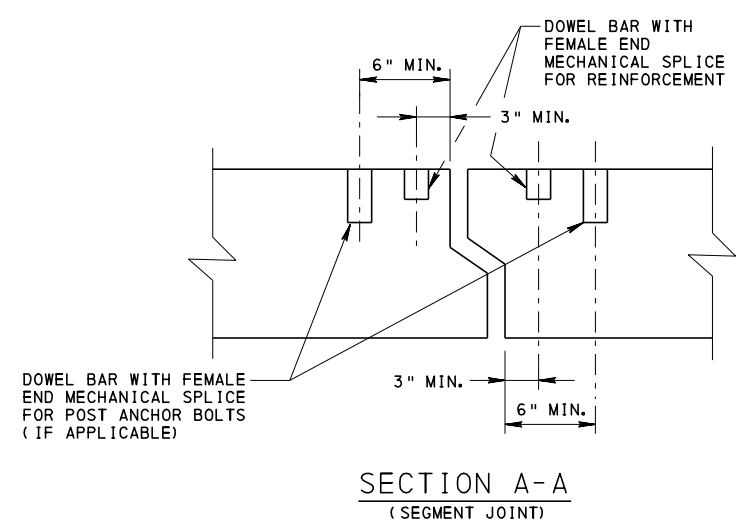


ELEVATION CONNECTION STRAP

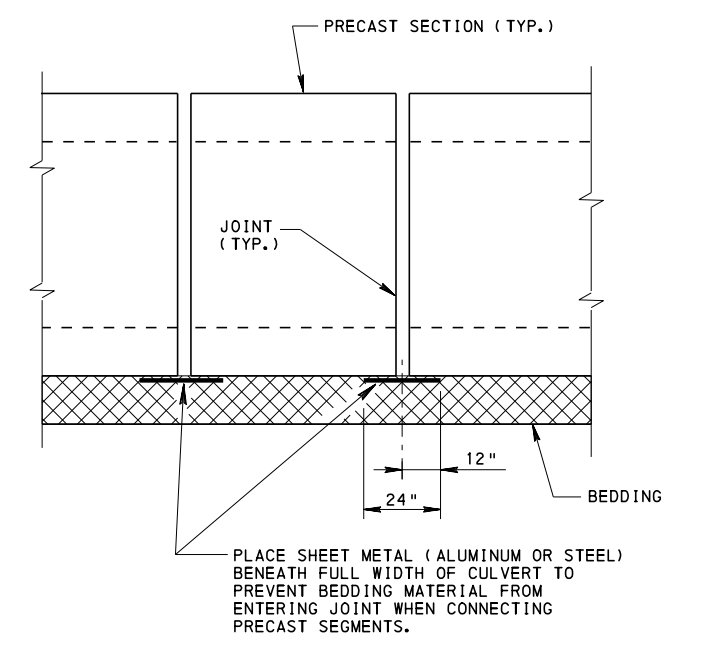


- * * 1" ϕ ASTM F3125 GRADE A325 OR SAE, GRADE 5 BOLT (GALVANIZED) (TYP.)
- * * 2" MIN. SQUARE OR ROUND WASHER (GALVANIZED) (TYP.)
- * * GALVANIZED THREADED INSERTS CAST INTO WALLS OF ADJACENT SECTIONS
- * * THREADED INSERT, BOLT LENGTH, AND WASHER THICKNESS SHALL BE SELECTED TO PROVIDE A SNUG-TIGHT CONDITION AND THREAD ENGAGEMENT PER INSERT MANUFACTURER'S SPECIFICATIONS.

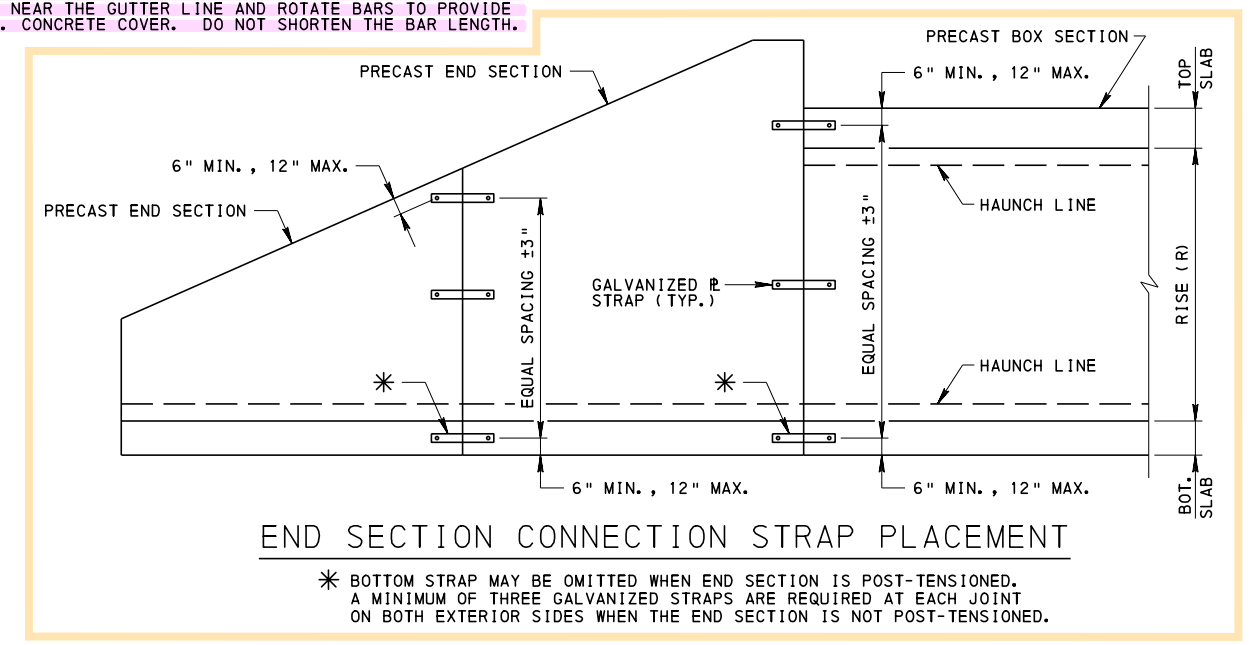
GALVANIZED STRAP CONNECTION DETAIL



- SKewed BARRIER LAYOUT GUIDELINES:**
1. MAINTAIN THE REQUIRED POST SPACING (IF APPLICABLE) AND MOVE THE POSTS AS A GROUP TO AVOID CONFLICTS WITH THE CULVERT JOINTS.
 2. ADJUST CULVERT SEGMENT LENGTHS WHEN POSSIBLE TO AVOID CONFLICTS WITH POSTS (IF APPLICABLE).
 3. MAINTAIN THE MINIMUM EDGE DISTANCES SHOWN ON SECTION A-A.
 4. ONE (1) OF THE FOUR (4) ANCHOR BOLTS FOR A POST (IF APPLICABLE) MAY USE A LOOP FERRULE INSERT SUBSTITUTE OR HOOK BOLT EMBEDDED ONLY IN THE CURB CONCRETE.
 5. TAILS OF THE DOWELS MAY BE ROTATED IN ANY DIRECTION TO PROVIDE 1 1/2" MIN. CONCRETE COVER. DO NOT SHORTEN TAILS OF THE DOWEL BARS.
 6. S8 BARS FOR THE PA 3-RAIL BRIDGE BARRIER ARE NOT SHOWN IN THE PLAN VIEW BUT NEED TO BE INCLUDED. IF REQUIRED BEND THE BARS NEAR THE GUTTER LINE AND ROTATE BARS TO PROVIDE 1 1/2" MIN. CONCRETE COVER. DO NOT SHORTEN THE BAR LENGTH.



ELEVATION VIEW AT PRECAST SEGMENT JOINTS



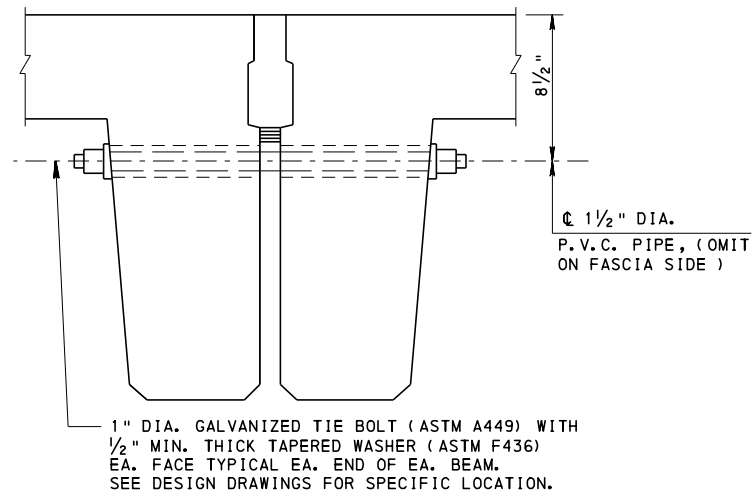
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BUREAU OF BRIDGE

STANDARD
 MECHANICAL CONNECTION DETAILS
 PRECAST R.C. BOX CULVERT

RECOMMENDED FEB. 14, 2023
 RECOMMENDED FEB. 14, 2023
 SHEET 2 OF 3

CHIEF BRIDGE ENGINEER
 CHIEF ENGINEER, HIGHWAY ADMIN.

BC-798M



TIE BOLT DETAIL - PRECAST CHANNEL BEAM

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE

STANDARD
MECHANICAL CONNECTION DETAILS
PRECAST SLAB AND
PRECAST CHANNEL BEAM

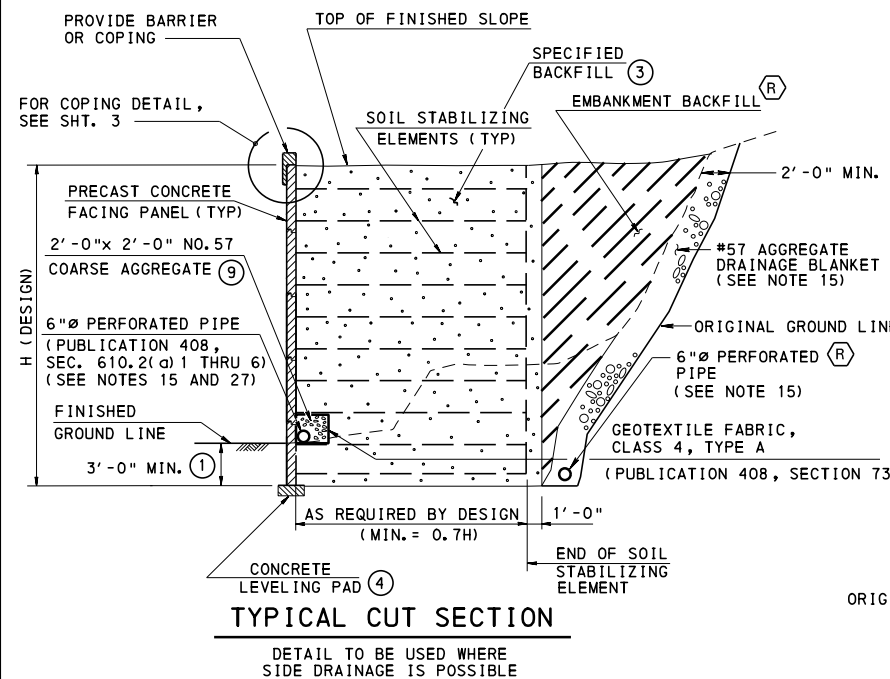
RECOMMENDED FEB. 14, 2023
[Signature]
CHIEF BRIDGE ENGINEER

RECOMMENDED FEB. 14, 2023
[Signature]
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 3 OF 3
BC-798M

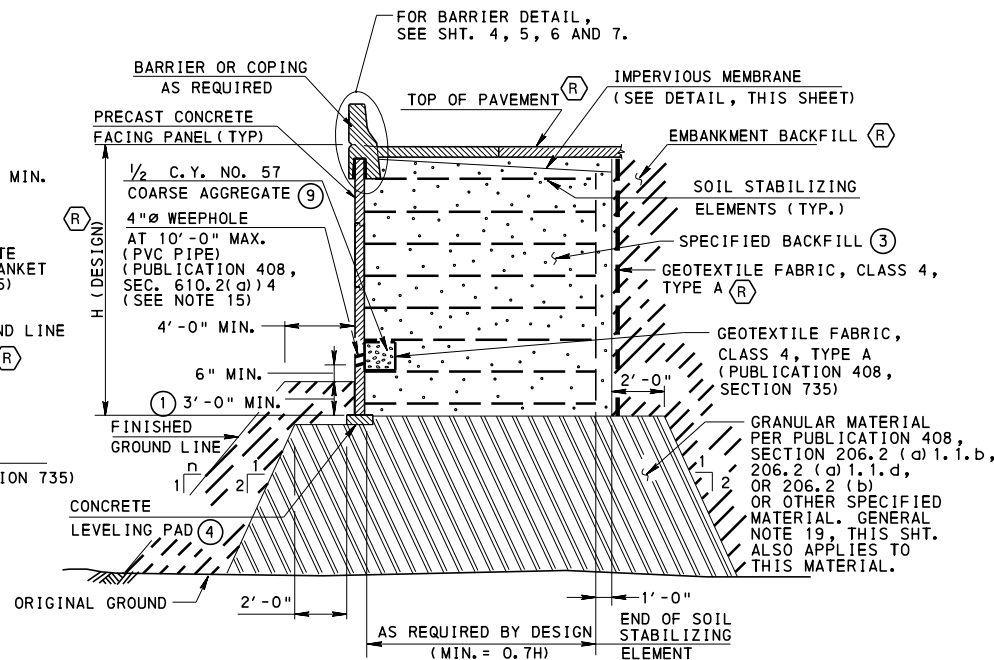
GENERAL NOTES:

- FOR LEGEND OF NOTES AND SYMBOLS, SEE SHEET 2.
- USE THIS STANDARD FOR THE PREPARATION OF CONSTRUCTION PLANS IN CONJUNCTION WITH THE DEPARTMENT'S DESIGN MANUAL, PART 4, SECTION 11.10, SPECIAL PROVISIONS AND PUBLICATION 408 SPECIFICATIONS.
- THIS STANDARD IS INTENDED TO BE USED AS A GUIDE FOR DETAILING THE PREFABRICATED WALLS. FOR UNUSUAL COMBINATIONS OF SHARP SKEW AND/OR VERTICAL AND HORIZONTAL CURVATURE, THIS STANDARD MUST BE USED WITH CAUTION SINCE THESE CONDITIONS MAY REQUIRE SPECIAL DESIGN CONSIDERATIONS.
- DESIGN COMPUTATIONS ARE NOT REQUIRED FOR THE C.I.P. AND PRECAST BARRIER AND C.I.P. SLAB CONFIGURATIONS SHOWN ON THIS STANDARD. WHERE CONDITIONS AND/OR DETAILS DIFFER FROM THE STANDARD, COMPLETE DESIGN COMPUTATIONS MUST BE SUBMITTED TO THE DEPARTMENT. SUCH SPECIAL DESIGN FOR BARRIER MUST PROVIDE ULTIMATE STRENGTH EQUAL TO THE DESIGN PROVIDED IN THIS STANDARD.
- PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH PUBLICATION 408, AND CONTRACT SPECIAL PROVISIONS.
- DESIGN SPECIFICATIONS:
 - CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND COMMENTARY AS AMENDED BY DESIGN MANUAL PART 4, VOLUME 1, PUBLICATION 15M.
- CHAMFER EXPOSED CONCRETE EDGES $\frac{3}{4}$ " x $\frac{3}{4}$ ", EXCEPT AS NOTED OTHERWISE.
- FOR CONCRETE STRENGTH FOR PANELS, REFER TO SPECIAL PROVISIONS.
- USE CLASS A CEMENT CONCRETE, $f'_c = 3.0$ ksi, FOR FOOTINGS, LEVELING PADS, STEP DETAILS AND CRASH WALLS.
- USE CLASS AA, $f'_c = 3.5$ ksi, CEMENT CONCRETE FOR CURBS, BARRIERS, CONCRETE LEVELING FILLS, MOMENT SLABS, BACKWALLS AND COPINGS.
- USE GRADE 60 STEEL DEFORMED REINFORCEMENT BARS AS SET FORTH IN PUBLICATION 408. PROVIDE 2" CONCRETE COVER ON REINFORCEMENT BARS EXCEPT AS NOTED. PROVIDE MINIMUM LAP LENGTH AND EMBEDMENT LENGTH IN ACCORDANCE WITH BC-736M.
- PROVIDE EPOXY COATED REINFORCEMENT STEEL FOR COPINGS, BARRIERS AND SHOULDER SLABS, AND BACKWALLS. PROVIDE EPOXY COATED REINFORCEMENT STEEL FOR PANELS AS INDICATED.
- THE DIFFERENCE BETWEEN SPECIFIED BACKFILL AND EMBANKMENT BACKFILL ELEVATIONS IS NOT TO BE MORE THAN 2'-0" AT ANY TIME DURING BACKFILLING.
- WHERE P.C.P. IS INDICATED, USE PREFORMED CELLULAR POLYSTYRENE ASTM C578, TYPE 1, EXCEPT LIMIT THE WATER ABSORPTION TO 2% BY VOLUME.
- PROVIDE DRAINAGE DETAILS SUCH AS 4"Ø WEEPHOLES OR 6"Ø PERFORATED PIPE UNDERDRAIN AND/OR #57 DRAINAGE BLANKETS BASED UPON THE FIELD CONDITIONS. FOR WALL INSTALLATION AT STREAM CROSSINGS PROVIDE ADEQUATE DRAINAGE SO THE DIFFERENCE BETWEEN STREAMBED AND SATURATED BACKFILLS IS NOT GREATER THAN WHAT IS CONSIDERED IN THE DESIGN, BUT NOT GREATER THAN 3'-0" DURING DRAWDOWN CONDITIONS.
- PROVIDE SHOP DRAWINGS AS PER PUBLICATION 408.
- FOR PREFABRICATED WALLS ALONG RAILROADS, REFER TO DM-4 FOR CRASH WALL REQUIREMENTS AND THE TYPICAL DETAIL ON SHEET 3.
- GALVANIZE ALL SOIL STABILIZING ELEMENTS AND HARDWARE AS SPECIFIED.
- REMOVE UNSUITABLE OR UNSTABLE FOUNDATION MATERIAL BELOW THE TOP OF LEVELING PAD AND REPLACE WITH SPECIFIED GRANULAR MATERIAL. PRIOR TO WALL CONSTRUCTION, COMPACT THE FOUNDATION AREA WITH A SMOOTH VIBRATORY ROLLER ACCORDING TO PUB. 408.
- BACKFILL MATERIALS (DESIGN PROPERTIES):
 - EMBANKMENT BACKFILL $\phi = 30^\circ$
 - SPECIFIED BACKFILL $\phi = 34^\circ$
 - #57 COARSE AGGREGATE USE $\phi = 34^\circ$
 - WEIGHT OF SPECIFIED BACKFILL = 90-120 LBS. PER CUBIC FOOT
 - PER THE DESIGN AND AS SPECIFIED ON DESIGN DRAWINGS. #57 COARSE AGGREGATE IS PERMITTED AS SPECIFIED BACKFILL IF MATERIAL MEETS REQUIREMENTS OF SPECIAL PROVISIONS.
- THE M.S.E. WALL DESIGNER/SUPPLIER MUST CERTIFY ALL ASSUMPTIONS MADE IN THE DESIGN. PLACE THE FOLLOWING NOTE NEAR THE P.E. SEAL ON THE FIRST SHEET OF THE DRAWINGS. "I CERTIFY THAT ALL ASSUMPTIONS MADE IN DESIGNING THIS WALL HAVE BEEN VALIDATED THROUGH CONSTRUCTION DETAILS, SPECIAL NOTES AND/OR INSTRUCTIONS TO THE FABRICATOR, ERECTOR AND CONTRACTOR."
- SOME OF THE TECHNICAL DETAILS WERE PROVIDED BY REINFORCED EARTH COMPANY AND RETAINED EARTH (FOSTER GEOTECHNICAL) COMPANY. FOR PROPRIETARY RIGHTS CONTACT APPROPRIATE PROPRIETOR.
- DO NOT CUT REINFORCEMENT STRIPS OR MESH. BEND OR SKEW ONLY AS SHOWN IN DETAIL OR NOTES ON SHEETS 2, 8 & 11.
- DURING THE SPECIFIED BACKFILL PLACEMENT, KEEP THE BACKFILL AT OR JUST ABOVE THE REINFORCEMENT CONNECTION TO PANEL, PRIOR TO MAKING THE CONNECTION. REMOVE AND REPLACE ANY FACE PANEL THAT DOES NOT MEET CONSTRUCTION TOLERANCE, SPECIFIED IN THE SPECIAL PROVISIONS. AVOID PLACING HEAVY EQUIPMENT OVER BACKFILL COVERING WALL STRAPS WHICH MIGHT CAUSE MOVEMENT OF WALL PANELS.
- PROVIDE ROCK PROTECTION AS REQUIRED BY SCOUR CALCULATIONS.
- PUNCTURING IMPERVIOUS MEMBRANE IS TO BE AVOIDED. FORMWORK SUPPORTS UTILIZING STAKES DRIVEN THROUGH IMPERVIOUS MEMBRANE ARE PROHIBITED. IMPERVIOUS MEMBRANE'S INTEGRITY MUST NOT BE COMPROMISED.
- METAL PIPES AS SPECIFIED IN PUBLICATION 408, SECTIONS 610.2(a)7 AND 8, ARE NOT PERMITTED.
- REFER TO SHEET 8 FOR HORIZONTAL DRAINAGE PIPES WHICH ARE INSTALLED WITHIN SPECIFIED BACKFILL AREA.
- THE 45" F-SHAPE CONCRETE BARRIER IS NOT PERMITTED ON MOMENT SLABS.
- THE 42" F-SHAPE CONCRETE BARRIER ATTACHED TO A MOMENT SLAB IS DESIGNATED AS MASH TL-4. THE 32" F-SHAPE CONCRETE BARRIER ATTACHED TO MOMENT SLAB IS DESIGNATED AS MASH TL-3. THE ALTERNATE SIDEWALK WITH 42" VERTICAL WALL CONCRETE BARRIER ATTACHED TO A MOMENT SLAB IS DESIGNATED AS MASH TL-2.



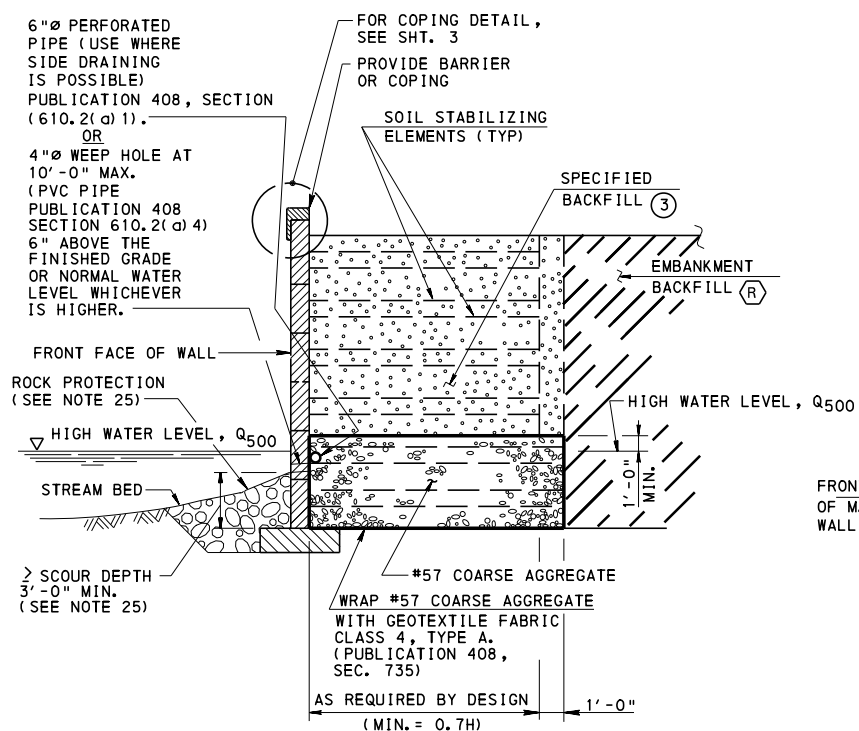
TYPICAL CUT SECTION

DETAIL TO BE USED WHERE SIDE DRAINAGE IS POSSIBLE



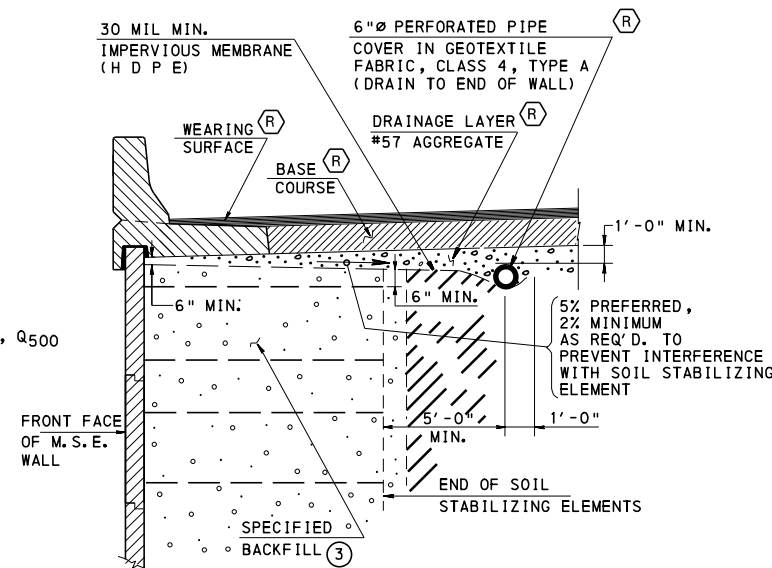
TYPICAL FILL SECTION

DETAIL TO BE USED WHERE WEEPHOLES ARE POSSIBLE
n = SLOPE AS PER CONTRACT PLAN



TYPICAL SECTION AT STREAM

DETAIL TO BE USED WHERE HIGH WATER LEVEL IN FRONT OF THE WALL IS ANTICIPATED, AND THE STREAM VELOCITY, V, IS LESS THAN 2.0 fps



IMPERVIOUS MEMBRANE DETAIL

NOTE: PROVIDE IMPERVIOUS MEMBRANE WHEN SPECIFIED.

INDEX OF SHEETS

SHEET NO.	SHEET TITLE
1	DETAILS AND GENERAL NOTES
2	ABUTMENT
3	CRASH WALL AND MISCELLANEOUS WALL DETAILS
4	C. I. P. TRAFFIC BARRIER
5	PRECAST TRAFFIC BARRIER
6	MOMENT SLAB AND BARRIER JOINT
7	SIDEWALK AND ALTERNATE BARRIER AND GUIDE RAIL TRANSITION
8	DRAINAGE INSTALLATIONS
9	SHOULDER RELIEF JOINT AND INLET INSTALLATION
10	REINFORCED EARTH WALL PANELS
11	REINFORCED EARTH WALL PANELS
12	RETAINED EARTH WALL PANELS
13	RETAINED EARTH WALL PANEL AND WIRE MESH TOLERANCES

BC-735M	WALL CONSTR. & EXP. JOINTS DETAILS
BC-736M	REINFORCEMENT BAR FABRICATION DETAILS
BC-752M	CONCRETE DECK SLAB DETAILS
BC-767M	NEOPRENE STRIP SEAL DAM FOR PRESTRESSED CONCRETE AND STEEL I-BEAM BRIDGES
BC-788M	TYP. WATERPROOFING AND EXPANSION DETAILS
RC-11M	CLASSIFICATION OF EARTHWORK FOR STRUCTURES
RC-12M	BACKFILL AT STRUCTURES
RC-20M	CEMENT CONCRETE PAVEMENT JOINTS
RC-27M	PLAIN CONCRETE PAVEMENT
RC-50M	GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS

REFERENCE DRAWINGS

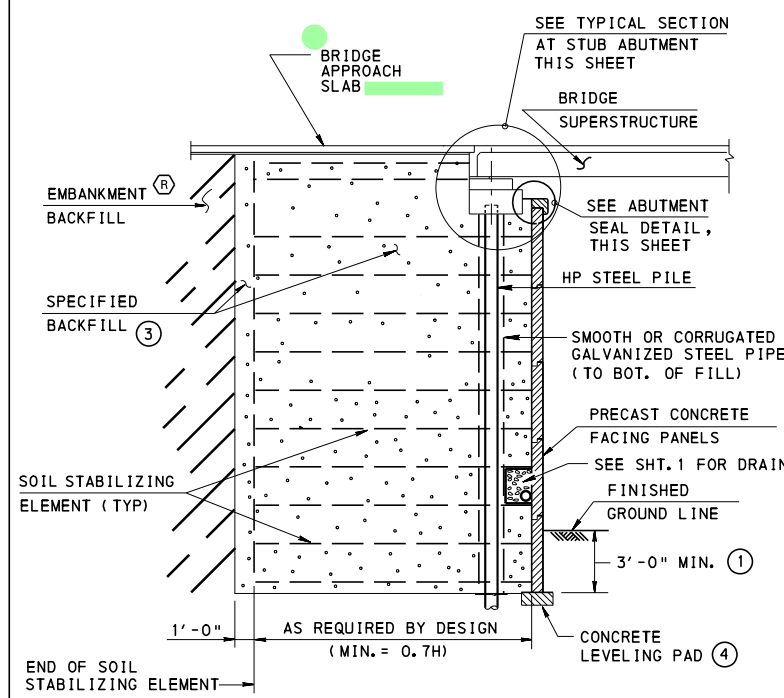
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

**STANDARD
MECHANICALLY STABILIZED EARTH
RETAINING WALLS
DETAILS AND GENERAL NOTES**

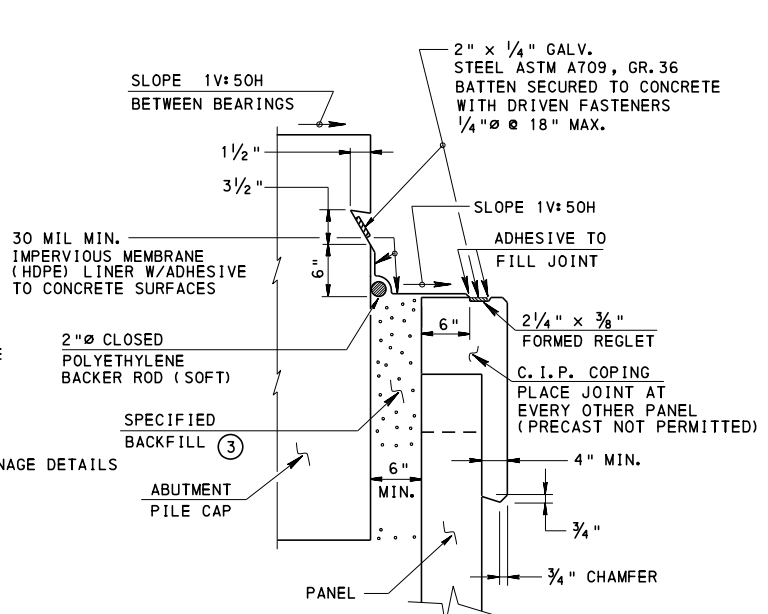
RECOMMENDED NOV. 23, 2022	RECOMMENDED NOV. 23, 2022	SHEET 1 OF 13
<i>L. L. W. Gray</i> CHIEF BRIDGE ENGINEER	<i>Gavin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	BC-799M

- CHANGE 2
- CHANGE 3
- CHANGE 4

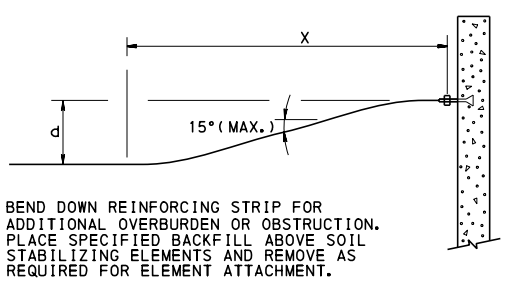
NOTE: Strike-off Letter revisions on Shts. 4, 5 & 7



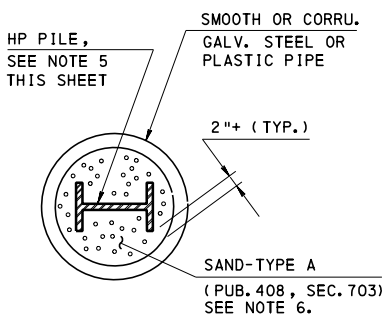
BRIDGE ABUTMENT



ABUTMENT SEAL DETAIL

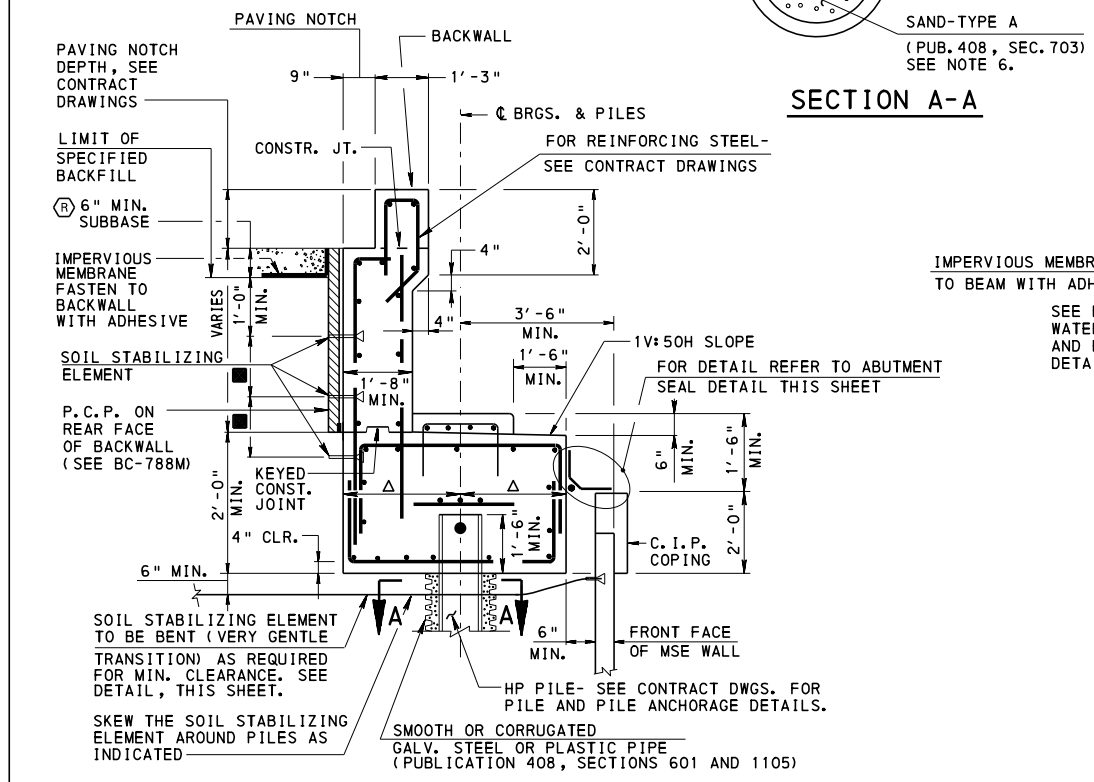


REINFORCING STRIP OR MESH BEND DETAIL

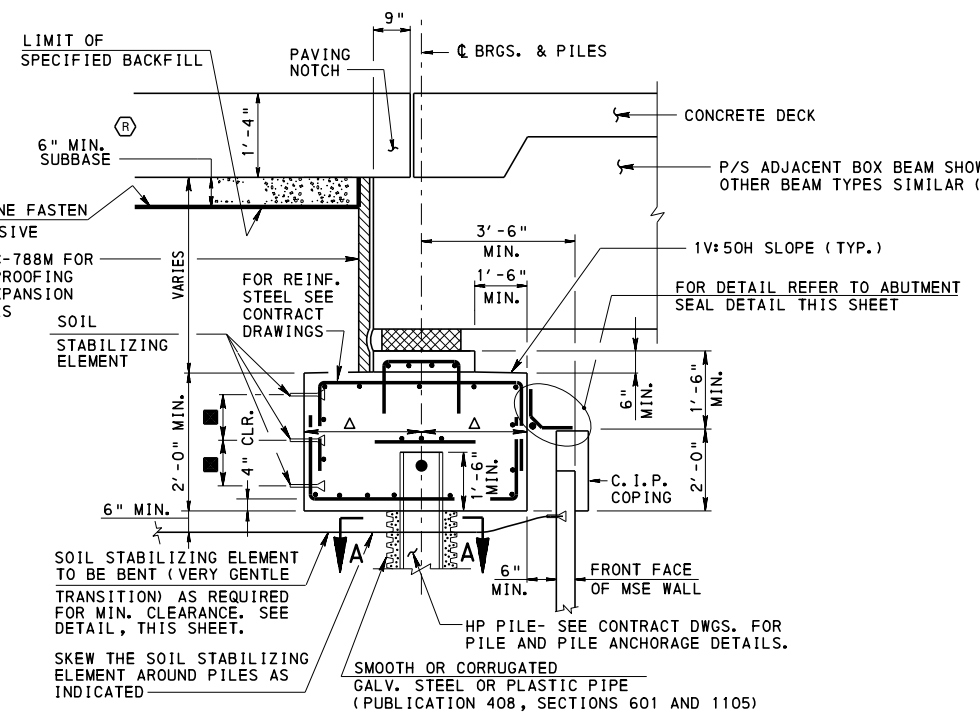


SECTION A-A

ADDITIONAL DEPTH (d) OF R.S. REQUIRED	REQUIRED MINIMUM DISTANCE (X) TO ACHIEVE SMOOTH BEND
3"	2'-3"
6"	3'-3"
9"	4'-0"
12"	5'-0"
15"	6'-0"



TYPICAL SECTION AT STUB ABUTMENT WITH BACKWALL



TYPICAL SECTION AT STUB ABUTMENT WITHOUT BACKWALL

■ SOIL STABILIZING ELEMENTS TO BE DESIGNED AND DETAILED (NUMBER, SIZE AND SPACING) BY THE M.S.E. WALL COMPANY FOR FORCES INDICATED ON THE CONTRACT DRAWINGS. MINIMUM AND MAXIMUM HORIZONTAL FORCES (K/FT.) DUE TO EARTH PRESSURE, LIVE LOAD SURCHARGE, AND FORCES AT BRIDGE BEARINGS TO BE PROVIDED BY THE DESIGNER AND INDICATED ON THE CONTRACT DRAWINGS.

△ 1/2 OF PILE CAP DESIGN WIDTH

LEGEND

- ① OR PREVAILING FROST DEPTH OR AS REQUIRED BY DESIGN AND SLOPE STABILITY ANALYSIS.
 - ② AS REQUIRED BY DESIGN. (EXCLUSIVE OF ANY AESTHETIC DETAILS.)
 - ③ REFER TO SPECIAL PROVISIONS FOR GRANULAR FILL MATERIALS.
 - ④ 12" WIDE X 6" THICK MIN. UNREINFORCED CONCRETE, EXCEPT FOR CRASHWALL CONDITION.
 - ⑤ MIN. SHOWN OR PANEL THICKNESS + 10 1/2".
 - ⑥ MIN. SHOWN OR PANEL THICKNESS + 1 1/2".
 - ⑦ MIN. SHOWN OR PANEL THICKNESS + 3".
 - ⑧ MIN. SHOWN OR PANEL THICKNESS + 4".
 - ⑨ MODIFY FIELD DIMENSIONS TO SUIT SOIL STABILIZING ELEMENT LAYOUT.
 - Ⓡ ROADWAY ITEM
- H D P E = HIGH DENSITY POLYETHYLENE
 C. I. P. = CAST IN PLACE
 M. S. E. = MECHANICALLY STABILIZED EARTH
 C. C. N. S. = CLOSED CELL NEOPRENE SPONGE
 SCGS = SMOOTH OR CORRUGATED GALVANIZED STEEL PIPE
 R. S. = REINFORCING STRIP
 P. C. P. = PREFORMED CELLULAR POLYSTYRENE

PILE INSTALLATION SEQUENCE NOTES

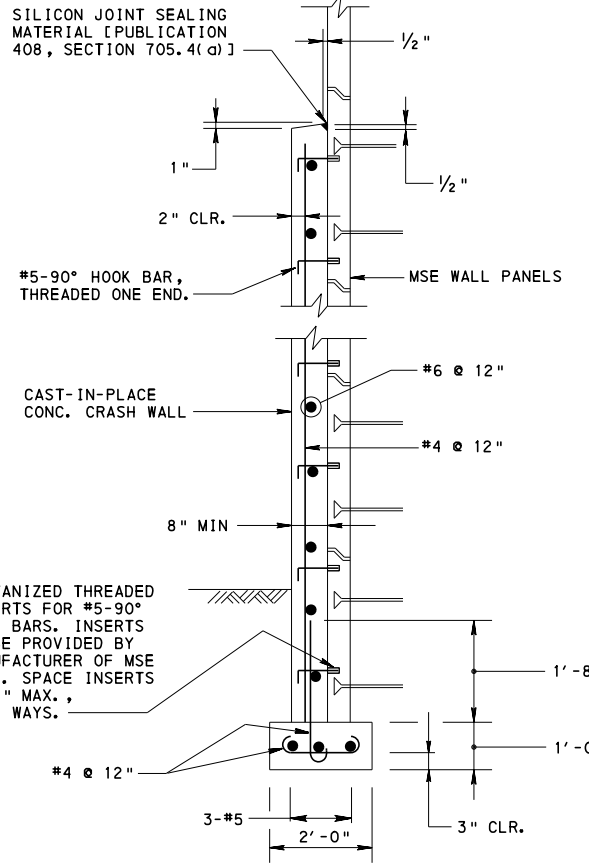
1. DRIVE ALL PILES PRIOR TO MSE WALL INSTALLATION. PREDRILL AS INDICATED.
2. PLACE OVER EACH PILE, A SMOOTH WALL OR CORRUGATED GALVANIZED STEEL (SCGS) OR PLASTIC PIPE OF SUFFICIENT THICKNESS OR AS SPECIFIED, TO PREVENT BUCKLING OR DISTORTION DURING THE PLACEMENT AND COMPACTION OF THE BACKFILL.
3. PLACE SPACERS BETWEEN THE PILE AND THE SCGS PIPE TO PREVENT THE SCGS PIPE FROM COMING INTO CONTACT WITH THE PILE DURING BACKFILLING OF THE WALL.
4. EXTEND SCGS PIPE FROM THE BOTTOM OF THE MSE WALL BACKFILL TO THE BOTTOM OF THE BRIDGE STUB ABUTMENT FOOTER.
5. SEAL THE TOP OF THE SCGS PIPE UNTIL PIPE IS FILLED WITH AGGREGATE.
6. FILL THE SCGS PIPE LOOSELY WITH FINE AGGREGATE, SAND - TYPE A (PUBLICATION 408, SECTION 703). AT THE CONTRACTOR'S OPTION, PLACE FINE AGGREGATE BEFORE OR AFTER THE MSE WALL CONSTRUCTION IS COMPLETED.

M.S.E. WALL ABUTMENT NOTES

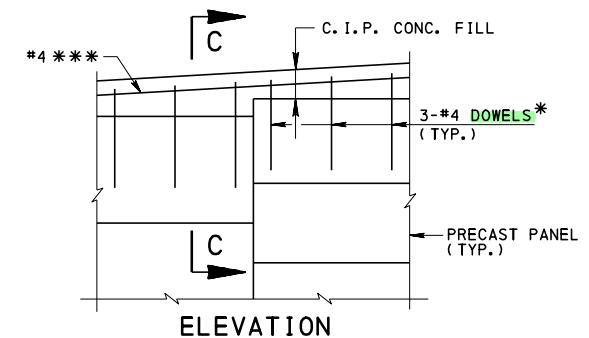
1. ALL M.S.E. WALL PLANS AND SHOP DRAWINGS MUST SHOW PILE LOCATION AND ARRANGEMENT OF M.S.E. WALL SOIL REINFORCEMENT ELEMENTS TO AVOID INTERFERENCE WITH PILES. CUTTING SOIL REINFORCING ELEMENTS TO AVOID INTERFERENCE WITH PILES IS NOT PERMITTED.

**COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF TRANSPORTATION
 BRIDGE OFFICE**

**STANDARD
 MECHANICALLY STABILIZED EARTH
 RETAINING WALLS
 ABUTMENT**



CRASH WALL TYPICAL SECTION

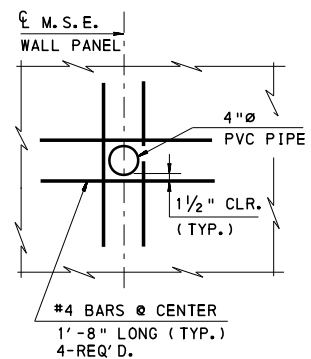


DETAIL A

* FOR RECTANGULAR DOUBLE WIDTH PANELS, USE 6-#4 BARS.

** BARS MAY BE SAWCUT IN FIELD TO ALLOW FOR STANDARD DETAILING OF DOWELS. TORCH CUTTING IS NOT PERMITTED. COAT CUT ENDS WITH EPOXY PAINT.

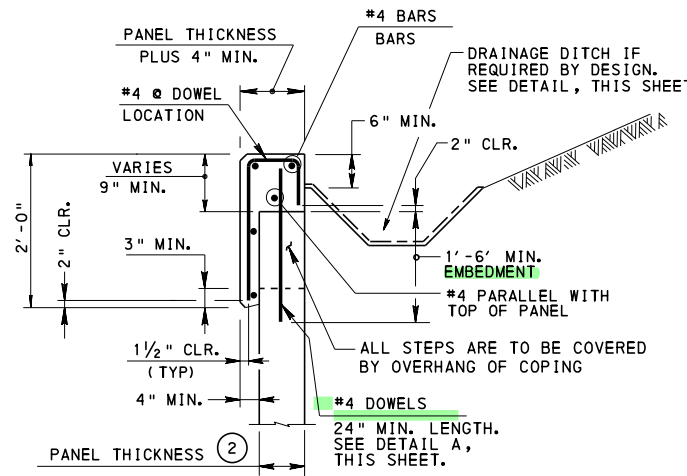
*** LONGITUDINAL REINFORCEMENT NOT REQUIRED IF DEPTH OF C.I.P. CONCRETE FILL IS LESS THAN 4".



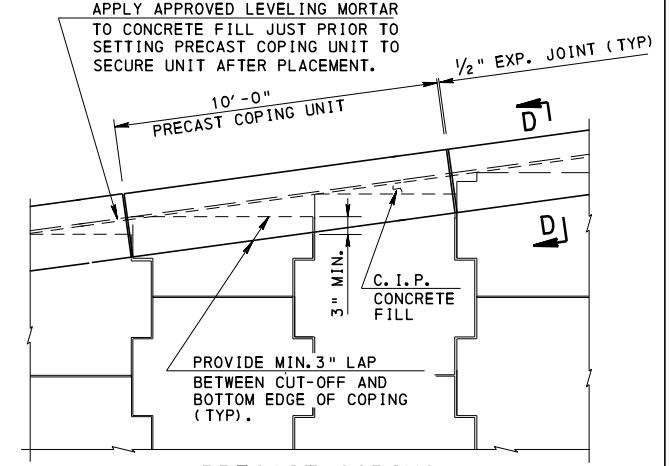
WEEPHOLE REINFORCEMENT

CRASH WALL REQUIREMENTS FOR M.S.E. WALLS NEAR RAILROADS

1. PROVIDE CRASH WALLS IN FRONT OF PREFABRICATED WALLS WHEN THE WALL IS WITHIN 50'.
2. CRASH WALLS SHALL BE 8" THICK AND 6' ABOVE THE TOP OF RAILROAD TRACK.



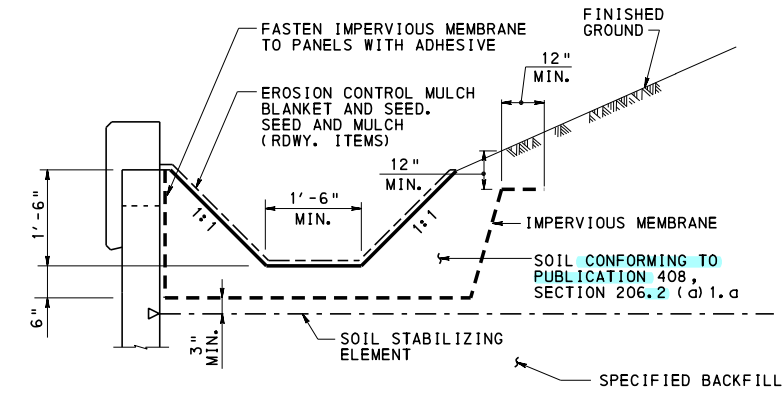
C.I.P. CONCRETE COPING DETAIL



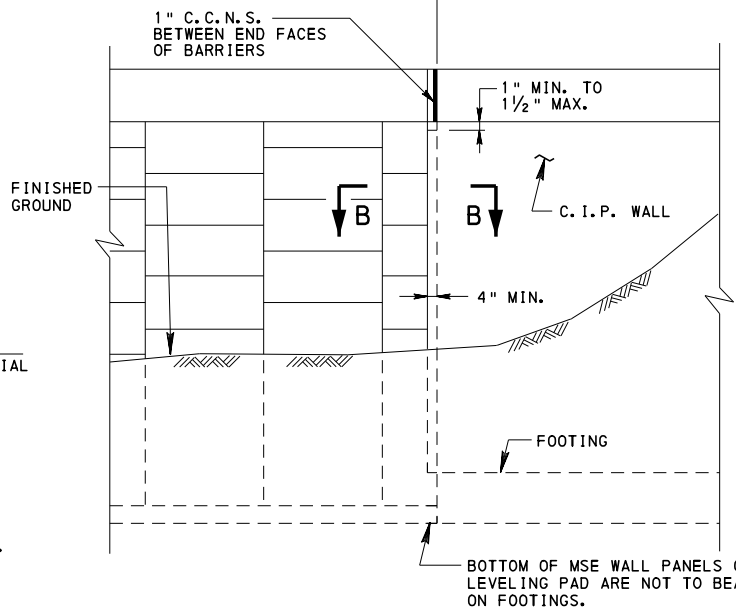
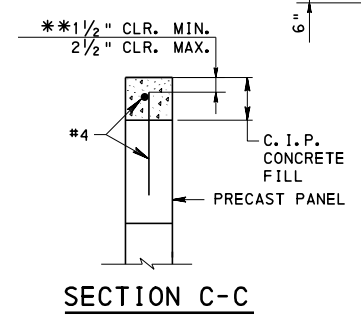
PRECAST COPING PARTIAL ELEVATION

NOTES:

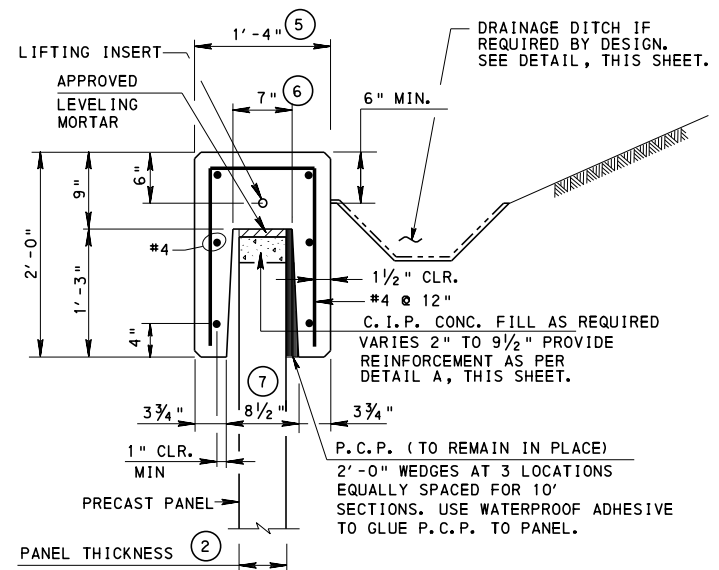
- COPING UNIT STANDARD LENGTHS, 5'-0" AND 10'-0", UNLESS OTHERWISE APPROVED. LINE UP COPING JOINTS WITH PANEL JOINTS WITH 3"± TOLERANCE.
- R.E. WALL PANEL SHOWN, RETAINED EARTH WALL PANEL DETAIL SIMILAR.



DRAINAGE DITCH DETAIL



ELEVATION - M.S.E. WALL JUNCTION WITH C.I.P. WALL

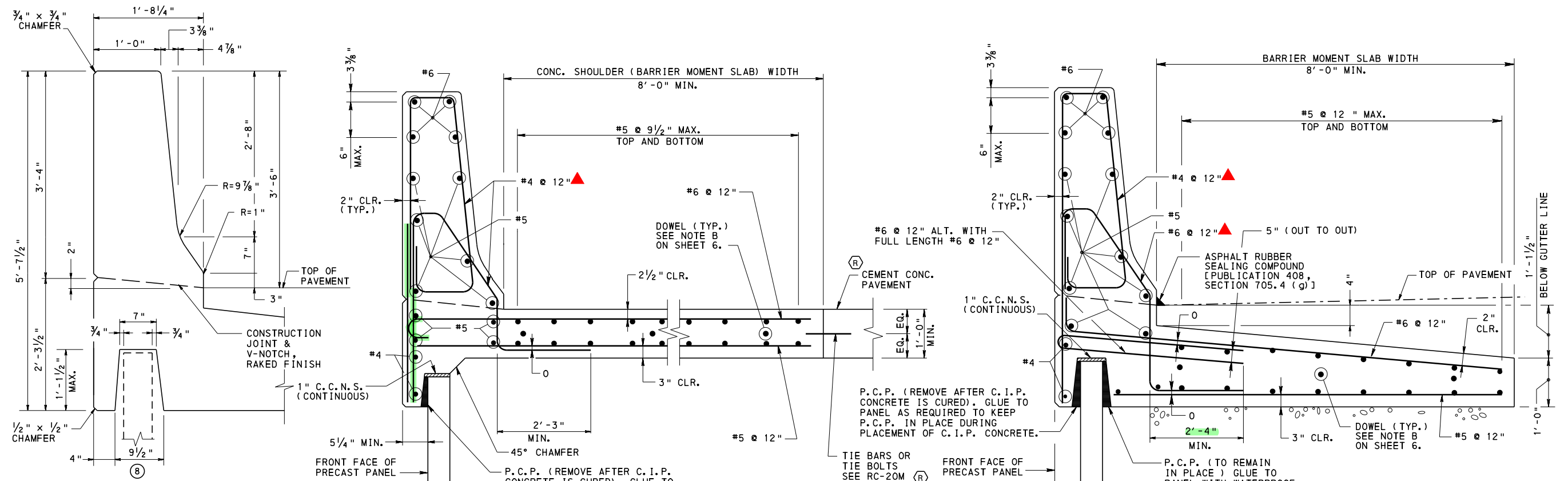


SECTION D-D PRECAST COPING DETAIL

NOTE: FOR LEGEND OF NOTES, ABBREVIATIONS AND SYMBOLS, SEE SHEET 2.

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BRIDGE OFFICE

STANDARD MECHANICALLY STABILIZED EARTH RETAINING WALLS CRASH WALL AND MISCELLANEOUS WALL DETAILS



CAST-IN-PLACE 42" F-SHAPE CONCRETE BARRIER DIMENSIONS

32" F-SHAPE CONCRETE BARRIER SIMILAR (SEE NOTE 29, SHEET 1)

C. I. P. F-SHAPE CONCRETE BARRIER WITH CEMENT CONCRETE SHOULDER

SEE SHEET 6 FOR PLAN OF C. I. P. MOMENT SLAB

C. I. P. F-SHAPE CONCRETE BARRIER WITH ASPHALT-PAVED SHOULDER

SEE SHEET 6 FOR PLAN OF C. I. P. MOMENT SLAB

S.O.L. 483-23-01, dated Feb. 7, 2023

▲ WITHIN 10 FT. OF AN EXPANSION JOINT AND AT THE END OF THE BARRIER, REDUCE SPACING OF VERTICAL REINFORCEMENT BARS IN THE BARRIER TO HALF THE SHOWN SPACING.

TRAFFIC BARRIER AND MOMENT SLAB NOTES:

1. PLACE EXPANSION JOINT IN BARRIER WITH PAVEMENT JOINT, EXCEPT NOT TO FALL WITHIN 6'-0" OF CENTERLINE OF LIGHT POLE OR 2'-0" OF CENTERLINE OF JUNCTION BOX. SEE SHEET 9 FOR INLET INSTALLATION DETAILS.
2. FOR BRIDGE BARRIER TO GUIDE RAIL TRANSITION, SEE SHEET. 7.

NOTE:

1. FOR LEGEND OF ○ NOTES, ABBREVIATIONS AND SYMBOLS, SEE SHEET 2.

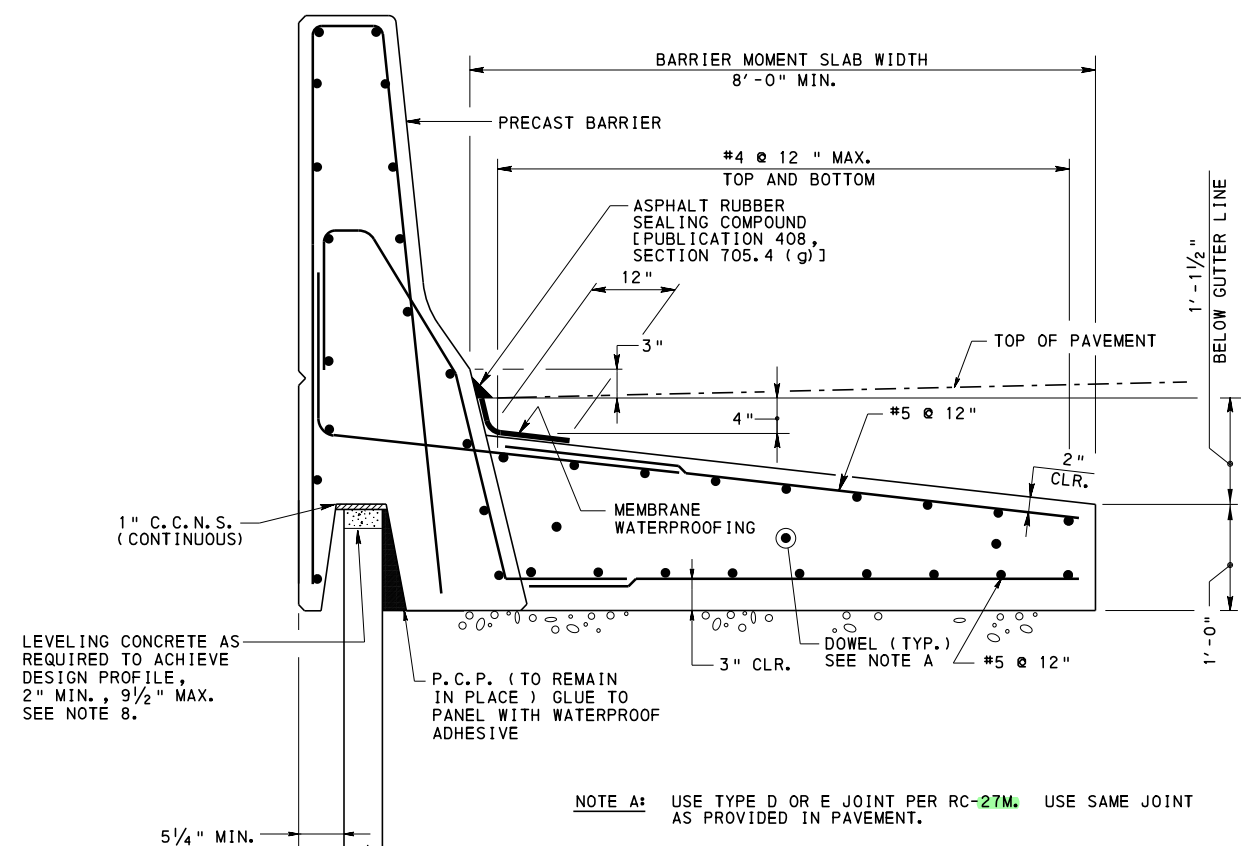
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
MECHANICALLY STABILIZED EARTH
RETAINING WALLS
C. I. P. TRAFFIC BARRIER

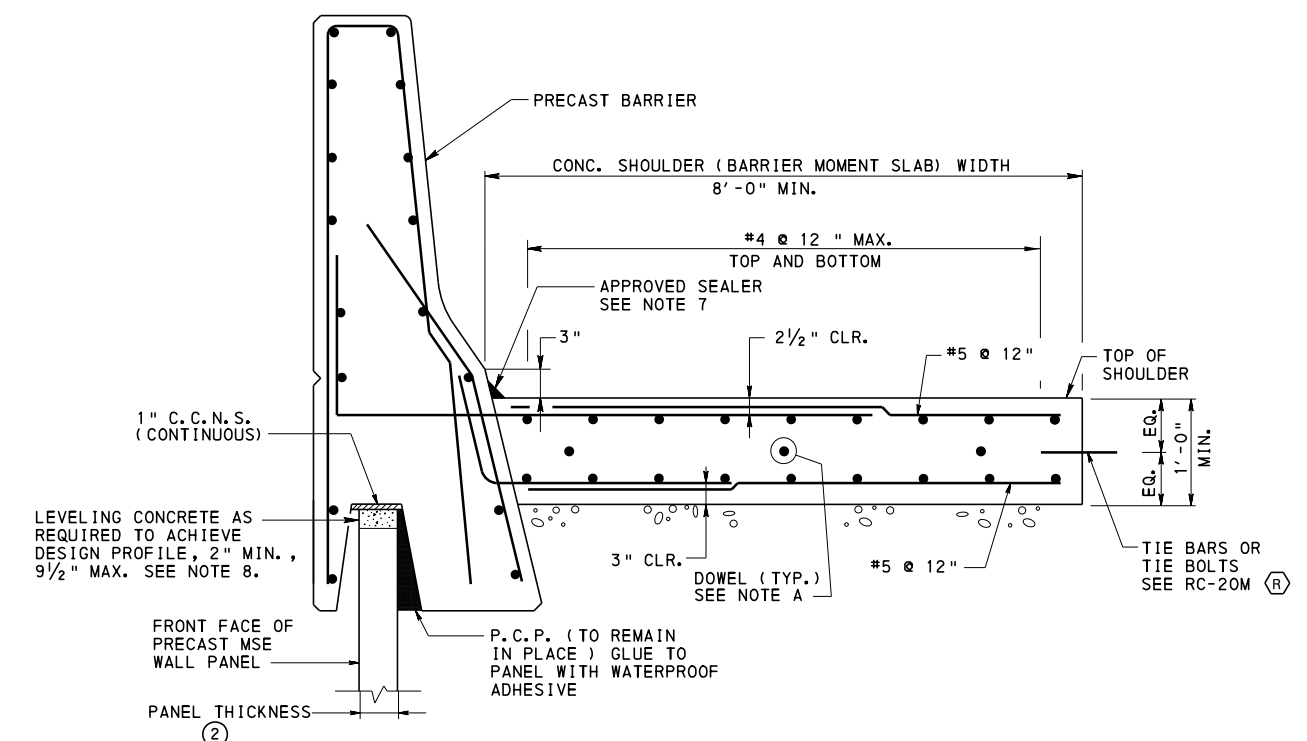
RECOMMENDED NOV. 23, 2022
L. W. [Signature]
CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022
Grain E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

SHEET 4 OF 13
BC-799M



PRECAST F-SHAPE CONCRETE BARRIER WITH ASPHALT-PAVED SHOULDER
SEE SHEET 6 FOR PLAN OF C. I. P. MOMENT SLAB



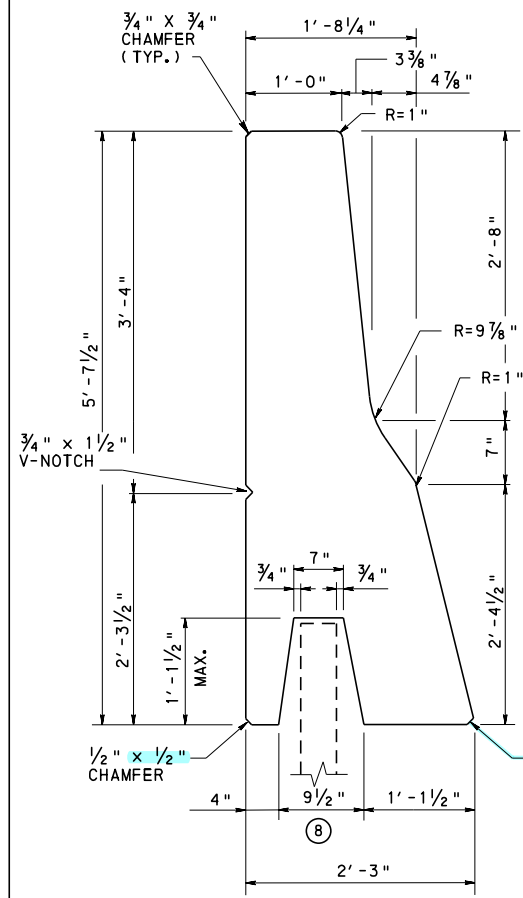
PRECAST F-SHAPE CONCRETE BARRIER WITH CEMENT CONCRETE SHOULDER
SEE SHEET 6 FOR PLAN OF C. I. P. MOMENT SLAB

- TRAFFIC BARRIER AND MOMENT SLAB NOTES:**
1. PLACE EXPANSION JOINTS IN PRECAST BARRIER TO MATCH WITH PAVEMENT JOINTS. DO NOT LOCATE THE BARRIER EXPANSION JOINT WITHIN 6'-0" FROM CENTERLINE OF LIGHT POLE OR 2'-0" FROM CENTERLINE OF JUNCTION BOX.
 2. PROVIDE A MINIMUM PRECAST BARRIER LENGTH OF 10'-0".
 3. PROVIDE SPECIAL DESIGN AND DETAILING OF THE MOMENT SLAB AND BARRIER FOR INLET INSTALLATIONS.
 4. BEGIN VERTICAL REINFORCEMENT AT 3" FROM EITHER END OF 10'-0" PANEL.
 5. FOR BRIDGE BARRIER TO GUIDE RAIL TRANSITION, SEE SHEET. 7.
 6. APPLY BONDING COMPOUND BETWEEN PRECAST BARRIER AND C. I. P. MOMENT SLAB.
 7. USE SILICON JOINT SEALING MATERIAL AS SPECIFIED IN PUBLICATION 408 SECTION 705.4 (d).
 8. PROVIDE REINFORCEMENT AS PER DETAIL A ON SHEET 3.

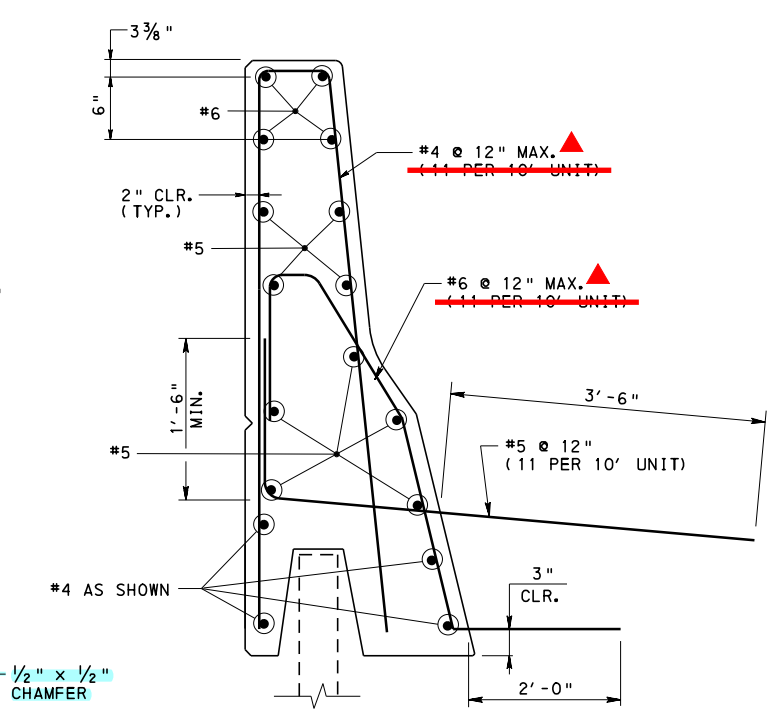
NOTE:
FOR LEGEND OF ○ NOTES, ABBREVIATIONS AND SYMBOLS, SEE SHEET 2.

S.O.L. 483-23-01,
dated Feb. 7, 2023

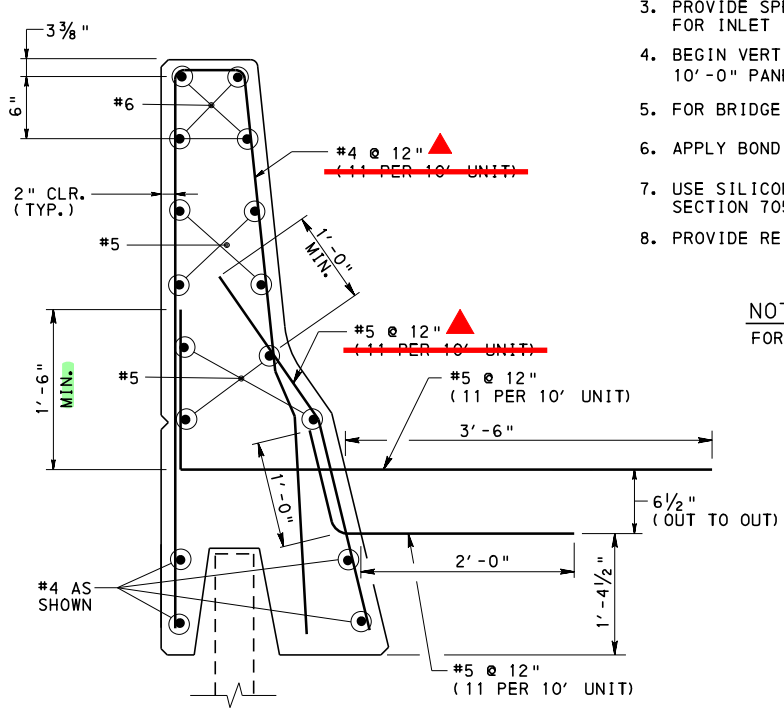
▲ WITHIN 10 FT. OF AN EXPANSION JOINT AND AT THE END OF THE BARRIER, REDUCE SPACING OF VERTICAL REINFORCEMENT BARS IN THE BARRIER TO HALF THE SHOWN SPACING.



DIMENSIONS



REINFORCEMENT FOR BARRIER WITH ASPHALT-PAVED SHOULDER



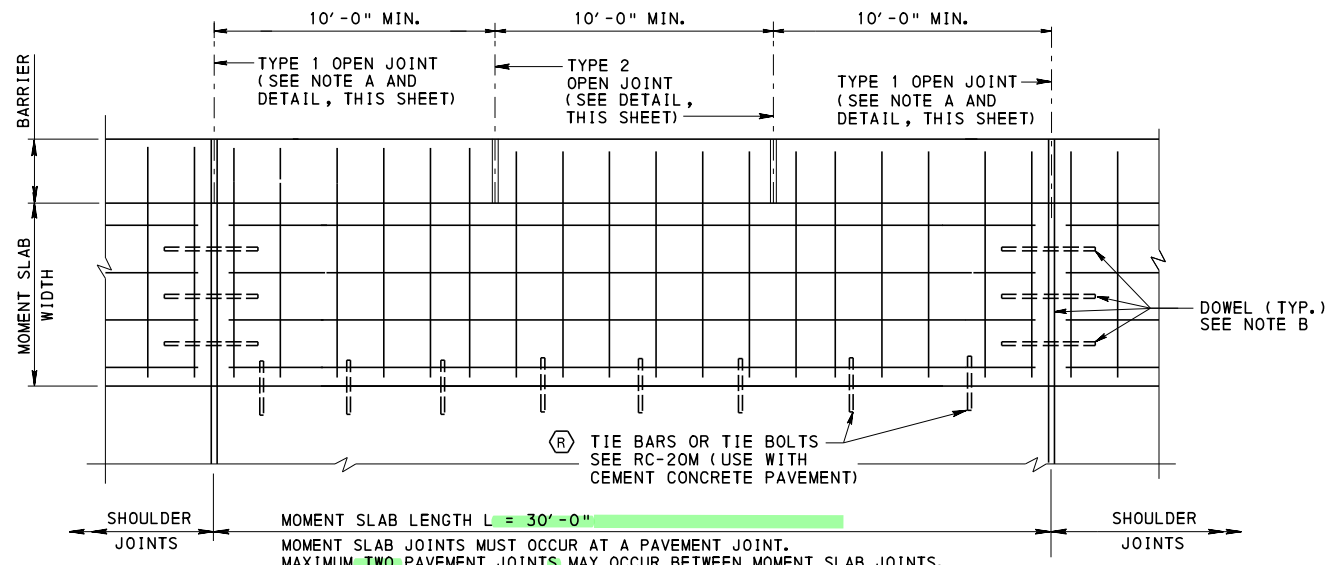
REINFORCEMENT FOR BARRIER WITH CEMENT CONCRETE SHOULDER

PRECAST 42" F-SHAPE CONCRETE BARRIER DETAILS

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

**STANDARD
MECHANICALLY STABILIZED EARTH
RETAINING WALLS
PRECAST TRAFFIC BARRIER**

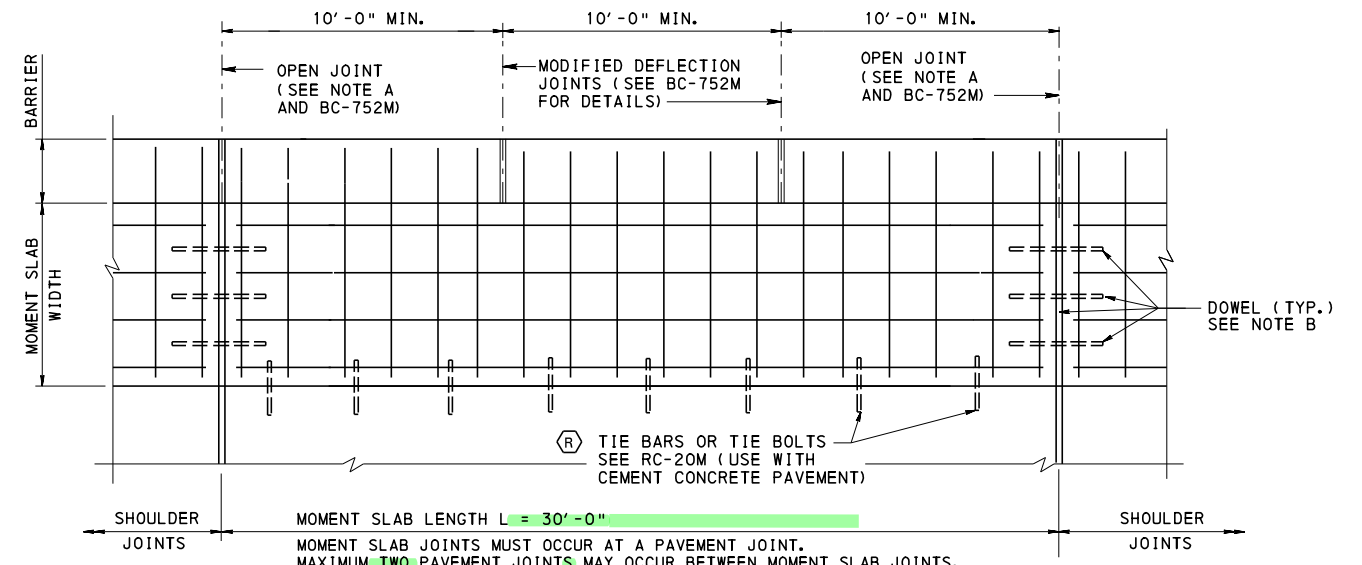
RECOMMENDED NOV. 23, 2022 <i>L. L. W. Gray</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Grain E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 5 OF 13 BC-799M
--	---	--------------------------



NOTE A: PROVIDE TYPE 1 OPEN JOINTS AT SAME LOCATIONS AS THOSE PROVIDED FOR THE MOMENT SLAB.

NOTE B: USE TYPE D OR E JOINT PER RC-27M. USE SAME JOINT AS PROVIDED IN PAVEMENT.

PLAN - BARRIER MOMENT SLAB
(PRECAST BARRIER)



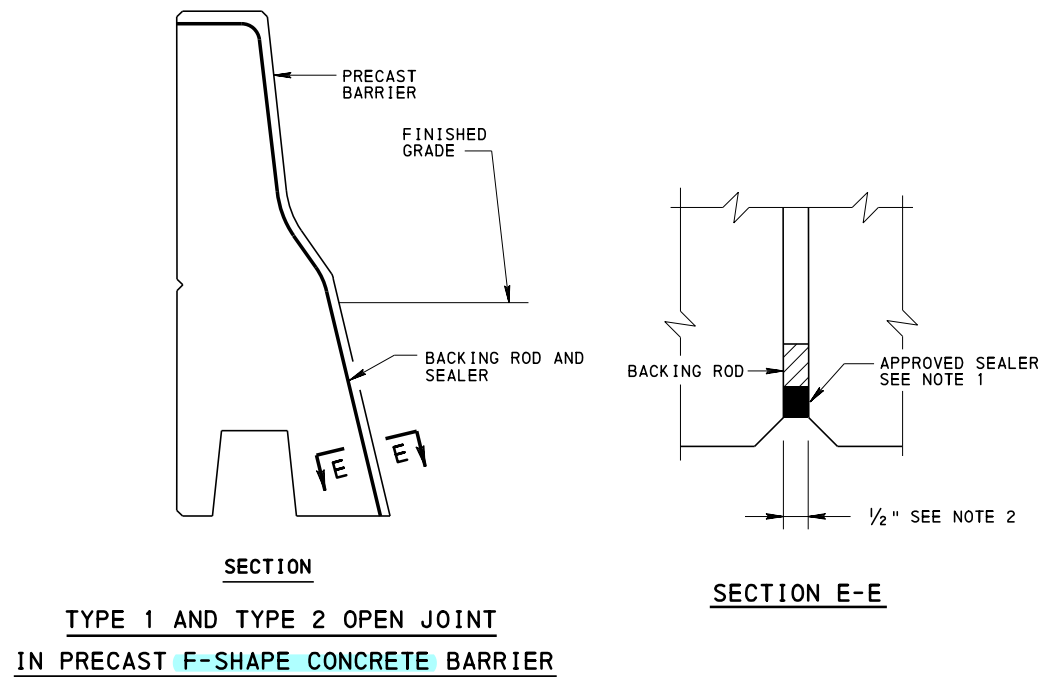
NOTE A: PROVIDE OPEN JOINTS IN BARRIER AT SAME LOCATIONS AS THOSE PROVIDED FOR THE MOMENT SLAB.

NOTE B: USE TYPE D OR E JOINT PER RC-27M. USE SAME JOINT AS PROVIDED IN PAVEMENT.

PLAN - BARRIER MOMENT SLAB
(C.I.P. BARRIER)

BARRIER MOMENT SLAB NOTES:

- ALL OPEN JOINTS IN THE BARRIER MUST BE FILLED WITH BACKING ROD AND SEALED WITH SILICONE JOINT SEALING MATERIAL AS SPECIFIED IN PUBLICATION 408, SECTION 705.4 (a).
- EXPOSED JOINTS @ BARRIER MAY VARY FROM 1/2" TO 1" WIDTH FOR TYPE 1 OPEN JOINT AND 1/4" TO 3/4" WIDTH FOR TYPE 2 OPEN JOINT, TO ALLOW FOR HORIZONTAL AND/OR VERTICAL CURVATURE IN WALL.

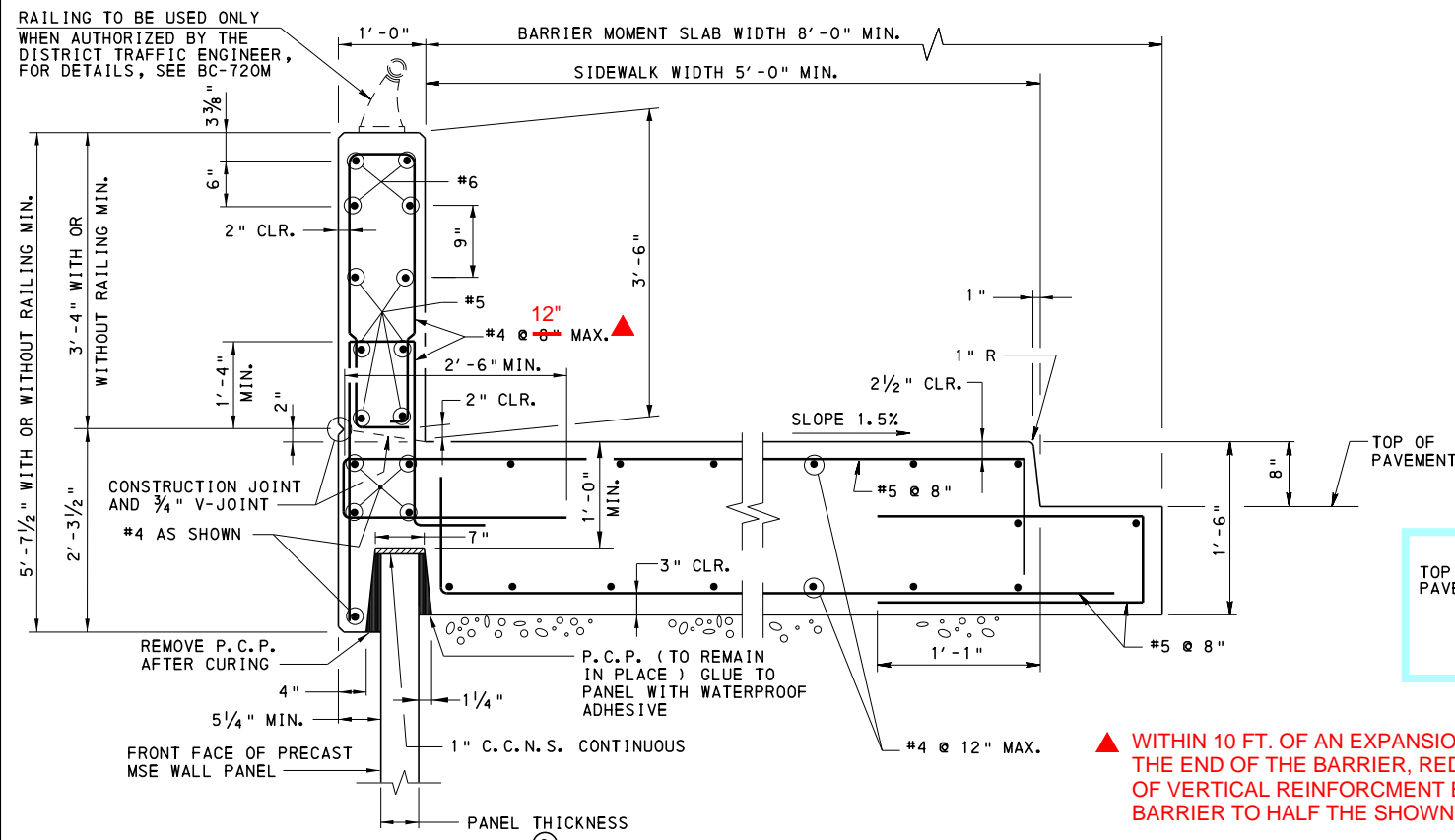


NOTE:
FOR LEGEND OF SYMBOLS, SEE SHEET 2.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

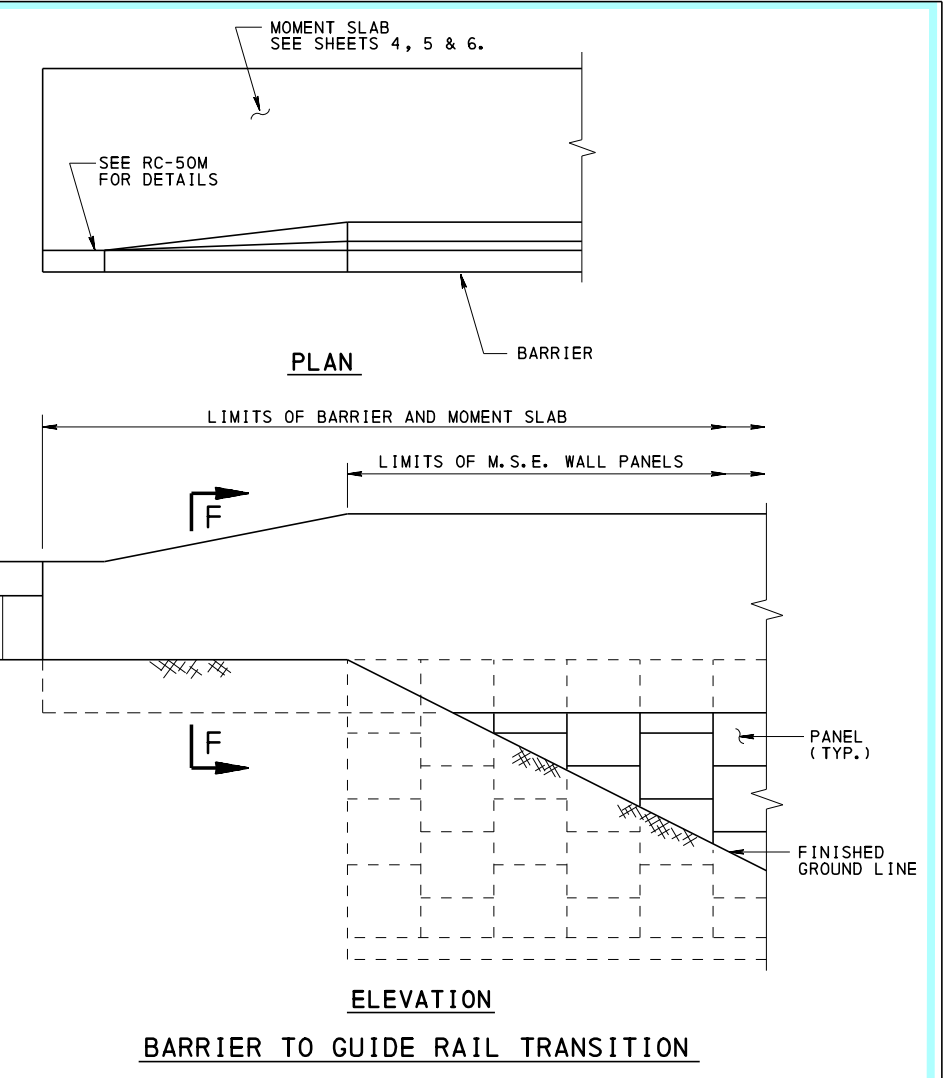
STANDARD
MECHANICALLY STABILIZED EARTH
RETAINING WALLS
MOMENT SLAB AND BARRIER JOINT

RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>[Signature]</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 6 OF 13 BC-799M
--	---	--------------------------



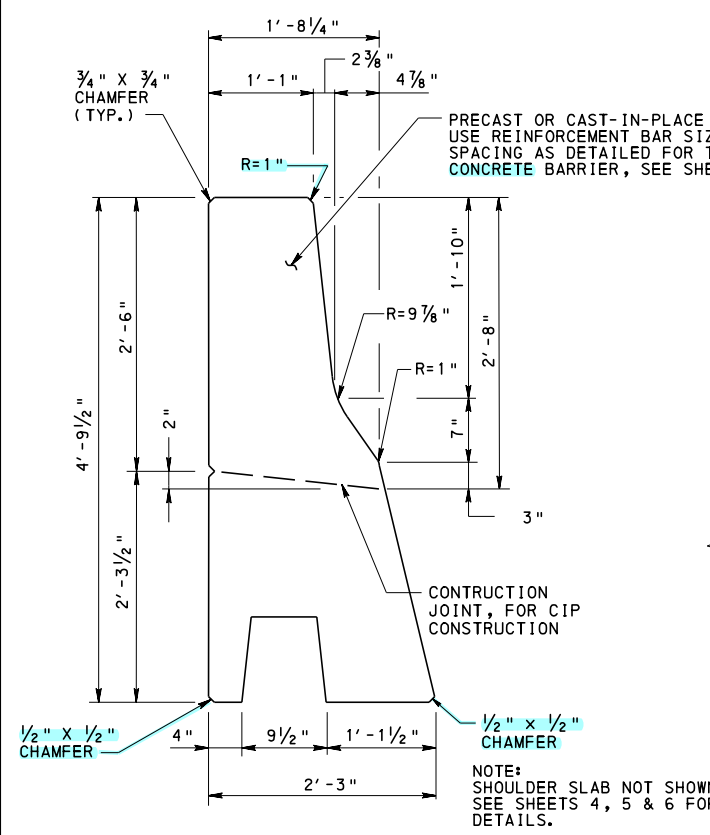
ALTERNATE SIDEWALK WITH 42" VERTICAL WALL CONCRETE BARRIER SECTION
(C. I. P.)
PERMITTED WITH A POSTED VEHICULAR SPEED LESS THAN OR EQUAL TO 45 MPH.

NOTE:
GUIDE RAIL AND INLET
(AS APPLICABLE) NOT SHOWN.

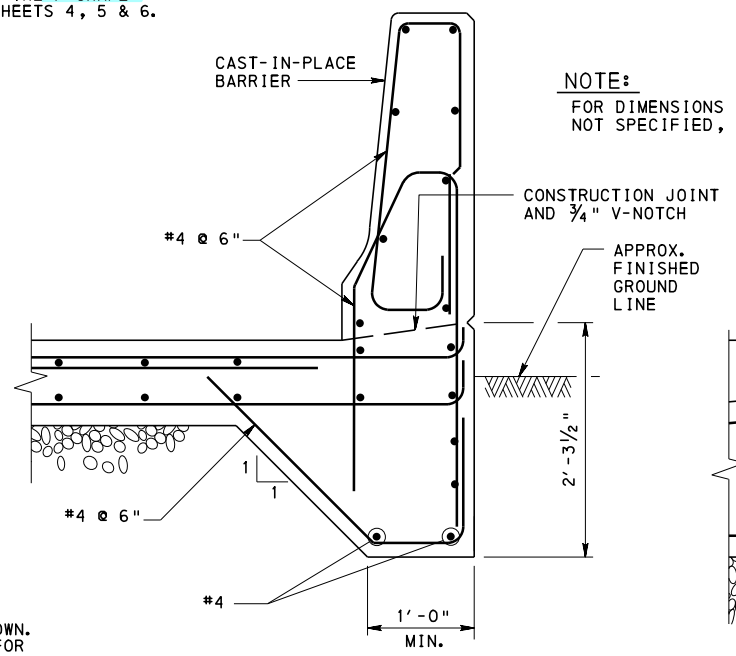


ELEVATION
BARRIER TO GUIDE RAIL TRANSITION

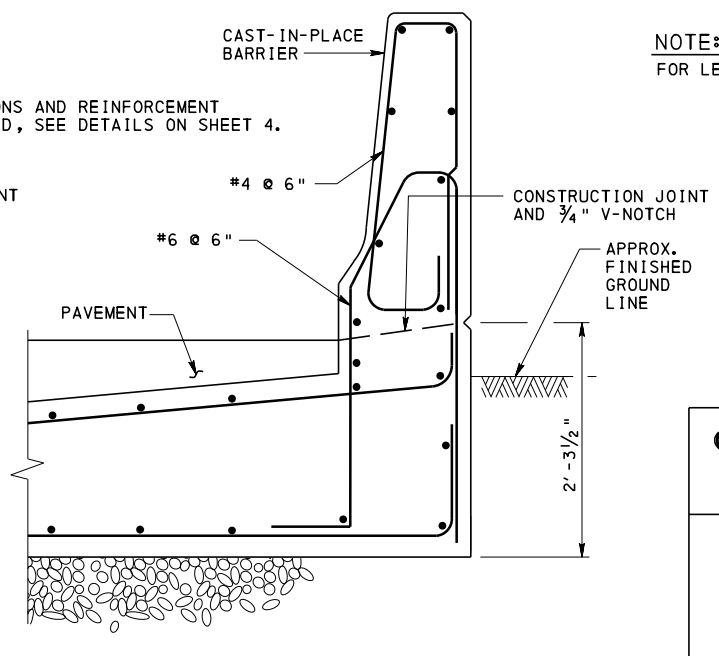
S.O.L. 483-23-01,
dated Feb. 7, 2023



32" F-SHAPE CONCRETE BARRIER
TO BE USED ONLY IF AUTHORIZED BY
CHIEF BRIDGE ENGINEER



BARRIER WITH CEMENT CONCRETE SHOULDER
(C. I. P.)



BARRIER WITH ASPHALT-PAVED SHOULDER
(C. I. P.)

NOTE:
FOR DIMENSIONS AND REINFORCEMENT
NOT SPECIFIED, SEE DETAILS ON SHEET 4.

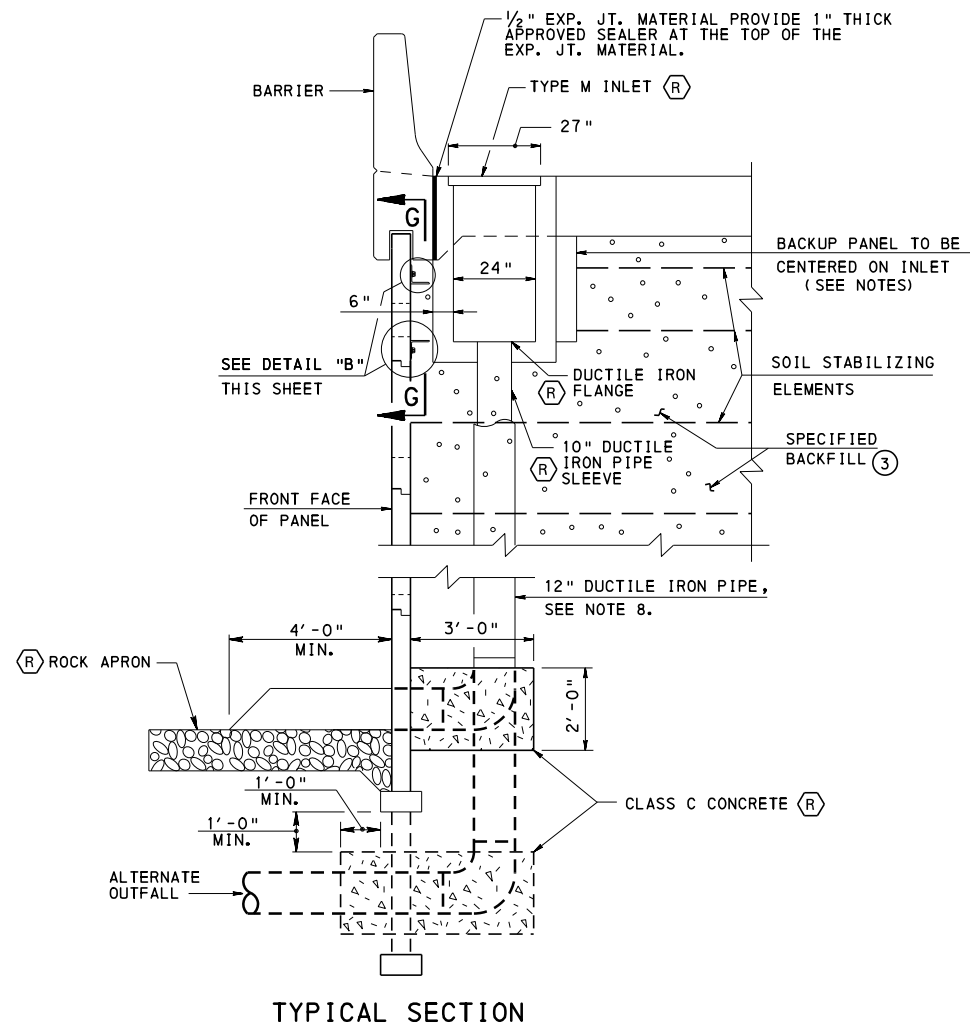
NOTE:
FOR LEGEND OF ○ NOTES, ABBREVIATIONS AND SYMBOLS, SEE SHEET 2.

SECTION F-F

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

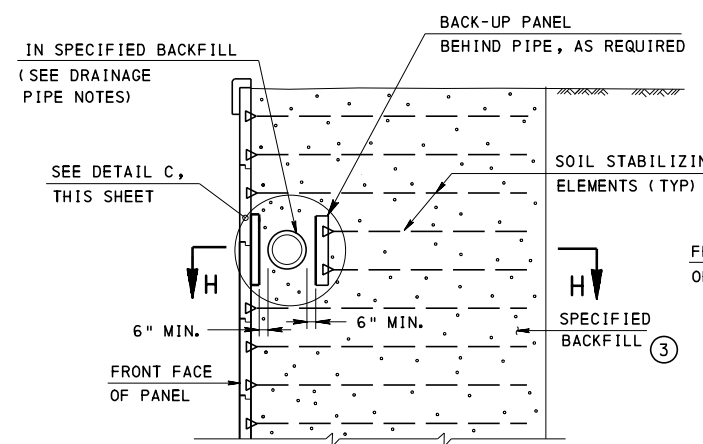
STANDARD
MECHANICALLY STABILIZED EARTH
RETAINING WALLS
SIDEWALK AND ALTERNATE BARRIER
AND GUIDE RAIL TRANSITION

RECOMMENDED NOV. 23, 2022 <i>L. W. [Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Gavin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 7 OF 13 BC-799M
--	---	--------------------------

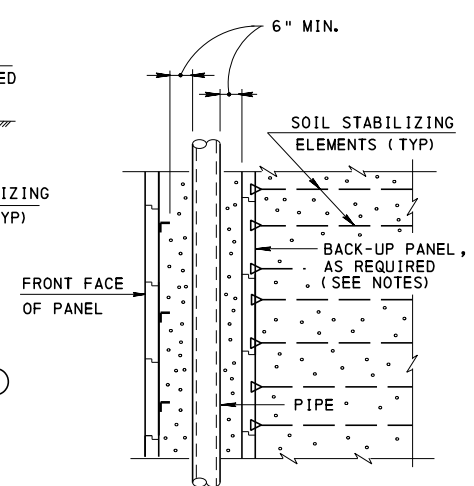


TYPICAL SECTION

INLET BEHIND WALL



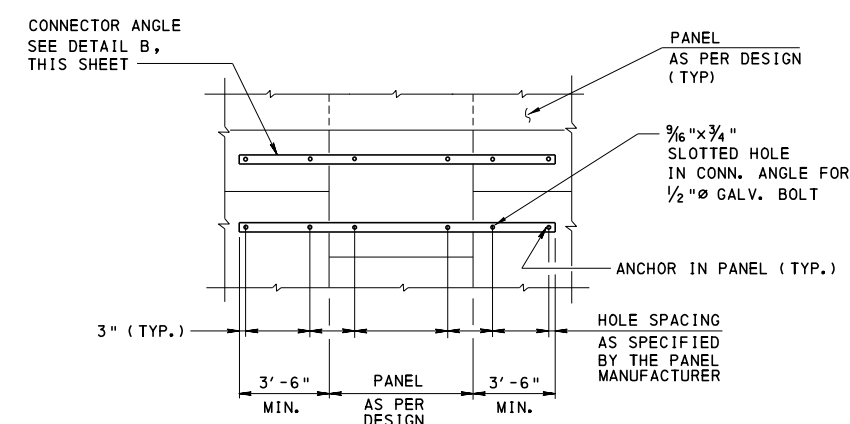
TYPICAL SECTION



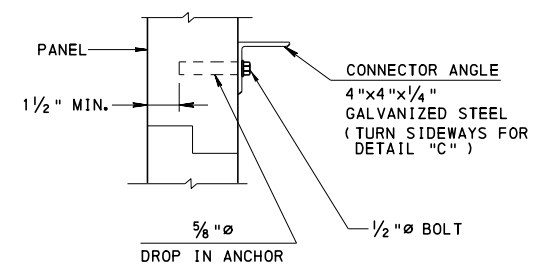
SECTION H-H

DRAINAGE PIPE BEHIND WALL

USE FOR PIPES LARGER THAN 12" AND LESS THAN 30" O.D. DRAINAGE INSTALLATIONS WITH PIPES LARGER THAN 30" O.D. REQUIRES APPROVAL FROM THE CHIEF BRIDGE ENGINEER. SEE NOTE 7 FOR ADDITIONAL INFORMATION.



SECTION G-G

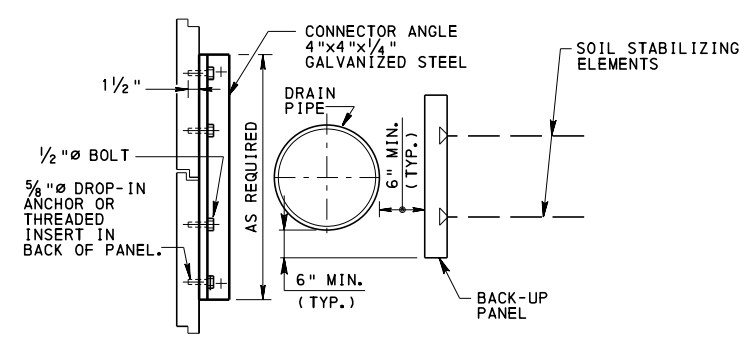


DETAIL B

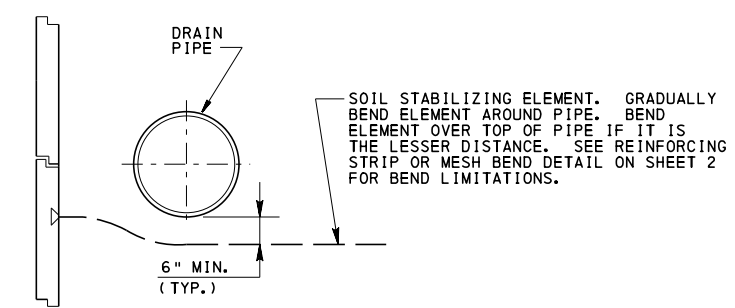
DRAINAGE PIPE NOTES :

1. FOR HORIZONTAL DRAIN PIPES, PROVIDE NONFERROUS PIPE WITH A 100-YEAR DESIGN LIFE AND WATERTIGHT JOINTS. PROVIDE POLYETHYLENE PIPES CONFORMING TO PUBLICATION 408, SECTION 601.2(a) 6.9 FOR THERMOPLASTIC PIPES, PROVIDE WATERTIGHT JOINTS IN ACCORDANCE WITH ASTM D3212. FOR CONCRETE PIPES, PROVIDE WATERTIGHT JOINTS IN ACCORDANCE WITH ASTM C443. TAKE SPECIAL CARE IN DETAILING TO MAINTAIN PIPE JOINTS INTACT.
2. TAKE SPECIAL CARE TO PROPERLY COMPACT GRANULAR BACKFILL AROUND PIPE SO AS NOT TO DAMAGE IT. USE LIGHT MECHANICAL TAMPER.
3. THE NUMBER OF BACKUP PANELS ARE TO BE DETERMINED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
4. THE COST FOR CONNECTOR DEVICES IS INCIDENTAL TO THE BID PRICE FOR CONTRACT ITEMS.
5. GALVANIZE ALL CONNECTOR ANGLES, BOLTS AND ANCHORS.
6. IF NECESSARY, MAKE MODIFICATIONS TO THESE DETAILS ON THE CONSTRUCTION PLANS.
7. DRAINAGE PIPES WITHIN MECHANICALLY STABILIZED EARTH WALLS IS NOT A PREFERRED CONDITION. DRAINAGE SHOULD BE EXITED OUTSIDE THE WALL IN ACCORDANCE WITH THE INLET BEHIND WALL DETAIL, THIS SHEET, WHENEVER POSSIBLE.
8. THE NON-FERROUS PIPE REQUIREMENTS IN NOTE 1, DO APPLY TO VERTICAL PIPES.

NOTE:
FOR LEGEND OF ○ NOTES, ABBREVIATIONS AND SYMBOLS, SEE SHEET 2.



DETAIL C - WITH BACKUP PANEL

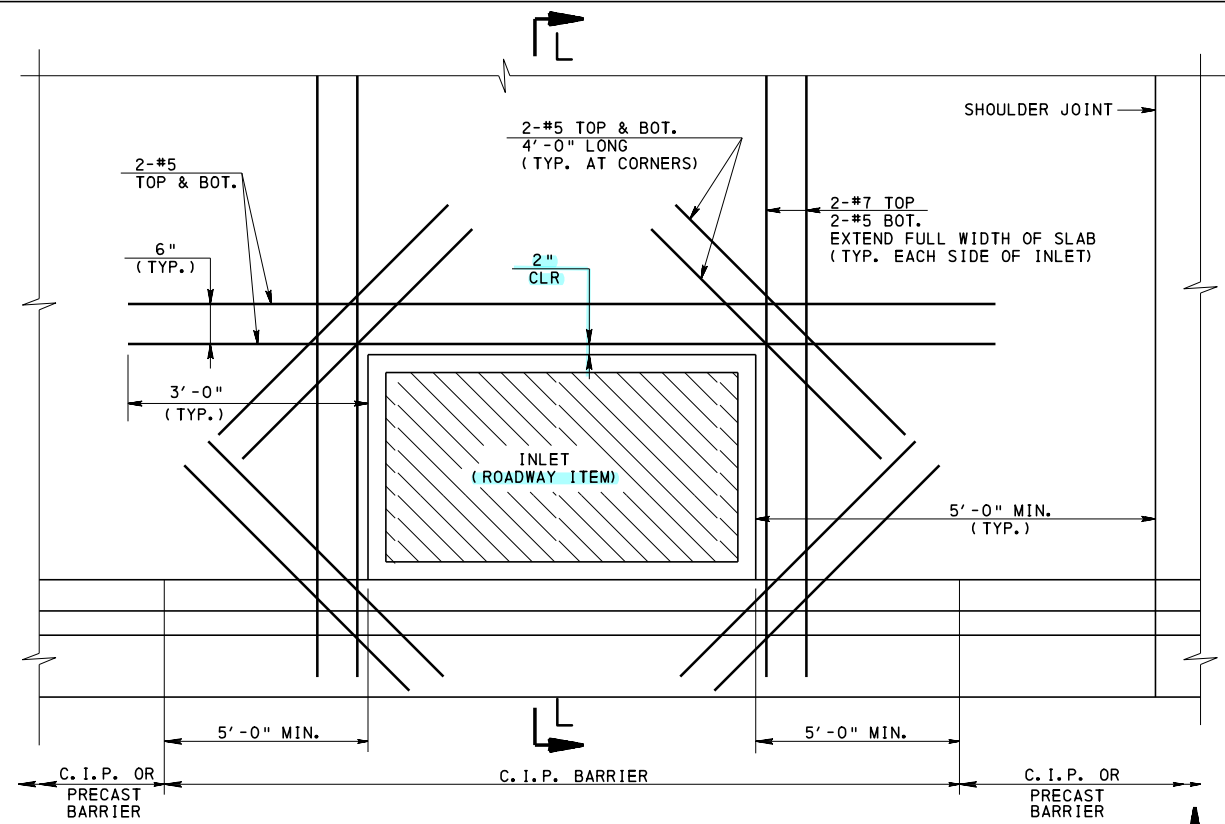


DETAIL C - WITHOUT BACKUP PANEL

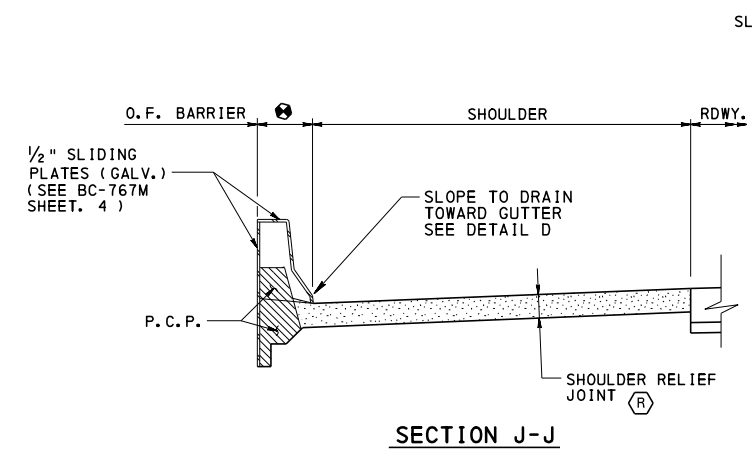
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
 BRIDGE OFFICE

STANDARD
 MECHANICALLY STABILIZED EARTH
 RETAINING WALLS
 DRAINAGE INSTALLATIONS

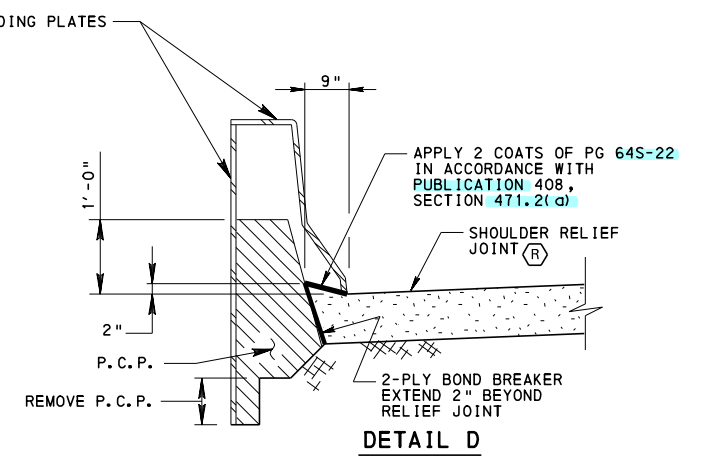
RECOMMENDED NOV. 23, 2022 <i>L. W. Gray</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Grain E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 8 OF 13 BC-799M
---	---	--------------------------



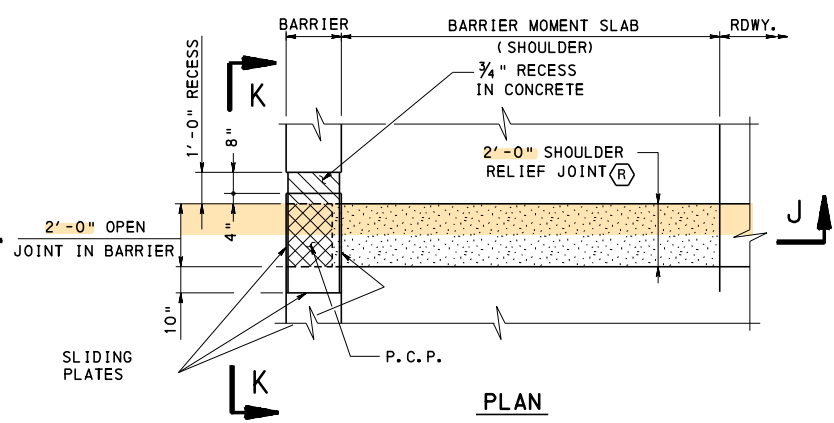
PLAN - SHOULDER DETAILS AT INLET



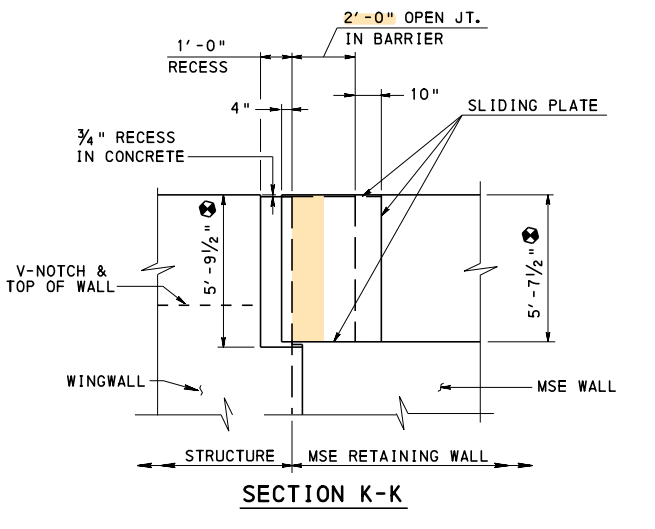
SECTION J-J



DETAIL D



PLAN

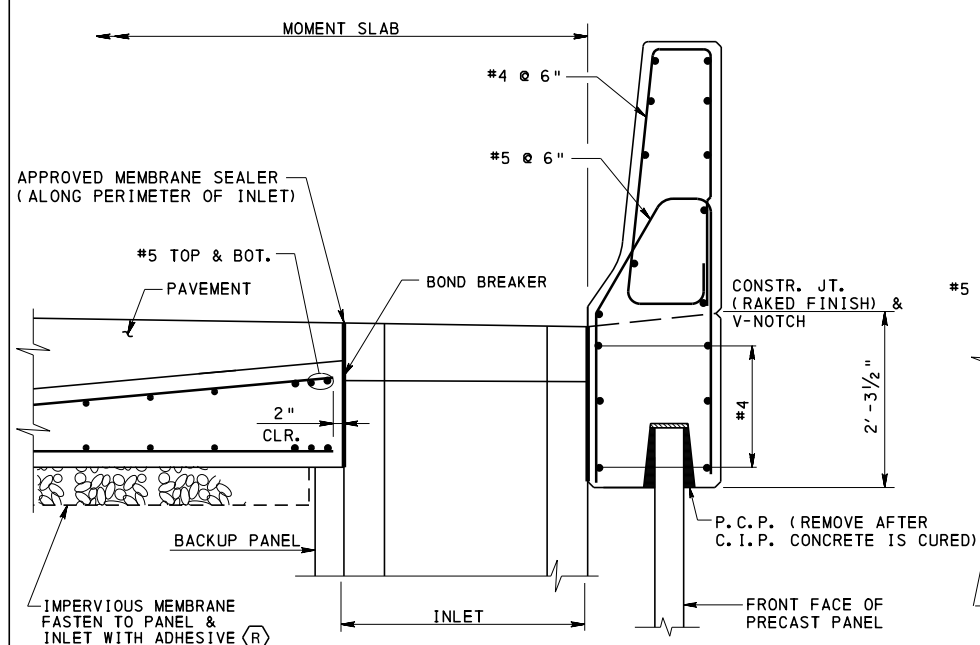


SECTION K-K

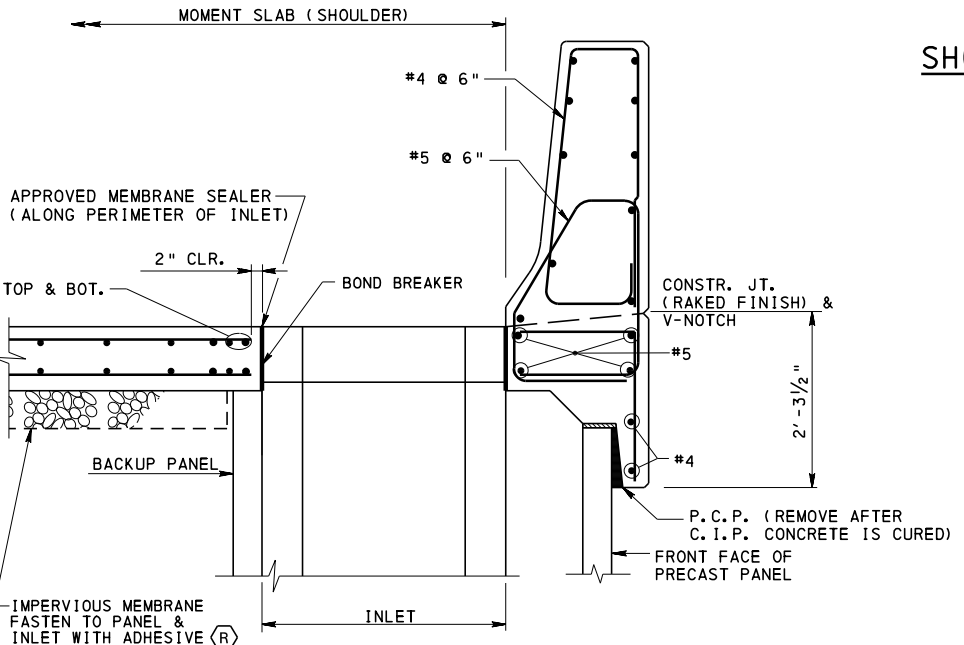
⊗ DIMENSIONS SHOWN ARE FOR 42" F-SHAPE CONCRETE BARRIER AND ALTERNATE SIDEWALK WITH 42" VERTICAL WALL CONCRETE BARRIER. ADJUST FOR 32" F-SHAPE CONCRETE BARRIER.

SHOULDER RELIEF JOINT
NOT TO SCALE

NOTE:
FOR LEGEND OF ABBREVIATIONS AND SYMBOLS, SEE SHEET 2.



BARRIER WITH ASPHALT-PAVED SHOULDER
(C. I. P.)

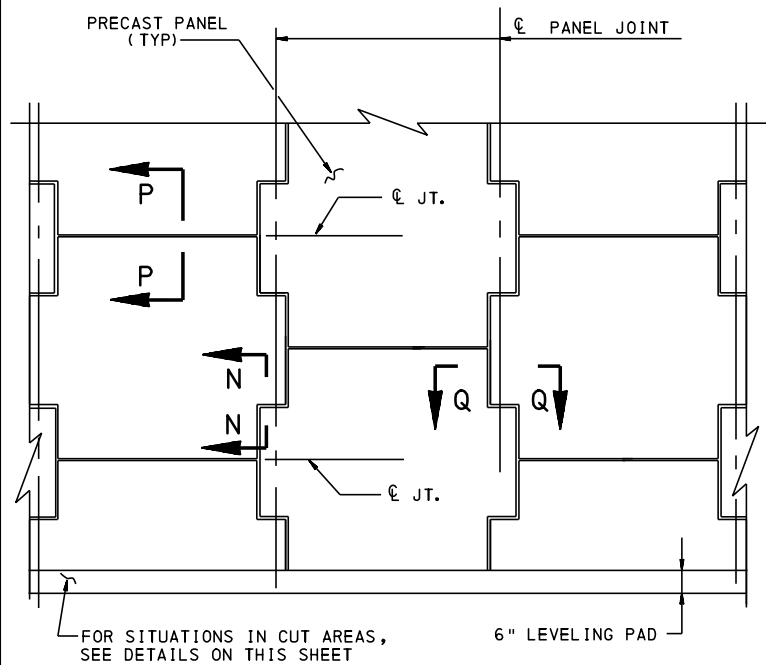


BARRIER WITH CEMENT CONCRETE SHOULDER
(C. I. P.)

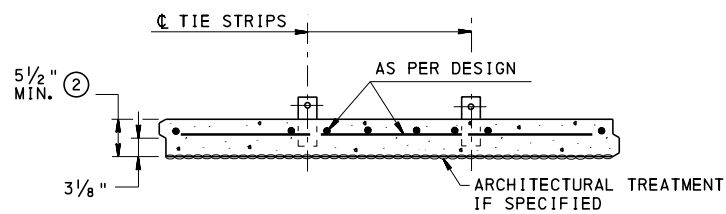
SECTION L-L
NOT TO SCALE

NOTES:
1. FOR DIMENSIONS AND REINFORCEMENT NOT SPECIFIED, SEE DETAILS ON SHEET 4.
2. FOR ADDITIONAL INLET INSTALLATION DETAILS, SEE SHEET 8.

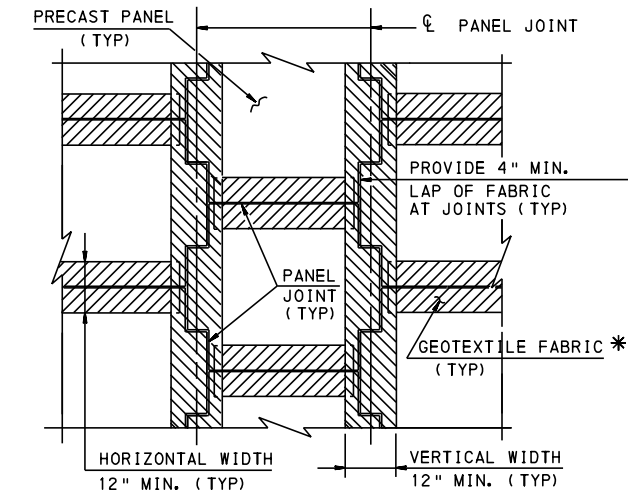
COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BRIDGE OFFICE		
STANDARD MECHANICALLY STABILIZED EARTH RETAINING WALLS SHOULDER RELIEF JOINT AND INLET INSTALLATION		
RECOMMENDED NOV. 23, 2022 <i>L. L. W. Gray</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Gavin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 9 OF 13 BC-799M



TYPICAL PANEL LAYOUT
PARTIAL ELEVATION - FRONT FACE

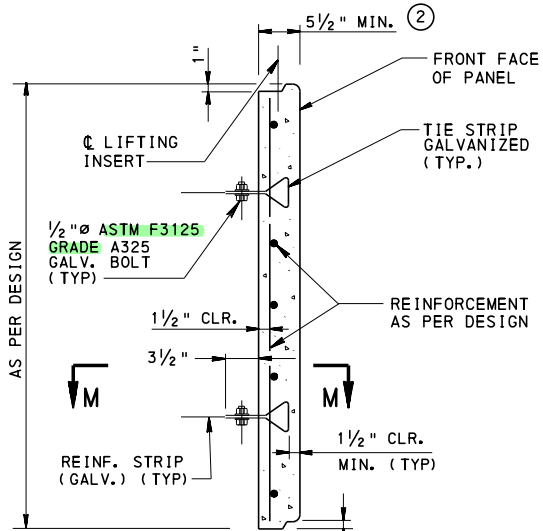


SECTION M-M

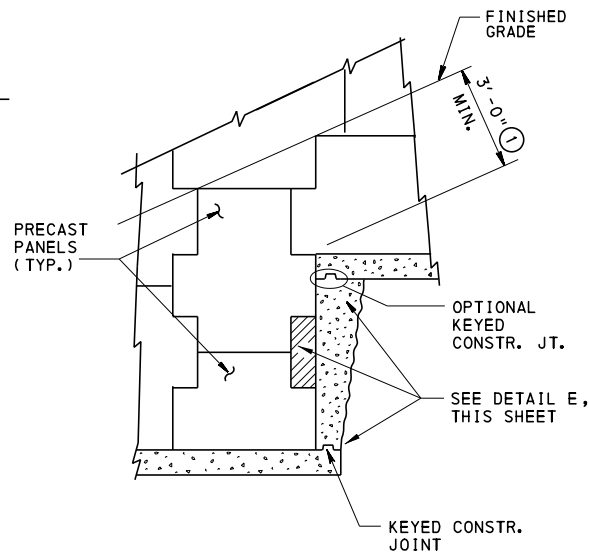
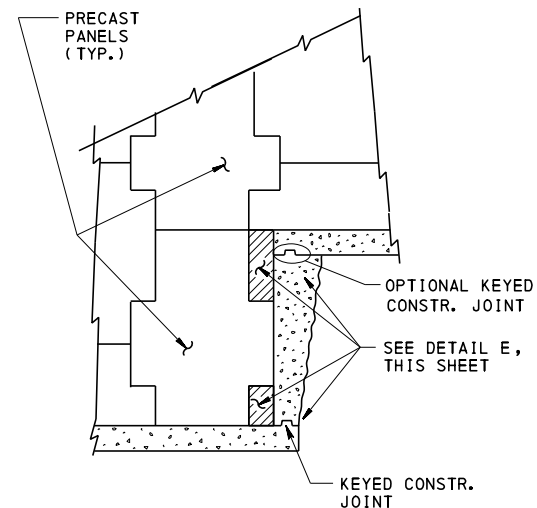


GEOTEXTILE FABRIC PLACEMENT DETAIL
PARTIAL ELEVATION - REAR FACE

* COVER ALL JOINTS BETWEEN PANELS ON BACK SIDE OF THE WALL WITH GEOTEXTILE FABRIC CLASS 4, TYPE A. APPLY ADHESIVE COATING ON PANELS ONLY AND NOT ON GEOTEXTILE FABRIC. DO NOT APPLY ADHESIVE WITHIN 2" OF THE JOINT. DO NOT PLACE FOAM STRIP FILLER IN HORIZONTAL JOINTS.



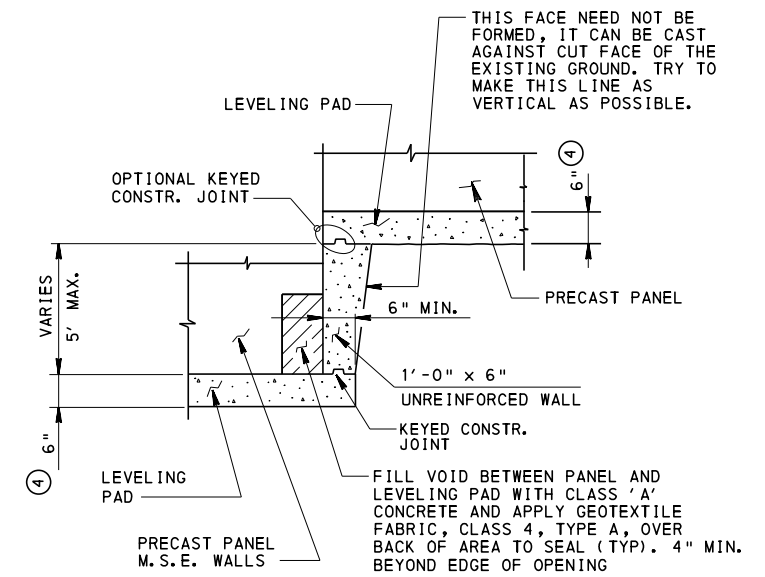
TIE STRIP LOCATION



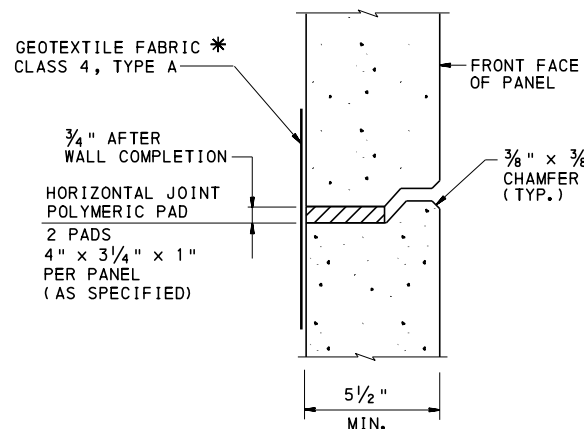
ELEVATIONS - FRONT FACE
(LEVELING PAD STEP DETAILS FOR MOST COMMON ARRANGEMENT OF PANELS)

NOTES:

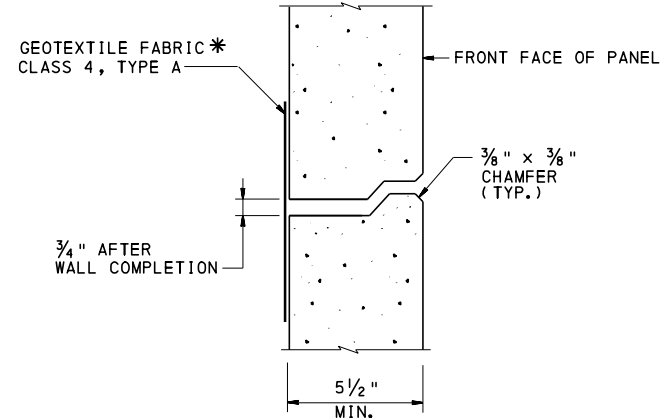
- ALL REINFORCEMENT BARS ARE EPOXY COATED AND A 615 GRADE 60 AS INDICATED. SEE BC-736M FOR REINFORCEMENT BAR REQUIREMENTS.
- PROVIDE A 3/8" x 3/8" CHAMFER ON ALL EXPOSED EDGES OF PANELS (FRONT FACE ONLY).
- ALL PANEL TYPES AND OTHER RELATED ELEMENTS WILL BE DETAILED ON SHOP DRAWINGS. INCLUDE LAYOUT (PLAN AND ELEVATION) OF COMPLETE WALL. INCLUDE WEEP HOLES DETAILS, LOCATION OF ABUTMENT PILES IF APPLICABLE, ALL OBSTRUCTIONS, BARRIER LAYOUT, SHOULDER SLAB AND JOINT DETAILS, INLET LOCATIONS, LIGHTPOLES, ETC. SHOW OBSTRUCTION MITIGATION DETAILS AND DESIGN ON THE CONSTRUCTION DRAWINGS AND SHOP DRAWINGS.
- ALL PANELS SHALL HAVE TWO LIFTING INSERTS OF 2 TON CAPACITY EACH. GALVANIZE IN ACCORDANCE WITH PUBLICATION 408 SECTION 1105.02 (s).
- PANEL DESIGN THICKNESS IS 5 1/2". THICKNESS OF CONCRETE MUST INCREASE TO ACCOMMODATE ANY ARCHITECTURAL SURFACE FINISH THAT MAY BE SPECIFIED.
- GALVANIZE ALL REINFORCING STRIPS, CONNECTION APPURTENANCES AND LIFTING HARDWARE.
- THE STRIP SKEW MAY BE INCREASED TO 25° MAXIMUM PROVIDED THAT CALCULATIONS SHOWING THE STRUCTURAL ADEQUACY OF ALL AFFECTED M.S.E. WALL COMPONENTS ARE SUBMITTED AND ACCEPTED.
- BOTTOM OF BOTTOM PANEL, TOP OF TOP PANEL, AND EXPOSED EDGES OF PANELS SHOULD BE FABRICATED WITH A FLAT SURFACE SQUARE TO THE REAR FACE OF PANEL.
- FOR LEGEND OF ○ NOTES AND SYMBOLS, SEE SHEET 2.



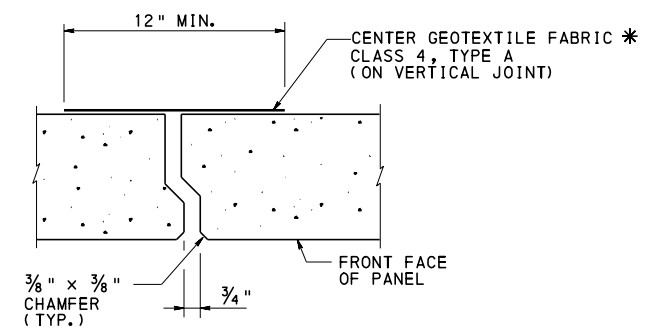
DETAIL E



SECTION P-P

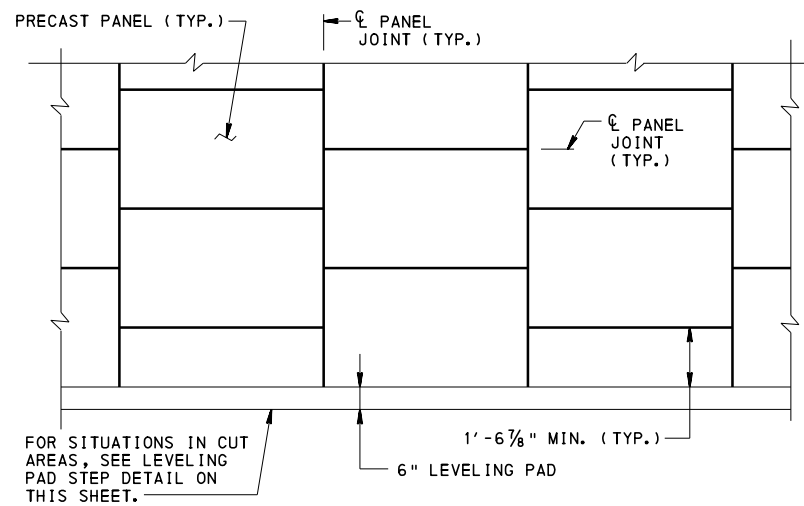


SECTION N-N

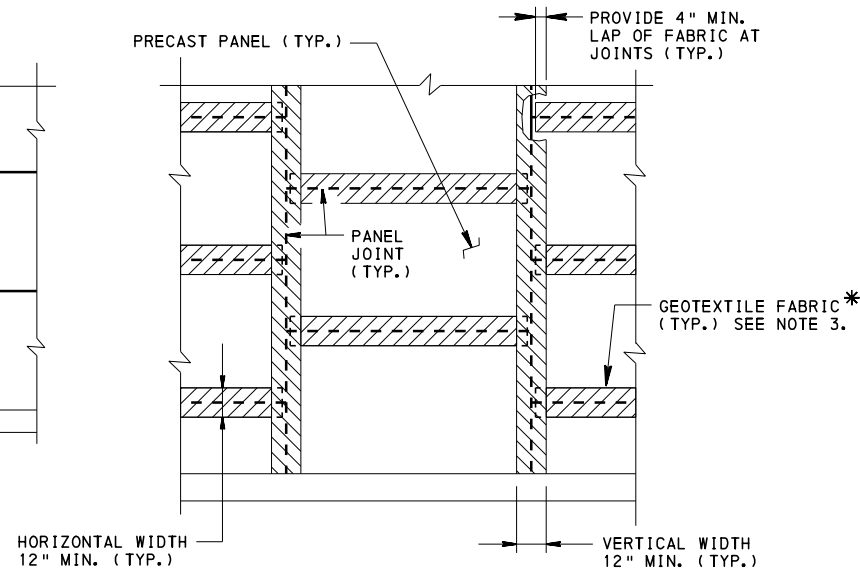


SECTION Q-Q

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE
STANDARD
MECHANICALLY STABILIZED EARTH
RETAINING WALLS
REINFORCED EARTH WALL PANELS

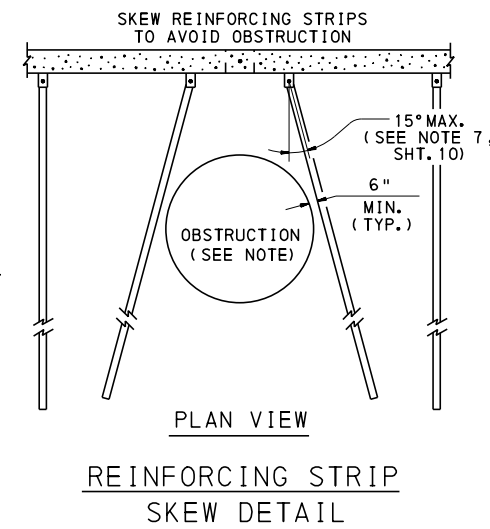


**TYPICAL PANEL LAYOUT
PARTIAL ELEVATION - FRONT FACE**



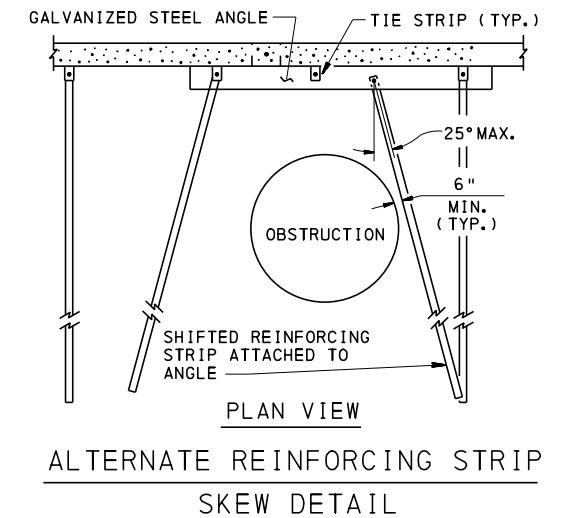
**GEOTEXTILE FABRIC PLACEMENT DETAIL
PARTIAL ELEVATION - REAR FACE**

* COVER ALL JOINTS BETWEEN PANELS ON BACK SIDE OF THE WALL WITH GEOTEXTILE FABRIC CLASS 4, TYPE A. APPLY ADHESIVE COATING ON PANELS ONLY AND NOT ON GEOTEXTILE FABRIC. DO NOT APPLY ADHESIVE WITHIN 2" OF THE JOINT. DO NOT PLACE FOAM STRIP FILLER IN HORIZONTAL JOINTS.

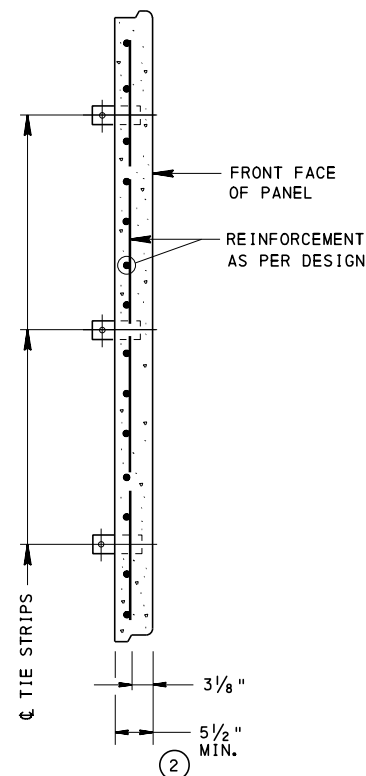


**REINFORCING STRIP
SKEW DETAIL**

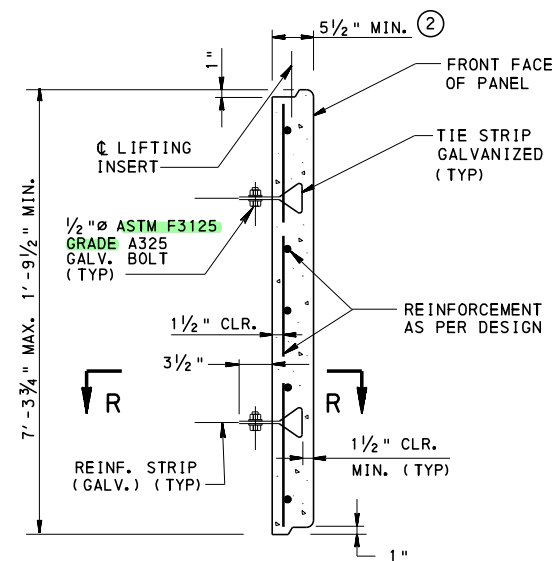
NOTE: SIZE OF OBSTRUCTION LIMITED BY THE MIN. CLEARANCE AND STRIP INCLINATION LIMITS SHOWN.



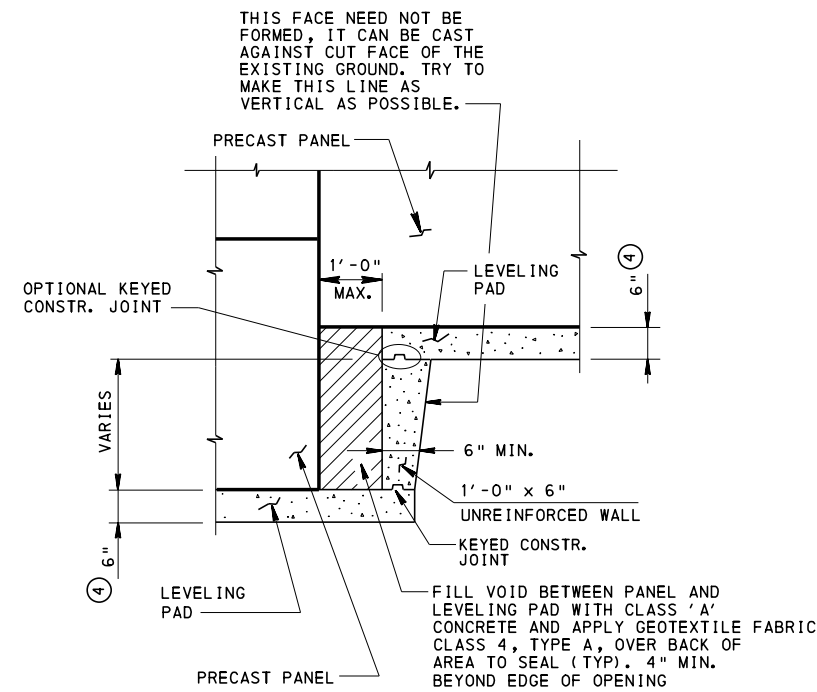
**ALTERNATE REINFORCING STRIP
SKEW DETAIL**



SECTION R-R



TIE STRIP LOCATION



LEVELING PAD STEP DETAIL

NOTES:

1. FOR ADDITIONAL NOTES, SEE SHEET 10.
2. ALL PANELS SHALL HAVE TWO LIFTING INSERTS OF 2 TON CAPACITY EACH.
3. STAGGERED HORIZONTAL PANEL JOINTS, MINIMUM DISTANCE 2'-5 1/2".
4. FOR LEGEND OF ○ NOTES AND SYMBOLS, SEE SHEET 2.

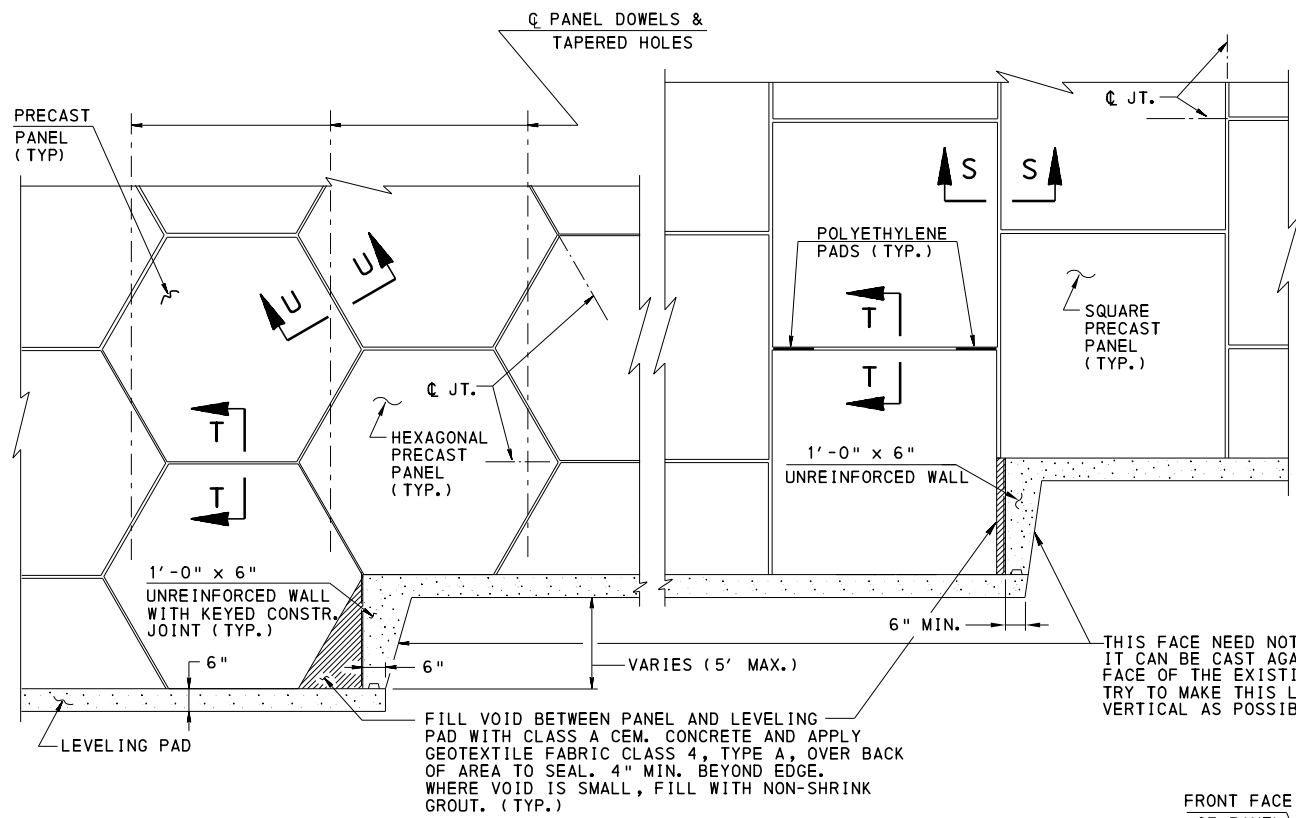
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

**STANDARD
MECHANICALLY STABILIZED EARTH
RETAINING WALLS
REINFORCED EARTH WALL PANELS**

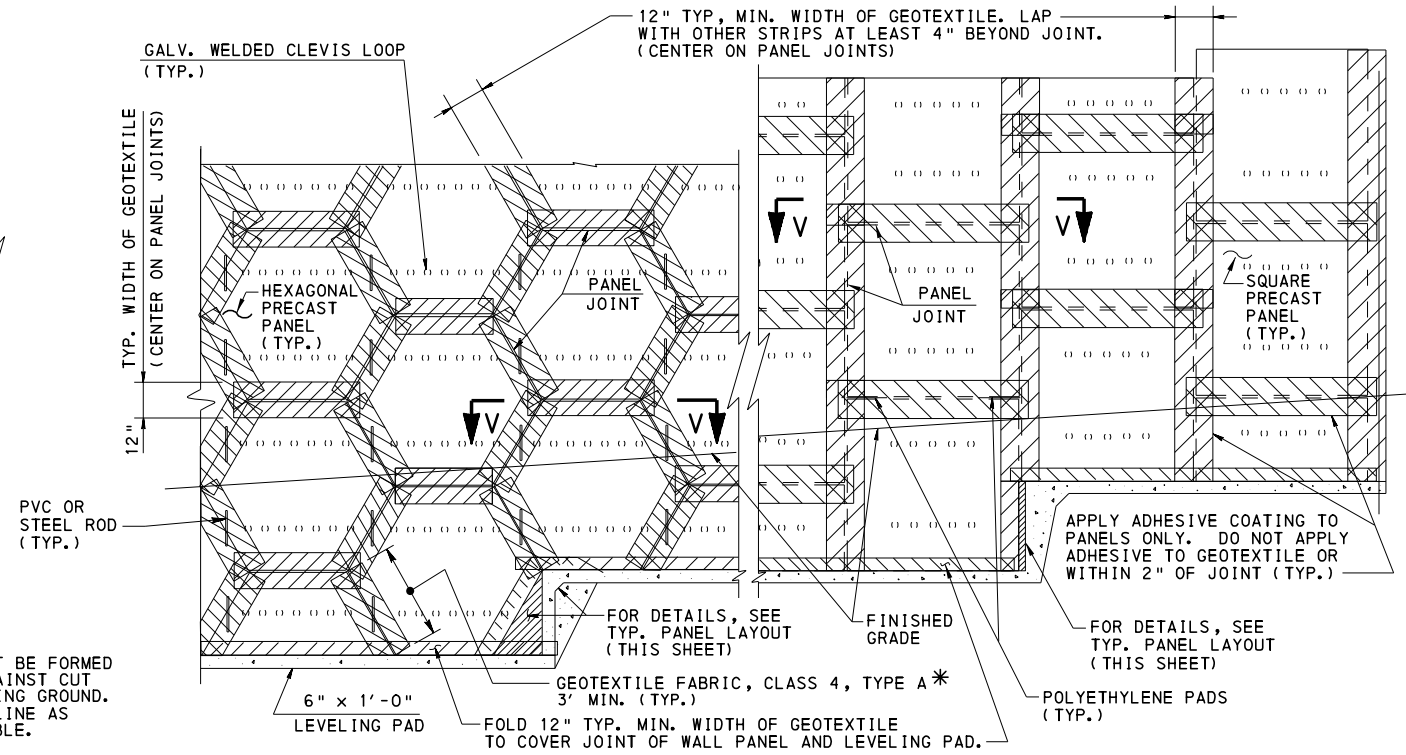
RECOMMENDED NOV. 23, 2022
L. W. Gray
CHIEF BRIDGE ENGINEER

RECOMMENDED NOV. 23, 2022
Grain E. Gray
CHIEF ENGINEER, HIGHWAY ADMIN.

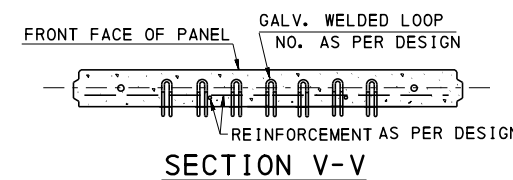
SHEET 11 OF 13
BC-799M



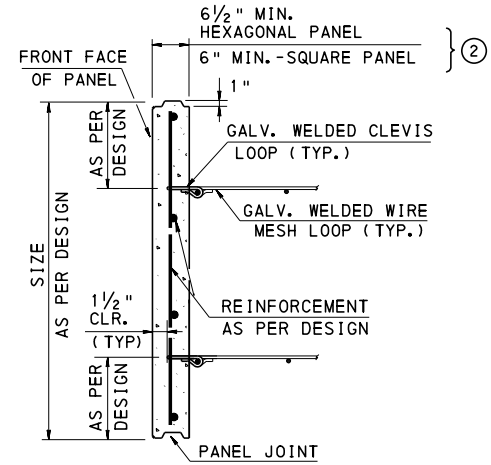
**TYPICAL PANEL LAYOUT
PARTIAL ELEVATION - FRONT FACE**



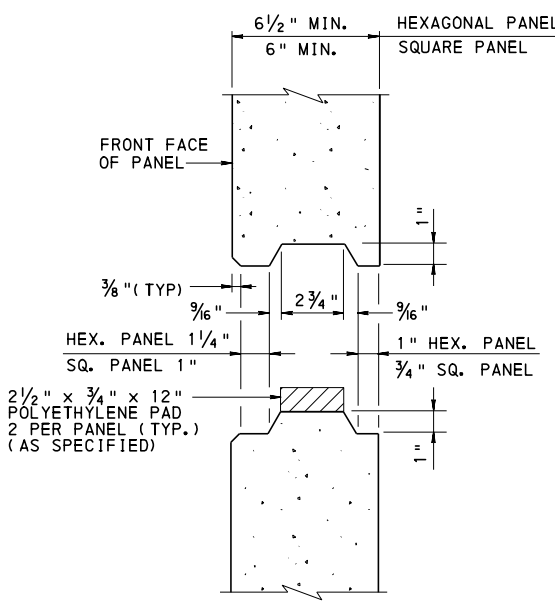
**GEOTEXTILE FABRIC DETAIL
PARTIAL ELEVATION - REAR FACE**



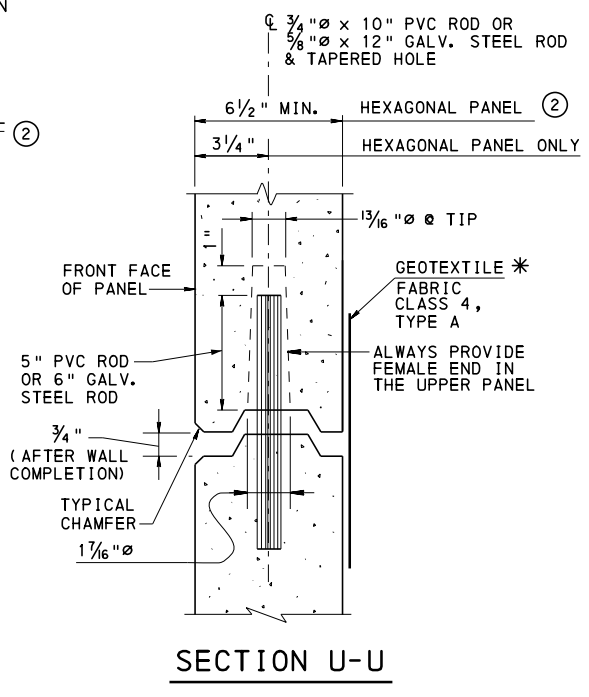
SECTION V-V



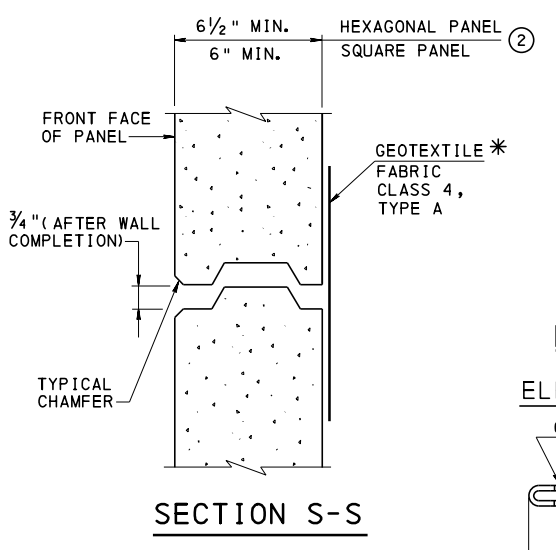
**MESH CONNECTOR LOCATION
EXCLUSIVE OF ANY AESTHETIC ENHANCEMENTS**



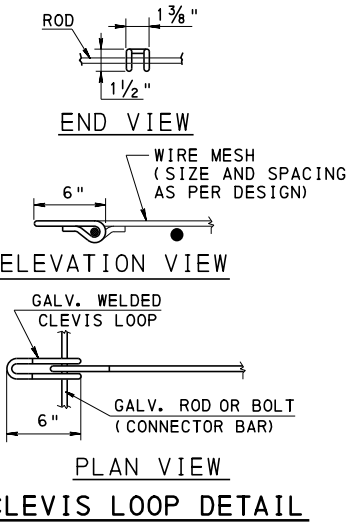
SECTION T-T



SECTION U-U



SECTION S-S



CLEVIS LOOP DETAIL

NOTES:

1. ALL CONNECTORS MUST ALIGN WITHIN 1/8" OF ALIGNMENT.
2. ALL PANELS SHALL HAVE A MINIMUM OF 2 LIFTING INSERTS OF 2 TON CAPACITY EACH. GALVANIZE IN ACCORDANCE WITH PUBLICATION 408 SECTION 1105.02(s).
3. NUMBER OF LOOP MESH CONNECTORS VARIES ACCORDING TO MESH CONFIGURATION.
4. REINFORCING MESH MAY BE SKEWED FROM THE NORMAL POSITION PERPENDICULAR TO THE WALL FACE UP TO A MAXIMUM SKEW OF 15° WITH SMOOTH BENDS. DO NOT CUT CROSSBARS. SEE DETAIL ON SHEET 9. THE MESH SKEW MAY BE INCREASED TO 25° MAXIMUM PROVIDED THAT CALCULATIONS SHOWING THE STRUCTURAL ADEQUACY OF ALL AFFECTED M.S.E. WALL COMPONENTS ARE PROVIDED AND ACCEPTED.
5. ALL PANEL REINFORCEMENT BARS ARE TO BE EPOXY COATED AND A615 GRADE 60, AS INDICATED. SEE BC-736M FOR REINFORCEMENT BAR REQUIREMENTS.
6. 3/8" x 3/8" CHAMFER SHALL BE PROVIDED ON ALL EXPOSED EDGES OF PANELS. (FRONT FACE ONLY)
7. DETAIL ALL PANEL TYPES AND OTHER RELATED ELEMENTS ON SHOP DRAWINGS. INCLUDE LAYOUT (PLAN AND ELEVATION) OF COMPLETE WALL. INCLUDE WEEP HOLES DETAILS, LOCATION OF ABUTMENT PILES IF APPLICABLE, ALL OBSTRUCTIONS, BARRIER LAYOUT, ETC. SHOW OBSTRUCTION MITIGATION DETAILS AND DESIGN ON THE CONSTRUCTION DRAWINGS.
8. PANEL DOWELS MAY BE 3/4" x 10" PVC ROD OR 5/8" x 12" GALVANIZED STEEL ROD.
9. MINIMUM PANEL DESIGN THICKNESS IS AS INDICATED ON SECTION T-T, U-U OR S-S, THIS SHEET. THICKNESS OF CONCRETE MUST INCREASE TO ACCOMMODATE ANY ARCHITECTURAL SURFACE FINISH THAT MAY BE SPECIFIED.
10. GALVANIZE ALL REINFORCING MESH, CONNECTION APPURTENANCES AND LIFTING HARDWARE.
11. BOTTOM OF BOTTOM PANEL, TOP OF TOP PANEL, AND EXPOSED EDGES OF PANELS SHOULD BE FABRICATED WITH A FLAT SURFACE SQUARE TO THE REAR FACE OF PANEL.
12. FOR LEGEND OF ○ NOTES AND SYMBOLS, SEE SHEET 2.

* COVER ALL JOINTS BETWEEN PANELS ON BACK SIDE OF THE WALL WITH GEOTEXTILE FABRIC CLASS 4, TYPE A. APPLY ADHESIVE COATING ON PANELS ONLY AND NOT ON GEOTEXTILE FABRIC. DO NOT APPLY ADHESIVE WITHIN 2" OF THE JOINT. DO NOT PLACE FOAM STRIP FILLER IN HORIZONTAL JOINTS.

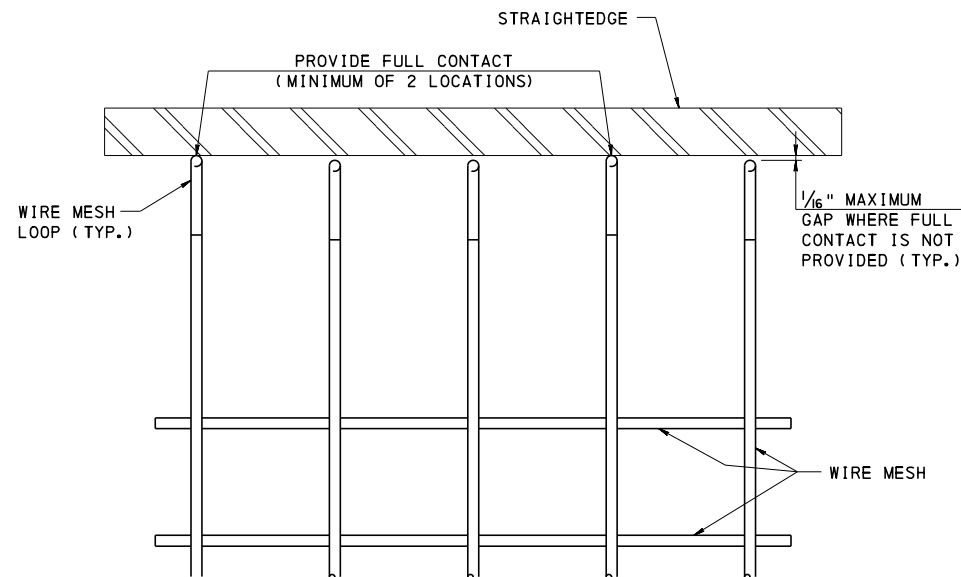
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE**

**STANDARD
MECHANICALLY STABILIZED EARTH
RETAINING WALLS
RETAINED EARTH WALL PANELS**

RECOMMENDED NOV. 23, 2022 <i>L. W. Gray</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Grain E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 12 OF 13 BC-799M
---	---	----------------------------------

PANEL LOOP AND WIRE MESH LOOP TOLERANCES

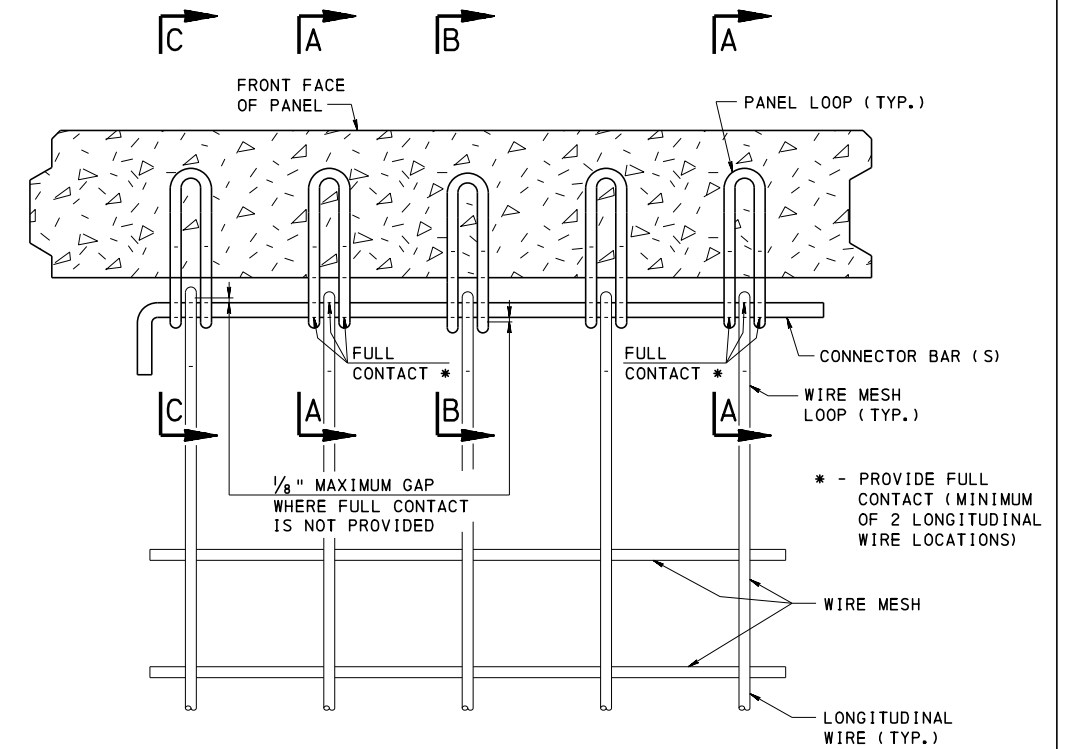
- FABRICATE PANELS AND WIRE MESH TO PREFERABLY ACHIEVE FULL CONTACT OF THE WIRE MESH TO THE PANEL CONNECTION. THE MAXIMUM PERMISSIBLE GAP BETWEEN THE CONNECTING BAR(S) AND PANEL/WIRE LOOPS AFTER ASSEMBLY WILL BE 1/8" AS SHOWN IN DETAIL A.
- SUBMIT A QUALITY CONTROL PLAN DESCRIBING METHODS AND PROCEDURES USED TO ACHIEVE A MAXIMUM 1/8" GAP AS PER DETAIL A. DIVIDE THE QUALITY CONTROL PLAN INTO TWO PARTS: PART I: FABRICATION, AND PART II: ERECTION. AS A MINIMUM, INCLUDE THE FOLLOWING IN THE QUALITY CONTROL PLAN:
 - PART I: FABRICATION
 - METHOD OF POSITIONING/MAINTAINING THE CLEVIS LOOPS IN THE PANEL DURING CONCRETE PLACEMENT, VIBRATION AND FINISHING.
 - PROPOSED FINAL FABRICATION TOLERANCES OF THE CLEVIS WITH RESPECT TO EMBEDMENT AND ALIGNMENT.
 - MEASUREMENT METHOD (INCLUDING TOOLS) USED TO VERIFY FABRICATION TOLERANCES.
 - METHOD OF HANDLING, STORING AND SHIPPING THE PANELS TO AVOID CONTACT WITH AND/OR CHANGE IN POSITION OF THE CLEVIS LOOPS.
 - PART II: ERECTION
 - PROPOSED TOLERANCES FOR ALIGNMENT OF THE WIRE MESH LOOPS.
 - MEASUREMENT METHOD (INCLUDING TOOLS) USED TO VERIFY WIRE MESH LOOP ALIGNMENT AND FINAL CONNECTION TOLERANCES.
- AS AN ALTERNATIVE TO THE PREPARATION OF A QUALITY CONTROL PLAN, OR WHERE THE QUALITY CONTROL PLAN IS REJECTED BY THE CHIEF STRUCTURAL MATERIALS ENGINEER AND THE DISTRICT STRUCTURAL CONTROL ENGINEER FOR REVIEW AND APPROVAL. APPROVAL FROM BOTH THE CHIEF STRUCTURAL MATERIALS ENGINEER AND THE DISTRICT STRUCTURAL CONTROL ENGINEER ARE REQUIRED PRIOR TO ACCEPTANCE OF THE SHOP DRAWINGS.
 - PANELS: FABRICATE PANELS WITH LOOPS THAT ARE POSITIONED WITHIN 1/16" OF THE DEFINED POSITION. ACCEPTANCE WILL BE ESTABLISHED BY PLACEMENT OF A STRAIGHT BAR THROUGH ALL LOOPS IN A ROW OF A PANEL. REFER TO DETAIL C.
 - WIRE MESH: FABRICATE LOOPS OF WIRE MESH TO WITHIN 1/16" OF A POSITION DEFINED BY A STRAIGHTEDGE PLACED IN CONTACT WITH AT LEAST TWO LOOPS. REFER TO DETAIL B.
 - MAINTAIN PANEL AND WIRE MESH TOLERANCES DURING TRANSPORTATION AND ASSEMBLY TO ACHIEVE A MAXIMUM 1/8" GAP BETWEEN CONNECTOR BAR(S) AND PANEL LOOPS AND WIRE MESH LOOPS. REFER TO DETAIL A.
- BENDING OR REPOSITIONING PANEL LOOPS AFTER PANEL FABRICATION WILL NOT BE ACCEPTED AS MEANS OF ACHIEVING PROPER TOLERANCES.
- REFER TO THE MECHANICALLY STABILIZED EARTH RETAINING WALL SYSTEMS SPECIAL PROVISION FOR ADDITIONAL WIRE MESH TOLERANCES.



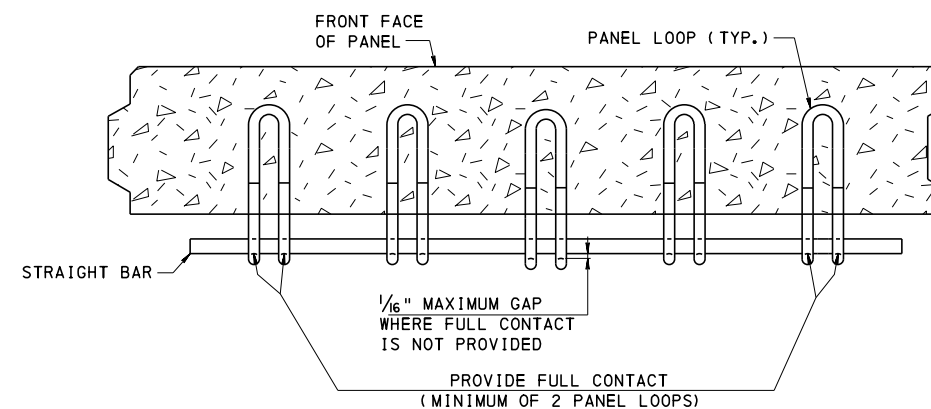
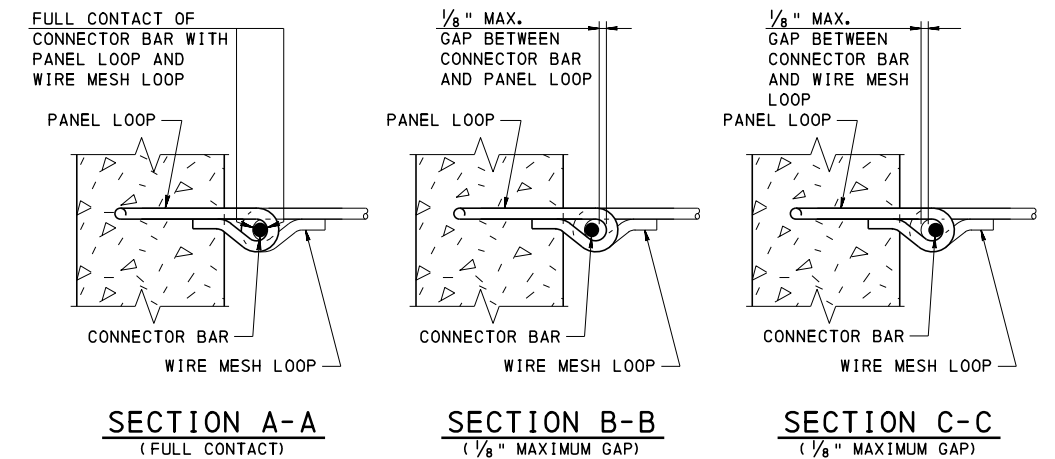
DETAIL B **
(WIRE MESH)

METHOD FOR ESTABLISHING ACCEPTANCE OF WIRE MESH CONNECTION DURING CONSTRUCTION

- CONNECT WIRE MESH TO PANEL WITH CONNECTING BAR(S).
- PULL WIRE MESH AWAY FROM THE PANEL WITH SUFFICIENT EFFORT SO THAT THE CONNECTOR BAR(S) MAKE FULL CONTACT WITH THE MESH WIRE LOOPS AND THE PANEL LOOPS AT A MINIMUM OF TWO WIRE MESH LOOP LOCATIONS.
- MEASURE THE GAPS, IF ANY, BETWEEN THE CONNECTOR BAR(S) AND THE PANEL LOOPS, AND BETWEEN THE CONNECTOR BAR(S) AND THE WIRE MESH LOOPS. REFER TO DETAIL A.
- THE MAXIMUM ACCEPTABLE GAP BETWEEN THE CONNECTOR BAR(S) AND THE PANEL AND WIRE MESH LOOPS IS 1/8".
- THE USE OF WOODEN WEDGES DRIVEN BETWEEN THE PANEL AND CONNECTOR BAR(S) TO ASSIST IN ENGAGING THE CONNECTOR BAR(S) WITH THE LOOPS TO ACHIEVE THE 1/8" MAXIMUM GAP WILL NOT BE PERMITTED. THE USE OF WOODEN WEDGES TO STABILIZE THE MESH FROM MOVEMENT DURING BACKFILL OPERATIONS WILL BE PERMITTED, BUT THE WEDGES MUST BE DRIVEN AT LOCATIONS OF FULL CONTACT ONLY OR AT ANY LOCATION AFTER GAPS ARE MEASURED AND FOUND TO BE WITHIN TOLERANCE.



DETAIL A
(WIRE MESH CONNECTION)



DETAIL C **
(PANEL LOOPS)

** TOLERANCES IN DETAILS "B" AND "C" ARE APPLICABLE UNLESS SUPERCEDED IN A QUALITY CONTROL PLAN.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE OFFICE

STANDARD
MECHANICALLY STABILIZED EARTH
RETAINING WALLS
RETAINED EARTH WALL PANEL
AND WIRE MESH TOLERANCES

RECOMMENDED NOV. 23, 2022 <i>L. W. [Signature]</i> CHIEF BRIDGE ENGINEER	RECOMMENDED NOV. 23, 2022 <i>Gavin E. Gray</i> CHIEF ENGINEER, HIGHWAY ADMIN.	SHEET 13 OF 13 BC-799M
--	---	---------------------------