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DEPARTMENT OF TRANSPORTATION
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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.

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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.
	2 of 2	Added new sheet with nut and bolt details.
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	Added ALTERNATE DETAIL A for attachment of pedestrian railing post with anchor bolts cast in deck slab. Added ALTERNATE PLATE DETAIL. DETAIL A: added galvanized anchor bolts callout.

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 throughput.
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	NOTES TO FABRICATOR: in 1st bullet point: replaced NOT with RECOMMENDED. Deleted remainder of note.
		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. DESIGN CRITERIA: Catwalk reference changed to "3.6" under AASHTO Sign Spec.
	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
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 IIIE: 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
		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.
BC-775M (continued)	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, 2nd bullet point – added AND AFTER THE PANELS ARE INSTALLED to end of statement.
BC-779M	2 of 9	MATERIAL NOTES: Note 7, 1st bullet point – replaced ASTM A325 with ASTM A307, GRADE A for bolt specification. In 4th 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.
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 ¾”. Also changed length of 5/8” diameter galvanized steel to 12”.

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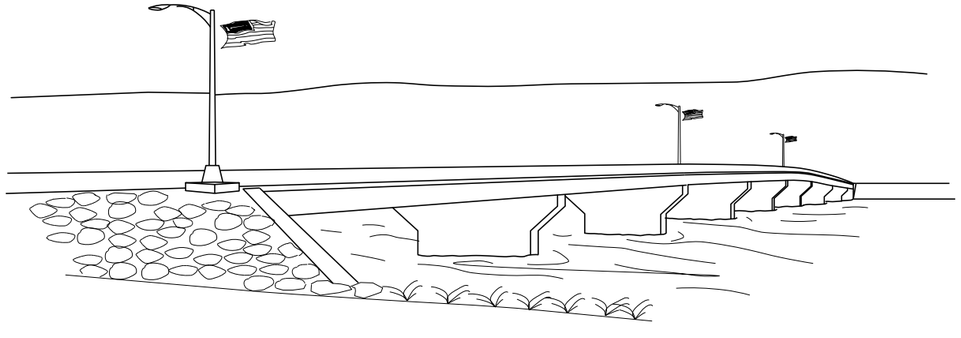
STANDARDS FOR BRIDGE CONSTRUCTION



BC–700M SERIES

SEPTEMBER 2016 EDITION

PUB. #219M

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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.

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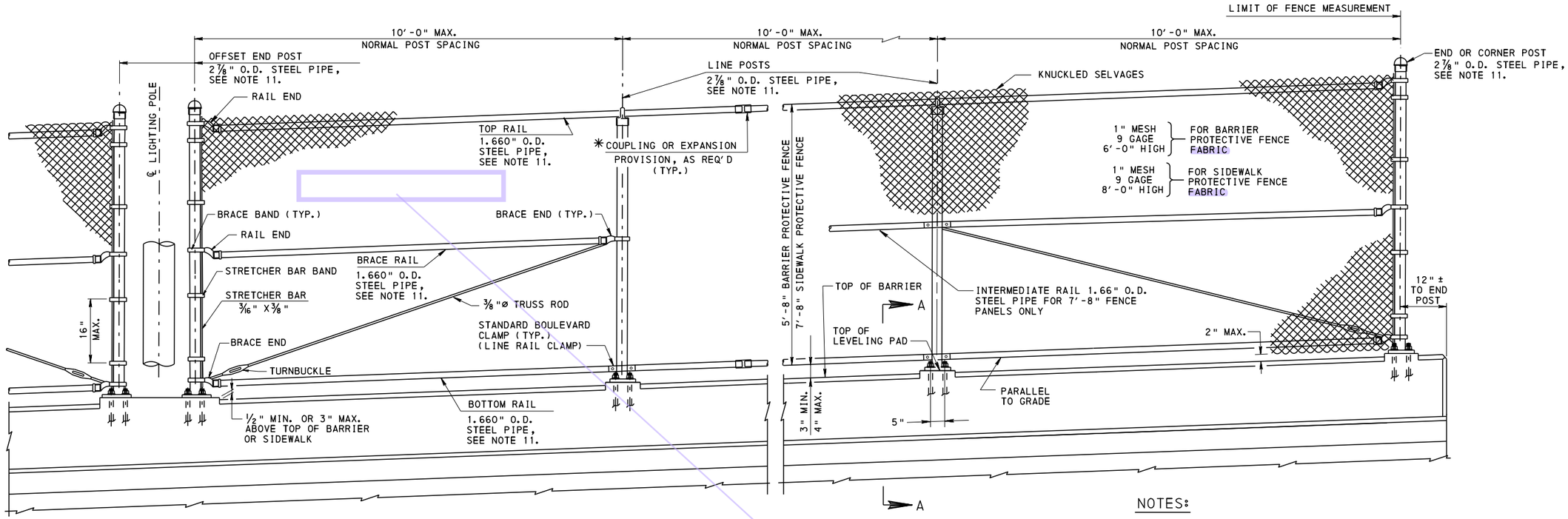
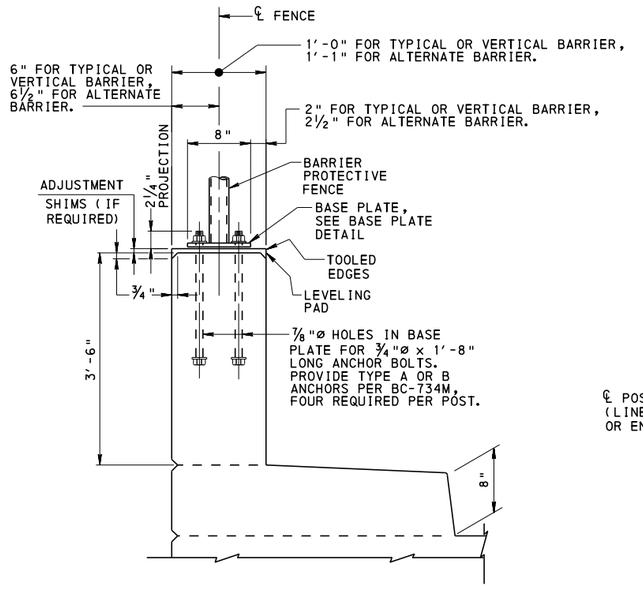
BC-757M	STEEL PILE TIP REINFORCEMENTS & SPLICES	3	SEPT. 30, 2016
BC-762M	TOOTH EXPANSION DAM FOR PRESTRESSED CONCRETE & STEEL BEAM BRIDGES	7	SEPT. 30, 2016
BC-766M	PREFORMED NEOPRENE COMPRESSION SEAL JOINT FOR APPROACH SLABS	2	SEPT. 30, 2016
BC-767M	NEOPRENE STRIP SEAL DAM FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES	6	SEPT. 30, 2016
BC-770M	STEEL MID-SPAN DIAPHRAGMS FOR P/S CONCRETE AASHTO I-BEAM AND PA BULB-TEE BEAM BRIDGES	4	SEPT. 30, 2016
BC-772M	PRESTRESSED CONCRETE BEAM BRACING	5	SEPT. 30, 2016
BC-775M	MISCELLANEOUS PRESTRESS DETAILS	3	SEPT. 30, 2016
BC-776M	GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE PANELS	7	SEPT. 30, 2016
BC-777M	GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE POSTS	12	SEPT. 30, 2016
BC-778M	GROUND MOUNTED SOUND BARRIERS STEEL POSTS	10	SEPT. 30, 2016
BC-779M	STRUCTURE MOUNTED SOUND BARRIER WALLS	9	SEPT. 30, 2016
BC-780M	OFFSET SOUND BARRIER WALLS	8	SEPT. 30, 2016
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	SEPT. 30, 2016
BC-788M	TYPICAL WATERPROOFING AND EXPANSION DETAILS	12	SEPT. 30, 2016
BC-794M	UTILITY ATTACHMENT & SUPPORT DETAILS, PRESTRESSED BRIDGES	1	SEPT. 30, 2016
BC-798M	MECHANICAL CONNECTION DETAILS	3	SEPT. 30, 2016
BC-799M	MECHANICALLY STABILIZED EARTH RETAINING WALLS	13	SEPT. 30, 2016



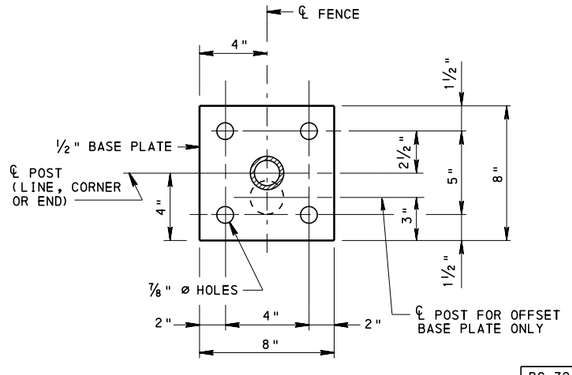
TYPICAL FENCE ELEVATION

✳ 9" MIN. DISTANCE TO STRUCTURE EXPANSION JOINT.



SECTION A-A

TYPICAL FENCE POST SECTION, ALTERNATE SIDEWALK DETAIL SHOWN (TYP. AND ALT. CONCRETE BARRIER SIMILAR)



BASE PLATE DETAIL

(ALL DIMENSIONS ARE TYPICAL UNLESS NOTED OTHERWISE) N.T.S.

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP 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 MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 705.8(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. POSTS AND RAIL MATERIAL PER PUBLICATION 408, SECTION 1016.2(a)3.
12. REFER TO CONTRACT DOCUMENTS FOR POST SPACING.
13. PLACE CORNER POSTS AT ANGLE POINTS IN HORIZONTAL AND VERTICAL ALIGNMENT OF FENCE.

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

REFERENCE DRAWINGS

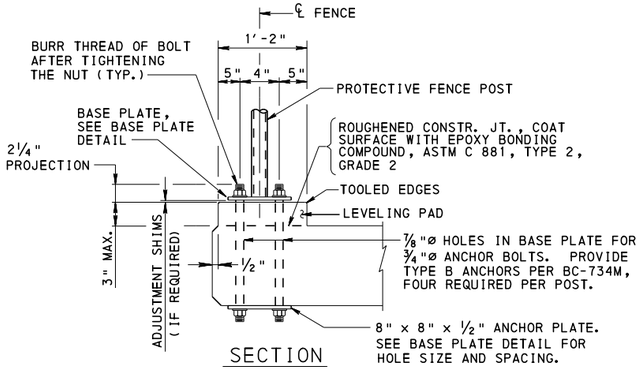
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD PROTECTIVE FENCE

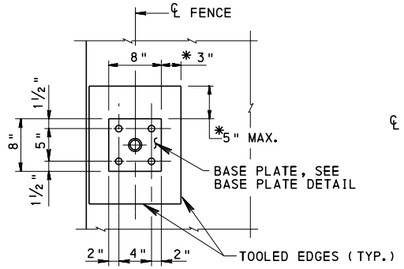
RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-701M



SECTION

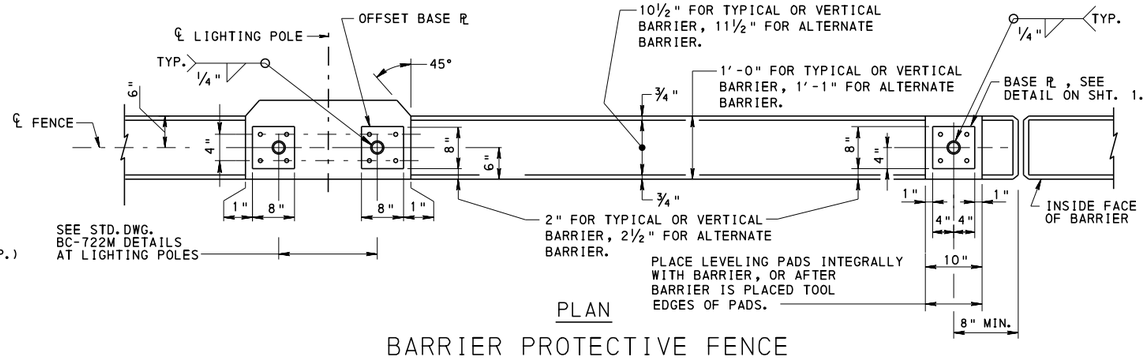


*CLEARANCE BETWEEN BASE PLATE AND FORMS NEEDED TO PLACE CONCRETE.

PLAN

LEVELING PAD DETAIL

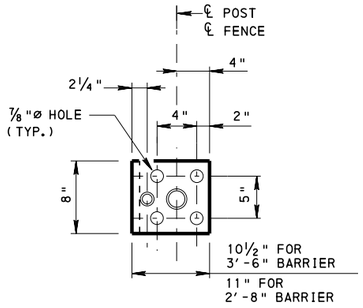
AT SIDEWALK



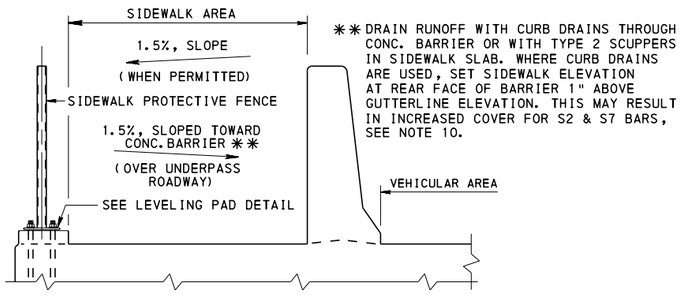
PLAN

BARRIER PROTECTIVE FENCE

FOR BASE PLATE DETAIL, SEE SHEET 1.
ALTERNATE SIDEWALK DETAIL SHOWN
(TYP. AND ALT. CONCRETE BARRIER SIMILAR)



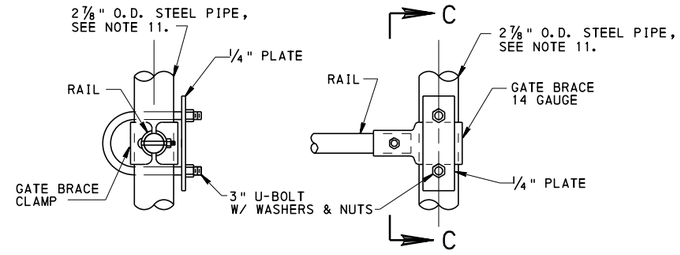
PLAN



** DRAIN RUNOFF WITH CURB DRAINS THROUGH CONC. 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. THIS MAY RESULT IN INCREASED COVER FOR S2 & S7 BARS, SEE NOTE 10.

SIDEWALK DETAIL

(RAISED SIDEWALK DETAIL SIMILAR)

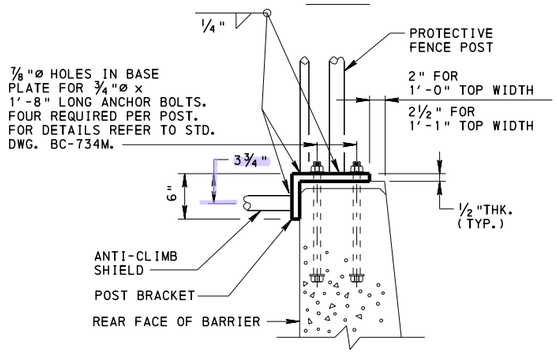


SECTION C-C

N.T.S.

TYPICAL BRACE BAND

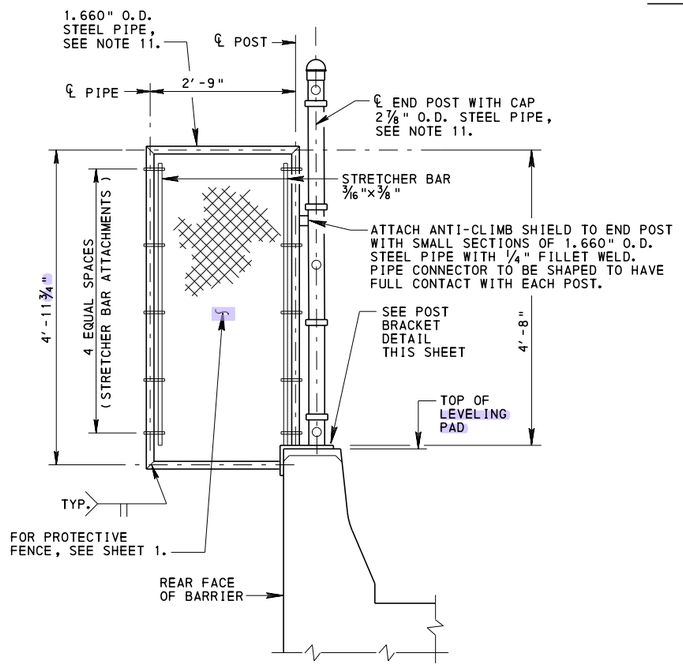
N.T.S.



SECTION

POST BRACKET DETAIL

AT ANTI-CLIMB SHIELD



ANTI-CLIMB SHIELD DETAILS

(1 REQ'D. FOR EACH END OF FENCE)

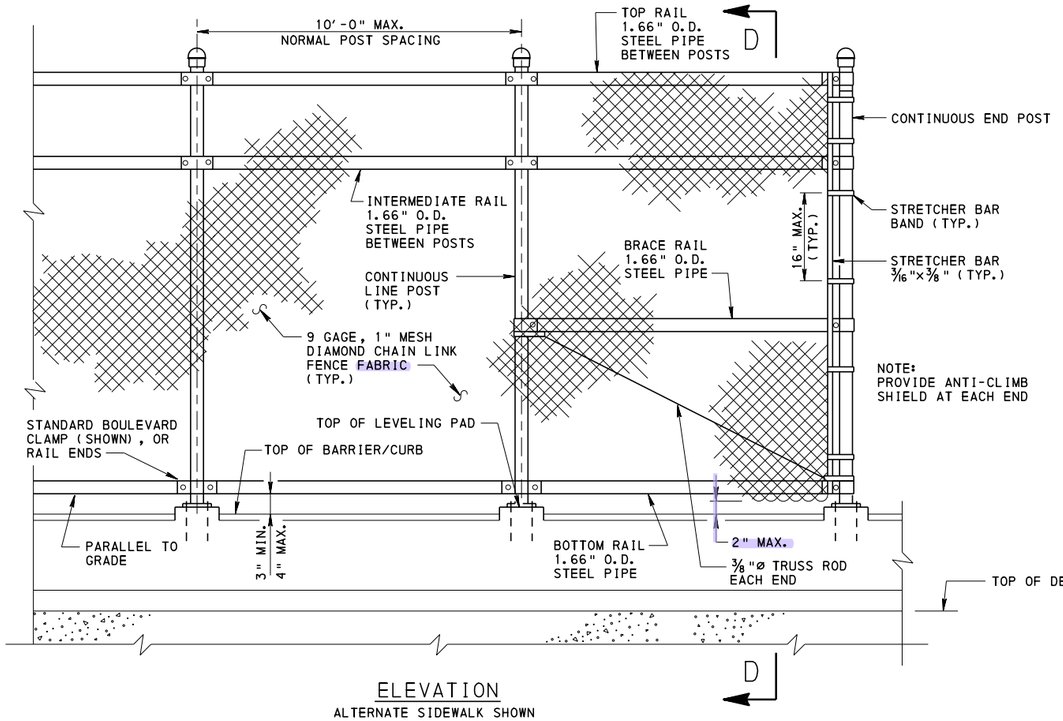
NOTES:

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

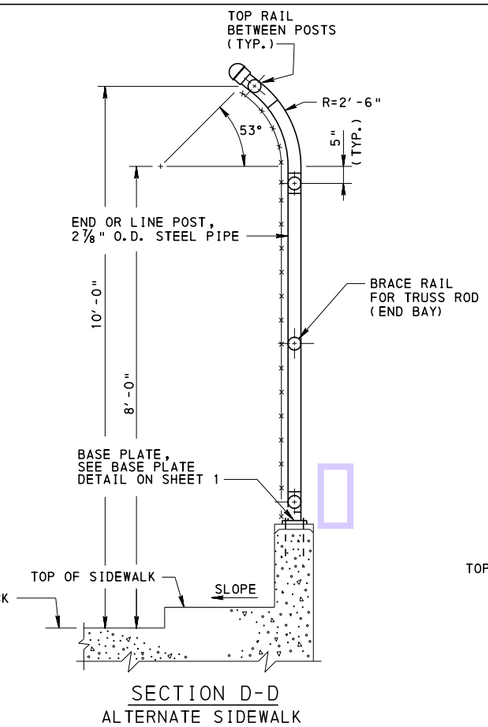
STANDARD PROTECTIVE FENCE

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 3
Thomas P. Macioce	Brian D. Thompson	BC-701M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



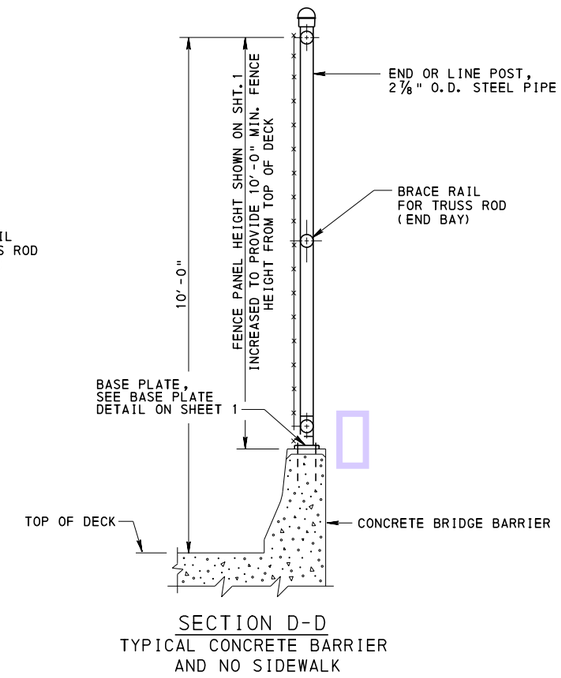
ELEVATION

ALTERNATE SIDEWALK SHOWN
TYPICAL SIDEWALK SIMILAR



SECTION D-D

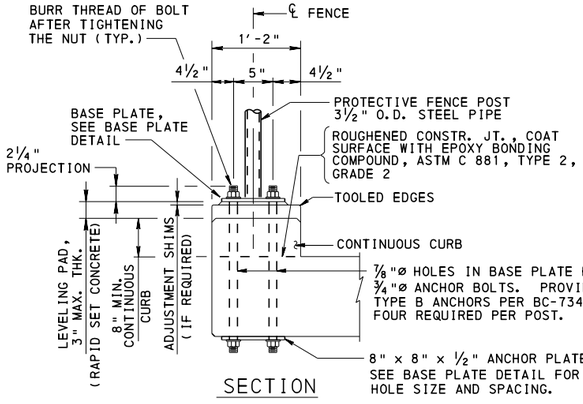
ALTERNATE SIDEWALK



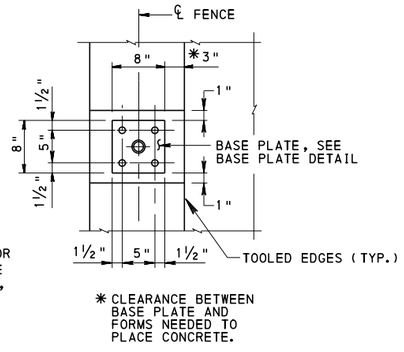
SECTION D-D

TYPICAL CONCRETE BARRIER
AND NO SIDEWALK

BARRIER MOUNTED DETAILS



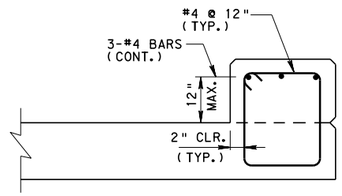
SECTION



PLAN

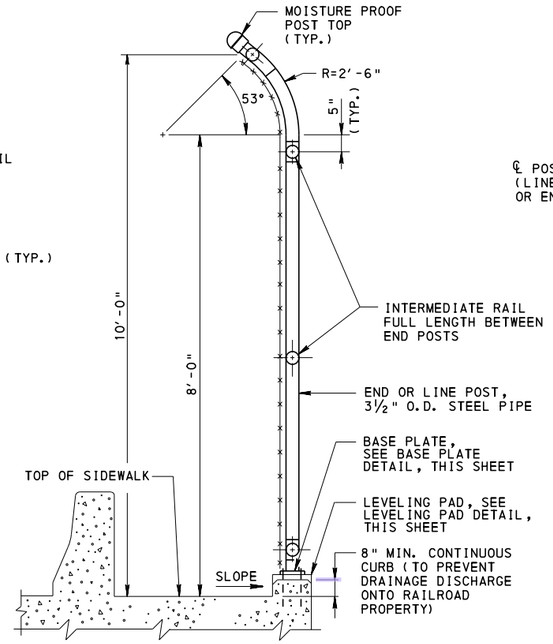
LEVELING PAD DETAIL

(CURB MOUNTED RAILROAD PROTECTIVE FENCE)



CURB REINFORCEMENT DETAIL

(SIDEWALK/DECK SLAB REINFORCEMENT
NOT SHOWN FOR CLARITY)

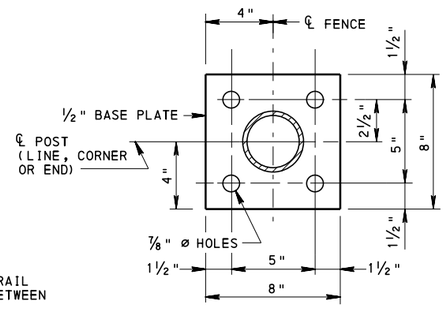


SECTION D-D

TYPICAL SIDEWALK

NOTES:

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



BASE PLATE DETAIL

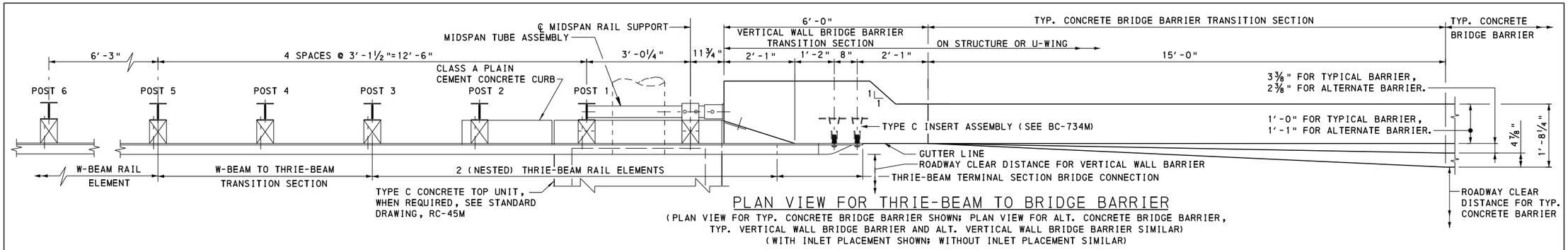
(CURB MOUNTED RAILROAD
PROTECTIVE FENCE)

CURB MOUNTED DETAILS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

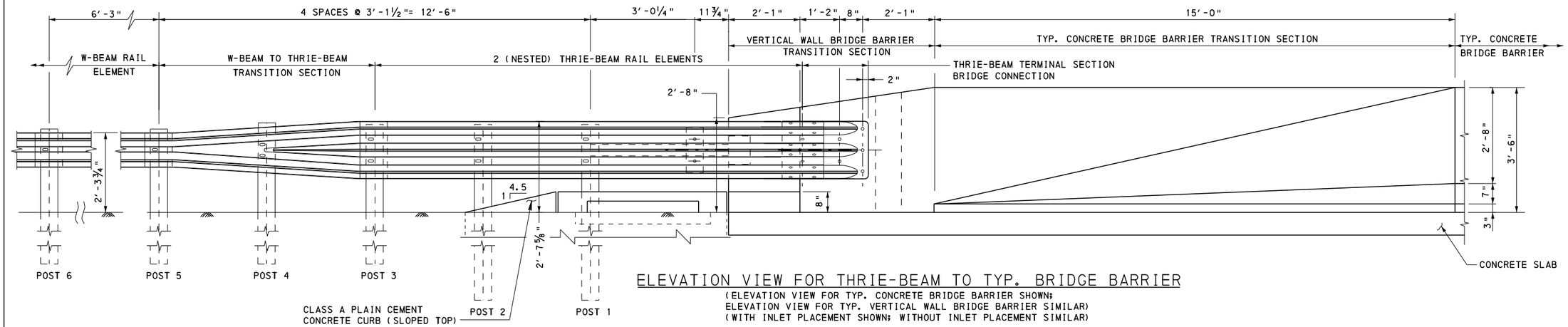
STANDARD
PROTECTIVE FENCE
OVERHEAD BRIDGE
OVER RAILROADS

RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 3 OF 3 BC-701M



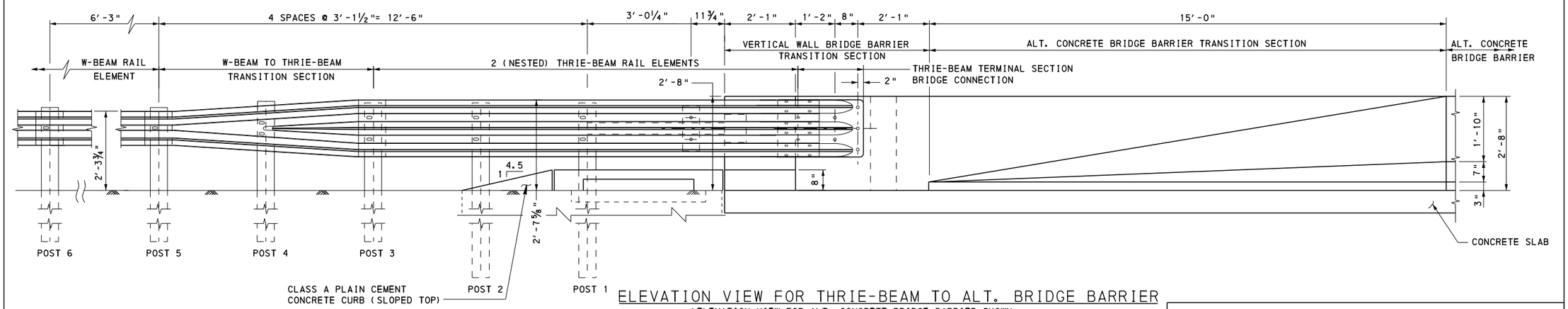
PLAN VIEW FOR THRIE-BEAM TO BRIDGE BARRIER

(PLAN VIEW FOR TYP. CONCRETE BRIDGE BARRIER SHOWN; PLAN VIEW FOR ALT. CONCRETE BRIDGE BARRIER, TYP. VERTICAL WALL BRIDGE BARRIER AND ALT. VERTICAL WALL BRIDGE BARRIER SIMILAR)
(WITH INLET PLACEMENT SHOWN; WITHOUT INLET PLACEMENT SIMILAR)



ELEVATION VIEW FOR THRIE-BEAM TO TYP. BRIDGE BARRIER

(ELEVATION VIEW FOR TYP. CONCRETE BRIDGE BARRIER SHOWN; ELEVATION VIEW FOR TYP. VERTICAL WALL BRIDGE BARRIER SIMILAR)
(WITH INLET PLACEMENT SHOWN; WITHOUT INLET PLACEMENT SIMILAR)



ELEVATION VIEW FOR THRIE-BEAM TO ALT. BRIDGE BARRIER

(ELEVATION VIEW FOR ALT. CONCRETE BRIDGE BARRIER SHOWN; ELEVATION VIEW FOR ALT. VERTICAL WALL BRIDGE BARRIER SIMILAR)
(WITH INLET PLACEMENT SHOWN; WITHOUT INLET PLACEMENT SIMILAR)

NOTE:

THRIE-BEAM TO BRIDGE BARRIER TRANSITION ON THIS SHEET IS PERMITTED IN PLACE OF FLARED END TRANSITIONS FOR RECONSTRUCTED STRUCTURES WITHOUT SAFETY WINGS OR WITHOUT BACKWALLS WITH APPROACH SLABS. FOR STRUCTURES < 100 FT., USE VERTICAL WALL BRIDGE BARRIER. FOR STRUCTURES > 100 FT., USE TYPICAL CONCRETE BRIDGE BARRIER OR ALTERNATE CONCRETE BRIDGE BARRIER.

NOTES:

1. THRIE-BEAM TO BRIDGE BARRIER TRANSITION HAS BEEN ACCEPTED BY FHWA AS A TL-3 BARRIER DESIGNATION.
2. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408.
3. USE PLAN DIMENSIONS WHEN DIFFERENT FROM THOSE SHOWN ON THIS STANDARD.
4. REINFORCED CONCRETE BARRIER AND EMBEDDED INSERTS ARE BRIDGE ITEMS.
5. SEE RC-50M AND RC-52M FOR DETAILS AND HARDWARE NOT SHOWN.
6. PROVIDE APPROACH END GUIDE RAIL TREATMENT AT BOTH THE APPROACH AND TRAILING ENDS OF STRUCTURE BARRIERS ON TWO LANE FACILITIES WITH TWO-WAY TRAFFIC. ON FOUR LANE DIVIDED HIGHWAYS, GUIDE RAIL TRANSITION IS NOT REQUIRED ON TRAILING ENDS OF BARRIERS UNLESS WARRANTED BY OTHER OBSTRUCTIONS.
7. THE APPROACH END TRANSITION COMPONENTS ARE ROADWAY ITEMS.

BC-734M	ANCHOR SYSTEMS
BC-752M	CONCRETE DECK SLAB DETAILS
BC-788M	TYPICAL WATERPROOFING AND EXPANSION DETAILS
RC-45M	INLET TOPS, GRATES AND FRAMES
RC-50M	GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS
RC-52M	TYPE 2 STRONG POST GUIDE RAIL

REFERENCE DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

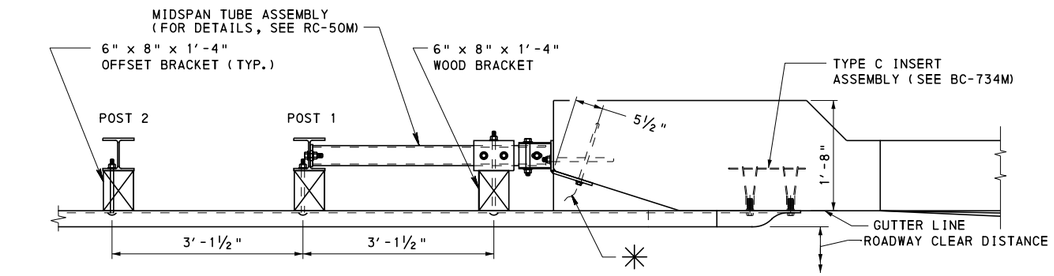
THRIE-BEAM TO VERTICAL WALL BRIDGE BARRIER TRANSITION CONNECTION

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY

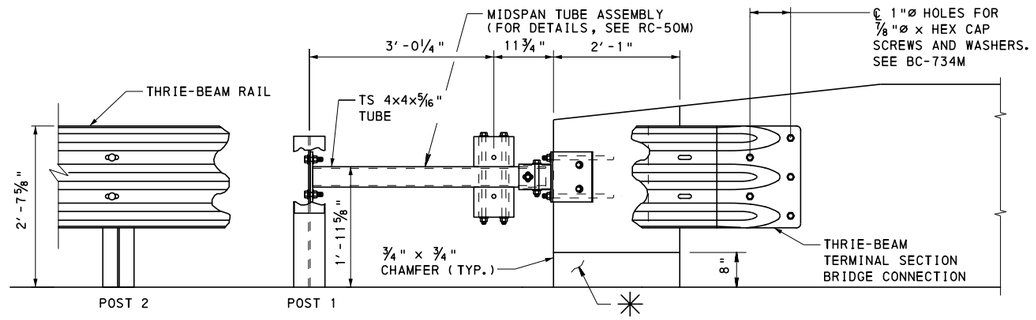
SHEET 1 OF 2

BC-703M



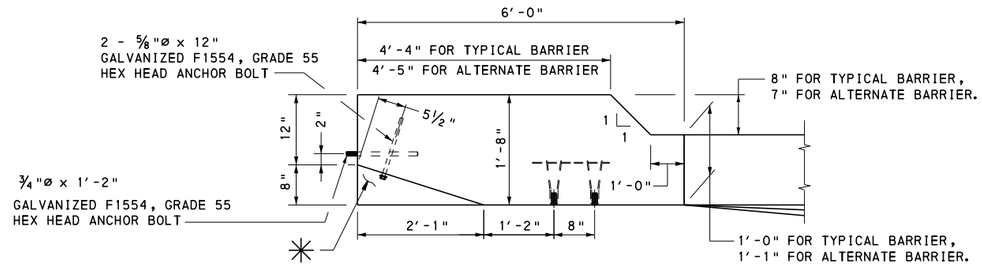
TRANSITION CONNECTION PLAN

(AT TYP. CONCRETE BRIDGE BARRIER SHOWN;
AT ALT. CONCRETE BRIDGE BARRIER AND VERTICAL WALL BRIDGE BARRIERS SIMILAR)



TRANSITION CONNECTION ELEVATION

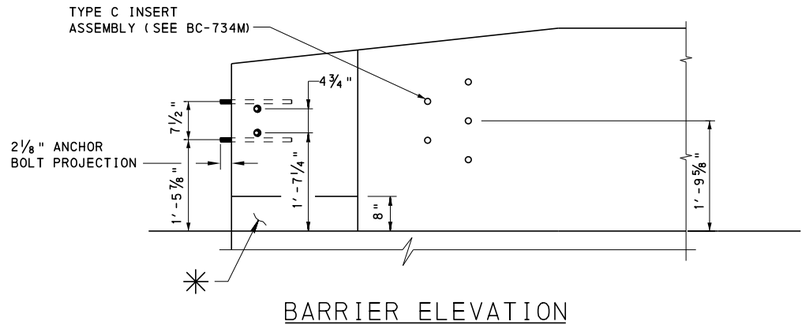
(AT TYP. CONCRETE BRIDGE BARRIER SHOWN;
AT ALT. CONCRETE BRIDGE BARRIER AND VERTICAL
WALL BRIDGE BARRIERS SIMILAR)



BARRIER PLAN

(AT TYP. CONCRETE BRIDGE BARRIER SHOWN;
AT ALT. CONCRETE BRIDGE BARRIER AND
VERTICAL WALL BRIDGE BARRIER SIMILAR)

✳-DETAILS SHOWN INCLUDE CURB FOR INLET PLACEMENT.
DELETE CURB IF NO INLET IS PRESENT.



BARRIER ELEVATION

(AT TYP. CONCRETE BRIDGE BARRIER SHOWN;
AT ALT. CONCRETE BRIDGE BARRIER AND VERTICAL
WALL BRIDGE BARRIERS SIMILAR)

NOTES:

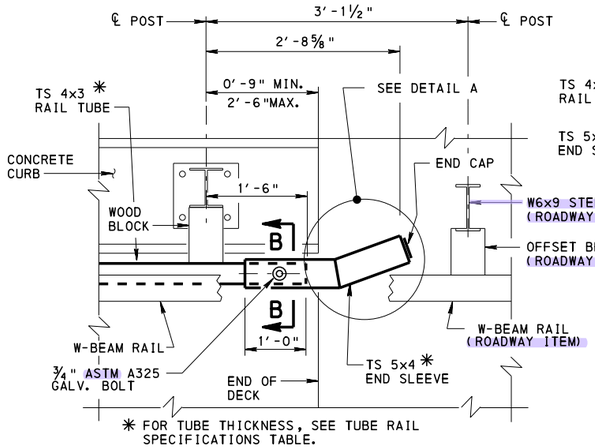
1. FOR ADDITIONAL NOTES, SEE SHEET 1.
2. FOR APPROACH TRANSITION POST DETAILS, SEE RC-50M.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

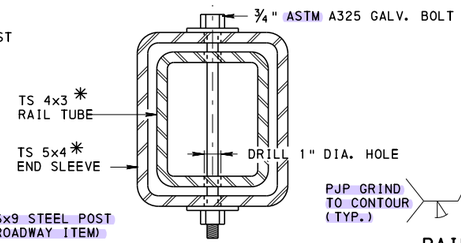
STANDARD

THRIE-BEAM TO VERTICAL WALL BRIDGE BARRIER TRANSITION CONNECTION

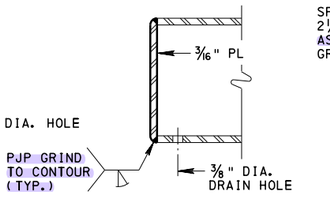
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 2
Thomas P Macioce	Brian D Thompson	BC-703M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



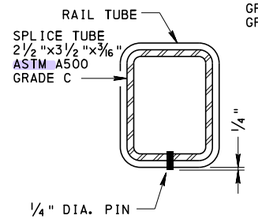
PLAN



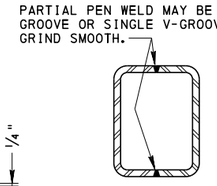
SECTION B-B



RAIL TUBE END CAP



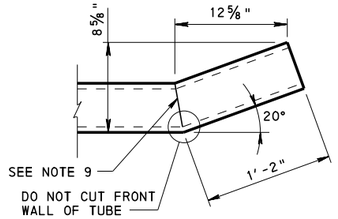
SECTION C-C



ALTERNATE SPLICE TUBE FABRICATION

REQUIRED IF RAIL THICKNESS IS 0.25" OR 0.313".

NOTE:
THE DIFFERENCE BETWEEN THE OUTSIDE DIMENSIONS OF THE SLEEVE AND THE INSIDE DIMENSIONS OF THE RAIL SHALL NOT EXCEED ⅛" ALONG EITHER AXIS.

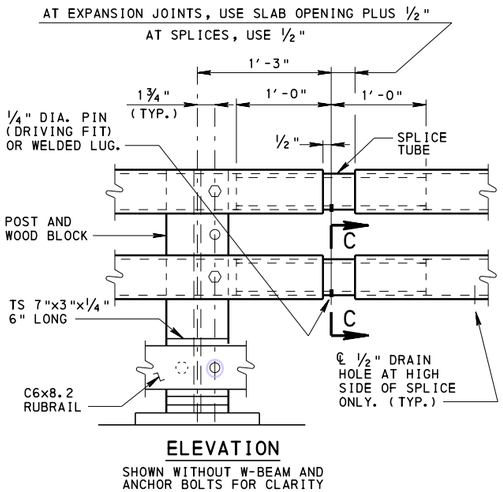


DETAIL A

RAIL AT END OF BRIDGE

TUBE, SLEEVE AND RUBRAIL MEMBERS					
RAIL MEMBER		SLEEVE		RUBRAIL MEMBER	
MATERIAL	THICKNESS	MATERIAL	THICKNESS	MATERIAL	THICKNESS
A500 GR. C	0.188"	A500 GR. C	0.188"	A500 GR. C	0.25"
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



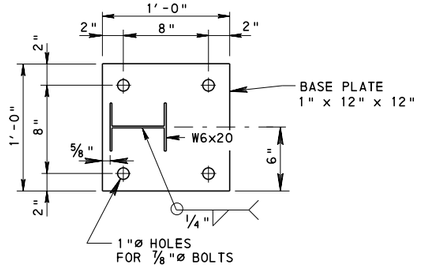
ELEVATION

SHOWN WITHOUT W-BEAM AND ANCHOR BOLTS FOR CLARITY

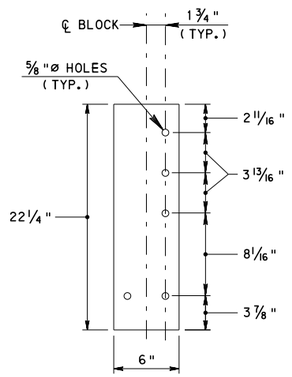
TUBE SPLICE DETAILS

NOTES:

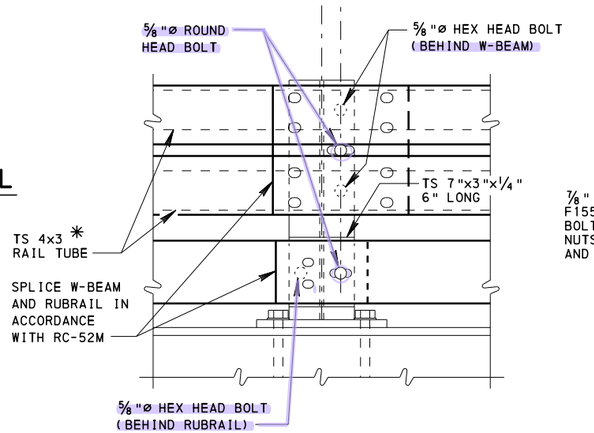
1. PA STRUCTURE MOUNTED GUIDE RAIL BARRIER DESIGNED AND MANUFACTURED IN ACCORDANCE WITH THIS STANDARD DRAWING DOES NOT REQUIRE SHOP DRAWINGS.
2. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
3. LOCATE RAIL SPLICES AT EXPANSION JOINTS AND AT OTHER LOCATIONS WHERE NECESSARY. PROVIDE RAILS AS LONG AS PRACTICAL, WITH A MINIMUM OF THREE POSTS BETWEEN SPLICES, UNLESS OTHERWISE REQUIRED FOR EXPANSION.
4. PROVIDE RAIL TUBES CONTINUOUS OVER NOT LESS THAN TWO RAILING POSTS. NO WELDED BUTT SPLICES WILL BE ALLOWED IN THE RAIL TUBE SECTIONS.
5. PLACE POST AND POST ANCHOR BOLTS NORMAL TO GRADE AND RAILS PARALLEL TO GRADE.
6. 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 MEETING THE REQUIREMENTS OF SECTION 705, PUBLICATION 408.
7. DO NOT USE DEFLECTION JOINTS WITH PA STRUCTURE MOUNTED GUIDE RAIL BRIDGE BARRIERS.
8. STRUCTURAL STEEL FOR BASE PLATES AND POSTS IN ACCORDANCE WITH ASTM A709. GRADE 36 OR 50, UNLESS OTHERWISE NOTED.
9. COMPLETE JOINT PENETRATION GROOVE WELD. GRIND FLUSH ON OUTSIDE FACE. WELD BACKING IS REQUIRED.
10. RAIL TUBES IN ACCORDANCE WITH ASTM A500 OR A501, GRADE AS SPECIFIED BASED ON PROVIDED WALL THICKNESS.
11. GALVANIZE ALL STEEL COMPONENTS IN ACCORDANCE WITH SECTION 1105.02(s) OF PUBLICATION 408, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
12. THE APPROACH END TRANSITION COMPONENTS ARE ROADWAY ITEMS.
13. FOR POST RAIL ATTACHMENT BOLTS DETAILS, SEE SHEET 2.



BASE PLATE DETAIL



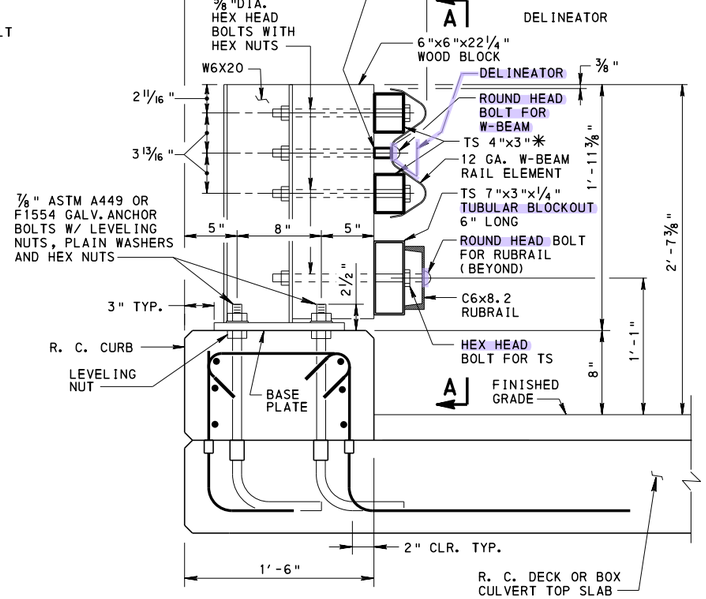
WOOD BLOCK DETAIL



ELEVATION A-A

W-BEAM AND RUBRAIL SPLICE POST
INTERMEDIATE POST SIMILAR

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



TYPICAL SECTION

DECK / SLAB REINFORCEMENT NOT SHOWN FOR CLARITY

RC-52M	TYPE 2 STRONG POST GUIDE RAIL
BC-734M	ANCHOR SYSTEMS

REFERENCE DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

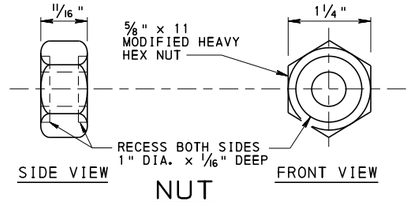
PA STRUCTURE MOUNTED GUIDE RAIL BARRIER MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brian D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

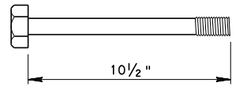
SHEET 1 OF 2

BC-706M



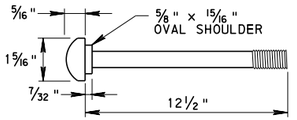
NUT

NUT DETAIL IS SHOWN PROPORTIONALLY LARGER THAN THE BOLT DETAILS FOR CLARITY.



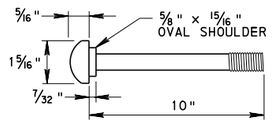
RUB RAIL TO POST BOLT

5/8 " HEX HEAD BOLT



RUB RAIL TO POST BOLT

5/8 " ROUND HEAD BOLT



W-BEAM TO POST BOLT

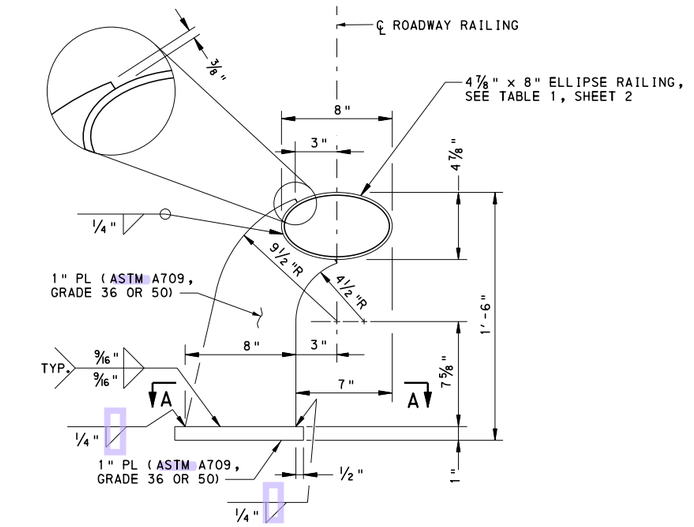
5/8 " ROUND HEAD BOLT

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

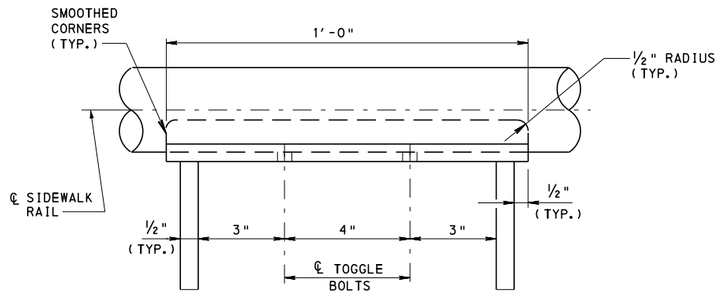
STANDARD

PA STRUCTURE MOUNTED
GUIDE RAIL BARRIER
MISCELLANEOUS DETAILS

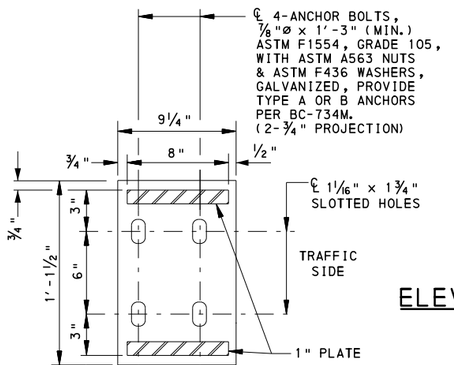
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 2 OF 2 BC-706M



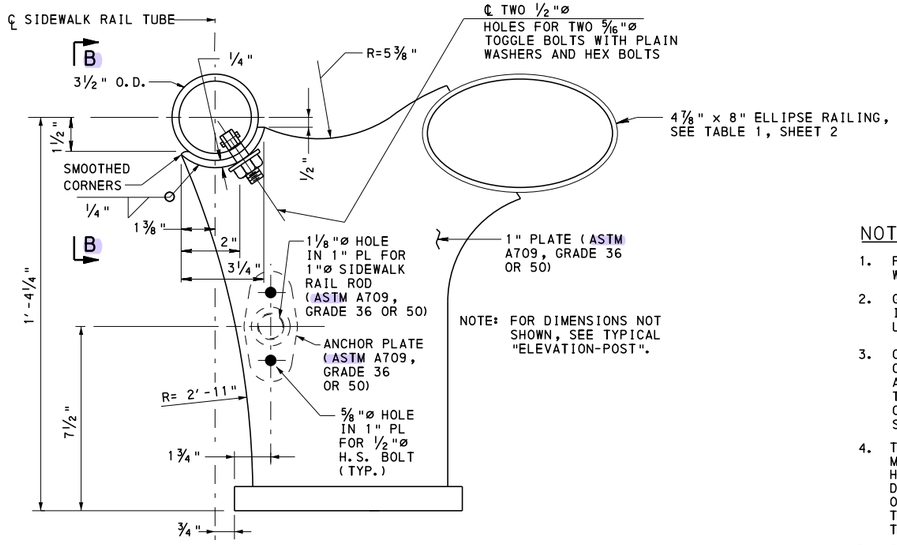
ELEVATION-POST
(TYPICAL)



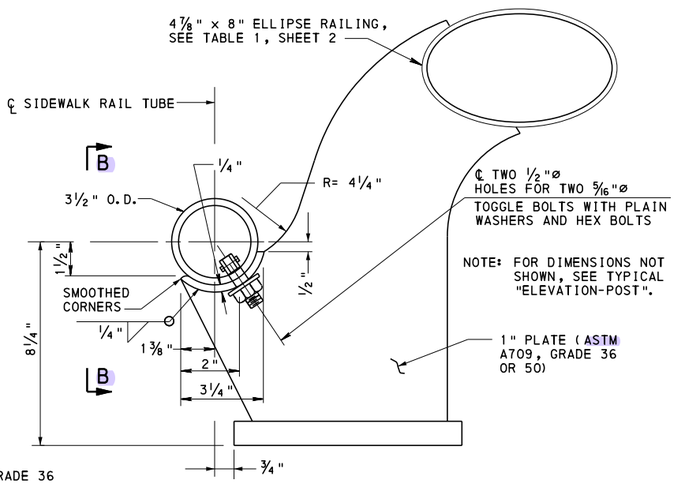
SECTION B-B



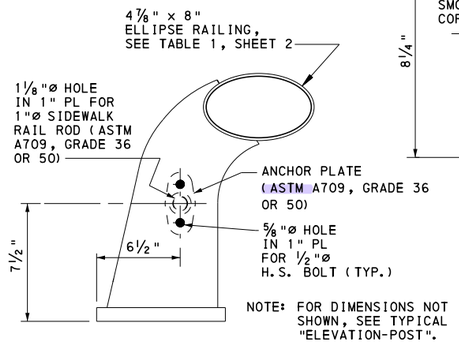
SECTION A-A



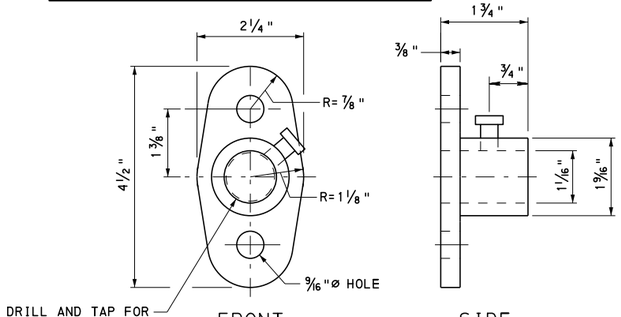
ELEVATION-RAISED SIDEWALK POST



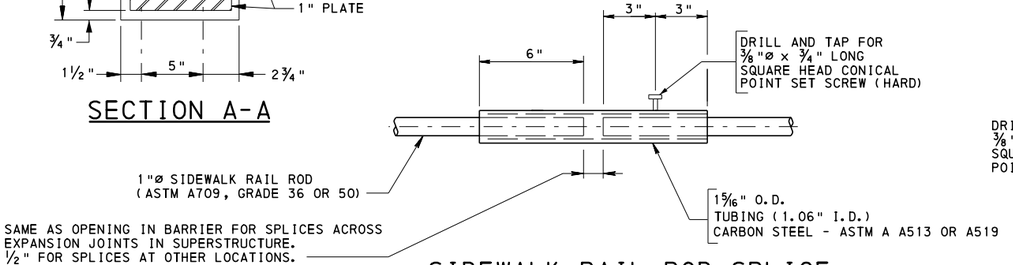
ELEVATION-SIDEWALK POST



ELEVATION-ALTERNATE SIDEWALK POST



ANCHOR PLATE DETAIL



SIDEWALK RAIL ROD SPLICE

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. GALVANIZE ALL RAILING COMPONENTS (AFTER FABRICATION) IN ACCORDANCE WITH SECTION 1105.02(s) , PUBLICATION 408 UNLESS OTHERWISE SHOWN ON THE PLANS.
3. 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 MEETING THE REQUIREMENTS OF PUBLICATION 408 , SECTION 705.8(b) ASTM C834 OR C920.
4. THE MAJOR AND MINOR DIAMETERS OF THE RAIL MEMBER MAY VARY +/- 0.1875 INCHES FROM PLAN DIMENSION. HOWEVER, THE DIFFERENCE BETWEEN THE OUTSIDE DIAMETERS OF THE SLEEVE AND THE INSIDE DIAMETERS OF THE RAIL SHALL NOT EXCEED 0.125 INCHES ALONG THE MAJOR OR MINOR AXIS. THE MAXIMUM GAP ALONG THE 45° AXIS OF THE SLEEVE MAY BE 1/4" MAX.
5. PLACE POST AND POST ANCHOR BOLTS NORMAL TO GRADE AND RAILS PARALLEL TO GRADE.
6. BOLT TIGHTENING PROCEDURES ARE AS FOLLOWS:
   SNUG TIGHTEN ALL ANCHOR BOLTS. TIGHTEN THE NUTS AN ADDITIONAL 1/3 TURN USING A WRENCH.
7. IF FLAME CUTTING OR PLASMA CUTTING IS USED TO CREATE SLOTTED HOLES, GRIND SMOOTH TO PROVIDE VERTICAL AND FLAT SURFACES ALONG THE HOLE.
8. 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 7/8" TO MEET THIS TOLERANCE.
9. FOR SIDEWALK RAIL TUBE SPLICE DETAILS, SEE BC-720M.

REFERENCE DRAWINGS	
BC-711M	ALUMINUM PROTECTIVE BARRIER
BC-720M	ALUMINUM OR STEEL BRIDGE HAND RAILING
BC-739M	BRIDGE BARRIER TO GUIDE RAIL TRANSITION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

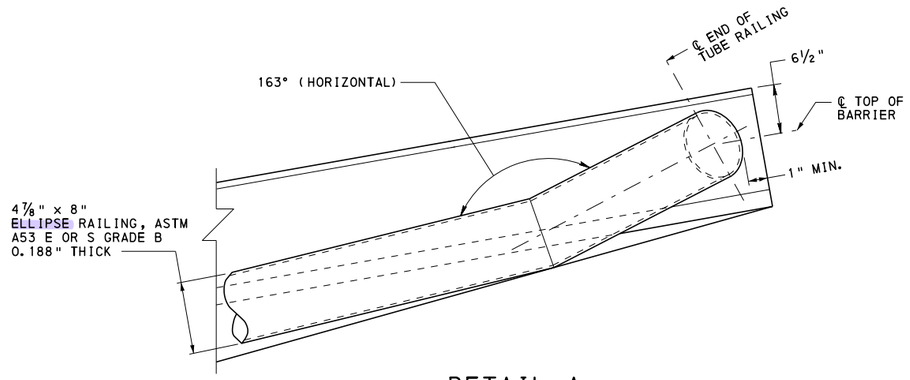
STANDARD

PA HT BRIDGE BARRIER MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

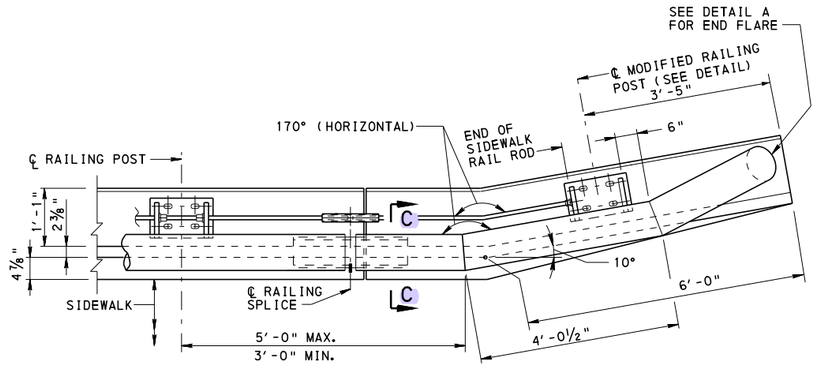
RECOMMENDED SEPT. 30, 2016
Brian B Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-707M



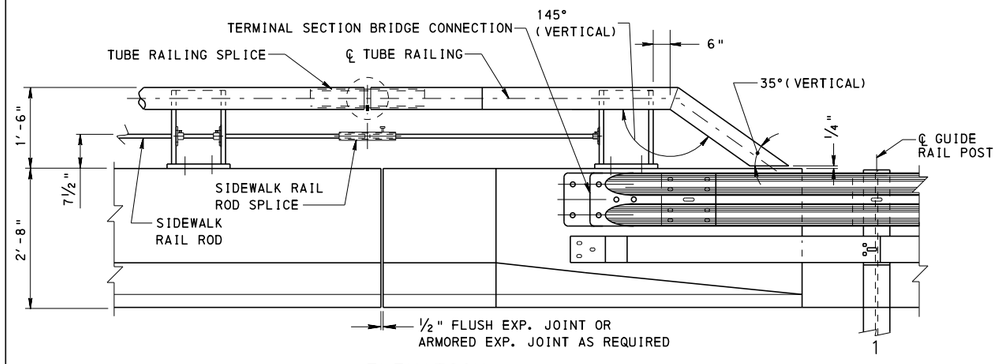
DETAIL A

(RAILING POST NOT SHOWN)



PLAN

(GUIDE RAIL NOT SHOWN)



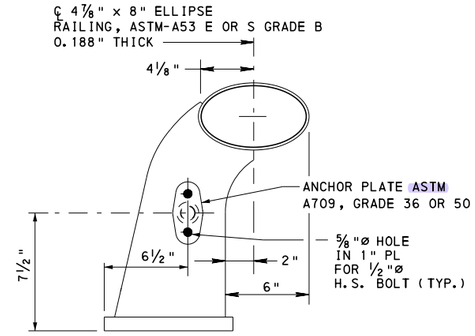
ELEVATION

ALTERNATE SIDEWALK RAIL

(WITHOUT INLET PLACEMENT SHOWN; WITH INLET PLACEMENT SIMILAR)

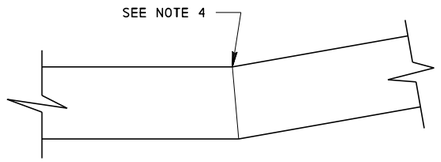
(DETAILS FOR ALTERNATE SIDEWALK RAIL SHOWN; DETAILS FOR TYPICAL RAIL SIMILAR EXCEPT SIDEWALK RAIL ROD NOT INCLUDED. FOR SECTION VIEWS, SEE SHEET 1)

PA HT BRIDGE BARRIER END DETAILS



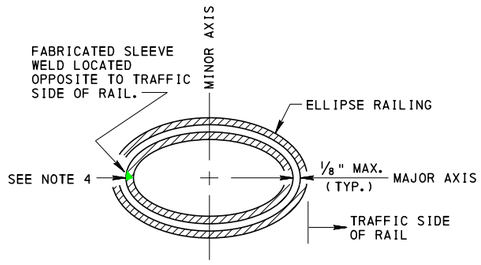
MODIFIED RAILING POST ON TRANSITION BARRIER

(MODIFIED RAILING POST SHOWN IS USED ON THE TRANSITION SECTION OF THE CONCRETE BARRIER AT THE ALTERNATE SIDEWALK RAIL AND TYPICAL RAIL ONLY. FOR DIMENSIONS, MATERIAL AND CONNECTION DETAILS NOT SHOWN, SEE TYPICAL "ELEVATION-POST", SHEET 1)



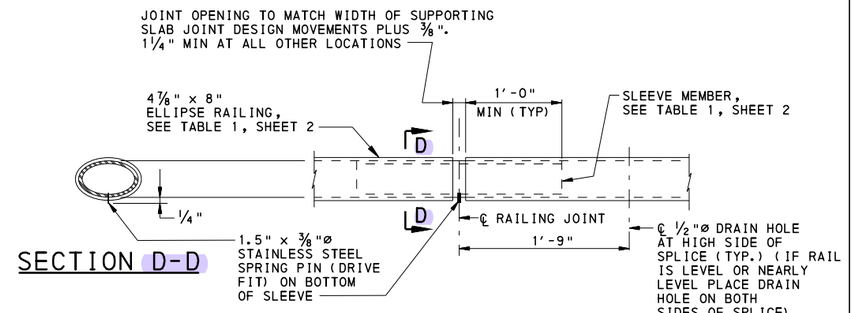
TYPICAL WELD AT MITERS

TABLE 1		
APPROVED RAILING MATERIAL		
4⅞" x 8" ELLIPSE RAILING	SLEEVE MEMBER (AT RAILING SPLICE)	
MATERIAL DISCRIPT.	MATERIAL TYPE	THICKNESS
6" DIA. STD. PIPE	ASTM-A53-B	0.353"
	ASTM A709, GRADE 36 OR 50	0.339"
	ASTM A500, GRADE B OR C	
	API-5LX52	0.224"
6⅝" O.D. x 0.188" TUBE	ASTM-A53-B	0.339"
	ASTM A709, GRADE 36 OR 50	0.325"
	ASTM A500, GRADE B OR C	
	API-5LX52	0.216"



SECTION C-C

THE DIFFERENCE BETWEEN THE OUTSIDE DIAMETERS OF THE SLEEVE SPLICE AND THE INSIDE DIAMETERS OF THE MAIN RAIL NOT TO EXCEED 0.125 INCHES ALONG THE MAJOR AND MINOR AXIS. GAPS EXCEEDING THIS AMOUNT UP TO ¼" ARE PERMISSABLE ALONG THE 45° AXES OF THE SLEEVE SPLICE RAIL.



SECTION D-D

ELLIPSE RAILING SPLICE

NOTES:

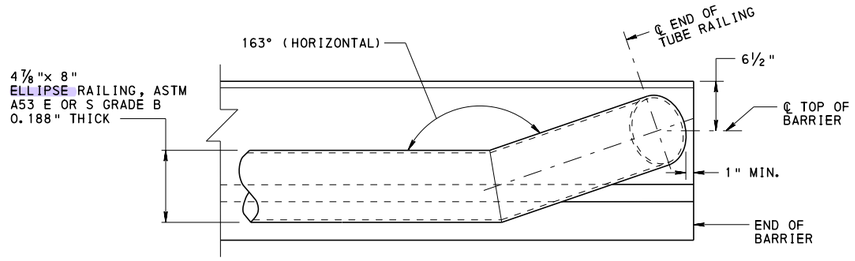
1. THE CONCRETE PORTION OF PA HT BRIDGE BARRIER IS THE SAME AS THE ALTERNATE BARRIER. FOR REINFORCEMENT DETAILS IN THE TRANSITION, SEE THE STRUCTURE PLANS.
2. FOR GUIDERAIL TRANSITION DETAILS, SEE BC-739M.
3. FOR ADDITIONAL NOTES, SEE SHEET 1.
4. COMPLETE JOINT PENETRATION GROOVE WELD. GRIND FLUSH ON OUTSIDE FACE. SHOW SPECIFIC WELD SYMBOL ON SHOP DRAWINGS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

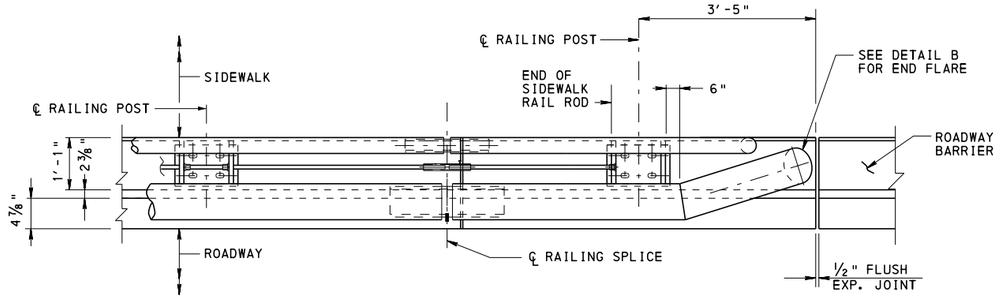
PA HT BRIDGE BARRIER MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 5
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brian D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-707M

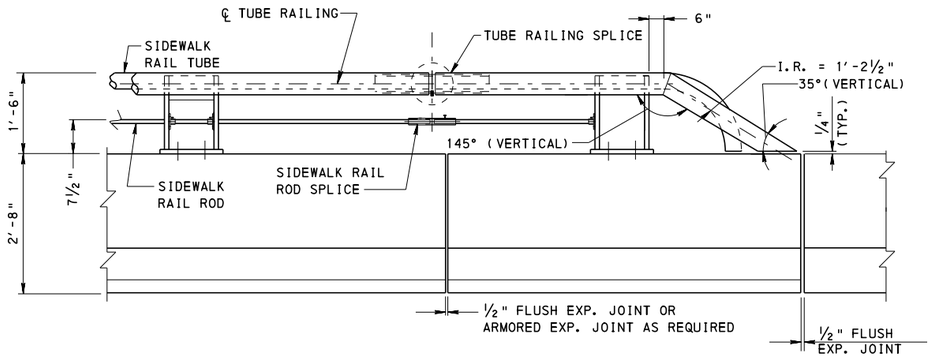


DETAIL B

(RAILING POST NOT SHOWN)



PLAN

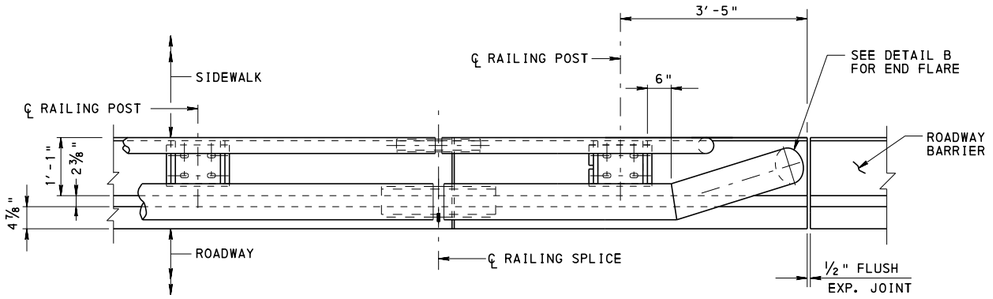


ELEVATION

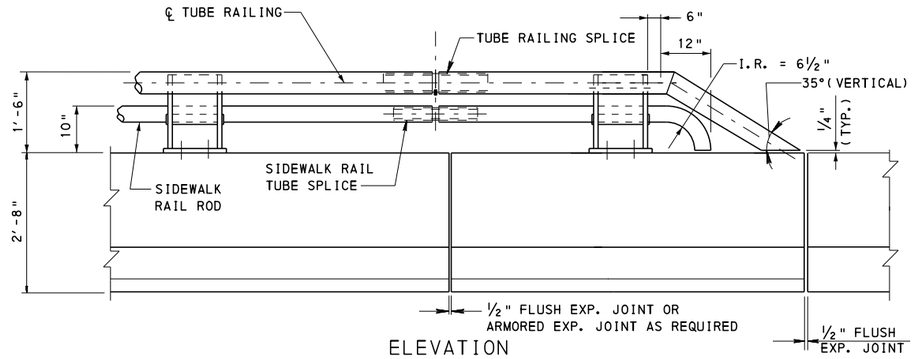
RAISED SIDEWALK RAIL

(FOR SECTION VIEW, SEE SHEET 1)

(THESE DETAILS MAY BE USED FOR THE TYPICAL INSTALLATIONS WITHOUT SIDEWALK WHERE ROADWAY BARRIER IS USED OFF THE STRUCTURE)



PLAN



ELEVATION

SIDEWALK RAIL

(FOR SECTION VIEW, SEE SHEET 1)

(THESE DETAILS MAY BE USED FOR THE TYPICAL INSTALLATIONS WITHOUT SIDEWALK WHERE ROADWAY BARRIER IS USED OFF THE STRUCTURE)

NOTES:

1. THE CONCRETE PORTION OF PA HT BRIDGE BARRIER IS THE SAME AS THE ALTERNATE BARRIER. FOR REINFORCEMENT DETAILS IN THE TRANSITION, SEE THE STRUCTURE PLANS.
2. FOR TYPICAL WELD DETAIL AT MITERS, SEE SHEET 2.
3. FOR ADDITIONAL NOTES, SEE SHEET 1.

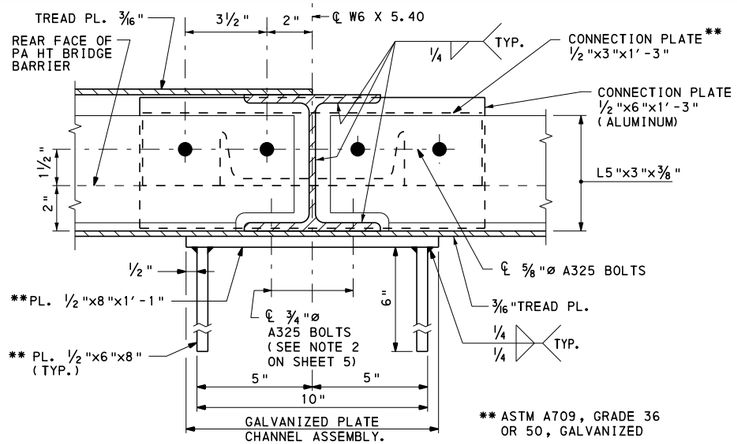
PA HT BRIDGE BARRIER END DETAILS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

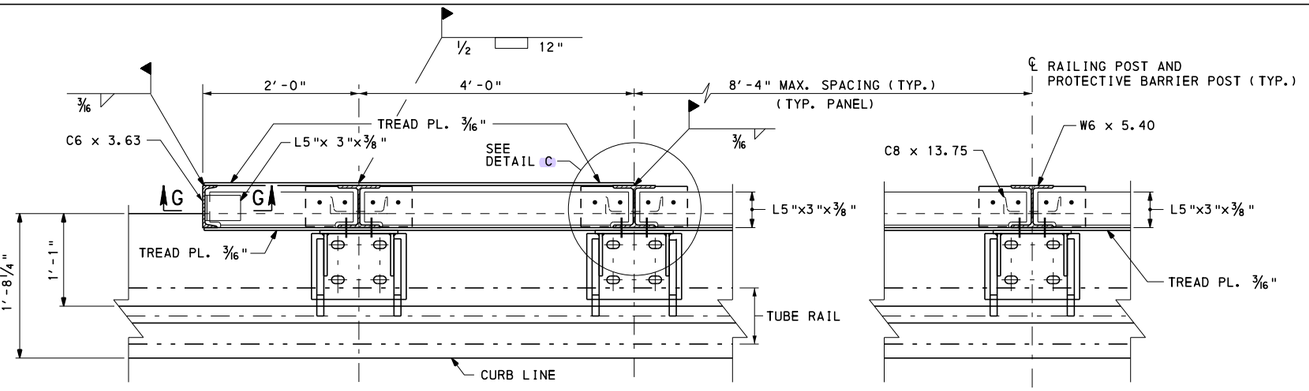
STANDARD

PA HT BRIDGE BARRIER
MISCELLANEOUS DETAILS

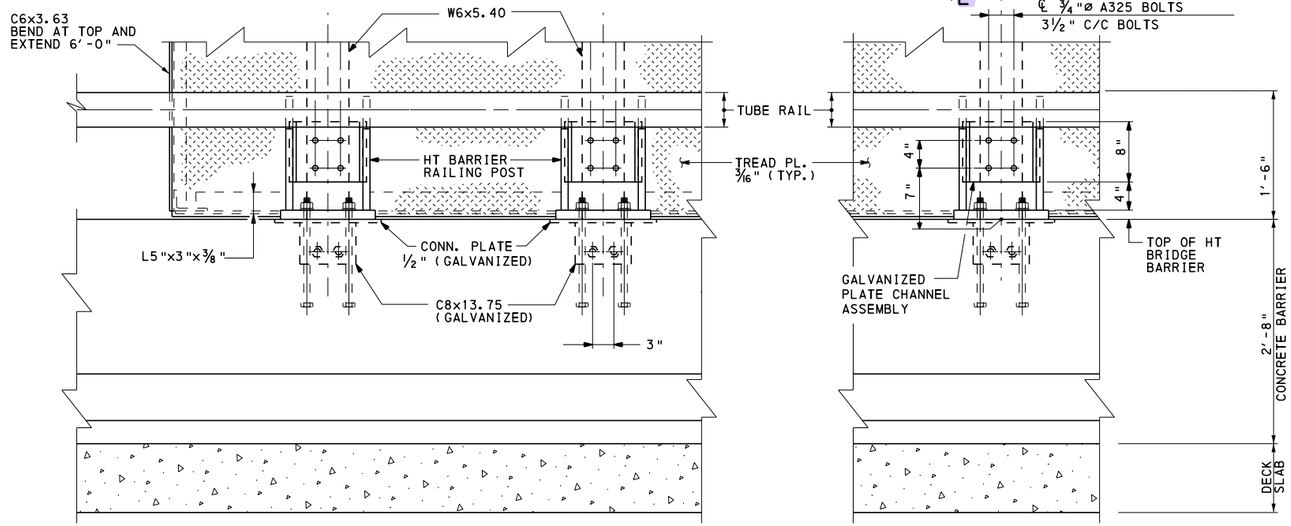
RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 3 OF 5 BC-707M



DETAIL C

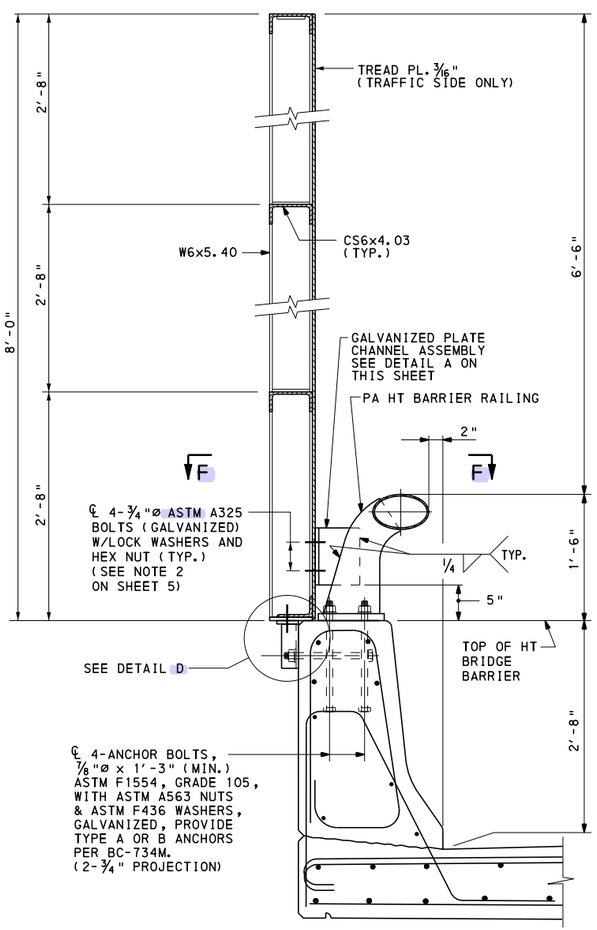


SECTION F-F : PLAN



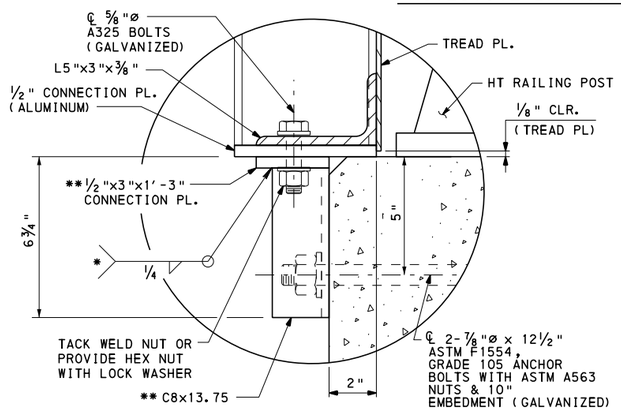
PROTECTIVE BARRIER END SECTION

TYPICAL POST LOCATION



SECTION E-E

(SECTION AT TYPICAL PANEL SHOWN; SECTION AT END AND ADJACENT PANEL SIMILAR)



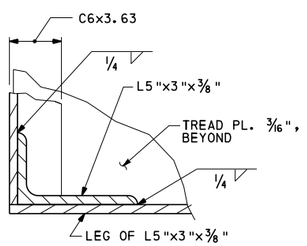
* WELD ALL AROUND EXCEPT ON REAR FACE OF C8x13.75 WEB

** ASTM A709, GRADE 36 OR 50, GALVANIZED

DETAIL D

ELEVATION

(INSIDE FACE)



SECTION G-G

(AT END SECTION)

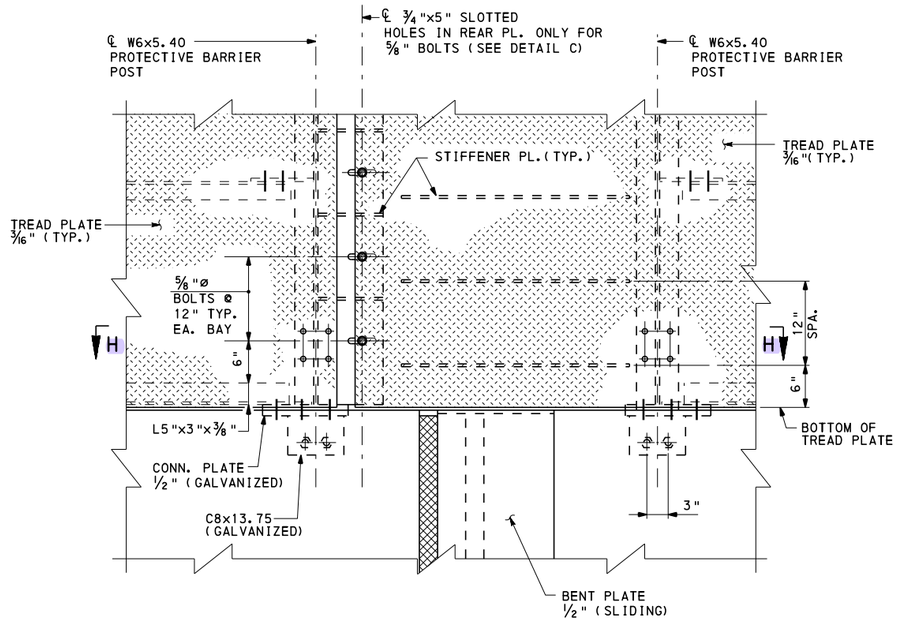
ALUMINUM PROTECTIVE BARRIER AT PA HT BRIDGE BARRIER

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

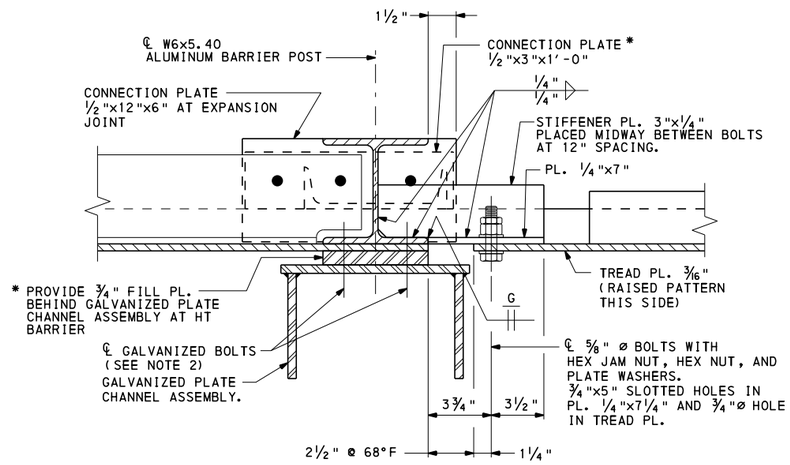
PA HT BRIDGE BARRIER
MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 4 OF 5
Thomas P Macioce	Brent D Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-707M



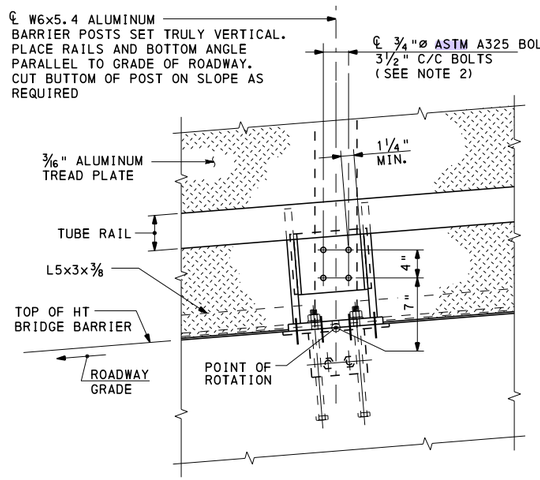
ELEVATION

NOTE: FOR CLARITY, HT RAILING POSTS, TUBE RAILS AND BASE PLATES ARE NOT SHOWN.

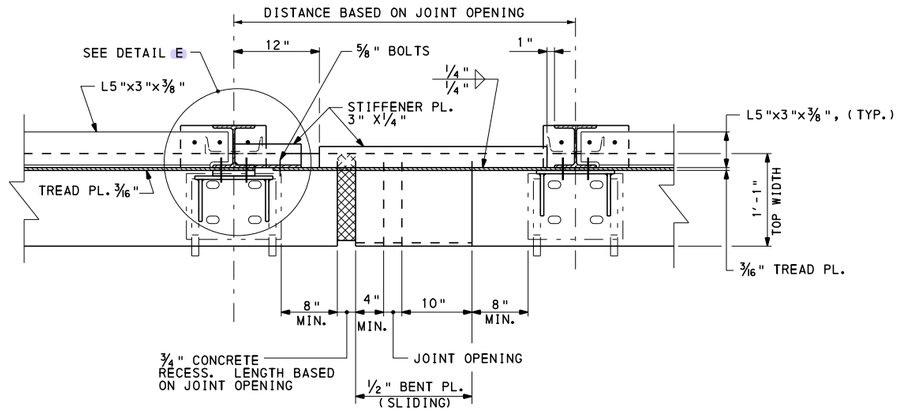


DETAIL E

*ASTM A709, GRADE 36 OR 50, GALVANIZED



POST MOUNTING ON GRADE



SECTION H-H

EXPANSION JOINT AT PIERS

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. PROVIDE ELASTOMERIC PADS OR WASHERS ⅛" MIN. THICKNESS CONFORMING TO PUB. 408, SECTION 1107.02(P), TYPE I, BETWEEN CONTACT SURFACES WHEREVER ALUMINUM COMPONENTS COME IN CONTACT WITH GALVANIZED STEEL. ALSO PROVIDE FABRIC BUSHING MATERIAL CONFORMING TO SECTION 1107.02 (P), 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.

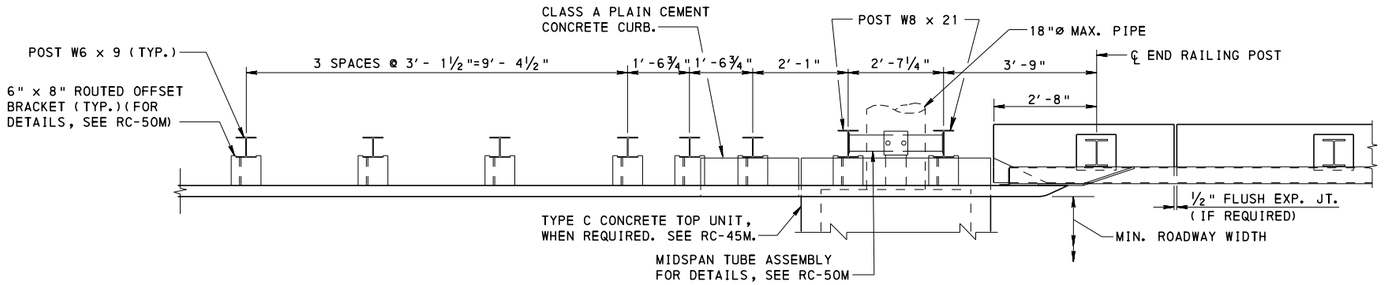
ALUMINUM PROTECTIVE BARRIER AT PA HT BRIDGE BARRIER

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

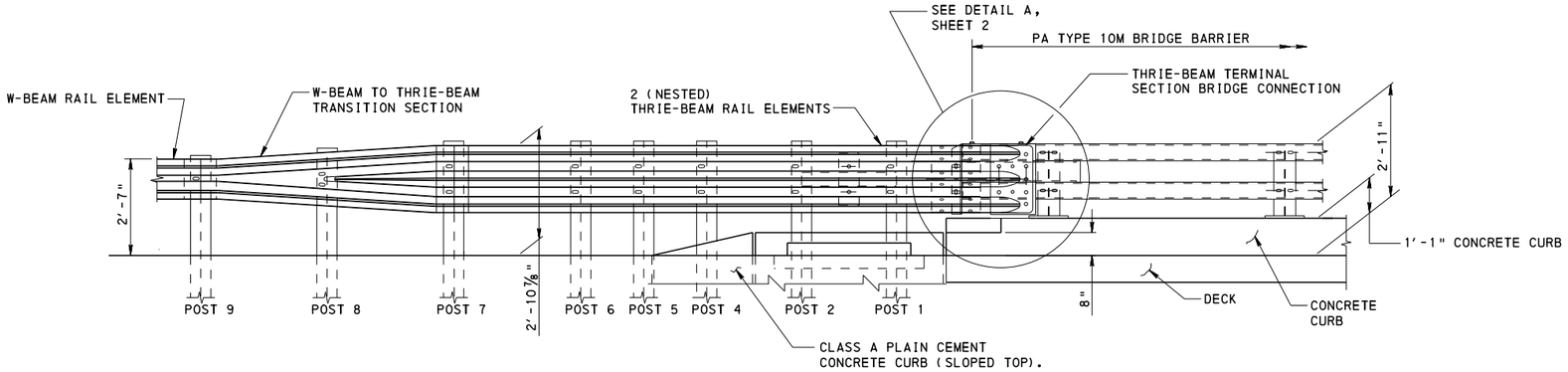
STANDARD

PA HT BRIDGE BARRIER
MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 5 OF 5
Thomas P Macioce CHIEF BRIDGE ENGINEER	Brian D Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-707M



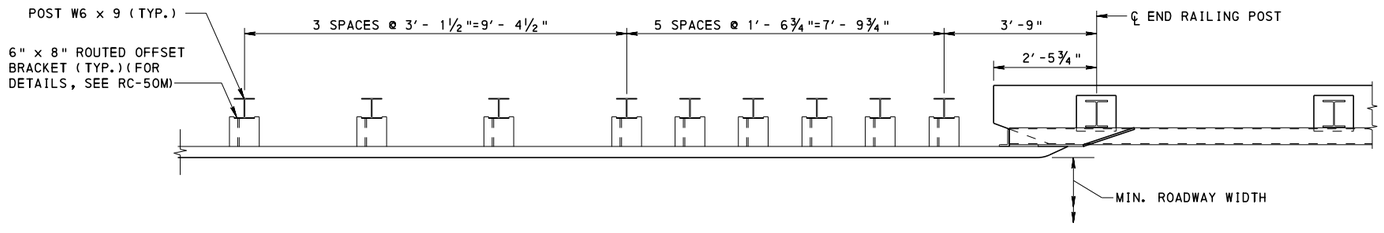
PLAN VIEW FOR THRIE-BEAM TO PA TYPE 10M BRIDGE BARRIER



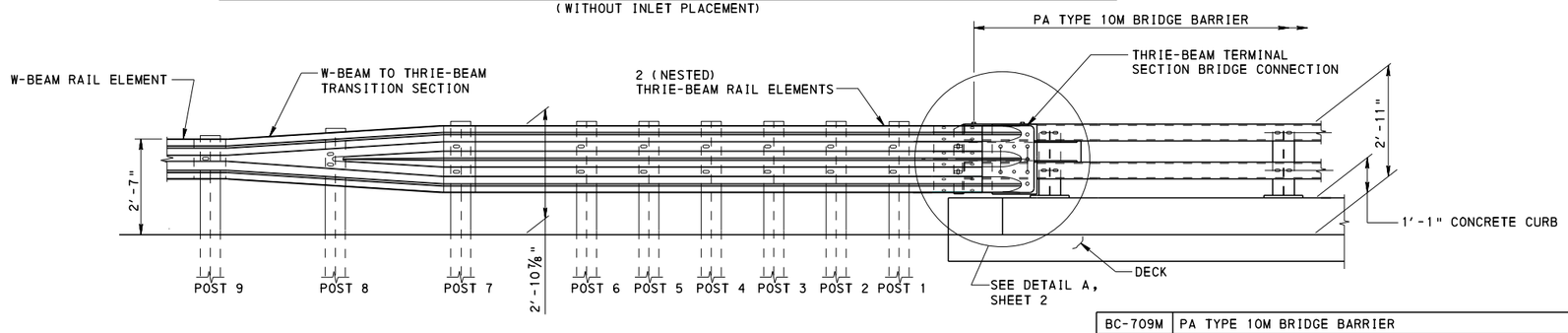
ELEVATION VIEW FOR THRIE-BEAM TO PA TYPE 10M BRIDGE BARRIER

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. USE PLAN DIMENSIONS WHEN DIFFERANT FROM THOSE SHOWN ON THIS STANDARD.
3. REINFORCED CONCRETE BARRIER AND EMBEDDED INSERTS ARE BRIDGE ITEMS.
4. SEE RC-52M AND RC-50M FOR DETAILS AND HARDWARE NOT SHOWN.
5. THRIE-BEAM TO PA TYPE 10M BRIDGE BARRIER TRANSITION WITHOUT INLET PLACEMENT HAS SUCCESSFULLY PASSED TL-4 SINGLE UNIT TRUCK CRASH TESTING. THRIE-BEAM TO PA TYPE 10M BRIDGE BARRIER TRANSITION WITH INLET PLACEMENT HAS BEEN GRANTED TL-4 EQUIVALENCE BY FHWA.
6. PROVIDE APPROACH END GUIDE RAIL TREATMENT AT BOTH THE APPROACH AND TRAILING ENDS OF STRUCTURE BARRIERS ON TWO LANE FACILITIES WITH TWO-WAY TRAFFIC. ON FOUR LANE DIVIDED HIGHWAYS, GUIDE RAIL TRANSITION IS NOT REQUIRED ON TRAILING ENDS OF BARRIERS UNLESS WARRANTED BY OTHER OBSTRUCTIONS.
7. THE APPROACH END TRANSITION COMPONENTS ARE ROADWAY ITEMS.



PLAN VIEW FOR THRIE-BEAM TO PA TYPE 10M BRIDGE BARRIER
(WITHOUT INLET PLACEMENT)



ELEVATION VIEW FOR THRIE-BEAM TO PA TYPE 10M BRIDGE BARRIER
(WITHOUT INLET PLACEMENT)

BC-709M	PA TYPE 10M BRIDGE BARRIER
RC-45M	INLET TOPS, GRATES AND FRAME
RC-50M	GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS
RC-52M	TYPE 2 STRONG POST GUIDE RAIL

REFERENCE DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

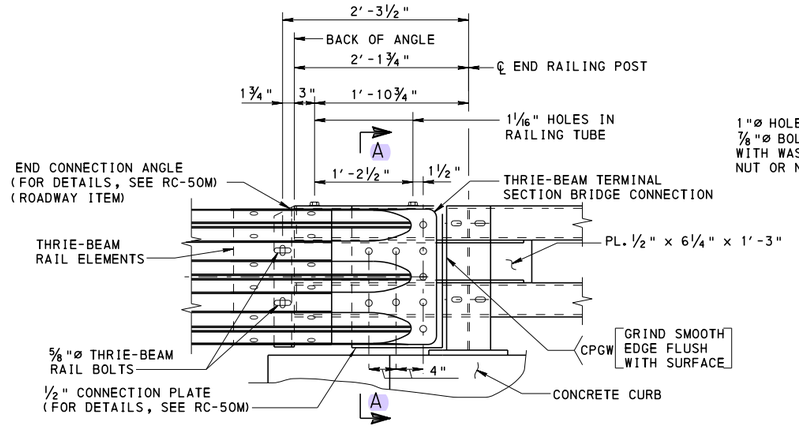
THRIE-BEAM TO PA TYPE 10M BRIDGE BARRIER TRANSITION CONNECTION

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brian S. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

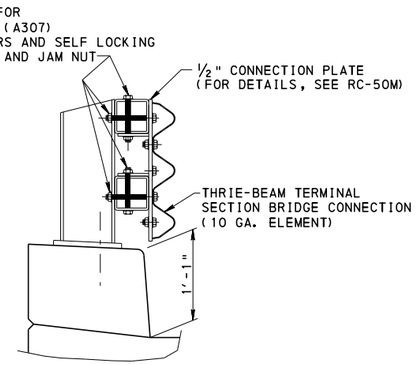
SHEET 1 OF 2

BC-708M

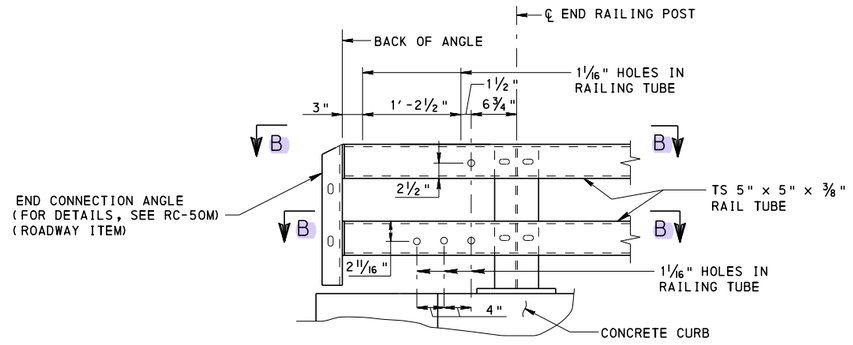


DETAIL A

(WITHOUT INLET SHOWN; WITH INLET SIMILAR)

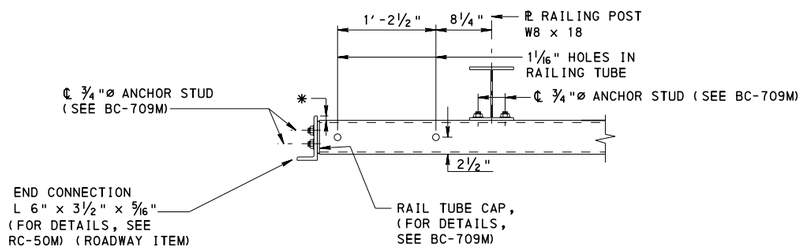


SECTION A-A



DETAIL A

(ONLY RAILING SHOWN)



SECTION B-B

* END CONNECTION ANGLE WILL PROTRUDE ½" BEYOND BACK FACE OF MAIN RAIL TUBE.

NOTES:

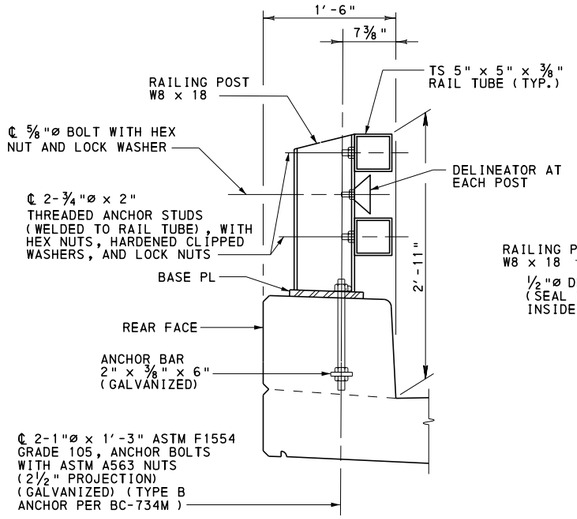
1. FOR LOCATION OF DETAIL A, SEE SHEET 1.
2. FOR NOTES, SEE SHEET 1.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

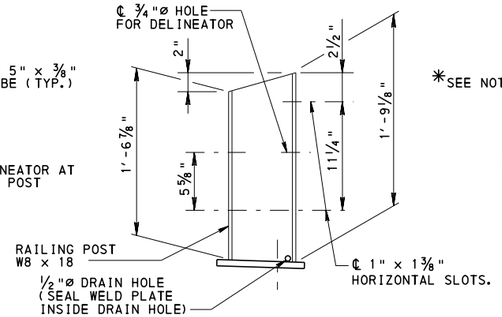
STANDARD

THRIE-BEAM TO PA TYPE 10M BRIDGE BARRIER TRANSITION CONNECTION

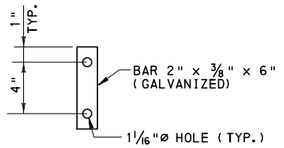
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian D Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 2 OF 2 BC-708M



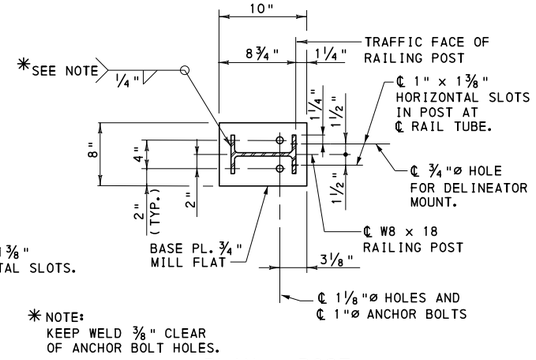
BARRIER SECTION



ELEVATION-POST



ANCHOR BAR DETAIL



✱NOTE:
KEEP WELD ⅜" CLEAR OF ANCHOR BOLT HOLES.

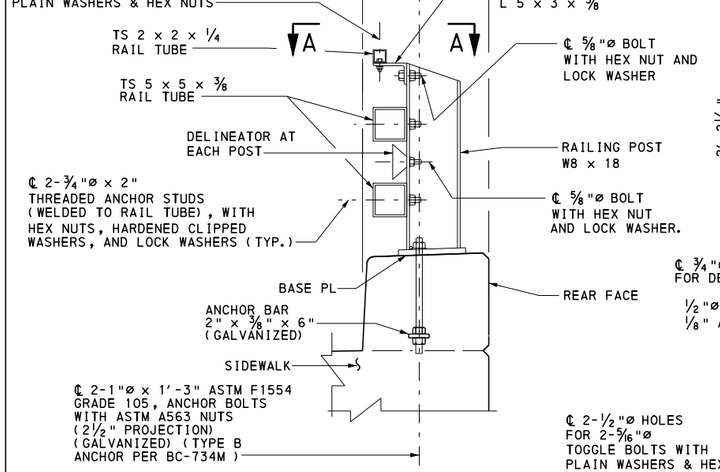
PLAN - POST

TYPICAL RAIL

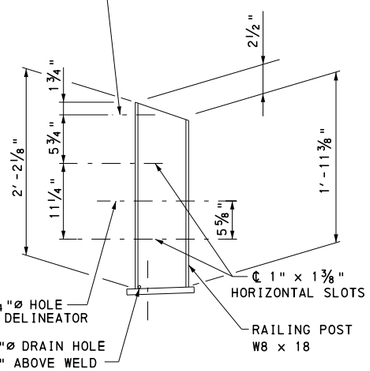
GENERAL NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. PROVIDE RAILING TUBES IN ACCORDANCE WITH ASTM A500 GRADE B OR C.
3. PROVIDE RAILING POSTS IN ACCORDANCE WITH AASHTO M270 (ASTM A709) GRADE 50 OR 50W OR ASTM A992. PROVIDE BASE PLATES IN ACCORDANCE WITH AASHTO M270 (ASTM A709) GRADE 50 OR 50W.
4. ALL RAILING COMPONENTS SHALL BE GALVANIZED (AFTER FABRICATION) IN ACCORDANCE WITH SECTION 1105.02(s), PUBLICATION 408 UNLESS OTHERWISE SHOWN ON THE PLANS.
5. THE RAILING TUBES ARE SHOP BENT OR FABRICATED TO FIT HORIZONTAL CURVE WHEN RADIUS IS LESS THAN 1,500 FEET.
6. PROVIDE THREADED ANCHOR STUDS IN ACCORDANCE WITH ASTM A108 TYPE B.
7. FOR SIDEWALK RAIL TUBE SPLICE DETAILS, SEE SHEET 4 AND BC-720M.
8. STEEL TUBE TOLERANCES:
   A. STRAIGHTNESS: THE PERMISSIBLE VARIATION FOR STRAIGHTNESS SHALL BE ⅛" 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.

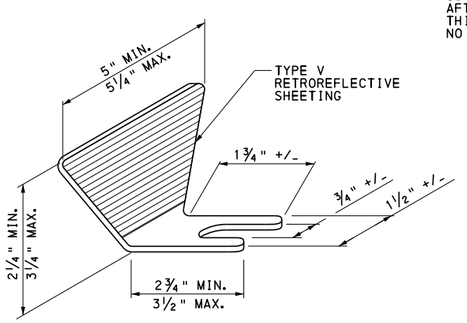
   NOTE - TWIST IS MEASURED BY HOLDING DOWN ONE END OF SQUARE OR RECTANGULAR TUBE ON A FLAT SURFACE PLATE WITH THE BOTTOM SIDE OF THE TUBE PARALLEL TO THE SURFACE PLATE AND NOTING THE HEIGHT DIFFERENCE BETWEEN THE TWO CORNERS AT THE OPPOSITE END OF THE BOTTOM SIDE OF THE TUBE.
9. ALL WELDING SHALL CONFORM 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.
10. IF FLAME CUTTING OR PLASMA CUTTING IS USED TO CREATE SLOTTED HOLES, GRIND SMOOTH TO PROVIDE VERTICAL AND FLAT SURFACES ALONG THE HOLE.
11. THE OUT OF FLATNESS TOLERANCE FOR THE POST BASE PLATES IS ⅛" 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 ⅞" TO MEET THIS TOLERANCE.
12. FOR THRIE-BEAM RAIL TO PA TYPE 10M BRIDGE BARRIER TRANSITION CONNECTION, SEE BC-708M AND RC-50M.
13. BOLT TIGHTENING PROCEDURES ARE AS FOLLOWS:
    SNUG TIGHTEN ALL ANCHOR BOLTS. TIGHTEN THE NUTS AN ADDITIONAL 1/3 TURN USING A WRENCH.
14. IF FLAME CUTTING OR PLASMA CUTTING IS USED TO CREATE SLOTTED HOLES, GRIND SMOOTH TO PROVIDE VERTICAL AND FLAT SURFACES ALONG THE HOLE.
15. THE OUT OF FLATNESS TOLERANCE FOR THE POST BASE PLATES IS ⅛" 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 ⅞" TO MEET THIS TOLERANCE.



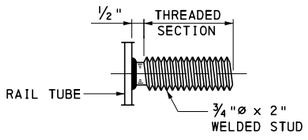
BARRIER SECTION



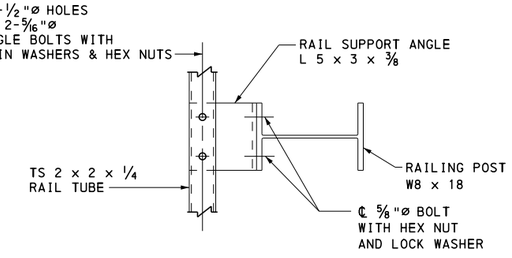
ELEVATION-POST
(AT ALTERNATE SIDEWALK)



DELINEATOR DETAIL



ANCHOR STUD DETAIL



SECTION A-A

ALTERNATE SIDEWALK RAIL

BC-708M	THRIE-BEAM TO PA TYPE 10M BRIDGE BARRIER TRANSITION CONNECTION
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

REFERENCE DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

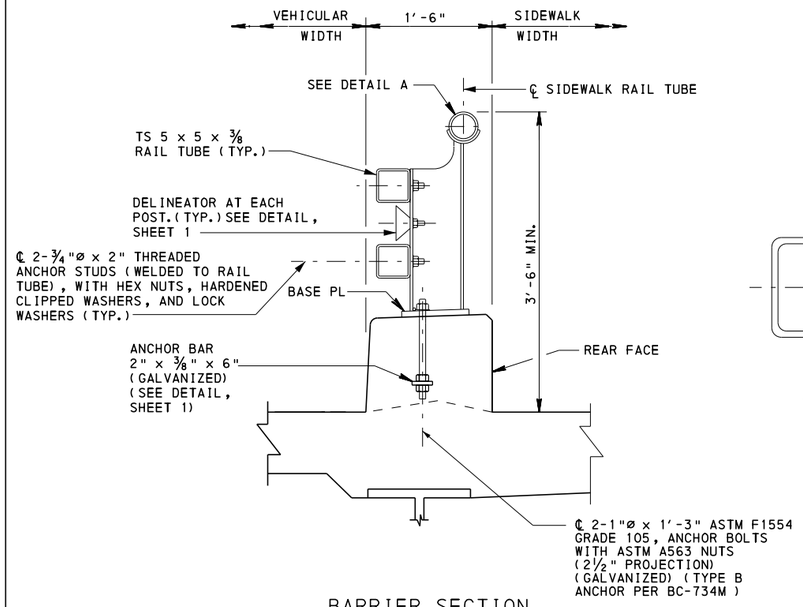
PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

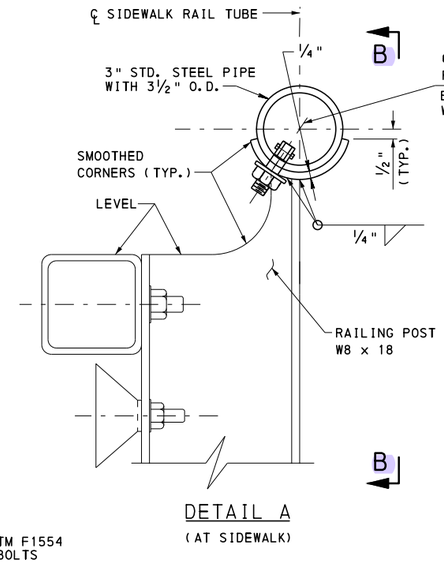
RECOMMENDED SEPT. 30, 2016
Brent D. Thompson
DIRECTOR, BUR. OF PROJECT DIRECTOR

SHEET 1 OF 12

BC-709M

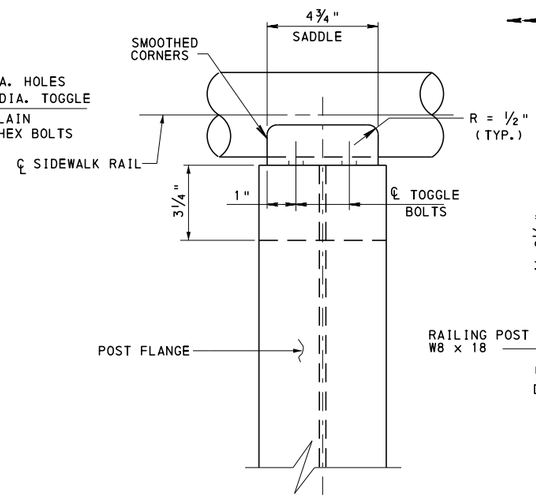


BARRIER SECTION

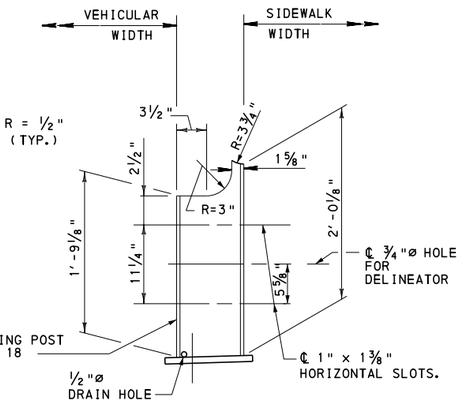


DETAIL A

(AT SIDEWALK)



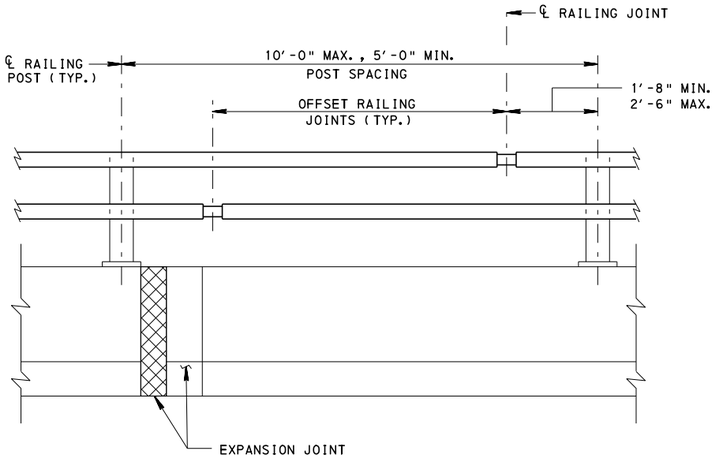
SECTION B-B



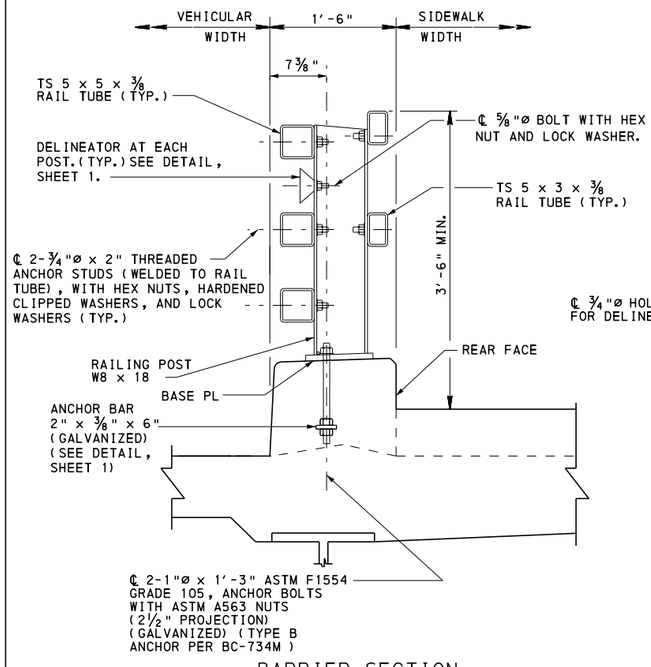
ELEVATION-POST

(AT SIDEWALK)

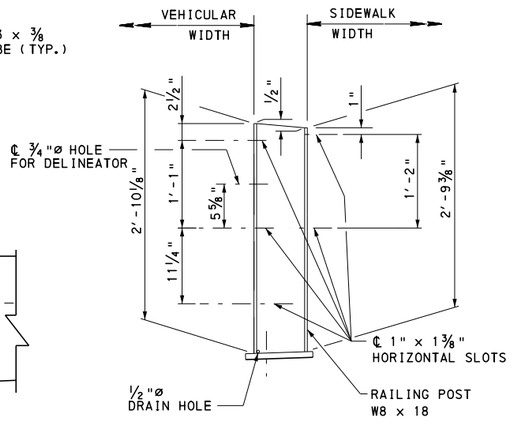
SIDEWALK RAIL



RAILING JOINTS ELEVATION



BARRIER SECTION



ELEVATION-POST

(AT RAISED SIDEWALK)

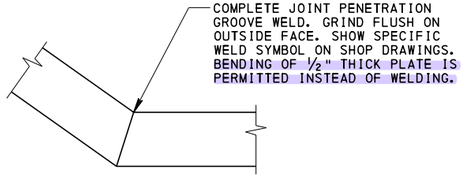
RAISED SIDEWALK RAIL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

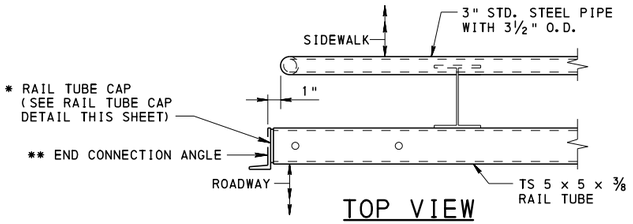
STANDARD

PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 12
Thomas P. Macioce	Brian D. Thompson	BC-709M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DIRECTOR	

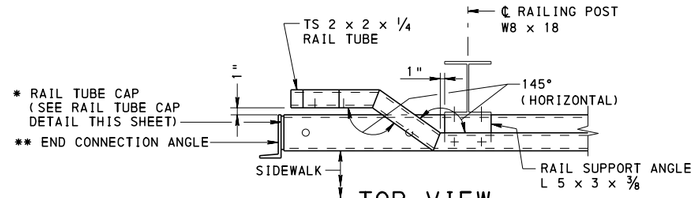


TYPICAL WELD AT MITERS



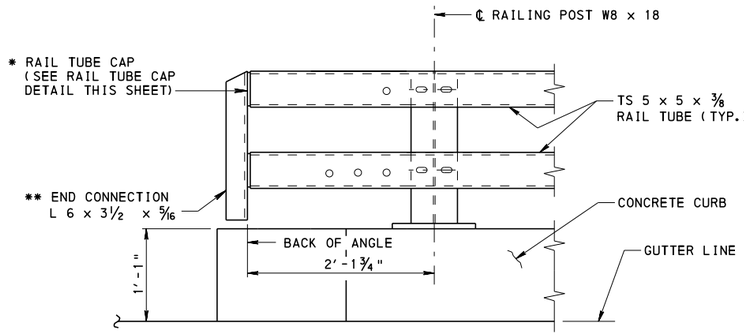
TOP VIEW

(CONCRETE CURB NOT SHOWN)



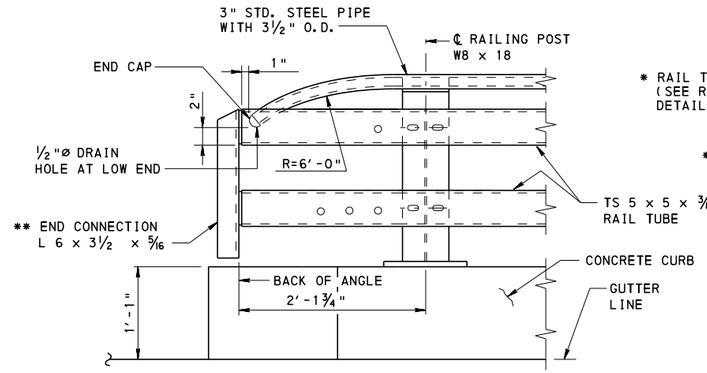
TOP VIEW

(CONCRETE CURB NOT SHOWN)



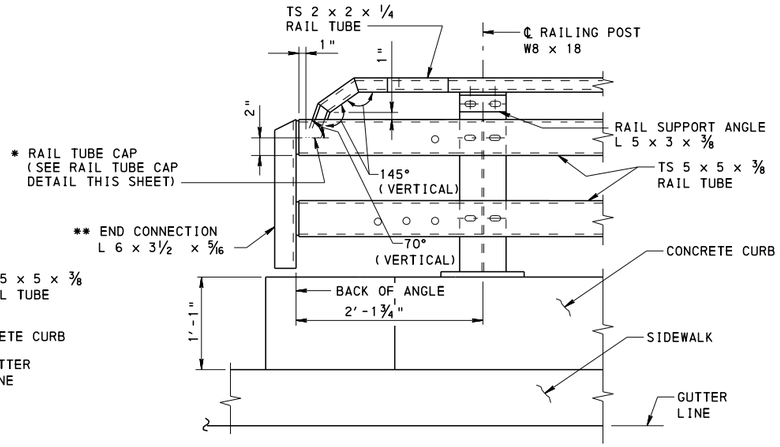
TYPICAL RAIL

(FOR SECTION VIEW, SEE SHEET 1)
(WITHOUT INLET SHOWN; WITH INLET SIMILAR)



SIDEWALK RAIL

(FOR SECTION VIEW, SEE SHEET 2)
(WITHOUT INLET SHOWN; WITH INLET SIMILAR)



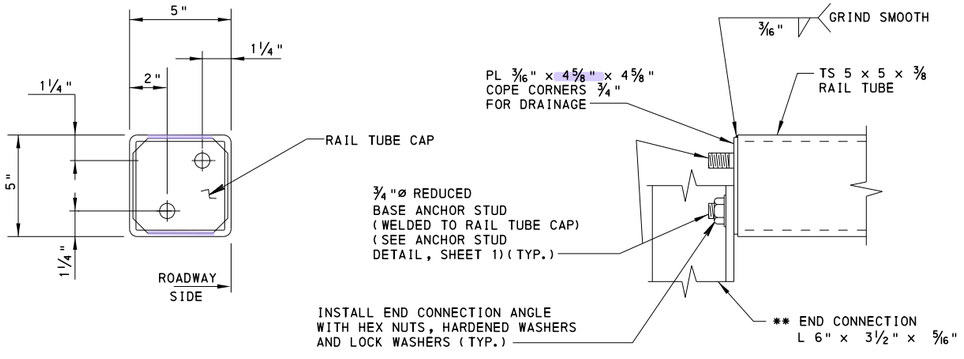
ALTERNATE SIDEWALK RAIL

(FOR SECTION VIEW, SEE SHEET 1)
(WITHOUT INLET SHOWN; WITH INLET SIMILAR)

NOTES:

* SEE END CAP SIZES FOR VARIOUS RAIL TUBES ON SHEET 4.

** END CONNECTION ANGLE IS ROADWAY ITEM, FOR DETAILS, SEE RC-50M.



END VIEW
(END CONNECTION ANGLE NOT SHOWN FOR CLARITY)

ELEVATION VIEW

RAIL TUBE CAP DETAIL

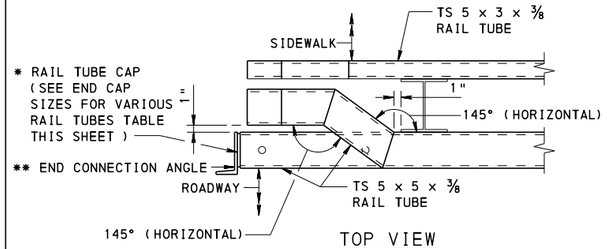
RAIL TUBE CAP AT END CONNECTION ANGLE SHOWN;
RAIL TUBE CAPS AT ALL OTHER LOCATIONS SIMILAR EXCEPT WITHOUT ANCHOR STUDS. (CAP TO COMPLETELY COVER END OF TUBE EXCEPT FOR CLIPPED CORNERS)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

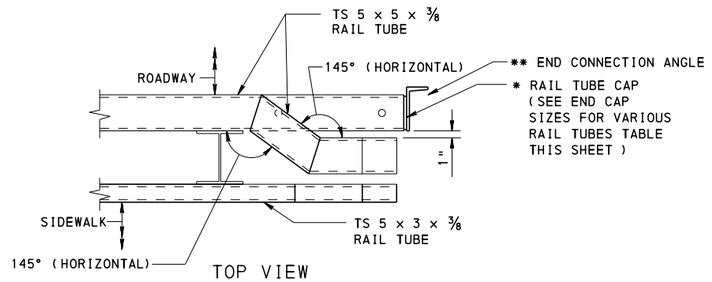
PA TYPE 10M BRIDGE BARRIER END OF RAIL DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 12
Thomas P. Macioce	Brent D. Thompson	BC-709M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DIRECTOR	



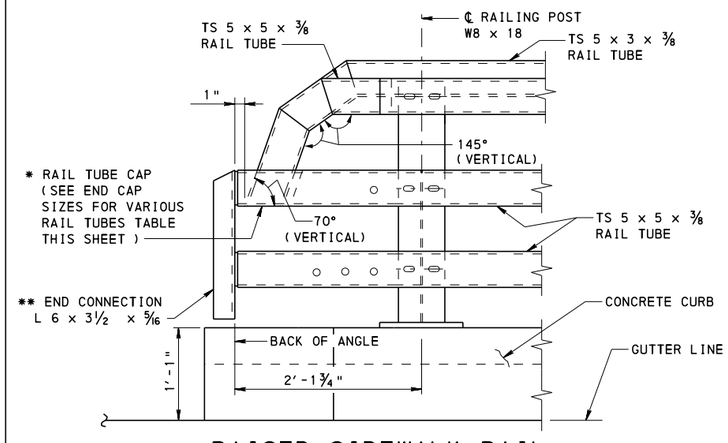
TOP VIEW

(CONCRETE CURB NOT SHOWN)



TOP VIEW

(CONCRETE CURB NOT SHOWN)

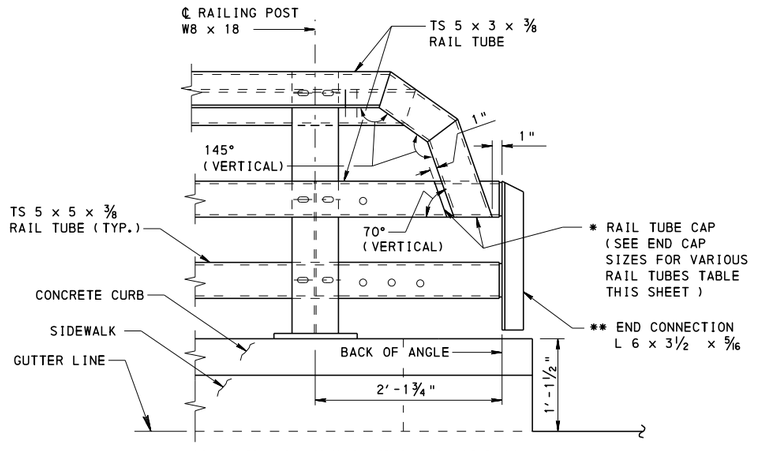


RAISED SIDEWALK RAIL

(ROADWAY VIEW)

(FOR SECTION VIEW, SEE SHEET 2)

(WITHOUT INLET SHOWN; WITH INLET SIMILAR)



RAISED SIDEWALK RAIL

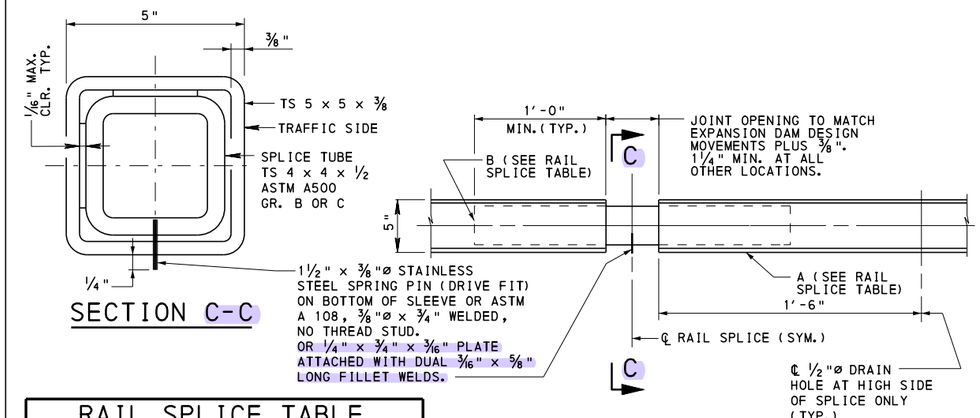
(SIDEWALK VIEW)

(FOR SECTION VIEW, SEE SHEET 2)

(WITHOUT INLET SHOWN; WITH INLET SIMILAR)

END CAP SIZES FOR VARIOUS RAIL TUBES TABLE

MEMBER SIZE	ANGLE	END CAP SIZE (THK. x H x W)
TS 5 x 5 x 3/8	90°	PL 3/16" x 4 3/4" x 4 5/8"
TS 5 x 5 x 3/8	70°	PL 3/16" x 5" x 4 5/8"
TS 2 x 2 x 1/4	70°	PL 3/16" x 1 7/8" x 1 5/8"
TS 5 x 3 x 3/8	70°	PL 3/16" x 5" x 2 5/8"

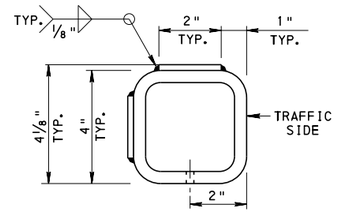


SECTION C-C

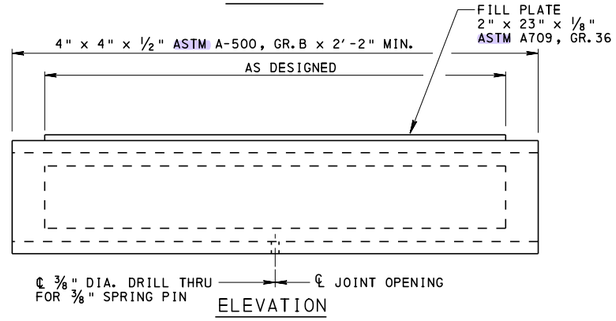
RAIL SPLICE TABLE	
A (RAIL TUBE)	B (SPLICE TUBE)
TS 5 x 5 x 3/8	TS 4 x 4 x 1/2 ASTM A500, GR. B OR C
TS 5 x 3 x 3/8	TS 4 x 2 x 5/16 ASTM A500, GR. B OR C
TS 2 x 2 x 1/4	1 1/4" x 1 1/4" ROD ASTM A709, GR. 36 OR 50

RAIL SPLICE

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



END VIEW



ELEVATION

SPLICE TUBE

NOTES:

* SEE RAIL TUBE CAP DETAIL ON SHEET 3.

** END CONNECTION ANGLE IS ROADWAY ITEM, FOR DETAILS, SEE RC-50M.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

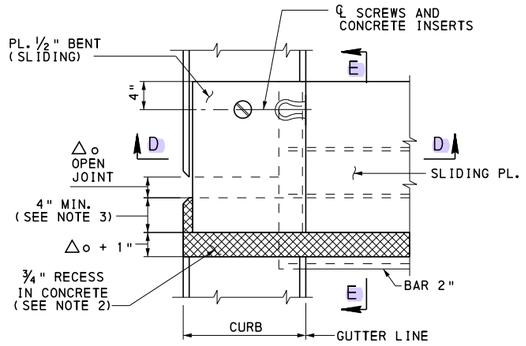
PA TYPE 10M BRIDGE BARRIER END OF RAIL DETAILS

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brian S. Thompson
DIRECTOR, BUR. OF PROJECT DIRECTOR

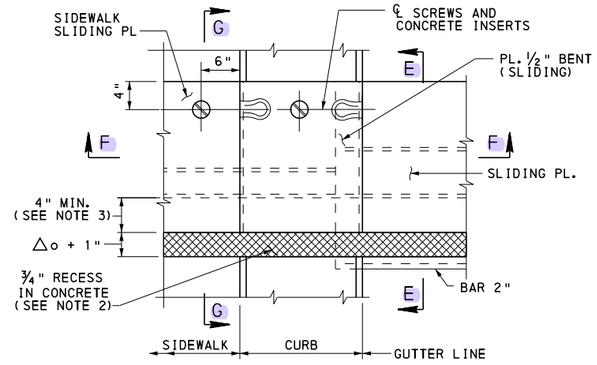
SHEET 4 OF 12

BC-709M



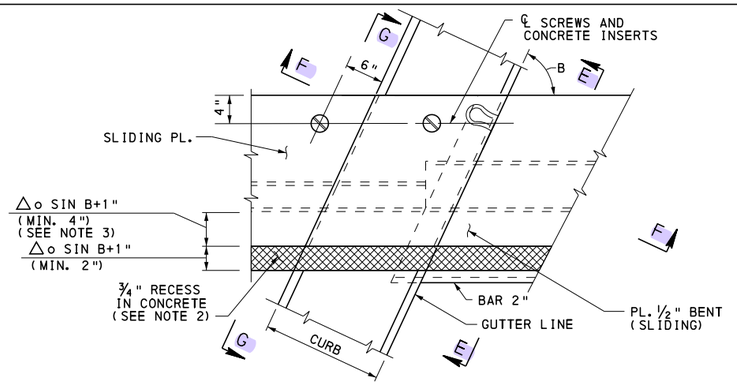
PLAN - SKEW ANGLE ≥ 75°

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



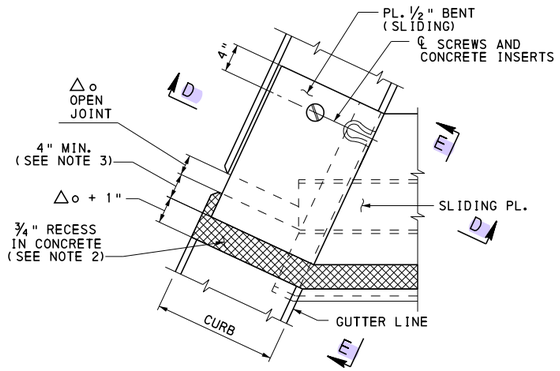
PLAN AT SIDEWALK- SKEW ANGLE ≥ 75°

(AT SIDEWALK SHOWN; AT RAISED SIDEWALK SIMILAR)



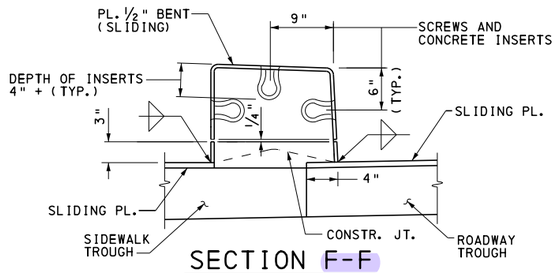
PLAN AT SIDEWALK- SKEW ANGLE < 75°

(AT SIDEWALK SHOWN; AT RAISED SIDEWALK SIMILAR)



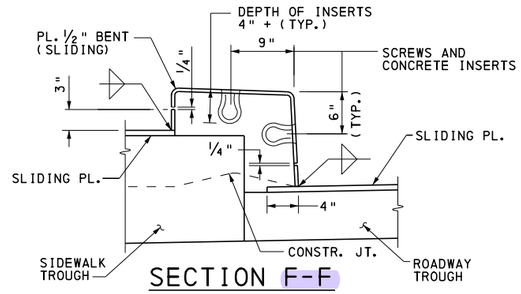
PLAN - SKEW ANGLE < 75°

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



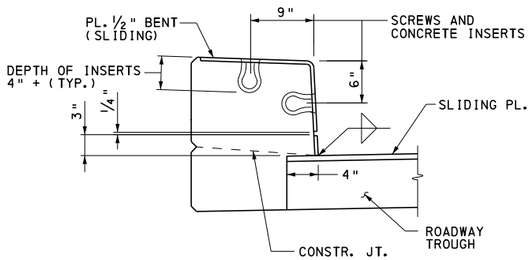
SECTION F-F

(AT SIDEWALK)

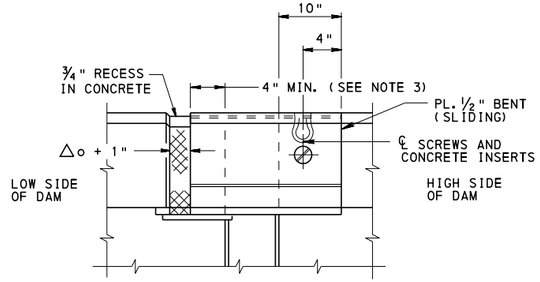


SECTION F-F

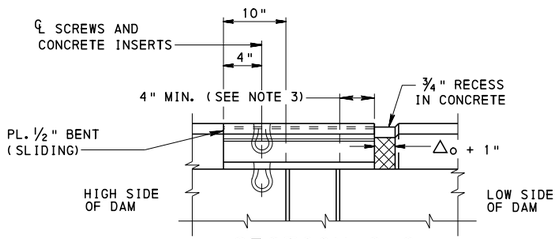
(AT RAISED SIDEWALK)



SECTION D-D



SECTION E-E



SECTION G-G

(AT RAISED SIDEWALK SHOWN; AT SIDEWALK SIMILAR)

PA TYPE 10M BRIDGE BARRIER AT EXPANSION TOOTH DAM

(RAILING POST AND TUBE RAILS NOT SHOWN)

NOTES:

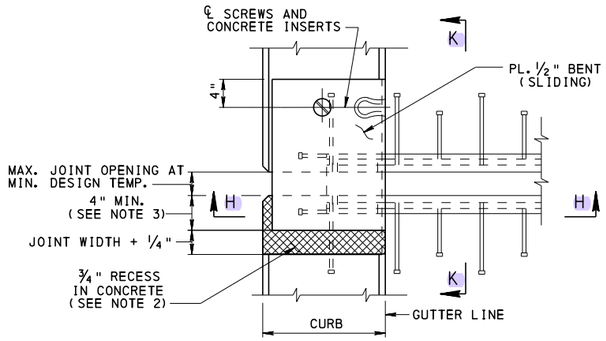
1. FOR △o SEE BC-762M
2. FORM CONCRETE RECESS AREA IN CURB AND GRIND TO PROVIDE SMOOTH SURFACE. APPLY ONE COAT OF ASPHALT CEMENT PAINT WA-1 OR PERFORMANCE GRADED ASPHALT CEMENT PG 64-22 TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION.
3. MAINTAIN 4" MIN. BETWEEN EDGE OF STEEL TO THE EDGE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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

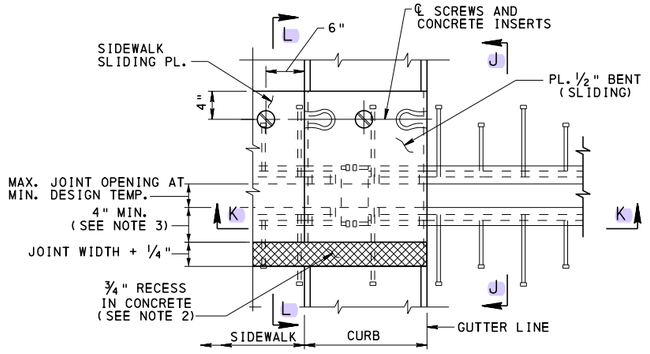
STANDARD

PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 5 OF 12
Thomas P. Macioce, CHIEF BRIDGE ENGINEER	Brent D. Thompson, DIRECTOR, BUR. OF PROJECT DIRECTOR	BC-709M

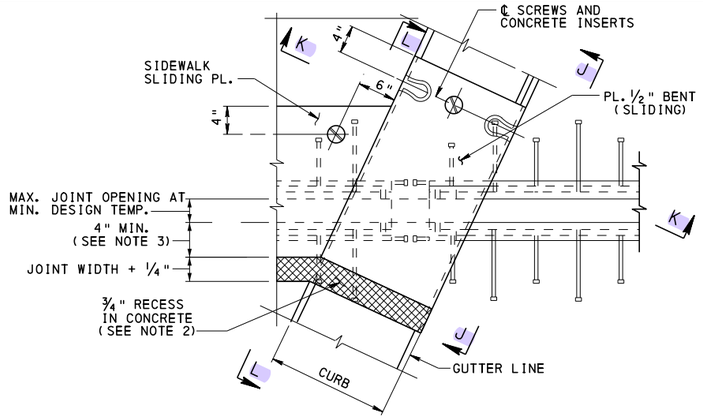


PLAN - SKEW ANGLE ≥ 75°



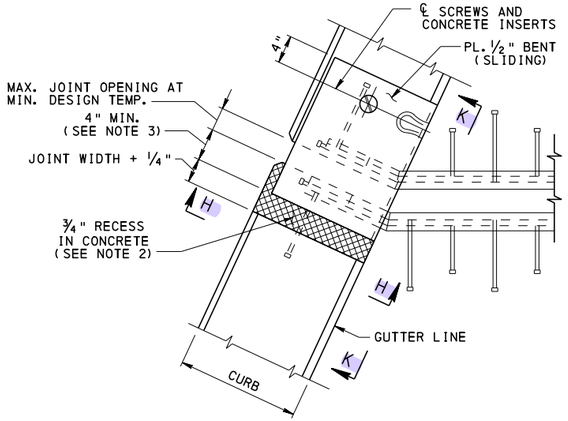
PLAN AT SIDEWALK- SKEW ANGLE ≥ 75°

(AT SIDEWALK SHOWN; AT RAISED SIDEWALK SIMILAR)

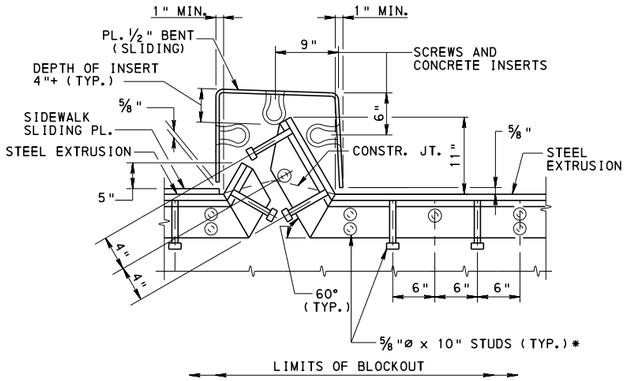


PLAN AT SIDEWALK- SKEW ANGLE < 75°

(AT SIDEWALK SHOWN; AT RAISED SIDEWALK SIMILAR)

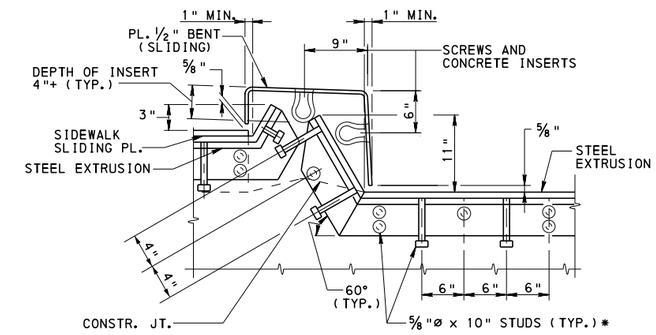


PLAN - SKEW ANGLE < 75°



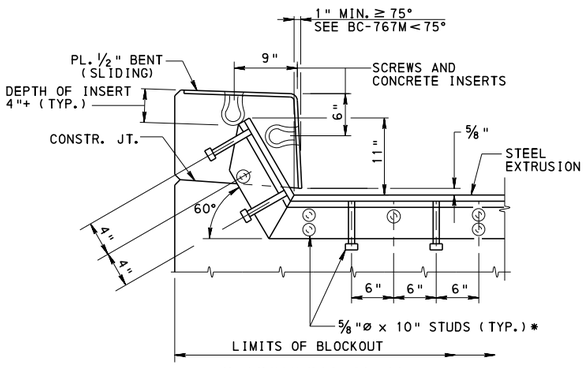
SECTION K-K

(AT SIDEWALK)

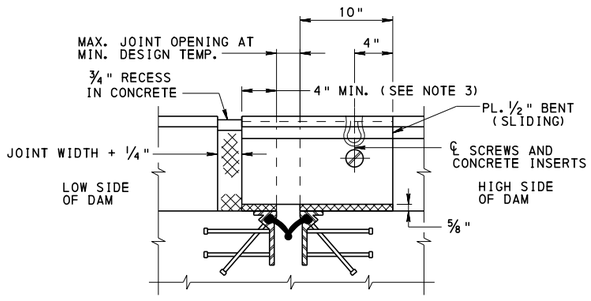


SECTION K-K

(AT RAISED SIDEWALK)



SECTION H-H



SECTION J-J

NOTES:

1. FOR SECTION L-L, SEE SHEET 7.
2. FORM CONCRETE RECESS AREA IN CURB 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.
3. MAINTAIN 4" MIN. BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT TEMP. OF -10°F FOR STEEL AND 10°F FOR P/S CONCRETE.
4. MAXIMUM DISTANCE FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3".

PA TYPE 10M BRIDGE BARRIER AT NEOPRENE STRIP SEAL DAM

(RAILING POST AND TUBE RAILS NOT SHOWN)

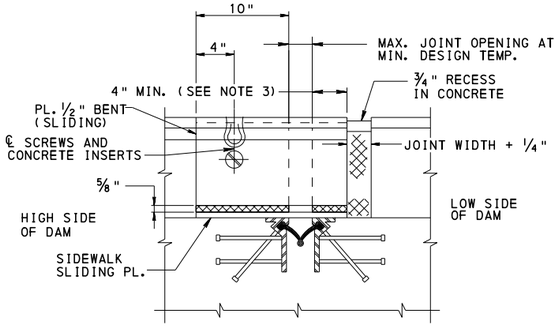
* IF 10" STUDS CANNOT BE ACCOMMODATED IN THE SPACE AVAILABLE, REQUEST SPECIFIC LENGTH APPROVAL FROM THE DISTRICT BRIDGE ENGINEER AT THE SHOP DRAWINGS APPROVAL STAGE.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

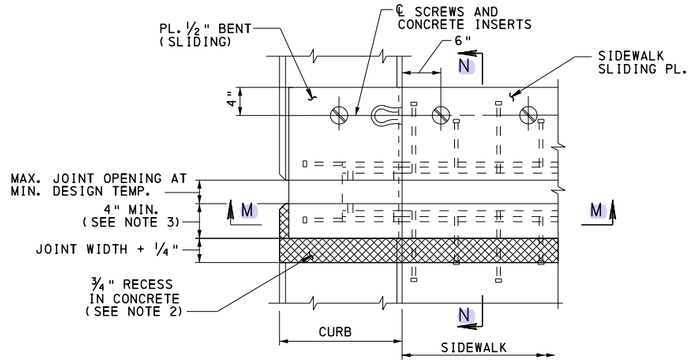
PA TYPE 10M BRIDGE BARRIER MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 6 OF 12
Thomas P Macioce	Brian B Thompson	BC-709M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DIRECTOR	

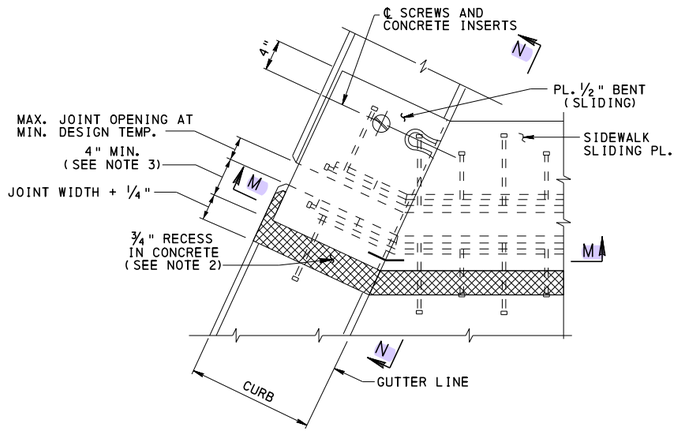


SECTION C-C

(AT SIDEWALK)



PLAN AT ALTERNATE SIDEWALK- SKEW ANGLE ≥ 75°

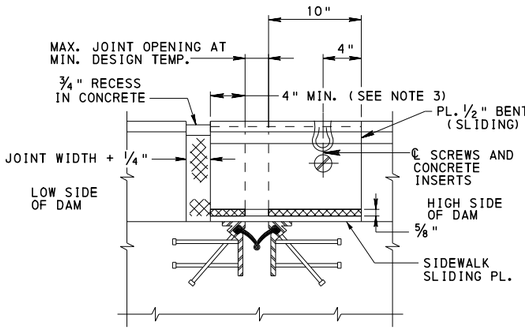


PLAN AT ALTERNATE SIDEWALK- SKEW ANGLE < 75°

SECTION L-L

(AT RAISED SIDEWALK)

SECTION M-M



SECTION N-N

NOTES:

1. FOR LOCATION OF SECTION L-L, SEE SHEET 6.
2. FORM CONCRETE RECESS AREA IN CURB 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.
3. MAINTAIN 4" MIN. BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT TEMP. OF -10°F FOR STEEL AND 10°F FOR P/S CONCRETE.
4. MAXIMUM DISTANCE FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3".

PA TYPE 10M BRIDGE BARRIER AT NEOPRENE STRIP SEAL DAM

(RAILING POST AND TUBE RAILS NOT SHOWN)

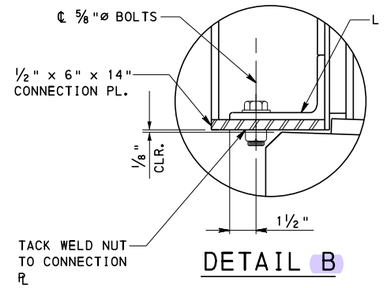
* IF 10" STUDS CANNOT BE ACCOMMODATED IN THE SPACE AVAILABLE, REQUEST SPECIFIC LENGTH APPROVAL FROM THE DISTRICT BRIDGE ENGINEER AT THE SHOP DRAWINGS APPROVAL STAGE.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

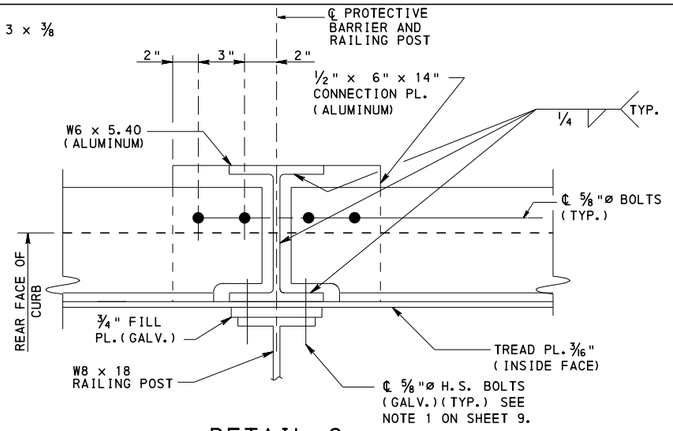
STANDARD

PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS

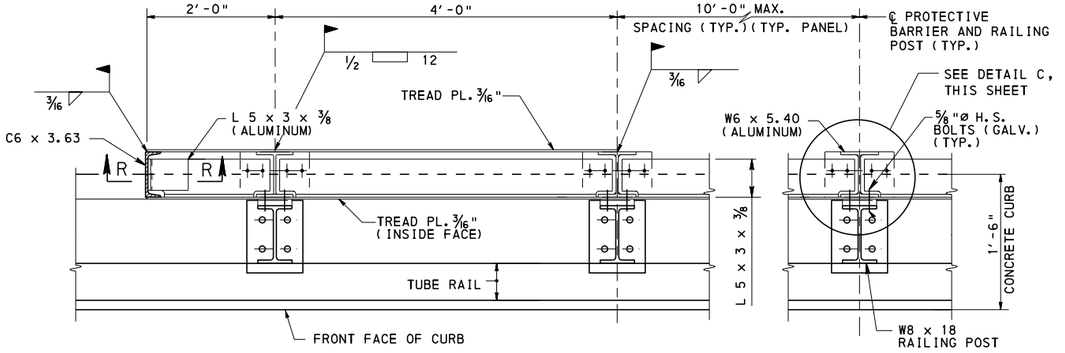
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 7 OF 12
Thomas P Macioce CHIEF BRIDGE ENGINEER	Bruce B Thompson DIRECTOR, BUR. OF PROJECT DIRECTOR	BC-709M

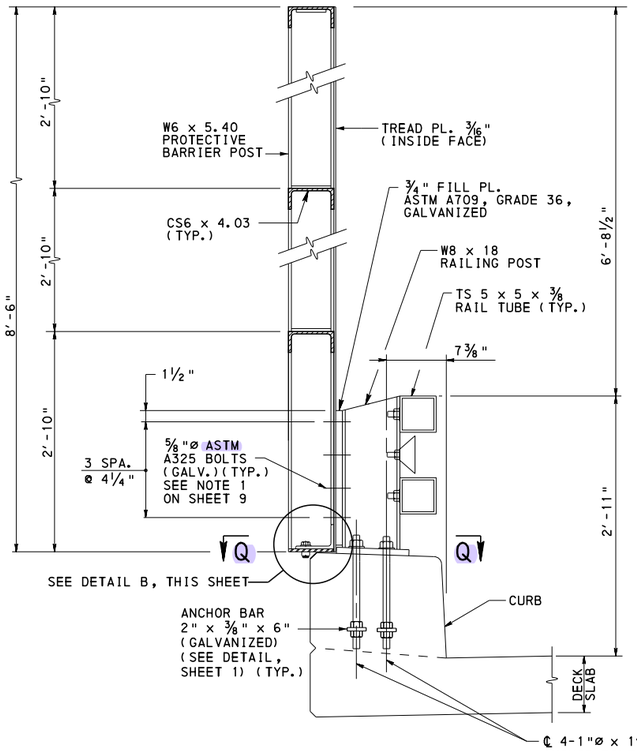


DETAIL B

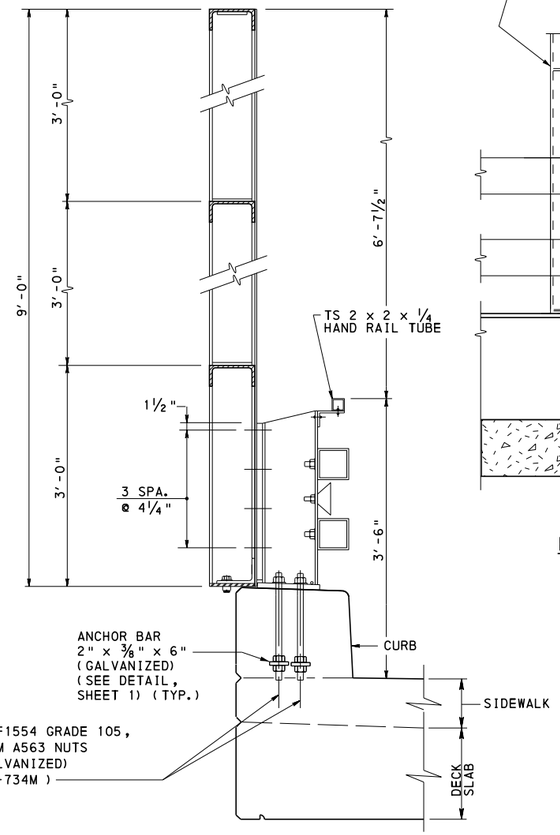


DETAIL C





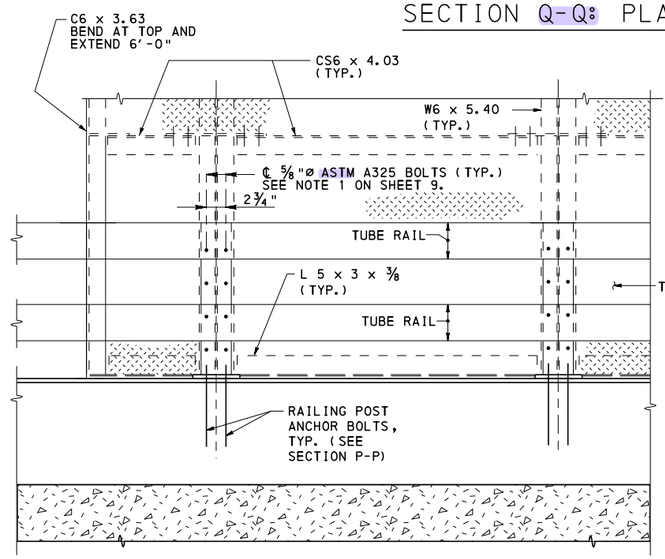
SECTION P-P (TYPICAL)



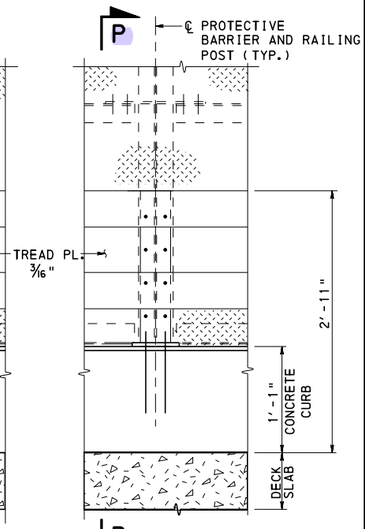
SECTION P-P (WITH ALTERNATE SIDEWALK)

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

SECTION Q-Q: PLAN

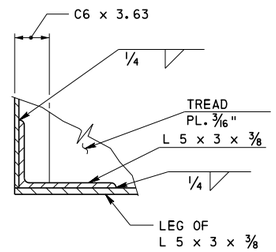


RAILING END SECTION



TYPICAL POST SECTION

ELEVATION
(INSIDE FACE)



SECTION R-R

NOTE:
SEE SHEET 9 FOR NOTES.

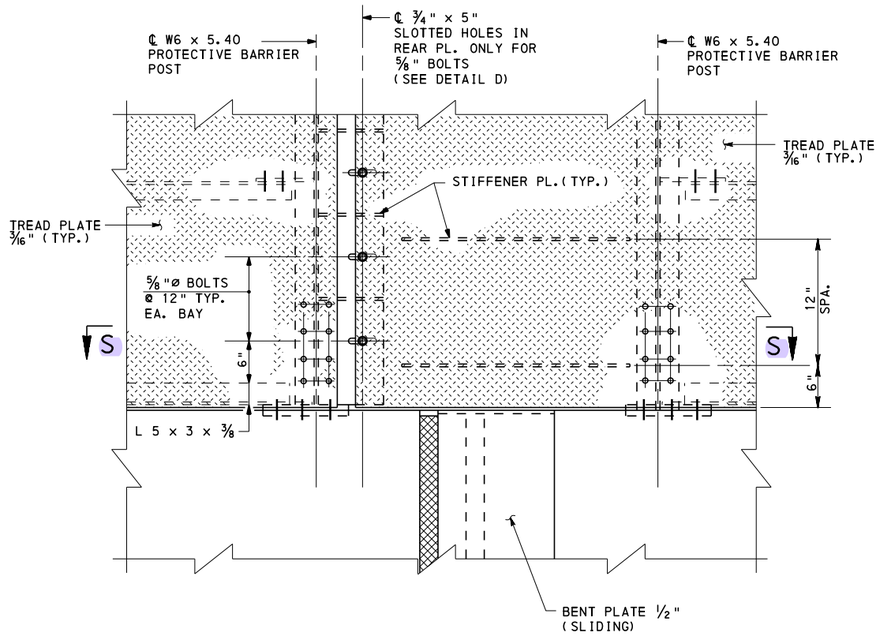
ALUMINUM PROTECTIVE BARRIER AT PA TYPE 10M BRIDGE BARRIER

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

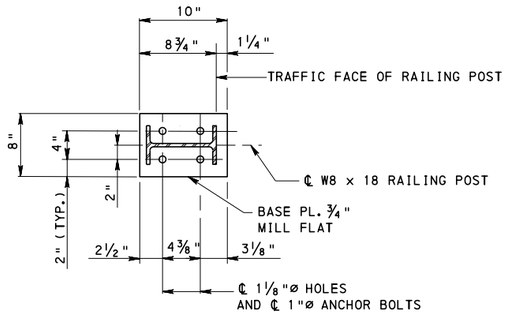
PA TYPE 10M BRIDGE BARRIER MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 8 OF 12
Thomas P Macioce CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DIRECTOR	BC-709M



ELEVATION

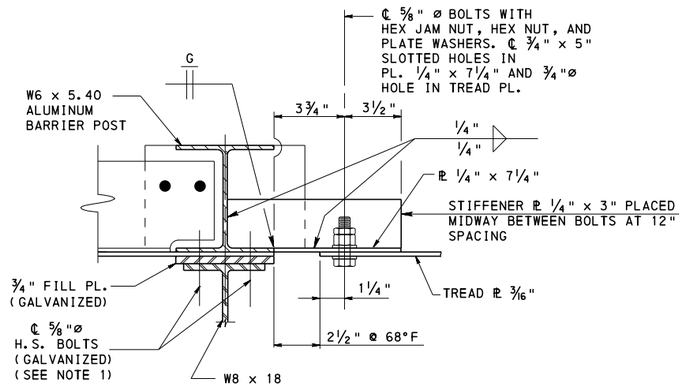
NOTE:
FOR CLARITY, W8 x 18 RAILING POSTS, RAIL TUBES, AND BASE PLATES NOT SHOWN IN ELEVATION VIEW.



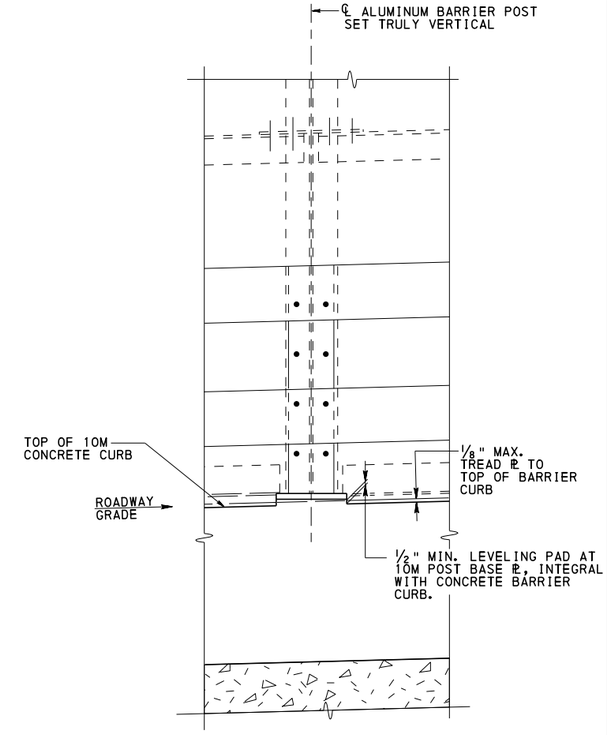
NOTE: SEE SHEET 1 FOR DETAILS NOT SHOWN HERE.

POST AND BASE PLATE

(AT ALUMINUM BARRIER)

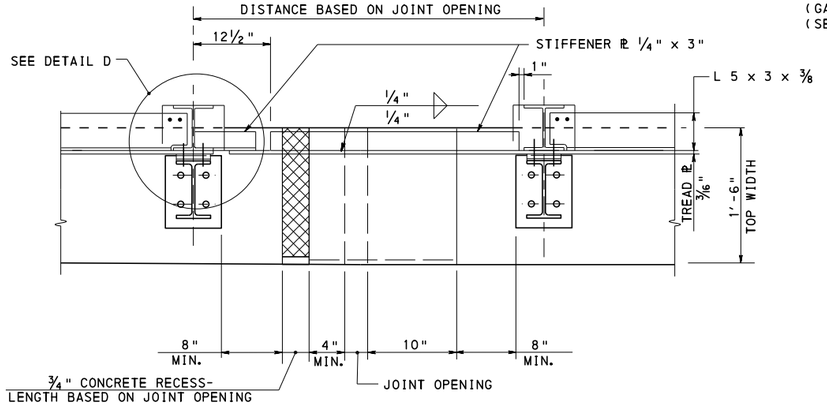


DETAIL D



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



SECTION J-J

EXPANSION JOINT AT PIERS

NOTES:

1. PROVIDE ELASTOMERIC PADS OR WASHERS ⅛" MIN. THICKNESS CONFORMING TO PUB. 408, SECTION 1107.02 (p), TYPE I, BETWEEN CONTACT SURFACES WHEREVER ALUMINUM COMPONENTS COME IN CONTACT WITH GALVANIZED STEEL. ALSO PROVIDE FABRIC BUSHINGS WITH MATERIAL CONFORMING TO SECTION 1107.02(p), 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.

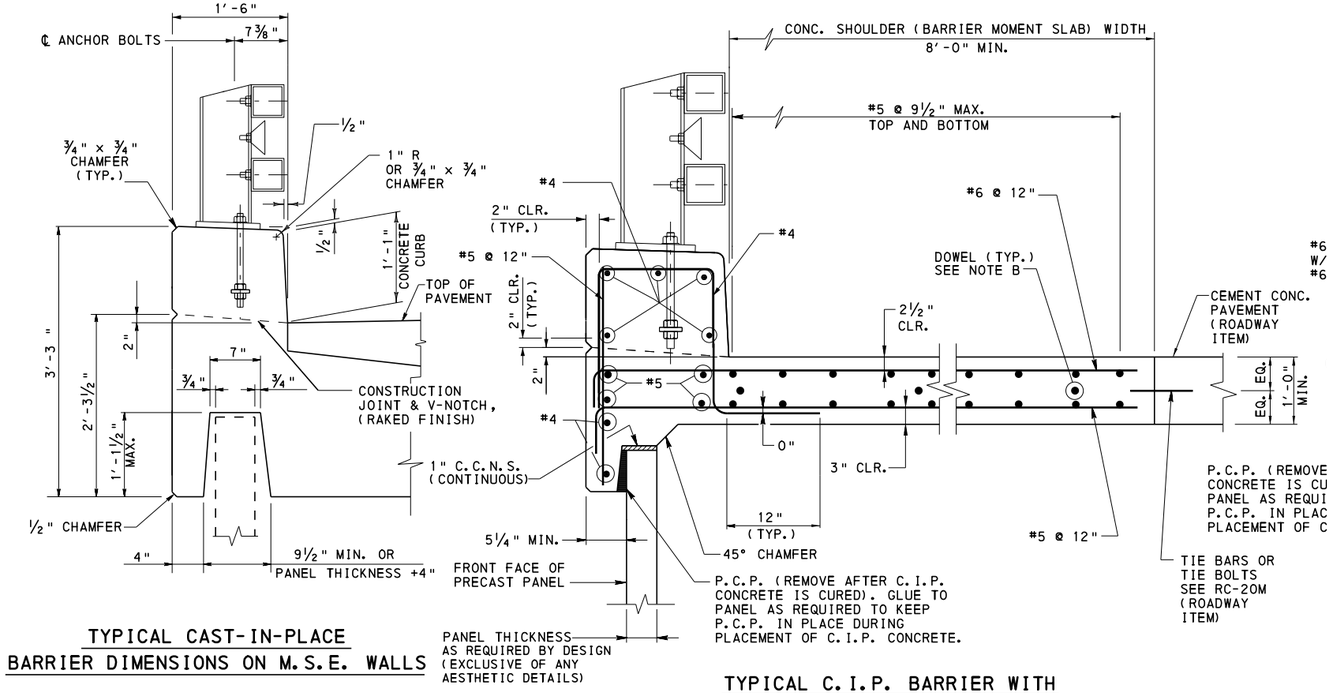
ALUMINUM PROTECTIVE BARRIER AT PA TYPE 10M BRIDGE BARRIER

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS

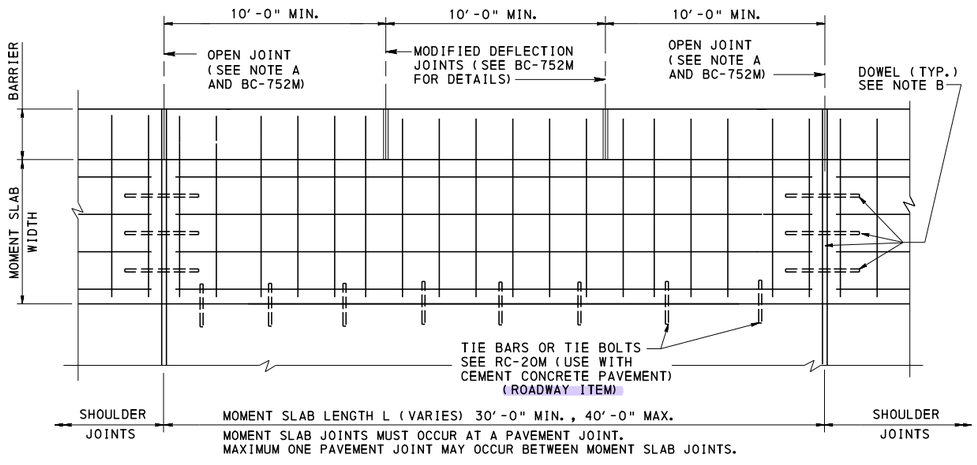
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian D Thompson DIRECTOR, BUR. OF PROJECT DIRECTOR	SHEET 9 OF 12 BC-709M



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

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

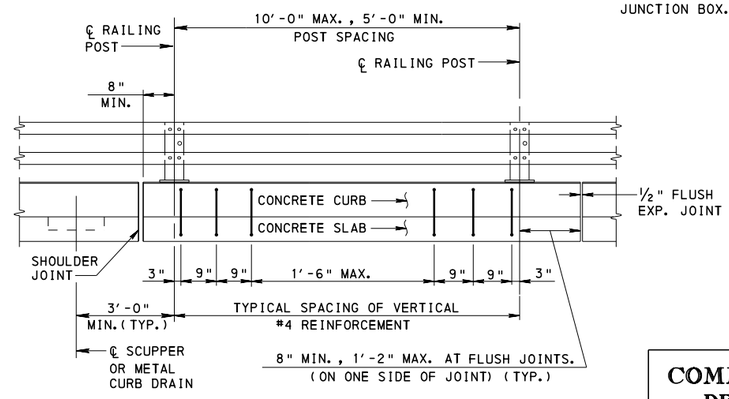
TYPICAL C.I.P. BARRIER WITH BITUMINOUS SHOULDER ON M.S.E. WALLS



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-20M. USE SAME JOINT AS PROVIDED IN PAVEMENT.

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



CONCRETE CURB ELEVATION
(RAILING POST AND VERTICAL REINFORCEMENT SPACING)

NOTES:

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

LEGEND:
C.C.N.S. = CLOSED CELL NEOPRENE SPONGE
P.C.P. = PREFORMED CELLULAR POLYSTYRENE

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

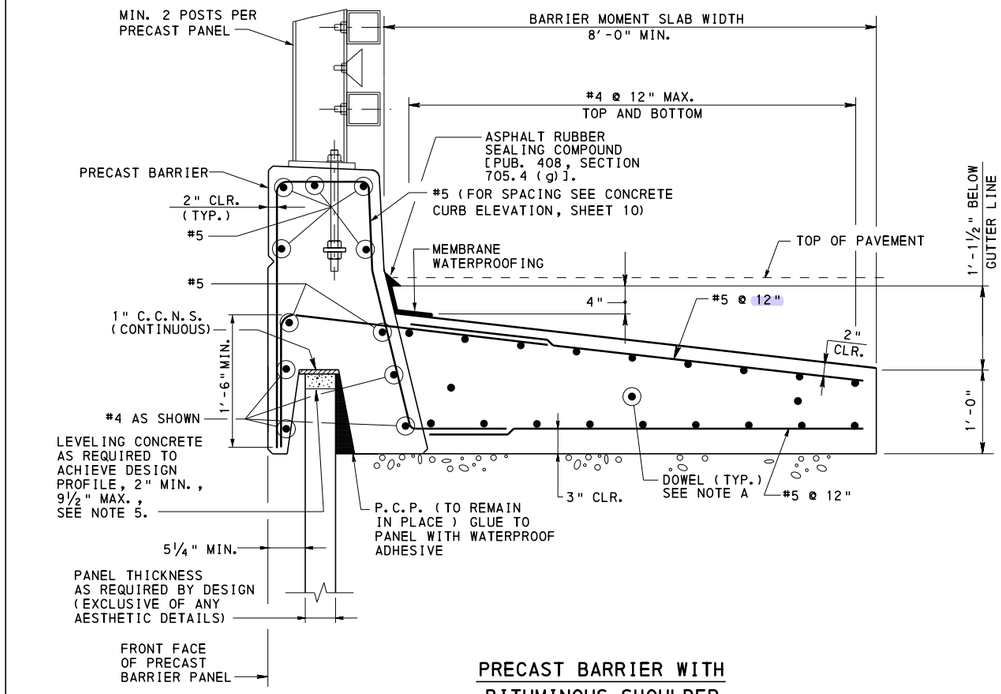
PA TYPE 10M BRIDGE BARRIER MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

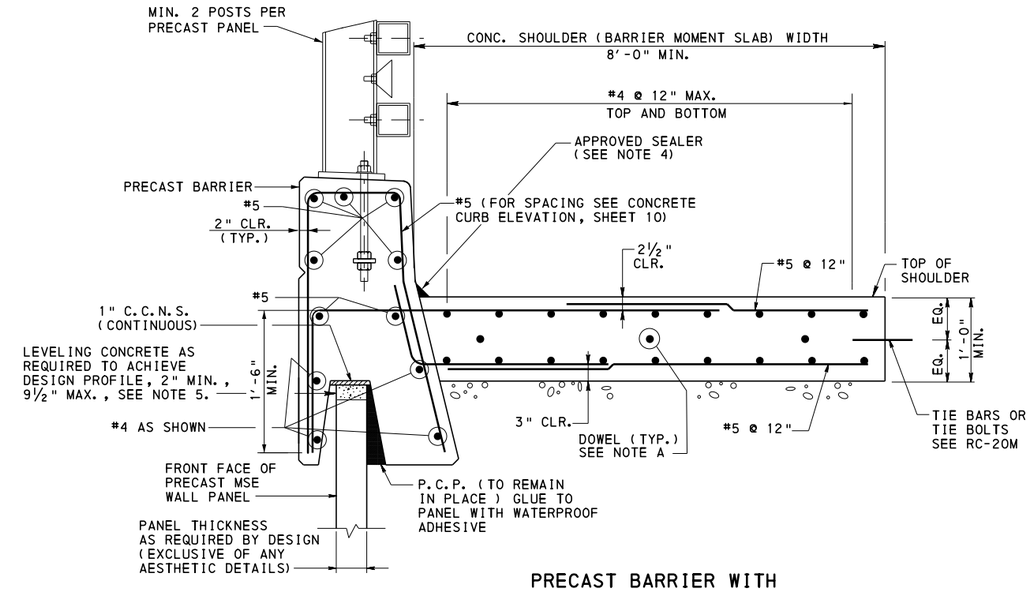
RECOMMENDED SEPT. 30, 2016
Brent D. Thompson
DIRECTOR, BUR. OF PROJECT DIRECTOR

SHEET 10 OF 12

BC-709M



PRECAST BARRIER WITH BITUMINOUS SHOULDER



PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER

NOTE A:

USE TYPE D OR E JOINT PER RC-20M. USE SAME JOINT AS PROVIDED IN PAVEMENT.

TRAFFIC BARRIER AND MOMENT SLAB NOTES:

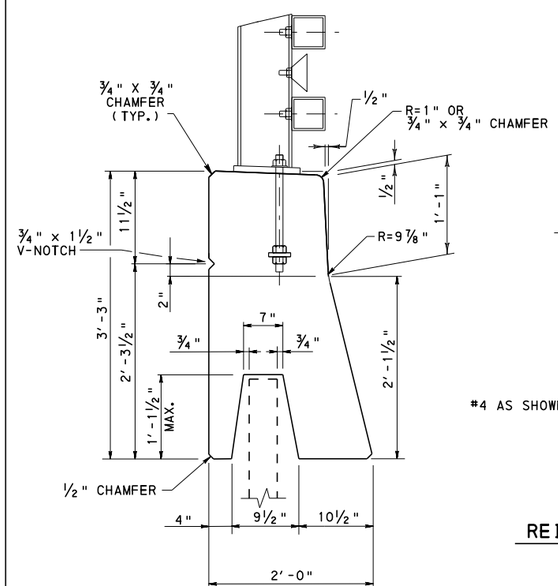
1. PLACE EXPANSION JOINTS IN CONCRETE CURB TO MATCH PAVEMENT JOINTS. DO NOT LOCATE THE CONCRETE CURB EXPANSION JOINT WITHIN 6'-0" FROM CENTERLINE OF LIGHT POLE OR 3'-6" FROM CENTERLINE OF JUNCTION BOX.
2. PROVIDE A MINIMUM PRECAST BARRIER LENGTH OF 10'-0".
3. PROVIDE SPECIAL DESIGN AND DETAILING OF THE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

NOTE:

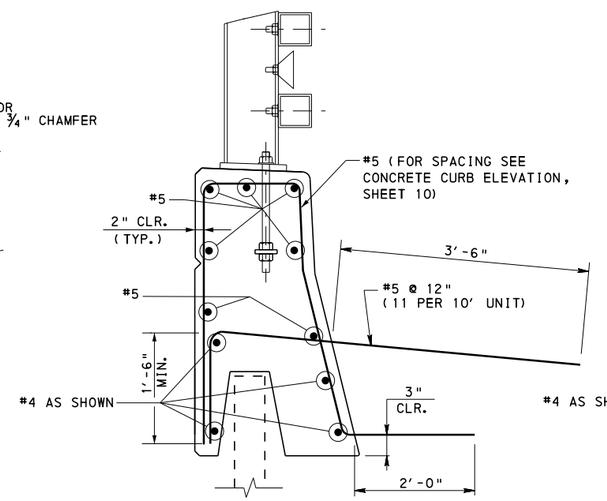
1. FOR NOTES, SEE SHEET 10.

LEGEND:

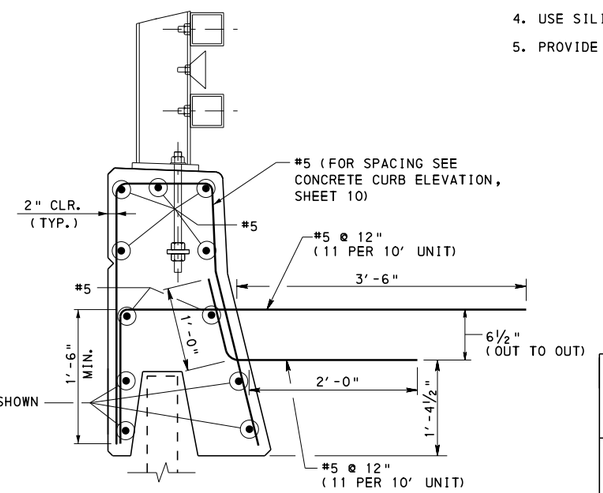
C.C.N.S. = CLOSED CELL NEOPRENE SPONGE
P.C.P. = PREFORMED CELLULAR POLYSTYRENE



DIMENSIONS



REINFORCEMENT FOR BARRIER WITH BITUMINOUS SHOULDER



REINFORCEMENT FOR BARRIER WITH CEMENT CONCRETE SHOULDER

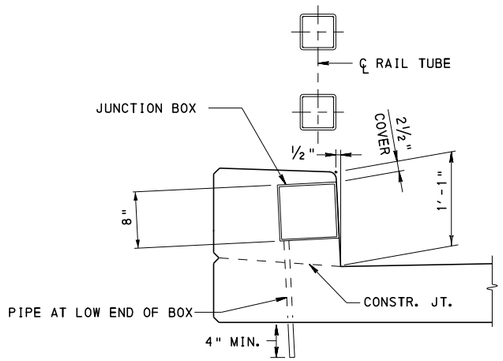
PA TYPE 10M PRECAST BARRIER ON M.S.E. WALLS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

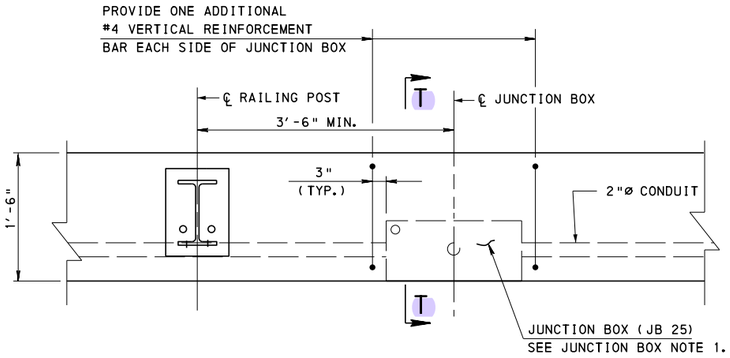
STANDARD

PA TYPE 10M BRIDGE BARRIER MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 11 OF 12
Thomas P Macioce CHIEF BRIDGE ENGINEER	Brian D. Thompson DIRECTOR, BUR. OF PROJECT DIRECTOR	BC-709M



SECTION T-T

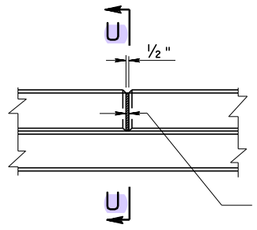


PLAN
(RAIL TUBE NOT SHOWN)

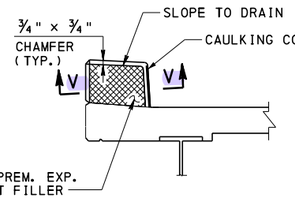
JUNCTION BOX NOTES:

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 SIDEWALK RAIL, PLACE JUNCTION BOX ON SIDEWALK SIDE.
4. FOR RAISED SIDEWALK, PLACE JUNCTION BOX ON TOP, ADJACENT TO REAR FACE.

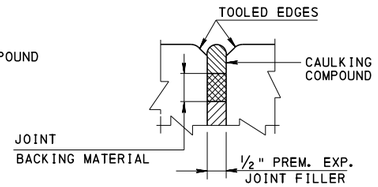
PA TYPE 10M BRIDGE BARRIER ALTERNATE JUNCTION BOX DETAIL



ELEVATION



SECTION U-U



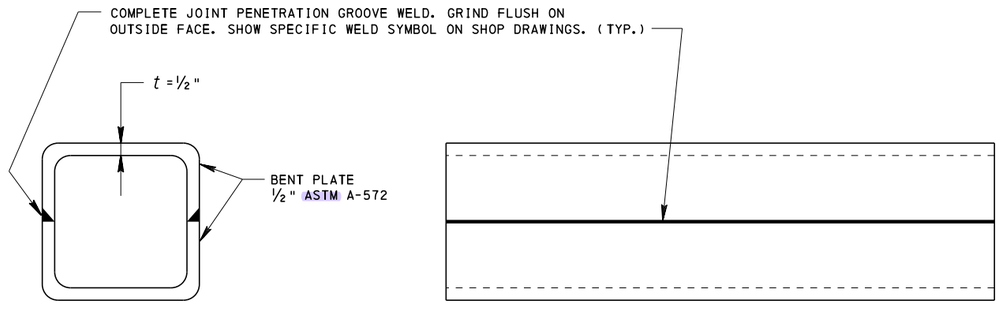
SECTION V-V

OPEN JOINT NOTES:

1. FOR LOCATION OF CONSTRUCTION JOINTS AND OPEN JOINTS, REFER TO DESIGN DRAWINGS.
2. PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH SECTION 705.8 (b) OF PUB. 408.
3. PROVIDE JOINT BACKING MATERIAL IN ACCORDANCE WITH SECTION 705.9 OF PUB. 408.
4. PROVIDE PREMOLDED EXPANSION JOINT FILLER IN ACCORDANCE WITH SECTION 705.1 OF PUB. 408.
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

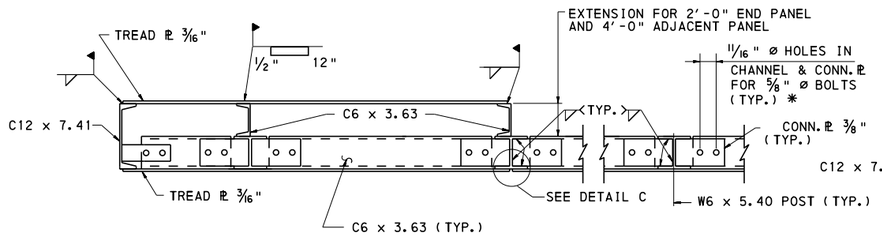
ALTERNATE
RAIL SPLICE SLEEVE

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

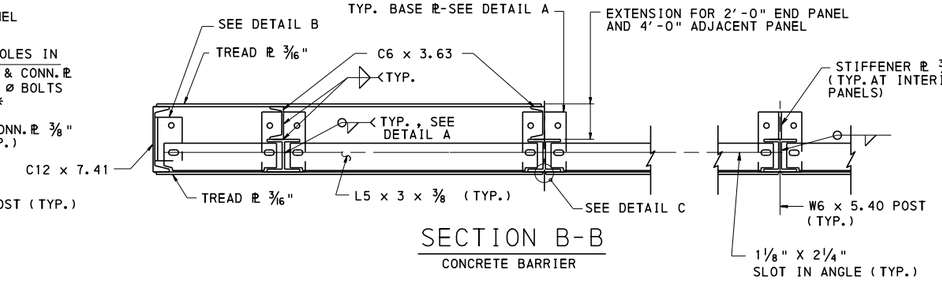
STANDARD

PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS

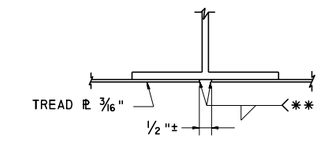
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian D Thompson DIRECTOR, BUR. OF PROJECT DIRECTOR	SHEET 12 OF 12 BC-709M



SECTION A-A

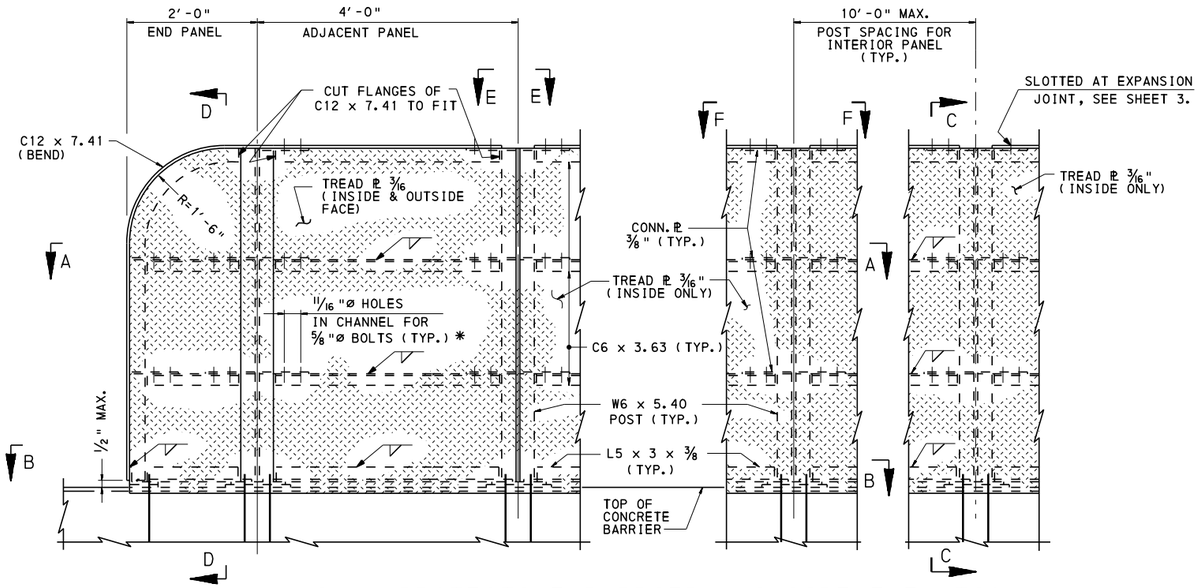


SECTION B-B
CONCRETE BARRIER

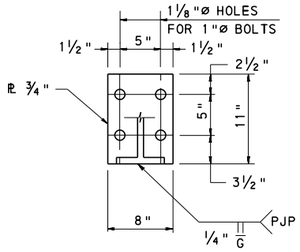


** OMIT WELDS IF TREAD PLATE IS MADE CONTINUOUS.

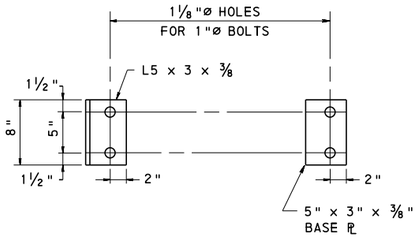
DETAIL C



ALUMINUM PROTECTIVE BARRIER - INSIDE ELEVATION



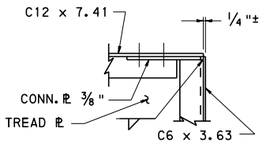
DETAIL A



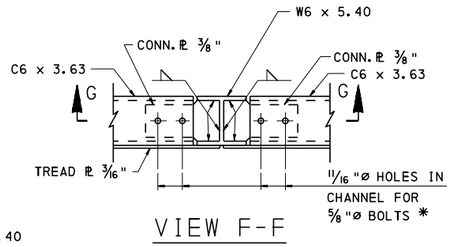
DETAIL B

NOTES:

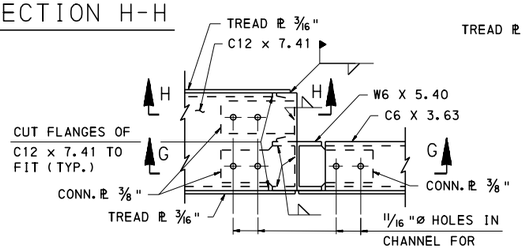
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. PLACE POSTS AND ANCHOR BOLTS TRULY VERTICAL. PLACE RAILS PARALLEL TO GRADE.
3. ALL MINIMUM SIZE OF FILLET WELDS 3/16".
4. FOR SPACING OF POSTS, LOCATION OF EXPANSION JOINTS AND OPEN JOINTS IN CONCRETE BARRIER, REFER TO DESIGN 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 MEETING THE REQUIREMENTS OF SECTION 705, PUBLICATION 408.
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.



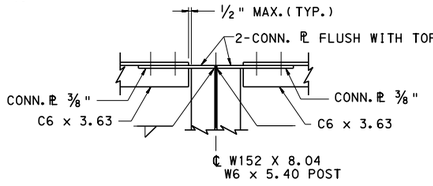
SECTION H-H



VIEW F-F



VIEW E-E



SECTION G-G

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

BC-739M	BRIDGE BARRIER TO GUIDE RAIL TRANSITION
BC-734M	ANCHOR SYSTEMS
BC-722M	LIGHTING POLE ANCHORAGE
BC-720M	ALUMINUM OR STEEL BRIDGE HAND RAILING

REFERENCE DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

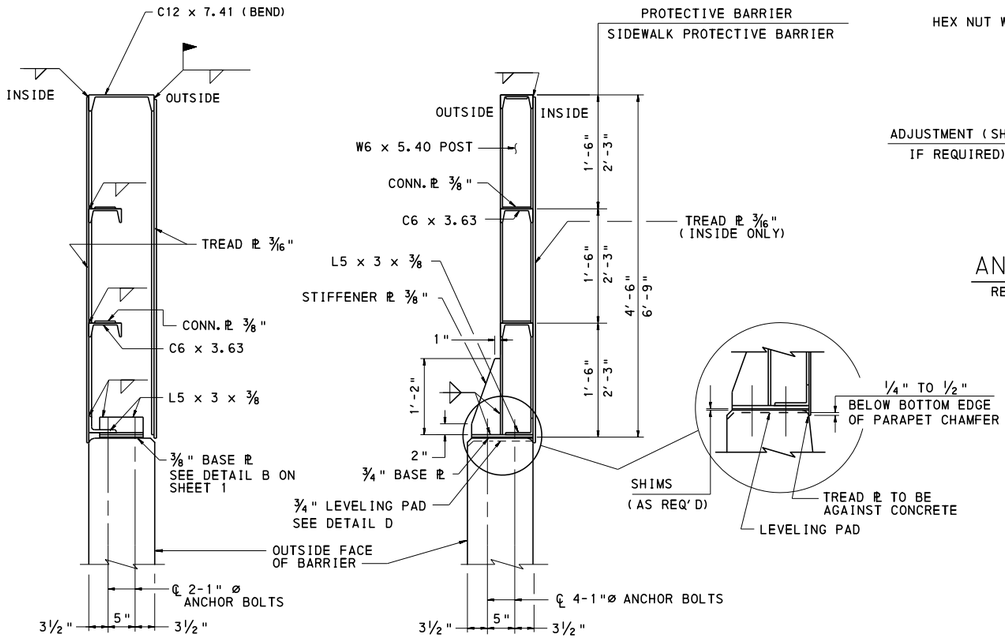
STANDARD ALUMINUM PROTECTIVE BARRIER

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brent D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 1 OF 4

BC-711M

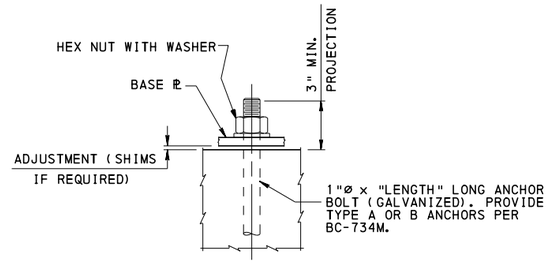


SECTION D-D

(SEE NOTE 6)

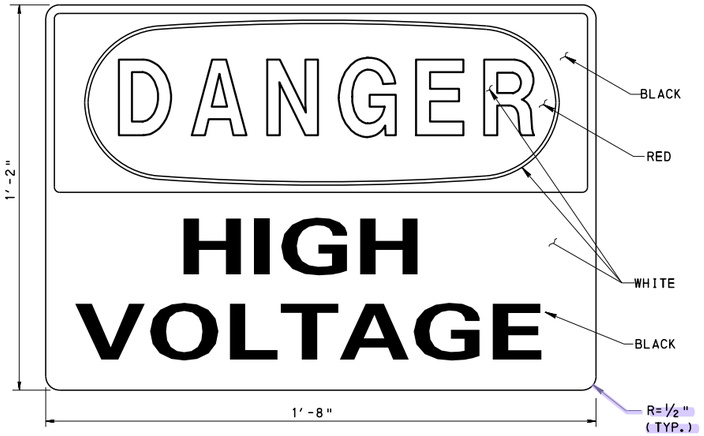
SECTION C-C

(SEE NOTE 6)

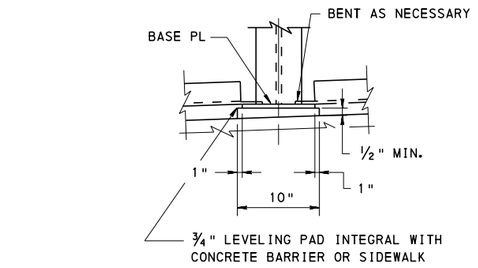


ANCHOR BOLT DETAIL

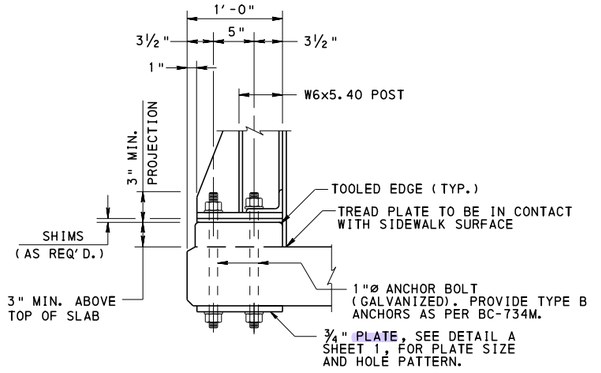
REVERSE DETAIL FOR BOTTOM SLAB



ACCIDENT PREVENTION SIGN



DETAIL D

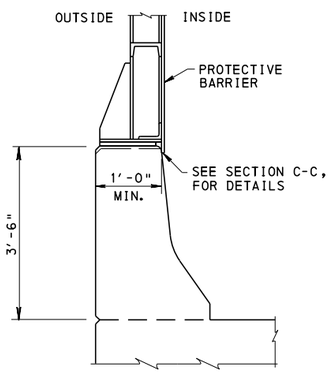


DETAIL E

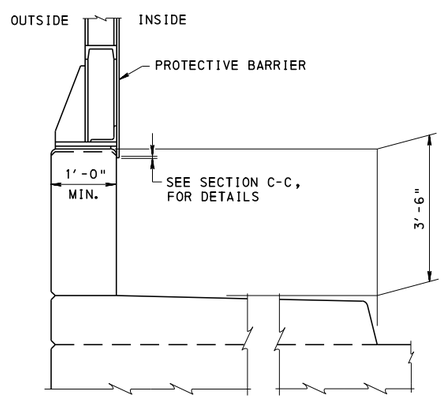
FOR CONVENTIONAL DECK

NOTES

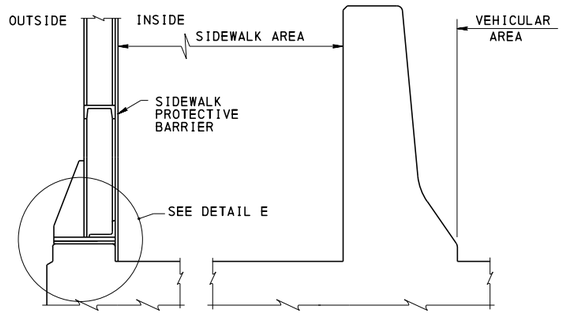
1. FABRICATE SIGN FROM ALUMINUM AND CONFORM TO SECTION 1103 OF PUBLICATION 408.
2. MOUNT SIGN WITH ALUMINUM BOLTS, NUTS, AND WASHERS WHICH CONFORM TO SECTION 1103 OF PUBLICATION 408.
3. MOUNT SIGNS AS SHOWN ON SHEET 4, AND DO NOT SPACE MORE THAN 50' APART.
4. SEE AMERICAN NATIONAL STANDARD SPECIFICATIONS FOR ACCIDENT PREVENTION SIGNS, ANSI Z535.1 THRU ANSI Z535.5.
5. REFER TO SHEET 1 FOR OTHER NOTES.
6. PROTECTIVE BARRIER CONNECTION DETAIL SHOWN FOR TYPICAL CONCRETE BARRIER SECTION, TYPICAL SIDEWALK SECTION AND ALTERNATE SIDEWALK SECTION. FOR ALTERNATE CONCRETE BARRIER (1'-1" TOP WIDTH) OR OTHER WIDER CONNECTION SURFACES HOLD INSIDE FACE FLUSH.
7. SEE SHEET 1 FOR LOCATION OF SECTION C-C AND SECTION D-D.



TYPICAL SLOPED BARRIER SECTION



ALTERNATE SIDEWALK SECTION

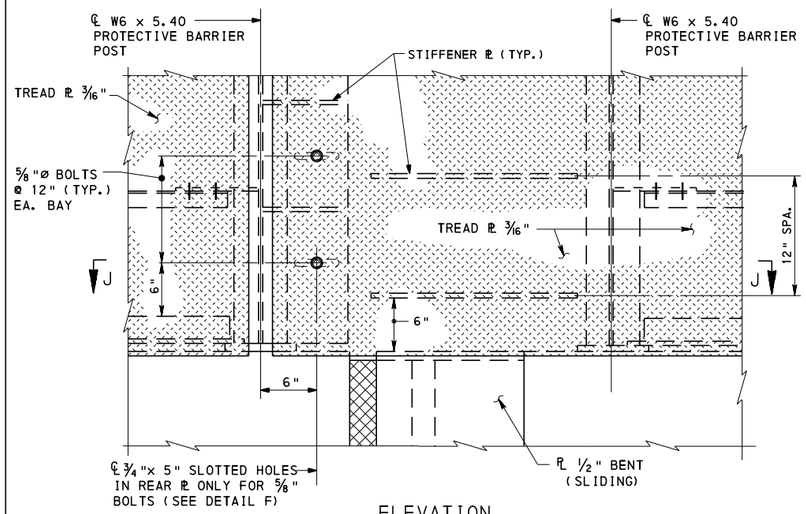


TYPICAL SIDEWALK SECTION

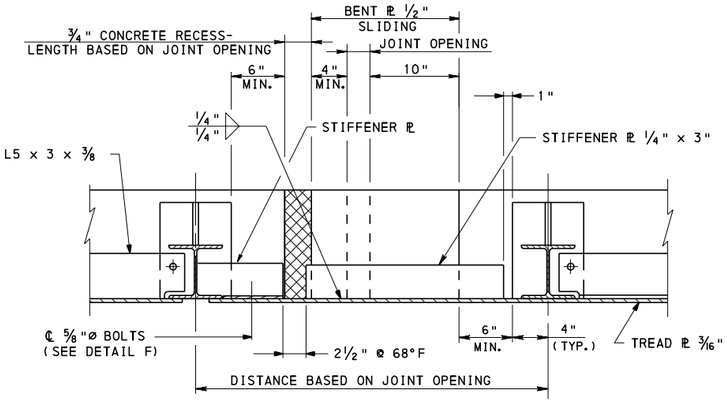
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD ALUMINUM PROTECTIVE BARRIER

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 4
Thomas P Macioce	Brian D Thompson	BC-711M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



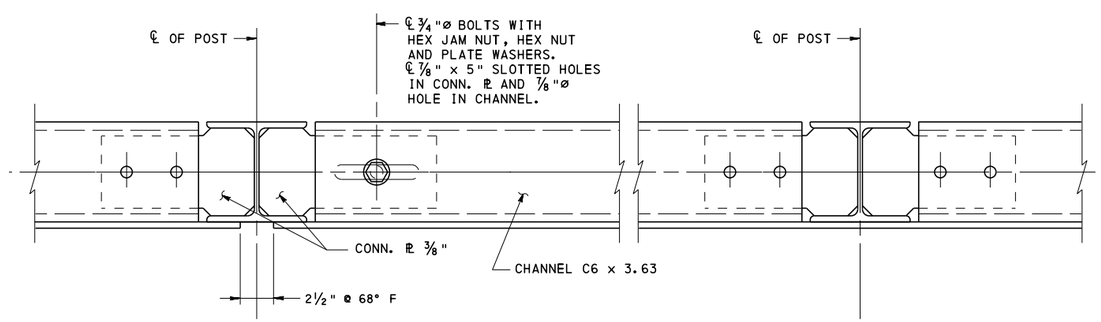
ELEVATION



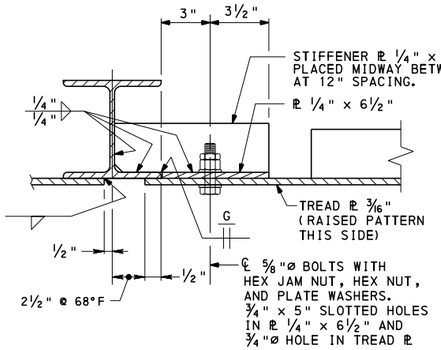
SECTION J-J

DETAIL OF EXPANSION JOINT AT PIERS

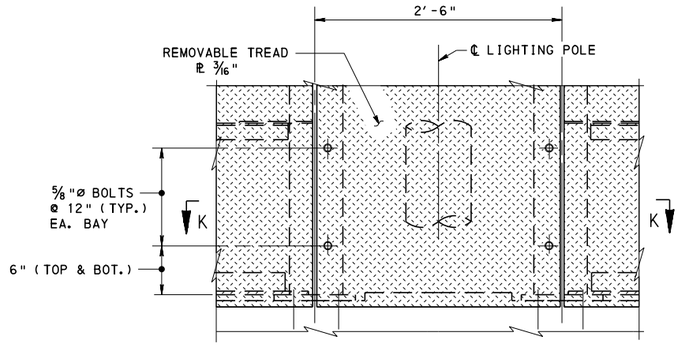
NOTE:
EXPANSION DETAILS, SLOTTED OPENINGS AND CLEARANCES SHOWN ARE FOR MOVEMENTS UP TO 2" EXPANSION OR 2" CONTRACTION. ADJUST ALL EXPANSION JOINT DETAILS SHOWN AND PROVIDE SPECIAL DETAILS AS REQUIRED FOR LARGER MOVEMENTS.



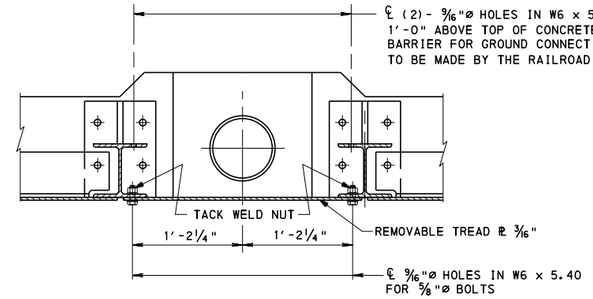
TOP OF BARRIER AT EXPANSION JOINT



DETAIL F



ELEVATION



SECTION K-K

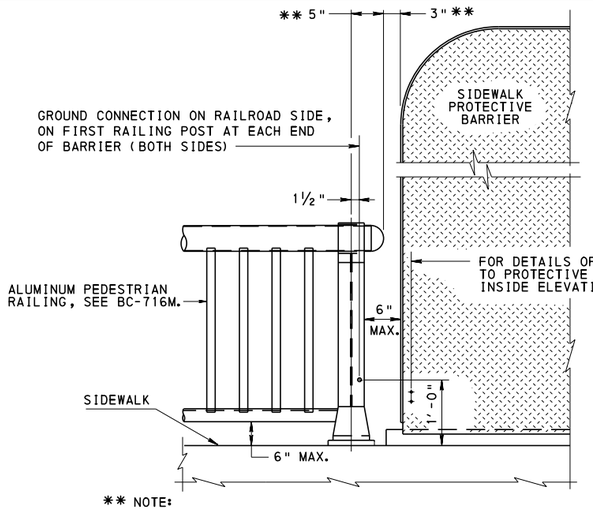
DETAIL AT LIGHTING POLE

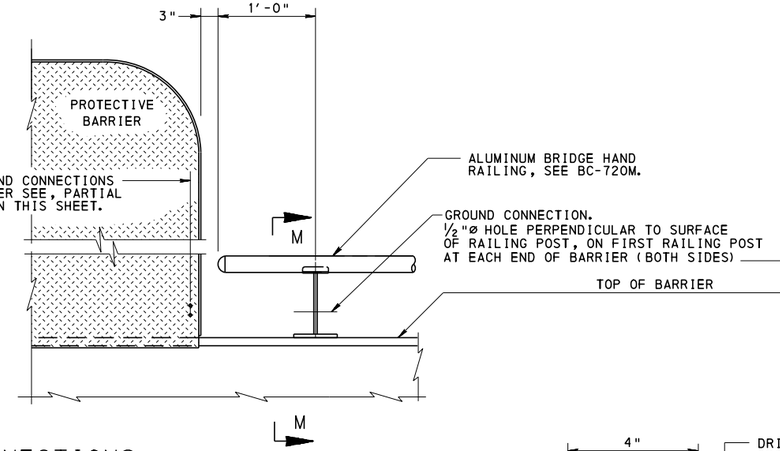
(FOR LIGHTING POLE ANCHORAGE DETAILS, REFER TO BC-722M)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

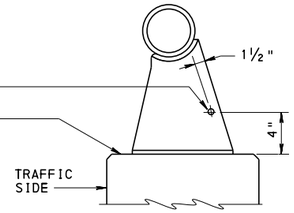
STANDARD ALUMINUM PROTECTIVE BARRIER

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 4
Thomas P Macioce	Brian D Thompson	BC-711M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

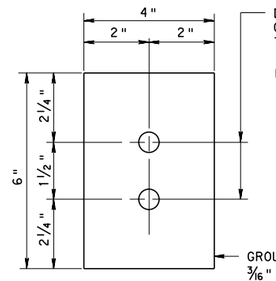




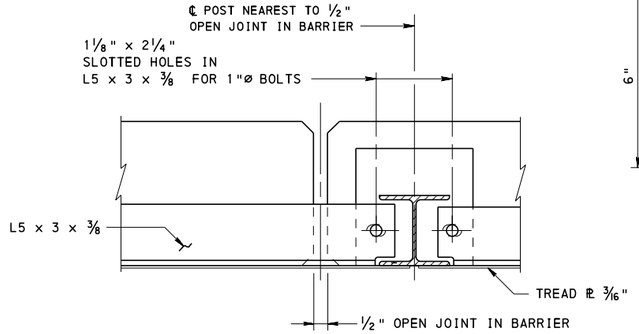
GROUND CONNECTIONS



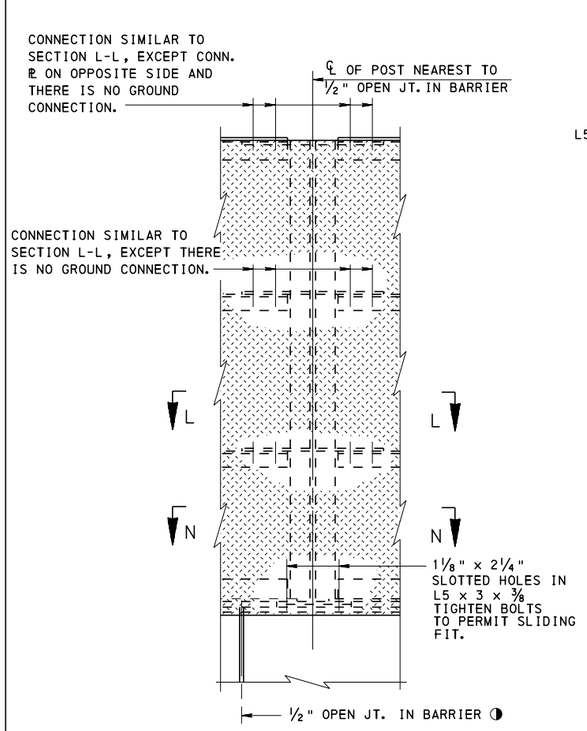
SECTION M-M



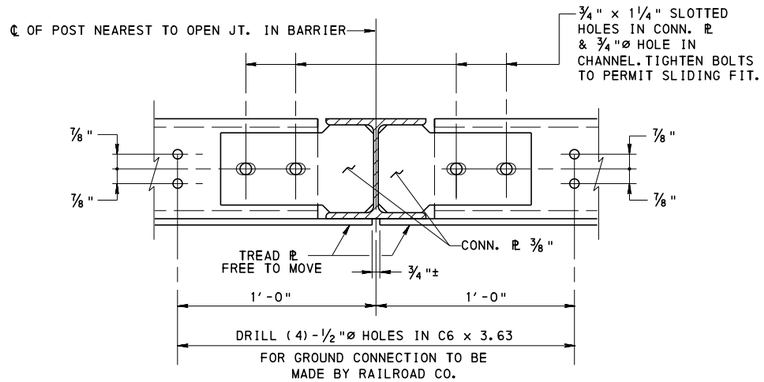
DETAIL G



SECTION N-N



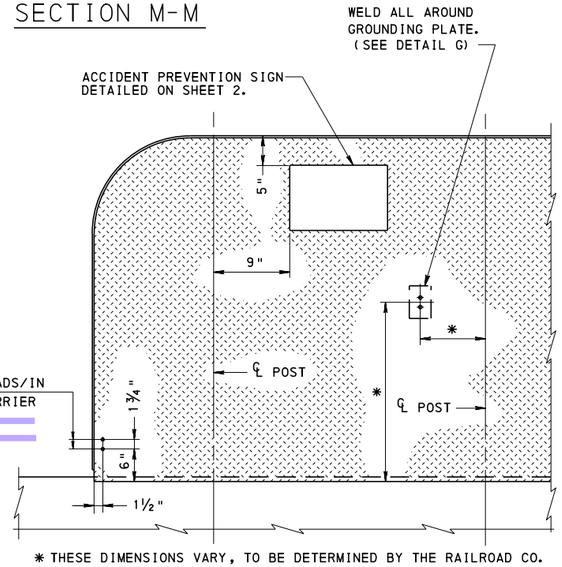
ELEVATION



SECTION L-L

PROTECTIVE BARRIER DETAIL AT OPEN JOINT IN BARRIER

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



* THESE DIMENSIONS VARY, TO BE DETERMINED BY THE RAILROAD CO.

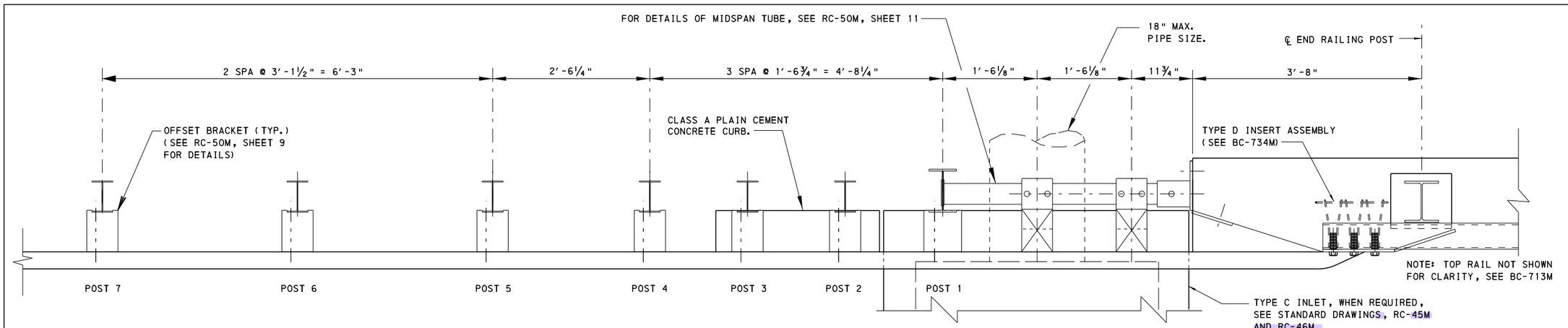
PARTIAL INSIDE ELEVATION

(TYPICAL FOR BARRIER ENDS)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

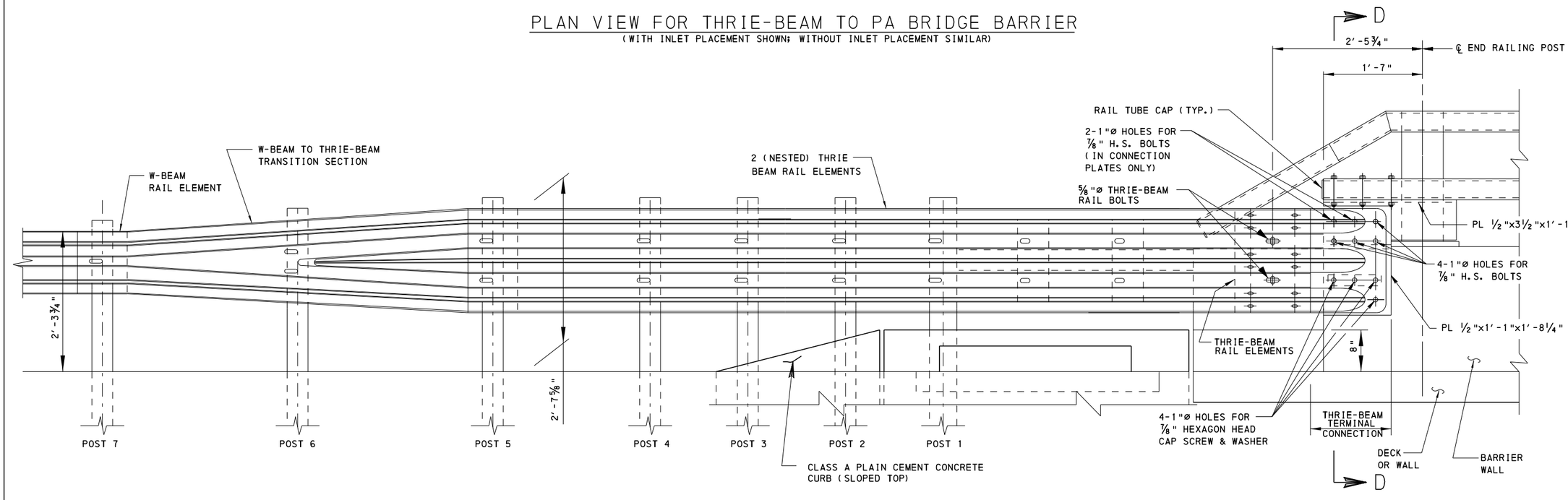
STANDARD ALUMINUM PROTECTIVE BARRIER

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 4 OF 4
Thomas P Macioce	Brent D Thompson	BC-711M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



PLAN VIEW FOR THRIE-BEAM TO PA BRIDGE BARRIER

(WITH INLET PLACEMENT SHOWN; WITHOUT INLET PLACEMENT SIMILAR)



ELEVATION VIEW FOR THRIE-BEAM TO PA BRIDGE BARRIER

(WITH INLET PLACEMENT SHOWN; WITHOUT INLET PLACEMENT SIMILAR)

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408.
2. USE PLAN DIMENSIONS WHEN DIFFERENT FROM THOSE SHOWN ON THIS STANDARD.
3. REINFORCED CONCRETE BARRIER AND EMBEDDED INSERTS ARE BRIDGE ITEMS.
4. SEE RC-52M AND RC-50M FOR DETAILS AND HARDWARE NOT SHOWN.
5. THRIE-BEAM TO PA BRIDGE BARRIER TRANSITION HAS BEEN ACCEPTED BY FHWA AS A TL-4 BARRIER DESIGN.
6. PROVIDE APPROACH END GUIDE RAIL TREATMENT AT BOTH THE APPROACH AND TRAILING ENDS OF STRUCTURE BARRIERS ON TWO LANE FACILITIES WITH TWO-WAY TRAFFIC. ON FOUR LANE DIVIDED HIGHWAYS, GUIDE RAIL TRANSITION IS NOT REQUIRED ON TRAILING ENDS OF BARRIERS UNLESS WARRANTED BY OTHER OBSTRUCTIONS.
7. THE APPROACH END TRANSITION COMPONENTS ARE ROADWAY ITEMS.
8. FOR SECTION D-D, SEE SHEET 2.

BC-734M	ANCHOR SYSTEMS
BC-713M	PA BRIDGE BARRIER
RC-45M	INLET TOPS, GRATES AND FRAMES
RC-50M	GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS
RC-52M	TYPE 2 STRONG POST GUIDE RAIL

REFERENCE DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

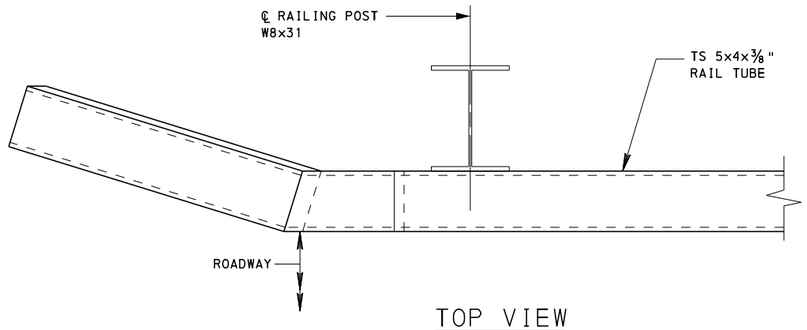
THRIE-BEAM TO PA BRIDGE BARRIER TRANSITION CONNECTION

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brian B Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

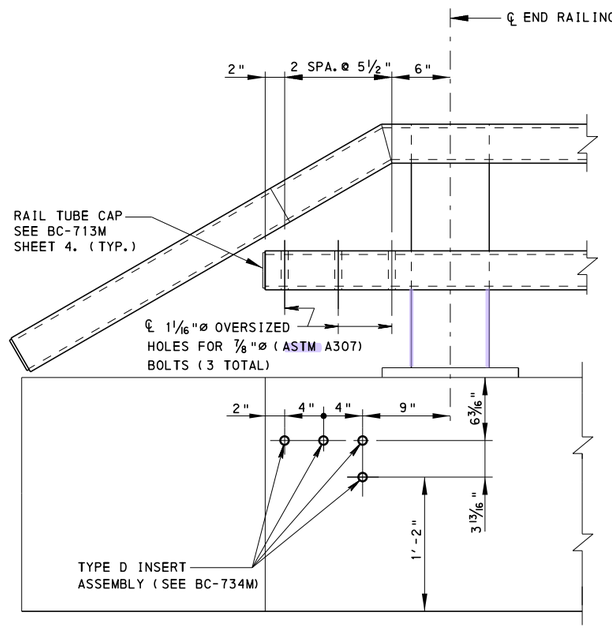
SHEET 1 OF 2

BC-712M



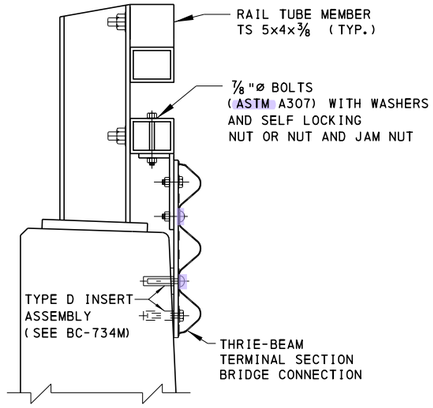
TOP VIEW

(CONCRETE BARRIER WALL NOT SHOWN)



END OF RAIL DETAIL

(CONNECTION PLATES NOT SHOWN, SEE RC-50M FOR DETAILS)



SECTION D-D

NOTES:

1. FOR LOCATION OF SECTION D-D, SEE SHEET 1.
2. FOR ADDITIONAL DETAILS, SEE RC-50M.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

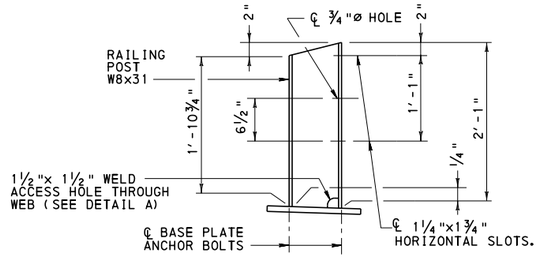
THRIE-BEAM TO PA BRIDGE BARRIER TRANSITION CONNECTION

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 2
Thomas P. Macioce	Brent D. Thompson	BC-712M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

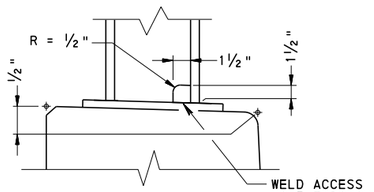
NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. PROVIDE RAILING TUBES IN ACCORDANCE WITH ASTM A 500 GRADE B.
3. PROVIDE RAILING POSTS AND BASE PLATES IN ACCORDANCE WITH AASHTO ASTM A 709 GRADE 50 OR 50W KSI.
4. ALL RAILING COMPONENTS SHALL BE GALVANIZED (AFTER FABRICATION) IN ACCORDANCE WITH SECTION 1105.02(s), PUBLICATION 408 UNLESS OTHERWISE SHOWN ON THE PLANS. GALVANIZE POSTS, ANCHOR BARS AND SPLICE SLEEVES IN ACCORDANCE WITH ASTM A 123. GALVANIZE RAIL TUBES IN ACCORDANCE WITH ASTM A 123, EXCEPT COATING ON THREADED STUDS AND NUTS USED WITH THE STUDS SHALL MEET THE REQUIREMENTS OF ASTM A 153 FOR CLASS C MATERIAL. GALVANIZE ALL ANCHOR HARDWARE IN ACCORDANCE WITH ASTM A 153 OR ASTM B 695.
5. THE RAILING TUBES ARE SHOP BENT OR FABRICATED TO FIT HORIZONTAL CURVE.
6. 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" MAX TWIST IN THE FIRST 3 FEET AND IN EACH ADDITIONAL 3 FOOT.

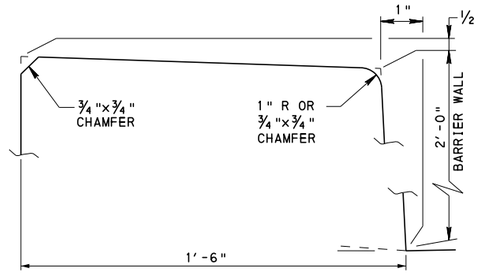
   NOTE - TWIST IS MEASURED BY HOLDING DOWN ONE END OF SQUARE OR RECTANGULAR TUBE ON A FLAT SURFACE PLATE WITH THE BOTTOM SIDE OF THE TUBE PARALLEL TO THE SURFACE PLATE AND NOTING THE HEIGHT DIFFERENCE BETWEEN THE TWO CORNERS AT THE OPPOSITE END OF THE BOTTOM SIDE OF THE TUBE.
7. MILL TO BEAR IS DEFINED AS FOLLOWS:
   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.
8. ALL WELDING SHALL CONFORM TO THE PROVISIONS OF AASHTO/AWS BRIDGE WELDING CODE D1.5-2002, EXCEPT USE AASHTO/AWS BRIDGE WELDING CODE D1.1-2002 FOR WELDING NOT COVERED IN D1.5-2002.
9. FOR BARRIER RAIL TO POST CONNECTION AND SIDEWALK RAIL CONNECTION, USE AUTOMATIC WELDED THREADED ANCHOR STUDS MEETING THE REQUIREMENTS OF ASTM A 108. USE HEX NUTS MEETING THE REQUIREMENTS OF ASTM A 563. USE A 3/16" THICK PLATE LOCK WASHER ON EACH STUD AND A 3/8" THICK PLATE ASTM A 709, GRADE 36 KSI WASHER. U-WASHERS SHALL MEET THE REQUIREMENTS OF ASTM A 709, GRADE 36 KSI STEEL.
10. FOR ANCHOR BOLTS, USE 1 1/8" DIA BOLTS CONFORMING TO THE REQUIREMENTS OF ASTM F 1554, GRADE 105 KSI, INCLUDING THE SUPPLEMENTARY REQUIREMENT, S5, FOR CHARPY IMPACT STRENGTH. USE ASTM A 563, GRADE DH HEAVY HEX NUTS. USE ONE ASTM F 436, 2 1/4" O.D. CLIPPED WASHER AT THE TOP OR ALTERNATIVELY USE A RECTANGULAR 3/8"x2"x3", ASTM A 709, GRADE 36 KSI WASHER WITH 1 5/16" DIA HOLE. FOR ANCHOR BARS USE ASTM A 709, GRADE 36 KSI STEEL.
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. 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.
12. IF FLAME CUTTING OR PLASMA CUTTING IS USED TO CREATE SLOTTED HOLES, GRIND SMOOTH TO PROVIDE VERTICAL AND FLAT SURFACES ALONG THE HOLE.
13. 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 7/8" TO MEET THIS TOLERANCE.
14. FOR RAIL TUBE SPLICE DETAILS, SEE SHEET 2.
15. FOR POST TO BASE PLATE WELDING DETAILS, SEE SHEET 2.
16. 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 POSTS.
17. ONE OR MORE 7'-6" MAX. POST SPACINGS MAY BE REDUCED TO 4'-0" MIN. IN ORDER TO MAINTAIN APPROPRIATE SPACING DIMENSIONS FROM THE END OF THE RAIL, EXPANSION JOINTS AND DRAINAGE SCUPPERS.
18. FOR ANCHOR BAR, DELINEATOR, ANCHOR STUD, U-WASHER AND RAIL-TO-POST DETAILS, SEE SHEET 5.
19. 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.
20. PROVIDE RAIL TUBES CONTINUOUS OVER NOT LESS THAN THREE RAILING POSTS. NO WELDED BUTT SPLICES WILL BE ALLOWED IN THE RAIL TUBE SECTIONS.
21. PLACE POST AND POST ANCHOR BOLTS NORMAL TO GRADE AND RAILS PARALLEL TO GRADE.
22. 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 MEETING THE REQUIREMENTS OF SECTION 705.8, PUBLICATION 408.



POST DETAIL

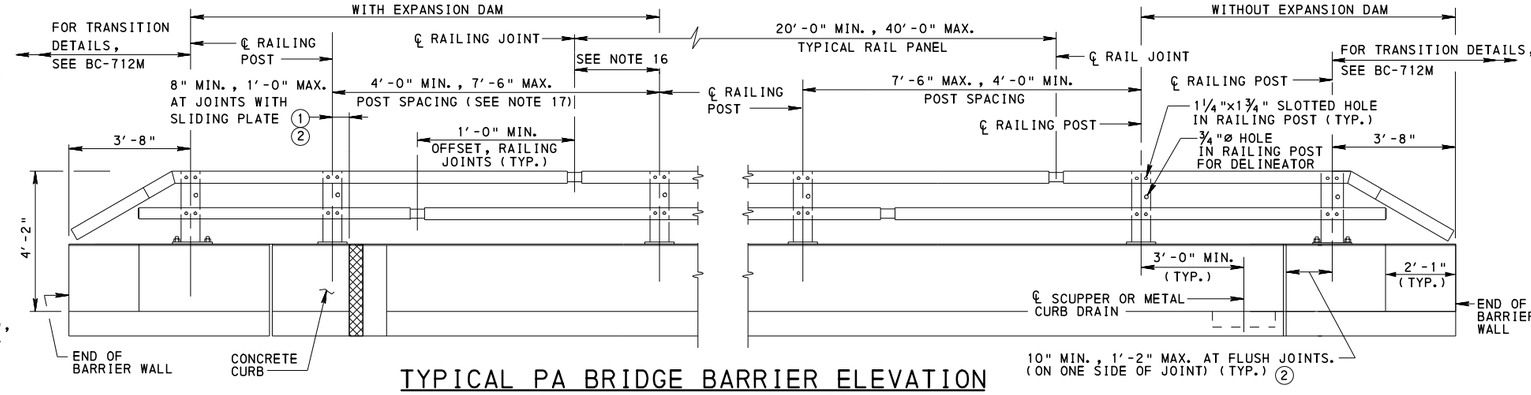


DETAIL A



BARRIER WALL GEOMETRY DETAIL

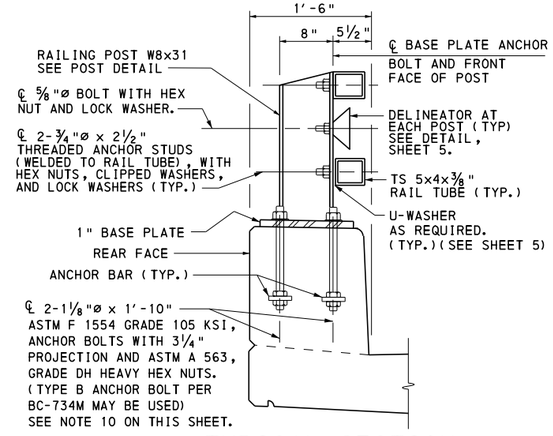
(BASE PLATE AND ANCHOR BOLTS NOT SHOWN FOR CLARITY)



TYPICAL PA BRIDGE BARRIER ELEVATION

(WITHOUT INLET PLACEMENT SHOWN; WITH INLET PLACEMENT SIMILAR)

1. ℄ RAILING POST TO EDGE OF RECESS IN CONCRETE (SHOWN) OR ℄ RAILING POST TO EDGE OF FIXED END OF SLIDING PLATE
2. NO POST REQUIRED ADJACENT TO FLUSH JOINTS AT WINGWALL. IF POSTS LOCATED AT EXPANSION JOINT



TYPICAL SECTION

BC-711M	ALUMINUM PROTECTIVE BARRIER
BC-712M	THRIE-BEAM TO PA BRIDGE BARRIER TRANSITION CONNECTION
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

REFERENCE DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

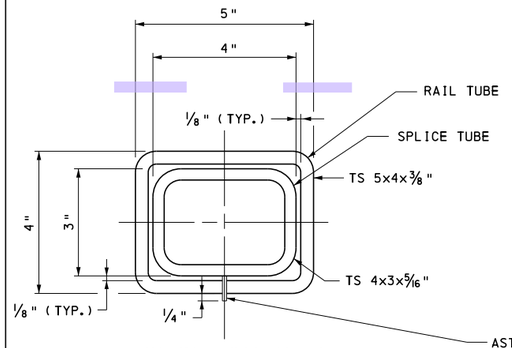
PA BRIDGE BARRIER MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

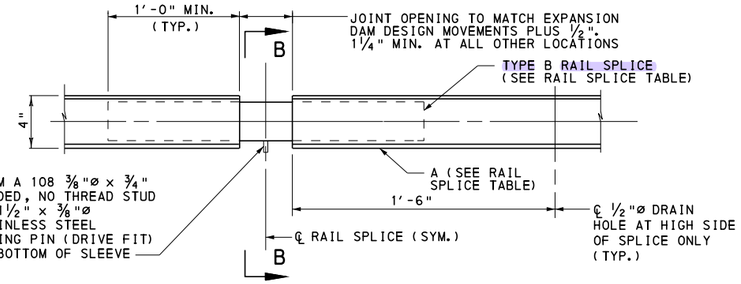
RECOMMENDED SEPT. 30, 2016
Brian B Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 1 OF 13

BC-713M

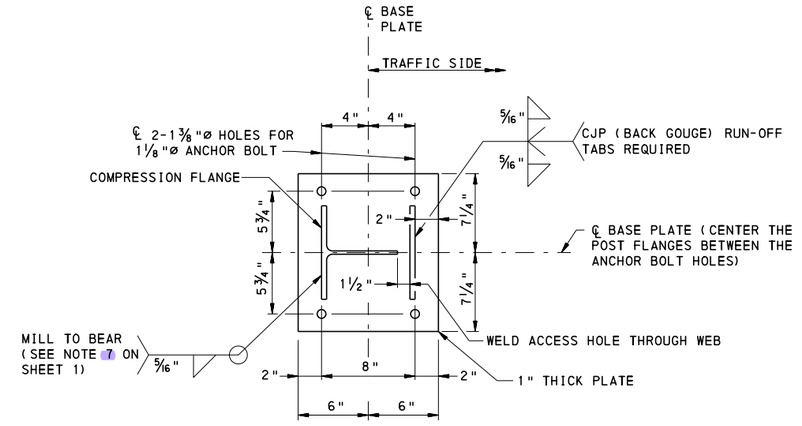


SECTION B-B



DETAIL B
RAIL SPLICE

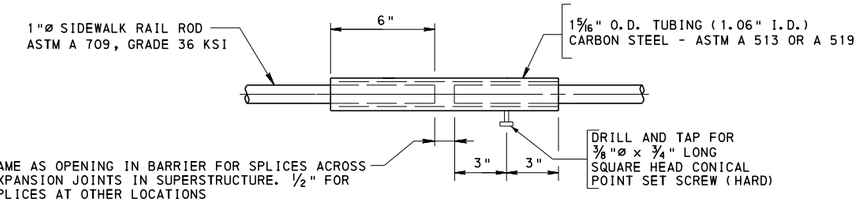
TS 5x4x⅜ RAIL SPLICE SHOWN;
TS 2x2x¼ RAIL SPLICE SIMILAR



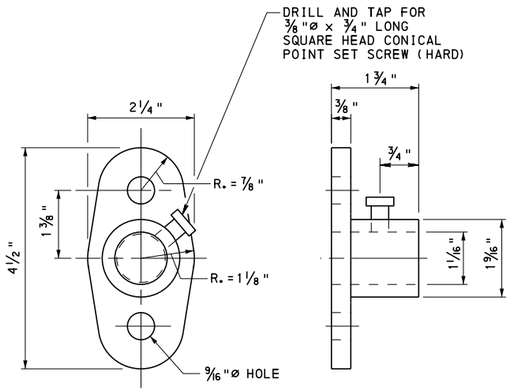
DETAIL C
POST TO BASE PLATE WELD

RAIL SPLICE TABLE		
TYPE	A (RAIL TUBE)	B (SPLICE TUBE)
MAIN RAIL	TS 5x4x⅜"	TS 4x3x5⁄16"
SIDEWALK RAIL	TS 2x2x¼"	1¼"x1¼" ROD, 36 KSI

NOTE: FOR SIDEWALK RAIL DETAILS, SEE SHEET 3.

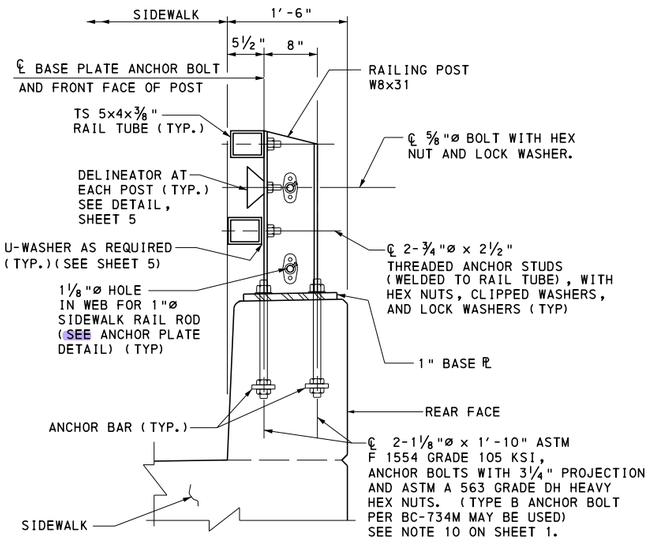


SIDEWALK RAIL ROD SPLICE

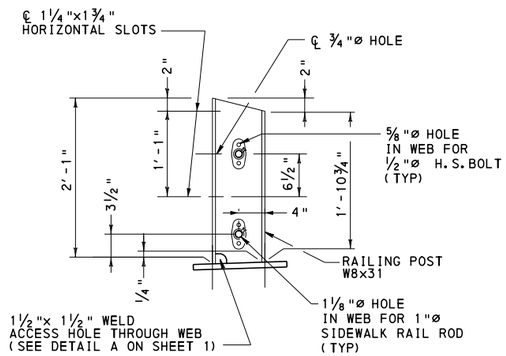


FRONT SIDE

SIDEWALK RAIL ROD ANCHOR PLATE DETAIL



ALTERNATE BARRIER SECTION



ALTERNATE POST DETAIL
(AT ALTERNATE SIDEWALK)

ALTERNATE SIDEWALK RAIL

NOTES:

1. SEE SHEET 1 FOR NOTES.
2. IN LIEU OF FABRICATED ANCHOR PLATE, USE CAST OR OTHER TYPE OF ANCHOR PLATE SUBJECT TO SHOP DRAWING APPROVAL.

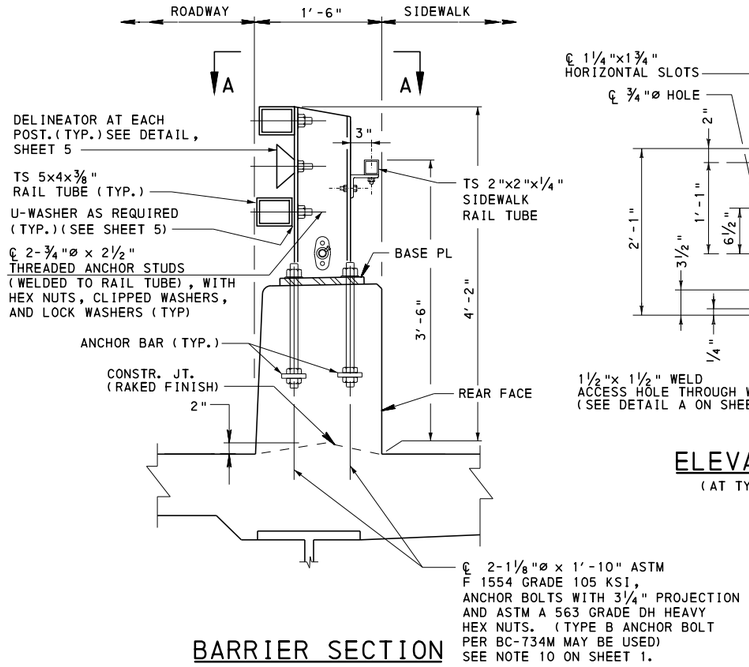
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

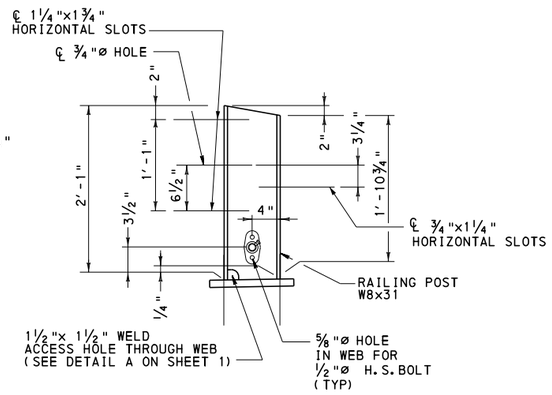
PA BRIDGE BARRIER

MISCELLANEOUS RAILING DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 13
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-713M



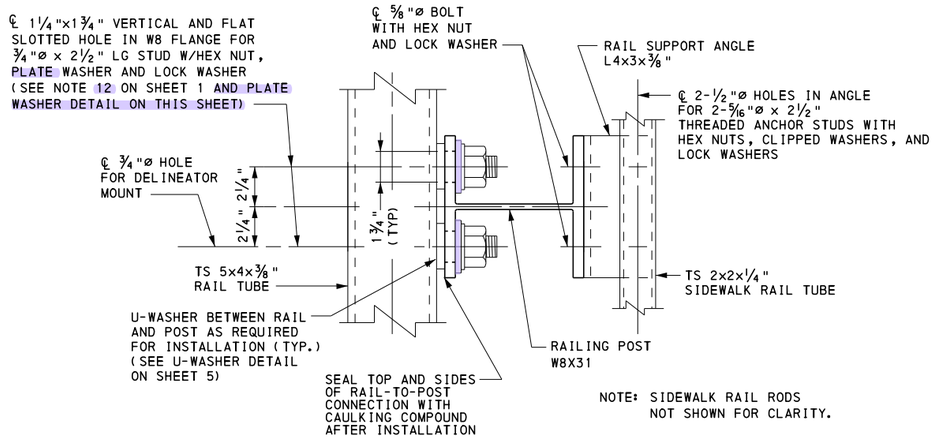
BARRIER SECTION



ELEVATION-POST

(AT TYPICAL SIDEWALK)

TYPICAL SIDEWALK RAIL



SECTION A-A

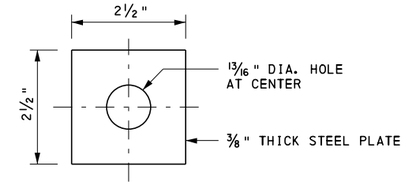
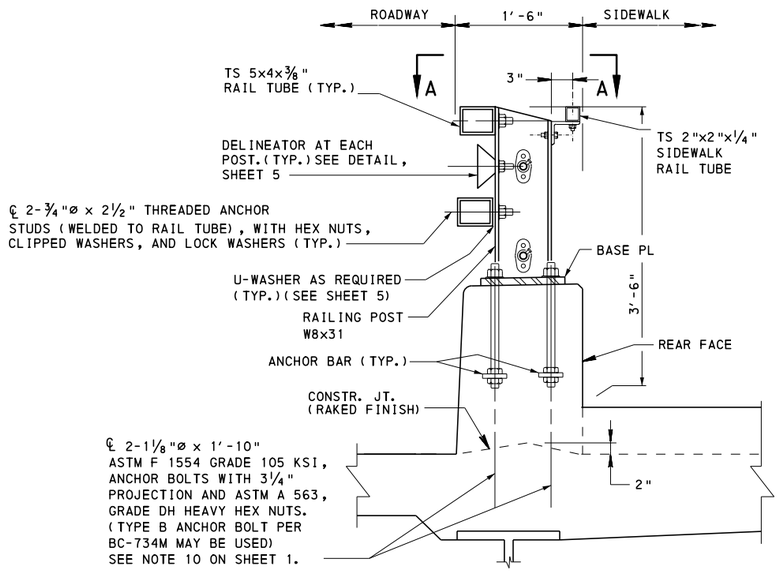
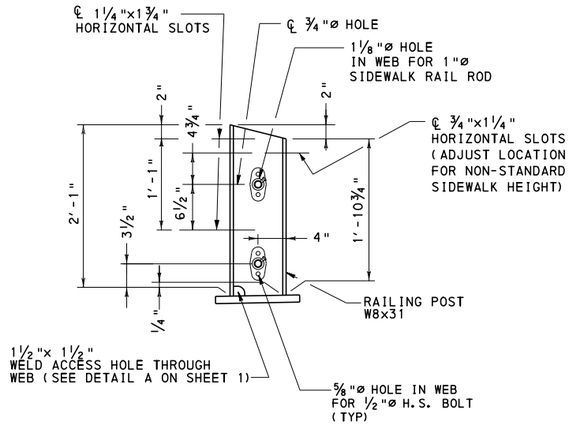


PLATE WASHER DETAIL



BARRIER SECTION



ELEVATION-POST

(AT RAISED 8" SIDEWALK)

RAISED SIDEWALK RAIL

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. PROVIDE RAILING TUBES IN ACCORDANCE WITH ASTM A 500 GRADE B.
3. PROVIDE RAILING POSTS AND BASE PLATES IN ACCORDANCE WITH AASHTO ASTM A 709 GRADE 50 OR 50S KSI.
4. ALL RAILING COMPONENTS SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1105.02(s), PUBLICATION 408 UNLESS OTHERWISE SHOWN ON THE PLANS.
5. THE RAILING TUBES ARE SHOP BENT OR FABRICATED TO FIT HORIZONTAL CURVE.
6. FOR SIDEWALK RAIL TUBE SPLICE DETAILS, SEE SHEET 2.
7. FOR ADDITIONAL NOTES, SEE SHEET 1.
8. FOR WELDING DETAILS, SEE SHEET 2.
9. FOR ANCHOR STUD DETAILS, SEE SHEET 5.

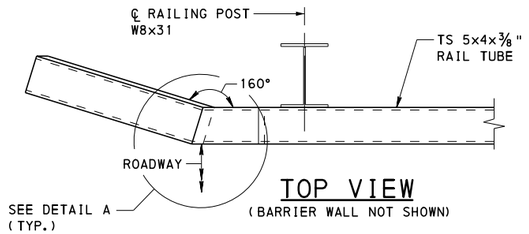
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

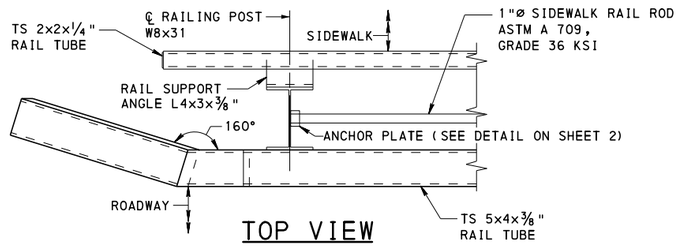
PA BRIDGE BARRIER

MISCELLANEOUS RAILING DETAILS

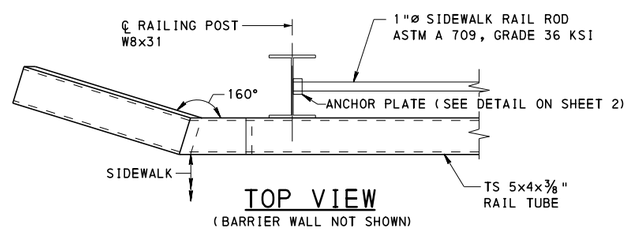
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 13
Thomas P. Macioce	Brent D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-713M



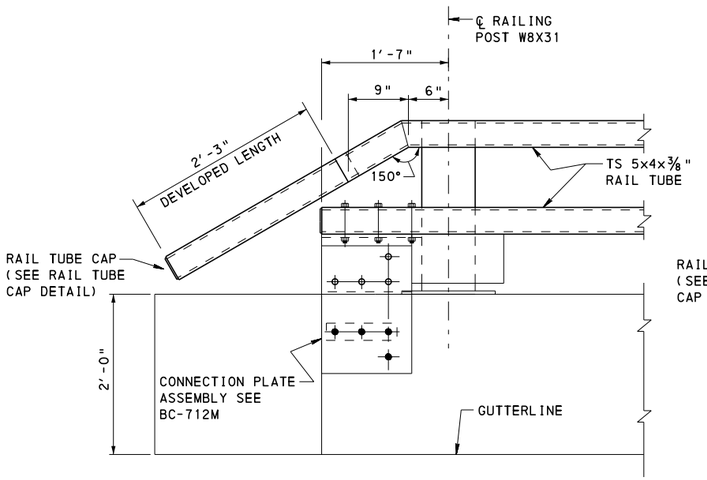
TOP VIEW
(BARRIER WALL NOT SHOWN)



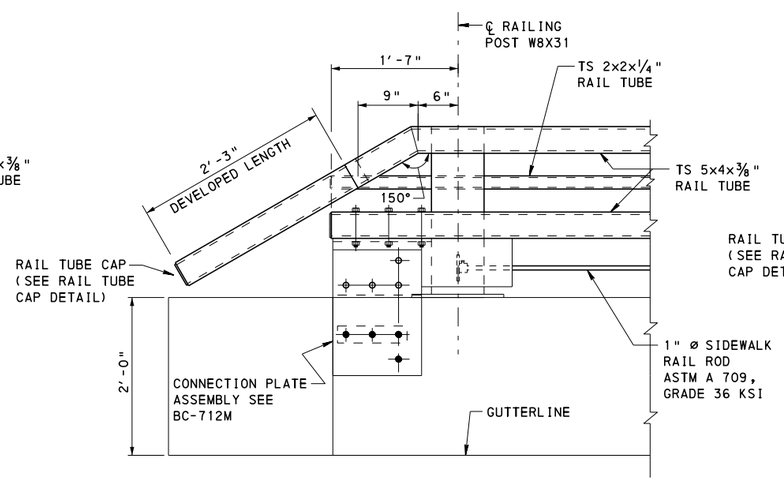
TOP VIEW
(BARRIER WALL NOT SHOWN)



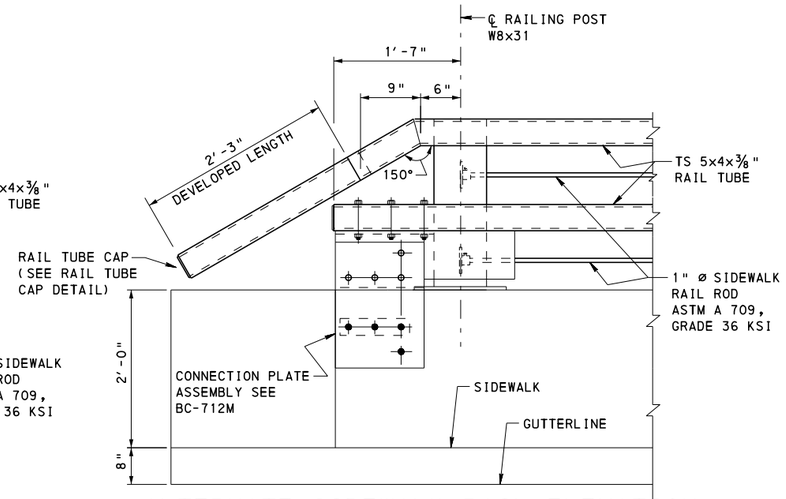
TOP VIEW
(BARRIER WALL NOT SHOWN)



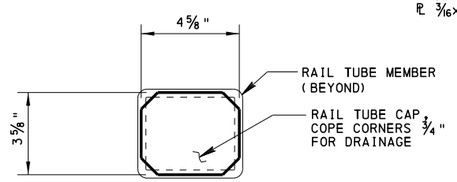
TYPICAL RAIL ELEVATION
(FOR SECTION VIEW, SEE SHEET 1)
(ANCHOR BOLTS OMITTED FOR CLARITY)
(WITHOUT INLET SHOWN; WITH INLET SIMILAR)
(FOR CHORD ANGLES SEE ALTERNATE SIDEWALK RAIL ELEVATION)



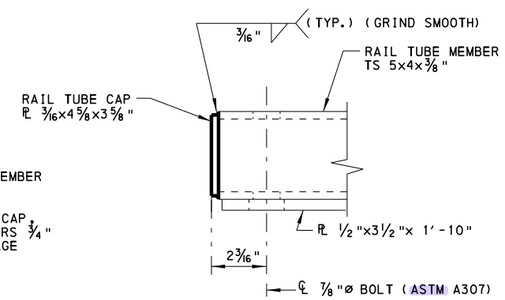
TYPICAL SIDEWALK RAIL ELEVATION
(FOR SECTION VIEW, SEE SHEET 3)
(ANCHOR BOLTS OMITTED FOR CLARITY)
(WITHOUT INLET SHOWN; WITH INLET SIMILAR)
(FOR CHORD ANGLES SEE ALTERNATE SIDEWALK RAIL ELEVATION)



ALTERNATE SIDEWALK RAIL ELEVATION
(FOR SECTION VIEW, SEE SHEET 1)
(ANCHOR BOLTS OMITTED FOR CLARITY)
(WITHOUT INLET SHOWN; WITH INLET SIMILAR)



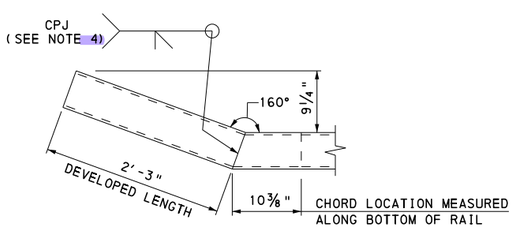
END VIEW



ELEVATION VIEW
BOTTOM RAIL TUBE MEMBER SHOWN,
TOP RAIL TUBE SIMILAR BUT WITHOUT
BOLT AND PL 1/2"x3 1/2"x1'-10"

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

RAIL TUBE CAP DETAIL



DETAIL A
(TOP RAIL ONLY)

NOTES:

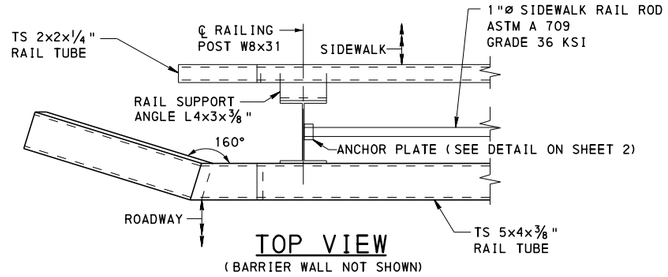
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. FOR THRIE-BEAM RAIL TO PA BRIDGE BARRIER TRANSITION CONNECTION, SEE BC-712M AND RC-50M.
3. FOR ADDITIONAL NOTES, SEE SHEET 1.
4. COMPLETE JOINT PENETRATION GROOVE WELD. GRIND FLUSH ON OUTSIDE FACE. SHOW SPECIFIC WELD SYMBOL ON SHOP DRAWINGS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

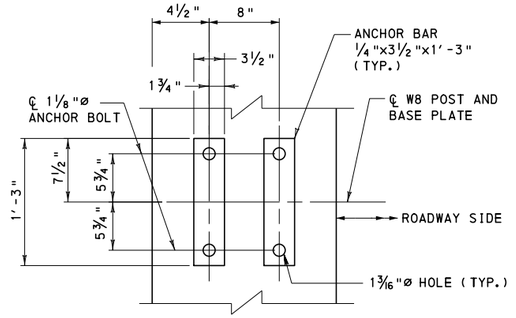
STANDARD

PA BRIDGE BARRIER
END OF RAIL DETAILS

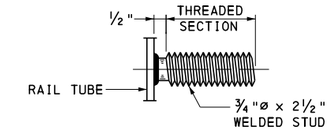
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 4 OF 13
Thomas P Macioce	Brent D Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-713M



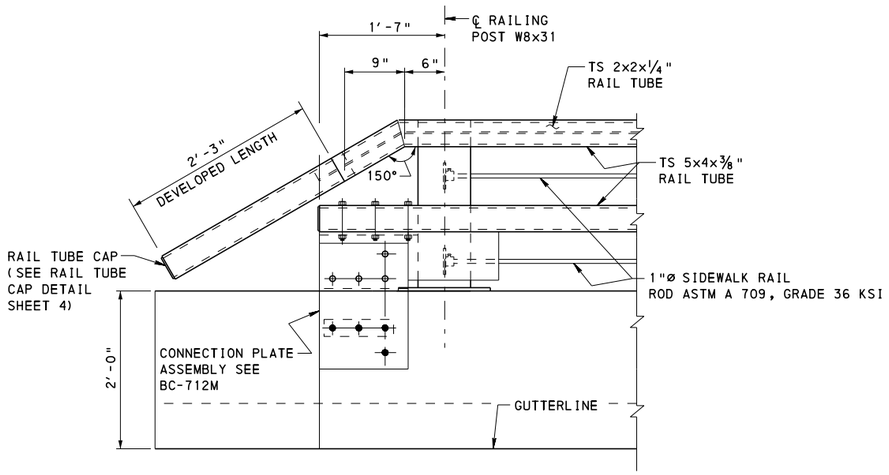
TOP VIEW
(BARRIER WALL NOT SHOWN)



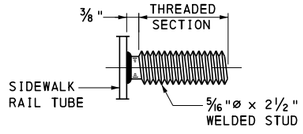
ANCHOR BAR DETAIL



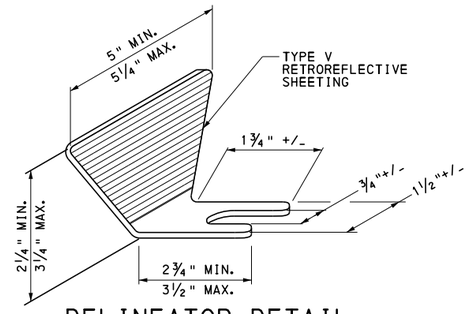
BARRIER RAIL ANCHOR STUD DETAIL



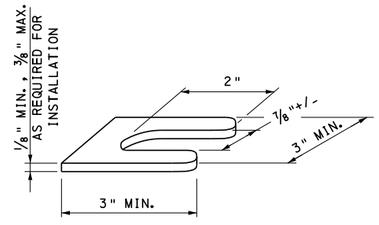
RAISED SIDEWALK RAIL ELEVATION
(FOR SECTION VIEW, SEE SHEET 3)
(ANCHOR BOLTS OMITTED FOR CLARITY)
(WITHOUT INLET SHOWN; WITH INLET SIMILAR)



SIDEWALK RAIL ANCHOR STUD DETAIL



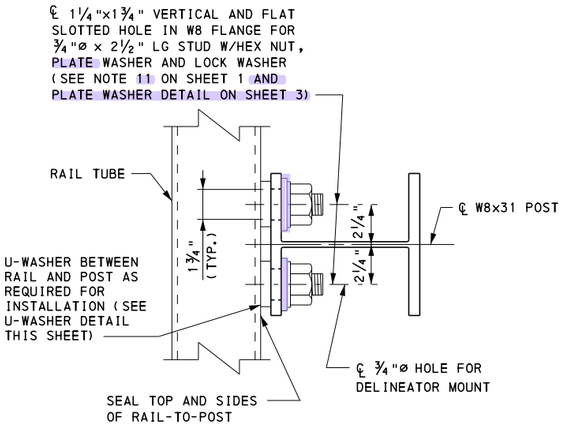
DELINEATOR DETAIL



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.



TYPICAL RAIL TO POST DETAIL

NOTES:

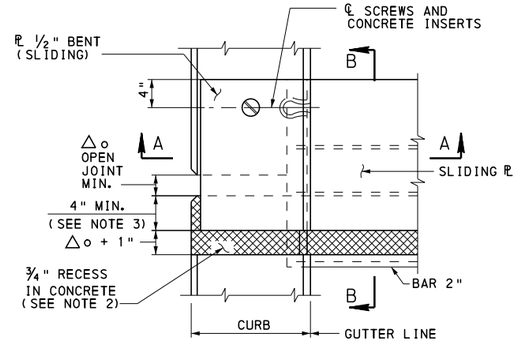
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. FOR THRIE-BEAM RAIL TO PA BRIDGE BARRIER TRANSITION CONNECTION, SEE BC-712M AND RC-50M.
3. FOR ADDITIONAL NOTES, SEE SHEET 1.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

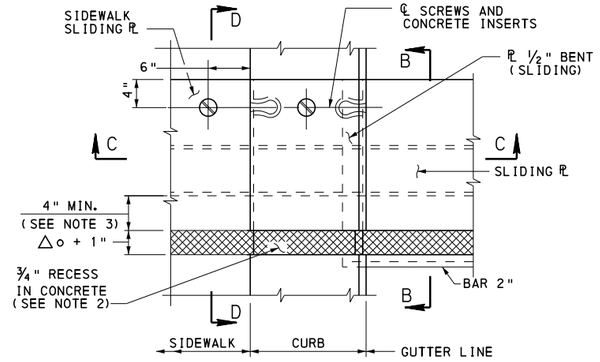
PA BRIDGE BARRIER
MISCELLANEOUS RAILING DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 5 OF 13
Thomas P Macioce	Brenda B Thompson	BC-713M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



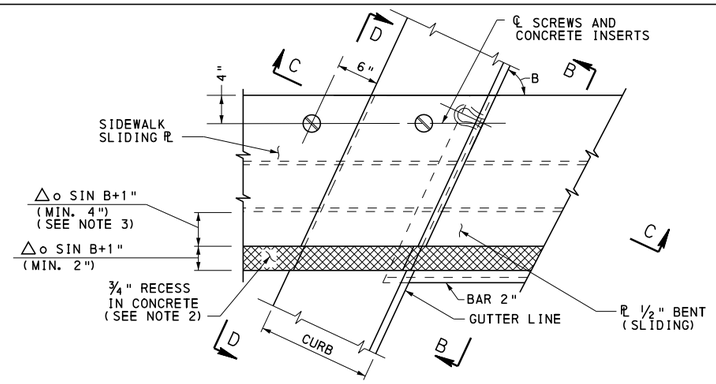
PLAN - SKEW ANGLE ≥ 75°

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



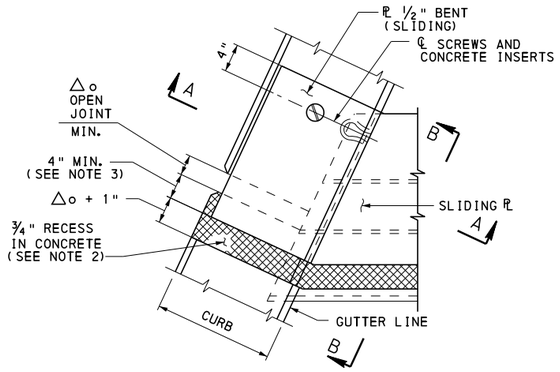
PLAN AT SIDEWALK- SKEW ANGLE ≥ 75°

(AT SIDEWALK SHOWN; RAISED SIDEWALK SIMILAR)



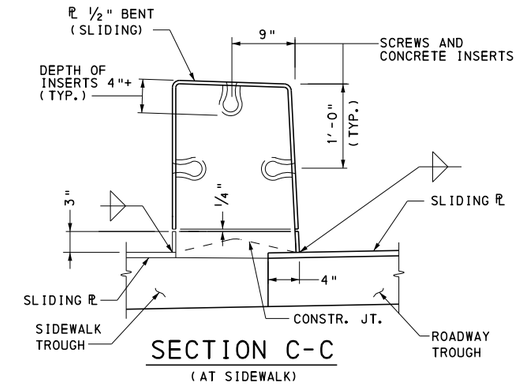
PLAN AT SIDEWALK- SKEW ANGLE < 75°

(AT SIDEWALK SHOWN; RAISED SIDEWALK SIMILAR)



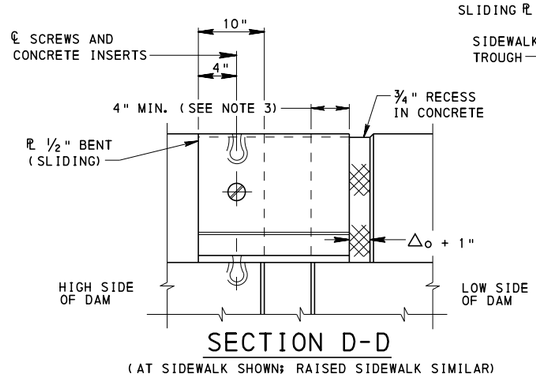
PLAN - SKEW ANGLE < 75°

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



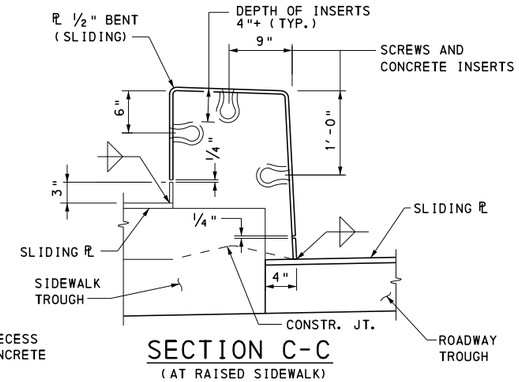
SECTION C-C

(AT SIDEWALK)



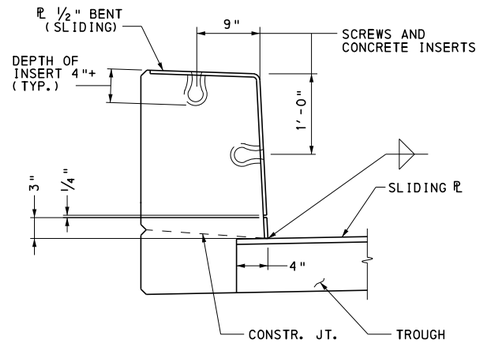
SECTION D-D

(AT SIDEWALK SHOWN; RAISED SIDEWALK SIMILAR)

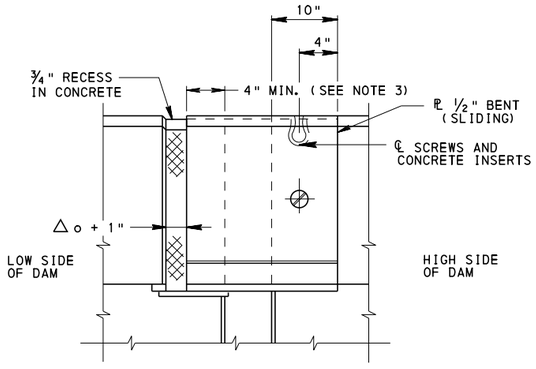


SECTION C-C

(AT RAISED SIDEWALK)



SECTION A-A



SECTION B-B

NOTES:

1. FOR △o SEE BC-762M
2. 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.
3. MAINTAIN 4" MIN. BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT TEMP. OF -9°F FOR STEEL AND 10°F FOR P/S CONCRETE.
4. MAXIMUM DISTANCE FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3".

PA BRIDGE BARRIER AT TOOTH EXPANSION DAM

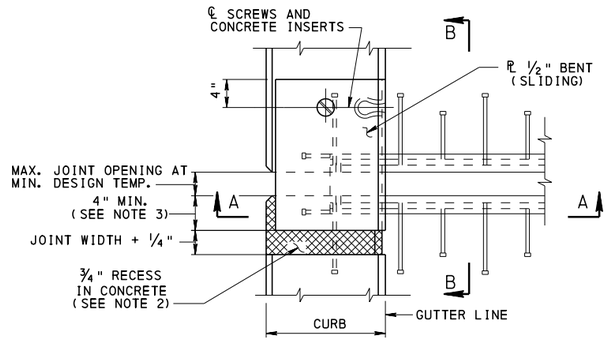
(RAILING POST AND TUBE RAILS NOT SHOWN)
(AT SIDEWALK SHOWN; RAISED SIDEWALK SIMILAR)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

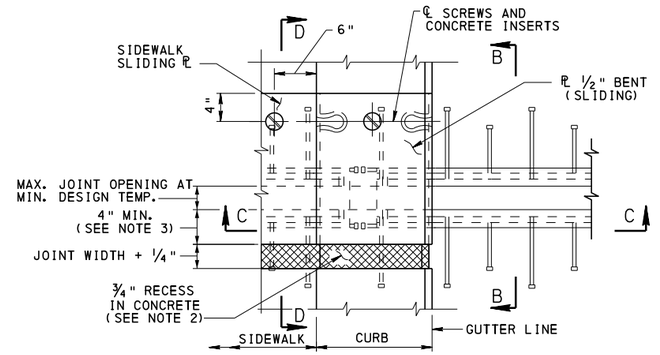
STANDARD

PA BRIDGE BARRIER
DETAILS AT TOOTH EXPANSION DAM

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 6 OF 13
Thomas P Macioce	Brian D Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-713M

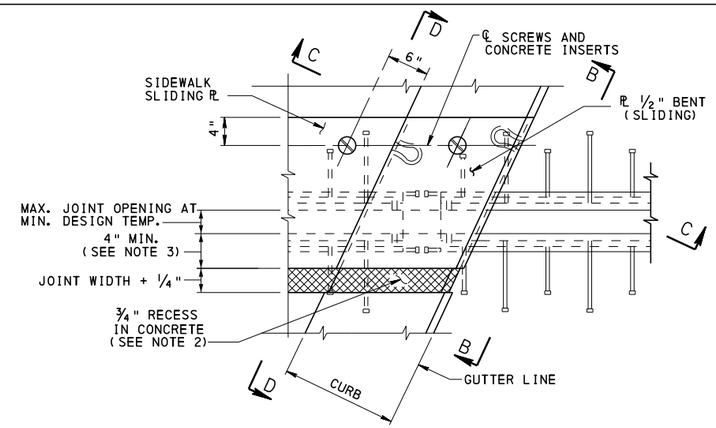


PLAN - SKEW ANGLE ≥ 75°



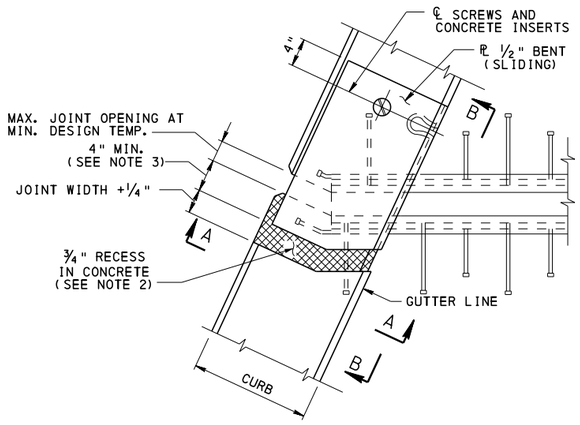
PLAN AT SIDEWALK- SKEW ANGLE ≥ 75°

(AT SIDEWALK SHOWN; AT RAISED SIDEWALK SIMILAR)

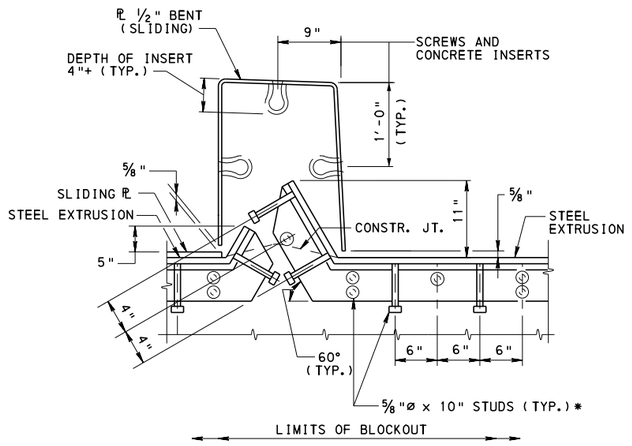


PLAN AT SIDEWALK- SKEW ANGLE < 75°

(AT SIDEWALK SHOWN; RAISED SIDEWALK SIMILAR)

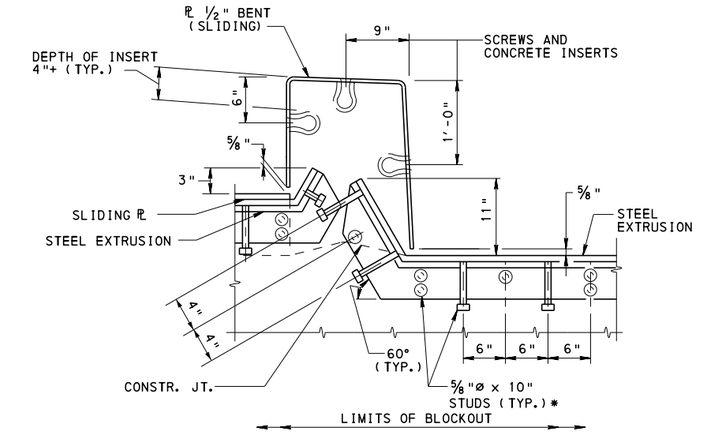


PLAN - SKEW ANGLE < 75°



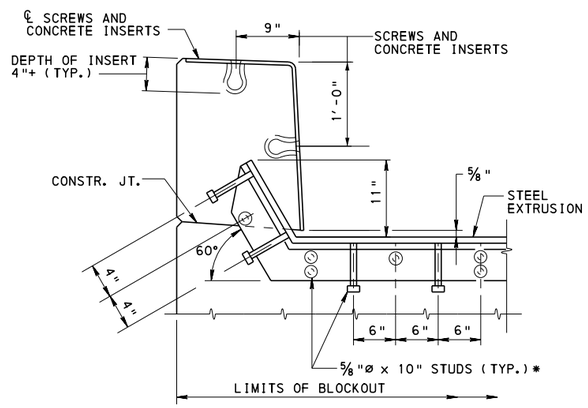
SECTION C-C

(AT SIDEWALK)



SECTION C-C

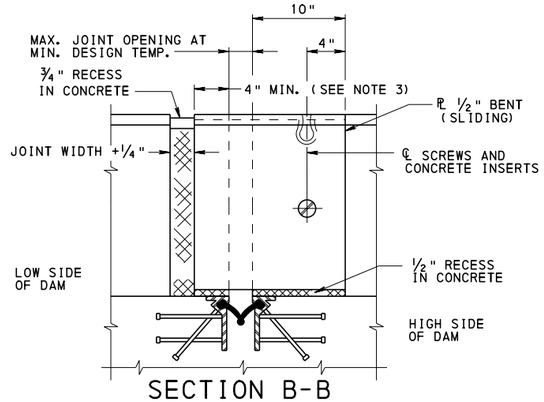
(AT RAISED SIDEWALK)



SECTION A-A

PA BRIDGE BARRIER AT NEOPRENE STRIP SEAL DAM

(RAILING POST AND TUBE RAILS NOT SHOWN)



SECTION B-B

* 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.

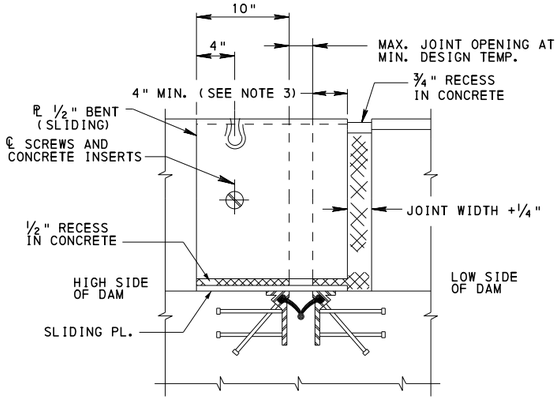
NOTES:

1. FOR SECTION D-D DETAILS, SEE SHEET 8.
2. 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.
3. MAINTAIN 4" MIN. BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT TEMP. OF -9°F FOR STEEL AND 10°F FOR P/S CONCRETE.
4. MAXIMUM DISTANCE FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3".

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

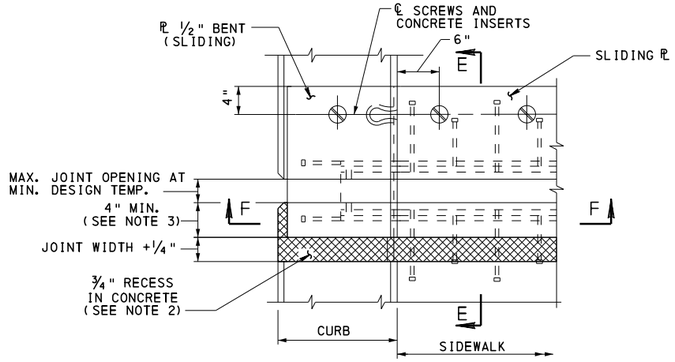
STANDARD PA BRIDGE BARRIER DETAILS AT NEOPRENE STRIP SEAL DAM

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 7 OF 13
Thomas P Macioce CHIEF BRIDGE ENGINEER	Brian D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-713M

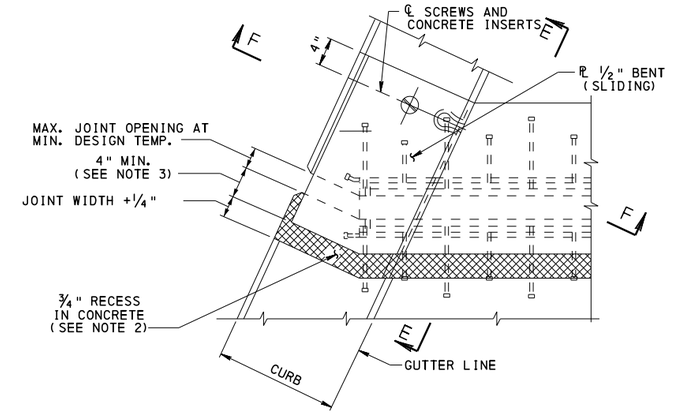


SECTION D-D

(AT SIDEWALK)



PLAN AT ALTERNATE SIDEWALK- SKEW ANGLE ≥ 75°



PLAN AT ALTERNATE SIDEWALK- SKEW ANGLE < 75°

SECTION D-D

(AT RAISED SIDEWALK)

SECTION F-F

SECTION E-E

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.

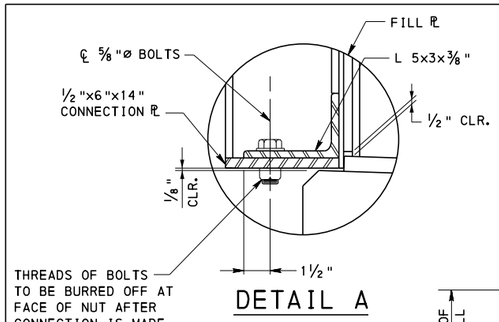
NOTES:

1. FOR LOCATION OF SECTION D-D, SEE SHEET 7.
2. 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.
3. MAINTAIN 4" MIN. BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT TEMP. OF -9°F FOR STEEL AND 10°F FOR P/S CONCRETE.
4. MAXIMUM DISTANCE FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3".

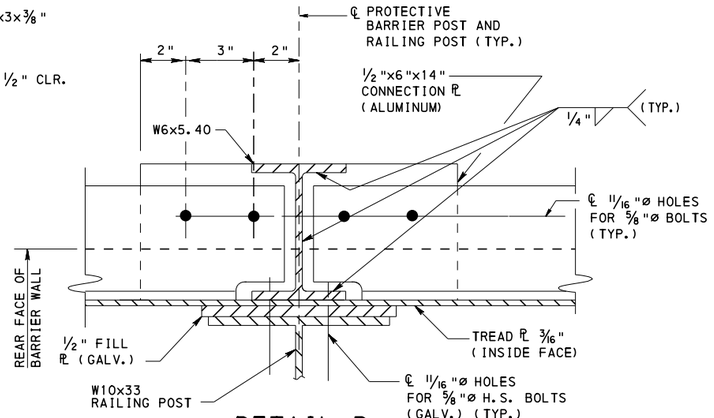
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PA BRIDGE BARRIER
DETAILS AT NEOPRENE
STRIP SEAL DAM

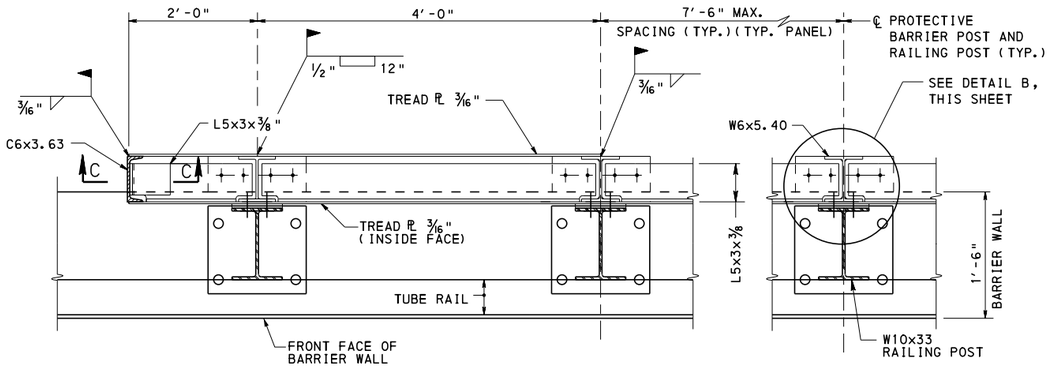
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 8 OF 13
Thomas P Macioce	Brian D Thompson	BC-713M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



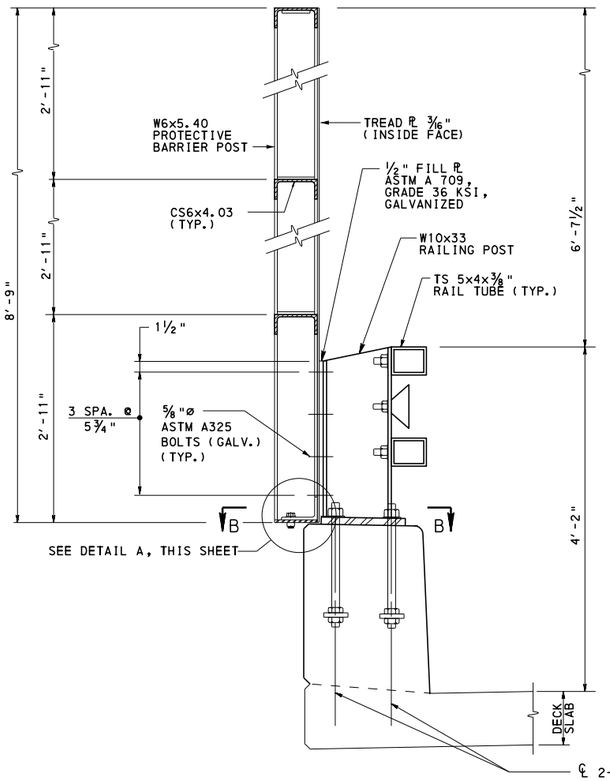
DETAIL A



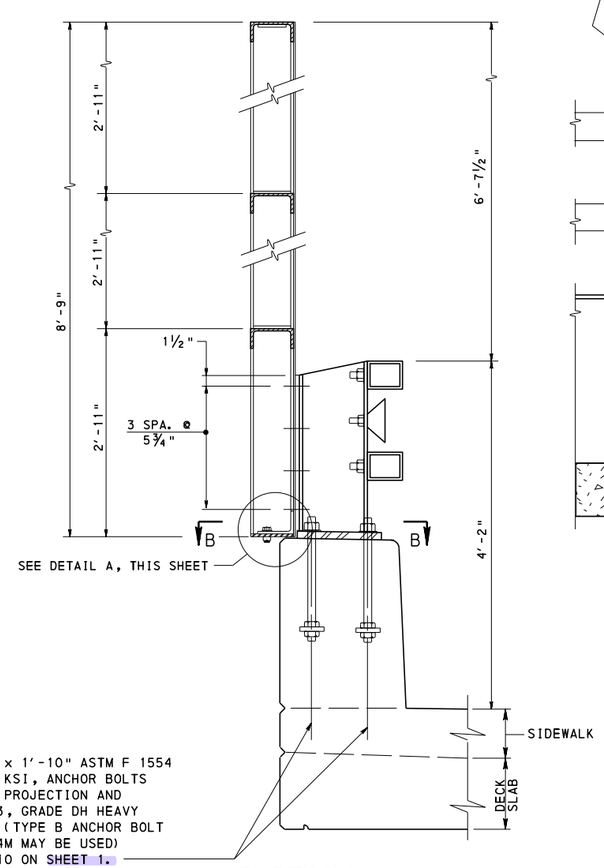
DETAIL B



SECTION B-B: PLAN

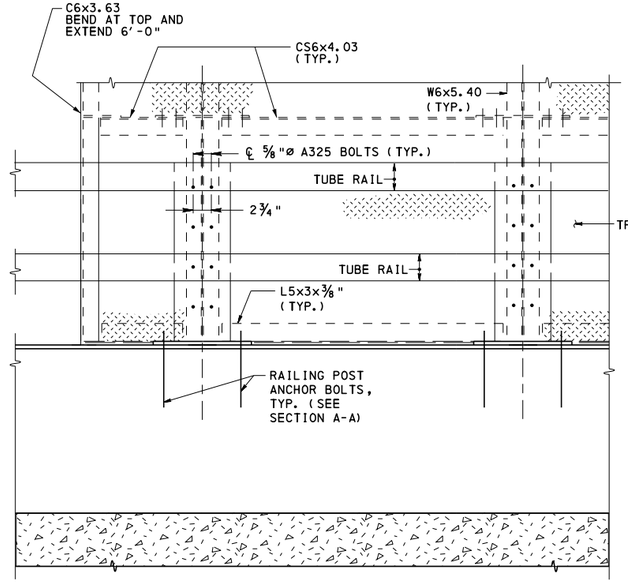


SECTION A-A
(TYPICAL)



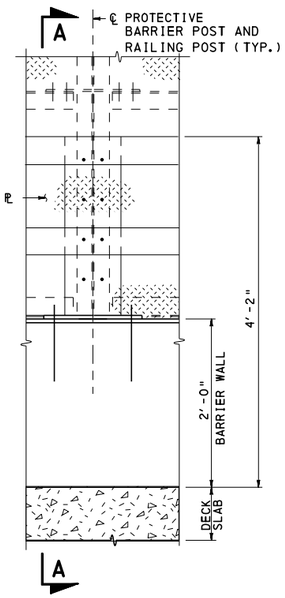
SECTION A-A
(WITH ALTERNATE SIDEWALK)

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

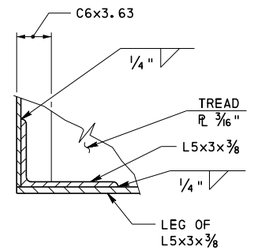


RAILING END SECTION

ELEVATION
(INSIDE FACE)



TYPICAL POST SECTION



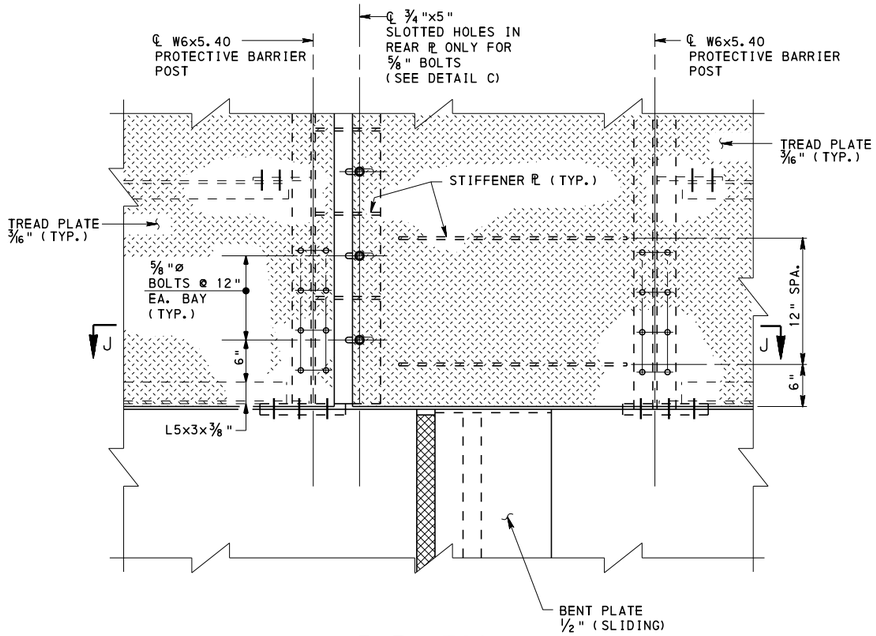
SECTION C-C

ALUMINUM PROTECTIVE BARRIER AT PA BRIDGE BARRIER

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

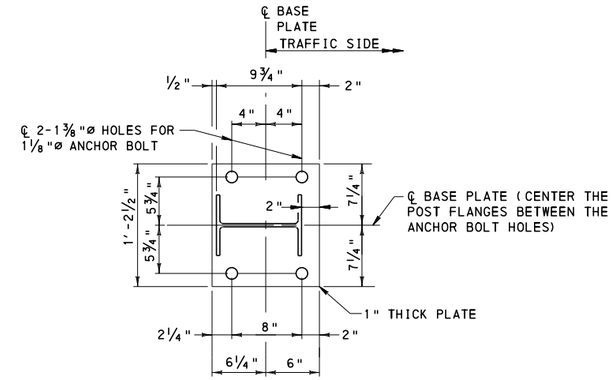
STANDARD
PA BRIDGE BARRIER
ALUMINUM PROTECTIVE
BARRIER DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 9 OF 13
Thomas P Macioce	Bruce D Thompson	BC-713M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



ELEVATION

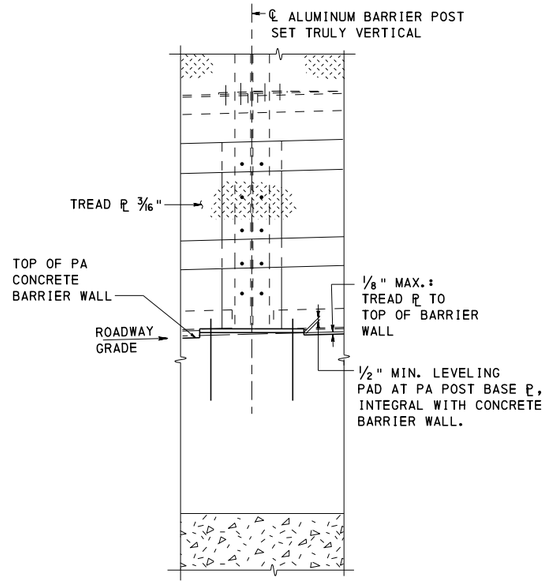
FOR CLARITY, W10x33 RAILING POSTS, RAIL TUBES, AND BASE PLATES NOT SHOWN IN ELEVATION VIEW.



NOTE: ATTACH POST TO BASEPLATE AS SHOWN ON DETAIL C, SHEET 2.

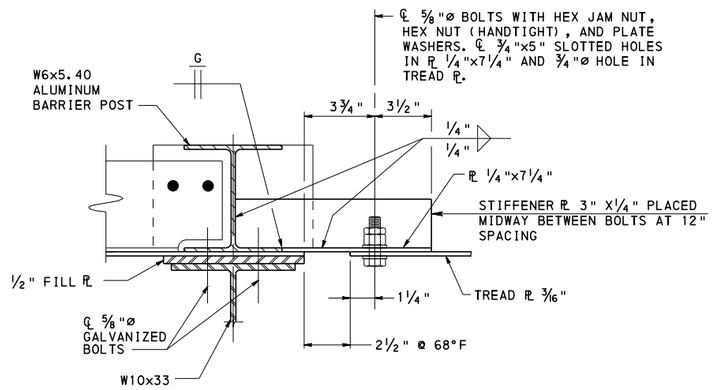
POST AND BASE PLATE

(AT ALUMINUM BARRIER)

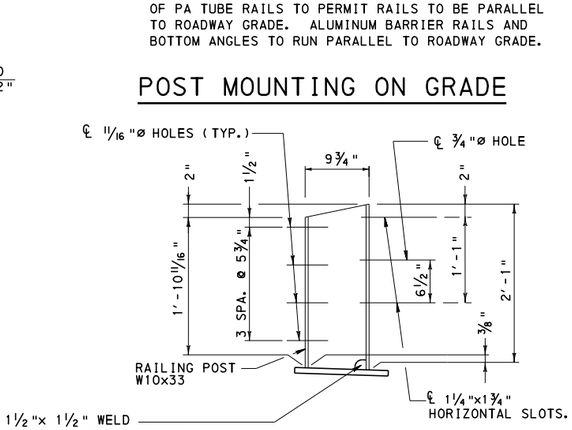


NOTE:
SET PA BRIDGE BARRIER POSTS AND ALUMINUM PROTECTIVE BARRIER POSTS TRULY VERTICAL. ADJUST WELDED STUDS OF PA TUBE RAILS TO PERMIT RAILS TO BE PARALLEL TO ROADWAY GRADE. ALUMINUM BARRIER RAILS AND BOTTOM ANGLES TO RUN PARALLEL TO ROADWAY GRADE.

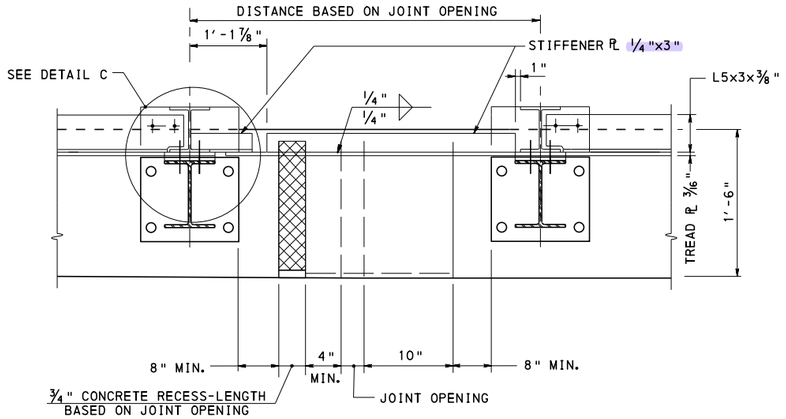
POST MOUNTING ON GRADE



DETAIL C



ELEVATION-POST



SECTION J-J

EXPANSION JOINT AT PIERS

NOTES:

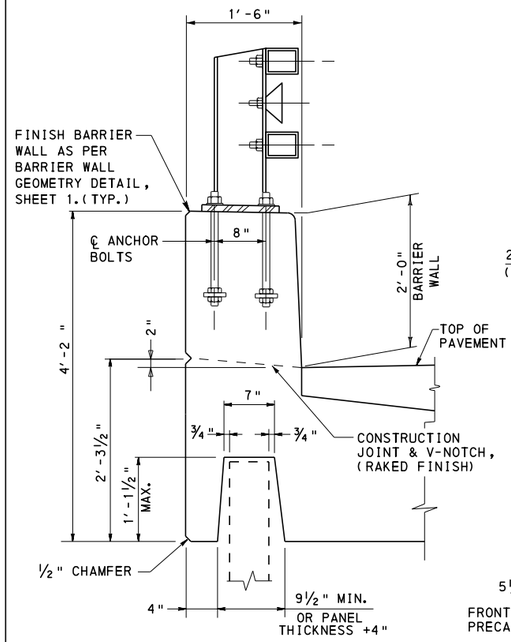
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. PROVIDE ELASTOMERIC PADS OR WASHERS ⅛" MIN. THICKNESS CONFORMING TO PUB. 408, SECTION 1113.03 (h), TYPE I, BETWEEN CONTACT SURFACES WHEREVER ALUMINUM COMPONENTS COME IN CONTACT WITH GALVANIZED STEEL. ALSO PROVIDE FABRIC BUSHINGS WITH MATERIAL CONFORMING TO 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.

ALUMINUM PROTECTIVE BARRIER AT PA BRIDGE BARRIER

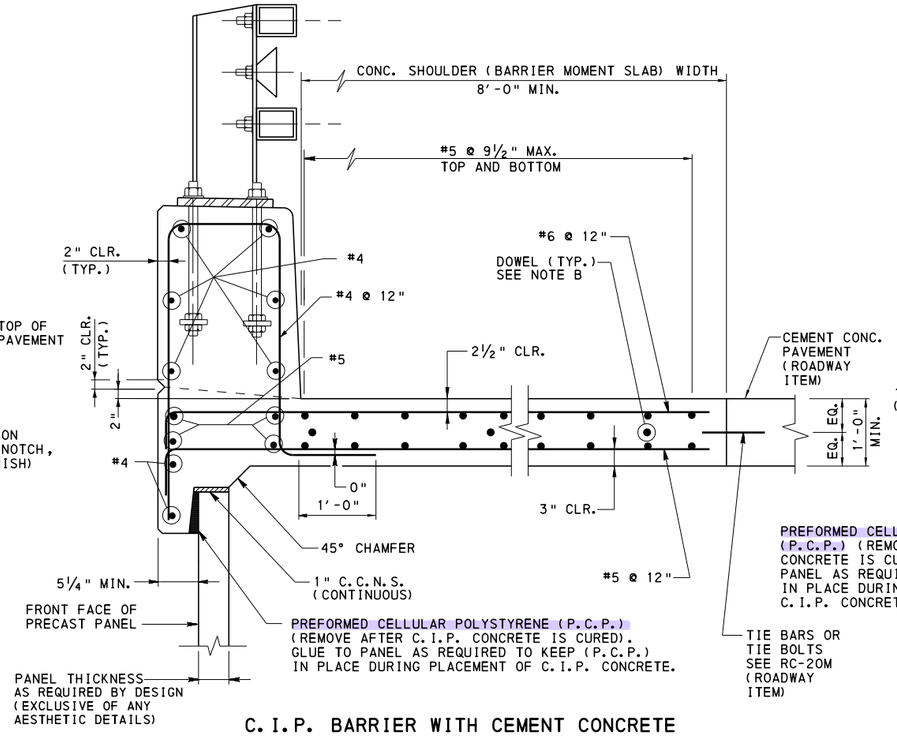
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PA BRIDGE BARRIER
ALUMINUM PROTECTIVE
BARRIER DETAILS

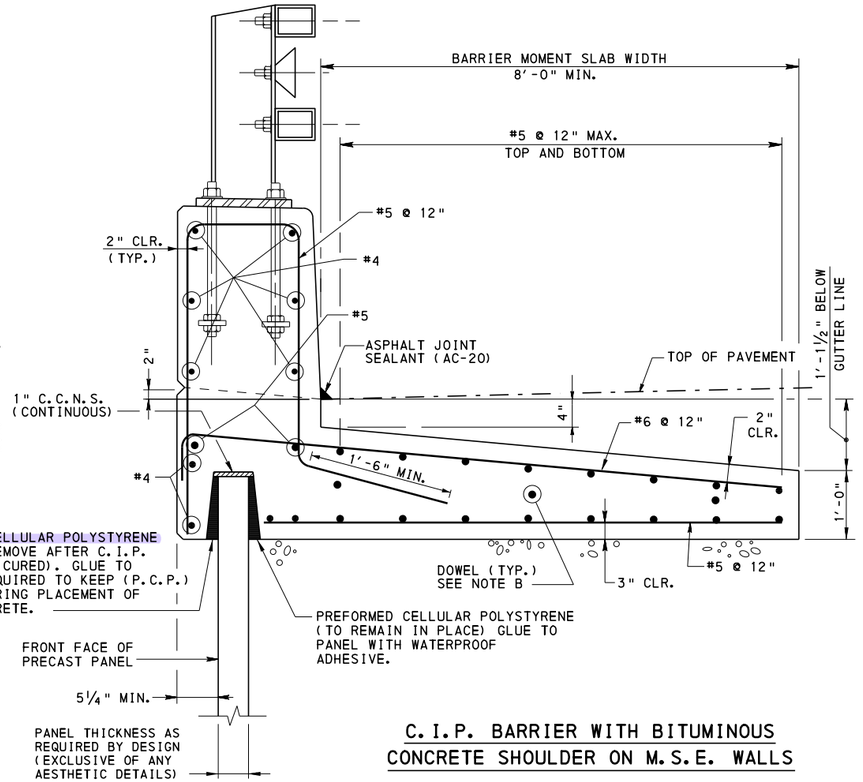
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Bruce A Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 10 OF 13 BC-713M



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

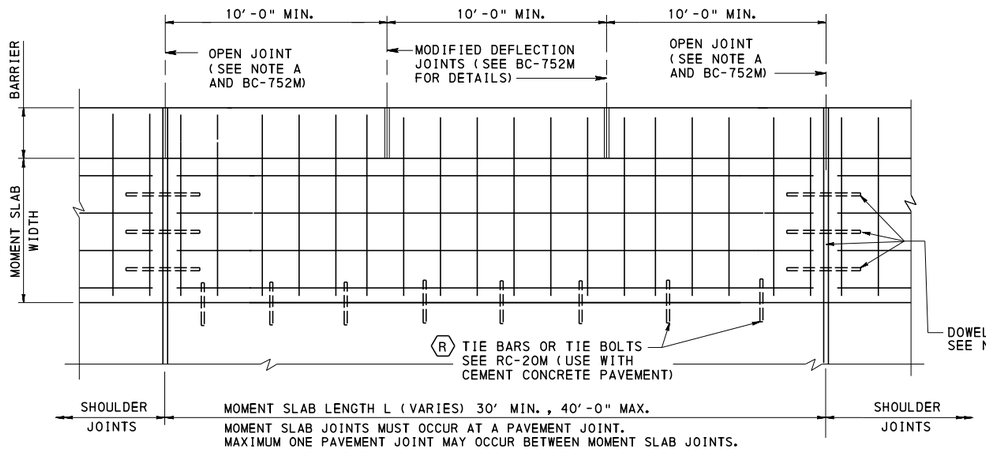


C.I.P. BARRIER WITH CEMENT CONCRETE SHOULDER ON M.S.E. WALLS



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

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

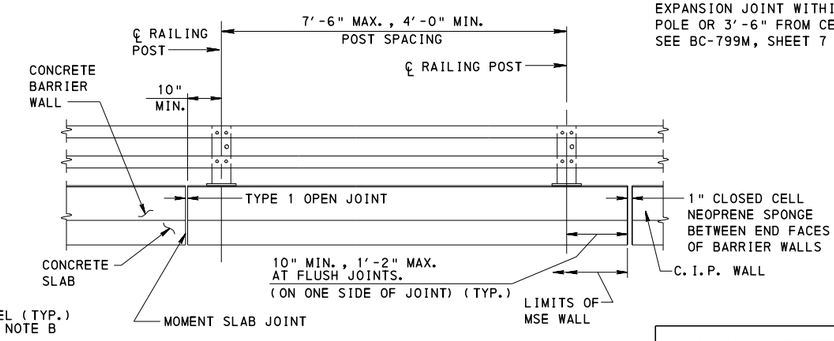


NOTE A: PROVIDE OPEN JOINTS IN BARRIER AT SAME LOCATIONS AS THOSE PROVIDED FOR THE MOMENT SLAB.

NOTE B: USE TYPE D OR E JOINT PER RC-20M. USE SAME JOINT AS PROVIDED IN PAVEMENT.

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

Ⓡ = DESIGNATES ROADWAY ITEM



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

NOTES:

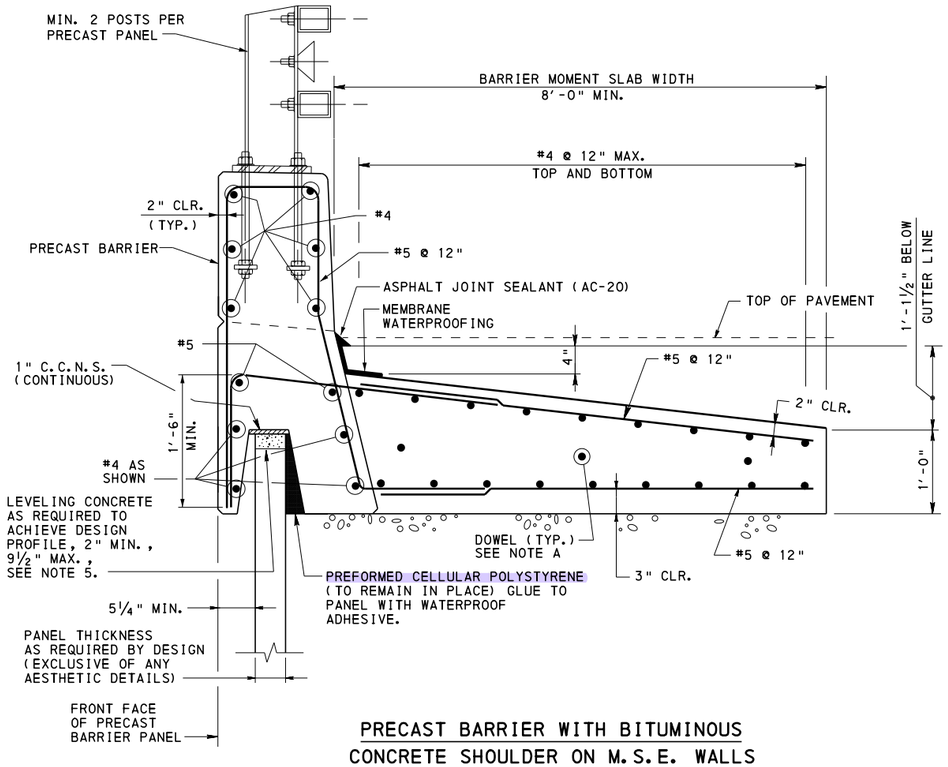
1. FOR GENERAL NOTES ON CONSTRUCTION OF PREFABRICATED WALLS, SEE BC-799M, SHEET 1.
2. PLACE EXPANSION JOINTS IN CONCRETE BARRIER WALL TO MATCH PAVEMENT JOINTS. DO NOT LOCATE THE CONCRETE BARRIER WALL EXPANSION JOINT WITHIN 6'-0" FROM CENTERLINE OF LIGHT POLE OR 3'-6" FROM CENTERLINE OF JUNCTION BOX. SEE BC-799M, SHEET 7 FOR INLET INSTALLATION DETAILS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

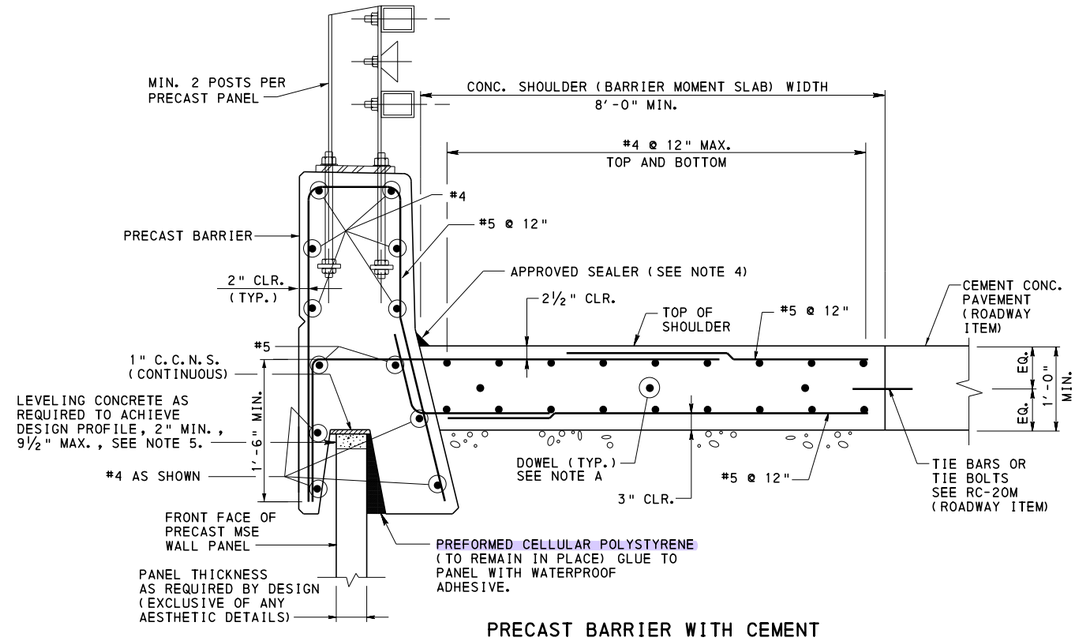
STANDARD

PA BRIDGE BARRIER
M.S.E. WALL DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 11 OF 13
Thomas P. Macioce	Brent D. Thompson	BC-713M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



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



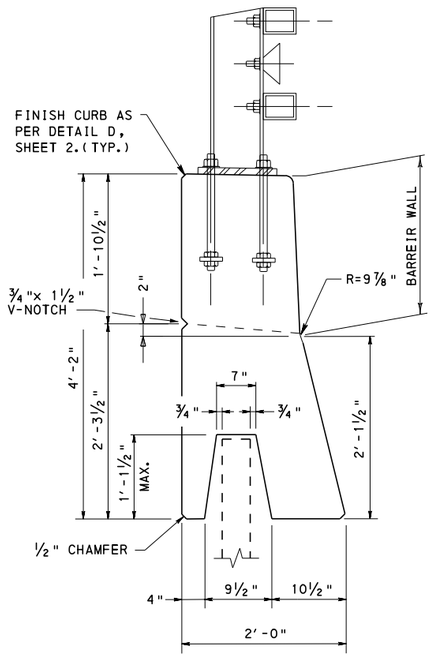
PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER ON M.S.E. WALLS

NOTE A:

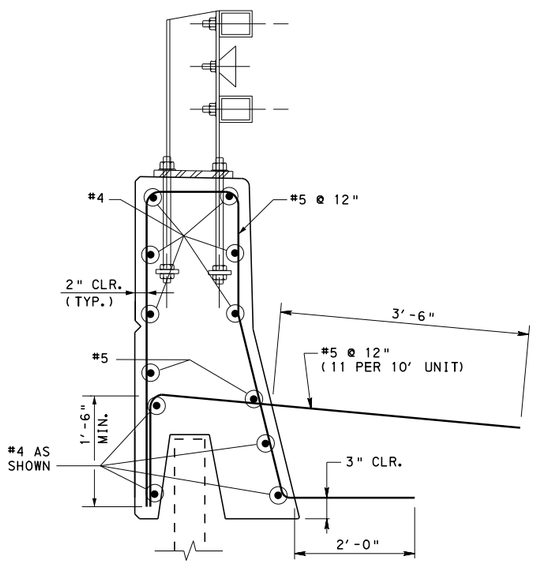
USE TYPE D OR E JOINT PER RC-20M. USE SAME JOINT AS PROVIDED IN PAVEMENT.

NOTES:

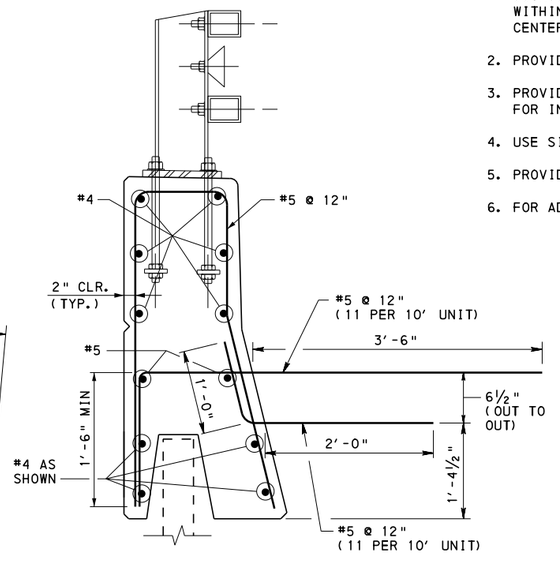
1. PLACE EXPANSION JOINTS IN CONCRETE BARRIER WALL TO MATCH PAVEMENT JOINTS. DO NOT LOCATE THE CONCRETE BARRIER WALL EXPANSION JOINT WITHIN 6'-0" FROM CENTERLINE OF LIGHT POLE OR 3'-6" FROM CENTERLINE OF JUNCTION BOX.
2. PROVIDE A MINIMUM PRECAST BARRIER LENGTH OF 10'-0".
3. PROVIDE SPECIAL DESIGN AND DETAILING OF THE MOMENT SLAB AND BARRIER FOR INLET INSTALLATIONS.
4. USE SILICONE SEALANT AS PER SECTION 705.4 (a).
5. PROVIDE LEVELING CONCRETE REINFORCEMENT AS PER DETAIL A, SHEET 3, BC-799M.
6. FOR ADDITIONAL NOTES, SEE SHEET 11.



PRECAST BARRIER DIMENSIONS ON M.S.E. WALLS



REINFORCEMENT FOR PRECAST BARRIER WITH BITUMINOUS CONCRETE SHOULDER



REINFORCEMENT FOR PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER

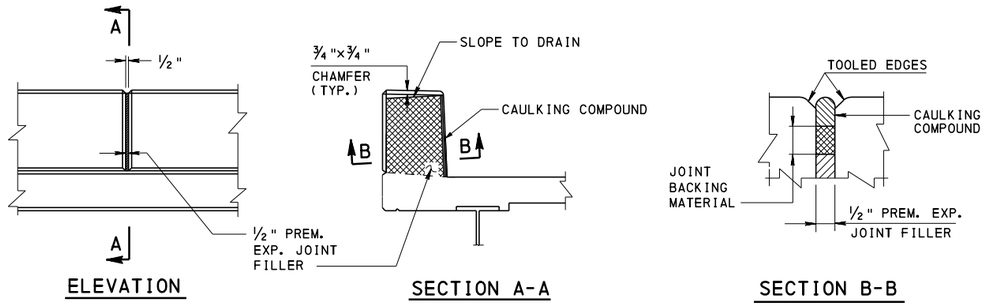
PRECAST PA BRIDGE BARRIER ON M.S.E. WALLS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

PA BRIDGE BARRIER
M.S.E. WALL DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 12 OF 13
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Bruce A. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-713M



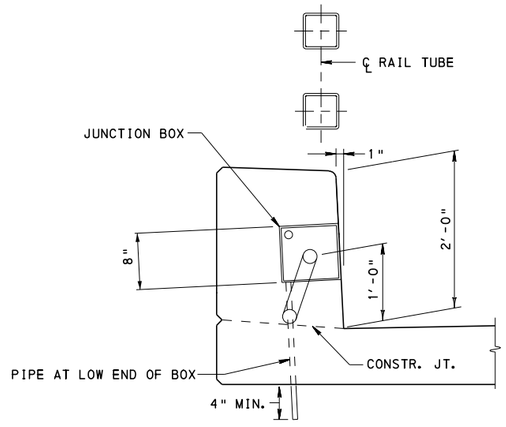
ELEVATION | SECTION A-A | SECTION B-B

PA BRIDGE BARRIER AT OPEN JOINT

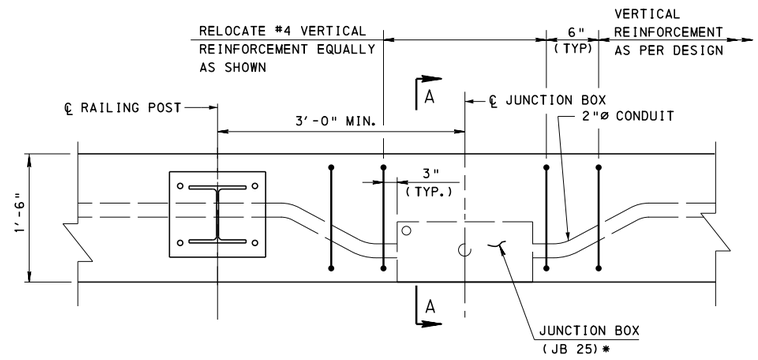
(RAILING POST AND TUBE NOT SHOWN)

NOTES:

1. FOR LOCATION OF CONSTRUCTION JOINTS AND OPEN JOINTS, REFER TO DESIGN DRAWINGS.
2. PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH SECTION 705.8 (b) OF PUB. 408.
3. PROVIDE JOINT BACKING MATERIAL IN ACCORDANCE WITH SECTION 705.9 OF PUB. 408.
4. PROVIDE 2" CLEAR ON ALL REINFORCEMENT UNLESS NOTED.
5. FOR ADDITIONAL NOTES, SEE SHEET 1.



SECTION A-A



PLAN

(RAIL TUBE NOT SHOWN)

* JUNCTION BOX MAY BE LOCATED EITHER TO THE LEFT OR TO THE RIGHT OF THE LIGHTING POLE.

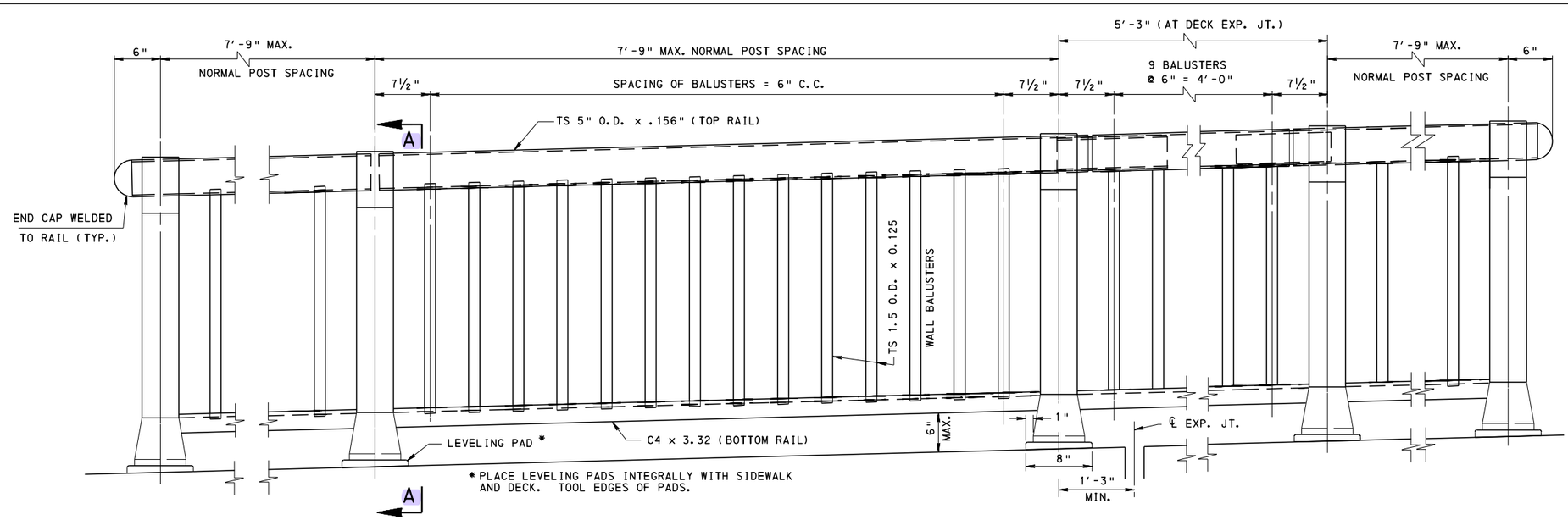
PA BRIDGE BARRIER ALTERNATE JUNCTION BOX DETAIL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

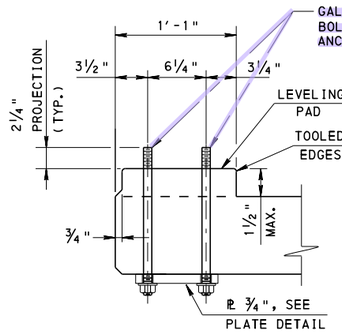
STANDARD

PA BRIDGE BARRIER
MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian S. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 13 OF 13 BC-713M



ELEVATION



DETAIL A

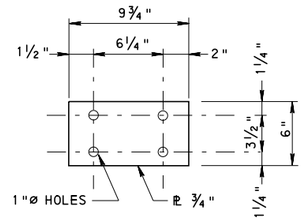
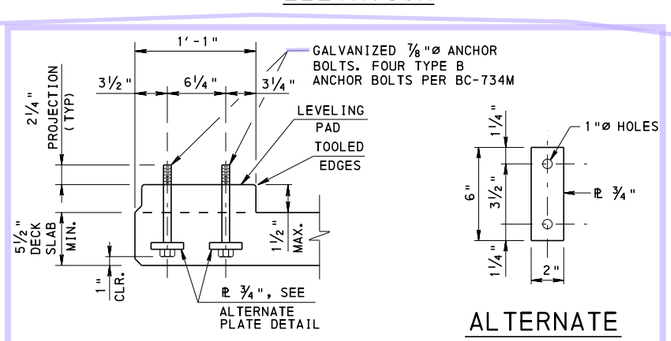
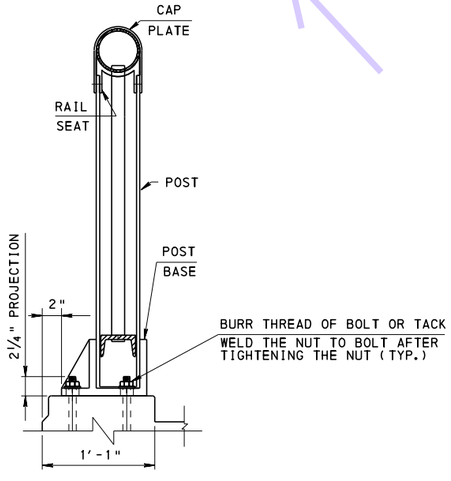


PLATE DETAIL

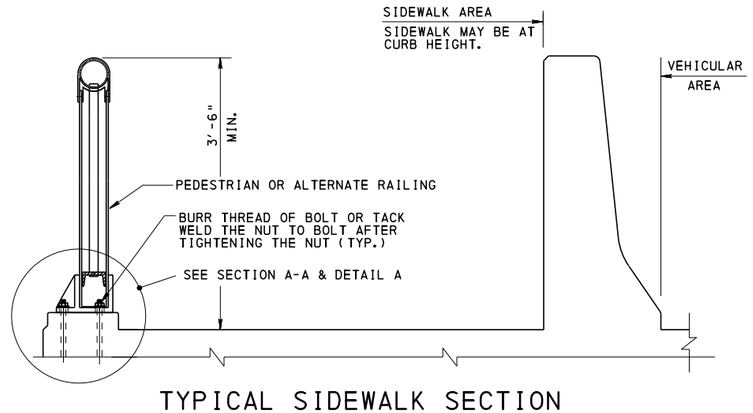


ALTERNATE DETAIL A

ALTERNATE PLATE DETAIL



SECTION A-A



TYPICAL SIDEWALK SECTION

NOTES:

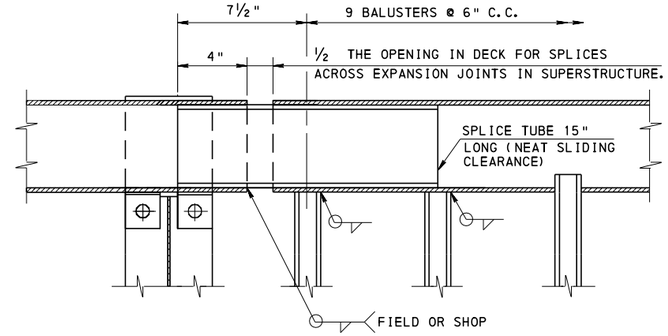
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. DO NOT PAINT ANY MATERIALS.
3. PLACE POST, BALUSTERS AND ANCHOR BOLTS TRULY VERTICAL. PLACE RAILS PARALLEL TO GRADE.
4. PLACE END CAPS FLUSH WITH RAILS.
5. PROVIDE UNIFORM SPACING OF BALUSTERS IN EACH PANEL. IF POST SPACING SHOWN 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 ¼".
6. IN LIEU OF CAST "POST BASE AND RAIL SEAT", USE FABRICATED "POST BASE AND RAIL SEAT" IF APPROVED BY THE DISTRICT BRIDGE ENGINEER.
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 MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 705.8(b).

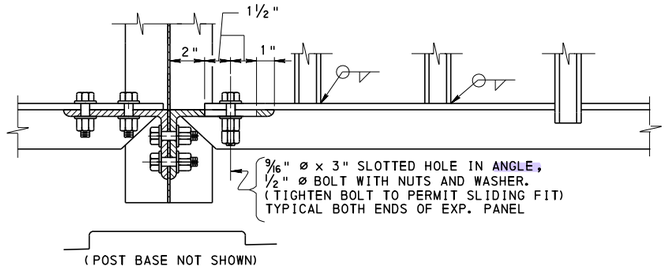
BC-734M	ANCHOR SYSTEMS
	REFERENCE DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

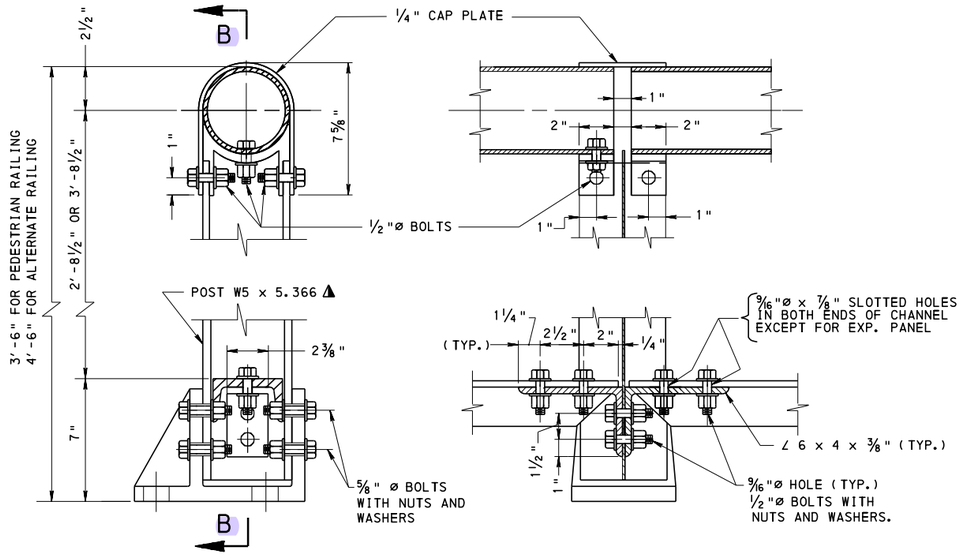
STANDARD ALUMINUM PEDESTRIAN RAILING

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 1 OF 2
Thomas P Macioce	Brian B Thompson	BC-716M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	





TYPICAL EXPANSION PANEL DETAIL

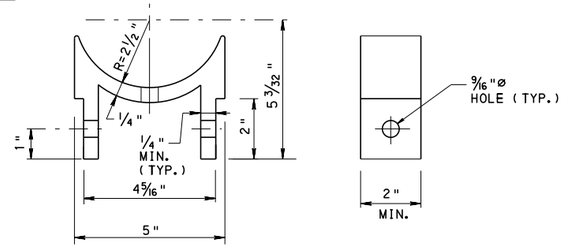


END ELEVATION

SECTION B-B

TYPICAL DETAIL AT POST

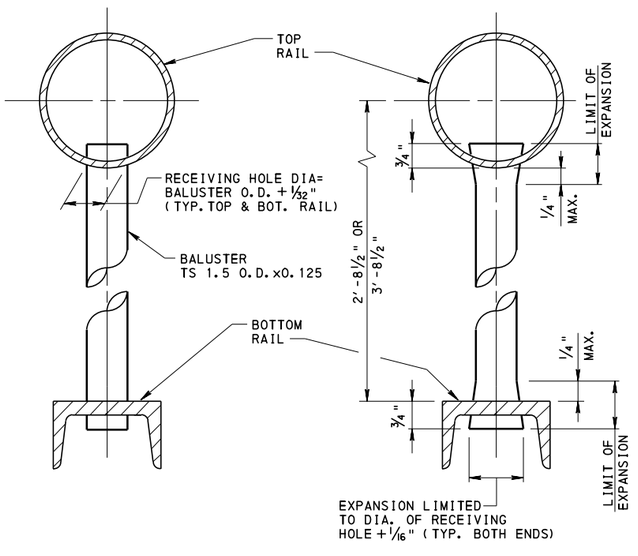
▲ 2'-11⅛" LONG FOR 3'-6" RAILING HEIGHT
3'-11⅛" LONG FOR 4'-6" RAILING HEIGHT



ELEVATION

END VIEW

RAIL SEAT DETAIL

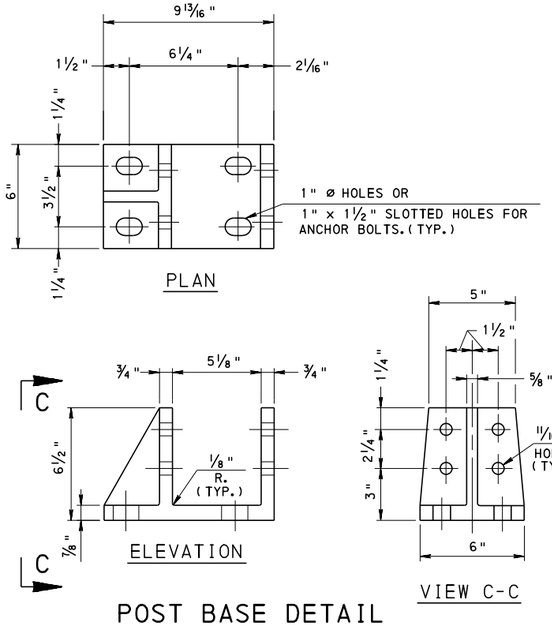


PRIOR TO EXPANDING

EXPANDED

BALUSTER DETAILS

EXPAND FULL CIRCUMFERENCE OF BALUSTER WITHIN THE LIMIT OF EXPANSION.



POST BASE DETAIL

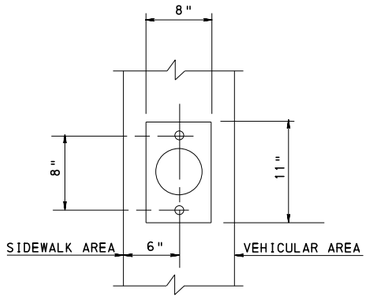
NOTE:

SEE SHEET 1 FOR OTHER NOTES.

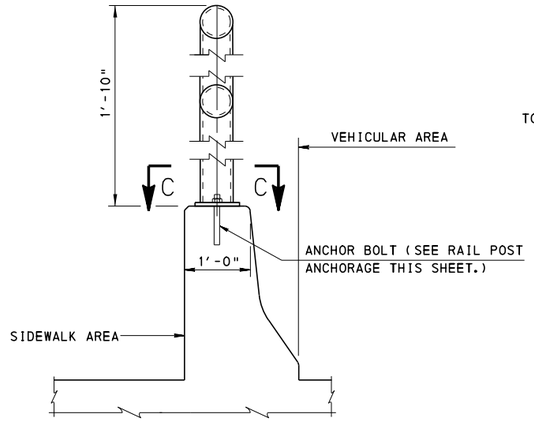
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD ALUMINUM PEDESTRIAN RAILING

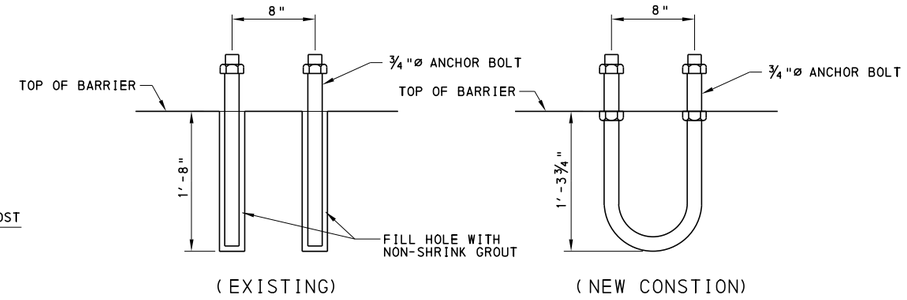
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 2
Thomas P. Macioce	Brent D. Thompson	BC-716M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



SECTION C-C

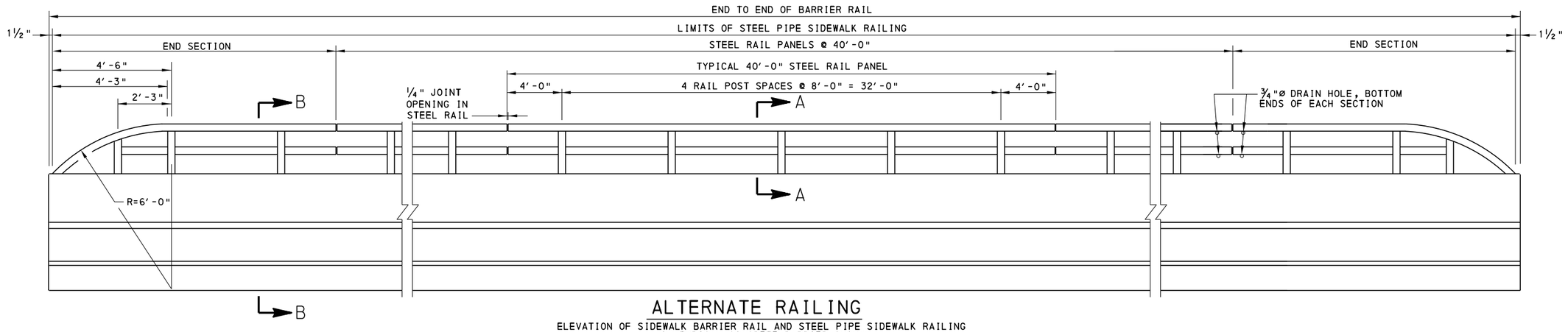


SECTION B-B



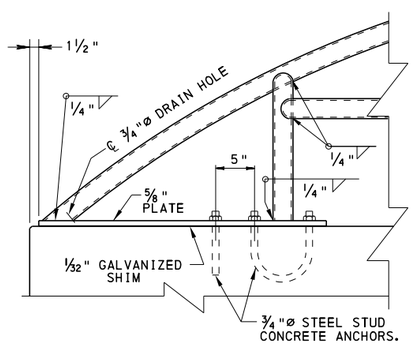
(EXISTING) (NEW CONSTION)

RAIL POST ANCHORAGE



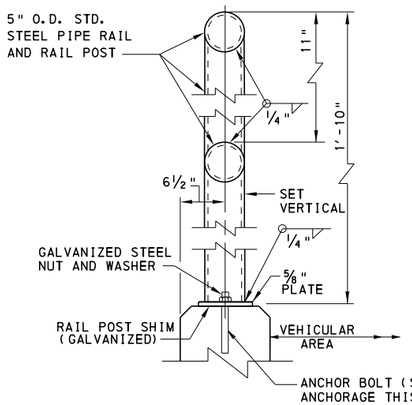
ALTERNATE RAILING

ELEVATION OF SIDEWALK BARRIER RAIL AND STEEL PIPE SIDEWALK RAILING
(ON TYPICAL CONCRETE BARRIER SHOWN;
ON ALTERNATE CONCRETE BARRIER, ALTERNATE SIDEWALK DETAIL
AND VERTICAL WALL SIMILAR)



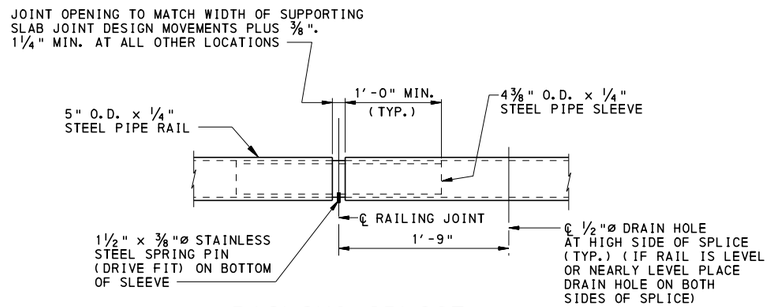
NOTE: PROVIDE TWO 1/32" SHIMS AT EACH RAIL POST. USE AT LEAST ONE.

RAIL END SECTION ELEVATION



RAIL AND RAIL POST DETAILS

SECTION A-A
BICYCLE RAILING



RAILING SPLICE

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
ALTERNATE RAILING DETAILS

RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent D Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 1 OF 1 BC-718M

GENERAL NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408 AND APPLICABLE SPECIAL PROVISIONS.

2. MATERIAL STRENGTH: REINFORCEMENT STEEL fy = 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.a 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 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. THREE TYPES OF INSTALLATION ARE ALLOWED.
   TYPE A: USE FOR SINGLE LANE(S) OF TRAFFIC PRESENT AND SPEED DOES NOT EXCEED 60 MPH.

   TYPE B: USE FOR TWO STANDARD WIDTH LANES OF TRAFFIC. IN THE SAME DIRECTION OR IN OPPOSITE DIRECTIONS, WITHOUT SHOULDERS WITH BARRIERS ON THE OUTSIDES ONLY AND THE SPEED DOES NOT EXCEED 50 MPH.

   TYPE C: USE FOR CONDITIONS OF SPEED AND/OR TRAFFIC LANES AND SHOULDERS NOT COVERED BY TYPE A AND B ABOVE.

9. SPACING OF BOLT THROUGH ANCHORS FOR BARRIERS AND FOR THE FACE(S) OF MEDIAN BARRIERS ADJACENT TO TRAFFIC:
   TYPE A INSTALLATION: SPACING = 4'-0"

   TYPE B INSTALLATION: SPACING = 4'-0"

   TYPE C INSTALLATION: SPACING = 2'-0"

10. INDICATE INSTALLATION TYPE ON THE CONTRACT DRAWINGS.

11. ANCHORS MUST BE INSTALLED IN THE END HOLES OF EACH BARRIER OR MEDIAN 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. SPACING OF ADHESIVE ANCHORS VARIES FROM 4'-0" TO 1'-0" AS SHOWN IN THE TABLE.

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.

TABLE 1

TEMPORARY PRECAST BARRIER AND MEDIAN BARRIERS
MINIMUM REQUIRED ADHESIVE ANCHOR
ULTIMATE CAPACITY BASED ON CONCRETE AND BOND STRENGTH

	BOLT SPACING					
	1'-0"		2'-0"		4'-0"	
	SHEAR (KIPS)	TENSION (KIPS)	SHEAR (KIPS)	TENSION (KIPS)	SHEAR (KIPS)	TENSION (KIPS)
TYPE A INSTALLATION *	2	4	3	7	4	11
TYPE B INSTALLATION *	3	8	6	15	9	26
TYPE C INSTALLATION *	9	28	N/A	N/A	N/A	N/A

TABLE 1 NOTES:

* FOR CONDITIONS FOR TYPE A, B AND C INSTALLATION, SEE GENERAL NOTE 8.

SHEAR AND TENSION VALUES ARE MINUMUM CAPACITY REQUIRED FOR AN INSTALLATION/SPACING. IF BOTH VALUES ARE NOT MET OR EXCEEDED BY THE ANCHOR PROVIDED, A CLOSER SPACING MUST BE SELECTED.

RC-57M	CONCRETE MEDIAN BARRIER
REFERENCE DRAWINGS	

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
TEMPORARY CONCRETE BARRIER,
STRUCTURE MOUNTED
GENERAL NOTES

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brent D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 1 OF 8

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 ±1°.

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 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.

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 BUT NOT TO EXCEED 2'-0" IN THE SEGMENT LENGTH ON THE BRIDGE.

6. BOLTING OF THE SEGMENTS TO THE DECKS IS NOT REQUIRED IF THE WIDTH OF THE DECK BEHIND THE TEMPORARY BARRIER EXCEEDS 6'-0" OR IF AN EFFECTIVE BARRIER EXISTS BEHIND THE TEMPORARY BARRIER. REFER TO RC-57M WHEN BOLT THROUGH ANCHORS OR ADHESIVE ANCHORS ARE NOT REQUIRED.

7. TREATMENT OF ANCHOR HOLES AFTER REMOVAL OF 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 SECTION 1080.2 (C) OF PUB. 408.

   - FOR ADHESIVE ANCHORS INSTALLED USING A MANUFACTUERS 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.

   - 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 POLYMER MOTAR AND CONCRETE AS PER BULLETIN 15, SECTION 679.2(e), PART C, AFTER THE REMOVAL OF THE TEMPORARY BARRIER.

8. THE MINIMUM DECK WIDTH BEHIND A BARRIER OR A MEDIAN 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.

9. ANCHORS ARE REQUIRED FOR TRAFFIC SIDE ONLY.

10. FIELD TEST LOADING VALUES ARE 85% OF THE ADHESIVE ANCHOR TENSILE CAPACITY.

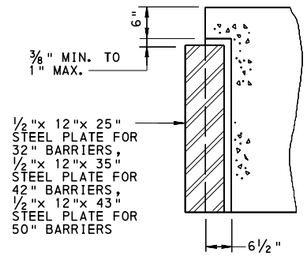
TABLE 2

FIELD TEST LOADING VALUES
(SEE CONSTRUCTION NOTE 10)

	BOLT SPACING		
	1'-0"	2'-0"	4'-0"
	TENSION (KIPS)	TENSION (KIPS)	TENSION (KIPS)
TYPE A INSTALLATION *	3	6	9
TYPE B INSTALLATION *	7	13	22
TYPE C INSTALLATION *	24	N/A	N/A

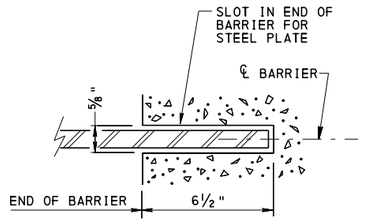
TABLE 2 NOTE:

* FOR CONDITIONS FOR TYPE A, B AND C INSTALLATION, SEE SHT. 1, GENERAL NOTE 8.

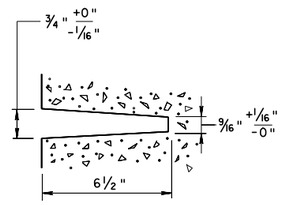


ELEVATION - SLOT DETAIL

NOTE:
1. PROVIDE STEEL PLATES MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 1105.



PARTIAL PLAN - SLOT DETAIL



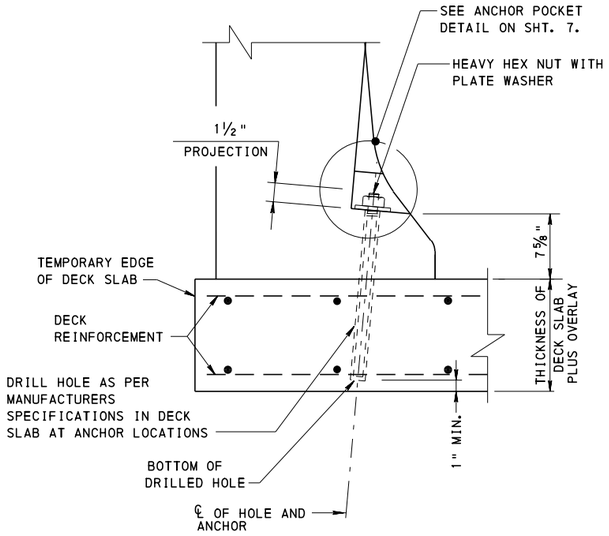
PERMISSIBLE TAPER

SLOTTED PLATE CONNECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

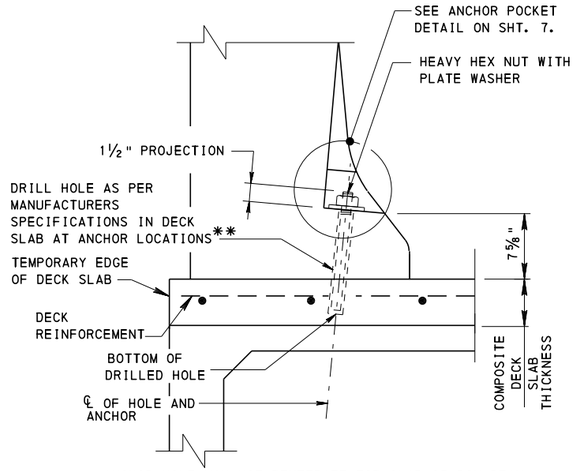
RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 2 OF 8 BC-719M



ADHESIVE ANCHOR

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

NOTE:
SEE TABLE 1, SHEET 1 FOR SPACING AND MINIMUM REQUIRED ADHESIVE ANCHOR ULTIMATE CAPACITY

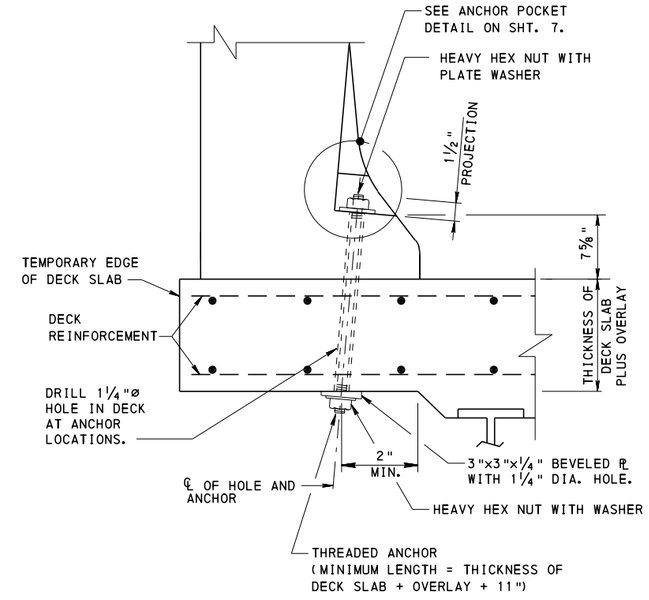


** ANCHOR HOLE MAY NOT PENETRATE TOP SLAB OF BOX BEAM. FOR 5" DECK SLAB THICKNESS, USE ANY TYPE A INSTALLATION OR TYPE B INSTALLATION WITH EITHER 1'-0" OR 2'-0" BOLT SPACINGS. FOR NEW DECKS, SLAB THICKNESS MUST BE INCREASED TO 7" TO BE ABLE TO USE ALL INSTALLATION OPTIONS LISTED IN TABLE 1, ON SHEET 1.

ADHESIVE ANCHOR ON COMPOSITE ADJACENT BOX BEAMS

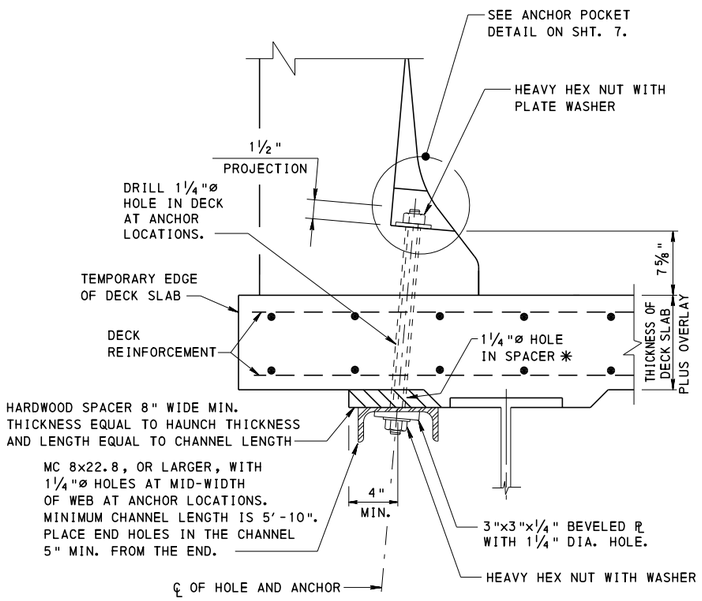
(CONCRETE TEMPORARY BARRIER SHOWN;
TEMPORARY MEDIAN BARRIER SIMILAR AT EITHER FACE)

NOTE:
SEE TABLE 1, SHEET 1 FOR SPACING AND MINIMUM REQUIRED ADHESIVE ANCHOR ULTIMATE CAPACITY



TYPICAL BOLT THROUGH ANCHOR

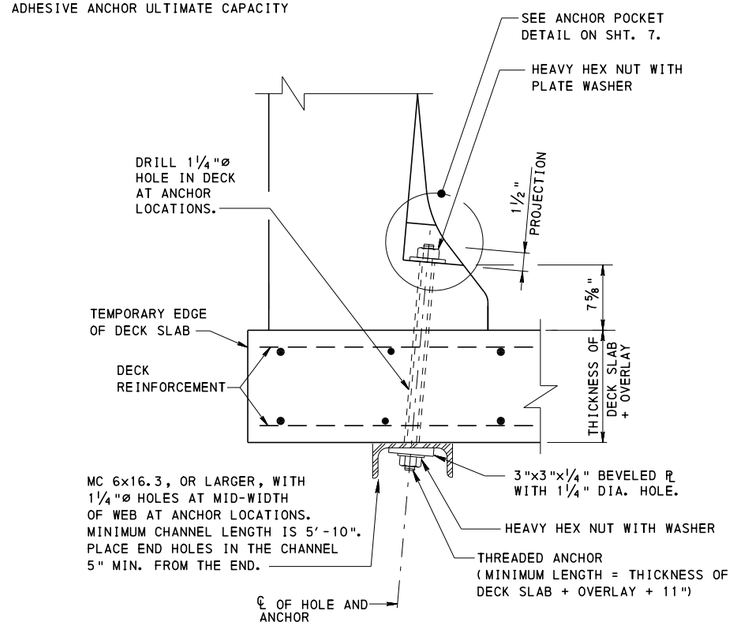
(CONCRETE TEMPORARY BARRIER SHOWN;
TEMPORARY MEDIAN BARRIER SIMILAR AT FACE(S) ADJACENT TO TRAFFIC)



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

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

✱ THE ENTIRE CIRCUMFERENCE OF THE HOLE IN THE HARDWOOD SPACER MUST BE ½" MIN. FROM THE EDGES OF THE SPACER.



ALTERNATE BOLT THROUGH ANCHOR

(CONCRETE TEMPORARY 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

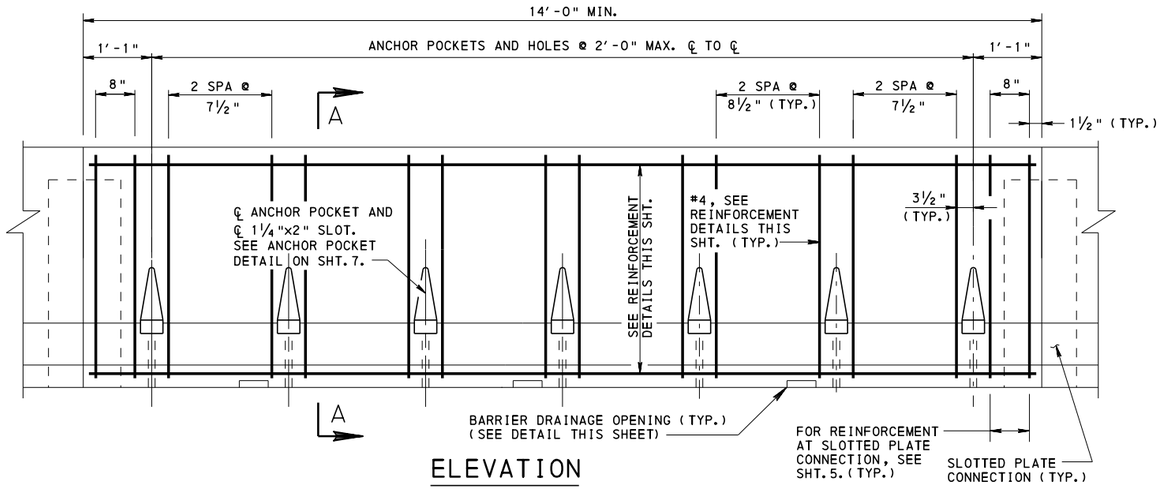
NOTES:

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.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

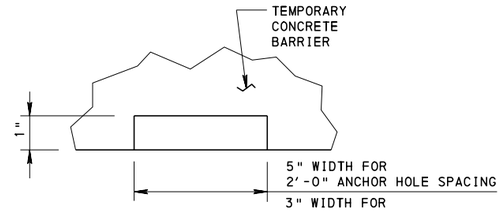
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 8
Thomas P. Macioce	Brenda S. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-719M



ELEVATION

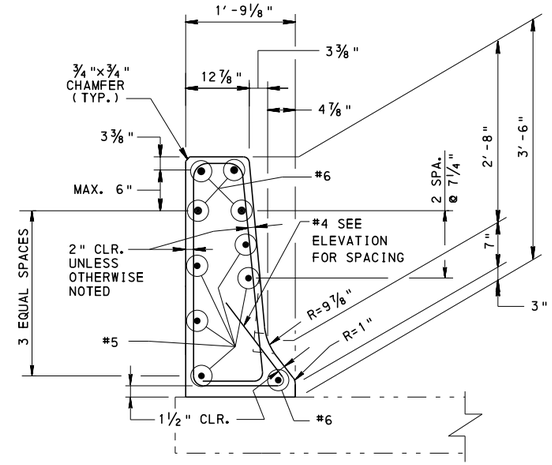
TRAFFIC FACE OF TYPICAL TEMPORARY CONCRETE BARRIER AND BOTH FACES OF TYPICAL TEMPORARY CONCRETE MEDIAN BARRIER

USE FOR INSTALLATIONS REQUIRING 4′-0" OR 2′-0" ANCHOR BOLT SPACING



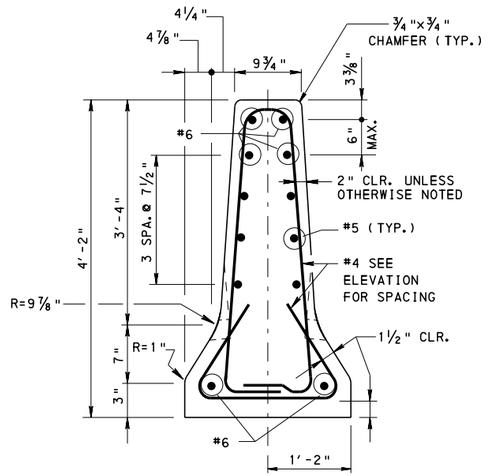
BARRIER DRAINAGE OPENING DETAIL

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



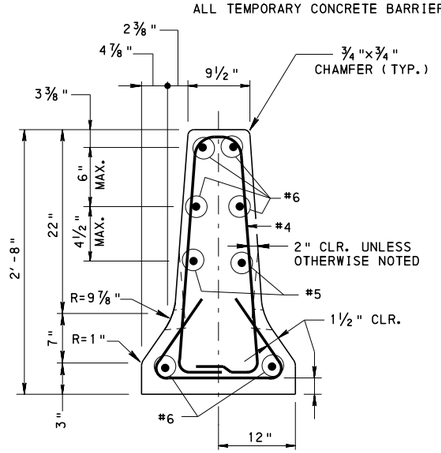
TEMPORARY BARRIER 42" TYPICAL REINFORCEMENT DETAIL

SECTION A-A



TEMPORARY GLARE SCREEN MEDIAN BARRIER 50" TYPICAL REINFORCEMENT DETAIL

SECTION A-A



TEMPORARY MEDIAN BARRIER 32" TYPICAL REINFORCEMENT DETAIL

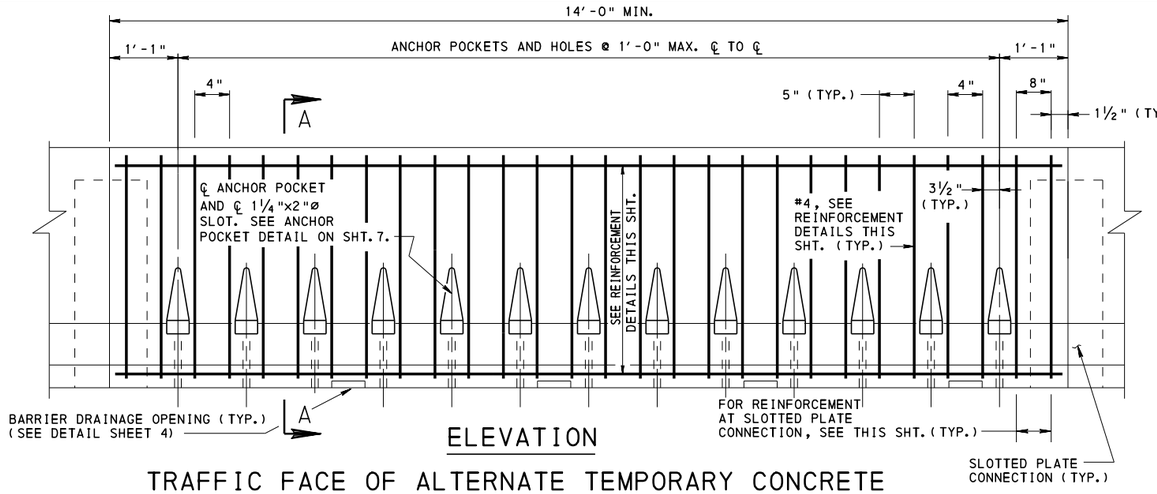
NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. FOR CONSTRUCTION NOTES, SEE SHEET 2.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD TEMPORARY CONCRETE BARRIER, STRUCTURE MOUNTED REINFORCEMENT DETAILS

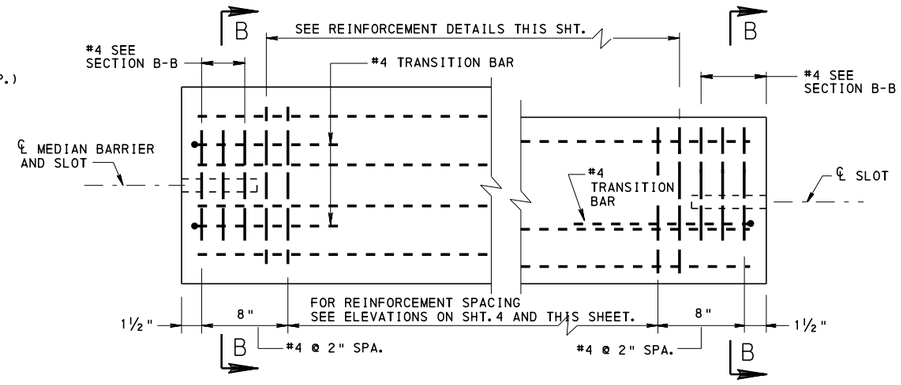
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 4 OF 8
Thomas P Macioce	Brent D Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-719M



ELEVATION

TRAFFIC FACE OF ALTERNATE TEMPORARY CONCRETE BARRIER AND BOTH FACES OF TYPICAL TEMPORARY CONCRETE MEDIAN BARRIER

USE FOR INSTALLATIONS REQUIRING 1′-0", 2′-0" OR 4′-0" ANCHOR BOLT SPACING

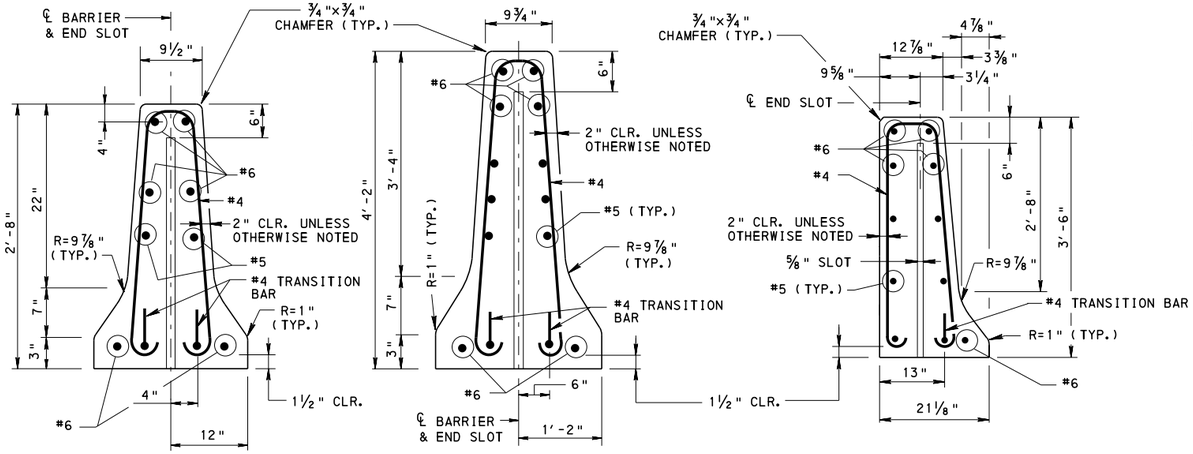


TEMPORARY MEDIAN BARRIER - PLAN

BOTH ENDS OF BARRIER ARE TYPICAL

TEMPORARY BARRIER - PLAN

BOTH ENDS OF BARRIER ARE TYPICAL



ALTERNATE TEMPORARY MEDIAN BARRIER 32"

TEMPORARY GLARE SCREEN MEDIAN BARRIER 50"

TEMPORARY BARRIER 42"

SECTION B-B

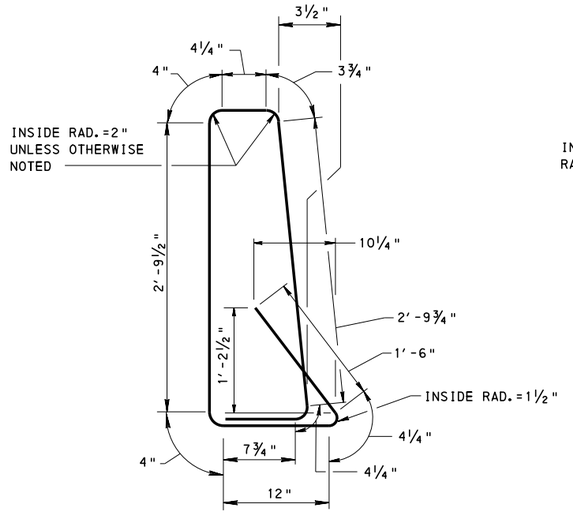
NOTES:

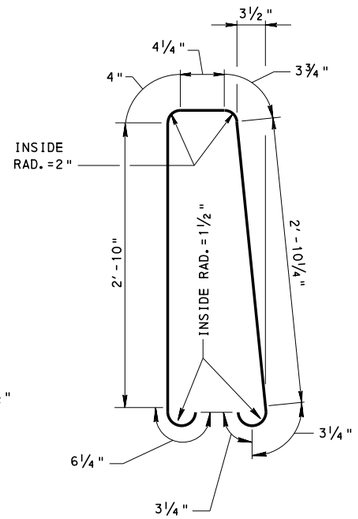
1. FOR GENERAL NOTES, SEE SHEET 1.
2. FOR CONSTRUCTION NOTES, SEE SHEET 2.
3. FOR SECTION A-A, SEE SHEET 4.

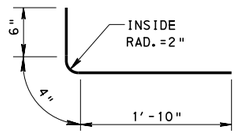
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD TEMPORARY CONCRETE BARRIER, STRUCTURE MOUNTED END SECTION DETAILS AND REINFORCEMENT DETAILS

RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent L. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 5 OF 8 BC-719M

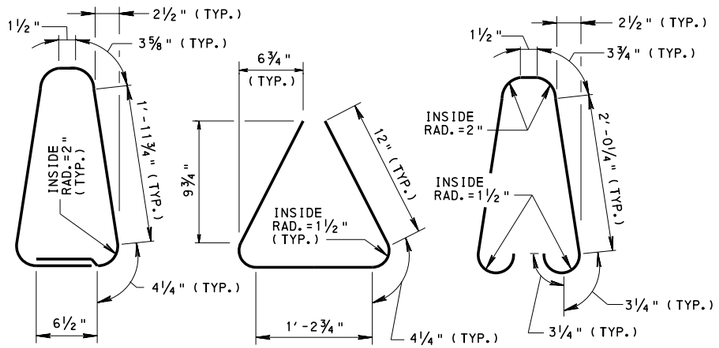




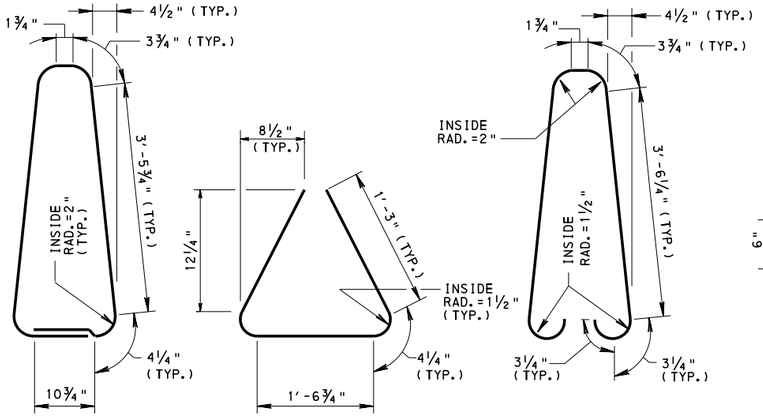


TRANSITION BAR

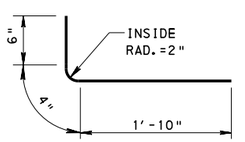
TEMPORARY BARRIER
TYPICAL REINFORCEMENT BARS



MEDIAN BARRIER 32"



GLARE SCREEN MEDIAN BARRIER 50"



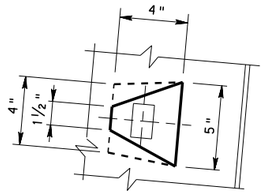
TRANSITION BAR

TEMPORARY MEDIAN BARRIER
TYPICAL REINFORCEMENT BARS

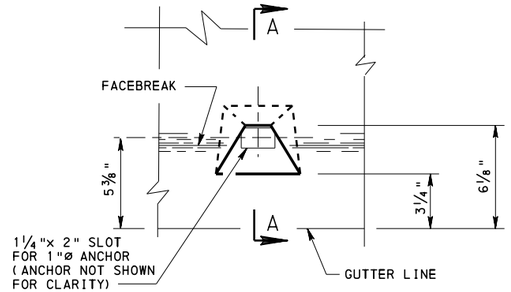
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
TEMPORARY CONCRETE BARRIER, STRUCTURE MOUNTED
BAR BENDING DIAGRAMS

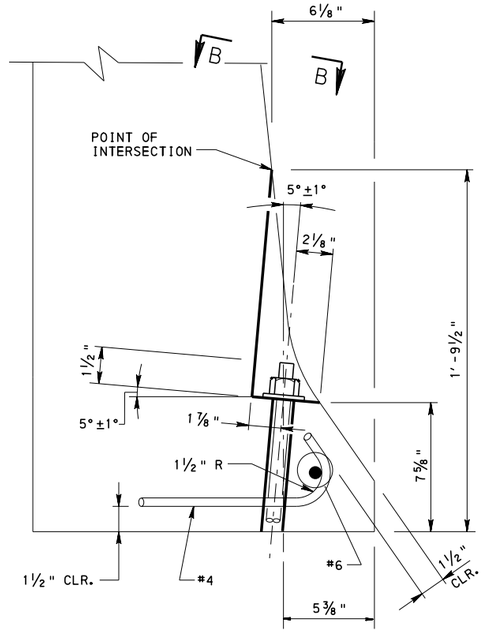
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian D Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 6 OF 8 BC-719M



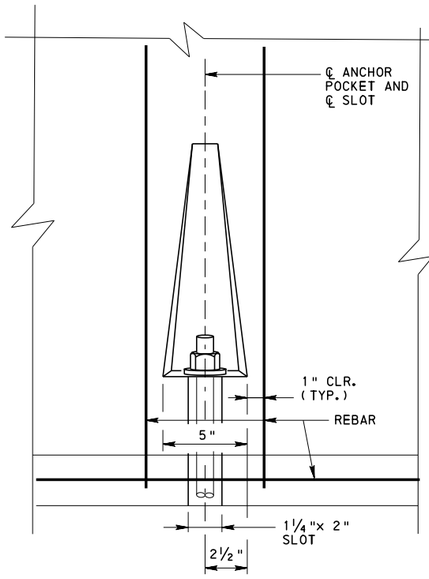
PARTIAL PLAN B-B



PLAN

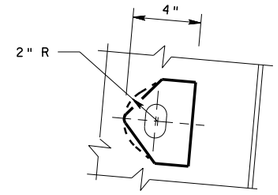


BARRIER SECTION A-A

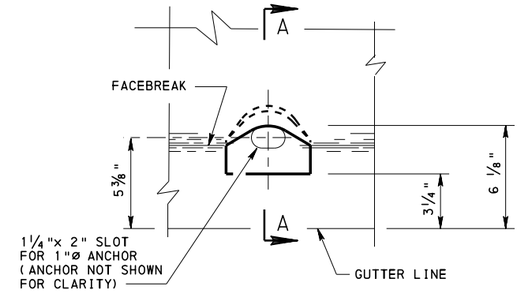


BARRIER ELEVATION

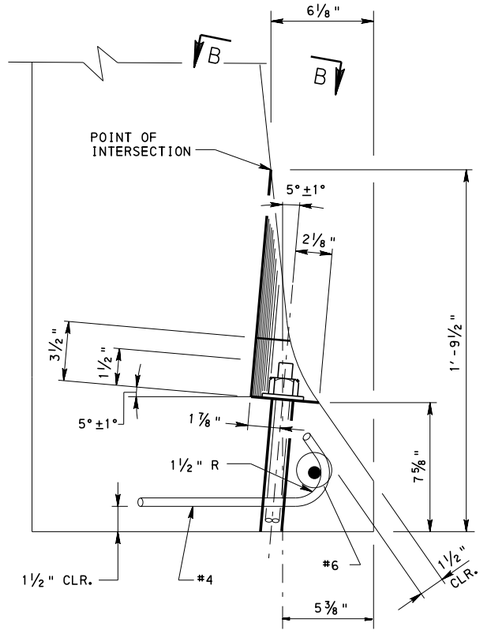
ALTERNATE ANCHOR POCKET DETAIL



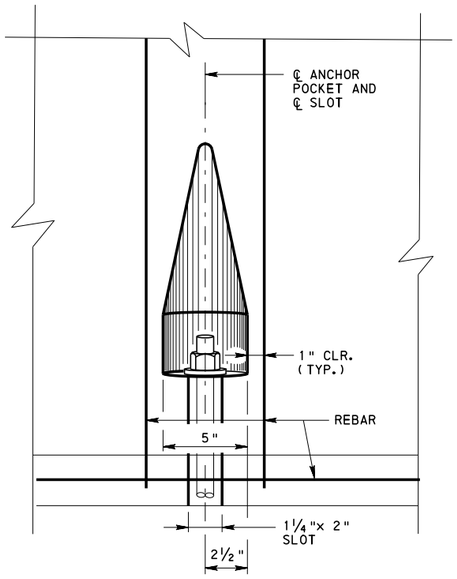
PARTIAL PLAN B-B



PLAN



BARRIER SECTION A-A



BARRIER ELEVATION

ANCHOR POCKET DETAIL

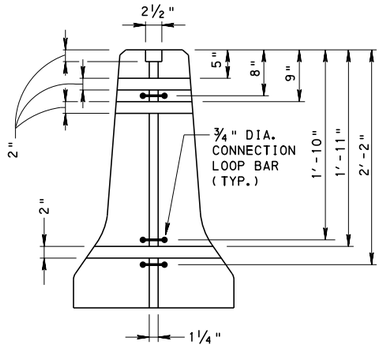
NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. FOR CONSTRUCTION NOTES, SEE SHEET 2.
3. FOR LOCATION OF ANCHOR POCKET, SEE SHEETS 4 AND 5.

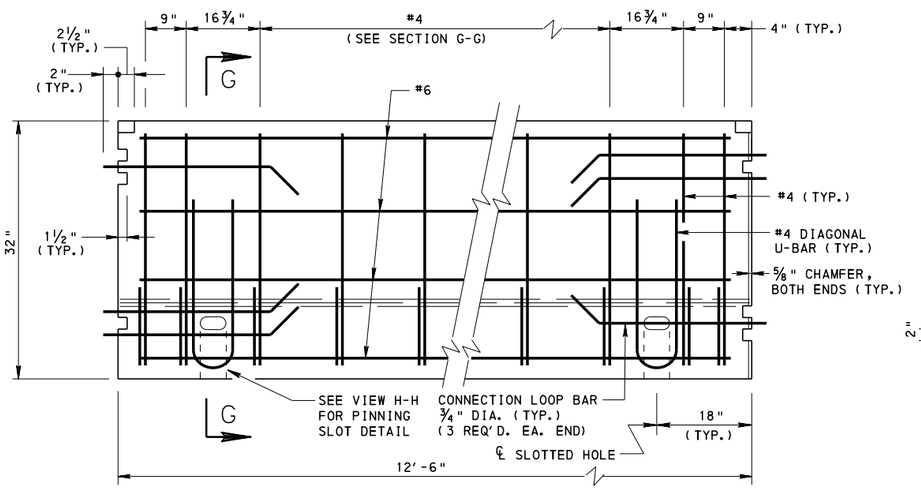
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
TEMPORARY CONCRETE BARRIER,
STRUCTURE MOUNTED
ANCHOR POCKET DETAILS

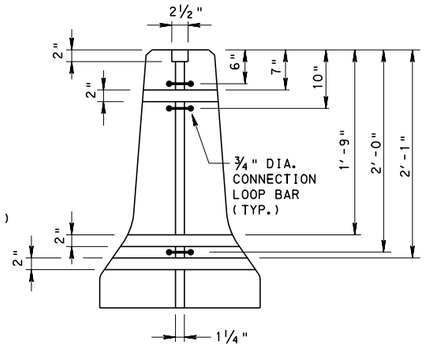
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 7 OF 8
Thomas P Macioce	Bureau of Project Delivery	BC-719M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



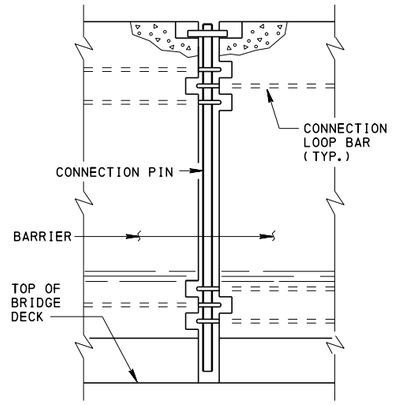
LEFT END VIEW



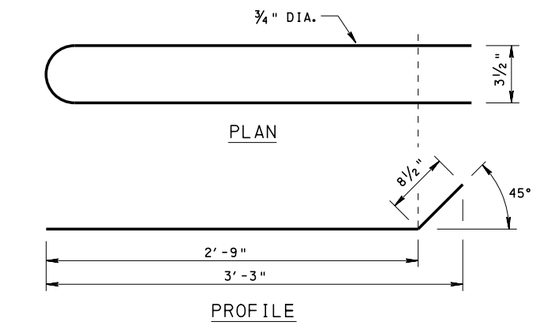
ELEVATION



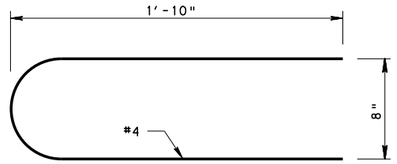
RIGHT END VIEW



CONNECTION DETAIL

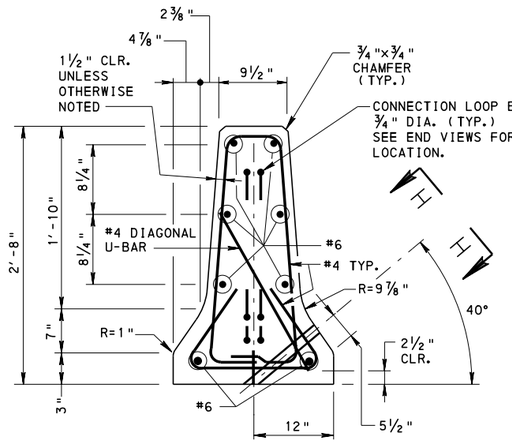


CONNECTION LOOP BAR

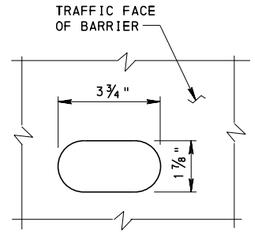


DIAGONAL U-BAR

REINFORCEMENT BAR DETAILS

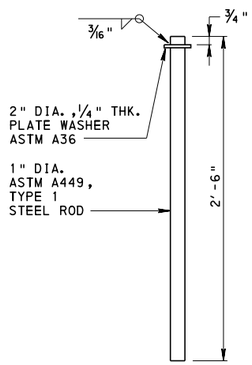


SECTION G-G

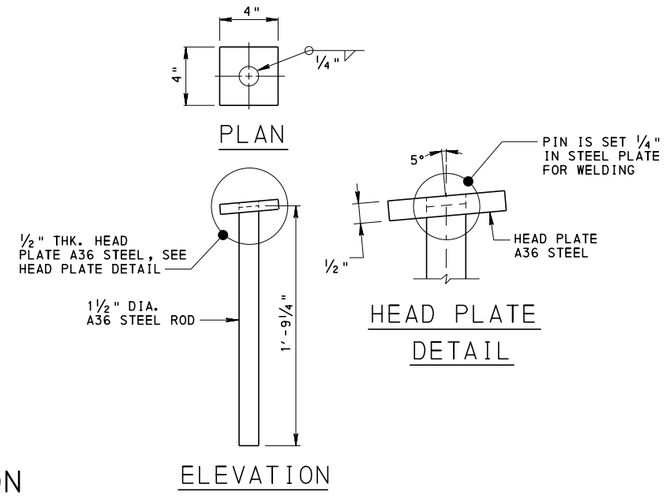


VIEW H-H
PINNING SLOT DETAIL

NOTE:
PIN CONNECTED DROP PIN ANCHOR BARRIER HAS BEEN SUCCESSFULLY TESTED FOR TL-3 TEMPORARY BARRIER AS PER NCHRP 350.

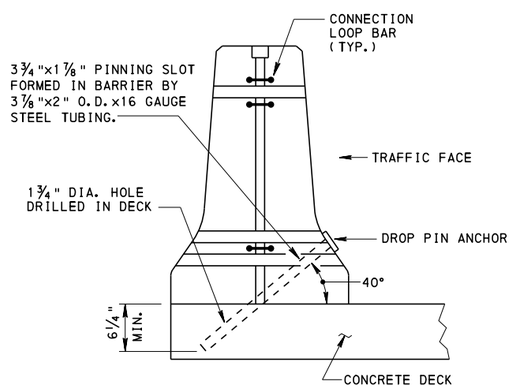


CONNECTION
PIN DETAIL



HEAD PLATE
DETAIL

DROP-PIN ANCHOR DETAIL



DECK SECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

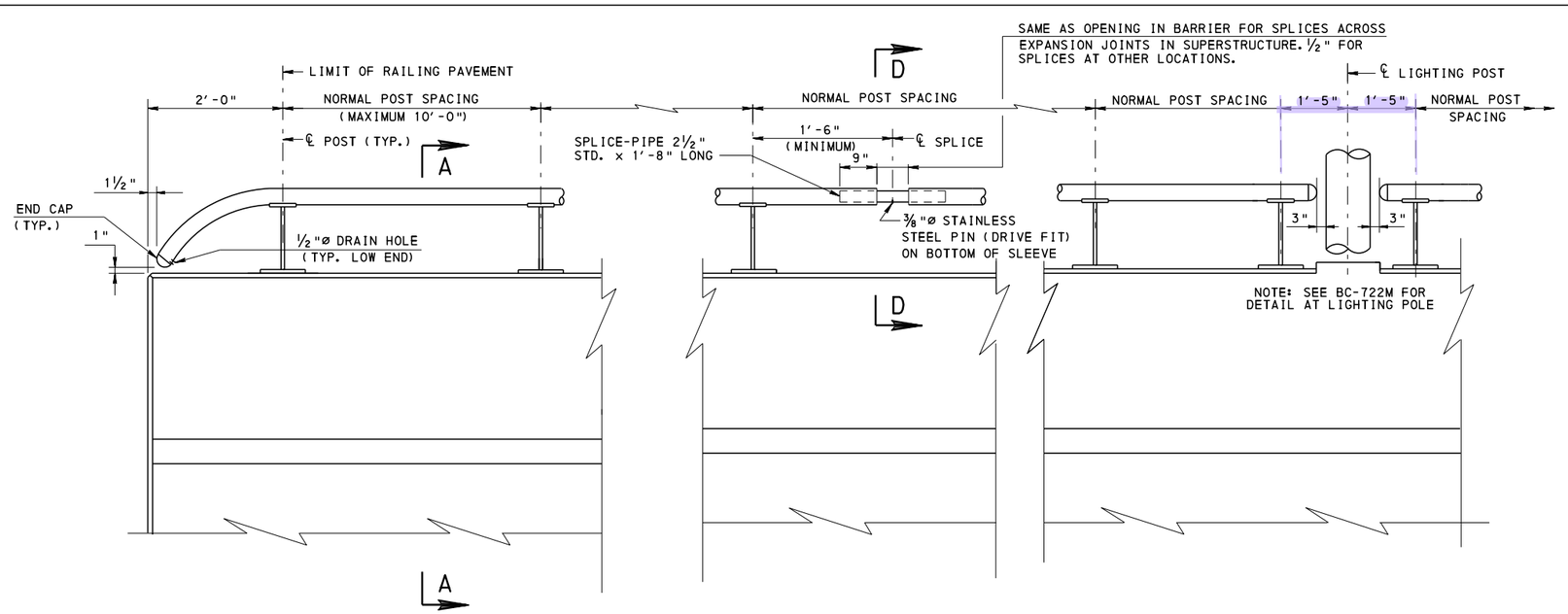
STANDARD TEMPORARY CONCRETE BARRIER, STRUCTURE MOUNTED PIN CONNECTED DROP-PIN ANCHOR BARRIER SYSTEM

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brian D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

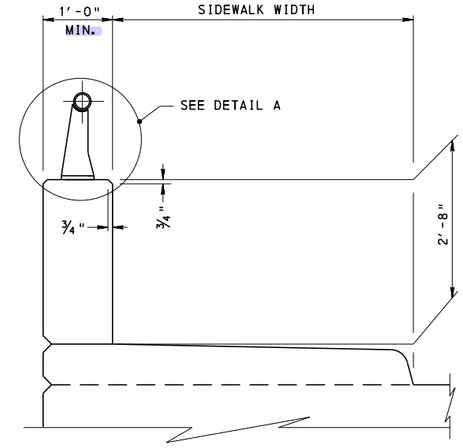
SHEET 8 OF 8

BC-719M

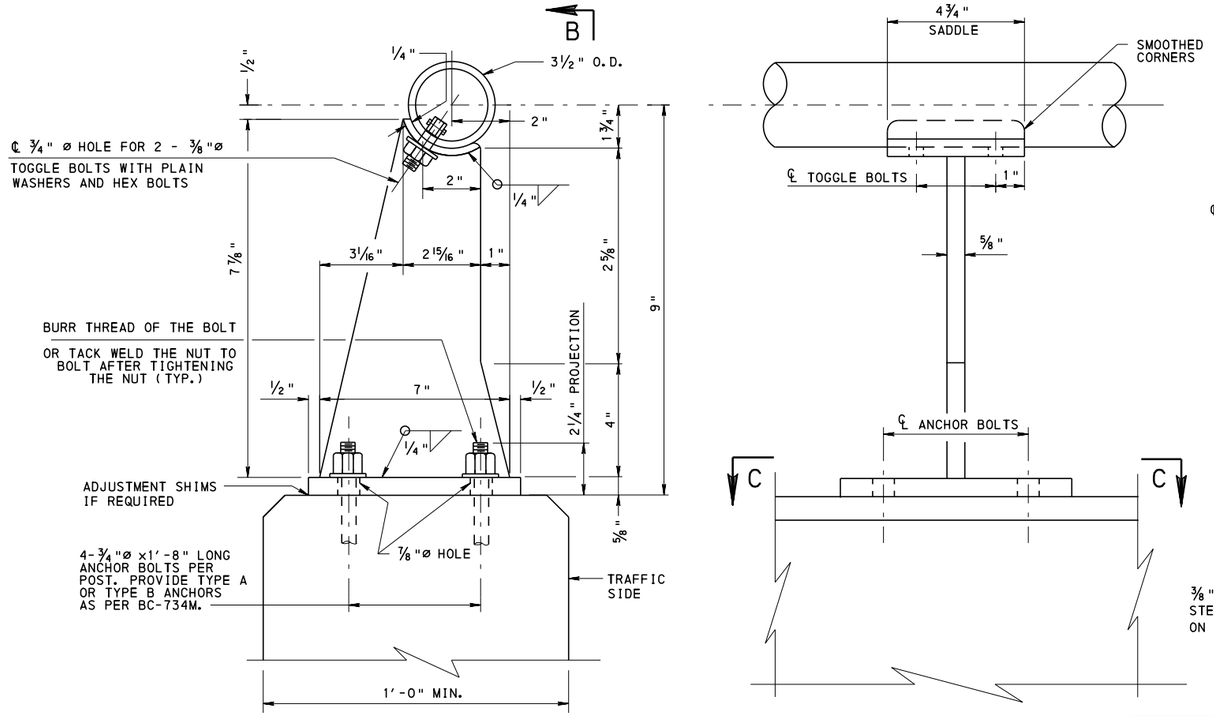


ELEVATION

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

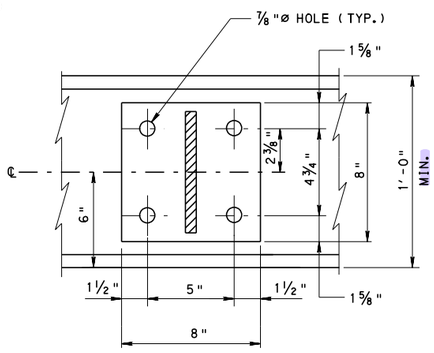


SECTION A-A

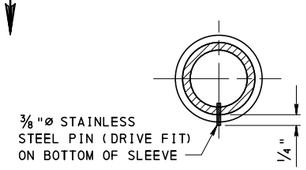


DETAIL A

VIEW B-B



SECTION C-C



SECTION D-D

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP 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 ℄ RAIL SPLICE 1'-6" FROM ℄ 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 MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 705.8(b).
8. FOR TYPICAL CONCRETE BARRIER OR 3'-6" VERTICAL WALL BRIDGE BARRIER TO BE USED ONLY WHEN AUTHORIZED BY THE DISTRICT TRAFFIC ENGINEER.

BC-711M	ALUMINUM PROTECTIVE BARRIER
BC-739M	BRIDGE BARRIER TO GUIDE RAIL TRANSITION
BC-734M	ANCHOR SYSTEMS
BC-722M	LIGHTING POLE ANCHORAGE

REFERENCE DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

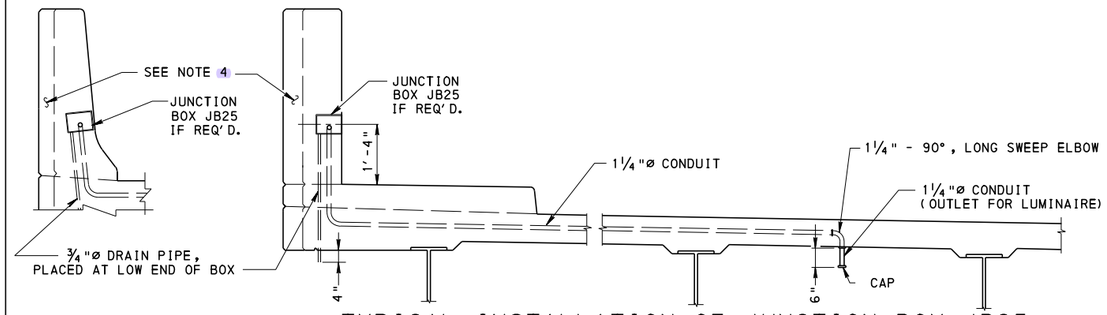
STANDARD ALUMINUM OR STEEL BRIDGE HAND RAILING

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY

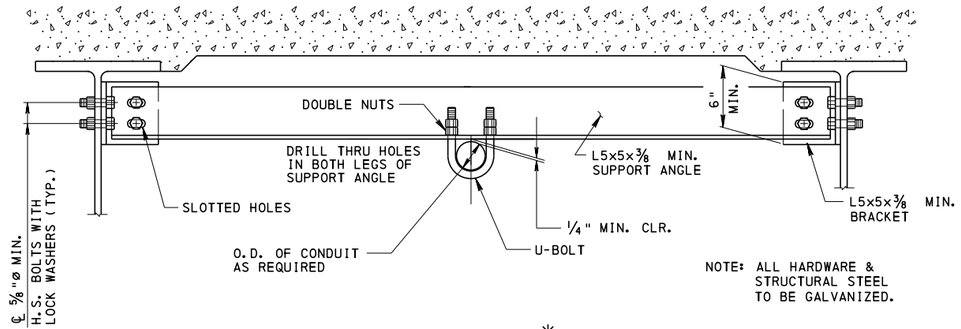
SHEET 1 OF 1

BC-720M



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

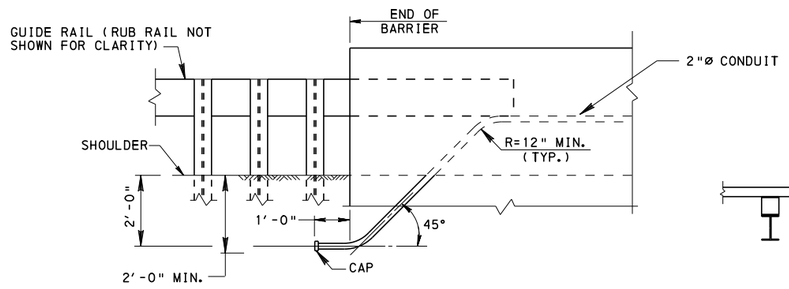
REFER TO DESIGN DRAWINGS FOR LOCATION OF OUTLETS FOR LUMINAIRES



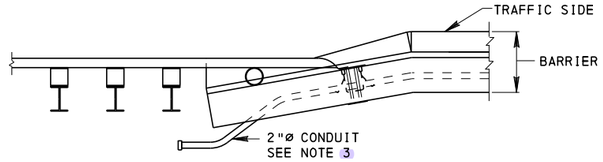
CONDUIT HANGER *

(FOR STEEL CONDUIT ONLY)

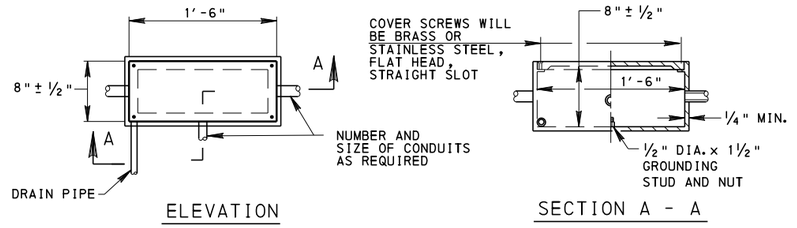
* MOUNTING DETAIL FOR CONDUIT HANGER AS SHOWN IS A SUGGESTED METHOD FOR STEEL STRUCTURES. DETAILS FOR PRESTRESSED BEAMS WOULD BE SIMILAR. ALTERNATIVE DETAILS WILL BE CONSIDERED ON A CASE BY CASE BASIS. ALL DETAILS MUST BE DESIGNED FOR SPECIFIC LOADS AND DETAILED ON SHOP DRAWINGS. DO NOT MAKE ANY ATTACHMENT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



ELEVATION



PLAN VIEW



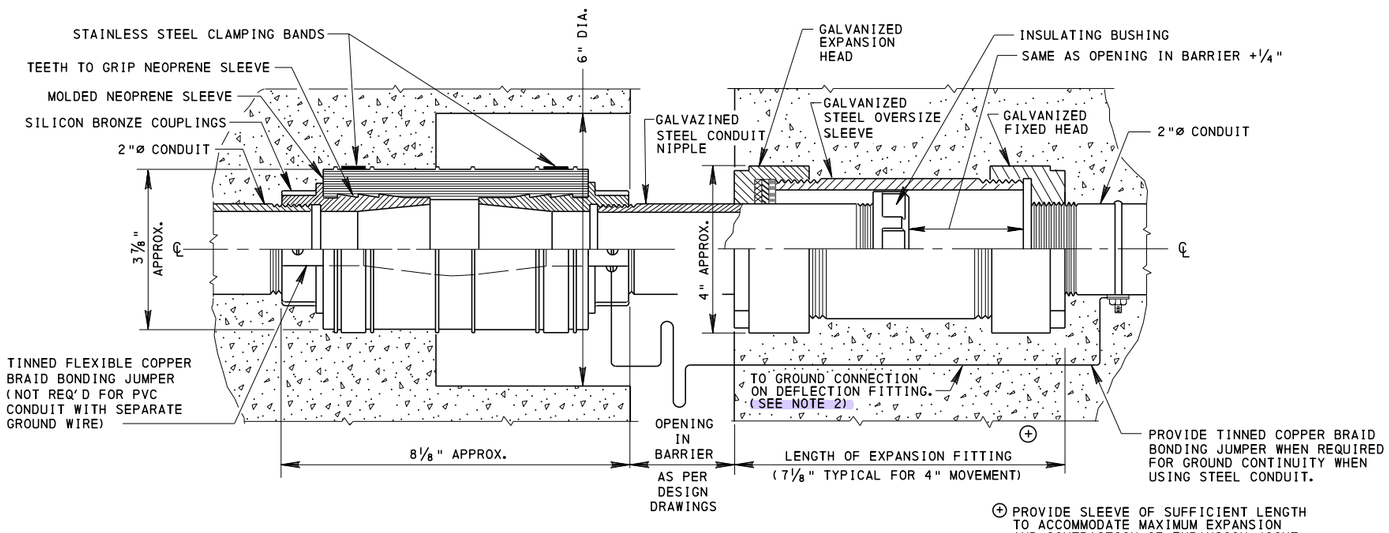
ELEVATION

SECTION A - A

JUNCTION BOX JB25

(SECTION 1101 OF PUB. 408)

CONDUIT DETAILS AT ENDS OF BRIDGE



ELEVATION

PLAN VIEW

CONDUIT EXPANSION AND DEFLECTION JOINT FITTINGS

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408.
2. FOR PROPER GROUNDING OF GALV. STEEL CONDUIT OR NON-METALLIC CONDUIT, SEE PUB. 408 SECTION 910.
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 PARAPETS 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.

REFERENCE DRAWINGS	
BC-739M	BRIDGE BARRIER TO GUIDE RAIL TRANSITION
BC-722M	LIGHTING POLE ANCHORAGE

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD ELECTRICAL DETAILS

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

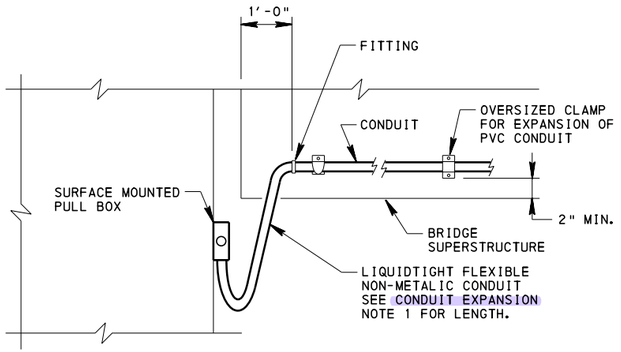
RECOMMENDED SEPT. 30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 1 OF 2

BC-721M

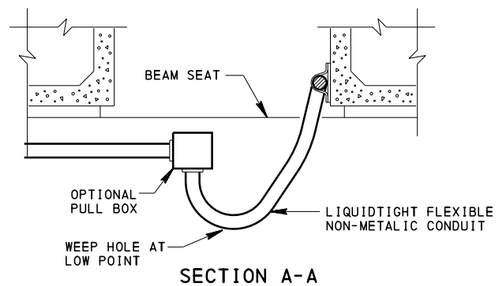
CONDUIT EXPANSION NOTES

1. APPROXIMATE LENGTH OF FLEXIBLE CONDUIT IS 2 TIMES ANTICIPATED MOVEMENT OR 1'-0" MIN. PLUS 3'-0".
2. SIZE BOX PER ARTICLE NEC314.
3. FOR UNDERBRIDGE LOCATIONS, BOXES CAN BE USED IF KEPT INACCESSABLE 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 PER PUB.408, SECTION 1101.10.

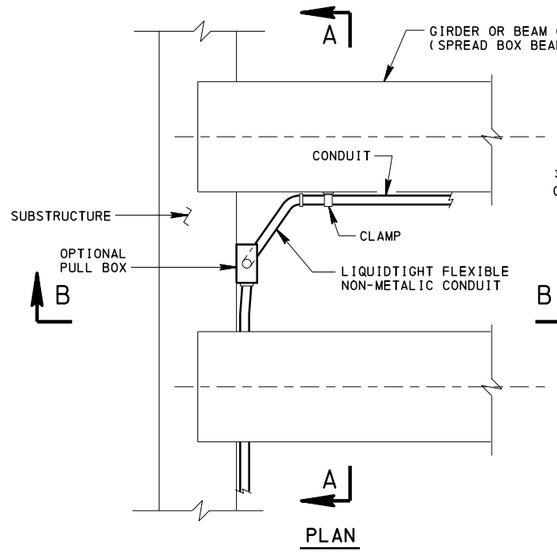


SECTION B-B

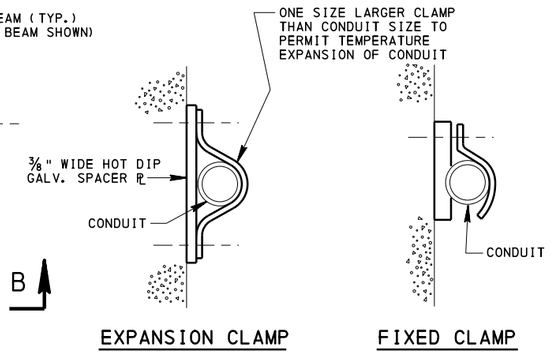
BOX USED FOR LARGER MOVEMENTS



SECTION A-A



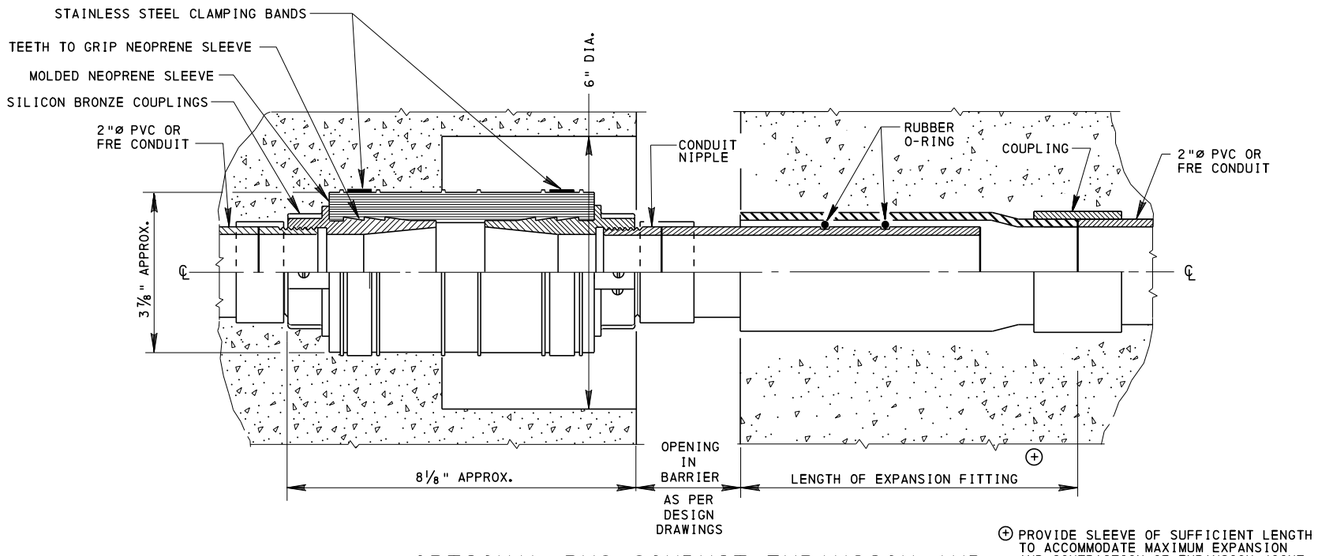
PLAN



EXPANSION CLAMP FIXED CLAMP

CONDUIT CLAMP DETAILS

EXPOSED CONDUIT CONNECTIONS AT EXPANSION JOINTS



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

OPTIONAL PVC CONDUIT EXPANSION AND DEFLECTION JOINT FITTINGS

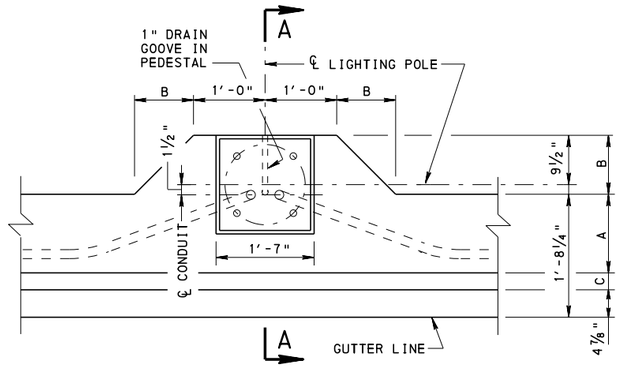
NOTES:

1. REFER TO PUBLICATION 408, SECTION 910.3(q) FOR GROUNDING.
2. GROUND METAL CONDUIT. PROVIDE AN AWG#4 BONDING JUMPER WHEN NECESSARY FOR GROUND CONTINUITY.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

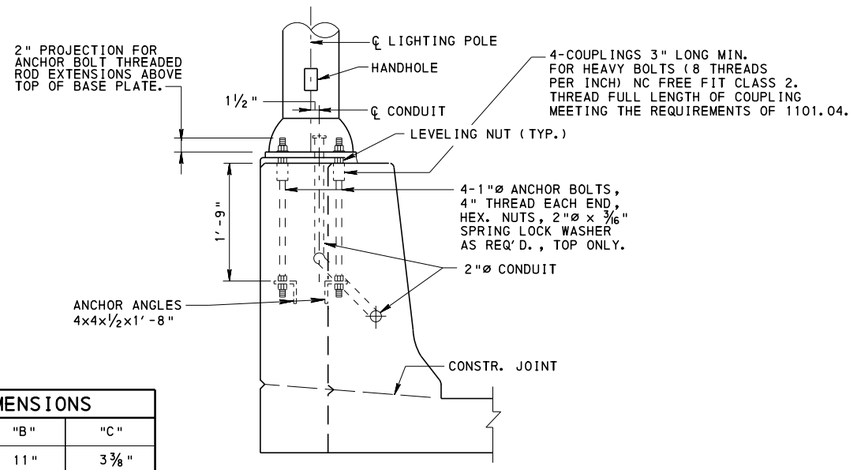
STANDARD
ELECTRICAL DETAILS

RECOMMENDED SEPT.30, 2016	RECOMMENDED SEPT.30, 2016	SHEET 2 OF 2
Thomas P. Macioce	Brian D. Thompson	BC-721M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



PLAN

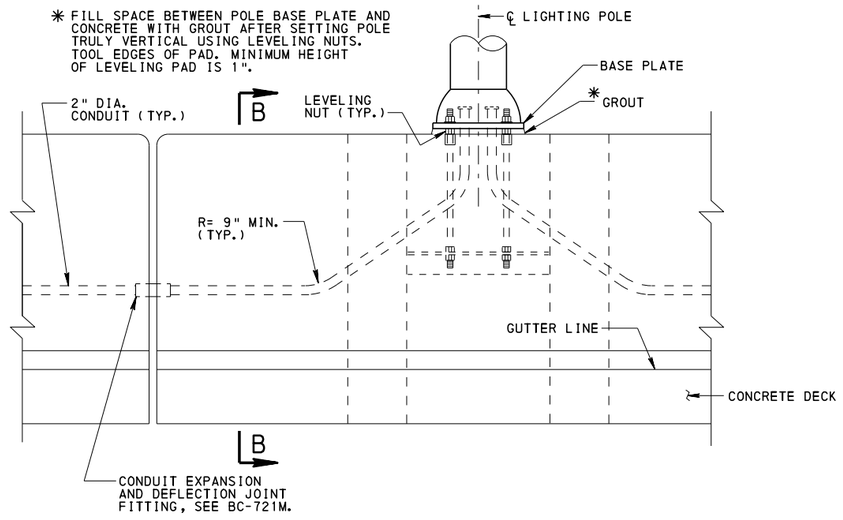
BLISTER DIMENSIONS			
F-BARRIER TYPE	"A"	"B"	"C"
TYP.	1'-0"	11"	3⅜"
ALT.	1'-1"	10"	2⅜"



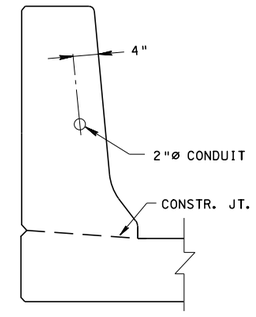
SECTION A-A

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP 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 2½" CONCRETE COVER FOR CONDUIT.

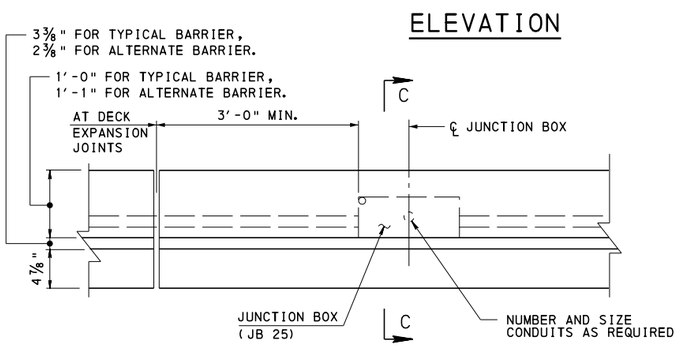


ELEVATION



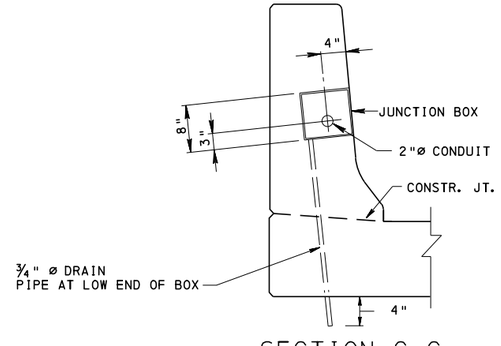
SECTION B-B

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



ALTERNATE - PLAN

(SLOPED BARRIER WITH JUNCTION BOX)



SECTION C-C

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

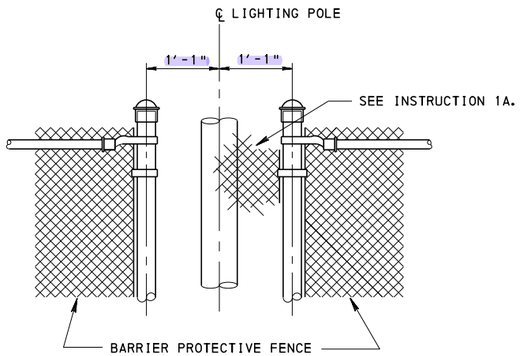
STANDARD LIGHTING POLE ANCHORAGE

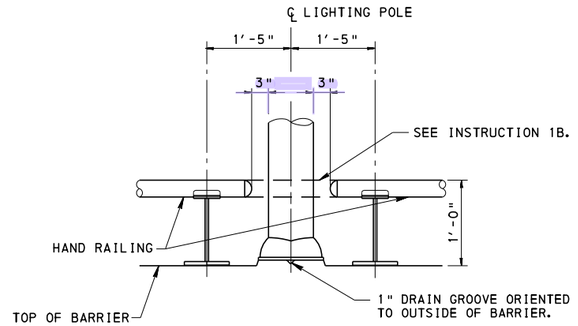
BC-721M	ELECTRICAL DETAILS
REFERENCE DRAWINGS	

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brian B Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-722M





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:

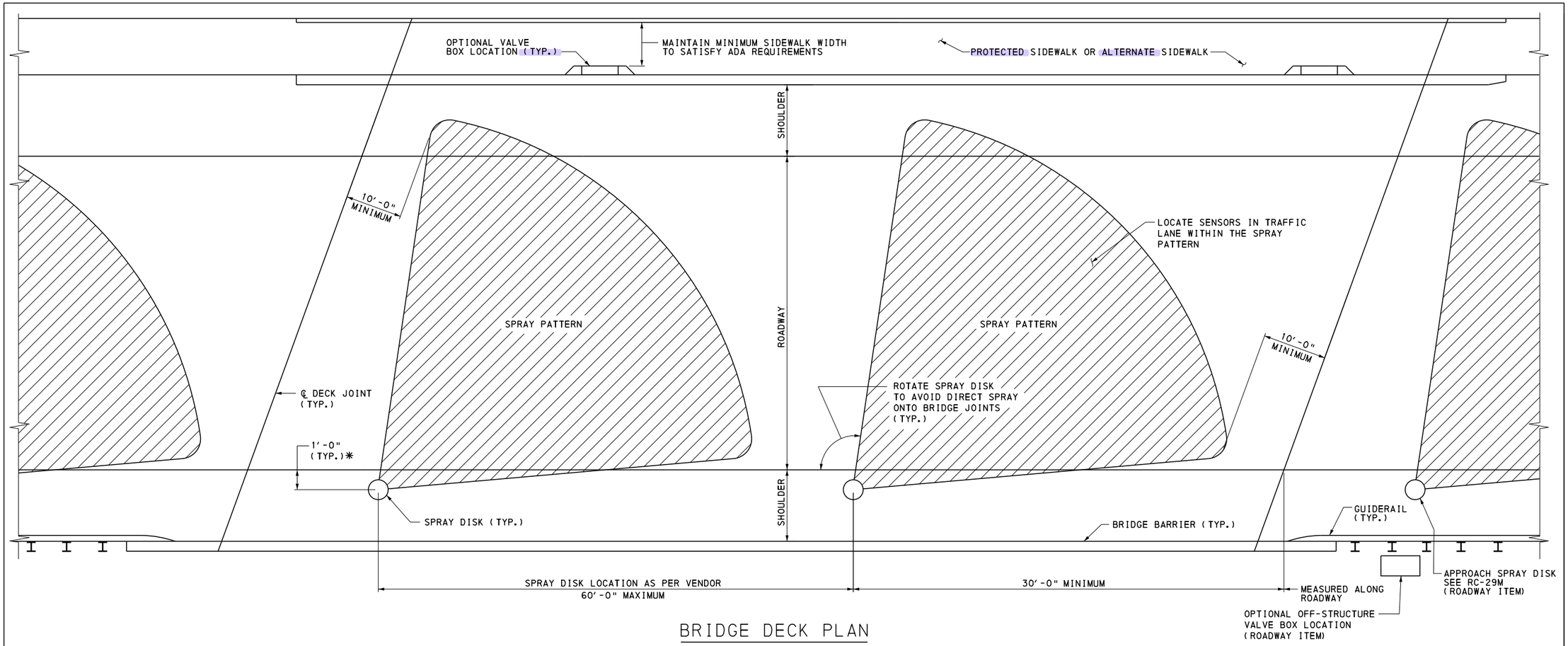
SEE SHEET 1 FOR NOTES.

PEDESTRIAN RAILING / FENCE / HAND RAILING AT LIGHTING POLE

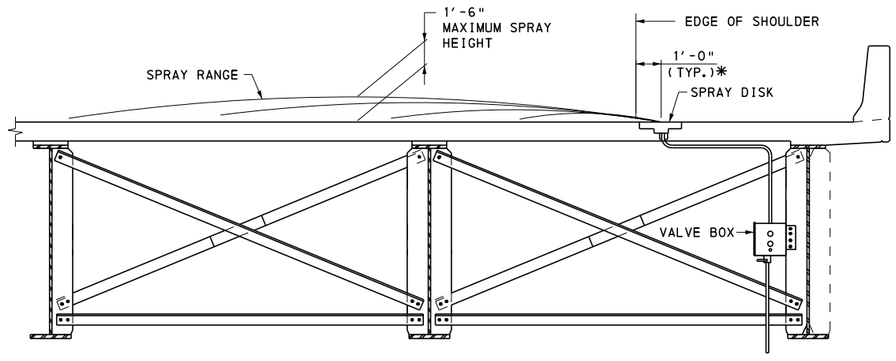
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
LIGHTING POLE ANCHORAGE

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 2
Thomas P Macioce CHIEF BRIDGE ENGINEER	Bureau of Project Delivery DIRECTOR, BUR. OF PROJECT DELIVERY	BC-722M



BRIDGE DECK PLAN



BRIDGE DECK SECTION

(STEEL SUPERSTRUCTURE SHOWN CONCRETE SIMILAR)

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.

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
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brian G Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

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 OVERLAYED, 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 ⅝" DIAMETER OR LARGER AASHTO M 164 (ASTM A 325) H.S. BOLTS FOR ALL ATTACHMENTS TO STRUCTURAL STEEL. DO NOT EXCEED BOLT SPACING OF 5½". 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 ½".

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 ⅛" 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
   - 9½" FOR 2" A53 STEEL PIPE
   - 5¾" 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.

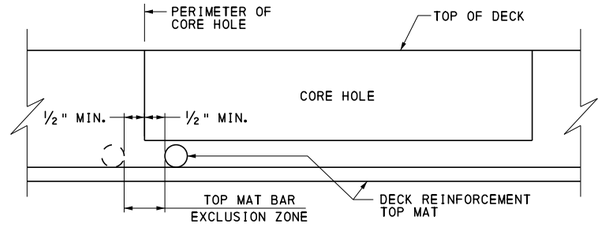
9. NOTE THAT DIAPHRAGMS AND OTHER BRIDGE COMPONENTS MAY RESULT IN LIMITED ACCEPTABLE "BETWEEN THE BEAM" LOCATIONS FOR CARRIER CONDUIT/PIPE. THIS SITUATION MAY RESULT IN EITHER NON-STANDARD SPRAY DISK LOCATIONS, OR, THE BRIDGE MAY BE UNSUITABLE FOR AN ANTI-ICING SYSTEM INSTALLATION. ALL NON STANDARD APPLICATIONS 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.



EXCLUSION ZONE DETAIL

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)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
BRIDGE ANTI-ICING SYSTEM
GENERAL NOTES

RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian D. Thompson 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 ½" 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 3⅜" SQUARE SPACE EXISTS BETWEEN REINFORCEMENT STEEL FOR THE 2⅜" 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 ½" 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 ½" 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.

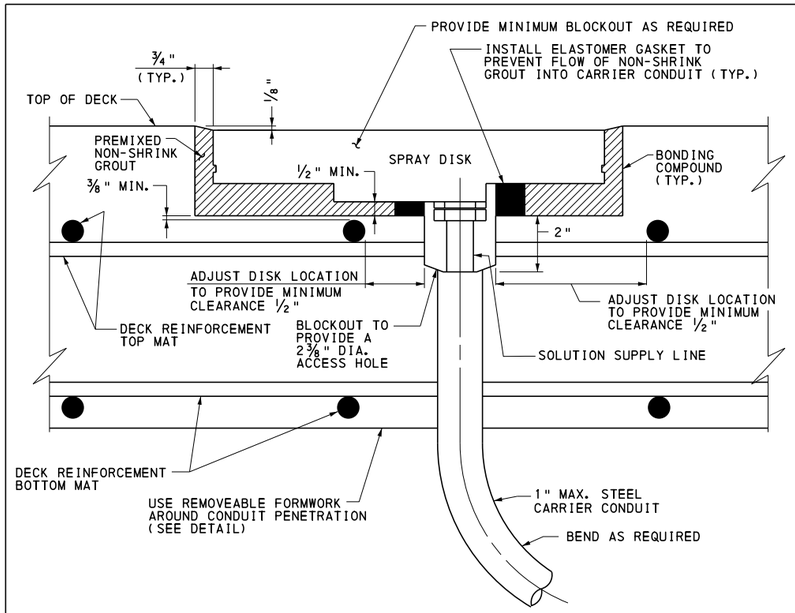
NOTES:

1. FOR GENERAL NOTES, SEE SHEET 2.

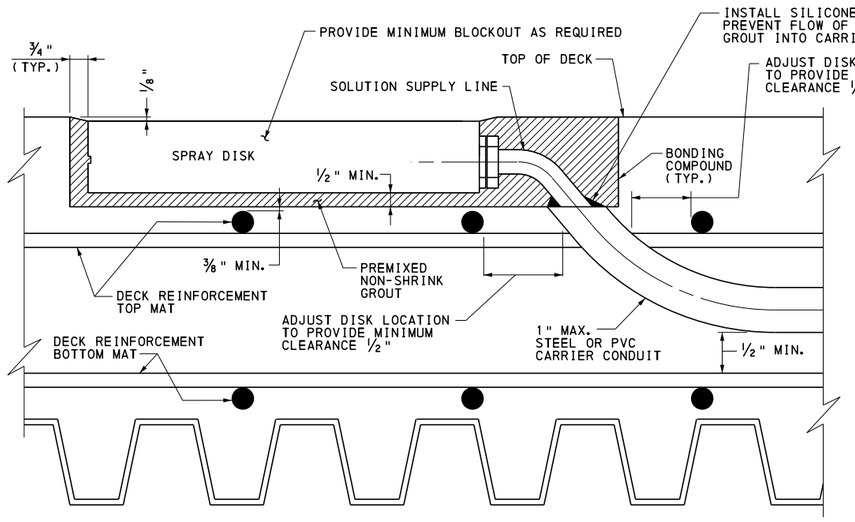
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
BRIDGE ANTI-ICING SYSTEM INSTALLATION PROCEDURES

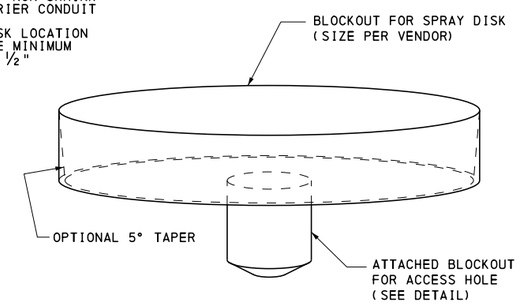
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 10
Thomas P Macioce CHIEF BRIDGE ENGINEER	Brian D Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-723M



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

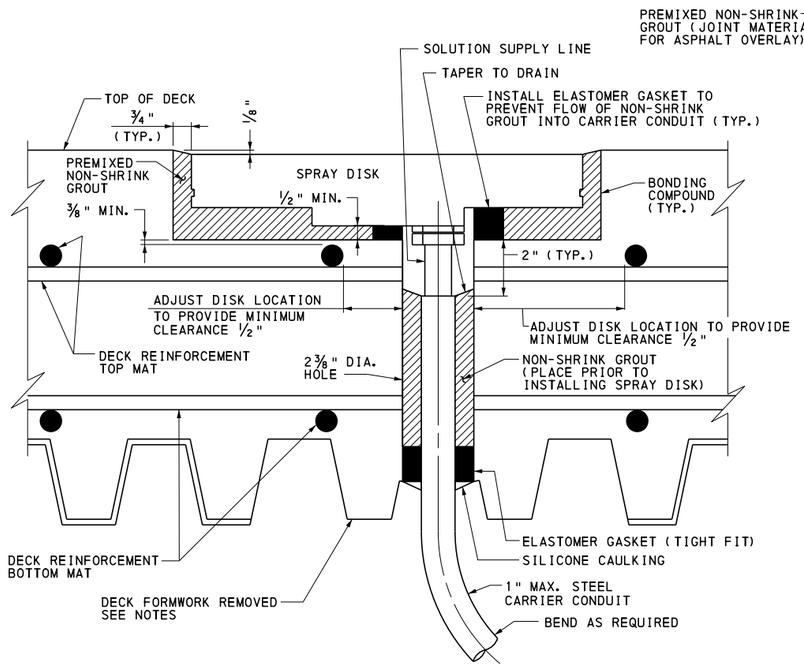
NOTES:

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.

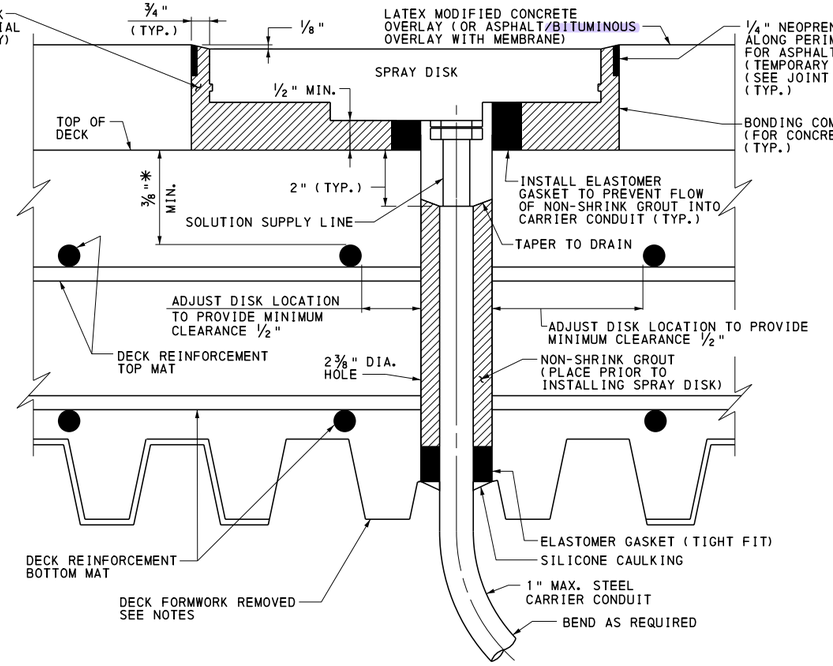
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

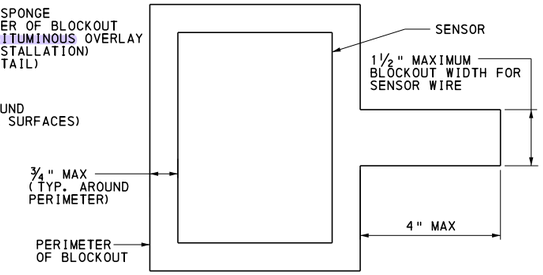
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 4 OF 10 BC-723M



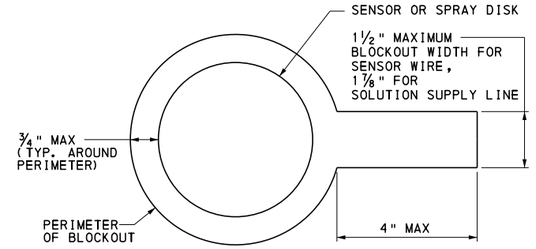
TYPICAL SPRAY DISK SECTION - DECK WITHOUT OVERLAY



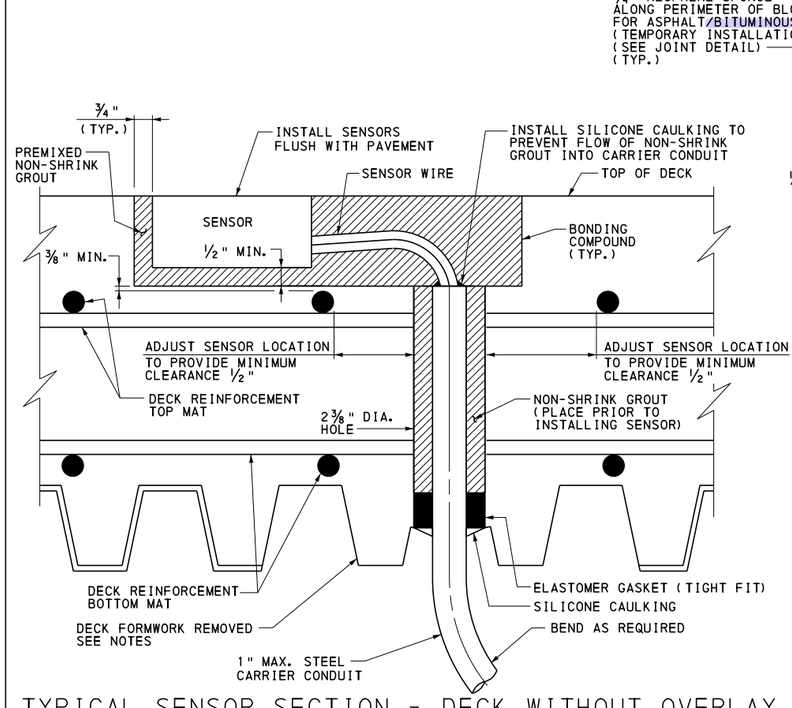
TYPICAL SPRAY DISK SECTION - DECK WITH OVERLAY



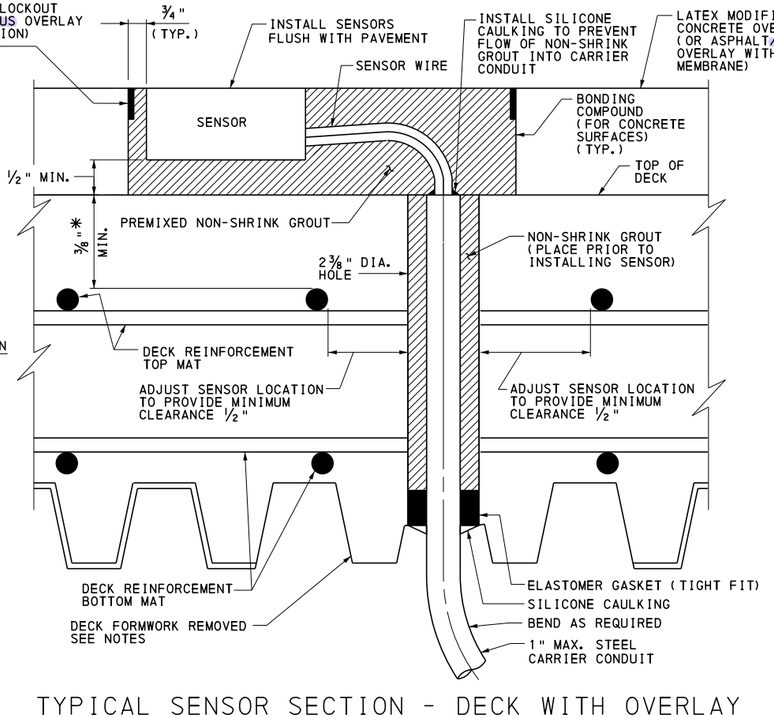
PLAN VIEW FOR RECTANGULAR SHAPED SENSOR



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

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

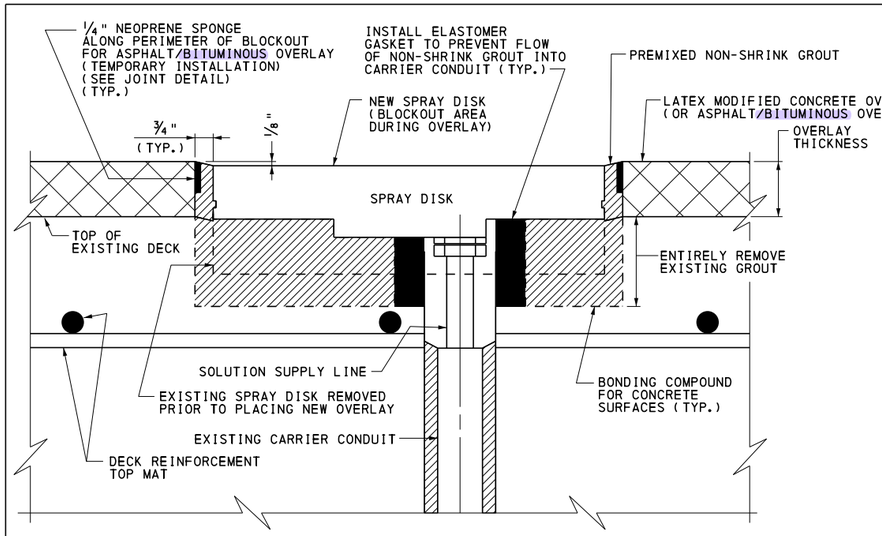
NOTES:

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.

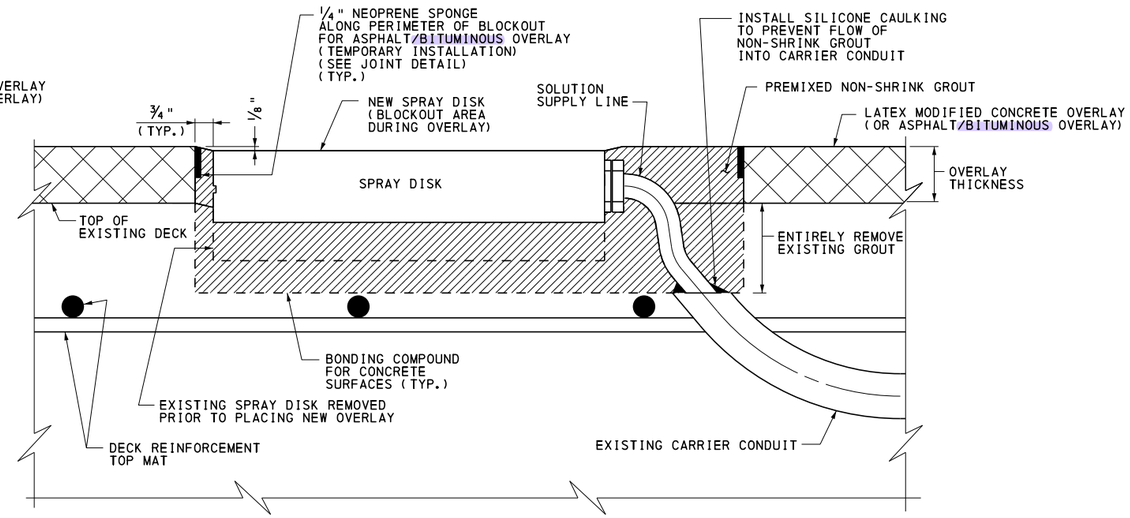
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

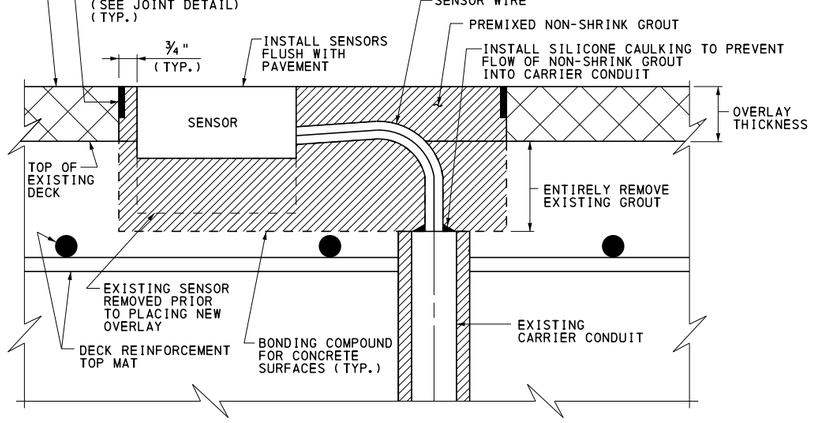
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 5 OF 10
Thomas P. Macioce	Brent D. Thompson	BC-723M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



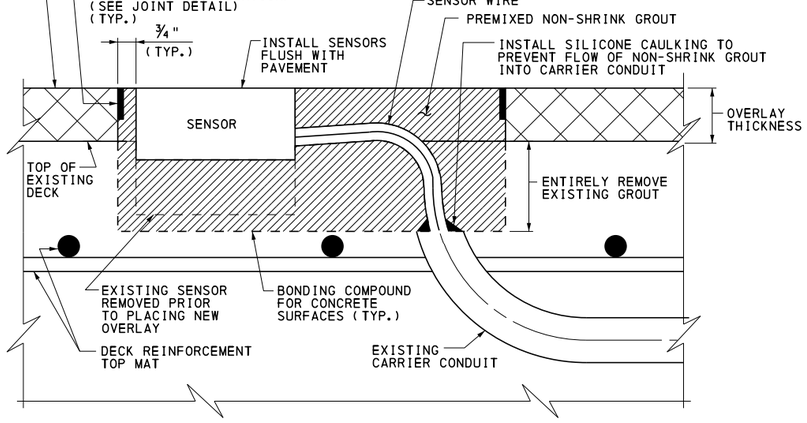
TYPICAL SPRAY DISK SECTION - CONDUIT THROUGH DECK



TYPICAL SPRAY DISK SECTION - CONDUIT IN DECK



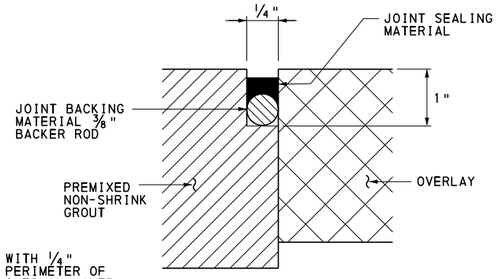
TYPICAL SENSOR SECTION - CONDUIT THROUGH DECK



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.



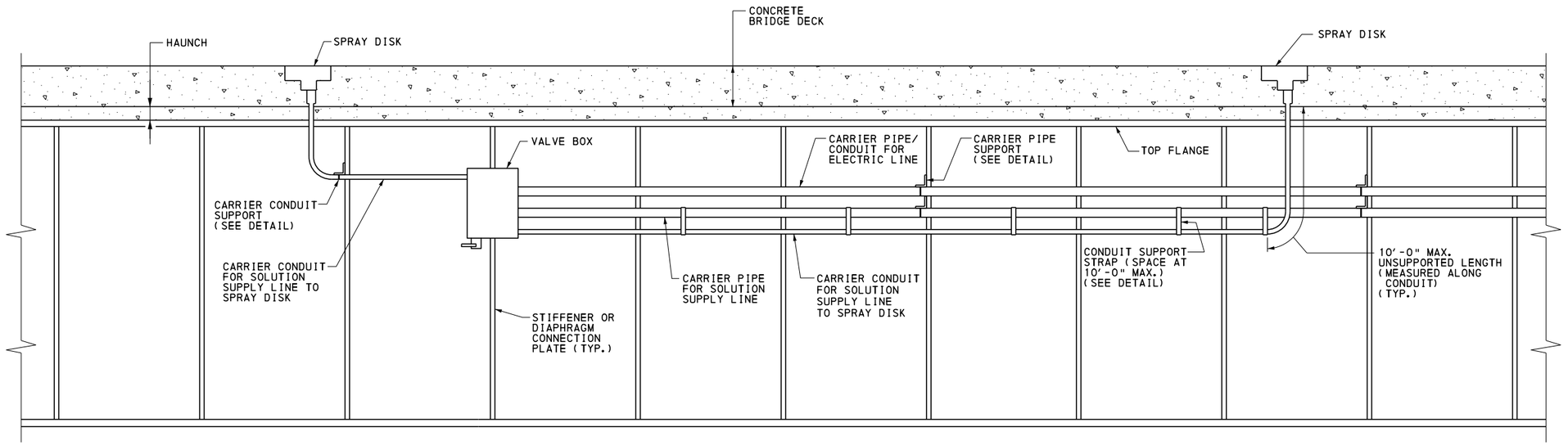
NOTE: INSTALL JOINT MATERIAL WITH 1/4" NEOPRENE SPONGE AROUND PERIMETER OF BLOCKOUT/CUTOUT IN THE OVERLAY LAYER ONLY. AFTER PREMIXED NON-SHRINK GROUT HARDENS, REMOVE SPONGE AND INSTALL 3/8" BACKER ROD AND SEAL WITH JOINT SEALING MATERIAL.

JOINT DETAIL

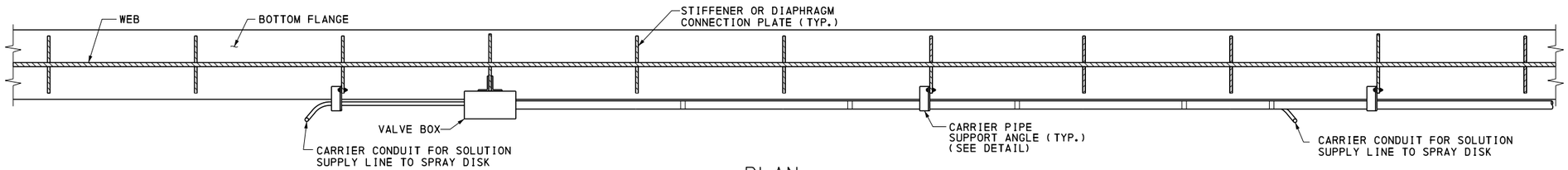
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

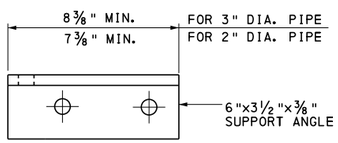
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 6 OF 10
Thomas P. Macioce	Brent D. Thompson	BC-723M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



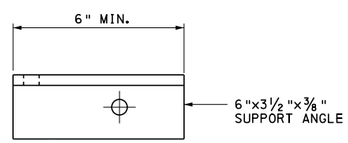
GIRDER ELEVATION



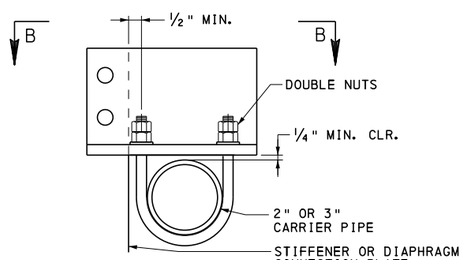
PLAN



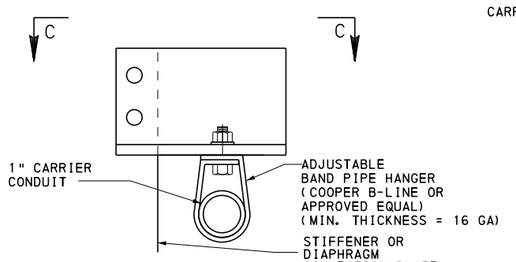
VIEW B-B



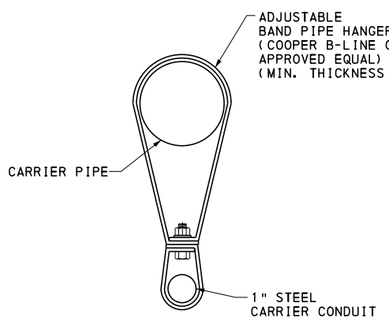
VIEW C-C



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.

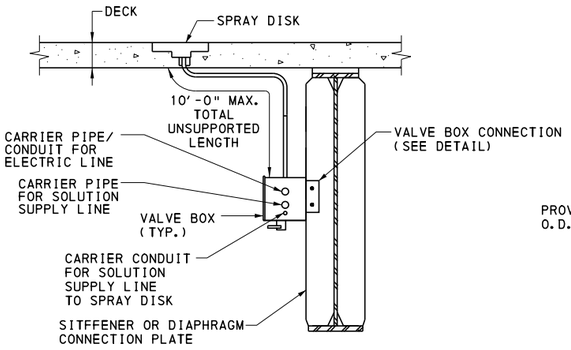
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

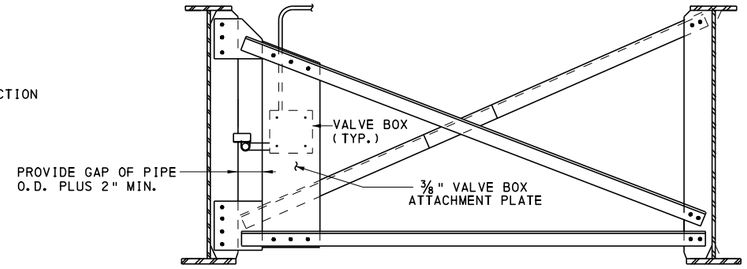
RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-723M



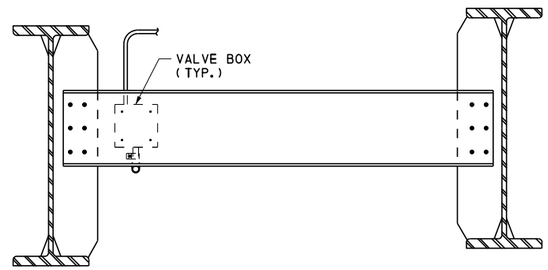
PREFERRED VALVE BOX ATTACHMENT DETAIL
AT STIFFENER OR DIAPHRAGM CONNECTION PLATE



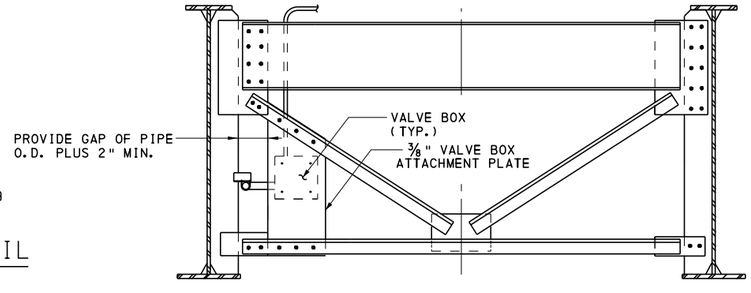
ALTERNATE VALVE BOX ATTACHMENT DETAIL
AT INTERMEDIATE DIAPHRAGM

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.

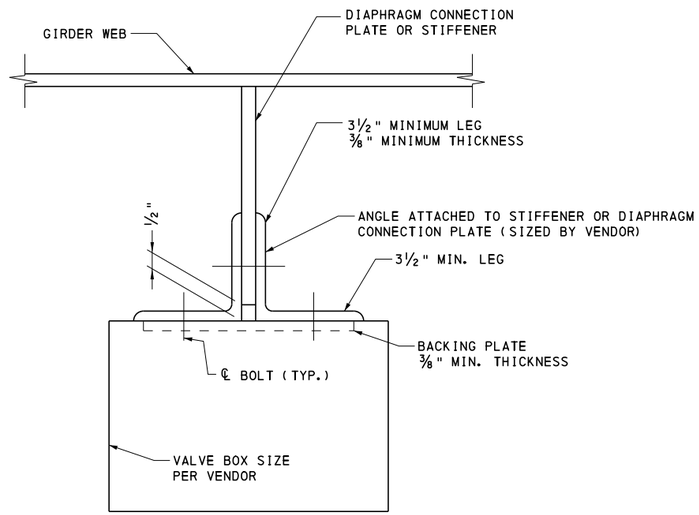


ALTERNATE VALVE BOX ATTACHMENT DETAIL
AT CHANNEL DIAPHRAGM



NOTE: DO NOT PLACE VALVE BOX ON JACKING DIAPHRAGM

ALTERNATE VALVE BOX ATTACHMENT DETAIL
AT END DIAPHRAGM

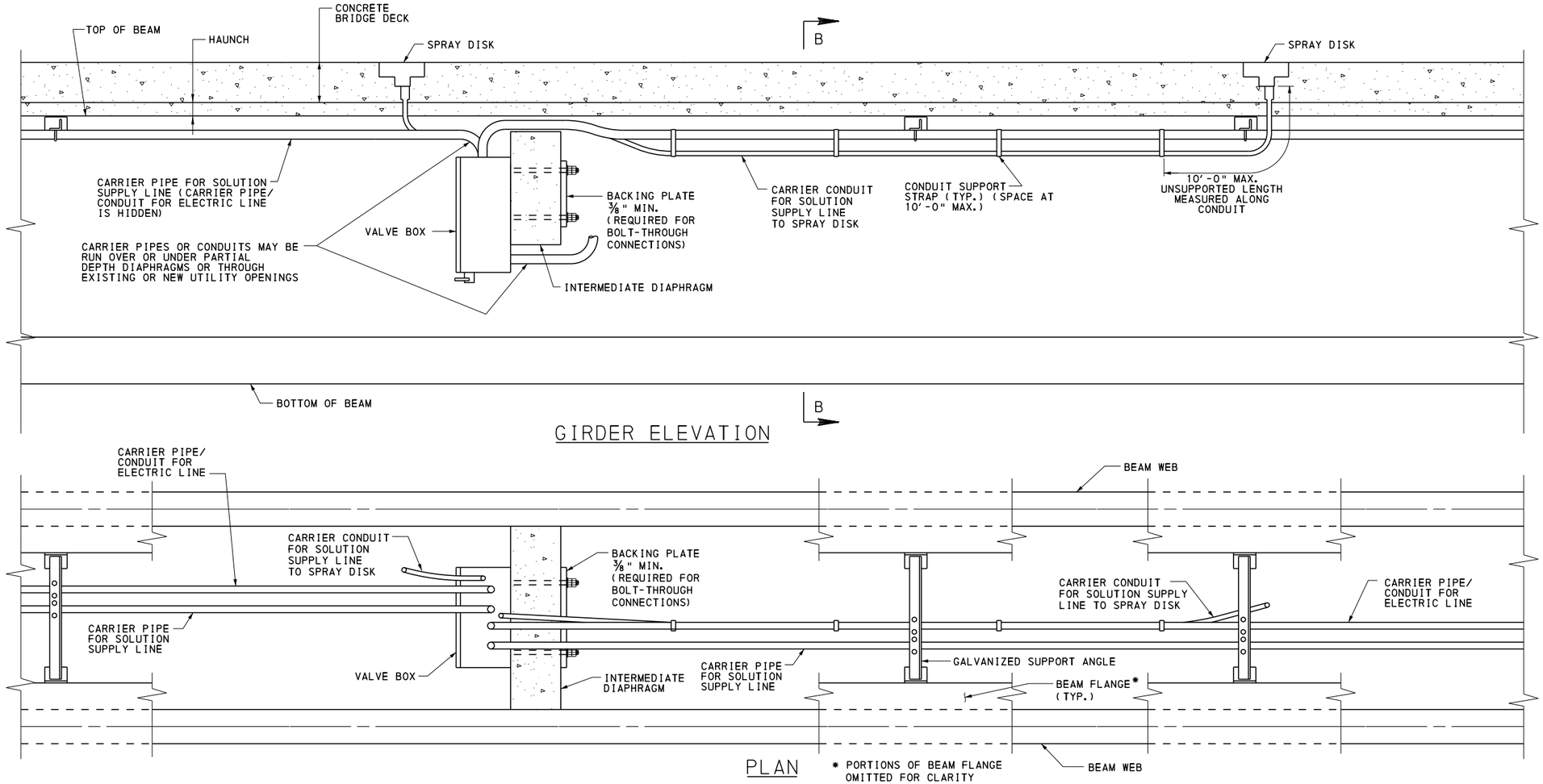


PREFERRED VALVE BOX CONNECTION DETAIL - PLAN

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

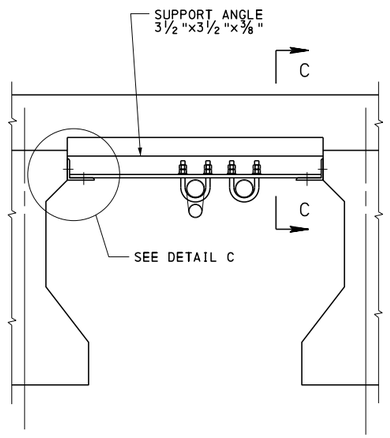
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 8 OF 10
Thomas P Macioce	Brian D Thompson	BC-723M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



GIRDER ELEVATION

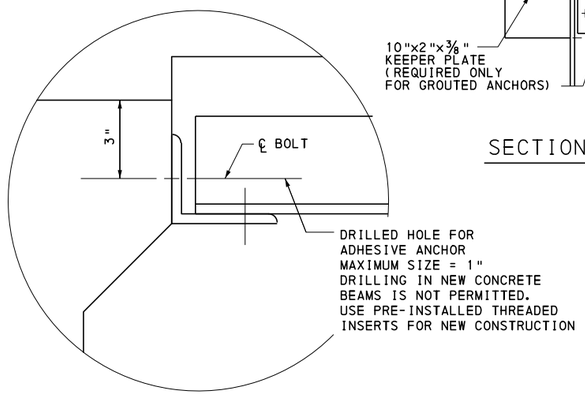
PLAN

* PORTIONS OF BEAM FLANGE OMITTED FOR CLARITY



SECTION B-B

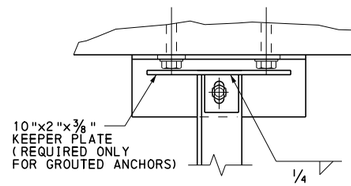
NOTE: I-BEAM SHOWN, BOX BEAM SIMILAR



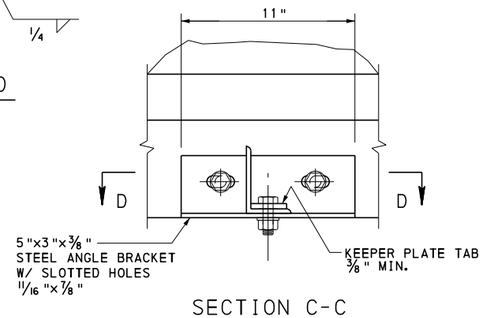
DETAIL C

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)

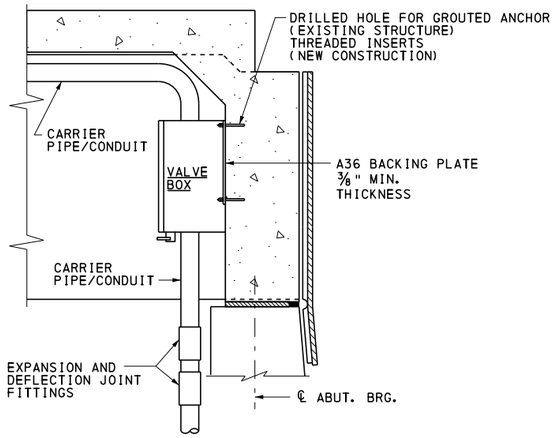
NOTES:

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

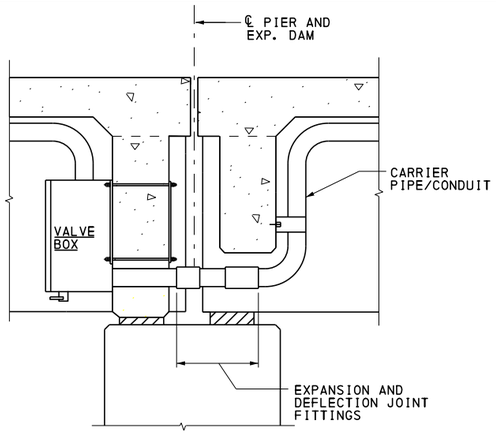
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

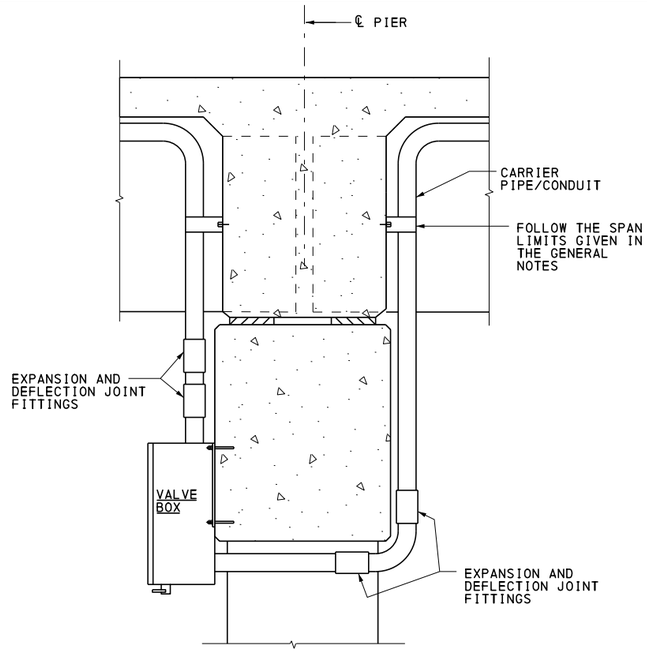
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 9 OF 10
Thomas P Macioce CHIEF BRIDGE ENGINEER	Bruce B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-723M



VALVE BOX ATTACHMENT AT END DIAPHRAGM

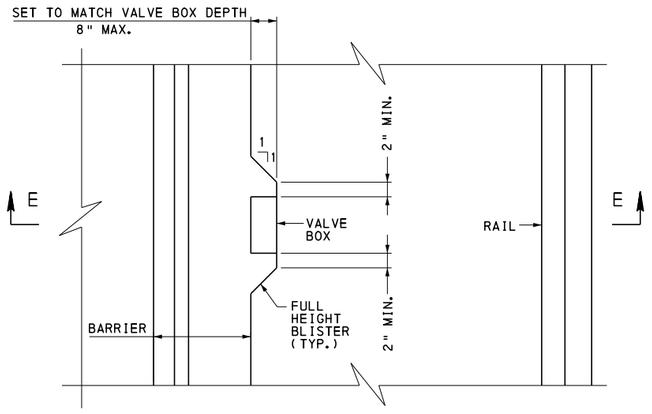


VALVE BOX ATTACHMENT AT
FULL AND PARTIAL DEPTH DIAPHRAGM
AT PIER (FIXED AND EXP.)

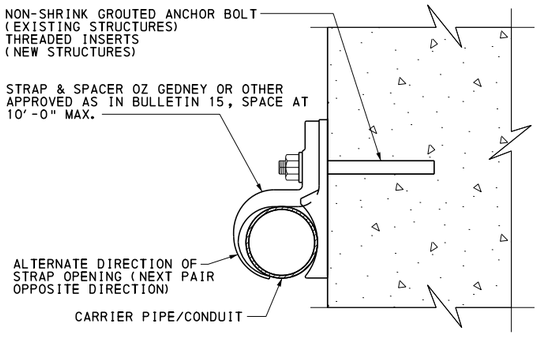


VALVE BOX ATTACHMENT AT
CONTINUITY DIAPHRAGM
AT PIER (FIXED AND EXP.)

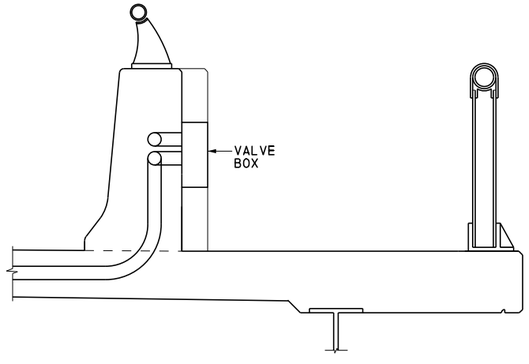
WHERE CROSSING AN EXISTING CONTINUITY DIAPHRAGM (WITHOUT UTILITY OPENINGS) IS REQUIRED, ATTACH VALVE BOXES TO PIER, AND RUN CONDUIT BELOW PIER CAPS.



BARRIER MOUNTED VALVE BOX DETAIL
(NEW CONSTRUCTION ONLY)



CARRIER PIPE / CONDUIT ATTACHMENT TO
CONCRETE SUBSTRUCTURES AND DIAPHRAGMS



SECTION E-E

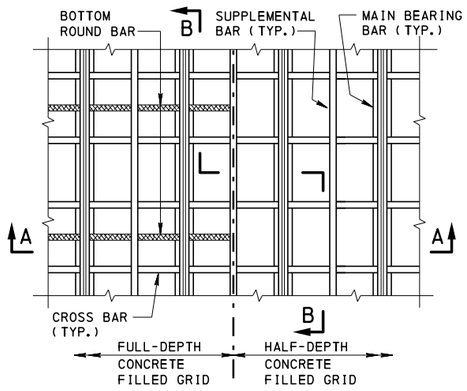
NOTES:

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.

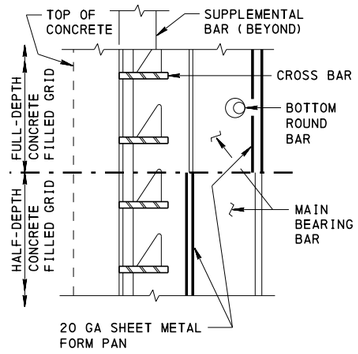
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
BRIDGE ANTI-ICING SYSTEM
GENERAL DETAILS

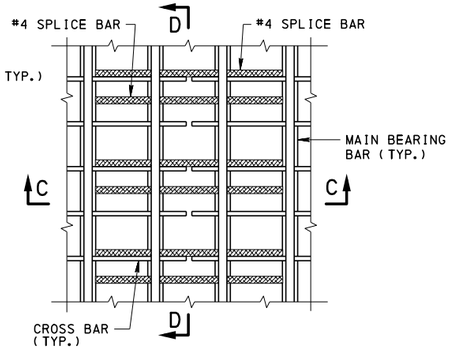
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 10 OF 10
Thomas P. Macioce	Brian D. Thompson	BC-723M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



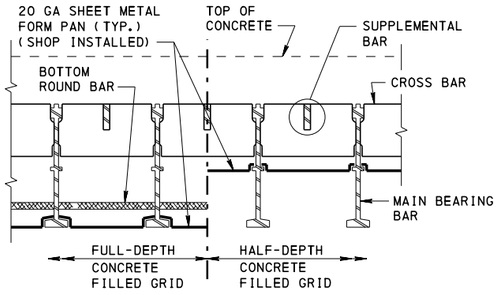
PLAN VIEW



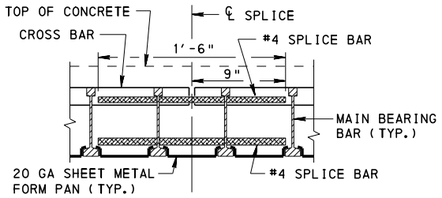
SECTION B-B



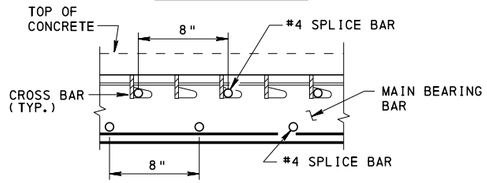
WELDLESS PLAN VIEW



SECTION A-A

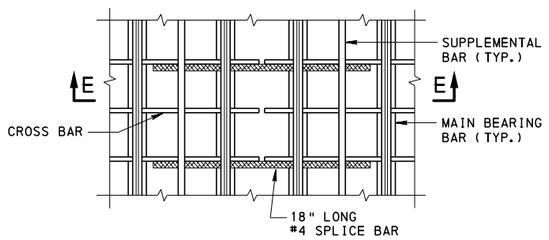


SECTION C-C

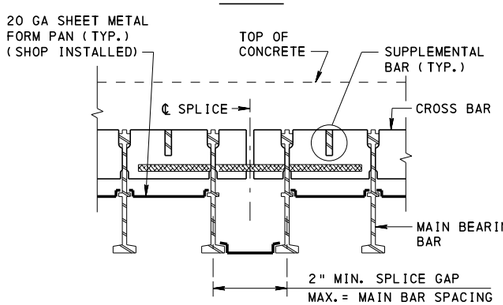


SECTION D-D

TYPICAL GRID DECK DETAILS



PLAN

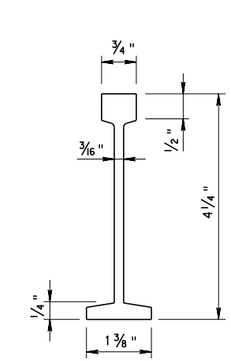


SECTION E-E

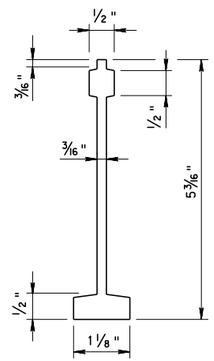
HALF DEPTH CONCRETE GRID
TRANSVERSE SPLICE BETWEEN PANELS

SECTION D-D

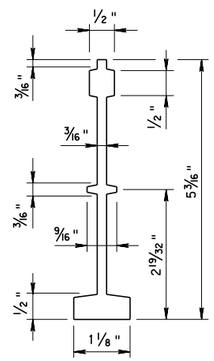
FULL DEPTH CONCRETE GRID
TRANSVERSE SPLICE BETWEEN PANELS



4¼" BAR WITHOUT MIDDLE RIB



5⅜" BAR WITHOUT MIDDLE RIB



5⅜" BAR WITH MIDDLE RIB

MAIN BEARING BAR

GENERAL NOTES:

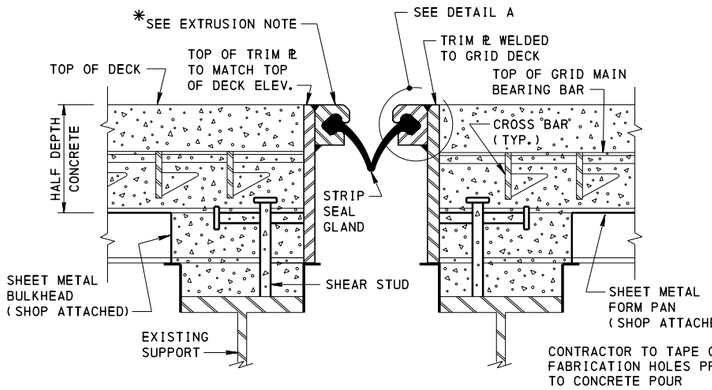
1. ALL REINFORCEMENT BARS TO MEET THE REQUIREMENTS OF PUB. 408 SECTION 709.1.
2. DESIGN SPECIFICATION:
   - AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND COMMENTARY
   - PENNDOT DESIGN MANUAL PART 4
3. FABRICATION ACCORDING TO AASHTO/AWS D1.5 (DATE AS NOTED IN PUB. 408 SECTION 1105), BRIDGE GRID FLOORING MANUFACTURERS ASSOCIATION AND APPROVED SHOP DRAWINGS.
4. MATERIAL STRENGTH:
   - STEEL BARS AND SHAPES:
     - PUB. 408 SECTION 1105.2
   - CONCRETE:
     - PUB. 408 SECTION 704.1 (b), CLASS AAAP
5. PROVIDE 1½" CONCRETE COVER ON REINFORCEMENT BARS UNLESS OTHERWISE NOTED.
6. PROVIDE 1½" COVER OVER GRID. THE TOP ½" OF OVERFILL/OVERLAY IS CONSIDERED SACRIFICIAL WEARING SURFACE.
7. ALL SHEET METAL AND FORM PANS TO MEET PUB. 408, SECTION 1001.2 GALVINIZING REQUIREMENTS. PROVIDE FORM PANS ACCORDING TO PUB. 408, SECTION 1001.2(h)2.
8. PROVIDE AN ERECTION DETAIL COMPLETE WITH PIECE MARKS WITH THE SHOP DRAWING SUBMISSION.
9. FOR LEVELING BOLT, USE ASTM A325 BOLT OR EQUIVALENT AS APPROVED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

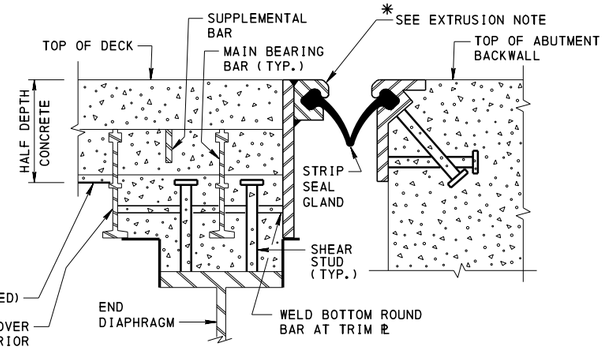
STEEL GRID REINFORCED CONCRETE BRIDGE DECK FOR BEAM BRIDGES CAST-IN-PLACE DECK DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 1 OF 5
Thomas P. Macioce	Brent L. Thompson	BC-726M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUREAU OF PROJECT DELIVERY	



TYPICAL MID-SPAN EXPANSION JOINT DETAIL

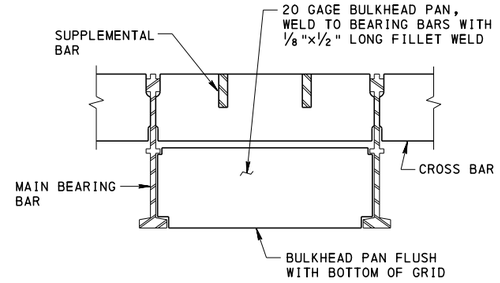
WITH MAIN BEARING BARS PARALLEL TO STRUCTURE, HALF DEPTH CONCRETE GRID IS SHOWN. FULL DEPTH CONCRETE GRID SIMILAR WITH FORM PANS LOCATED AT BOTTOM FLANGE OF MAIN BEARING BAR.



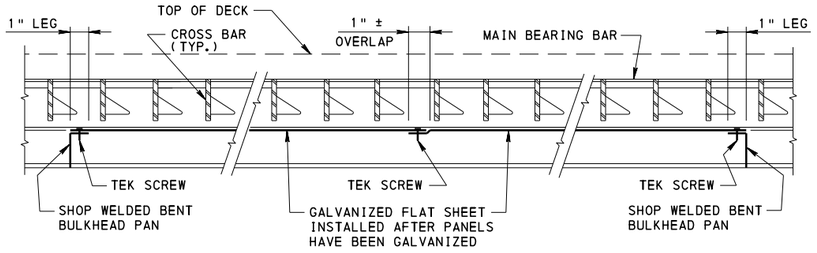
TYPICAL END SPAN EXPANSION JOINT DETAIL

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.

✱ 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)

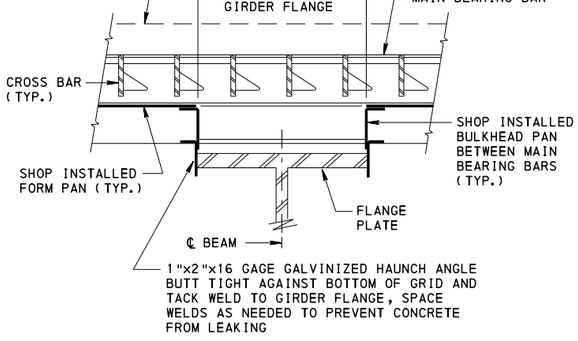


BULKHEAD PAN FIT-UP DETAIL



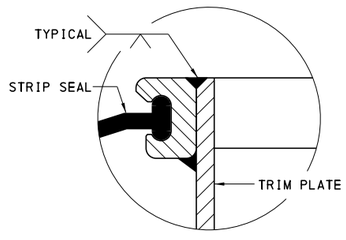
SECTION VIEW

HALF DEPTH CONCRETE GRID FORM PAN INSTALLATION DETAIL



SECTION VIEW

TYPICAL HAUNCH FORM DETAIL



DETAIL A

INSTALLATION NOTES:

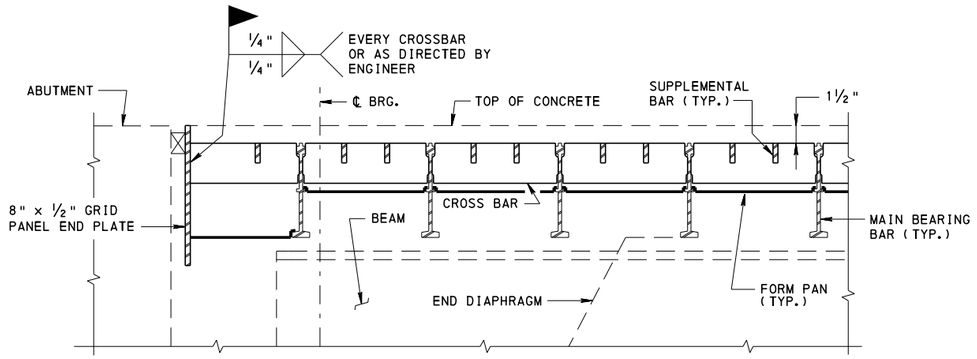
1. DURING PLACEMENT OF THE GRID PANELS THE CONTRACTOR MUST PLACE EACH PANEL IN ITS PROPER POSITION AND VERIFY ITS LOCATION FROM A COMMON FIXED POINT. DOING SO WILL MINIMIZE CUMULATIVE PLACEMENT ERRORS. CUMULATIVE ERRORS CAN RESULT IN A TOTAL DECK AREA LARGER OR SMALLER THAN THE ACTUAL AREA TO BE FILLED.
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.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

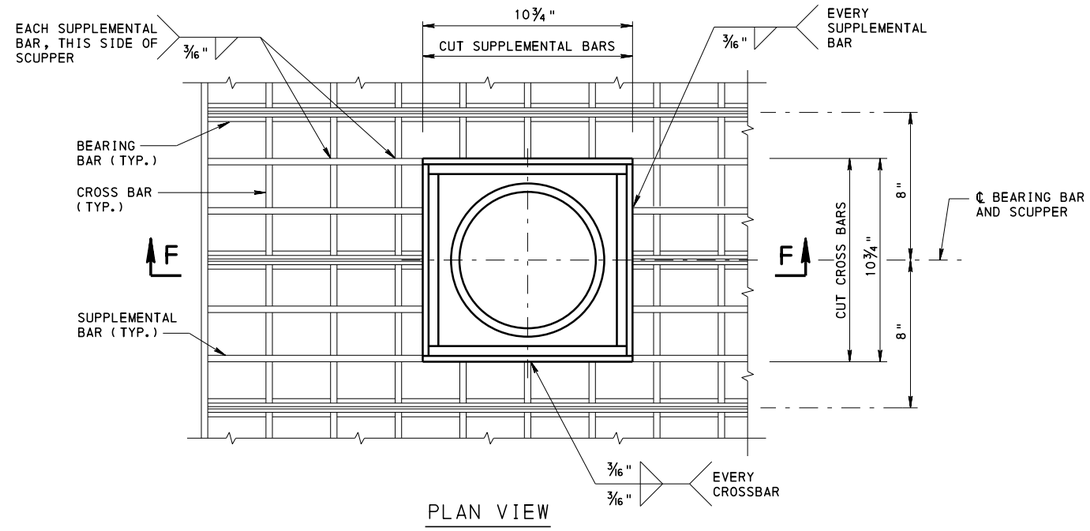
STANDARD

STEEL GRID REINFORCED CONCRETE BRIDGE DECK FOR BEAM BRIDGES CAST-IN-PLACE DECK DETAILS

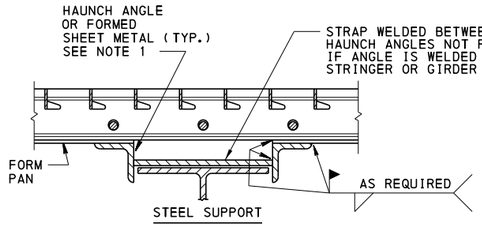
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 5
Thomas P. Macioce	Brent D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUREAU OF PROJECT DELIVERY	BC-726M



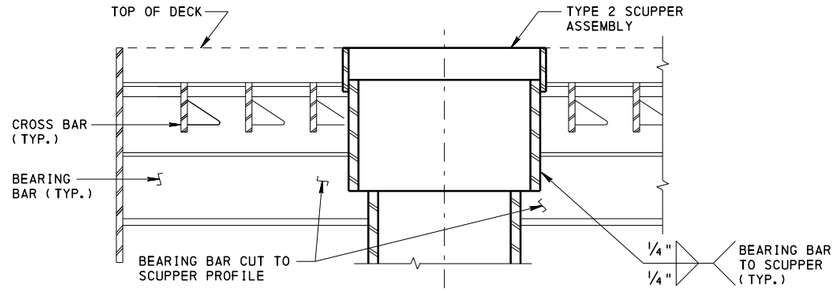
END SECTION DETAIL



PLAN VIEW

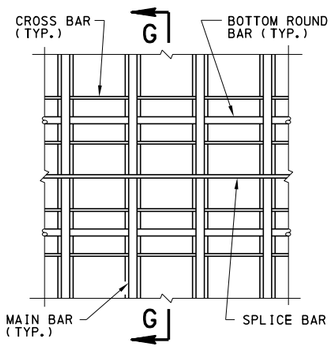


FORMED ANGLE - WELDED STRAP

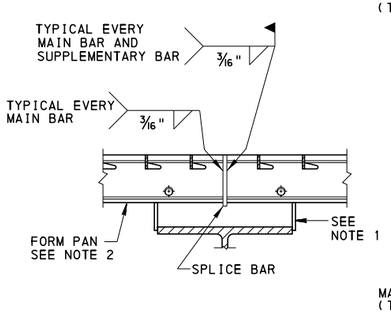


SECTION F-F

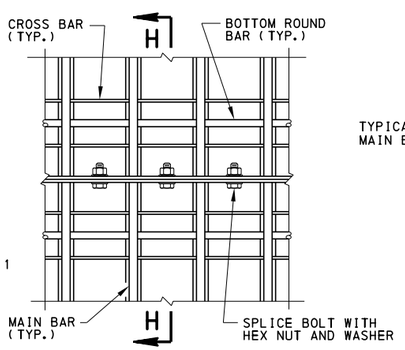
SCUPPER INSTALLATION DETAILS



SPLICE BAR PLAN VIEW

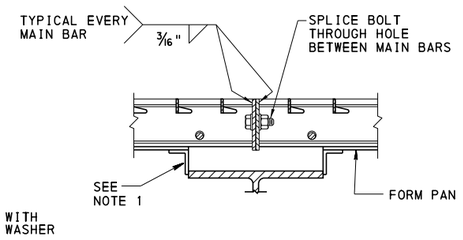


SECTION G-G



BOLTED PLAN VIEW

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



SECTION H-H

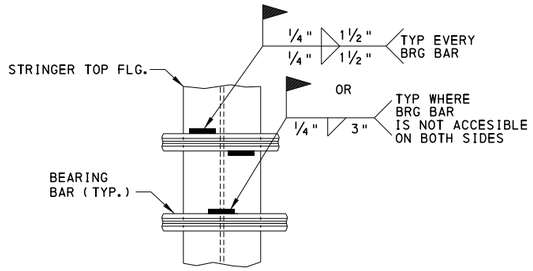
MAIN BAR SPLICE AT PANEL ENDS

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

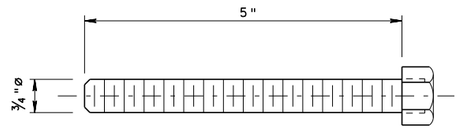
STANDARD
STEEL GRID REINFORCED CONCRETE BRIDGE DECK FOR BEAM BRIDGES CAST-IN-PLACE DECK DETAILS

RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent D. Thompson DIRECTOR, BUREAU OF PROJECT DELIVERY	SHEET 3 OF 5 BC-726M



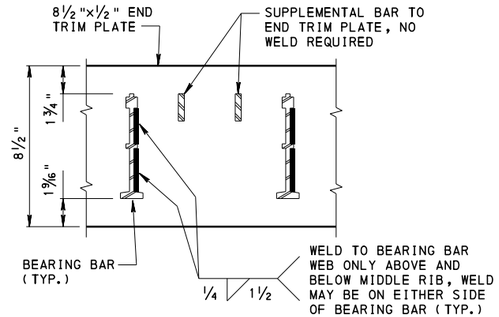
FIELD WELD DETAIL

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

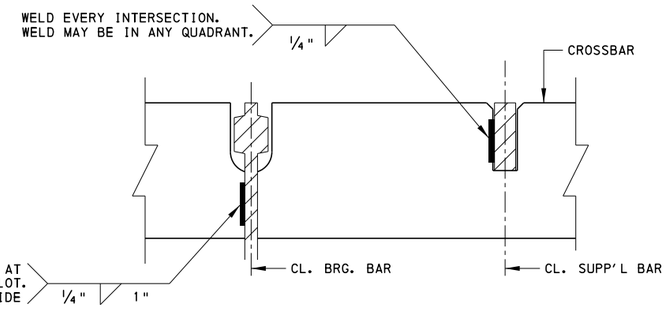


LEVELING BOLT DETAIL

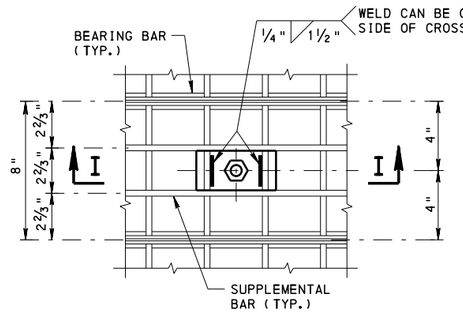
LEVELING BOLTS MAY BE FURNISHED UNCOATED
(MINIMUM 4 LEVELING BOLTS IN EACH PANEL)
(SEE NOTE 9 ON SHEET 1)



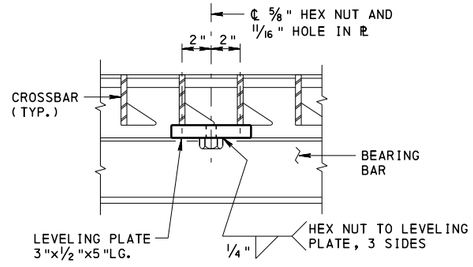
END TRIM PLATE WELD DETAIL



GRID COMPONENT WELD DETAILS



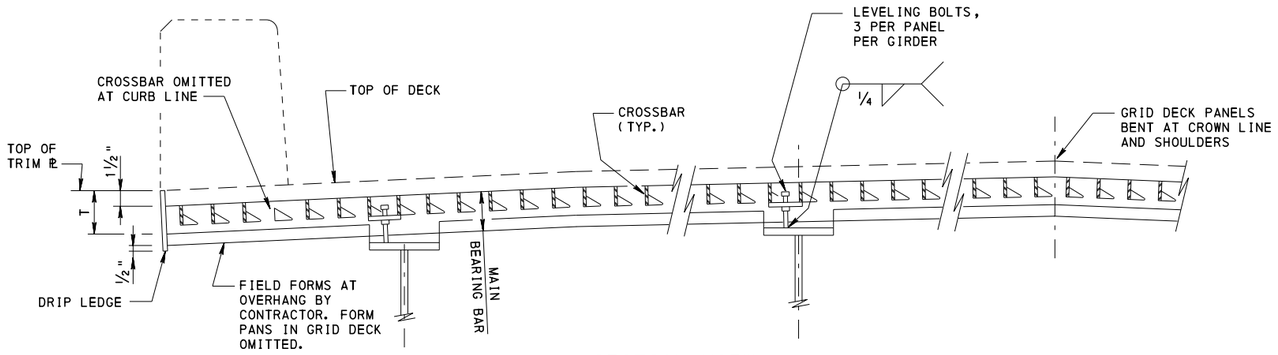
PLAN VIEW



SECTION I-I

LEVELING PLATE WELD DETAIL

NOTE: HEX NUT CAN BE TAPPED OVERSIZE FOR GALVANIZING



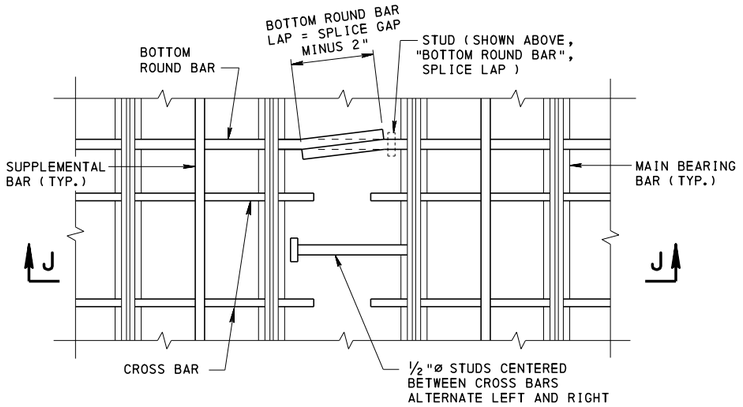
SECTION VIEW

PARTIAL TRANSVERSE SECTION THRU GRID DECK

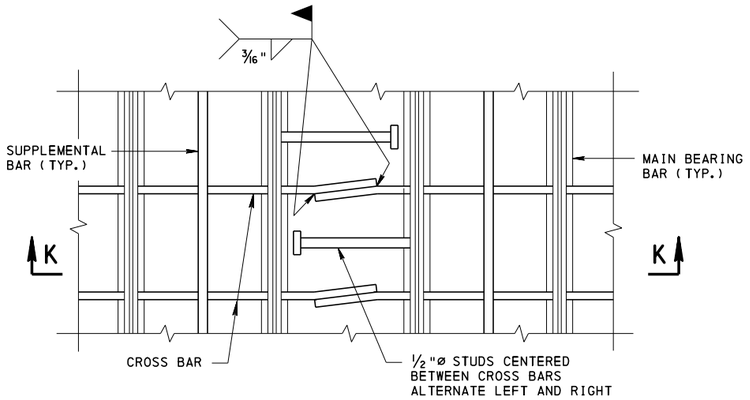
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

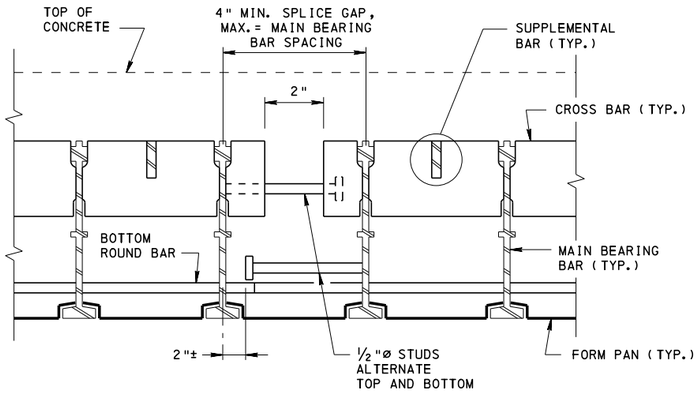
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 4 OF 5
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brian D. Thompson DIRECTOR, BUREAU OF PROJECT DELIVERY	BC-726M



PLAN VIEW

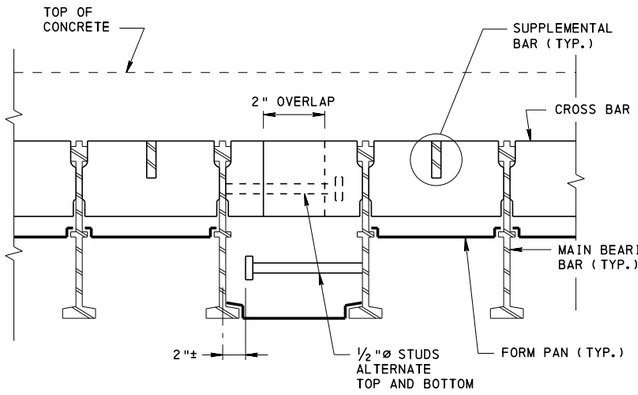


PLAN VIEW



SECTION J-J

FULL DEPTH CONCRETE GRID
TRANSVERSE SPLICE BETWEEN PANELS



SECTION K-K

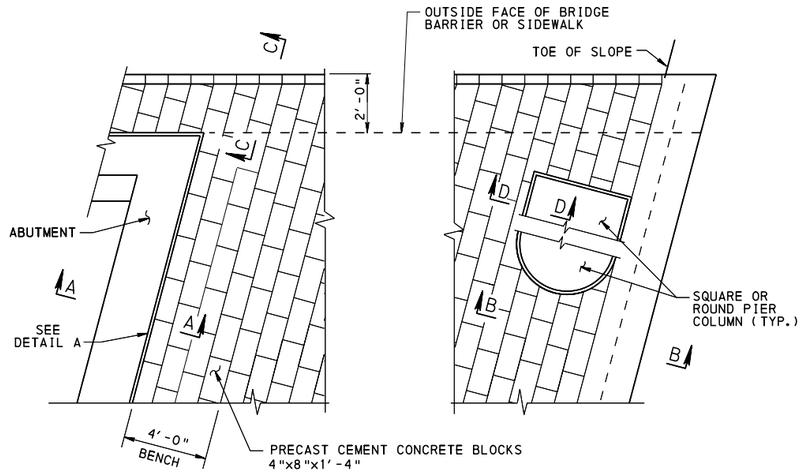
HALF DEPTH CONCRETE GRID
TRANSVERSE SPLICE BETWEEN PANELS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

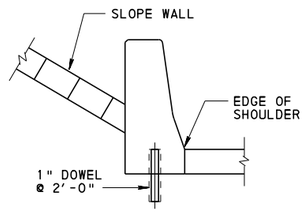
STANDARD

STEEL GRID REINFORCED
CONCRETE BRIDGE DECK
FOR BEAM BRIDGES
PRECAST DETAILS

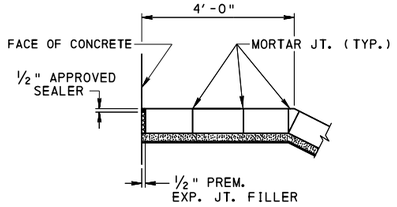
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent D. Thompson DIRECTOR, BUREAU OF PROJECT DELIVERY	SHEET 5 OF 5 BC-726M



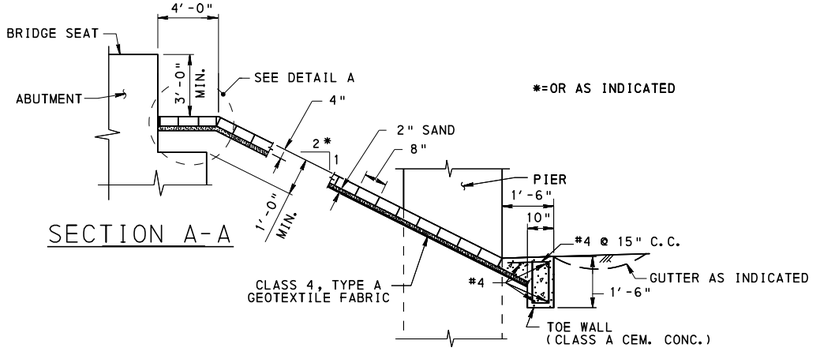
PLAN



PRECAST BARRIER TOE WALL



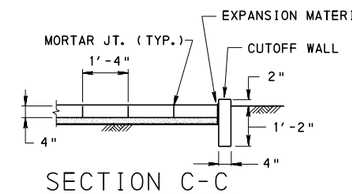
DETAIL A



SECTION A-A

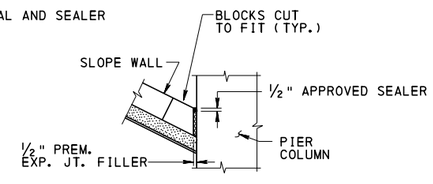
SECTION B-B

(SEE DETAIL J FOR SPECIAL CASES)



SECTION C-C

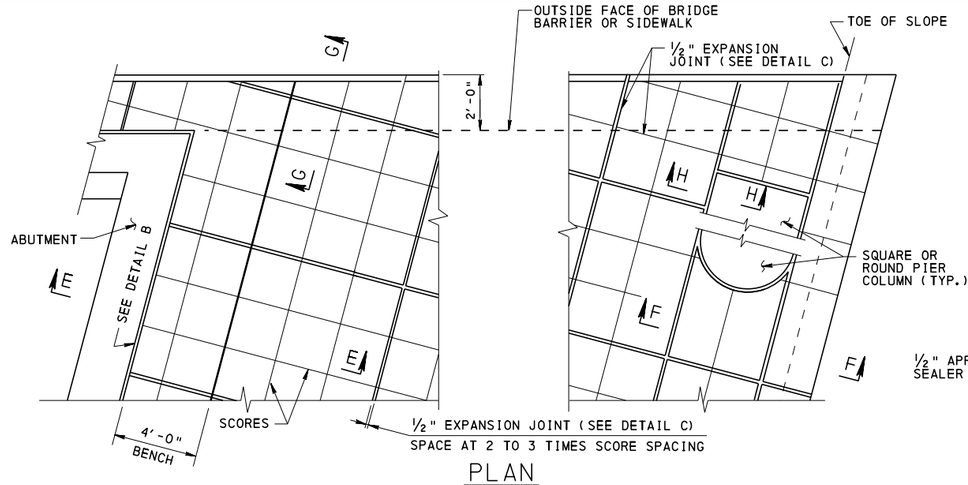
DIMENSIONS SHOWN FOR PRECAST CEMENT CONCRETE BLOCKS ARE NOMINAL



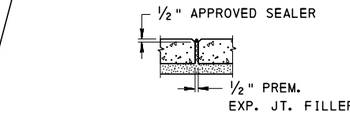
JT. (TYP.) BETWEEN SLOPE WALL AND PIER COLUMN

SECTION D-D

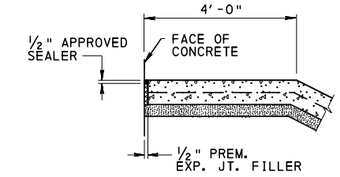
PRECAST CEMENT CONCRETE BLOCKS



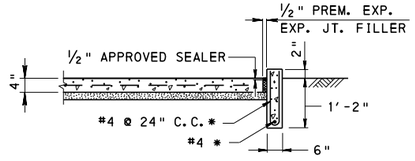
PLAN



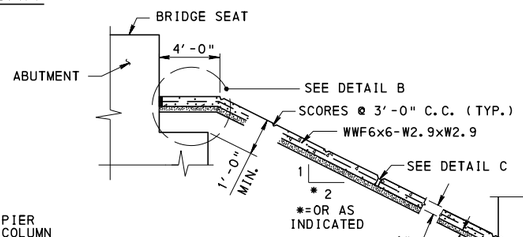
DETAIL C



DETAIL B

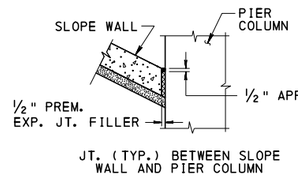


SECTION G-G



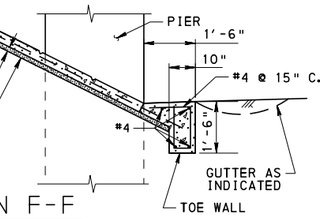
SECTION E-E

SCORE DETAIL



JT. (TYP.) BETWEEN SLOPE WALL AND PIER COLUMN

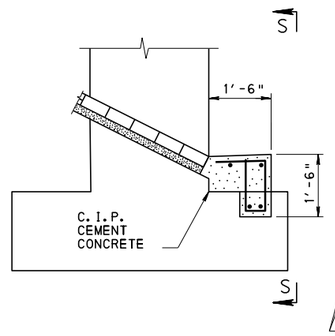
SECTION H-H



SECTION F-F

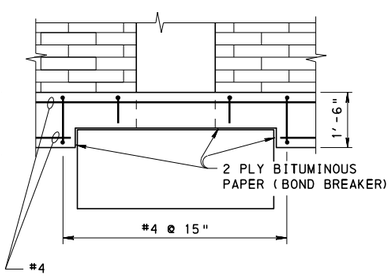
(SEE DETAIL J FOR SPECIAL CASES)

CAST-IN-PLACE CEMENT CONCRETE SLABS



SECTION B-B OR F-F

(SPECIAL CASES)



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)

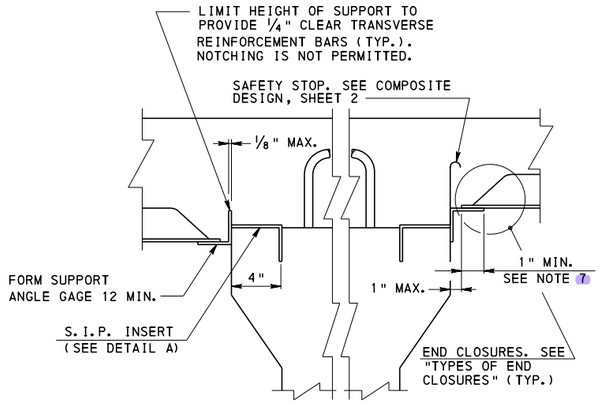
NOTES:

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

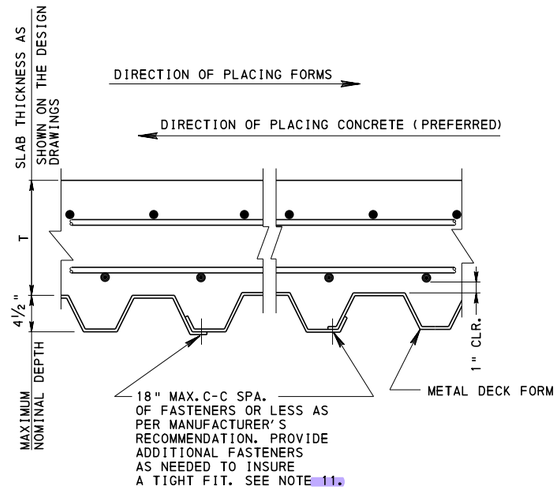
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 1 OF 1
Thomas P. Macioce	Brent D. Thompson	BC-731M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



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

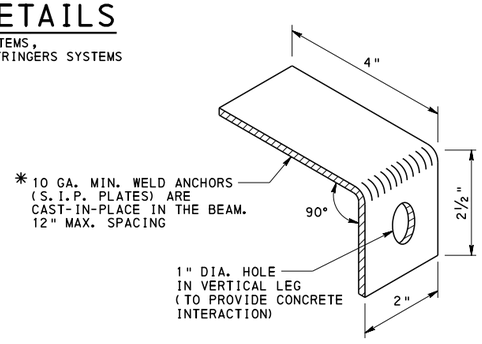
- THE MAXIMUM CORRUGATION DEPTH AND WIDTH SHALL BE SUCH THAT THE TOTAL DEAD LOAD OF THE FORM AND THE CONCRETE IN THE FORM DOES NOT EXCEED 15 LB/FT²
- FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.

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 PROVIDED IN THIS STANDARD-SPAN LENGTHS EXCEEDING 10'-0" AND/OR SLAB THICKNESS THAT EXCEEDS 10 INCHES.

SUGGESTED SUPPORT DETAILS

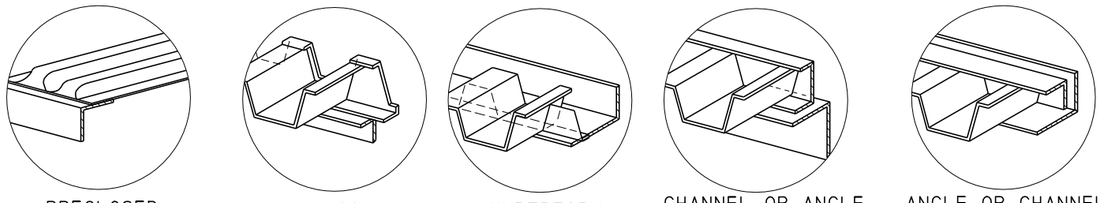
FOR STEEL BEAM SYSTEMS, STEEL GIRDER SYSTEMS, GIRDER-FLOOR BEAM SYSTEMS AND GIRDER-FLOOR BEAM-STRINGERS SYSTEMS



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



DECK FORM END CLOSURE

ALTERNATE DECK FORM END CLOSURES

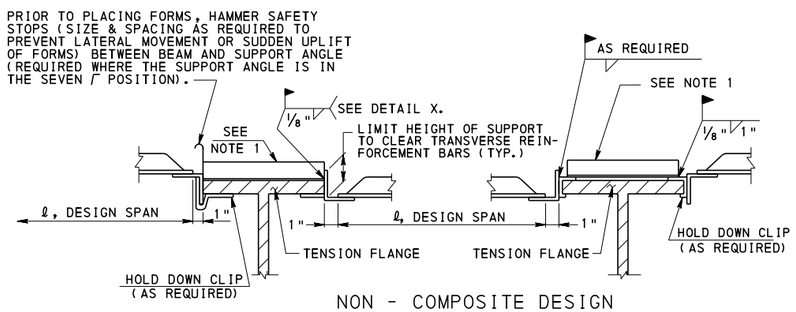
THIS DETAIL NOT PERMITTED

TYPES OF END CLOSURES

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

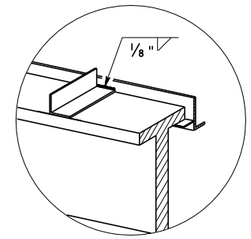
STANDARD PERMANENT METAL DECK FORMS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 1 OF 3
Thomas P. Macioce	Brian D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-732M



NON - COMPOSITE DESIGN

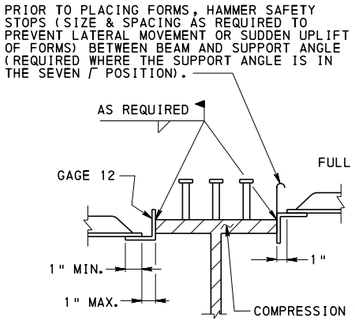
TOP FLANGE - TENSION



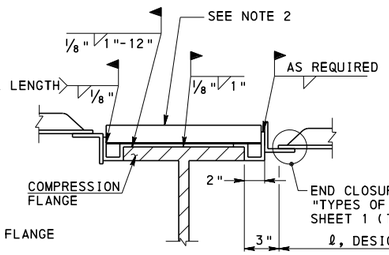
DETAIL X

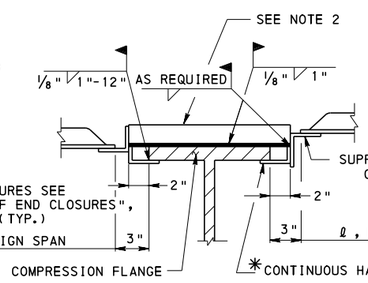
NOTE 1:

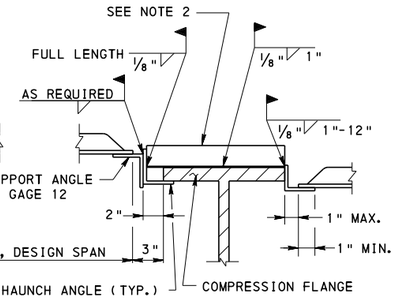
TENSION BAR, ANGLE OR CHANNEL, SIZE/SPACING AS REQUIRED. MINIMUM BAR GALVANIZED 2"x 8 GAGE MAX. SPACING 1'-3", ANGLE OR CHANNEL GAGE 12, WITH MAXIMUM SPACING 24". WELDING TYPICAL EACH SIDE, UNLESS NOTED.



COMPOSITE DESIGN
CONDITION 1







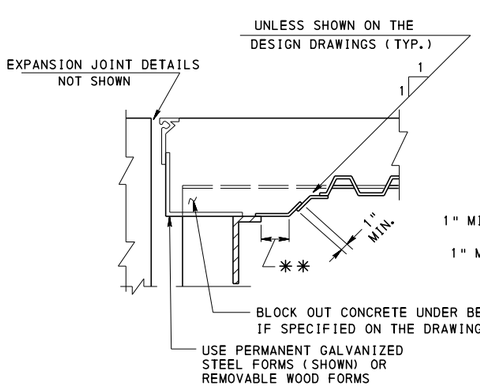
NON - COMPOSITE DESIGN
CONDITION 2

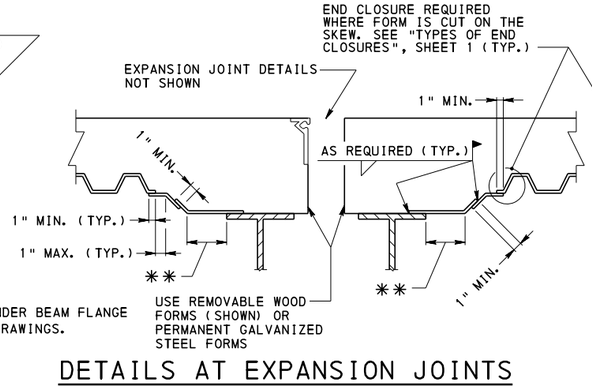
✱ FOR REHABILITATIONS, STEEL MUST BE PREPAINTED.

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:

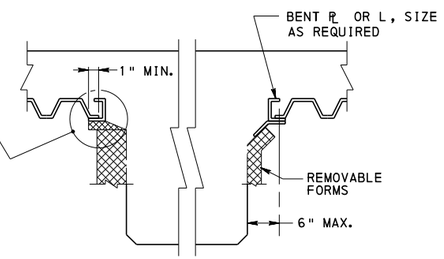
HAUNCH ANGLE OR CHANNEL, SIZE/SPACING AS REQUIRED. MINIMUM GAGE 12, WITH MAXIMUM SPACING 24". WELDING TYPICAL EACH SIDE, UNLESS NOTED.





DETAILS AT EXPANSION JOINTS

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

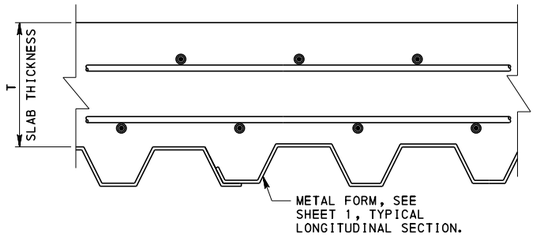


DETAIL AT CONCRETE DIAPHRAGM

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD PERMANENT METAL DECK FORMS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 3
Thomas P. Macioce	Brian D. Thompson	BC-732M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



TYPICAL LONGITUDINAL SECTION OF DECK SLAB WITH METAL FORM

FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP

DESIGN SPECIFICATIONS

DESIGN THE METAL FORMS ON THE BASIS OF THE DEAD LOAD OF THE FORM, REINFORCEMENT AND PLASTIC CONCRETE PLUS 50 POUNDS PER SQUARE FOOT FOR CONSTRUCTION LOADS. USE UNIT WORKING STRESS IN THE STEEL SHEET AS FOLLOWS:

MATERIAL GRADE ASTM A 653/A 653M OR A 924/A 924M	YIELD (PSI)	ALLOWABLE STRESS (PSI)
33	33,000	23,900
37	37,000	26,800
40	40,000	29,000
50	50,000	36,000
80	80,000	36,000

DO NOT ALLOW DEFLECTION UNDER THE WEIGHT OF THE FORMS, PLASTIC CONCRETE AND REINFORCEMENT TO EXCEED ℓ/180 OF THE FORM SPAN OR ½ INCH WHICHEVER IS LESS. IN NO CASE IS THE LOADING FOR DEFLECTION CALCULATION TO BE LESS THAN 120 PSF TOTAL.

FOR SPANS IN EXCESS OF TEN FEET THE PERMISSIABLE DEFLECTION IS NOT TO EXCEED ¾ INCH OR ℓ/240 WHICHEVER IS LESS.

BASE THE PERMISSIBLE FORM CAMBER ON THE ACTUAL DEAD LOAD CONDITION. DO NOT USE CAMBER TO COMPENSATE FOR DEFLECTION IN EXCESS OF THE FOREGOING LIMITS.

EXAMPLES

EXAMPLE #1

GIVEN: STEEL I-BEAM BRIDGE, COMPOSITE DESIGN
BEAM SPACING = 7'-10" C. TO C.
BEAM FLANGE WIDTH = 12"
SLAB THICKNESS T = 8.5" (2½" CL.)

REQUIRED: SECTION MODULUS S, AND MOMENT OF INERTIA I FOR METAL FORM SECTION, GRADE 40 MATERIAL.

SOLUTION: DESIGN SPAN ℓ (FROM SHEET 2 FOR CONDITION 1) = (7'-10") - (12") - (2") = 6'-8"
FROM TABLE, FOR ℓ = 6'-8" AND T = 8½"
S = .3181 IN.^{3} /FT. AND I = .4131 IN.^{4} /FT.
FOR GRADE 40 MATERIAL, MULTIPLY S BY 1.24
I.e. S REQD. = 1.24 X .3181 = .3944 IN.^{3} /FT.
I REQD. = .4131 IN.^{4} /FT.

EXAMPLE #2

GIVEN: STEEL I-BEAM BRIDGE, NON-COMPOSITE DESIGN
BEAM SPACING = 7'-10" C. TO C.
BEAM FLANGE WIDTH = 12"
SLAB THICKNESS T = 8.5" (2½" CL.)

REQUIRED: SECTION MODULUS S, AND MOMENT OF INERTIA I FOR METAL FORM SECTION, GRADE 50 MATERIAL, SUPPORT DETAIL AS PER TOP FLANGE-COMPRESSION, AS SHOWN ON SHEET 2.

SOLUTION: DESIGN SPAN ℓ (FROM SHEET 2 FOR CONDITION 2) = (7'-10") - (12") - (6") = 6'-4"
FROM TABLE, FOR ℓ = 6'-4" AND T = 8½"
S = .2871 IN.^{3} /FT. AND I = .3542 IN.^{4} /FT.
FOR GRADE 50 MATERIAL, MULTIPLY S BY 1.00
I.e. S REQD. = 1.00 X .2871 = .2871 IN.^{3} /FT.
I REQD. = .3542 IN.^{4} /FT.

LEGEND

✳ MULTIPLY VALUES OF S SHOWN IN TABLE BY:
1.00 FOR GRADES 50 AND 80
1.24 FOR GRADE 40
1.34 FOR GRADE 37
1.51 FOR GRADE 33

⊛ ℓ = DESIGN SPAN MEASURED PARALLEL TO THE FORM FLUTE, FOR STEEL STRUCTURES AS SHOWN ON SHEET 1, AND FOR (PRESTRESSED) CONCRETE STRUCTURES TAKE DESIGN SPAN AS CLEAR DISTANCE BETWEEN (THE FLANGES OF) THE SUPPORTING BEAMS MINUS TWO INCHES FOR CONDITION 1 AND SIX INCHES FOR CONDITION 2.

▲ = COMPUTE PHYSICAL DESIGN PROPERTIES IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN IRON AND STEEL INSTITUTE SPECIFICATION FOR THE DESIGN OF COLD FORMED STEEL STRUCTURALMEMBERS, LATEST PUBLISHED EDITION.

REQUIRED SECTION MODULUS AND MOMENT OF INERTIA OF FORMS

✳S, SECTION MODULUS IN.^{3} /FT. ▲ T, SLAB THICKNESS, INCHES							⊛ ℓ, DESIGN SPAN	I, MOMENT OF INERTIA IN.^{4} /FT. ▲ T, SLAB THICKNESS, INCHES				
7	7½	8	8½	9	9½	10		≤ 8	8½	9	9½	10
.0574	.0597	.0621	.0644	.0667	.0691	.0714	3'-0"	.0371	.0376	.0395	.0415	.0434
.0607	.0632	.0656	.0681	.0706	.0730	.0755	3'-1"	.0404	.0410	.0431	.0452	.0473
.0640	.0666	.0693	.0719	.0745	.0771	.0797	3'-2"	.0438	.0444	.0467	.0490	.0512
.0673	.0701	.0728	.0756	.0784	.0811	.0838	3'-3"	.0471	.0478	.0502	.0527	.0551
.0709	.0738	.0767	.0796	.0825	.0854	.0883	3'-4"	.0510	.0518	.0544	.0571	.0597
.0744	.0775	.0805	.0836	.0866	.0897	.0927	3'-5"	.0550	.0558	.0587	.0615	.0644
.0780	.0812	.0844	.0876	.0908	.0940	.0972	3'-6"	.0589	.0598	.0629	.0659	.0690
.0819	.0853	.0886	.0919	.0953	.0986	.1020	3'-7"	.0634	.0644	.0677	.0710	.0743
.0858	.0893	.0928	.0963	.0998	.1033	.1068	3'-8"	.0679	.0689	.0725	.0760	.0795
.0897	.0934	.0970	.1006	.1043	.1080	.1116	3'-9"	.0724	.0735	.0773	.0810	.0848
.0938	.0976	.1014	.1053	.1091	.1129	.1167	3'-10"	.0776	.0787	.0828	.0868	.0908
.0979	.1019	.1059	.1099	.1139	.1179	.1219	3'-11"	.0827	.0840	.0883	.0926	.0969
.1020	.1062	.1103	.1145	.1187	.1228	.1270	4'-0"	.0879	.0892	.0938	.0983	.1029
.1064	.1108	.1151	.1194	.1238	.1282	.1325	4'-1"	.0937	.0951	.1000	.1048	.1097
.1108	.1153	.1198	.1244	.1289	.1335	.1380	4'-2"	.0996	.1010	.1062	.1114	.1166
.1152	.1199	.1246	.1293	.1340	.1387	.1434	4'-3"	.1054	.1069	.1124	.1179	.1234
.1198	.1247	.1296	.1345	.1394	.1443	.1492	4'-4"	.1120	.1136	.1194	.1253	.1311
.1245	.1296	.1346	.1397	.1448	.1498	.1549	4'-5"	.1185	.1202	.1264	.1326	.1388
.1291	.1344	.1396	.1449	.1502	.1554	.1607	4'-6"	.1251	.1269	.1334	.1400	.1465
.1340	.1395	.1449	.1504	.1559	.1613	.1668	4'-7"	.1324	.1343	.1412	.1482	.1551
.1390	.1447	.1503	.1560	.1616	.1673	.1730	4'-8"	.1398	.1418	.1491	.1563	.1636
.1439	.1498	.1556	.1615	.1673	.1732	.1791	4'-9"	.1471	.1492	.1569	.1645	.1722
.1491	.1552	.1612	.1673	.1733	.1794	.1855	4'-10"	.1553	.1575	.1656	.1737	.1818
.1542	.1605	.1668	.1731	.1794	.1857	.1920	4'-11"	.1634	.1652	.1743	.1828	.1913
.1594	.1659	.1724	.1789	.1854	.1919	.1984	5'-0"	.1716	.1741	.1830	.1920	.2009
.1648	.1716	.1783	.1851	.1917	.1985	.2052	5'-1"	.1806	.1833	.1926	.2021	.2115
.1702	.1772	.1842	.1912	.1981	.2051	.2120	5'-2"	.1897	.1924	.2023	.2122	.2220
.1757	.1829	.1901	.1972	.2044	.2116	.2188	5'-3"	.1987	.2016	.2119	.2223	.2326
.1814	.1888	.1963	.2036	.2111	.2185	.2259	5'-4"	.2086	.2116	.2225	.2334	.2442
.1871	.1947	.2024	.2100	.2177	.2254	.2330	5'-5"	.2185	.2217	.2330	.2444	.2558
.1928	.2007	.2086	.2164	.2243	.2323	.2401	5'-6"	.2284	.2317	.2436	.2555	.2674
.1988	.2072	.2156	.2240	.2324	.2408	.2492	5'-7"	.2393	.2427	.2552	.2677	.2801
.2048	.2137	.2226	.2315	.2404	.2494	.2583	5'-8"	.2501	.2538	.2668	.2798	.2929
.2108	.2202	.2297	.2391	.2485	.2580	.2674	5'-9"	.2610	.2648	.2784	.2920	.3056
.2170	.2264	.2359	.2453	.2547	.2641	.2735	5'-10"	.2729	.2768	.2911	.3053	.3195
.2232	.2326	.2420	.2514	.2608	.2703	.2797	5'-11"	.2847	.2889	.3037	.3185	.3334
.2294	.2388	.2482	.2576	.2670	.2764	.2858	6'-0"	.2966	.3009	.3164	.3318	.3473
.2359	.2456	.2553	.2649	.2746	.2842	.2939	6'-1"	.3095	.3140	.3301	.3462	.3624
.2425	.2524	.2623	.2722	.2821	.2921	.3020	6'-2"	.3223	.3270	.3439	.3606	.3774
.2490	.2592	.2694	.2795	.2897	.2999	.3101	6'-3"	.3352	.3401	.3576	.3750	.3925
.2558	.2663	.2767	.2871	.2976	.3081	.3185	6'-4"	.3491	.3542	.3724	.3906	.4088
.2626	.2733	.2841	.2948	.3055	.3161	.3270	6'-5"	.3631	.3684	.3873	.4062	.4251
.2694	.2804	.2914	.3024	.3134	.3244	.3354	6'-6"	.3770	.3825	.4021	.4218	.4414
.2764	.2877	.2990	.3103	.3216	.3329	.3442	6'-7"	.3921	.3978	.4182	.4386	.4590
.2834	.2950	.3066	.3181	.3297	.3413	.3529	6'-8"	.4071	.4131	.4343	.4555	.4767
.2904	.3023	.3142	.3260	.3379	.3499	.3617	6'-9"	.4222	.4284	.4504	.4723	.4943
.2977	.3099	.3221	.3342	.3464	.3586	.3708	6'-10"	.4384	.4449	.4677	.4905	.5133
.3051	.3176	.3300	.3425	.3549	.3674	.3798	6'-11"	.4546	.4613	.4850	.5086	.5323
.3124	.3252	.3379	.3507	.3634	.3762	.3889	7'-0"	.4709	.4778	.5023	.5268	.5513
.3200	.3331	.3461	.3592	.3722	.3853	.3983	7'-1"	.4883	.4955	.5209	.5463	.5717
.3275	.3409	.3543	.3676	.3810	.3944	.4078	7'-2"	.5058	.5131	.5395	.5658	.5922
.3351	.3488	.3625	.3761	.3898	.4035	.4172	7'-3"	.5232	.5308	.5581	.5853	.6126
.3429	.3570	.3710	.3849	.3989	.4130	.4270	7'-4"	.5419	.5497	.5780	.6062	.6344
.3508	.3651	.3794	.3938	.4081	.4224	.4367	7'-5"	.5605	.5687	.5979	.6270	.6563
.3586	.3733	.3879	.4026	.4172	.4319	.4465	7'-6"	.5792	.5876	.6178	.6479	.6781
.3667	.3817	.3966	.4117	.4266	.4416	.4566	7'-7"	.6063	.6151	.6467	.6782	.7098
.3747	.3901	.4053	.4207	.4360	.4514	.4666	7'-8"	.6333	.6425	.6755	.7085	.7415
.3828	.3985	.4141	.4298	.4454	.4611	.4767	7'-9"	.6604	.6700	.7044	.7388	.7732
.3912	.4072	.4232	.4392	.4551	.4711	.4871	7'-10"	.6902	.7002	.7362	.7721	.8081
.3996	.4159	.4322	.4486	.4649	.4813	.4976	7'-11"	.7200	.7305	.7680	.8055	.8430
.4080	.4247	.4413	.4580	.4746	.4913	.5080	8'-0"	.7498	.7607	.7998	.8388	.8779
.4166	.4336	.4506	.4677	.4847	.5017	.5187	8'-1"	.7825	.7939	.8347	.8754	.9162
.4253	.4427	.4600	.4774	.4948	.5121	.5295	8'-2"	.8153	.8272	.8697	.9121	.9546
.4339	.4516	.4693	.4871	.5048	.5225	.5402	8'-3"	.8480	.8604	.9046	.9487	.9929
.4428	.4609	.4790	.4971	.5151	.5332	.5513	8'-4"	.8839	.8968	.9428	.9888	1.0348
.4517	.4702	.4886	.5071	.5255	.5440	.5624	8'-5"	.9197	.9331	.9810	1.0289	1.0768
.4606	.4794	.4982	.5171	.5359	.5547	.5735	8'-6"	.9556	.9695	1.0193	1.0690	1.1188
.4698	.4890	.5082	.5274	.5465	.5657	.5849	8'-7"	.9947	1.0092	1.0610	1.1128	1.1646
.4789	.4985	.5180	.5376	.5572	.5767	.5963	8'-8"	1.0339	1.0489	1.1028	1.1566	1.2105
.4881	.5080	.5280	.5479	.5678	.5878	.6077	8'-9"	1.0730	1.0886	1.1445	1.2004	1.2563
.4975	.5178	.5381	.5585	.5788	.5991	.6194	8'-10"	1.1157	1.1319	1.1900	1.2482	1.3063
.5070	.5277	.5484	.5691	.5898	.6105	.6312	8'-11"	1.1583	1.1752	1.2356	1.2959	1.3562
.5164	.5375	.5586	.5797	.6007	.6218	.6429	9'-0"	1.2010	1.2185	1.2811	1.3436	1.4062
.5261	.5476	.5691	.5906	.6120	.6335	.6550	9'-1"	1.2474	1.2656	1.3306	1.3956	1.4606
.5358	.5577	.5796	.6015	.6233	.6452	.6671	9'-2"	1.2938	1.3126	1.3801	1.4475	1.5149
.5455	.5678	.5901	.6124	.6346	.6569	.6792	9'-3"	1.3402	1.3597	1.4296	1.4994	1.5693
.5555	.5782	.6009	.6236	.6462	.6689	.6916	9'-4"	1.3905	1.4107	1.4832	1.5556	1.6281
.5654	.5885	.6116	.6347	.6578	.6809	.7040	9'-5"	1.4407	1.4617	1.5368	1.6118	1.6869
.5754	.5989	.6224	.6459	.6694	.6929	.7164	9'-6"	1.4910	1.5127	1.5904	1.6680	1.7457
.5856	.6095	.6334	.6574	.6813	.7052	.7291	9'-7"	1.5454	1.5679	1.6485	1.7289	1.8094
.5958	.6202	.6445	.6689	.6932	.7176	.7419	9'-8"	1.5999	1.6232	1.7065	1.7898	1.8732
.6060	.6308	.6555	.6803	.7051	.7298	.7546	9'-9"	1.6543	1.6784	1.7646	1.8507	1.9369
.6165	.6417	.6669	.6921	.7173	.7425	.7677	9'-10"	1.7131	1.7380	1.8273	1.9165	2.0057
.6270	.6526	.6782	.7039	.7295	.7551	.7807	9'-11"	1.7718	1.7977	1.8900	1.9822	2.0745
.6375	.6636	.6896	.7157	.7417	.7678	.7938	10'-0"	1.8306	1.8573	1.9526	2.0480	2.1433

NOTE: COMPUTATIONS ARE REQUIRED FOR SPANS IN EXCESS OF 12 FEET ALONG WITH SHOP DRAWINGS.

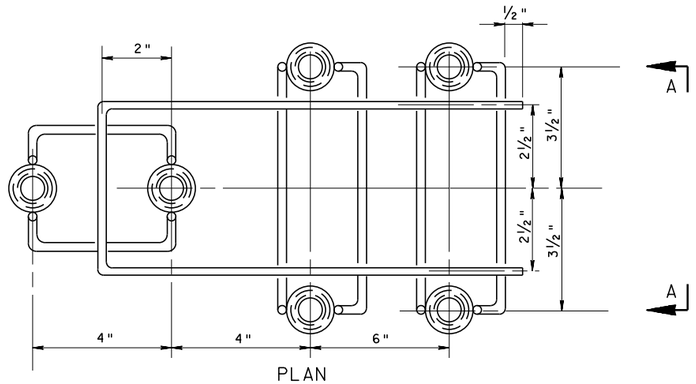
S, SECTION MODULUS IN.^{3}/FT.✳ ▲ T, SLAB THICKNESS, INCHES							⊛ ℓ, DESIGN SPAN	I, MOMENT OF INERTIA IN.^{4} /FT. ▲ T, SLAB THICKNESS, INCHES				
7	7½	8	8½	9	9½	10		≤ 8	8½	9	9½	10
.6461	.6725	.6990	.7255	.7520	.7784	.8049	10'-1"	1.8295	1.9289	2.0283	2.1277	2.2272
.6568	.6837	.7106	.7375	.7644	.7914	.8183	10'-2"	1.8752	1.9771	2.0790	2.1809	2.2829
.6676	.6949	.7223	.7497	.7770	.8044	.8317	10'-3"	1.9217	2.0261	2.1306	2.2350	2.3395
.6785	.7063	.7341	.7619	.7897	.8175	.8453	10'-4"	1.9689	2.0760	2.1830	2.2900	2.3970
.6895	.7177	.7460	.7742	.8025	.8308	.8590	10'-5"	2.0170	2.1266	2.2362	2.3458	2.4554
.7005	.7293	.7580	.7867	.8154	.8441	.8728	10'-6"	2.0658	2.1780	2.2903	2.4026	2.5148
.7117	.7409	.7700	.7992	.8154	.8441	.8867	10'-7"	2.1153	2.2303	2.3453	2.4602	2.5752
.7230	.7526	.7822	.8119	.8415	.8711	.9007	10'-8"	2.1657	2.2834	2.4011	2.5188	2.6365
.7343	.7644	.7945	.8246	.8547	.8848	.9149	10'-9"	2.2169	2.3373	2.4578	2.5783	2.6988
.7457	.7763	.8069	.8374	.8680	.8985	.9291	10'-10"	2.2688	2.3921	2.5154	2.6387	2.7620
.7572	.7883	.8193	.8504	.8814	.9124	.9435	10'-11"	2.3219	2.4477	2.5739	2.7001	2.8263
.7689	.8004	.8319	.8634	.8949	.9264	.9579	11'-0"	2.3751	2.5042	2.6333	2.7624	2.8915
.7805	.8125	.8445	.8765	.9085	.9405	.9725	11'-1"	2.4295	2.5616	2.6936	2.8257	2.9577
.7923	.8248	.8573	.8897	.9222	.9547	.9872	11'-2"	2.4848	2.6198	2.7548	2.8899	3.0249
.8042	.8372	.8701	.9031	.9360	.9690	1.0020	11'-3"	2.5408	2.6789	2.8170	2.9551	3.0931
.8162	.8496	.8831	.9165	.9500	.9834	10169	11'-4"	2.5977	2.7389	2.8800	3.0212	3.1624
.8282	.8621	.8961	.9300	.9640	.9979	1.0319	11'-5"	2.6554	2.7997	2.9440	3.0883	3.2327
.8403	.8748	.9092	.9437	.9781	1.0125	1.0470	11'-6"	2.7140	2.8615	3.0090	3.1565	3.3040
.8526	.8875	.9224	.9574	.9923	1.0273	1.0622	11'-7"	2.7734	2.9241	3.0749	3.2256	3.3763
.8649	.9003	.9358	.9712	1.0067	1.0421	1.0775	11'-8"	2.8337	2.9877	3.1417	3.2957	3.4497
.8773	.9132	.9492	.9851	1.0211	1.0570	1.0930	11'-9"	2.8948	3.0522	3.2095	3.3668	3.5242
.8898	.9262	.9781	.9992	1.0356	1.0721	1.1086	11'-10"	2.9569	3.1176	3.2783	3.4390	3.5997
.9023	.9393	.9763	1.0133	1.0503	1.0872	1.1242	11'-11"	3.0198	3.1839	3.3480	3.5121	3.6763
.9150	.9525	.9900	1.0275.	1.0650	1.1025	1.1400	12'-0"	3.0836	3.2512	3.4188	3.5863	3.7539

NOTE: COMPUTATIONS ARE REQUIRED FOR SPANS IN EXCESS OF 12 FEET ALONG WITH SHOP DRAWINGS.

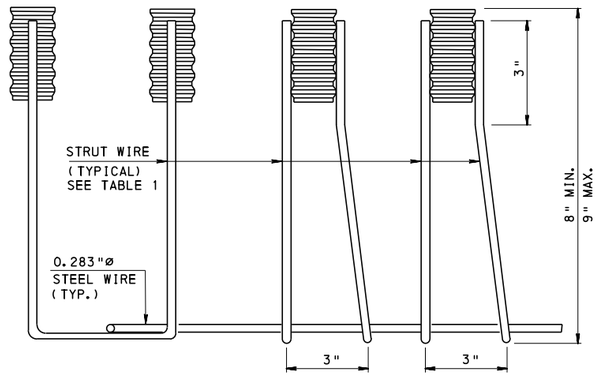
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD PERMANENT METAL DECK FORMS

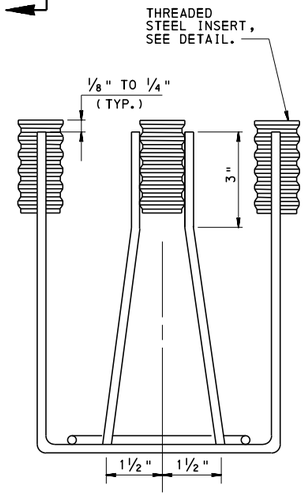
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 3
Thomas P Macioce	Brent B Thompson	BC-732M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



PLAN



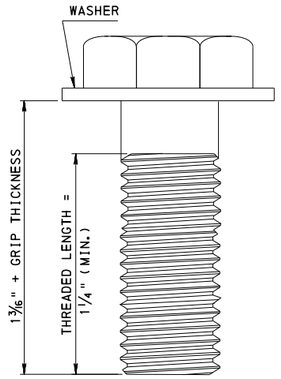
ELEVATION



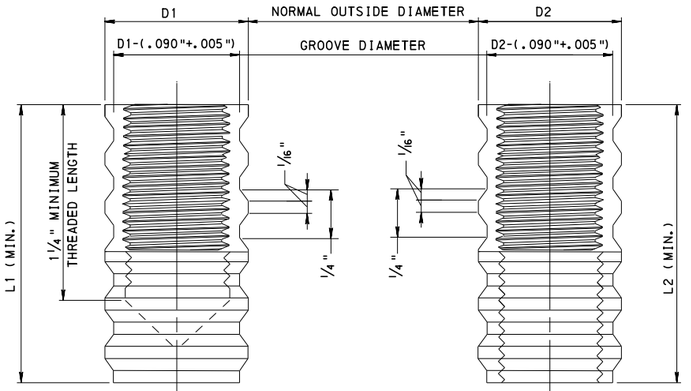
SECTION A-A

TYPE A INSERT ASSEMBLY

(INCLUDES CAP SCREWS AND WASHERS)



HEXAGON HEAD CAP SCREW

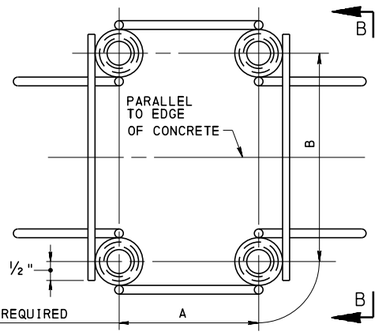


CLOSED BOTTOM

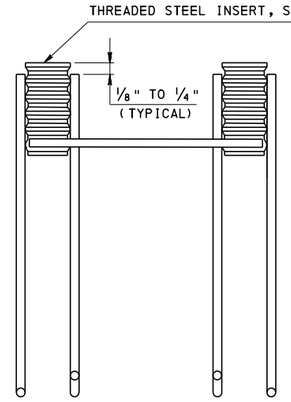
OPEN BOTTOM

THREADED STEEL INSERTS DETAIL

FOR DIMENSIONS, SEE TABLE 2



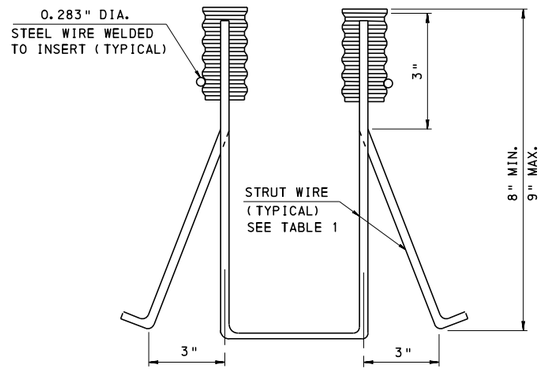
PLAN



SECTION B-B

TABLE 1	
CAP SCREW DIAMETER	DIA. OF STRUT WIRE (MIN.)
¾"	0.344"
⅞"	0.375"
1"	0.438"

TABLE 2	TYPE OF INSERTS			
CAP SCREW DIAMETER	CLOSED BOTTOM		OPEN BOTTOM	
	D1	L1	D2	L2
¾"	1"	1⅝"	1⅛"	1¼"
⅞"	1⅛"	1¾"	1¼"	1⅜"
1"	1¼"	1⅞"	1⅜"	1½"



ELEVATION

TYPE B INSERT ASSEMBLY

(INCLUDES CAP SCREWS AND WASHERS)

NOTES

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH SPECIFICATIONS PUBLICATION 408.
2. PROVIDE THREADED STEEL INSERTS IN ACCORDANCE WITH ASTM DESIGNATION A 29, GRADE 12L14. PROVIDE STRUT WIRE OF EITHER ASTM DESIGNATION A 510 GRADE 1018 WITH A MINIMUM TENSILE STRENGTH OF 80 KSI OR ASTM A 82 (TABLE 1 TENSILE STRENGTH REQUIREMENTS, 80 KSI), BOTH WITH A CARBON RANGE OF 0.15 - 0.20%.
3. PROVIDE GALVANIZED ASTM A 307 GRADE A CAP SCREWS AND WASHERS CONFORMING TO SECTION 1105 OF PUBLICATION 408.
4. PROVIDE WELDED CONNECTION BETWEEN STEEL INSERTS AND STRUTS EQUAL TO OR GREATER THAN THE STRENGTH OF THE ASTM A 307 GRADE A CAP SCREW.
5. 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.
6. PROVIDE EPOXY COATED INSERT ASSEMBLIES.
7. PROVIDE THREAD FOR SCREWS AND STEEL INSERTS CONFORMING TO SECTION 1105 OF PUBLICATION 408.
8. 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 TO CONCRETE.
   (2) ATTACHING BASE PLATES FOR FENCE, PEDESTRIAN RAILING, PROTECTIVE BARRIERS AND BRIDGE RAILING POSTS TO CONCRETE DECKS OR PARAPETS.
9. 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.
10. SHOW DIAMETER, PROJECTION, THREAD LENGTH AND LENGTH OF ANCHOR BOLTS ON DESIGN DRAWINGS.
11. BOLT DIAMETER INDICATED ON THE DRAWINGS IS NOMINAL OR BASIC BOLT DIAMETER.

REFERENCE DRAWINGS	
RC-50M	GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS
RC-52M	TYPE 2 STRONG POST GUIDE RAIL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

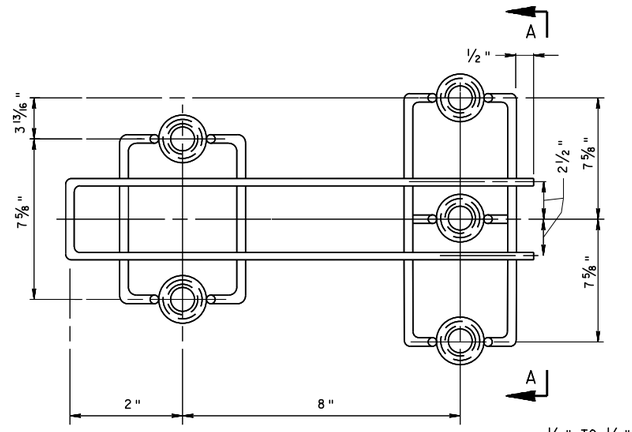
STANDARD ANCHOR SYSTEMS

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

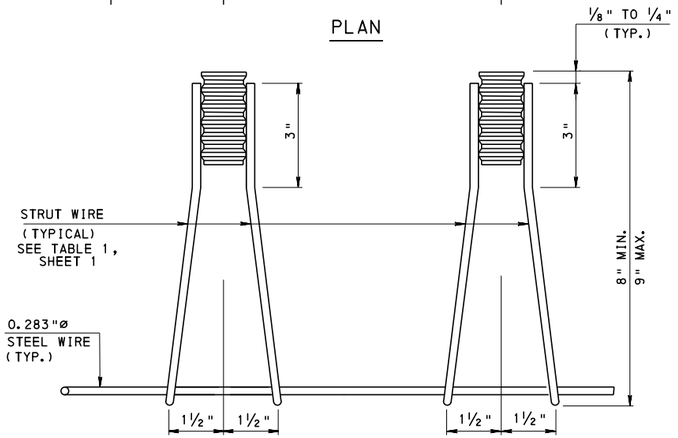
RECOMMENDED SEPT. 30, 2016
Brian B Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 1 OF 3

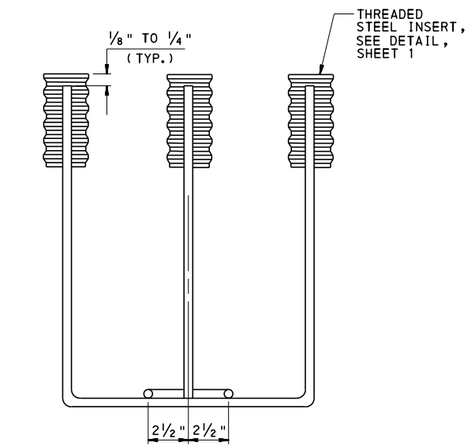
BC-734M



PLAN

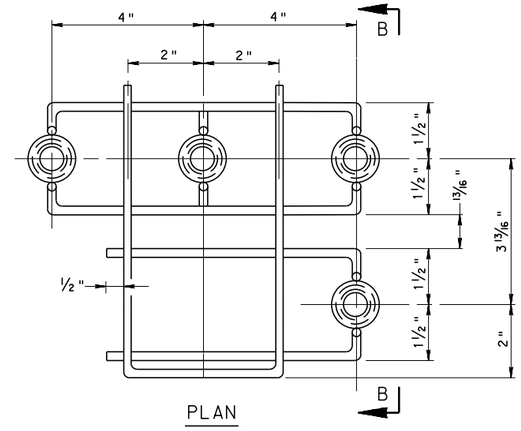


ELEVATION

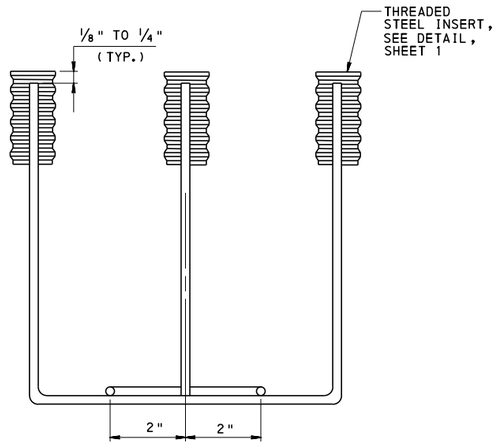


SECTION A-A

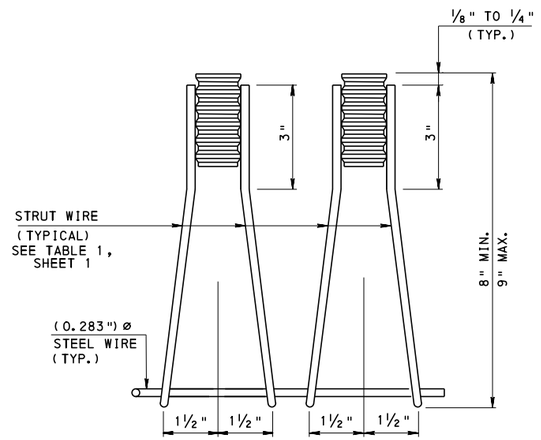
TYPE C INSERT ASSEMBLY
(INCLUDES CAP SCREWS AND WASHERS)



PLAN



ELEVATION



SECTION B-B

TYPE D INSERT ASSEMBLY
(INCLUDES CAP SCREWS AND WASHERS)

NOTES

1. FOR NOTES, SEE SHEET 1.

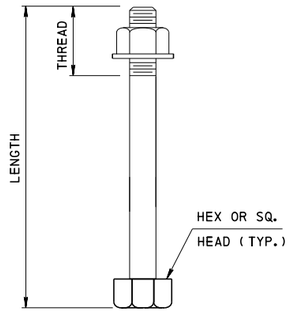
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
ANCHOR SYSTEMS

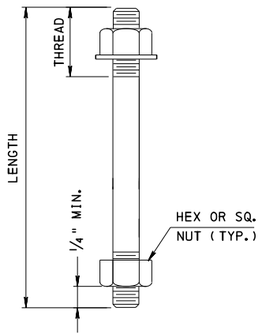
RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-734M



TYPE A



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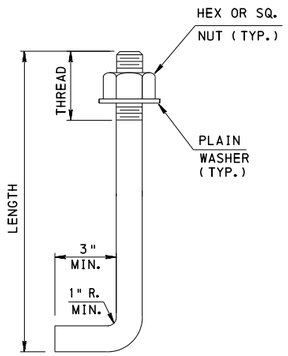
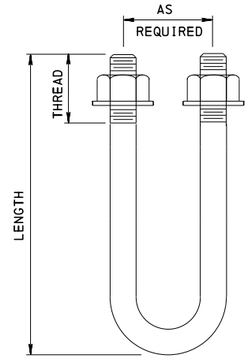


TYPE C



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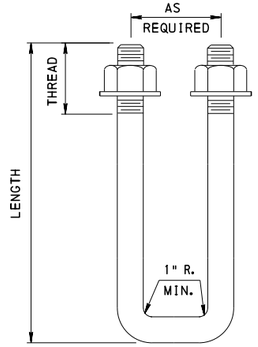

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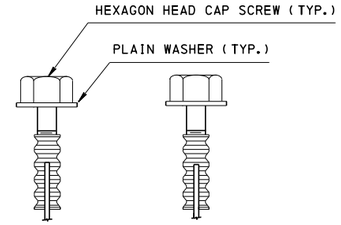
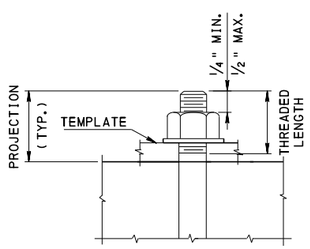


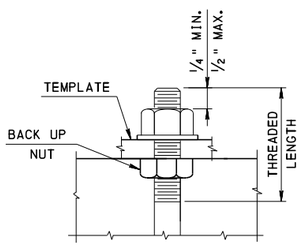
TYPE F

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

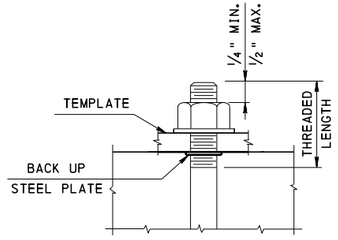
TYPES OF ANCHORS



DETAIL 1



DETAIL 2



DETAIL 3

CONSTRUCTION NOTES

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE SECURITY 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

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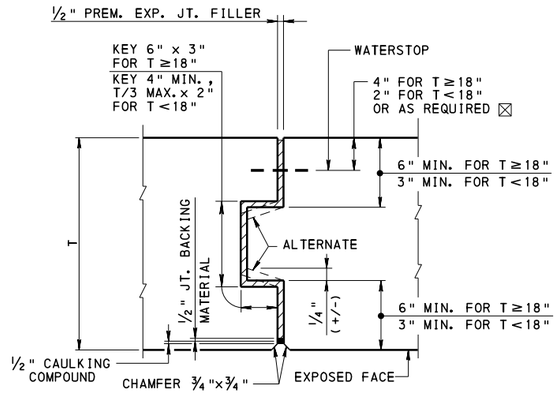
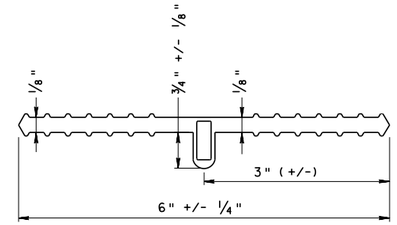
STANDARD ANCHOR SYSTEMS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 3
Thomas P Macioce	Brian D Thompson	BC-734M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



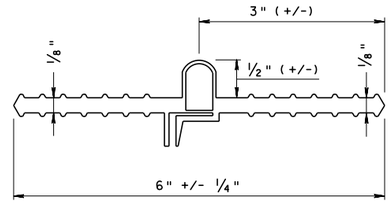
KEYED EXPANSION JOINT

(FLUSH EXPANSION JOINT SIMILAR EXCEPT OMIT KEY)
CHAMFER DIMENSIONS ARE NOMINAL AND MAY VARY ¼" (+/-).



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.

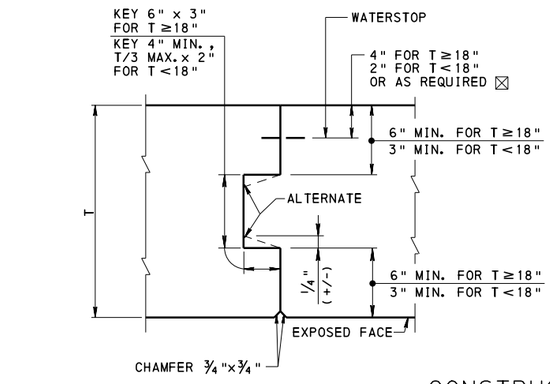
GENERAL NOTES:

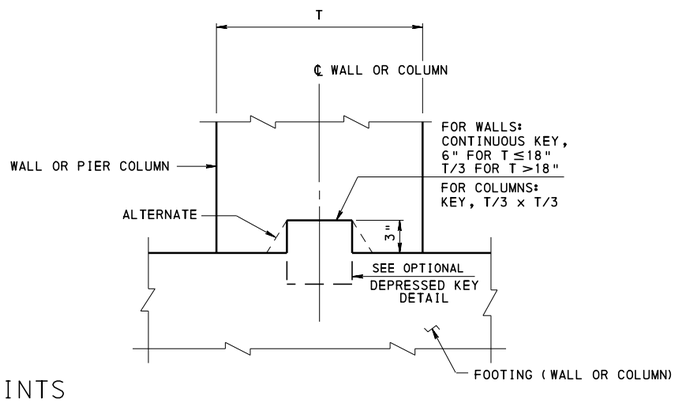
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408.
2. WHEN TYPE C2 WATERSTOP IS USED TO FACILITATE INSTALLATION, JOIN THE SPLIT-FLANGE TOGETHER USING PVC SOLVENT CEMENT MEETING THE REQUIREMENTS OF ASTM D 2564, AFTER THE FORMS FOR THE FIRST PLACEMENT OF CONCRETE ARE REMOVED.
3. CONTRACTOR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

LEGEND:

☒ =PLACE WATERSTOP INSIDE OF REINFORCEMENT BARS.

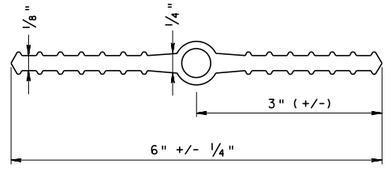
T =THICKNESS OF WALL OR DIAMETER OF COLUMN, AND IS THE LEAST DIMENSION.





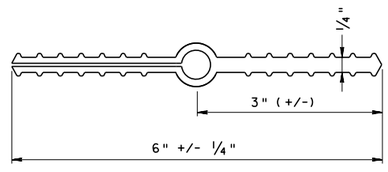
CONSTRUCTION JOINTS

NOTES:
1. KEY DIMENSIONS ARE NOMINAL AND MAY VARY ½" (+/-).
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

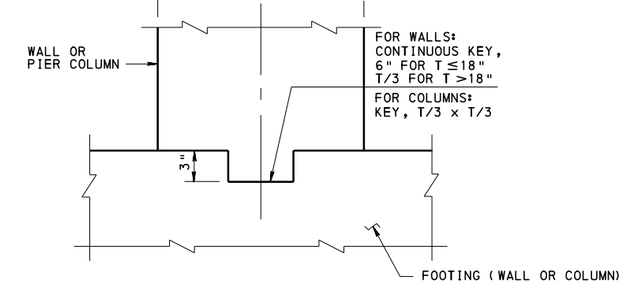


POLYVINYL CHLORIDE

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.



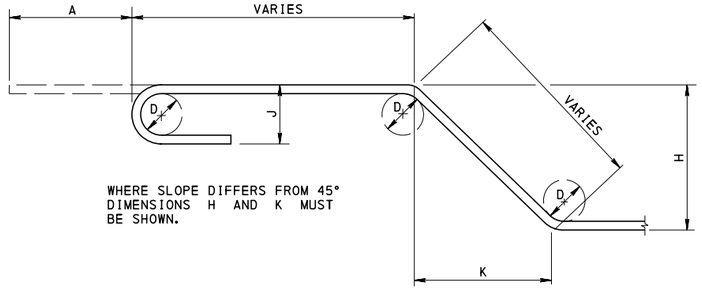
OPTIONAL DEPRESSED KEY DETAIL

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.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
WALL CONSTRUCTION & EXPANSION JOINT DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 1 OF 1
Thomas P Macioce	Brian B Thompson	BC-735M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



WHERE SLOPE DIFFERS FROM 45° DIMENSIONS H AND K MUST BE SHOWN.

BAR BENDING DETAILS

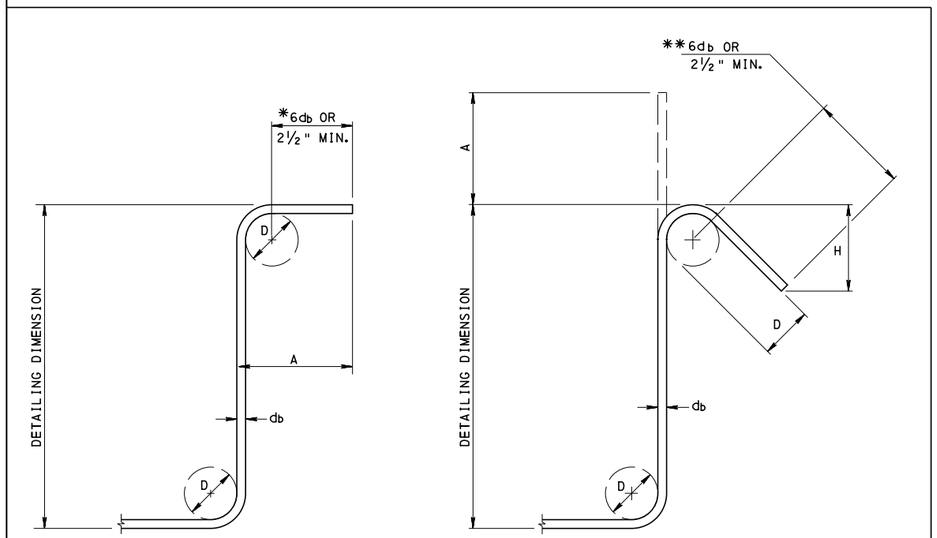
UNLESS OTHERWISE NOTED, DIAMETER D IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.

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:

1. ALL REINFORCEMENT STEEL BARS SHOWN MEET THE REQUIREMENTS OF ASTM A 615, A 996 OR A 706.
2. 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 HUNDREDTHS 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.
3. 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 5.11.5 AND SECURELY WIRE TOGETHER.
   (B) SPLICE WELDED WIRE FABRIC IN ACCORDANCE WITH AASHTO LRFD ARTICLE 5.11.6.
   (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.
4. 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



90° HOOKS — 135° HOOKS

STIRRUPS
(TIES SIMILAR)

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

RECOMMENDED STIRRUP AND TIE HOOK DIMENSIONS

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

GRADES 40 AND 60 KSI

BAR SIZE	D	90° HOOK A	135° HOOK A	135° HOOK APPROXIMATE H
#3	1½"	4"	4"	2½"
#4	2"	4½"	4½"	3"
#5	2½"	6"	5½"	3¾"
#6	4½"	1'-0"	8"	4½"

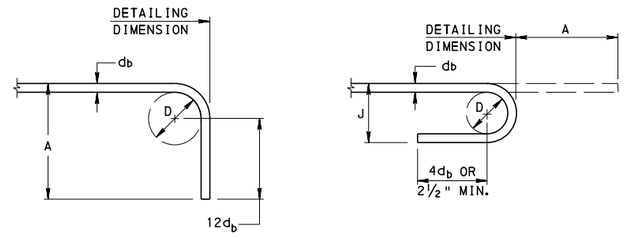
GRADES 40 AND 60 KSI

SEISMIC STIRRUP AND TIE			
BAR SIZE	D	135° HOOK A	135° HOOK APPROXIMATE H
#3	1½"	4¼"	3"
#4	2"	4½"	3"
#5	2½"	5½"	3¾"
#6	4½"	8"	4½"

RECOMMENDED END HOOK DIMENSIONS

ALL GRADES

BAR SIZE	90° HOOKS D	90° HOOKS A	180° HOOKS D	180° HOOKS A	180° HOOKS J
#3	2¼"	6"	2¼"	5"	3"
#4	3"	8"	3"	6"	4"
#5	3¾"	10"	3¾"	7"	5"
#6	4½"	1'-0"	4½"	8"	6"
#7	5¼"	1'-2"	5¼"	10"	7"
#8	6"	1'-4"	6"	11"	8"
#9	9½"	1'-7"	9½"	1'-3"	11¾"
#10	10¾"	1'-10"	10¾"	1'-5"	1'-1¼"
#11	12"	2'-0"	12"	1'-7"	1'-2¾"
#14	18¼"	2'-7"	18¼"	2'-3"	1'-9¾"
#18	24"	3'-5"	24"	3'-0"	2'-4½"



90° HOOKS — 180° HOOKS

D = 6d_b FOR #3 THROUGH #8
D = 8d_b FOR #9, #10, AND #11
D = 10d_b 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.

COMMON STOCK STYLES OF WELDED WIRE FABRIC

STYLE DESIGNATION	STEEL AREA SQ. IN. PER FT. LONGIT.	STEEL AREA SQ. IN. PER FT. TRANS.	WEIGHT APPROX. LBS. PER 100 S.F.
ROLLS			
6x6-W1.4xW1.4	.028	.028	21
6x6-W2.0xW2.0	.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-W2.0xW2.0	.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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD REINFORCEMENT BAR FABRICATION DETAILS

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brian D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 1 OF 3
BC-736M

DEVELOPMENT LENGTH AND LAP SPLICE LENGTH OF DEFORMED BARS IN TENSION

AASHTO LRFD SPECIFICATIONS,
ARTICLES 5.11.2.1.1, 5.11.2.1.2 AND 5.11.5.3.1

TABLE A

f'c = 3000 PSI (CLASS A)

BAR SIZE	BAR CROSS SECTION AREA (SQ. IN.) A_b	f_y=40 KSI (GRADE 40)								f_y=60 KSI (GRADE 60)							
		ALL BARS EXCEPT TOP BARS				TOP BARS				ALL BARS EXCEPT TOP BARS				TOP BARS			
		DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)		
			A	B	C		A	B	C		A	B	C		A	B	C
#3	0.11	12	12	12	12	12	12	12	15	12	12	12	16	13	13	17	22
#4	0.20	12	12	12	14	12	12	15	20	12	12	16	21	17	17	22	29
#5	0.31	12	12	13	17	14	14	19	24	15	15	20	26	21	21	28	36
#6	0.44	13	13	17	22	18	18	24	31	20	20	25	33	27	27	35	46
#7	0.60	18	18	23	30	25	25	32	42	26	26	34	45	37	37	48	62
#8	0.79	23	23	30	39	32	32	42	55	35	35	45	59	48	48	63	82
#9	1.00	29	29	38	50	41	41	53	69	44	44	57	74	61	61	79	104
#10	1.27	37	37	48	63	52	52	67	88	55	55	72	94	77	77	101	131
#11	1.56	46	46	59	77	64	64	82	108	68	68	88	115	95	95	123	161
#14	2.25	63				88				94				131			
#18	4.00	81				114				122				170			

f'c = 3500 PSI (CLASS AA)

BAR SIZE	BAR CROSS SECTION AREA (SQ. IN.) A_b	f_y=40 KSI (GRADE 40)								f_y=60 KSI (GRADE 60)							
		ALL BARS EXCEPT TOP BARS				TOP BARS				ALL BARS EXCEPT TOP BARS				TOP BARS			
		DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)		
			A	B	C		A	B	C		A	B	C		A	B	C
#3	0.11	12	12	12	12	12	12	12	15	12	12	12	16	13	13	17	22
#4	0.20	12	12	12	14	12	12	15	20	12	12	16	21	17	17	22	29
#5	0.31	12	12	13	17	14	14	19	24	15	15	20	26	21	21	28	36
#6	0.44	12	12	16	21	17	17	22	29	18	18	24	31	26	26	33	43
#7	0.60	17	17	21	28	23	23	30	39	25	25	32	41	34	34	44	58
#8	0.79	22	22	28	36	30	30	39	51	32	32	42	54	45	45	58	76
#9	1.00	27	27	35	46	38	38	49	64	41	41	53	69	57	57	73	96
#10	1.27	34	34	45	58	48	48	62	81	51	51	67	87	72	72	93	122
#11	1.56	42	42	55	71	59	59	76	100	63	63	82	107	88	88	114	149
#14	2.25	58				81				87				122			
#18	4.00	75				105				113				158			

f'c = 4000 PSI (CLASS AAA OR AAAP)

BAR SIZE	BAR CROSS SECTION AREA (SQ. IN.) A_b	f_y=40 KSI (GRADE 40)								f_y=60 KSI (GRADE 60)							
		ALL BARS EXCEPT TOP BARS				TOP BARS				ALL BARS EXCEPT TOP BARS				TOP BARS			
		DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)		
			A	B	C		A	B	C		A	B	C		A	B	C
#3	0.11	12	12	12	12	12	12	12	15	12	12	12	16	13	13	17	22
#4	0.20	12	12	12	14	12	12	15	20	12	12	16	21	17	17	22	29
#5	0.31	12	12	13	17	14	14	19	24	15	15	20	26	21	21	28	36
#6	0.44	12	12	16	21	17	17	22	29	18	18	24	31	26	26	33	43
#7	0.60	15	15	20	26	21	21	28	36	23	23	30	39	32	32	41	54
#8	0.79	20	20	26	34	28	28	36	47	30	30	39	51	42	42	54	71
#9	1.00	25	25	33	43	35	35	46	60	38	38	49	64	53	53	69	90
#10	1.27	32	32	42	54	45	45	58	76	48	48	62	81	67	67	87	114
#11	1.56	39	39	51	67	55	55	71	93	59	59	77	100	82	82	107	140
#14	2.25	54				76				81				114			
#18	4.00	70				98				105				147			

f'c = 4500 PSI

BAR SIZE	BAR CROSS SECTION AREA (SQ. IN.) A_b	f_y=40 KSI (GRADE 40)								f_y=60 KSI (GRADE 60)							
		ALL BARS EXCEPT TOP BARS				TOP BARS				ALL BARS EXCEPT TOP BARS				TOP BARS			
		DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)		
			A	B	C		A	B	C		A	B	C		A	B	C
#3	0.11	12	12	12	12	12	12	12	15	12	12	12	16	13	13	17	22
#4	0.20	12	12	12	14	12	12	15	20	12	12	16	21	17	17	22	29
#5	0.31	12	12	13	17	14	14	19	24	15	15	20	26	21	21	28	36
#6	0.44	12	12	16	21	17	17	22	29	18	18	24	31	26	26	33	43
#7	0.60	15	15	19	25	20	20	26	34	22	22	28	37	30	30	39	51
#8	0.79	19	19	25	32	27	27	34	45	28	28	37	48	40	40	51	67
#9	1.00	24	24	31	41	33	33	43	57	36	36	46	61	50	50	65	85
#10	1.27	30	30	39	51	42	42	55	72	45	45	59	77	63	63	82	107
#11	1.56	37	37	48	63	52	52	67	88	56	56	72	94	78	78	101	132
#14	2.25	51				72				77				107			
#18	4.00	66				93				99				139			

DEVELOPMENT LENGTH AND LAP SPLICE LENGTH OF DEFORMED BARS IN COMPRESSION

AASHTO LRFD SPECIFICATIONS,
ARTICLES 5.11.2.2.1 AND 5.11.5.5.1

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			
		f_y=40KSI (GRADE 40)		f_y=60KSI (GRADE 60)		f_y=40KSI (GRADE 40)		f_y=60KSI (GRADE 60)		f_y=40KSI (GRADE 40)		f_y=60KSI (GRADE 60)		f_y=40KSI (GRADE 40)		f_y=60KSI (GRADE 60)	
		DEVELOP. LENGTH (IN.)	SPLICE LENGTH (IN.)	DEVELOP. LENGTH (IN.)	SPLICE LENGTH (IN.)	DEVELOP. LENGTH (IN.)	SPLICE LENGTH (IN.)	DEVELOP. LENGTH (IN.)	SPLICE LENGTH (IN.)	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	8	12	9	12	8	12	8	12	8	12	8	12	8	12	8	12
#4	0.500	8	12	11	15	8	12	11	15	8	12	10	15	8	12	9	15
#5	0.625	10	13	14	19	9	13	13	19	8	13	12	19	8	13	12	19
#6	0.750	11	15	17	23	11	15	16	23	10	15	15	23	9	15	14	23
#7	0.875	13	18	20	27	12	18	18	27	12	18	17	27	11	18	16	27
#8	1.000	15	20	22	30	14	20	21	30	13	20	19	30	12	20	18	30
#9	1.128	17	23	25	34	16	23	23	34	15	23	22	34	14	23	21	34
#10	1.270	19	26	28	39	18	26	26	39	16	26	24	39	16	26	23	39
#11	1.410	21	29	31	43	19	29	29	43	18	29	27	43	17	29	26	43
#14	1.693	25	34	37	51	23	34	35	51	22	34	32	51	21	34	31	51
#18	2.257	33	46	50	68	31	46	46	68	29	46	43	68	28	46	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".

GUIDELINES FOR USE OF DEVELOPMENT LENGTH AND SPLICE LENGTH OF DEFORMED BARS IN TENSION

UNCOATED REBARS

USE TABLE A

EPOXY COATED REBARS

USE TABLE B WHEN :
- COVER IS < 3x BAR DIA.
  OR
- CLEAR SPACING BETWEEN BARS IS < 6x BAR DIA.

(INCLUDES 50% INCREASE IN LAP SPLICE LENGTH)

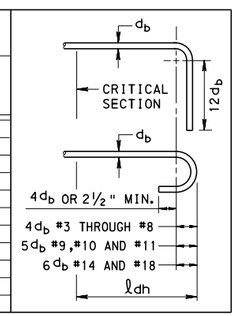
USE TABLE C FOR ALL OTHER CASES

(INCLUDES 20% INCREASE IN LAP SPLICE LENGTH)

DEVELOPMENT LENGTH OF STANDARD HOOKS IN TENSION

FOR REINFORCING STEEL GRADES 40 AND 60
AASHTO LRFD SPECIFICATION, ARTICLE 5.11.2.4.1

BAR SIZE	DIA. OF BAR d_b (IN.)	f'_c =3,000 PSI ALL BARS ℓ_{dh} (IN.)	f'_c =3,500 PSI ALL BARS ℓ_{dh} (IN.)	f'_c =4,000 PSI ALL BARS ℓ_{dh} (IN.)	f'_c =4,500 PSI ALL BARS 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
#14	1.693	38	35	33	31
#18	2.257	50	46	43	41



NOTE:
1. A FACTOR OF 0.7 CAN BE APPLIED FOR #11 BAR AND SMALLER, IF THE SIDE COVER (NORMAL TO PLANE OF HOOK) IS NOT LESS THAN 2½", AND FOR 90° HOOK, COVER ON BAR EXTENSION BEYOND HOOK IS NOT LESS THAN 2".
2. INCREASE THE DEVELOPMENT LENGTH, ℓ_{dh}, BY 1.2 FOR EPOXY COATED HOOKS IN TENSION.

NOTES FOR DEFORMED BARS IN TENSION (TABLES A, B AND C):

1. DEVELOPMENT LENGTH:
   - REFER TO AASHTO/LRFD FOR APPLICABLE MODIFICATION FACTORS.
   - TABLES ARE BASED ON NORMAL-WEIGHT CONCRETE.
   - TOP HORIZONTAL OR NEARLY HORIZONTAL REINFORCEMENT HAVE MORE THAN 12 INCHES OF FRESH CONCRETE CAST BELOW THE REINFORCEMENT.
   - INCREASE THE DEVELOPMENT LENGTH, ℓ_d, BY 2.0 FOR BARS WITH A COVER OF BAR DIAMETER OR LESS, OR WITH A CLEAR SPACING OF 2x BAR DIAMETER OR LESS.
   - DECREASE THE DEVELOPMENT LENGTH, ℓ_d, BY 0.8 FOR BARS SPACED LATERALLY AT LEAST 6 IN. ON CENTER WITH AT LEAST 3 IN. CLEAR COVER FROM FACE OF MEMBER TO EDGE OF BAR MEASURED IN THE DIRECTION OF THE SPACING, BUT THE DEVELOPMENT LENGTH CANNOT BE LESS THAN 12 IN.
2. LAP SPLICE LENGTH:
   - CLASSES OF TENSION LAP SPLICES:

RATIO OF (A_s AS PROVIDED) / (A_s AS REQUIRED)	PERCENT OF A_s SPLICED WITH REQUIRED LAP LENGTH		
	50%	75%	100%
≥ 2	A	A	B
< 2	B	C	C

   - ASSUME CLASS C SPLICES IN THE ABSENCE OF DESIGN ANALYSIS.
   - A_s IS THE AREA OF REINFORCEMENT REQUIRED BY ANALYSIS AT THE SPLICE LOCATION
   - THE LAP SPLICE LENGTH MAY BE DECREASED BY 0.8 FOR BARS SPACED LATERALLY AT LEAST 6 IN. ON CENTER WITH AT LEAST 3 IN. CLEAR COVER FROM FACE OF MEMBER TO EDGE OF BAR MEASURED IN THE DIRECTION OF THE SPACING, BUT THE LAP SPLICE LENGTH CANNOT BE LESS THAN 12 IN.
3. FOR TABLES B AND C, SEE SHEET 3.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
REINFORCEMENT BAR
FABRICATION DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 3
Thomas P Macioce	Brent D Thompson	BC-736M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

DEVELOPMENT LENGTH AND LAP SPLICE LENGTH OF DEFORMED BARS IN TENSION

AASHTO LRFD SPECIFICATIONS, ARTICLES 5.11.2.1.1, 5.11.2.1.2 AND 5.11.5.3.1

TABLE B

f'c = 3000 PSI (CLASS A)

BAR SIZE	BAR CROSS SECTION AREA (SQ. IN.) A_b	f_y=40 KSI (GRADE 40)								f_y=60 KSI (GRADE 60)							
		ALL BARS EXCEPT TOP BARS				TOP BARS				ALL BARS EXCEPT TOP BARS				TOP BARS			
		DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)		
			A	B	C		A	B	C		A	B	C		A	B	C
#3	0.11	12	12	12	16	12	12	14	18	14	14	18	23	16	16	20	27
#4	0.20	12	12	16	21	14	14	18	24	18	18	24	31	21	21	27	35
#5	0.31	15	15	20	26	17	17	23	29	23	23	30	39	26	26	34	44
#6	0.44	20	20	25	33	22	22	29	37	29	29	38	49	33	33	43	56
#7	0.60	26	26	34	45	30	30	39	51	39	39	51	67	45	45	58	76
#8	0.79	35	35	45	59	39	39	51	66	52	52	67	88	59	59	76	99
#9	1.00	44	44	57	74	50	50	64	84	65	65	85	111	74	74	96	126
#10	1.27	55	55	72	94	63	63	82	106	83	83	108	141	94	94	122	159
#11	1.56	68	68	88	115	77	77	100	131	102	102	132	173	115	115	150	196
#14	2.25	94				106				141				159			
#18	4.00	122				138				182				207			

f'c = 3500 PSI (CLASS AA)

BAR SIZE	BAR CROSS SECTION AREA (SQ. IN.) A_b	f_y=40 KSI (GRADE 40)								f_y=60 KSI (GRADE 60)							
		ALL BARS EXCEPT TOP BARS				TOP BARS				ALL BARS EXCEPT TOP BARS				TOP BARS			
		DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)		
			A	B	C		A	B	C		A	B	C		A	B	C
#3	0.11	12	12	12	16	12	12	14	18	14	14	18	23	16	16	20	27
#4	0.20	12	12	16	21	14	14	18	24	18	18	24	31	21	21	27	35
#5	0.31	15	15	20	26	17	17	23	29	23	23	30	39	26	26	34	44
#6	0.44	18	18	24	31	21	21	27	35	27	27	36	46	31	31	40	53
#7	0.60	25	25	32	41	28	28	36	47	37	37	47	62	41	41	54	70
#8	0.79	32	32	42	54	36	36	47	62	48	48	62	81	54	54	70	92
#9	1.00	41	41	53	69	46	46	60	78	61	61	79	103	69	69	89	116
#10	1.27	51	51	67	87	58	58	76	99	77	77	100	130	87	87	113	148
#11	1.56	63	63	82	107	71	71	93	121	94	94	122	160	107	107	139	181
#14	2.25	87				99				130				148			
#18	4.00	113				128				169				191			

f'c = 4000 PSI (CLASS AAA OR AAAP)

BAR SIZE	BAR CROSS SECTION AREA (SQ. IN.) A_b	f_y=40 KSI (GRADE 40)								f_y=60 KSI (GRADE 60)							
		ALL BARS EXCEPT TOP BARS				TOP BARS				ALL BARS EXCEPT TOP BARS				TOP BARS			
		DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)		
			A	B	C		A	B	C		A	B	C		A	B	C
#3	0.11	12	12	12	16	12	12	14	18	14	14	18	23	16	16	20	27
#4	0.20	12	12	16	21	14	14	18	24	18	18	24	31	21	21	27	35
#5	0.31	15	15	20	26	17	17	23	29	23	23	30	39	26	26	34	44
#6	0.44	18	18	24	31	21	21	27	35	27	27	36	46	31	31	40	53
#7	0.60	23	23	30	39	26	26	34	44	34	34	44	58	39	39	50	66
#8	0.79	30	30	39	51	34	34	44	58	45	45	58	76	51	51	66	86
#9	1.00	38	38	49	64	43	43	56	73	57	57	74	96	64	64	83	109
#10	1.27	48	48	62	81	54	54	71	92	72	72	93	122	81	81	106	138
#11	1.56	59	59	77	100	67	67	87	113	88	88	115	150	100	100	130	170
#14	2.25	81				92				122				138			
#18	4.00	105				119				158				179			

f'c = 4500 PSI

BAR SIZE	BAR CROSS SECTION AREA (SQ. IN.) A_b	f_y=40 KSI (GRADE 40)								f_y=60 KSI (GRADE 60)							
		ALL BARS EXCEPT TOP BARS				TOP BARS				ALL BARS EXCEPT TOP BARS				TOP BARS			
		DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)		
			A	B	C		A	B	C		A	B	C		A	B	C
#3	0.11	12	12	12	16	12	12	14	18	14	14	18	23	16	16	20	27
#4	0.20	12	12	16	21	14	14	18	24	18	18	24	31	21	21	27	35
#5	0.31	15	15	20	26	17	17	23	29	23	23	30	39	26	26	34	44
#6	0.44	18	18	24	31	21	21	27	35	27	27	36	46	31	31	40	53
#7	0.60	22	22	28	37	25	25	32	41	32	32	42	55	37	37	47	62
#8	0.79	28	28	37	48	32	32	42	54	42	42	55	72	48	48	62	81
#9	1.00	36	36	46	61	41	41	53	69	54	54	69	91	61	61	79	103
#10	1.27	45	45	59	77	51	51	67	87	68	68	88	115	77	77	100	130
#11	1.56	56	56	72	94	63	63	82	107	83	83	108	141	94	94	122	160
#14	2.25	77				87				115				130			
#18	4.00	99				113				149				169			

TABLE C

f'c = 3000 PSI (CLASS A)

BAR SIZE	BAR CROSS SECTION AREA (SQ. IN.) A_b	f_y=40 KSI (GRADE 40)								f_y=60 KSI (GRADE 60)							
		ALL BARS EXCEPT TOP BARS				TOP BARS				ALL BARS EXCEPT TOP BARS				TOP BARS			
		DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)		
			A	B	C		A	B	C		A	B	C		A	B	C
#3	0.11	12	12	12	13	12	12	14	18	12	12	15	19	16	16	20	26
#4	0.20	12	12	13	17	14	14	18	23	15	15	19	25	21	21	27	35
#5	0.31	12	12	16	21	17	17	22	29	18	18	24	31	26	26	33	43
#6	0.44	16	16	20	26	22	22	28	37	23	23	30	39	32	32	42	55
#7	0.60	21	21	28	36	30	30	38	50	32	32	41	53	44	44	57	75
#8	0.79	28	28	36	47	39	39	50	66	42	42	54	70	58	58	75	98
#9	1.00	35	35	46	59	49	49	64	83	52	52	68	89	73	73	95	124
#10	1.27	44	44	58	75	62	62	81	105	66	66	86	113	93	93	121	158
#11	1.56	55	55	71	92	76	76	99	129	82	82	106	138	114	114	148	193
#14	2.25	75				105				113				158			
#18	4.00	97				136				146				204			

f'c = 3500 PSI (CLASS AA)

BAR SIZE	BAR CROSS SECTION AREA (SQ. IN.) A_b	f_y=40 KSI (GRADE 40)								f_y=60 KSI (GRADE 60)							
		ALL BARS EXCEPT TOP BARS				TOP BARS				ALL BARS EXCEPT TOP BARS				TOP BARS			
		DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)		
			A	B	C		A	B	C		A	B	C		A	B	C
#3	0.11	12	12	12	13	12	12	14	18	12	12	15	19	16	16	20	26
#4	0.20	12	12	13	17	14	14	18	23	15	15	19	25	21	21	27	35
#5	0.31	12	12	16	21	17	17	22	29	18	18	24	31	26	26	33	43
#6	0.44	15	15	19	25	21	21	27	35	22	22	29	37	31	31	40	52
#7	0.60	20	20	26	33	27	27	36	46	29	29	38	50	41	41	53	69
#8	0.79	26	26	33	44	36	36	47	61	38	38	50	65	54	54	70	91
#9	1.00	33	33	42	55	45	45	59	77	49	49	63	82	68	68	88	115
#10	1.27	41	41	53	70	58	58	75	97	62	62	80	104	86	86	112	146
#11	1.56	51	51	66	86	71	71	92	120	76	76	98	128	106	106	137	179
#14	2.25	70				97				104				146			
#18	4.00	90				126				135				189			

f'c = 4000 PSI (CLASS AAA OR AAAP)

BAR SIZE	BAR CROSS SECTION AREA (SQ. IN.) A_b	f_y=40 KSI (GRADE 40)								f_y=60 KSI (GRADE 60)							
		ALL BARS EXCEPT TOP BARS				TOP BARS				ALL BARS EXCEPT TOP BARS				TOP BARS			
		DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)		
			A	B	C		A	B	C		A	B	C		A	B	C
#3	0.11	12	12	12	13	12	12	14	18	12	12	15	19	16	16	20	26
#4	0.20	12	12	13	17	14	14	18	23	15	15	19	25	21	21	27	35
#5	0.31	12	12	16	21	17	17	22	29	18	18	24	31	26	26	33	43
#6	0.44	15	15	19	25	21	21	27	35	22	22	29	37	31	31	40	52
#7	0.60	18	18	24	31	26	26	33	43	27	27	36	46	38	38	50	65
#8	0.79	24	24	31	41	34	34	44	57	36	36	47	61	50	50	65	85
#9	1.00	30	30	39	51	42	42	55	72	45	45	59	77	63	63	82	108
#10	1.27	39	39	50	65	54	54	70	91	58	58	75	98	81	81	105	137
#11	1.56	47	47	61	80	66	66	86	112	71	71	92	120	99	99	128	168
#14	2.25	65				91				98				137			
#18	4.00	84				118				126				177			

f'c = 4500 PSI

BAR SIZE	BAR CROSS SECTION AREA (SQ. IN.) A_b	f_y=40 KSI (GRADE 40)								f_y=60 KSI (GRADE 60)							
		ALL BARS EXCEPT TOP BARS				TOP BARS				ALL BARS EXCEPT TOP BARS				TOP BARS			
		DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)			DEVELOP. LENGTH ℓ_d (IN.)	LENGTH OF LAP SPLICE (IN.)		
			A	B	C		A	B	C		A	B	C		A	B	C
#3	0.11	12	12	12	13	12	12	14	18	12	12	15	19	16	16	20	26
#4	0.20	12	12	13	17	14	14	18	23	15	15	19	25	21	21	27	35
#5	0.31	12	12	16	21	17	17	22	29	18	18	24	31	26	26	33	43
#6	0.44	15	15	19	25	21	21	27	35	22	22	29	37	31	31	40	52
#7	0.60	17	17	23	29	24	24	31	41	26	26	34	44	36	36	47	61
#8	0.79	23	23	30	38	32	32	41	54	34	34	44	57	47	47	61	80
#9	1.00	29	29	37	49	40	40	52	68	43	43	56	73	60	60	78	101
#10	1.27	36	36	47	62	51	51	66	86	54	54	71	92	76	76	99	129
#11	1.56	45	45	58	75	62	62	81	106	67	67	87	113	93	93	121	158
#14	2.25	62				86				92				129			
#18	4.00	80				111				119				167			

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

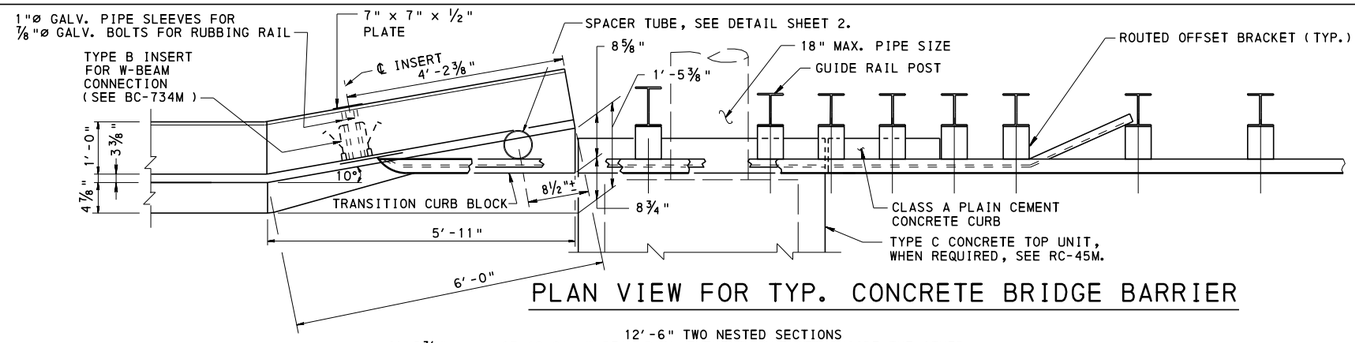
STANDARD
REINFORCEMENT BAR
FABRICATION DETAILS

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

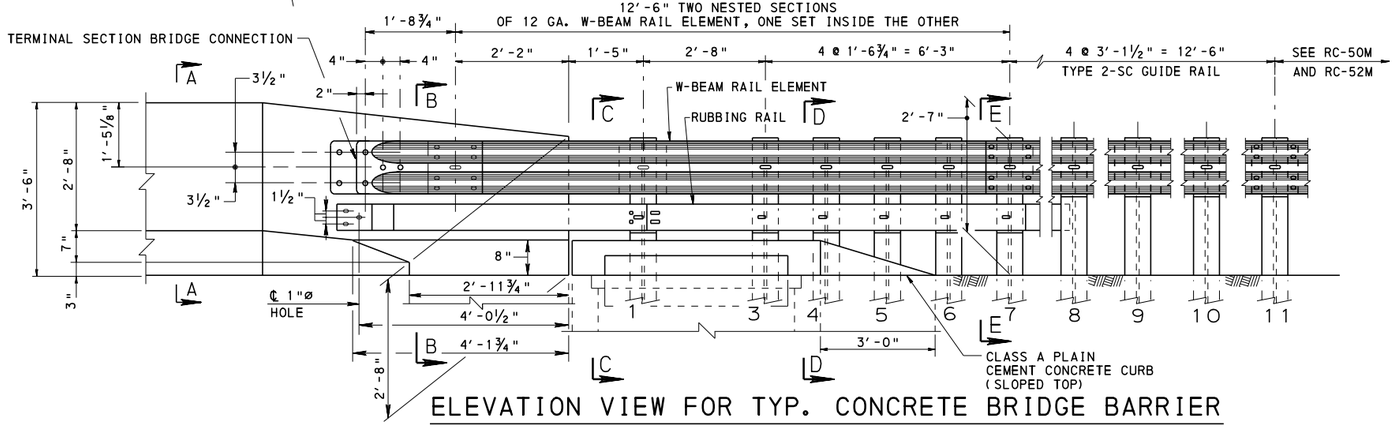
RECOMMENDED SEPT. 30, 2016
Brian D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 3 OF 3

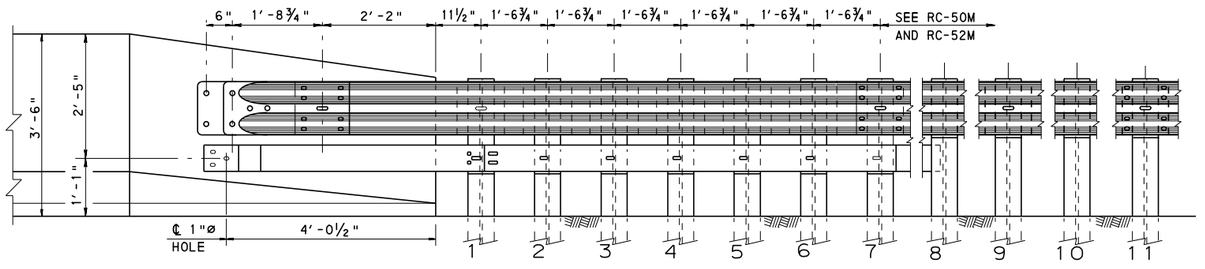
BC-736M



PLAN VIEW FOR TYP. CONCRETE BRIDGE BARRIER



ELEVATION VIEW FOR TYP. CONCRETE BRIDGE BARRIER



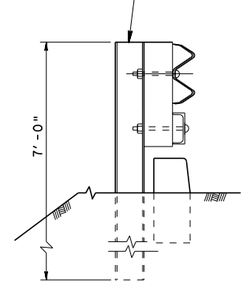
NOTE:
TYPICAL TO ELEVATION VIEW WITH INLET PLACEMENT EXCEPT AS NOTED.

ELEVATION VIEW FOR TYP. CONCRETE BRIDGE BARRIER

(WITHOUT INLET PLACEMENT)

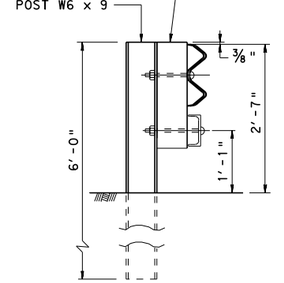
NOTES

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408.
2. USE PLAN DIMENSIONS WHEN DIFFERENT FROM THOSE SHOWN ON THIS STANDARD.
3. REINFORCED CONCRETE BARRIER AND EMBEDDED INSERTS ARE BRIDGE ITEMS.
4. TERMINAL SECTION AND RUBBING RAIL END MUST BE ATTACHED FLUSH WITH THE BRIDGE BARRIER. INSTALLATION CAN BE GREATLY SIMPLIFIED BY FABRICATING OR SHOP TWISTING TO BE CONSISTENT WITH THE SLOPE OF THE BARRIER.
5. SEE RC-52M AND RC-50M FOR DETAILS AND HARDWARE NOT SHOWN.
6. TYPICAL CONCRETE BARRIER 42" WITH INLET PLACEMENT HAS SUCCESSFULLY PASSED TL4 CRASH TESTING. THE TYPICAL CONCRETE BARRIER 42", ALTERNATE CONCRETE BARRIER 32", AND ALTERNATE CONCRETE BARRIER 32" WITH INLET PLACEMENT ARE GRANTED TL4 EQUIVALENCE BY FHWA.
7. PROVIDE APPROACH END GUIDE RAIL TREATMENT AT BOTH THE APPROACH AND TRAILING ENDS OF STRUCTURE BARRIERS ON TWO LANE FACILITIES WITH TWO-WAY TRAFFIC. ON FOUR LANE DIVIDED HIGHWAYS, GUIDE RAIL TRANSITION IS NOT REQUIRED ON TRAILING ENDS OF BARRIERS UNLESS WARRANTED BY OTHER OBSTRUCTIONS.
8. PAYMENT FOR THE APPROACH END TRANSITION ARE ROADWAY ITEMS.

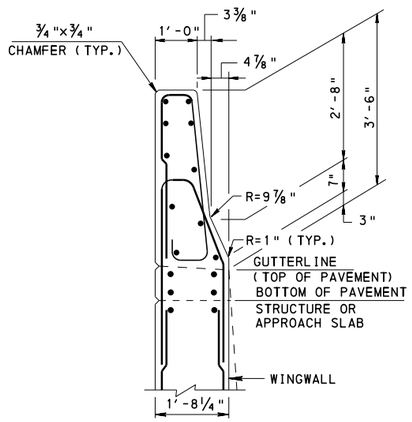


SECTION D-D

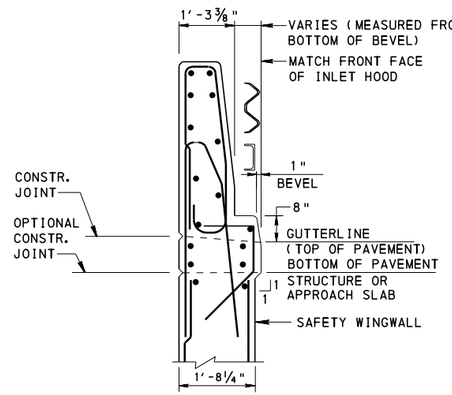
SECTION D-D IS TYPICAL TO SECTION C-C EXCEPT AS SHOWN OTHERWISE.



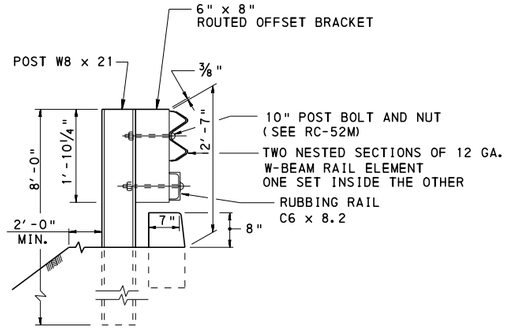
SECTION E-E



SECTION A-A



SECTION B-B



SECTION C-C

BC-734M	ANCHOR SYSTEMS
RC-45M	INLET TOPS, GRATES AND FRAMES
RC-50M	GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS
RC-52M	TYPE 2 STRONG POST GUIDE RAIL

REFERENCE DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

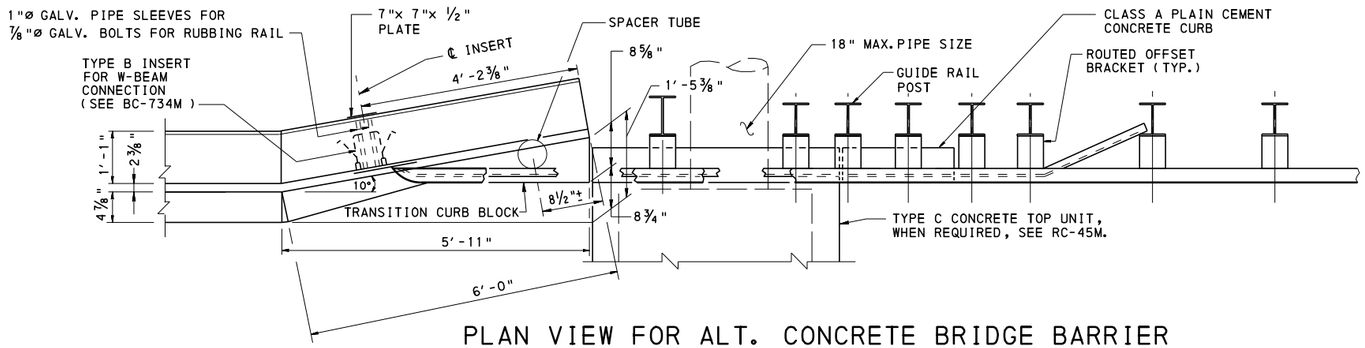
STANDARD BRIDGE BARRIER TO GUIDE RAIL TRANSITION

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

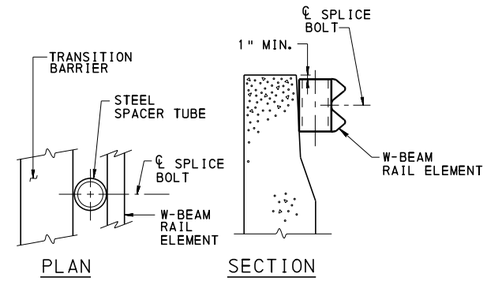
RECOMMENDED SEPT. 30, 2016
Bruce B Thompson
DIRECTOR, BUR. OF PROJECT DIRECTOR

SHEET 1 OF 2

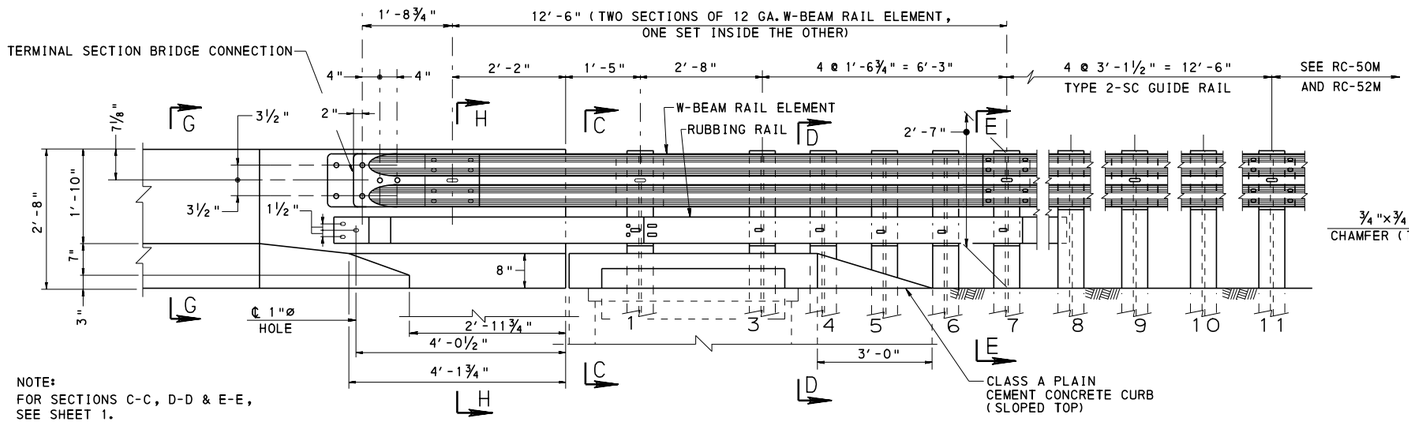
BC-739M



PLAN VIEW FOR ALT. CONCRETE BRIDGE BARRIER

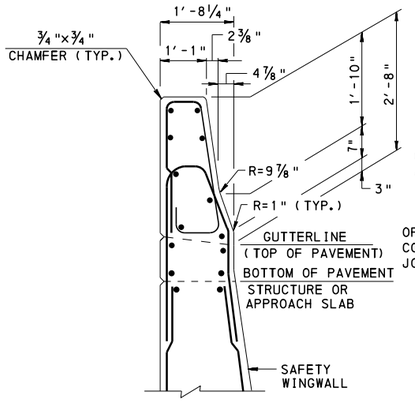


STEEL SPACER TUBE DETAIL

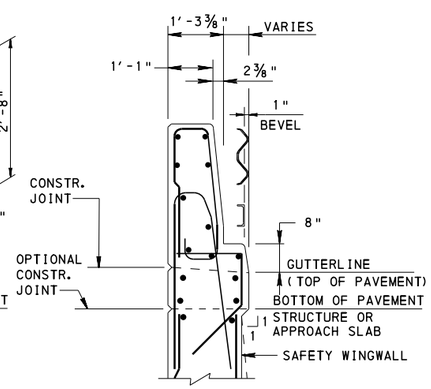


NOTE:
FOR SECTIONS C-C, D-D & E-E, SEE SHEET 1.

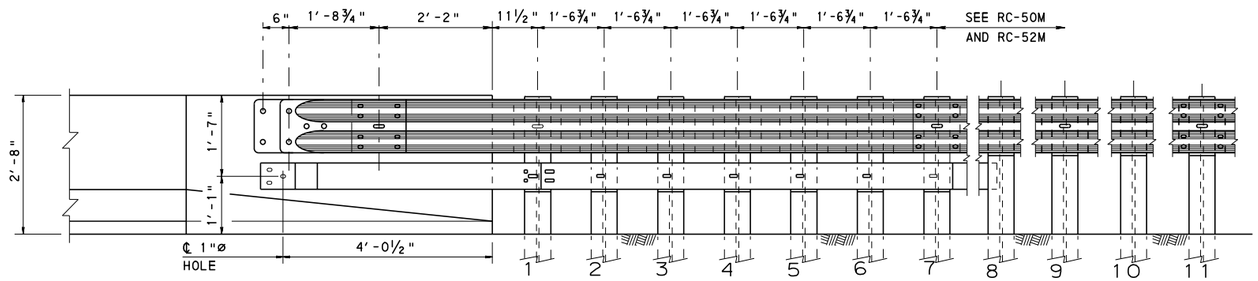
ELEVATION VIEW FOR ALT. CONCRETE BRIDGE BARRIER



SECTION G-G



SECTION H-H



NOTE:
TYPICAL TO ELEVATION VIEW WITH INLET PLACEMENT EXCEPT AS NOTED.

ELEVATION VIEW FOR ALT. CONCRETE BRIDGE BARRIER

(WITHOUT INLET PLACEMENT)

NOTES:

1. FOR NOTES, SEE SHEET 1.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD BRIDGE BARRIER TO GUIDE RAIL TRANSITION

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 2
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brian D. Thompson DIRECTOR, BUR. OF PROJECT DIRECTOR	BC-739M

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

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. SPREAD FOOTINGS MAY BE ORDERED BY THE ENGINEER TO BE AT ANY ELEVATION OR OF ANY DIMENSIONS NECESSARY TO PROVIDE A PROPER FOUNDATION.
10. GALVANIZE ALL STRUCTURAL STEEL, BOLTS, NUTS & WASHERS IN ACCORDANCE WITH PUB. 408, UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
11. PIPE DIAMETERS SHOWN UP TO AND INCLUDING 12 INCHES ARE NOMINAL DIAMETERS. PIPE DIAMETERS SHOWN FROM 14 INCHES AND UP ARE ACTUAL DIAMETERS.
12. 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".
13. 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.
14. PROVIDE ANCHOR BOLT HOLES 1/4" LARGER THAN BOLT DIAMETER.
15. PROVIDE A MINIMUM ANCHOR BOLT EMBEDMENT LENGTH OF 20 ANCHOR BOLT DIAMETERS.
16. PROVIDE DOUBLE NUTS AND WASHER FOR EACH ANCHOR BOLT.
17. 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 5/16". 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.

REFERENCE DRAWINGS

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-52M	TYPE 2 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

OVERHEAD SIGN STRUCTURES

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

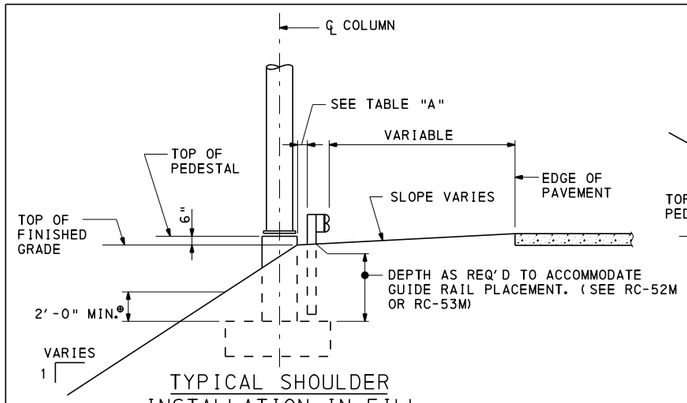
NOTES AND DESIGN CRITERIA

RECOMMENDED SEPT.30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

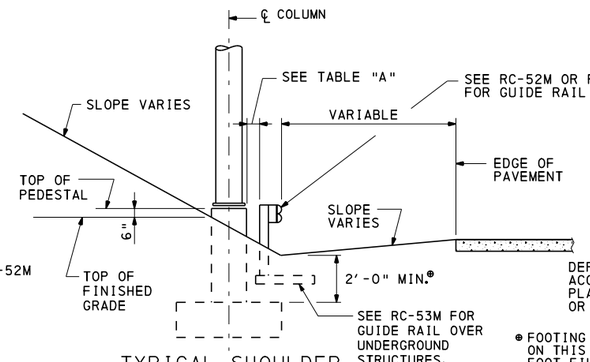
RECOMMENDED SEPT.30, 2016
Brian D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHT. 1 OF 6

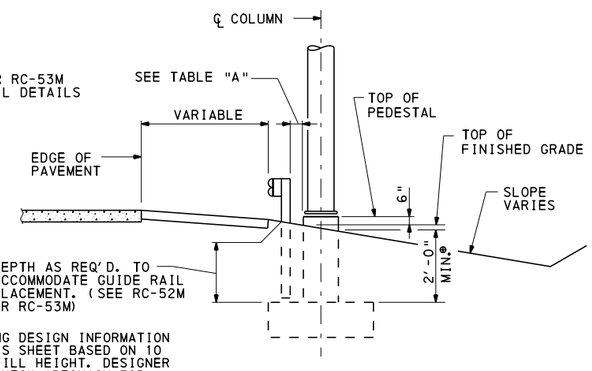
BC-741M



TYPICAL SHOULDER
INSTALLATION IN FILL



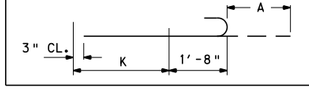
TYPICAL SHOULDER
INSTALLATION IN CUT



TYPICAL SHOULDER
INSTALLATION IN CUT WITH SWALE

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

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 SPLICE, HOWEVER NO COMPENSATION WILL BE ALLOWED FOR ADDITIONAL STEEL INVOLVED.

TABLE "A"	
TYPE OF GUIDE RAIL	REQUIRED † CLEARANCES
2-SCC	1'-0"
2-SC	2'-0"
2-S	3'-0"
2-WCC	4'-0"
2-WC	5'-0"
2-W	7'-0"
MEDIAN BARRIER	2'-0"

† THE MINIMUM UNOBSTRUCTED DISTANCE FROM BACK OF GUIDE RAIL POST TO FACE OF PEDESTAL.

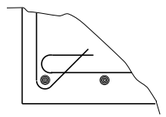
FOOTING			FOOTING REINFORCEMENT											
TYPE	DIMENSION		CU. YDS. CONC.	"L" BARS					"T" BARS					
				L_1		L_2		LENGTH	T_1		T_2		LENGTH
	G	F		NO.	SIZE	NO.	SIZE		NO.	SIZE	NO.	SIZE	
609	6'-0"	9'-0"	4.0	10	4	5	5	8'-6"	7	4	7	5	5'-6"
710	7'-0"	10'-0"	5.2	14	4	6	5	9'-6"	9	4	8	5	6'-6"
711	7'-0"	11'-0"	5.7	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.

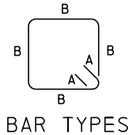
PEDESTAL	PEDESTAL REINFORCEMENT									
E	CU. YDS. CONC. (▲)	#4 BARS TYPE "M"			#4 BARS TYPE "N"			#4 BARS TYPE "X"			WEIGHT LBS. (✱)
		LENGTH	A	B	LENGTH	A	B	LENGTH	A	B	
2'-6"	0.23	8'-10"	5"	2'-0"	6'-9½"	5"	1'-5⅞"	---	---	---	11
2'-9"	0.28	9'-10"	5"	2'-3"	7'-6"	5"	1'-8"	---	---	---	12
3'-0"	0.33	10'-10"	5"	2'-6"	8'-2½"	5"	1'-10⅛"	---	---	---	13
3'-3"	0.39	11'-10"	5"	2'-9"	8'-11"	5"	2'-0¼"	---	---	---	14
3'-9"	0.52	13'-10"	5"	3'-3"	10'-4"	5"	2'-4½"	---	---	---	16
4'-3"	0.67	15'-10"	5"	3'-9"	11'-9"	5"	2'-8¾"	---	---	---	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.

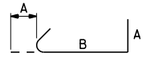
(✱) WEIGHT OF 1 TYPE "M" BAR PLUS 1 TYPE "N" BAR (WHERE INDICATED) OR 1 TYPE "M" BAR PLUS 4 TYPE "X" BARS (BASE TYPE "X" ONLY)



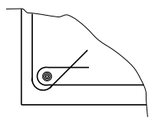
DETAIL A



BAR TYPES
"M" & "N"

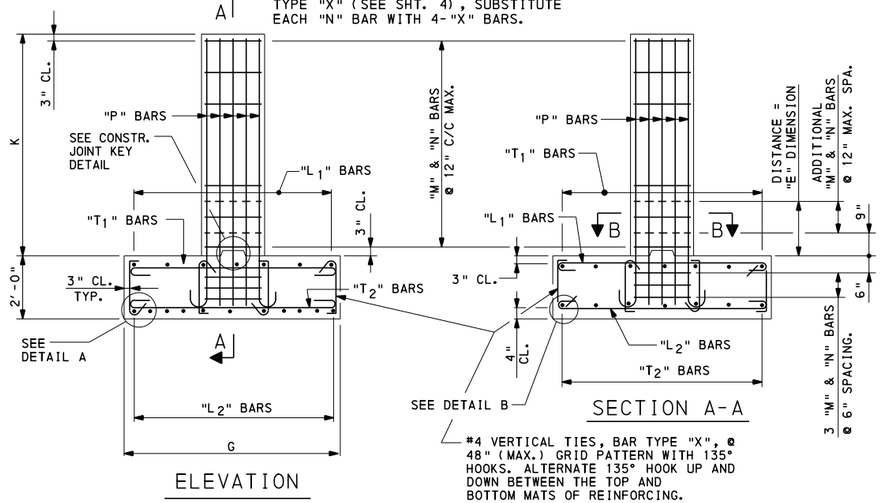


BAR TYPE "X"



DETAIL B

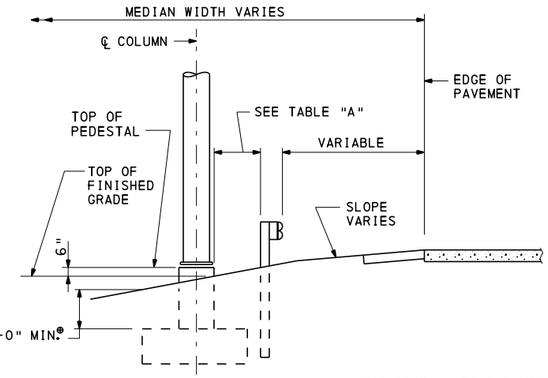
NOTE:
FOR 4'-3" PEDESTALS WITH BASE TYPE "X" (SEE SHT. 4), SUBSTITUTE EACH "N" BAR WITH 4-"X" BARS.



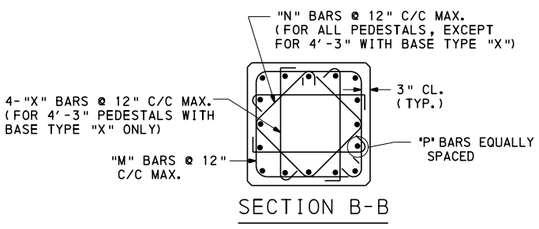
ELEVATION

SECTION A-A

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



TYPICAL GRADED
MEDIAN INSTALLATION



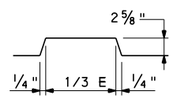
SECTION B-B

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.

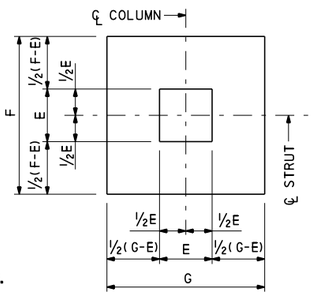
NOTES:

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



CONSTRUCTION JOINT
KEY DETAIL

ELEVATION SHOWN, SECTION A-A SIMILAR.



PLAN OF FOUNDATION

ALTERNATE FOUNDATION

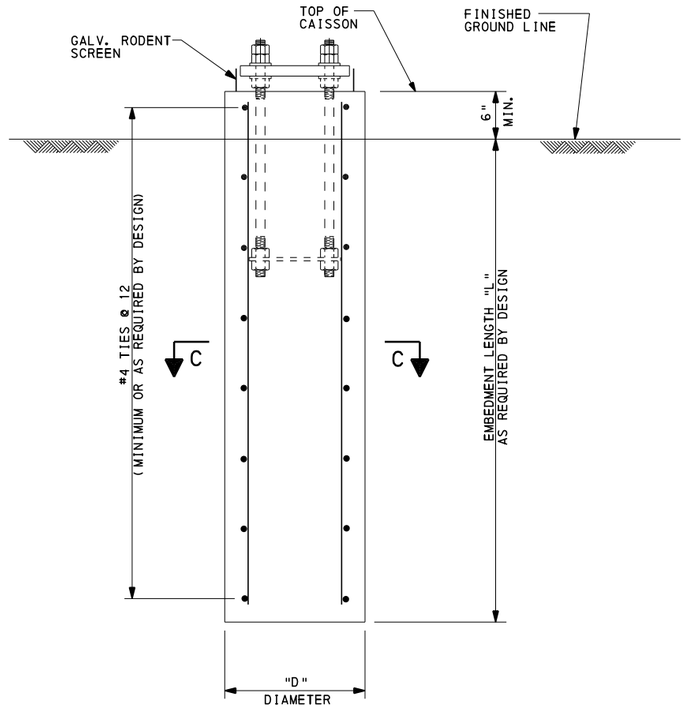
METAL FINNED PIPE FOUNDATION IS PERMITTED AS AN ALTERNATE FOUNDATION TO SPREAD FOOTING PER PENNDOT APPROVED PRODUCT DRAWINGS #95-290 PE REV. 1, #13-602-BDTD AND #14-603-BDTD FOR SUPPORT OF CENTER-MOUNT DMS SIGN STRUCTURES.

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

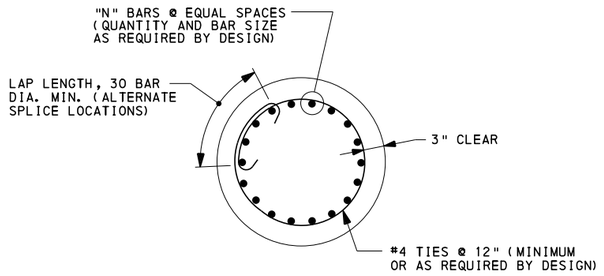
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 2 OF 6
Thomas P Macioce	Brian D Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-741M



(SEE TABLE FOR MINIMUM CAISSON DIAMETER BASED ON COLUMN SIZE)

CAISSON ELEVATION

N. T. S.



SECTION C-C

N. T. S.

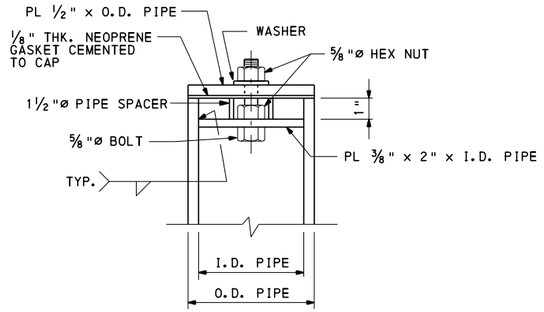
ALTERNATE FOUNDATION

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

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

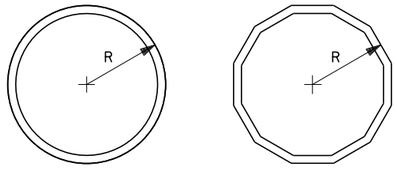


ILLUSTRATION OF DIMENSION "R" FOR CIRCULAR MEMBERS AND EQUIVALENT "PRESS-BREAK" MEMBERS

"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.

TABLE CONTINUED FROM SHEET 2.

FOOTING			FOOTING REINFORCEMENT									
TYPE	DIMENSION		CU. YDS. CONC.	"L" BARS					"T" BARS					
				L_1		L_2		LENGTH	T_1		T_2		LENGTH
	G	F		NO.	SIZE	NO.	SIZE		NO.	SIZE	NO.	SIZE	
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	15'-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:

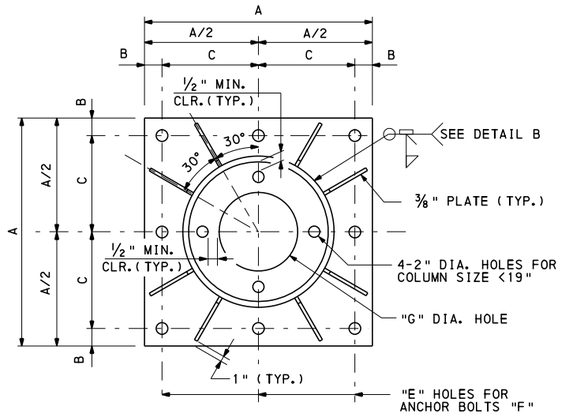
- PROVIDE 90° OR 180° HOOKS ON ALL "L" AND "T" BARS.
- LENGTH FOR "L" AND "T" BARS DOES NOT INCLUDE 90° OR 180° HOOK LENGTHS.
- COUNT AND SIZE OF PEDESTAL DETAIL "P" BARS TO BE SPECIFIED ON THE CONTRACT DRAWINGS, BASED ON INFORMATION OBTAINED FROM DESIGN TABLES ON BD-641M, SHEETS 6, 7, AND 8.
- FOR ADDITIONAL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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

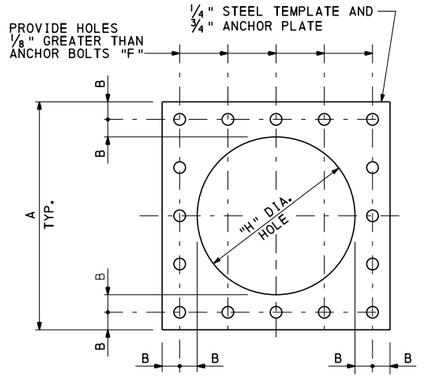
OVERHEAD SIGN STRUCTURES
CANTILEVER AND CENTER-MOUNT STRUCTURES
STRUT LENGTHS UP TO 40'

FOUNDATION DETAILS AND
ALTERNATE CAISSON FOUNDATION

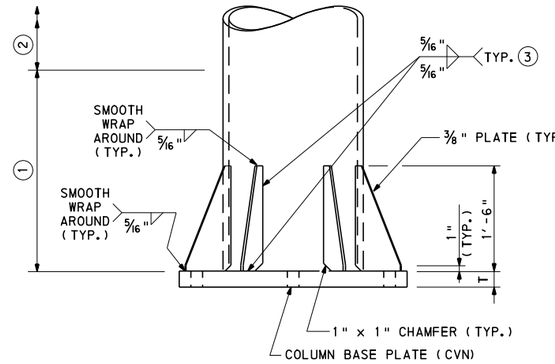
RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 3 OF 6 BC-741M



PLAN OF COLUMN BASE TYPE 'Y'

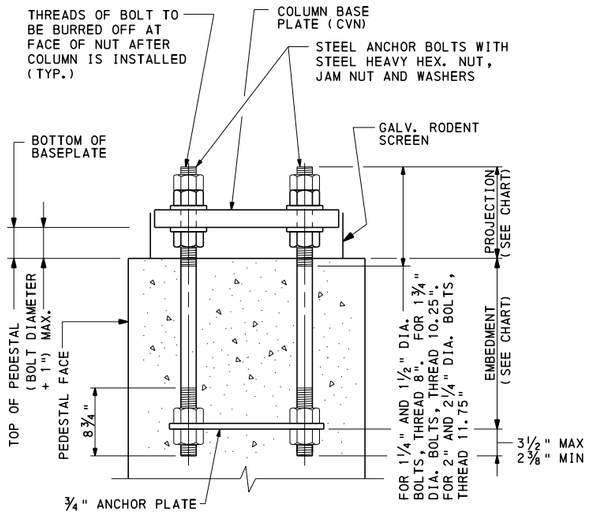


ANCHOR PLATE AND STEEL TEMPLATE DETAIL



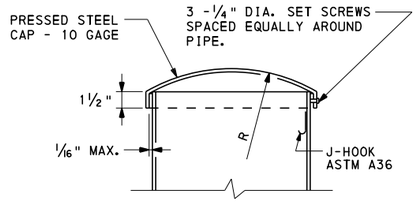
ELEVATION - TYPE Y
(TYPE - X SIMILAR)

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.

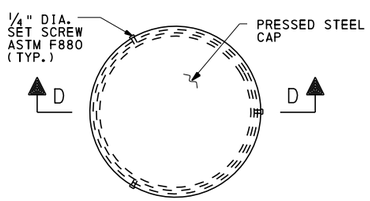


ANCHOR BOLT DETAIL

COLUMN, STIFFENERS, AND REINF. OMITTED FOR CLARITY

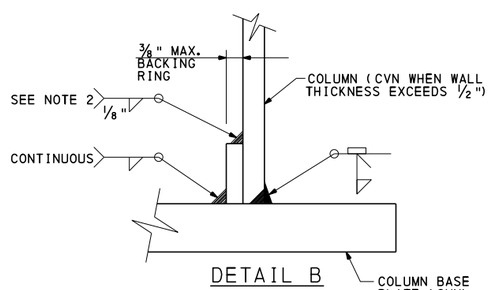


SECTION D-D



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"



DETAIL B

COLUMN BASES												
COLUMN NOMINAL SIZE X WALL THK.*	BASE TYPE	A	B	C	E	F	G	H	T	WASHER SIZE	PRO-JECTION	EMBED-MENT
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").

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.

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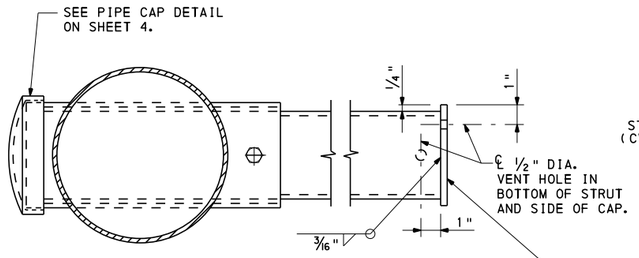
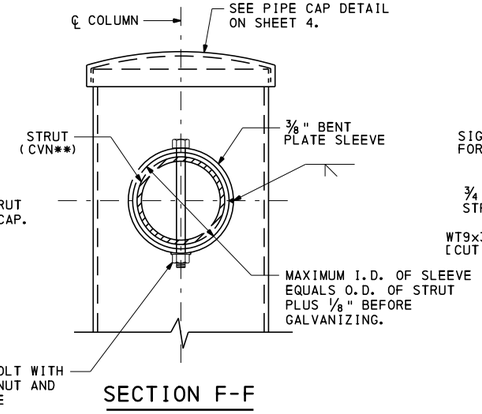
OVERHEAD SIGN STRUCTURES
CANTILEVER AND CENTER-MOUNT STRUCTURES
STRUT LENGTHS UP TO 40'

COLUMN BASE

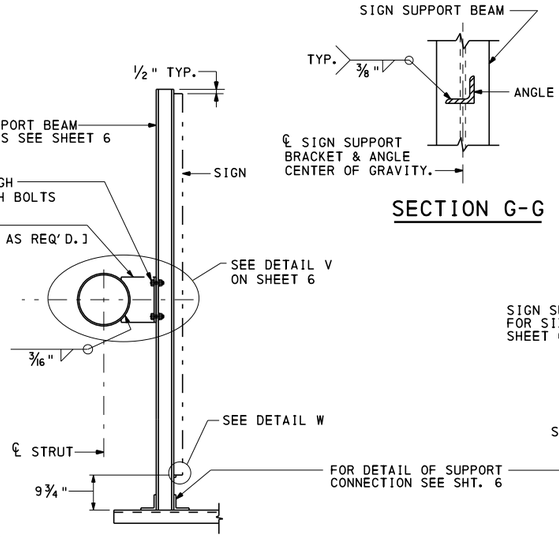
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 4 OF 6
Thomas P Macioce	Bruce D Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-741M



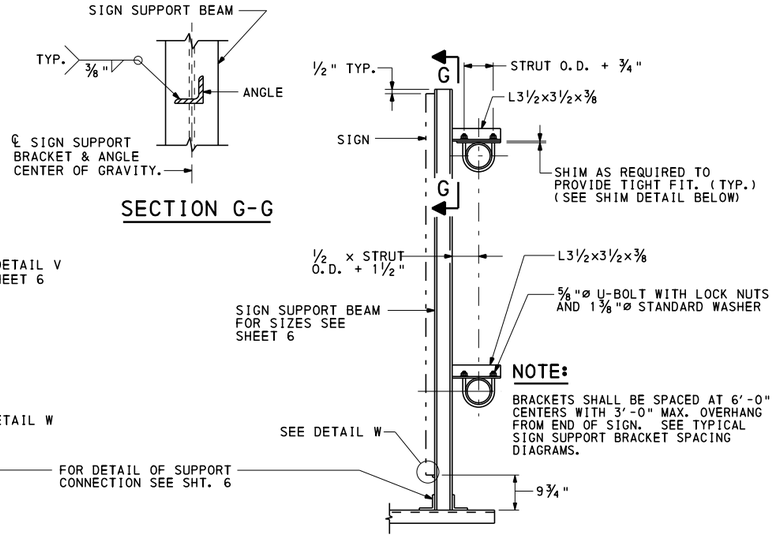
SECTION E-E



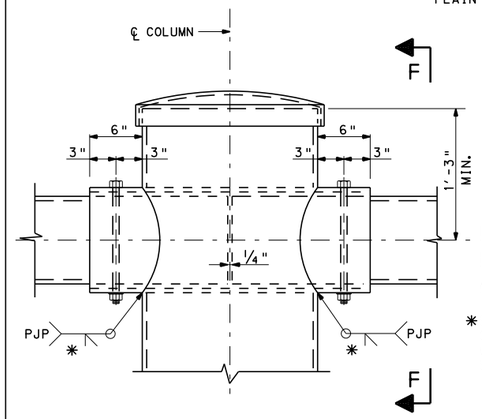
SECTION F-F



SINGLE STRUT SIGN
SUPPORT BRACKET DETAIL



TWO STRUT SIGN
SUPPORT BRACKET DETAIL

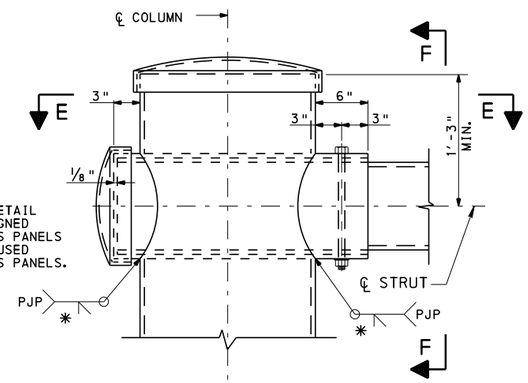


NOTE 1:
THIS CONNECTION DETAIL HAS NOT BEEN DESIGNED TO SUPPORT DMS/VMS PANELS AND IS NOT TO BE USED TO SUPPORT DMS/VMS PANELS.

* SPECIFY DEPTH OF BEVEL AND WELD SIZES ON SHOP DWGS.

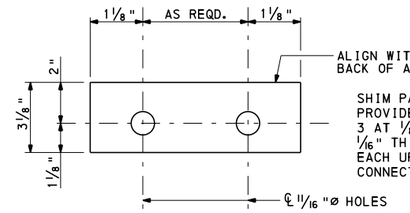
STRUT CONNECTION TYPE B

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

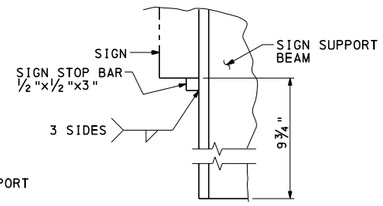


STRUT CONNECTION TYPE A

FOR TYPE A CANTILEVERS (SEE NOTE 1)



SHIM DETAIL



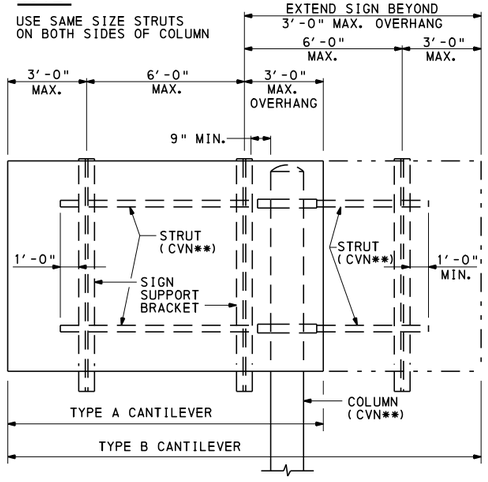
DETAIL W

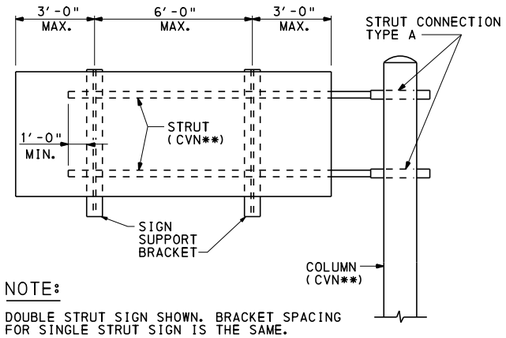
NOTES:

- 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 ½" (0.500").

NOTE:
USE SAME SIZE STRUTS ON BOTH SIDES OF COLUMN

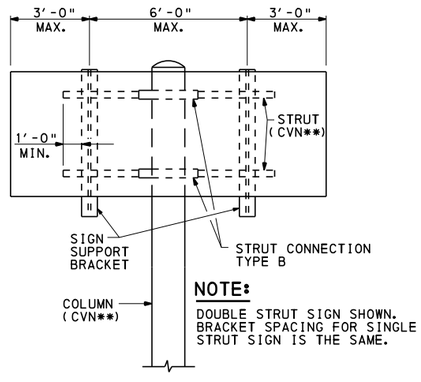




NOTE:
DOUBLE STRUT SIGN SHOWN. BRACKET SPACING FOR SINGLE STRUT SIGN IS THE SAME.

TYPICAL SIGN SUPPORT BRACKET
SPACING DIAGRAMS FOR CANTILEVERS

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



NOTE:
DOUBLE STRUT SIGN SHOWN. BRACKET SPACING FOR SINGLE STRUT SIGN IS THE SAME.

TYPICAL SIGN SUPPORT BRACKET
SPACING DIAGRAM FOR CENTER MOUNTS

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
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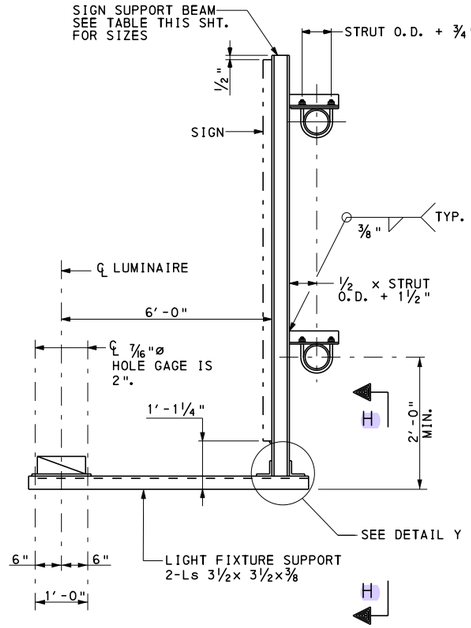
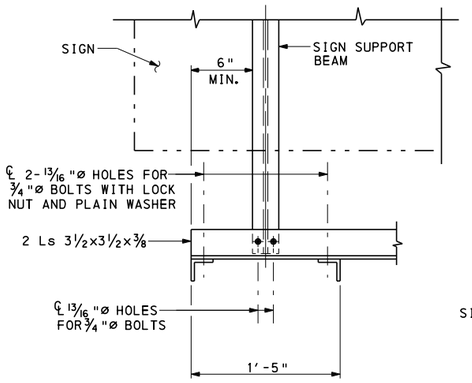
OVERHEAD SIGN STRUCTURES
CANTILEVER AND CENTER-MOUNT STRUCTURES
STRUT LENGTHS UP TO 40'

STRUCTURAL DETAILS

RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent D. Thomas DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 5 OF 6 BC-741M

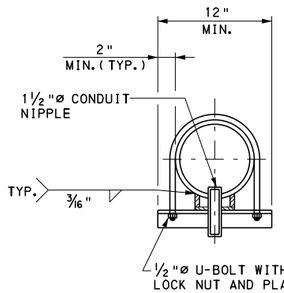


TYPICAL LIGHT FIXTURE SUPPORT DETAILS

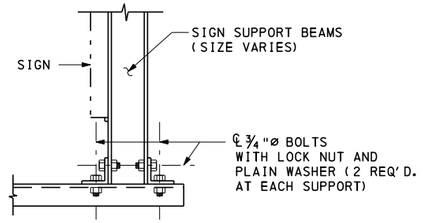


SECTION H-H

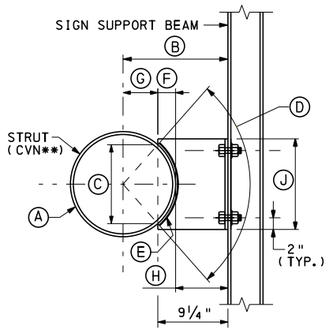
NOTE:
WEIGHT OF LUMINAIRE AND SUPPORT BRACKETS IS 400 lbs. BASED ON 10'-0" LUMINAIRE SPACING.



SECTION J-J



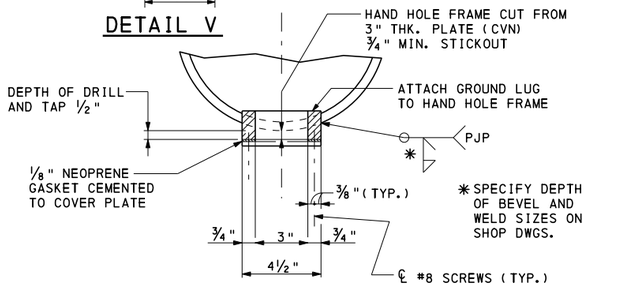
DETAIL Y



DETAIL V

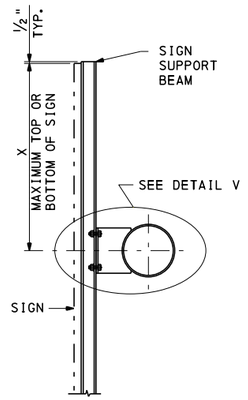
LEGEND (FOR DETAIL V):

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

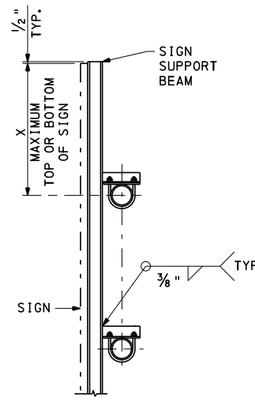


SECTION K-K

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

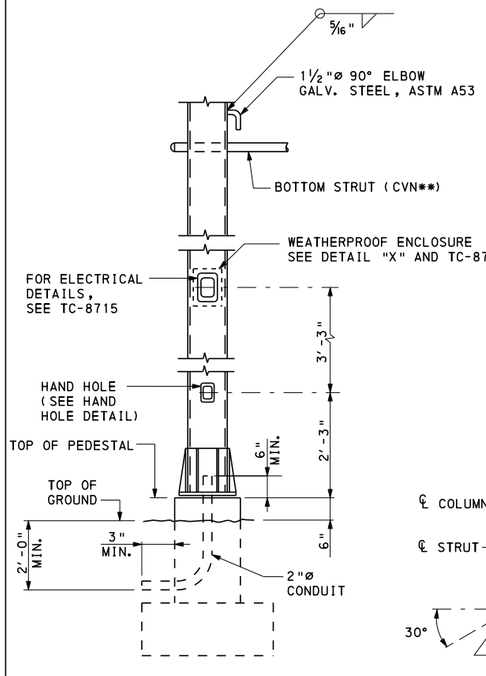


SINGLE STRUT

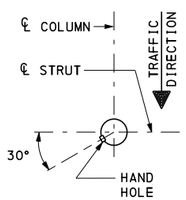


DOUBLE STRUT

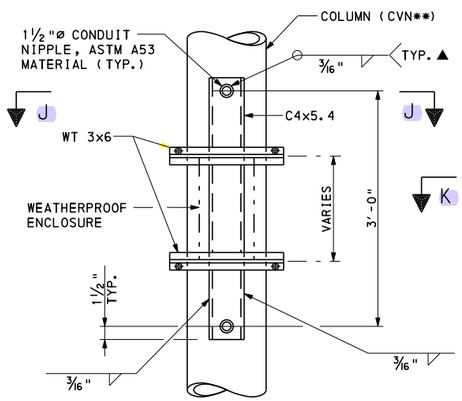
SIGN SUPPORT BEAM SIZES



TYPICAL COLUMN DETAIL

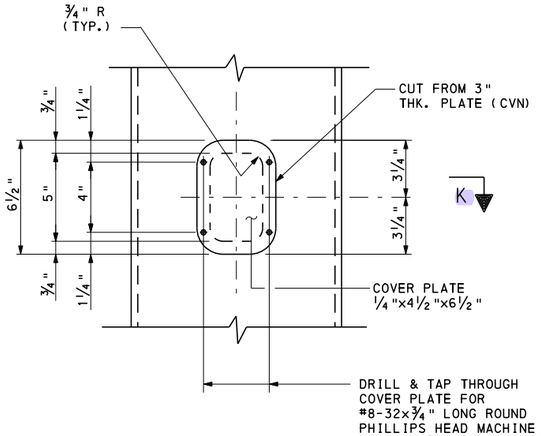


HAND HOLE LOCATION



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 ½" (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

RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Bruce B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 6 OF 6 BC-741M

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

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. SPREAD FOOTINGS MAY BE ORDERED BY THE ENGINEER TO BE AT ANY ELEVATION OR OF ANY DIMENSIONS NECESSARY TO PROVIDE A PROPER FOUNDATION.
10. GALVANIZE ALL STRUCTURAL STEEL, BOLTS, NUTS & WASHERS IN ACCORDANCE WITH PUB.408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
11. PIPE DIAMETERS SHOWN UP TO AND INCLUDING 12 INCHES ARE NOMINAL DIAMETERS. PIPE DIAMETERS SHOWN FROM 14 INCHES AND UP ARE ACTUAL DIAMETERS.
12. 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".
13. 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.
14. PROVIDE ANCHOR BOLT HOLES 1/4" LARGER THAN BOLT DIAMETER.
15. PROVIDE A MINIMUM ANCHOR BOLT EMBEDMENT LENGTH OF 20 ANCHOR BOLT DIAMETERS.
16. PROVIDE DOUBLE NUTS AND WASHER FOR EACH ANCHOR BOLT.
17. 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 5/16". 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.

* 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.

REFERENCE DRAWINGS

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-52M	TYPE 2 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

OVERHEAD SIGN STRUCTURES

2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'

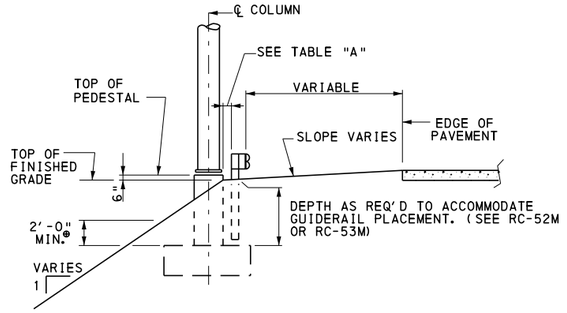
NOTES AND DESIGN CRITERIA

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

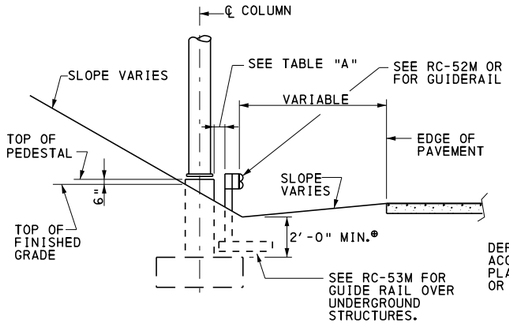
RECOMMENDED SEPT. 30, 2016
Brian S. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHT. 1 OF 10

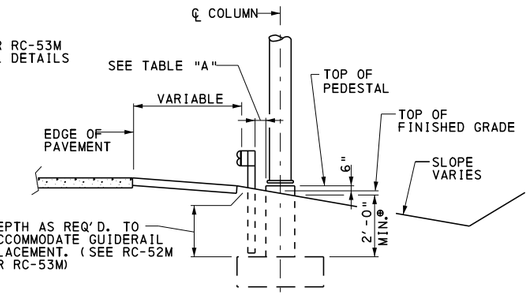
BC-743M



TYPICAL SHOULDER INSTALLATION IN FILL



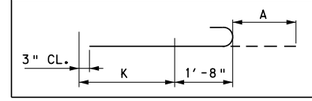
TYPICAL SHOULDER INSTALLATION IN CUT



TYPICAL SHOULDER INSTALLATION IN CUT WITH SWALE

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

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"



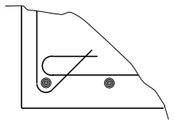
PROVIDE HOOK ON ALL "P" BARS. "P" BARS MAY BE DOWELED TO FOOTING USING CLASS C MIN. LAP SPLICE, HOWEVER NO COMPENSATION WILL BE ALLOWED FOR ADDITIONAL STEEL INVOLVED.

FOOTING			FOOTING REINFORCEMENT											
TYPE	DIMENSION		CU. YDS. CONC.	"L" BARS					"T" BARS					
				L_1		L_2			T_1		T_2			
	G	F		NO.	SIZE	NO.	SIZE	LENGTH	NO.	SIZE	NO.	SIZE	LENGTH
508	5'-0"	8'-0"	3.0	7	4	5	5	7'-6"	7	4	7	5	4'-6"
609	6'-0"	9'-0"	4.0	10	4	5	5	8'-6"	7	4	7	5	5'-6"
711	7'-0"	11'-0"	5.7	11	5	6	5	10'-6"	9	4	9	5	6'-6"
713	7'-0"	13'-0"	6.7	13	6	12	5	12'-6"	12	4	10	5	6'-6"
716	7'-0"	16'-0"	8.3	12	8	12	6	15'-6"	15	4	12	5	6'-6"
718	7'-0"	18'-0"	9.3	12	8	12	7	17'-6"	17	4	14	5	6'-6"
812	8'-0"	12'-0"	7.1	12	5	7	5	11'-6"	9	4	9	5	7'-6"
814	8'-0"	14'-0"	8.3	14	6	12	5	13'-6"	11	4	11	5	7'-6"
815	8'-0"	15'-0"	8.9	15	7	16	5	14'-6"	18	4	11	5	7'-6"
817	8'-0"	17'-0"	10.1	13	8	15	6	16'-6"	21	4	14	5	7'-6"
818	8'-0"	18'-0"	10.7	13	8	14	6	17'-6"	22	4	14	5	7'-6"
820	8'-0"	20'-0"	11.9	15	8	14	7	19'-6"	22	4	15	5	7'-6"
916	9'-0"	16'-0"	10.7	17	7	14	6	15'-6"	18	4	12	5	8'-6"
918	9'-0"	18'-0"	12.0	15	8	14	7	17'-6"	21	4	14	5	8'-6"
920	9'-0"	20'-0"	13.3	15	8	14	7	19'-6"	24	4	15	5	8'-6"
922	9'-0"	22'-0"	14.7	17	9	16	8	21'-6"	30	4	16	5	8'-6"
924	9'-0"	24'-0"	16.0	17	10	17	8	23'-6"	34	4	17	5	8'-6"
1020	10'-0"	20'-0"	14.8	19	8	20	7	19'-6"	33	4	15	5	9'-6"
1022	10'-0"	22'-0"	16.3	19	9	17	8	21'-6"	37	4	16	5	9'-6"
1024	10'-0"	24'-0"	17.8	18	10	17	8	23'-6"	45	4	17	5	9'-6"
1026	10'-0"	26'-0"	19.3	19	11	18	9	25'-6"	50	4	20	5	9'-6"
1112	11'-0"	12'-0"	9.8	22	5	12	5	11'-6"	17	5	9	5	10'-6"
1114	11'-0"	14'-0"	11.4	17	7	14	5	13'-6"	22	5	11	5	10'-6"
1124	11'-0"	24'-0"	19.6	19	10	19	8	23'-6"	33	5	17	5	10'-6"
1128	11'-0"	28'-0"	22.8	22	11	19	9	27'-6"	46	5	25	5	10'-6"
1215	12'-0"	15'-0"	13.3	19	7	22	5	14'-6"	23	5	11	5	11'-6"
1221	12'-0"	21'-0"	18.7	21	9	21	8	20'-6"	39	5	21	5	11'-6"
1317	13'-0"	17'-0"	16.4	21	8	21	6	16'-6"	32	5	15	5	12'-6"
1319	13'-0"	19'-0"	18.3	22	8	23	7	18'-6"	38	5	19	5	12'-6"
1323	13'-0"	23'-0"	22.1	22	10	23	8	22'-6"	38	6	27	5	12'-6"
1325	13'-0"	25'-0"	24.1	22	11	26	8	24'-6"	42	6	31	5	12'-6"
1425	14'-0"	25'-0"	25.9	27	10	24	8	24'-6"	47	6	30	5	13'-6"
1522	15'-0"	22'-0"	24.4	29	9	26	8	21'-6"	37	7	35	5	14'-6"
1524	15'-0"	24'-0"	26.7	28	10	26	8	23'-6"	41	7	39	5	14'-6"

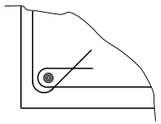
PEDESTAL	PEDESTAL REINFORCEMENT									
E	CU. YDS. CONC. (▲)	#4 BARS TYPE "M"			#4 BARS TYPE "N"			#4 BARS TYPE "X"			WEIGHT LBS. (*)
		LENGTH	A	B	LENGTH	A	B	LENGTH	A	B	
2'-6"	0.23	8'-10"	5"	2'-0"	6'-9½"	5"	1'-5⅞"	---	---	---	11
2'-9"	0.28	9'-10"	5"	2'-3"	7'-6"	5"	1'-8"	---	---	---	12
3'-0"	0.33	10'-10"	5"	2'-6"	8'-2½"	5"	1'-10⅛"	---	---	---	13
3'-3"	0.39	11'-10"	5"	2'-9"	8'-11"	5"	2'-0¼"	---	---	---	14
3'-9"	0.52	13'-10"	5"	3'-3"	10'-4"	5"	2'-4½"	---	---	---	16
4'-3"	0.67	15'-10"	5"	3'-9"	11'-9"	5"	2'-8¾"	---	---	---	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.

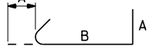
(*) WEIGHT OF 1 TYPE "M" BAR PLUS 1 TYPE "N" BAR (WHERE INDICATED) OR 1 TYPE "M" BAR PLUS 4 TYPE "X" BARS (BASE TYPE "X" ONLY)



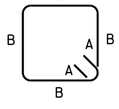
DETAIL A



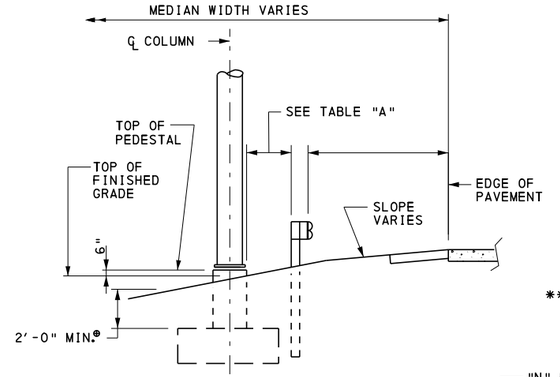
DETAIL B



BAR TYPE "X"



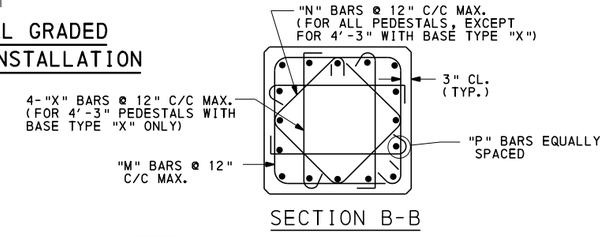
BAR TYPES "M" & "N"



TYPICAL GRADED MEDIAN INSTALLATION

TABLE "A"	
TYPE OF GUIDERAIL	REQUIRED ** CLEARANCES
2-SCC	1'-0"
2-SC	2'-0"
2-S	3'-0"
2-WCC	4'-0"
2-WC	5'-0"
2-W	7'-0"
MEDIAN BARRIER	2'-0"

** THE MINIMUM UNOBSTRUCTED DISTANCE FROM BACK OF GUIDE RAIL POST TO FACE OF PEDESTAL.



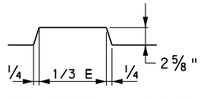
SECTION B-B

NOTES:

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

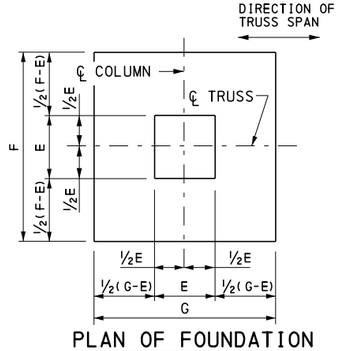
NOTES:

- 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 "P" BARS TO BE SPECIFIED ON THE CONTRACT DRAWINGS, BASED ON INFORMATION OBTAINED FROM DESIGN TABLES ON BD-643M, SHTS. 5 AND 6.

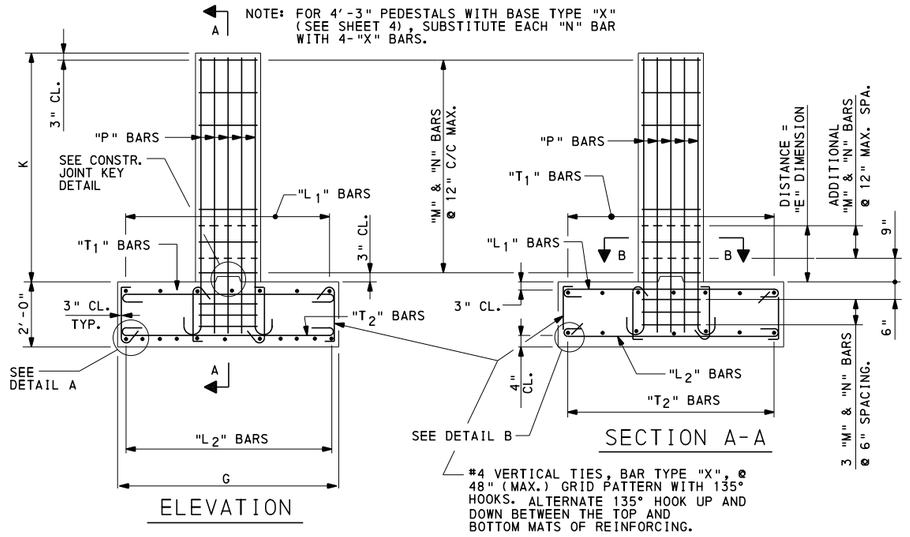


CONSTRUCTION JOINT KEY DETAIL

ELEVATION SHOWN, SECTION A-A SIMILAR.



PLAN OF FOUNDATION



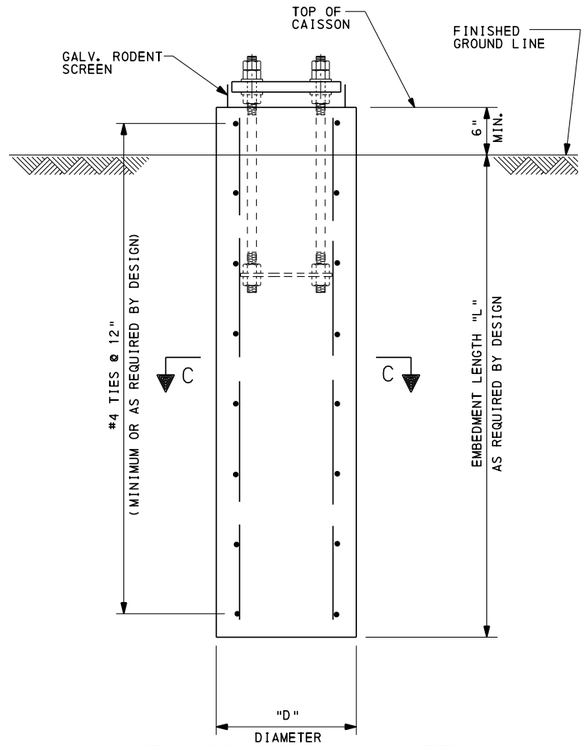
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'

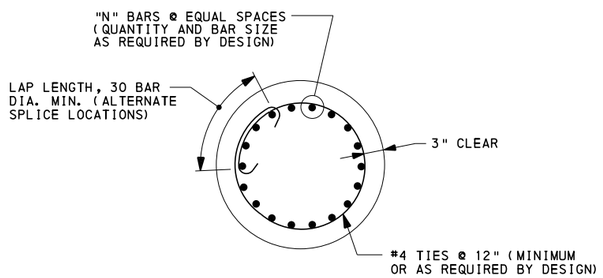
FOUNDATION DETAILS

RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 2 OF 10 BC-743M



CAISSON ELEVATION

N. T. S.



SECTION C-C

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.

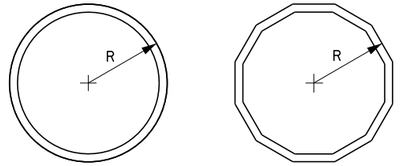


ILLUSTRATION OF DIMENSION "R" FOR CIRCULAR MEMBERS AND EQUIVALENT "PRESS-BREAK" MEMBERS

"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.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
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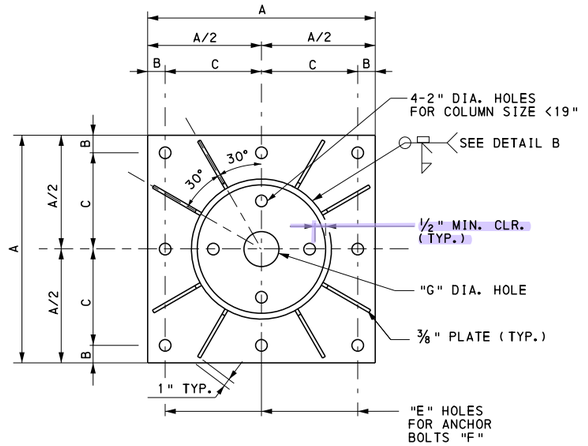
OVERHEAD SIGN STRUCTURES

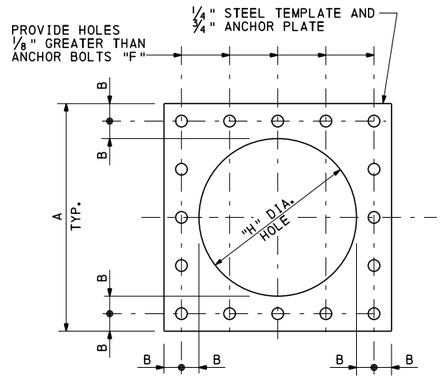
2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'

ALTERNATE CAISSON FOUNDATION

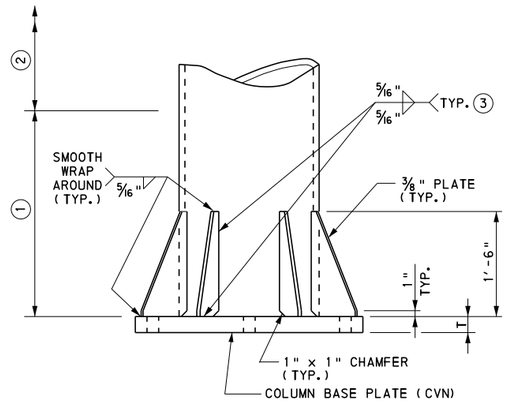
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 3 OF 10
Thomas P Macioce	Brent D. Thompson	BC-743M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



PLAN OF COLUMN BASE TYPE 'Y'



ANCHOR PLATE AND STEEL TEMPLATE DETAIL



ELEVATION - TYPE Y

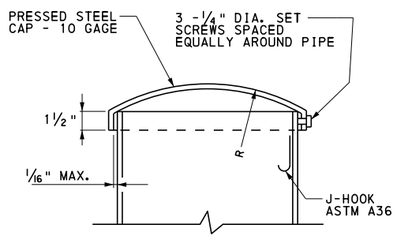
(TYPE - X SIMILAR)

(1) FOR PRESS BREAK COLUMN, 2'-6" LENGTH OF SEAM WELD TO BE COMPLETE PENETRATION GROOVE WELD.

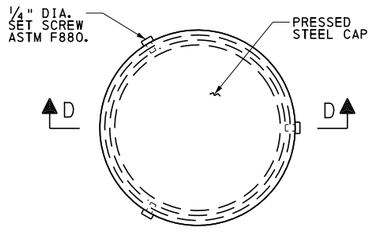
(2) SEAM WELD TO HAVE 60% MIN. PENETRATION.

(3) TERMINATE WELDS ¼" SHORT OF STIFFENER CHAMFER.

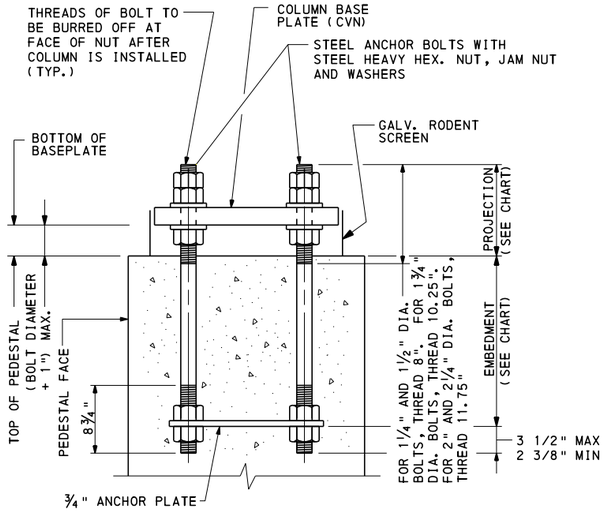
PIPE CAPS	
PIPE SIZE (NOMINAL)	R
8" DIA.	9"
10" DIA.	9"
12" DIA.	1'-6"
14" DIA.	1'-6"
16" DIA.	1'-6"
18" DIA.	1'-6"
20" DIA.	2'-6"
24" DIA.	2'-6"



SECTION D-D

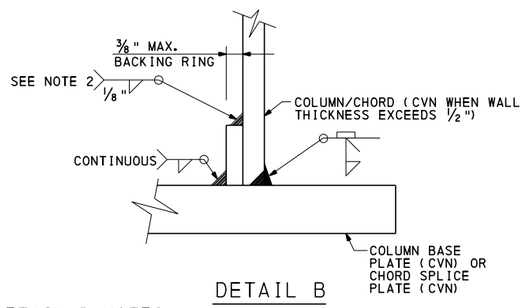


PIPE CAP DETAILS



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"	2½"	7.5"	1½"D	1¼"D	2"	10"	2"	3½"Dx⅜"	7¾"	2'-1"
10"x.365"	Y	1'-8"	2½"	7.5"	1½"D	1¼"D	3¼"	10"	2"	3½"Dx⅜"	7¾"	2'-1"
12"x.375"	Y	1'-10"	2½"	8.5"	1¾"D	1½"D	5¼"	1'-0"	2"	3½"Dx⅜"	8½"	2'-6"
14"x.375"	Y	2'-0"	2½"	9.5"	1¾"D	1½"D	6½"	1'-2"	2"	3½"Dx⅜"	8½"	2'-6"
16"x.375"	Y	2'-2"	2½"	10.5"	2"D	1¾"D	8"	1'-4"	2"	4"Dx⅜"	9¼"	2'-11"
18"x.375"	Y	2'-4"	2½"	11.5"	2"D	1¾"D	9¼"	1'-6"	2"	4"Dx⅜"	9¼"	2'-11"
20"x.375"	Y	2'-7"	3"	1'-0½"	2¼"D	2"D	1'-5"	1'-7"	3"	5"Dx⅜"	11"	3'-4"
24"x.375"	Y	2'-11"	3"	1'-2½"	2¼"D	2"D	1'-6"	1'-11"	3"	5"Dx⅜"	11"	3'-4"
24"x.500"	Y	3'-0"	3½"	1'-2½"	2½"D	2¼"D	1'-6"	1'-10"	3"	5"Dx⅜"	11¾"	3'-9"

NOTE: D DENOTES DIAMETER
* CVN REQUIRED FOR WALL THICKNESSES EXCEEDING ½" (.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, ½" BY ½" 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

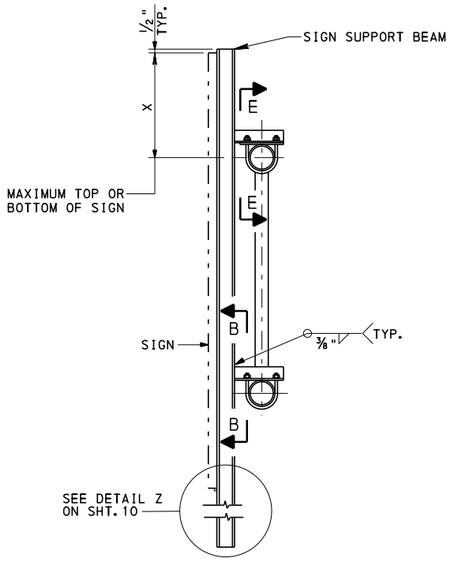
OVERHEAD SIGN STRUCTURES

2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'

COLUMN BASE

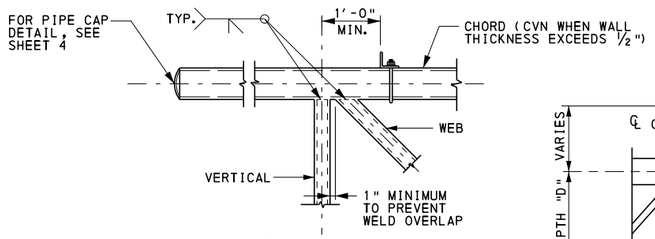
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 4 OF 10
Thomas P. Macioce	Brian D. Thompson	BC-743M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

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

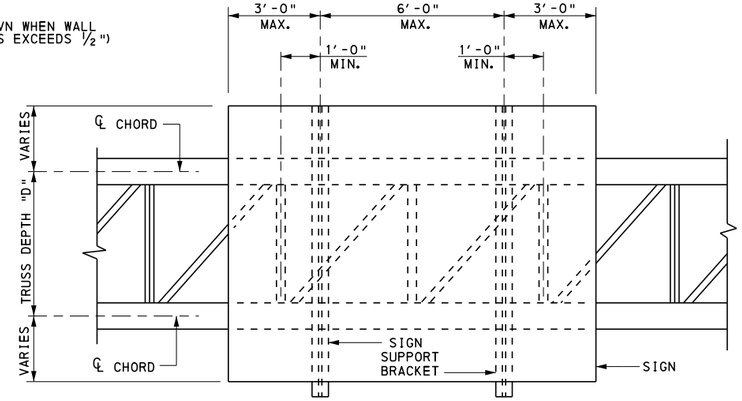
FOR SECTION B-B SEE SHT. 10



SECTION E-E

WORKLINES TO INTERSECT AT COMMON WORKPOINT

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

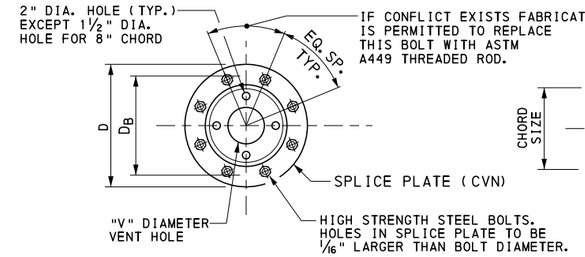


TYPICAL SIGN SUPPORT BRACKET SPACING DIAGRAM

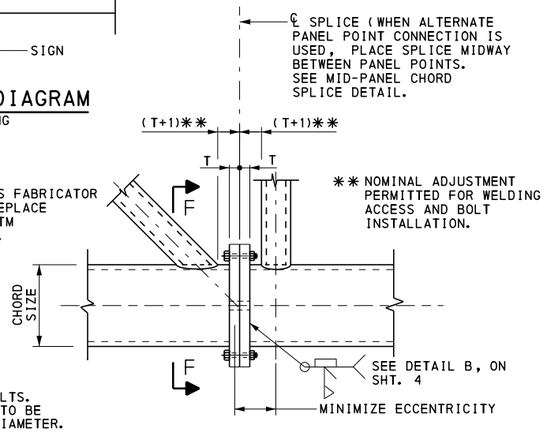
PROVIDE ADDITIONAL BRACKETS AS REQUIRED AT 6'-0" MAX. SPACING

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 SIGN PANEL DETAILS AND LIGHTING DETAILS, SEE STANDARD DRAWINGS TC-8700C, TC-8701D, TC-8701E, TC-8701S AND TC-8715.
- ALL MATERIAL FOR TRUSS SEATS AND SIGN SUPPORT BRACKETS TO BE STRUCTURAL STEEL AASHTO M270, GRADE 36.
- FOR ALTERNATE TRUSS SEAT DETAILS SEE SHT. 7, FOR ALTERNATE PANEL POINT CONNECTION DETAILS SEE SHT. 6. ALTERNATE DETAILS MAY BE USED UNLESS OTHERWISE INDICATED OR SPECIFIED.



SECTION F-F

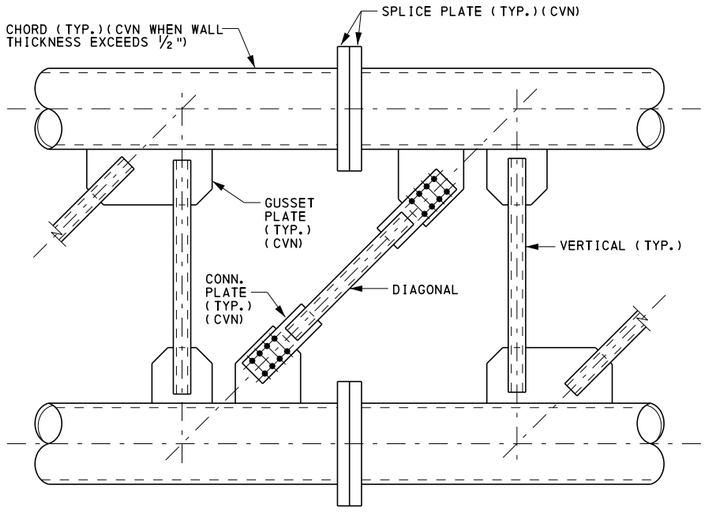


ELEVATION

CHORD SPLICE

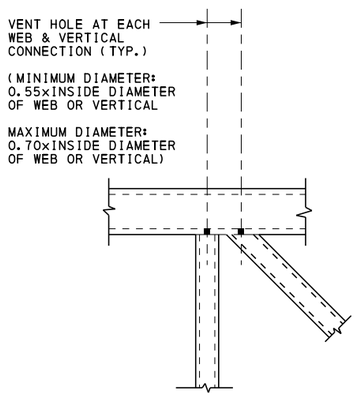
ONE OR MORE SPLICES MAY BE ADDED OR ELIMINATED AT THE OPTION OF THE FABRICATOR.

CHORD SPLICE					
CHORD NOMINAL SIZE X WALL THK.	D	D_B	BOLTS	T	V
8"x.322"	1'-4⅝"	1'-1⅝"	8-⅞"ø	2¼"	2"
10"x.365"	1'-6¾"	1'-3¾"	12-⅞"ø	2½"	3¼"
12"x.375"	1'-8¾"	1'-5¾"	14-⅞"ø	2½"	5¼"
14"x.375"	1'-10"	1'-7"	16-⅞"ø	2½"	6½"
16"x.375"	2'-0"	1'-9"	18-⅞"ø	2½"	8"
18"x.375"	2'-2"	1'-11"	20-⅞"ø	2½"	9¼"
20"x.375"	2'-4"	2'-1"	22-⅞"ø	2½"	10½"
24"x.375"	2'-8½"	2'-5"	20-1"ø	2½"	1'-0¾"
24"x.500"	2'-8½"	2'-5"	26-1"ø	3"	1'-0¾"



ELEVATION

MID-PANEL CHORD SPLICE



SECTION THRU TRUSS AT PANEL POINT

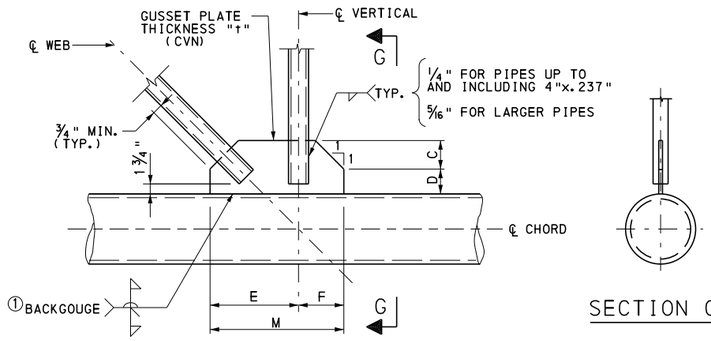
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'

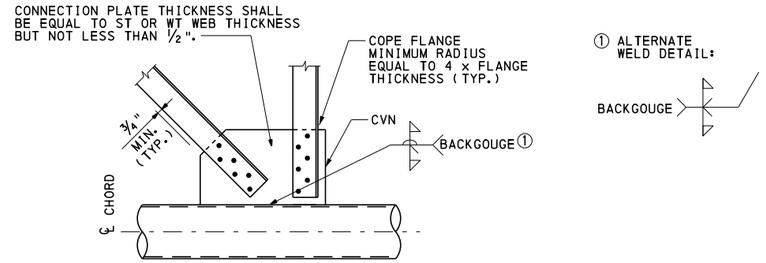
TRUSS DETAILS - 1

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 5 OF 10
Thomas P. Macioce	Brenda S. Thompson	BC-743M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



ALTERNATE PANEL POINT CONNECTION

SECTION G-G



ST/WT ALTERNATE PANEL POINT CONNECTION DETAIL

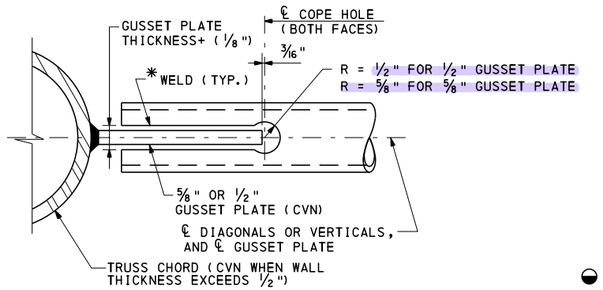
ALTERNATE PANEL POINT CONNECTION GUSSET PLATE DIMENSIONS

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"	2½"x.203"	3¼"	4"	10½"	5¾"	1'-4¼"	½"	5¼"	3⅝"
8"x.322"	2½"x.203"	3¼"	4"	11½"	5¾"	1'-5¼"	½"	5¼"	3⅝"
10"x.365"	2½"x.203"	3¼"	4"	1'-0½"	5¾"	1'-6¼"	½"	5¼"	3⅝"
12"x.375"	2½"x.203"	3¼"	4"	1'-1½"	5¾"	1'-7¼"	½"	5¼"	3⅝"
14"x.375"	3"x.216"	3⅝"	4⅝"	1'-3¼"	6⅜"	1'-9⅝"	½"	6¼"	4½"
16"x.375"	2½"x.203"	3¼"	4"	1'-3⅛"	5¾"	1'-8⅞"	½"	5¼"	3⅝"
	3"x.216"	3⅝"	4⅝"	1'-4¼"	6⅜"	1'-10⅝"	½"	6¼"	4½"
	3½"x.226"	4"	5¼"	1'-5¼"	7"	2'-0¼"	⅝"	7¼"	5 7/16"
18"x.375"	3"x.216"	3⅝"	4⅝"	1'-5¼"	6⅜"	1'-11⅝"	½"	6¼"	4½"
	3½"x.226"	4"	5¼"	1'-6¼"	7"	2'-1¼"	⅝"	7¼"	5 7/16"
20"x.375"	3"x.216"	3⅝"	4⅝"	1'-6¼"	6⅜"	2'-0⅝"	½"	6¼"	4½"
	3½"x.226"	4"	5¼"	1'-7¼"	7"	2'-2¼"	⅝"	7¼"	5 7/16"
	4"x.237"	4¼"	5⅞"	1'-8⅛"	7½"	2'-3⅝"	⅝"	8⅛"	6¼"
24"x.375"	3½"x.226"	4"	5¼"	1'-9¼"	7"	2'-4¼"	⅝"	7¼"	5 7/16"
	4"x.237"	4¼"	5⅞"	1'-10⅛"	7½"	2'-5⅝"	⅝"	8⅛"	6¼"
	5"x.258"	5"	6¼"	1'-11¼"	8⅞"	2'-8⅛"	⅝"	9¼"	6¾"
24"x.500"	5"x.258"	5"	6¼"	1'-11¼"	8⅞"	2'-8⅛"	⅝"	9¼"	6¾"
	6"x.280"	5¾"	7¾"	2'-1½"	10⅛"	2'-11⅝"	⅝"	11½"	8⅞"

BOLTS REQUIRED FOR ST/WT ALTERNATE PANEL POINT CONNECTION DETAIL

MEMBER	QTY.	DIA.
ST4x11.5	5	⅞"
ST6x15.9	5	1"
ST6x17.5	6	1"
ST6x20.4	7	1"
ST7.5x25	8	1"
WT10.5x41.5	10	1⅛"

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



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.

WEB AND VERTICAL MEMBER SUBSTITUTION TABLE ◒

PIPE SECTION	ST/WT SUBSTITUTION SECTION
2½"x.203"	ST4x11.5
3"x.216"	ST6x15.9
3½"x.226"	ST6x17.5
4"x.237"	ST6x20.4
5"x.258"	ST7.5x25
6"x.280"	WT10.5x41.5

◒ 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.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'

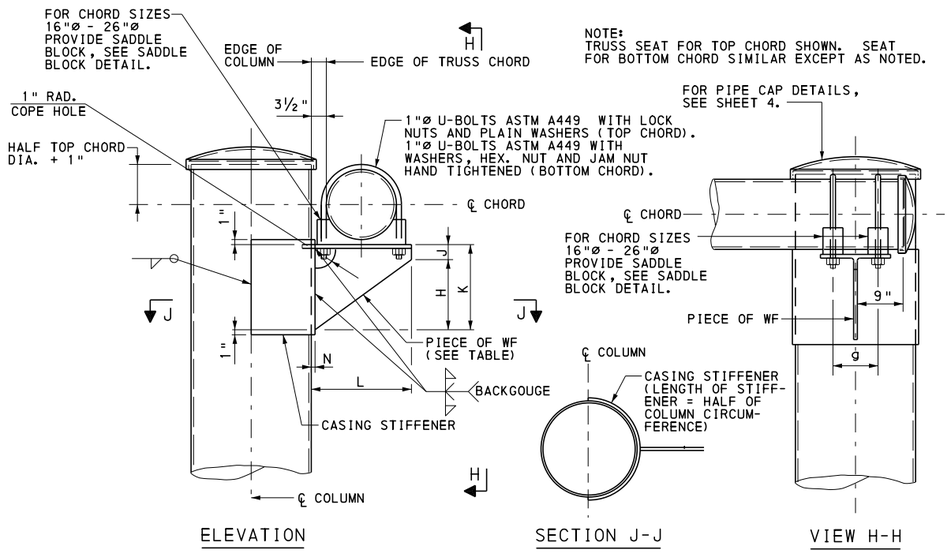
TRUSS DETAILS - 2

RECOMMENDED SEPT.30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT.30, 2016 Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 6 OF 10 BC-743M

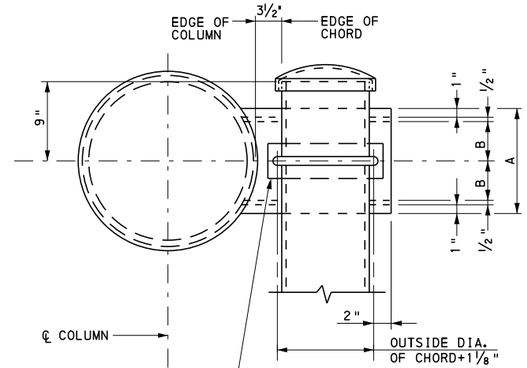
ALTERNATE TRUSS SEAT DETAILS
SEAT DIMENSIONS

SPAN LENGTH	WF SIZE	DIMENSIONS					
		H	J	K	L	ℊ	▲ N
30′	W16x36	9¾"	3"	1′-0¾"	CHORD ø +6½"	3½"	1"
40′	W18x35	11⅝"	3"	1′-2⅝"	CHORD ø +6½"	3½"	1⅛"
50′	W21x44	1′-2½"	3"	1′-5½"	CHORD ø +6½"	3½"	1¼"
60′	W27x84	1′-8⅝"	3"	1′-11⅝"	CHORD ø +6½"	5½"	1¼"
70′	W30x90	1′-9⅜"	3"	2′-2⅜"	CHORD ø +6½"	5½"	1⅜"
80′	W33x118	2′-2¾"	3"	2′-5¾"	CHORD ø +6½"	5½"	1⅝"
90′	W36x135	2′-5⅜"	3"	2′-8⅜"	CHORD ø +6½"	5½"	1⅝"
100′	W36x135	2′-5⅜"	3"	2′-8⅜"	CHORD ø +6½"	5½"	1¾"

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



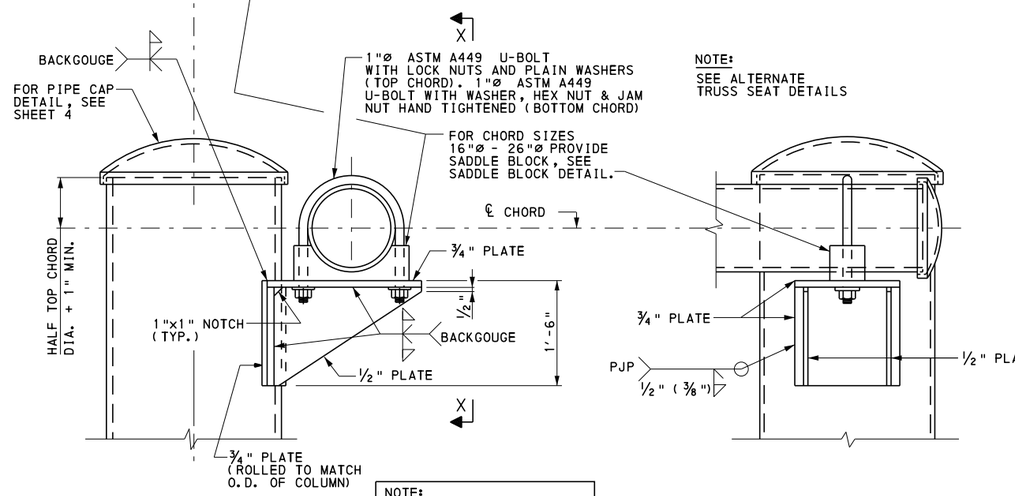
ALTERNATE TRUSS SEAT DETAILS



PLAN

TRUSS SEAT		
COLUMN SIZE (NOMINAL)	DIMENSION	
	A	B
◩ 8"ø	7"	2"
◩ 10"ø	7"	2"
◩ 12"ø	8"	2½"
14"ø	9"	3"
16"ø	9"	3"
18"ø	9"	3"
20"ø	1′-0"	4½"
24"ø	1′-0"	4½"

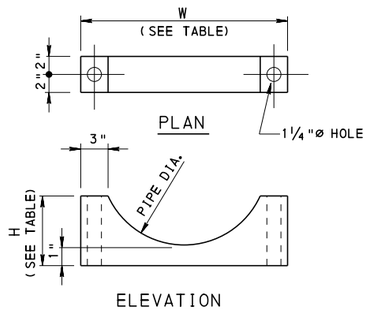
◩ ALTERNATE TRUSS SEAT DETAIL IS RECOMMENDED DUE TO POSSIBLE ACCESS LIMITATIONS FOR STIFFENER WELDS.



NOTE:
TO ACCOUNT FOR WELD DISTORTION ONLY, PROVIDE MAXIMUM SHIM PLATE THICKNESS OF ½" AT BOTTOM CHORD ONLY.

TRUSS SEAT DETAILS

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



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"	5¼"	1′-8⅛"
18"	6"	1′-10⅛"
20"	6¾"	2′-0⅛"
24"	8⁵⁄₁₆"	2′-4⅛"

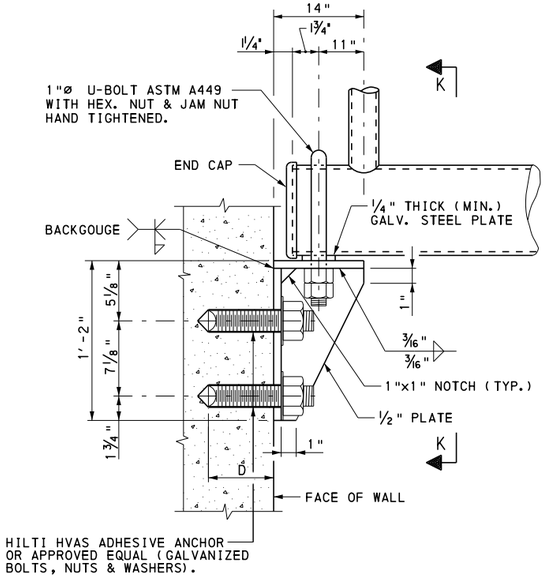
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

2 POST PLANAR TRUSS
SPANS FROM 30′ TO 100′

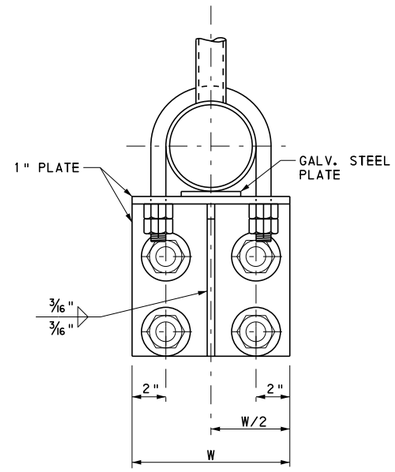
TRUSS SEAT DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 7 OF 10
Thomas P Macioce	Bruce B Thompson	BC-743M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

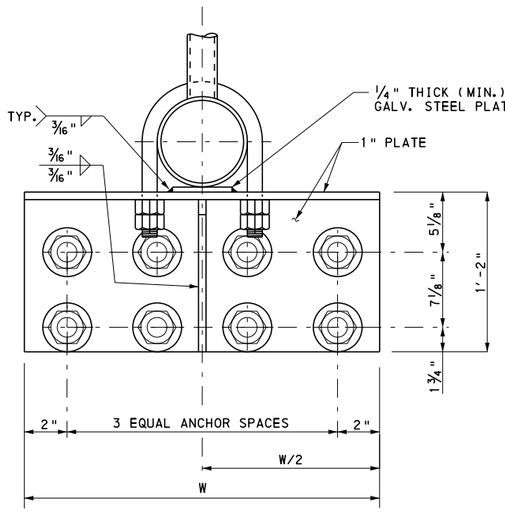


EXPANSION TRUSS SEAT

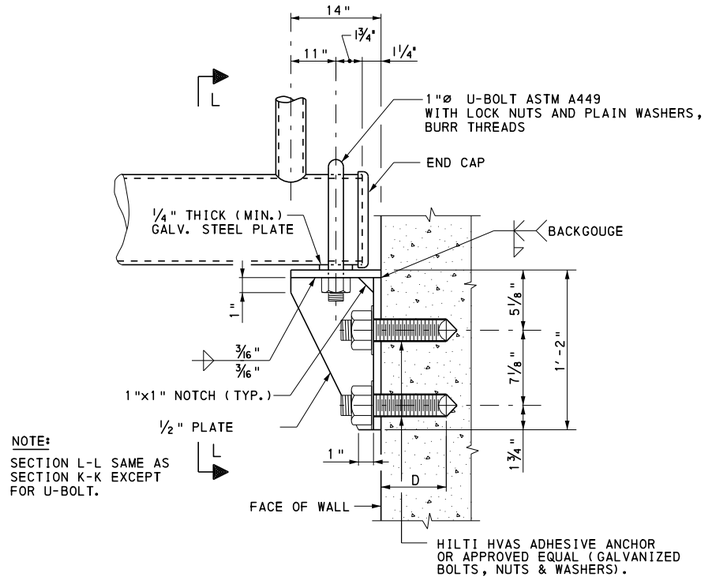
NOTE:
TO SEAL ENDS OF CHORD MEMBERS, USE ALTERNATE PIPE CAP DETAIL AS SHOWN ON SHEET 10.



SECTION K-K
TYPE 1



SECTION K-K
TYPE 2

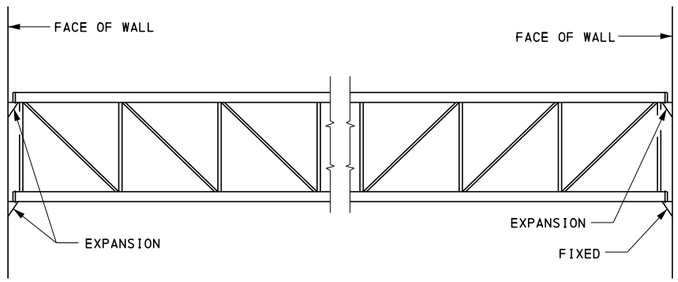


NOTE:
SECTION L-L SAME AS SECTION K-K EXCEPT FOR U-BOLT.

FIXED TRUSS SEAT

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

TRUSS SEATS				
SPAN LENGTH	ANCHOR DIA.	TYPE	W	D
30'	½"	1	1'-3⅜"	8½"
40'	⅝"	1	1'-5⅜"	10"
50'	⅝"	1	1'-6⅝"	10"
60'	⅝"	2	1'-10⅝"	10"
70'	⅞"	2	2'-0⅝"	1'-1¼"
80'	⅞"	2	2'-4⅝"	1'-1¼"
90'	⅞"	2	2'-6⅝"	1'-1¼"
100'	1"	2	2'-6⅝"	1'-4½"



ELEVATION OF TYPICAL TRUSS SHOWING
FIXED AND EXPANSION SEATS

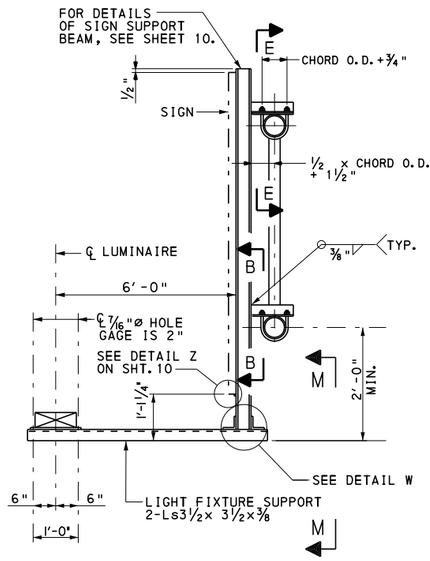
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'

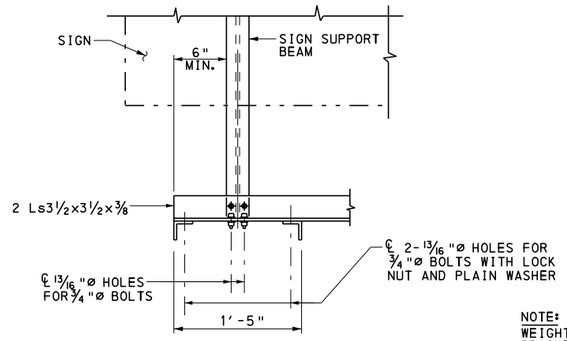
WALL MOUNTED TRUSS BEARING DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 8 OF 10
Thomas P. Macioce	Brian D. Thompson	BC-743M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

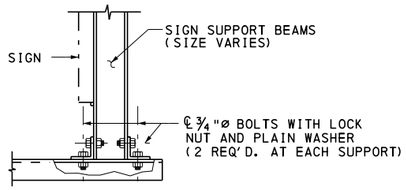


TYPICAL LIGHT FIXTURE SUPPORT DETAILS

FOR SECTION E-E SEE SHT. 5
FOR SECTION B-B SEE SHT. 10



SECTION M-M



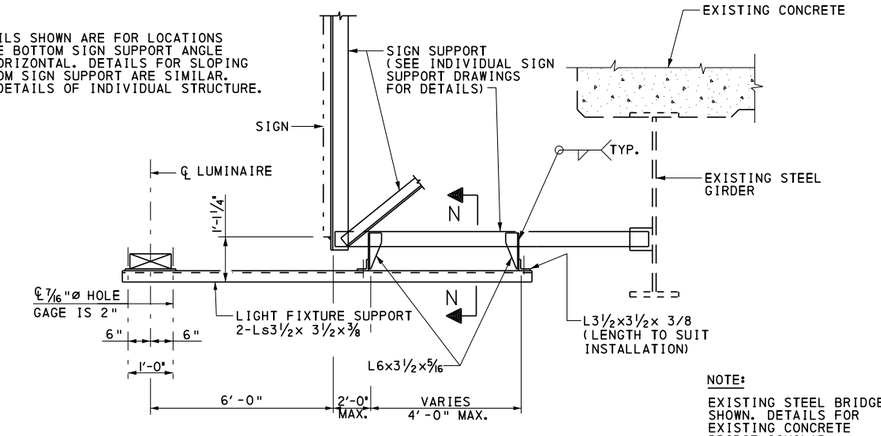
DETAIL W

NOTE:

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

NOTE:

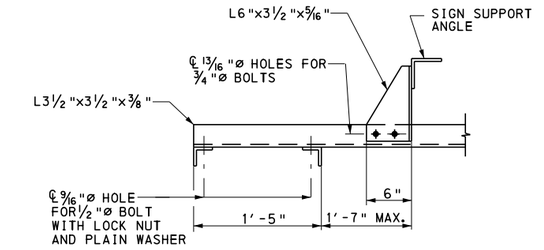
DETAILS SHOWN ARE FOR LOCATIONS WHERE BOTTOM SIGN SUPPORT ANGLE IS HORIZONTAL. DETAILS FOR SLOPING BOTTOM SIGN SUPPORT ARE SIMILAR. SEE DETAILS OF INDIVIDUAL STRUCTURE.



TYPICAL LIGHT SUPPORT DETAILS FOR SIGNS MOUNTED TO EXISTING BRIDGE STRUCTURES

NOTE:

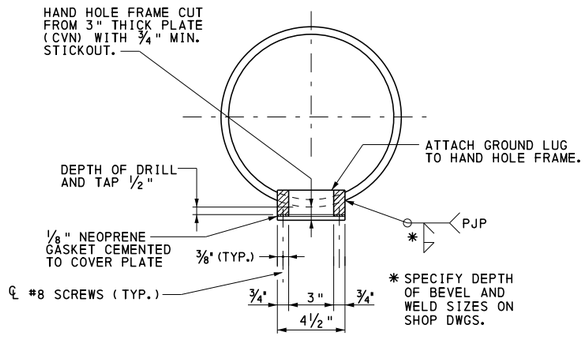
EXISTING STEEL BRIDGE SHOWN. DETAILS FOR EXISTING CONCRETE BRIDGE SIMILAR.



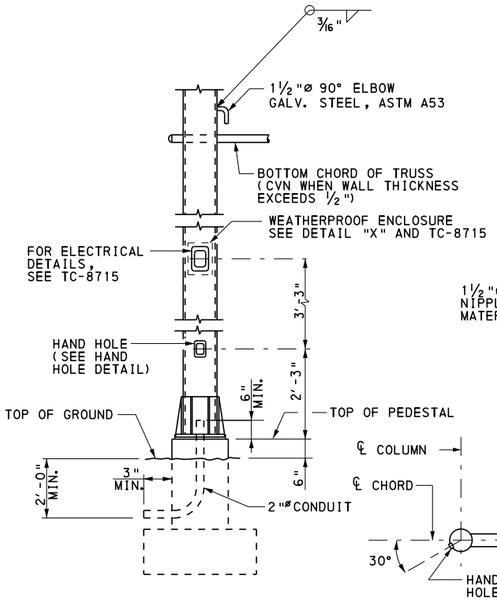
SECTION N-N

NOTE:

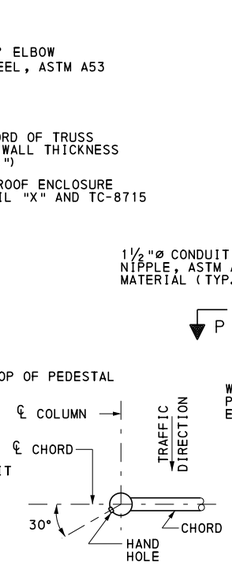
FOR SIGN PANEL DETAILS AND LIGHTING DETAILS, SEE STANDARD DRAWINGS TC-8700C, TC-8701D, TC-8701E, TC-8701S AND TC-8715.



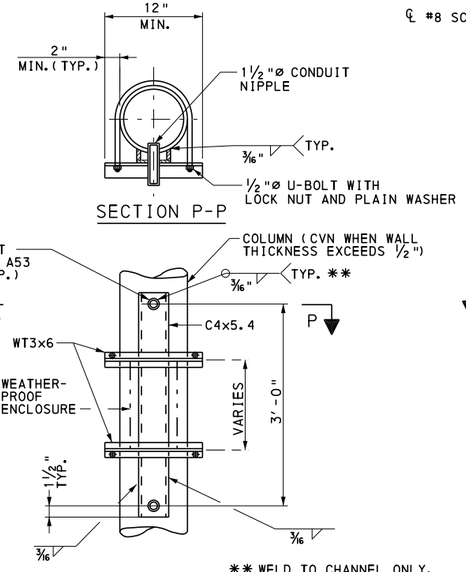
SECTION Q-Q



TYPICAL COLUMN DETAIL



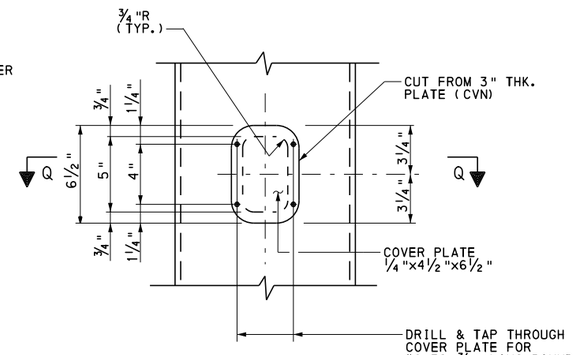
HAND HOLE LOCATION



SECTION P-P

DETAIL X

** WELD TO CHANNEL ONLY.



HAND HOLE DETAIL

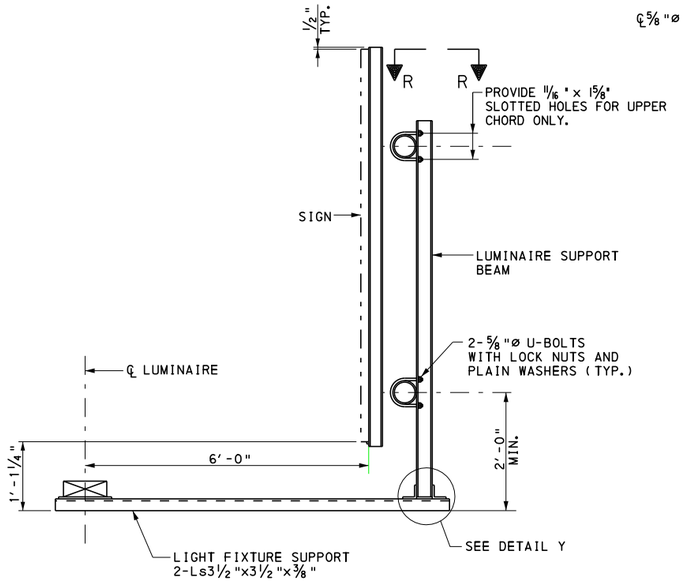
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

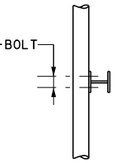
2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'

LIGHT SUPPORT & HAND HOLE DETAILS

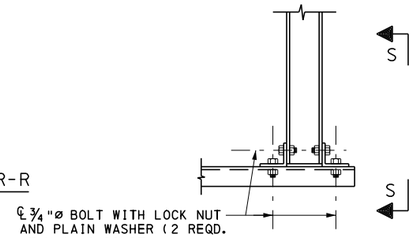
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 9 OF 10 BC-743M



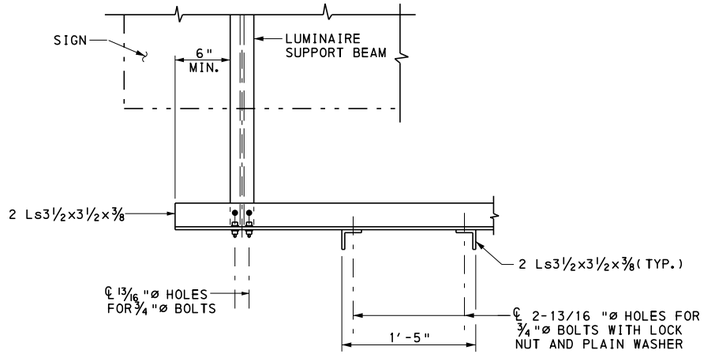
SPECIAL LIGHT FIXTURE SUPPORT DETAILS-LUMINAIRE FOR STRUCTURE MOUNTED ON HIGHWAY BRIDGE



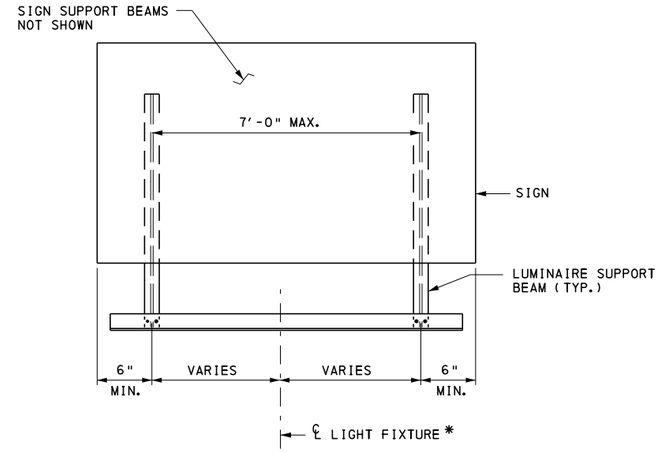
SECTION R-R



DETAIL Y

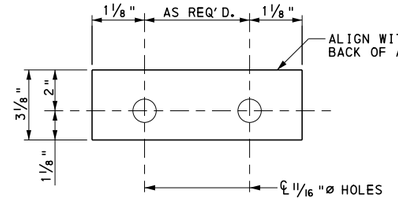


SECTION S-S



LUMINAIRE SUPPORT BEAM SPACING

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

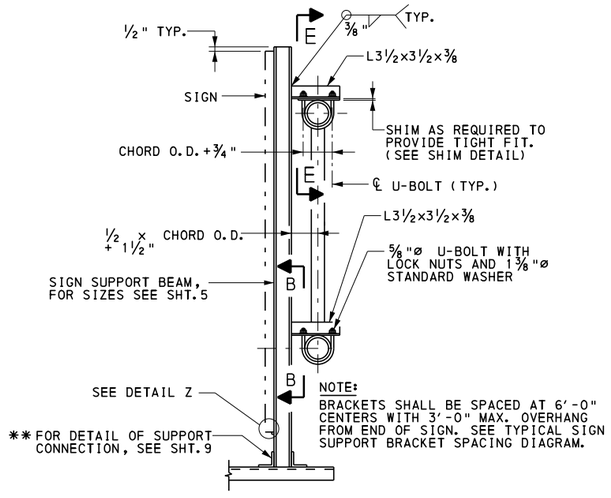


SHIM DETAIL

PROVIDE 1 AT ¼", 3 AT ⅛" AND 1 AT 1/16" THICKNESS FOR EACH UPPER SIGN SUPPORT CONNECTION ANGLE.

NOTE:

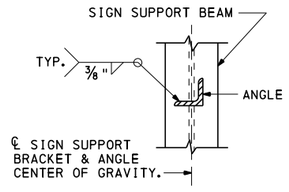
FOR SIGN PANEL DETAILS AND LIGHTING DETAILS, SEE STANDARD DRAWINGS TC-8700C, TC-8701D, TC-8701E, TC-8701S, AND TC-8715.



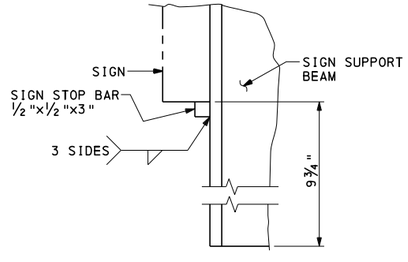
** SEE SPECIAL LIGHT FIXTURE SUPPORT DETAILS-LUMINAIRE FOR STRUCTURE MOUNTED ON HIGHWAY BRIDGE, THIS SHEET.

SIGN SUPPORT DETAIL

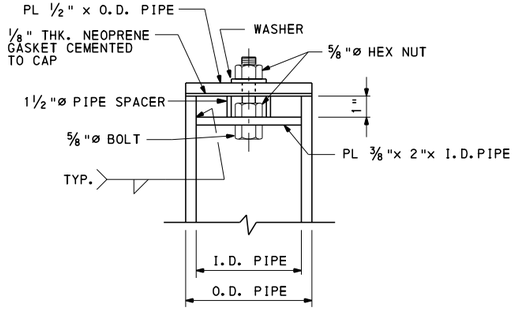
FOR SECTION E-E SEE SHT. 5



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

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 10 OF 10
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brian D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-743M

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

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. SPREAD FOOTINGS MAY BE ORDERED BY THE ENGINEER TO BE AT ANY ELEVATION OR OF ANY DIMENSIONS NECESSARY TO PROVIDE A PROPER FOUNDATION.
10. GALVANIZE ALL STRUCTURAL STEEL, BOLTS, NUTS & WASHERS IN ACCORDANCE WITH PUB. 408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
11. PIPE DIAMETERS SHOWN UP TO AND INCLUDING 12 INCHES ARE NOMINAL DIAMETERS. PIPE DIAMETERS SHOWN FROM 14 INCHES AND UP ARE ACTUAL DIAMETERS.
12. 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".
13. 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.
14. PROVIDE ANCHOR BOLT HOLES 1/4" LARGER THAN BOLT DIAMETER.
15. PROVIDE A MINIMUM ANCHOR BOLT EMBEDMENT LENGTH OF 20 ANCHOR BOLT DIAMETERS.
16. PROVIDE DOUBLE NUTS AND WASHER FOR EACH ANCHOR BOLT.
17. 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 5/16". 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.

* 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.

REFERENCE DRAWINGS	
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-52M	TYPE 2 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

OVERHEAD SIGN STRUCTURES

NOTES AND DESIGN CRITERIA

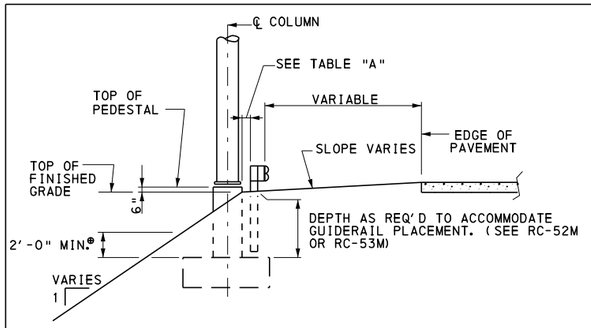
2 POST AND 4 POST TRI-CHORD TRUSS SPANS FROM 60′ TO 240′

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

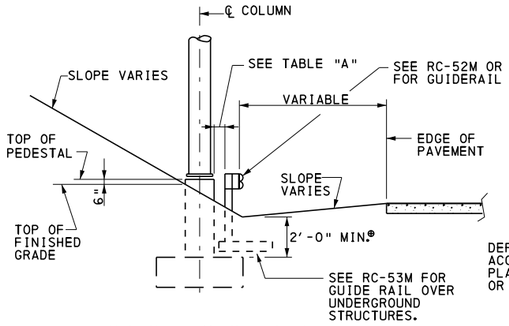
RECOMMENDED SEPT. 30, 2016
Brian D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHT. 1 OF 12

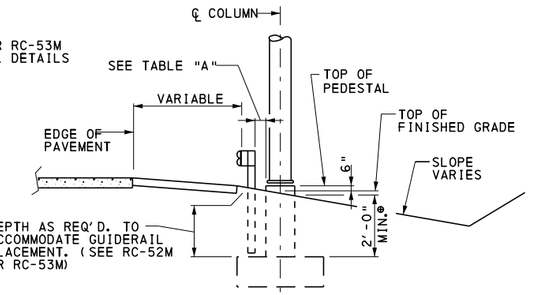
BC-744M



TYPICAL SHOULDER INSTALLATION IN FILL



TYPICAL SHOULDER INSTALLATION IN CUT



TYPICAL SHOULDER INSTALLATION IN CUT WITH SWALE

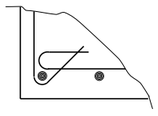
⊕FOOTING DESIGN INFORMATION ON THIS SHEET BASED ON 10 FOOT FILL HEIGHT. DESIGNER MUST CHECK ADEQUACY FOR FILL HEIGHTS <10'-0".

FOOTING				FOOTING REINFORCEMENT									
TYPE	DIMENSION		CU. YDS. CONC.	"L" BARS					"T" BARS				
				L_1		L_2			T_1		T_2		
	G	F		NO.	SIZE	NO.	SIZE	LENGTH	NO.	SIZE	NO.	SIZE	LENGTH
711	7'-0"	11'-0"	5.7	11	5	6	5	10'-6"	9	4	9	5	6'-6"
713	7'-0"	13'-0"	6.7	14	6	11	5	12'-6"	13	4	10	5	6'-6"
814	8'-0"	14'-0"	8.3	16	6	12	5	13'-6"	17	4	11	5	7'-6"
815	8'-0"	15'-0"	8.9	15	7	16	5	14'-6"	20	4	11	5	7'-6"
817	8'-0"	17'-0"	10.1	13	8	14	6	16'-6"	21	4	14	5	7'-6"
916	9'-0"	16'-0"	10.7	17	7	13	6	15'-6"	18	4	12	5	8'-6"
918	9'-0"	18'-0"	12.0	15	8	14	7	17'-6"	23	4	14	5	8'-6"
922	9'-0"	22'-0"	14.7	17	9	16	8	21'-6"	30	4	16	5	8'-6"
924	9'-0"	24'-0"	16.0	17	10	16	8	23'-6"	34	4	17	5	8'-6"
1010	10'-0"	10'-0"	7.4	20	4	8	5	9'-6"	18	4	8	5	9'-6"
1018	10'-0"	18'-0"	13.3	17	8	17	6	17'-6"	29	4	14	5	9'-6"
1019	10'-0"	19'-0"	14.1	17	8	16	7	18'-6"	33	4	14	5	9'-6"
1020	10'-0"	20'-0"	14.8	19	8	20	7	19'-6"	34	4	15	5	9'-6"
1022	10'-0"	22'-0"	16.3	20	9	17	8	21'-6"	40	4	16	5	9'-6"
1023	10'-0"	23'-0"	17.0	20	9	17	8	22'-6"	41	4	17	5	9'-6"
1024	10'-0"	24'-0"	17.8	17	10	17	8	23'-6"	42	4	17	5	9'-6"
1026	10'-0"	26'-0"	19.3	18	11	19	8	25'-6"	48	4	20	5	9'-6"
1112	11'-0"	12'-0"	9.8	21	5	10	5	11'-6"	17	5	9	5	10'-6"
1114	11'-0"	14'-0"	11.4	17	7	19	5	13'-6"	22	5	11	5	10'-6"
1121	11'-0"	21'-0"	17.1	22	8	21	7	20'-6"	31	5	16	5	10'-6"
1124	11'-0"	24'-0"	19.6	20	10	19	8	23'-6"	35	5	17	5	10'-6"
1213	12'-0"	13'-0"	11.6	20	6	17	5	12'-6"	23	5	12	5	11'-6"
1215	12'-0"	15'-0"	13.3	19	7	22	5	14'-6"	25	5	14	5	11'-6"
1216	12'-0"	16'-0"	14.2	22	7	20	5	15'-6"	27	5	12	5	11'-6"
1219	12'-0"	19'-0"	16.9	20	8	20	7	18'-6"	33	5	17	5	11'-6"
1221	12'-0"	21'-0"	18.7	21	9	21	8	20'-6"	40	5	21	5	11'-6"
1317	13'-0"	17'-0"	16.4	21	8	22	6	16'-6"	35	5	18	5	12'-6"
1319	13'-0"	19'-0"	18.3	22	8	22	7	18'-6"	29	6	20	5	12'-6"
1323	13'-0"	23'-0"	22.1	22	10	23	8	22'-6"	37	6	26	5	12'-6"
1418	14'-0"	18'-0"	18.7	23	8	28	6	17'-6"	32	6	23	5	13'-6"
1420	14'-0"	20'-0"	20.7	27	8	28	7	19'-6"	38	6	28	5	13'-6"
1421	14'-0"	21'-0"	21.8	24	9	23	8	20'-6"	38	6	26	5	13'-6"
1423	14'-0"	23'-0"	23.9	29	9	24	8	22'-6"	42	6	28	5	13'-6"
1516	15'-0"	16'-0"	17.8	28	7	22	6	15'-6"	32	6	23	5	14'-6"
1518	15'-0"	18'-0"	20.0	25	8	30	6	17'-6"	29	7	30	5	14'-6"
1522	15'-0"	22'-0"	24.4	29	9	26	8	21'-6"	38	7	38	5	14'-6"
1524	15'-0"	24'-0"	26.7	28	10	26	8	23'-6"	42	7	41	5	14'-6"
1620	16'-0"	20'-0"	23.7	29	8	28	7	19'-6"	36	7	34	5	15'-6"
1622	16'-0"	22'-0"	26.1	28	9	25	8	21'-6"	38	7	32	5	15'-6"
1624	16'-0"	24'-0"	28.4	27	10	28	8	23'-6"	44	7	37	5	15'-6"
1626	16'-0"	26'-0"	30.8	28	11	29	8	25'-6"	52	7	45	5	15'-6"
1720	17'-0"	20'-0"	25.2	30	8	27	7	19'-6"	37	7	15	5	16'-6"
1821	18'-0"	21'-0"	28.0	30	9	28	8	20'-6"	37	8	42	5	17'-6"
1917	19'-0"	17'-0"	23.9	32	8	29	6	16'-6"	28	8	14	5	18'-6"

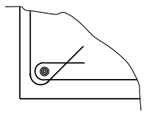
PEDESTAL	2 POST PEDESTAL REINFORCEMENT									
E	CU. YDS. CONC. (▲)	#4 BARS TYPE "M"			#4 BARS TYPE "N"			#4 BARS TYPE "X"			WEIGHT LBS. (*)
		LENGTH	A	B	LENGTH	A	B	LENGTH	A	B	
2'-6"	0.23	8'-10"	5"	2'-0"	6'-9½"	5"	1'-5⅞"	---	---	---	11
2'-9"	0.28	9'-10"	5"	2'-3"	7'-6"	5"	1'-8"	---	---	---	12
3'-0"	0.33	10'-10"	5"	2'-6"	8'-2½"	5"	1'-10⅛"	---	---	---	13
3'-3"	0.39	11'-10"	5"	2'-9"	8'-11"	5"	2'-0¼"	---	---	---	14
3'-9"	0.52	13'-10"	5"	3'-3"	10'-4"	5"	2'-4½"	---	---	---	16
4'-3"	0.67	15'-10"	5"	3'-9"	11'-9"	5"	2'-8¾"	---	---	---	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.

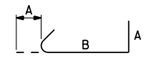
(*) WEIGHT OF 1 TYPE "M" BAR PLUS 1 TYPE "N" BAR (WHERE INDICATED) OR 1 TYPE "M" BAR PLUS 4 TYPE "X" BARS (BASE TYPE "X" ONLY)



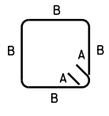
DETAIL A



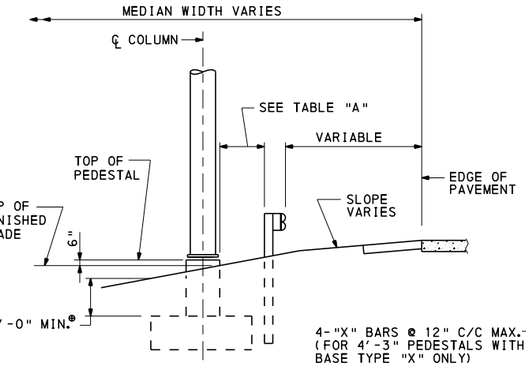
DETAIL B



BAR TYPE "X"

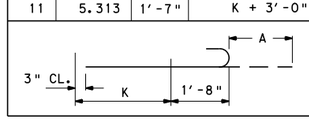


BAR TYPES "M" & "N"



TYPICAL GRADED MEDIAN INSTALLATION

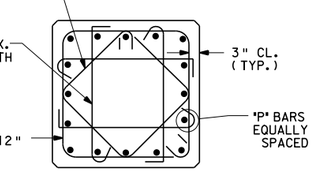
TABLE "P"			
BAR SIZE	WEIGHT LBS./FT.	A	LENGTH
6	1.502	8"	K + 2'-1"
8	2.670	11"	K + 2'-4"
9	3.400	1'-3"	K + 2'-8"
10	4.303	1'-5"	K + 2'-10"
11	5.313	1'-7"	K + 3'-0"



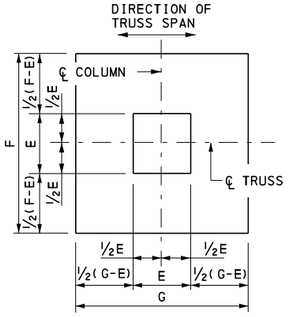
PROVIDE HOOK ON ALL "P" BARS. "P" BARS MAY BE DOWELED TO FOOTING USING CLASS C MIN. LAP SPLICE, HOWEVER NO COMPENSATION WILL BE ALLOWED FOR ADDITIONAL STEEL INVOLVED.

TABLE "A"	
TYPE OF GUIDERAIL	REQUIRED † CLEARANCES
2-SCC	1'-0"
2-SC	2'-0"
2-S	3'-0"
2-WCC	4'-0"
2-WC	5'-0"
2-W	7'-0"
MEDIAN BARRIER	2'-0"

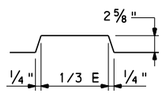
† THE MINIMUM UNOBSTRUCTED DISTANCE FROM BACK OF GUIDE RAIL POST TO FACE OF PEDESTAL.



SECTION B-B

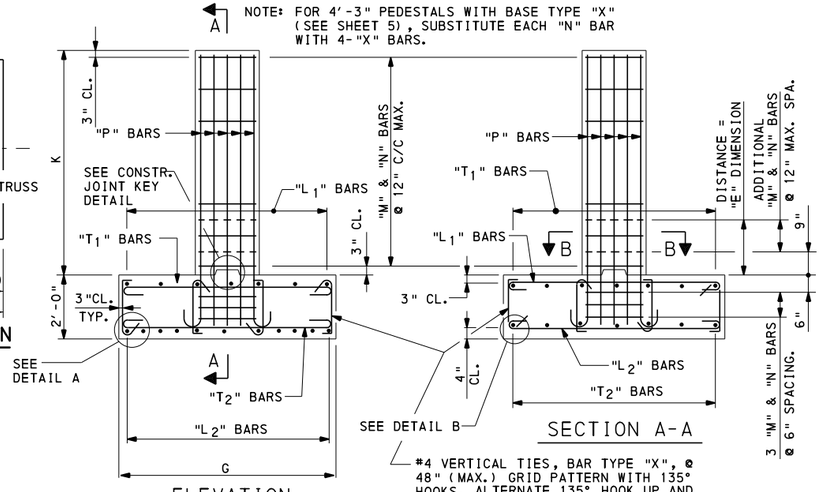


PLAN OF FOUNDATION



CONSTRUCTION JOINT KEY DETAIL

ELEVATION SHOWN, SECTION A-A SIMILAR.



ELEVATION

SECTION A-A

NOTES:

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

NOTES:

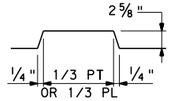
- PROVIDE 90° OR 180° HOOKS ON ALL "L" AND "T" BARS.
- LENGTH FOR "L" AND "T" BARS DOES NOT INCLUDE 90° OR 180° HOOK LENGTHS.
- COUNT AND SIZE OF PEDESTAL DETAIL "P" BARS TO BE SPECIFIED ON THE CONTRACT DRAWINGS, BASED ON INFORMATION OBTAINED FROM DESIGN TABLES ON BD-644M, SHEETS 5, 6, AND 7.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES
2 POST TRI-CHORD TRUSS
SPANS FROM 60' TO 100'

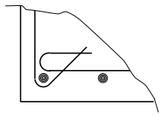
FOUNDATION DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 2 OF 12
Thomas P. Macioce	Brenda S. Thomas	BC-744M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

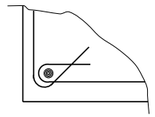


CONSTRUCTION JOINT KEY DETAIL

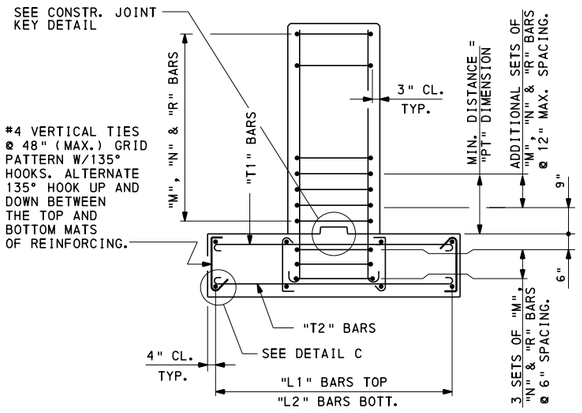
SECTION A-A SHOWN, ELEVATION SIMILAR.



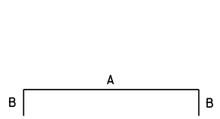
DETAIL C



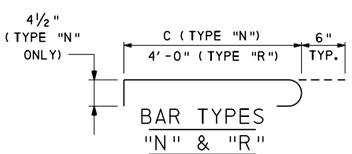
DETAIL D



SECTION A-A

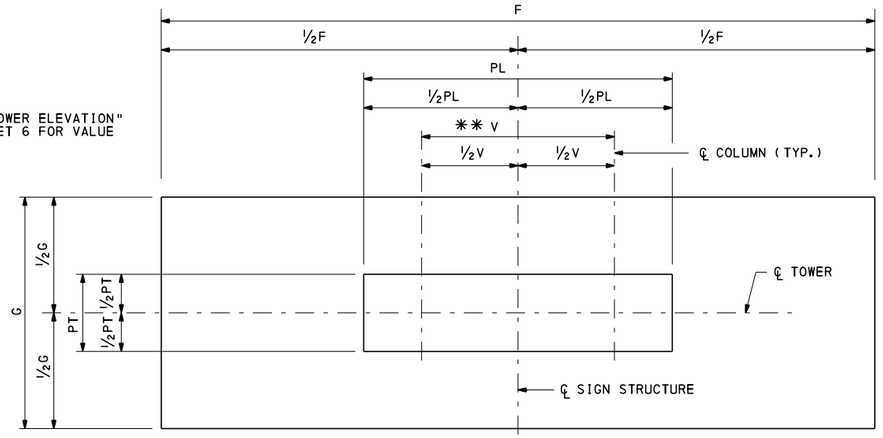


BAR TYPES "M"

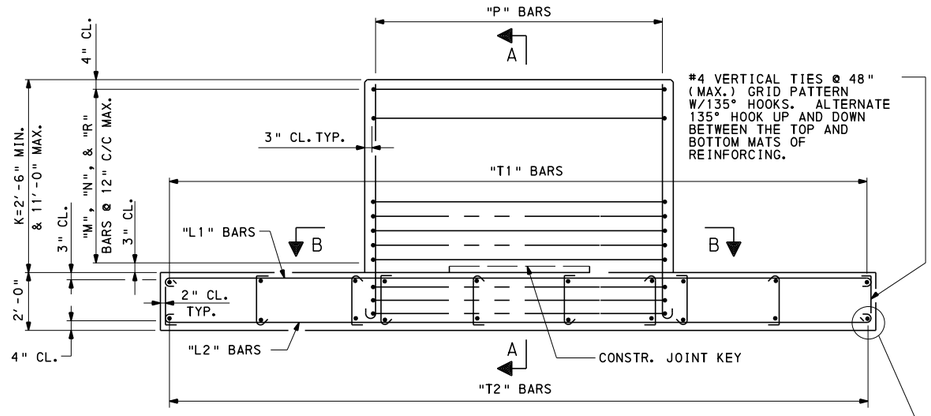


BAR TYPES "N" & "R"

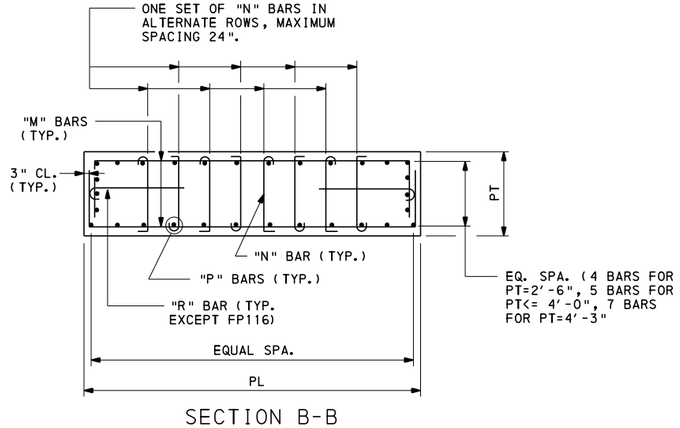
** SEE "TOWER ELEVATION" ON SHEET 6 FOR VALUE OF V.



PLAN OF FOUNDATION



ELEVATION

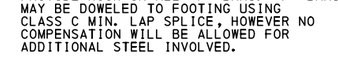


SECTION B-B

FOOTING				FOOTING REINFORCEMENT										
TYPE	DIMENSION G	DIMENSION F	CU. YDS. CONC.	"L" BARS L1 NO.	L1 SIZE	L2 NO.	L2 SIZE	"L" BARS LENGTH	"T" BARS T1 NO.	T1 SIZE	T2 NO.	T2 SIZE	"T" BARS LENGTH
612	6'-0"	12'-0"	5.3	5	4	5	5	11'-6"	9	4	9	5	5'-6"
613	6'-0"	13'-0"	5.8	6	4	5	5	12'-6"	10	4	10	5	5'-6"
614	6'-0"	14'-0"	6.2	9	4	5	5	13'-6"	11	4	11	5	5'-6"
615	6'-0"	15'-0"	6.7	10	4	5	5	14'-6"	11	4	11	5	5'-6"
616	6'-0"	16'-0"	7.1	9	4	5	5	15'-6"	12	4	12	5	5'-6"
714	7'-0"	14'-0"	7.3	6	4	6	5	13'-6"	11	4	11	5	6'-6"
715	7'-0"	15'-0"	7.8	6	4	6	5	14'-6"	11	4	11	5	6'-6"
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"
719	7'-0"	19'-0"	9.9	11	7	14	5	18'-6"	19	4	14	5	6'-6"
720	7'-0"	20'-0"	10.4	13	6	13	5	19'-6"	20	4	15	5	6'-6"
721	7'-0"	21'-0"	10.9	13	6	13	5	20'-6"	21	4	15	5	6'-6"
722	7'-0"	22'-0"	11.4	14	6	14	5	21'-6"	23	4	16	5	6'-6"
818	8'-0"	18'-0"	10.7	13	5	10	5	17'-6"	14	4	14	5	7'-6"
819	8'-0"	19'-0"	11.3	13	6	11	5	18'-6"	24	4	14	5	7'-6"

- 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 CONTINUATION OF FOOTING TABLE, SEE SHEET 4.

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.

4 POST FOUNDATION PEDESTAL REINFORCEMENT											
PEDESTAL TYPE	PT	PL	CU. YDS. CONC. (▲)	"P" BARS	HORIZONTAL REINFORCEMENT #4 BARS TYPE "M" LENGTH	A	B	#4 BARS TYPE "N" LENGTH	C	NO.	WEIGHT PER SET * (LBS.)
FP116	2'-6"	7'-9"	0.72	28-#9	11'-9"	7'-3"	2'-3"	2'-10½"	2'-0"	3	21.5
FP122	2'-9"	8'-9"	0.89	36-#9	12'-11"	8'-3"	2'-4"	3'-1½"	2'-3"	4	31.6
FP222	2'-9"	10'-3"	1.04	42-#9	14'-5"	9'-9"	2'-4"	3'-1½"	2'-3"	5	35.7
FP126	3'-3"	9'-3"	1.11	36-#10	13'-11"	8'-9"	2'-7"	3'-7½"	2'-9"	4	34.3
FP226	3'-3"	11'-0"	1.32	42-#10	15'-8"	10'-6"	2'-7"	3'-7½"	2'-9"	5	39.1
FP326	3'-3"	12'-6"	1.50	48-#10	17'-2"	12'-0"	2'-7"	3'-7½"	2'-9"	6	43.5
FP426	3'-3"	14'-3"	1.72	54-#10	18'-11"	13'-9"	2'-7"	3'-7½"	2'-9"	7	48.2
FP526	3'-3"	15'-9"	1.90	60-#10	20'-5"	15'-3"	2'-7"	3'-7½"	2'-9"	8	52.7
FP131	3'-9"	10'-0"	1.39	36-#11	15'-2"	9'-6"	2'-10"	4'-1½"	3'-3"	4	37.3
FP231	3'-9"	11'-9"	1.63	42-#11	16'-11"	11'-3"	2'-10"	4'-1½"	3'-3"	5	42.4
FP331	3'-9"	13'-3"	1.84	46-#11	18'-5"	12'-9"	2'-10"	4'-1½"	3'-3"	6	47.1
FP431	3'-9"	15'-0"	2.08	52-#11	20'-2"	14'-6"	2'-10"	4'-1½"	3'-3"	7	52.2
FP531	3'-9"	17'-0"	2.36	60-#11	22'-2"	16'-6"	2'-10"	4'-1½"	3'-3"	8	57.7
FP136	4'-0"	11'-3"	1.67	42-#11	16'-9"	10'-9"	3'-0"	4'-4½"	3'-6"	5	43.0
FP236	4'-0"	12'-9"	1.89	48-#11	18'-3"	12'-3"	3'-0"	4'-4½"	3'-6"	6	47.9
FP336	4'-0"	13'-6"	2.00	50-#11	19'-0"	13'-0"	3'-0"	4'-4½"	3'-6"	7	51.9
FP436	4'-0"	15'-0"	2.22	56-#11	20'-6"	14'-6"	3'-0"	4'-4½"	3'-6"	8	56.8
FP536	4'-0"	16'-3"	2.41	62-#11	21'-9"	15'-9"	3'-0"	4'-4½"	3'-6"	9	61.4
FP636	4'-0"	18'-0"	2.67	68-#11	23'-6"	17'-6"	3'-0"	4'-4½"	3'-6"	10	66.6
FP138	4'-3"	13'-0"	2.05	54-#11	18'-8"	12'-6"	3'-1"	4'-7½"	3'-9"	7	52.6
FP238	4'-3"	15'-0"	2.36	60-#11	20'-8"	14'-6"	3'-1"	4'-7½"	3'-9"	8	58.3
FP338	4'-3"	16'-9"	2.64	66-#11	22'-5"	16'-3"	3'-1"	4'-7½"	3'-9"	9	63.8
FP438	4'-3"	18'-3"	2.87	72-#11	23'-11"	17'-9"	3'-1"	4'-7½"	3'-9"	10	68.9

* ONE SET INCLUDES 2 "M" BARS, 2 "R" BARS (EXCEPT FOR FP116) AND NO. OF "N" BARS SHOWN IN TABLE.
(▲) CUBIC YARDS OF CONCRETE PER 1 FOOT HEIGHT OF PEDESTAL.

NOTES:

- PEDESTAL TYPE AND FOOTING TYPE INDICATED ON CONTRACT DRAWINGS OBTAINED FROM BD-644M, SHEETS 9, 10, 11, 12, AND 13.
- FOR INSTALLATION DETAILS, SEE SHEET 2.
- FOOTING DESIGN INFORMATION ON THIS SHEET BASED ON 10 FT. FILL HEIGHT. DESIGNER MUST CHECK ADEQUACY FOR FILL HEIGHTS <10'-0".
- 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 TRI-CHORD TRUSS
SPANS FROM 60' TO 240'

FOUNDATION DETAILS

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brian B Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHT. 3 OF 12

BC-744M

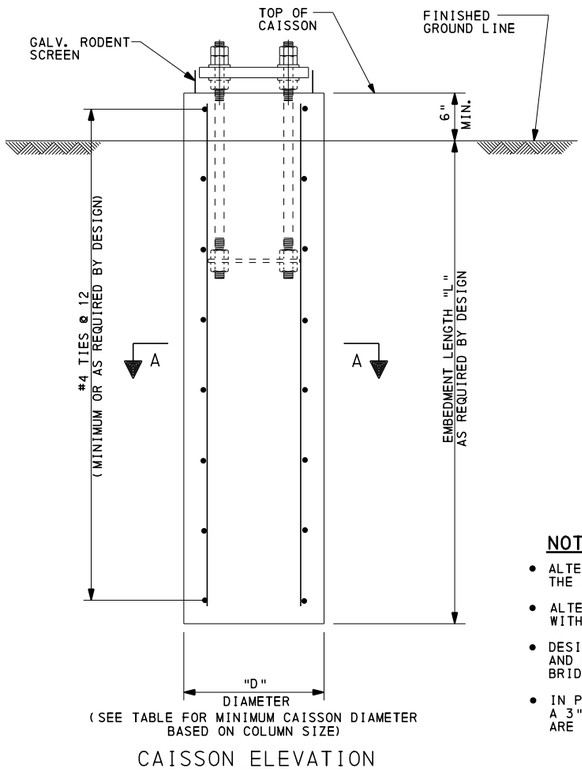
TABLE CONTINUED FROM SHEET 3.

FOOTING				FOOTING REINFORCEMENT										
TYPE	DIMENSION		CU. YDS. CONC.	"L" BARS					"T" BARS					
				L1		L2		LENGTH	T1		T2		LENGTH
	G	F		NO.	SIZE	NO.	SIZE		NO.	SIZE	NO.	SIZE	
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"
823	8'-0"	23'-0"	13.6	13	8	13	7	22'-6"	34	4	17	5	7'-6"
824	8'-0"	24'-0"	14.2	15	7	13	6	23'-6"	32	4	17	5	7'-6"
825	8'-0"	25'-0"	14.8	13	8	15	7	24'-6"	38	4	18	5	7'-6"
921	9'-0"	21'-0"	14.0	16	6	14	5	20'-6"	24	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	17	6	22'-6"	42	4	17	5	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	16	7	25'-6"	48	4	21	5	8'-6"
927	9'-0"	27'-0"	18.0	17	8	18	7	26'-6"	53	4	20	5	8'-6"
928	9'-0"	28'-0"	18.7	15	8	15	7	27'-6"	56	4	24	5	8'-6"
929	9'-0"	29'-0"	19.3	18	8	16	8	28'-6"	59	4	24	5	8'-6"
1016	10'-0"	16'-0"	11.9	12	4	8	5	15'-6"	22	5	14	5	9'-6"
1017	10'-0"	17'-0"	12.6	13	5	9	5	16'-6"	24	5	15	5	9'-6"
1018	10'-0"	18'-0"	13.3	14	5	9	5	17'-6"	27	5	18	5	9'-6"
1019	10'-0"	19'-0"	14.1	14	5	10	5	18'-6"	29	5	20	5	9'-6"
1020	10'-0"	20'-0"	14.8	15	5	11	5	19'-6"	31	5	23	5	9'-6"
1021	10'-0"	21'-0"	15.6	15	5	12	5	20'-6"	33	5	22	5	9'-6"
1024	10'-0"	24'-0"	17.8	17	8	19	6	23'-6"	39	4	17	5	9'-6"
1025	10'-0"	25'-0"	18.5	17	8	17	7	24'-6"	44	4	18	5	9'-6"
1026	10'-0"	26'-0"	19.3	18	8	19	7	25'-6"	47	4	20	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"
1029	10'-0"	29'-0"	21.5	20	8	17	8	28'-6"	58	4	25	5	9'-6"
1030	10'-0"	30'-0"	22.2	17	9	17	8	29'-6"	62	4	27	5	9'-6"
1032	10'-0"	32'-0"	23.7	16	9	17	8	31'-6"	63	4	27	5	9'-6"
1117	11'-0"	17'-0"	13.9	21	5	13	5	16'-6"	28	5	14	5	10'-6"
1118	11'-0"	18'-0"	14.7	19	6	17	5	17'-6"	33	5	18	5	10'-6"
1119	11'-0"	19'-0"	15.5	17	7	20	5	18'-6"	35	5	19	5	10'-6"
1120	11'-0"	20'-0"	16.3	20	7	17	6	19'-6"	39	5	22	5	10'-6"
1121	11'-0"	21'-0"	17.1	19	7	16	6	20'-6"	42	5	29	5	10'-6"
1122	11'-0"	22'-0"	17.9	19	7	17	6	21'-6"	44	5	30	5	10'-6"
1123	11'-0"	23'-0"	18.7	20	7	18	6	22'-6"	47	5	30	5	10'-6"
1124	11'-0"	24'-0"	19.6	16	6	17	5	23'-6"	48	5	33	5	10'-6"
1125	11'-0"	25'-0"	20.4	17	8	20	6	24'-6"	51	5	31	5	10'-6"
1127	11'-0"	27'-0"	22.0	18	8	19	7	26'-6"	42	5	25	5	10'-6"
1129	11'-0"	29'-0"	23.6	20	9	19	8	28'-6"	46	5	26	5	10'-6"
1130	11'-0"	30'-0"	24.4	19	9	19	8	29'-6"	47	5	29	5	10'-6"
1131	11'-0"	31'-0"	25.3	20	9	19	8	30'-6"	49	5	29	5	10'-6"
1132	11'-0"	32'-0"	26.1	22	9	19	8	31'-6"	53	5	32	5	10'-6"
1133	11'-0"	33'-0"	26.9	19	8	18	8	32'-6"	53	5	36	5	10'-6"
1134	11'-0"	34'-0"	27.7	18	10	20	8	33'-6"	59	5	40	5	10'-6"
1135	11'-0"	35'-0"	28.5	19	9	19	8	34'-6"	62	5	47	5	10'-6"
1219	12'-0"	19'-0"	16.9	23	5	15	5	18'-6"	28	5	14	5	11'-6"
1221	12'-0"	21'-0"	18.7	19	8	19	6	20'-6"	33	6	25	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"

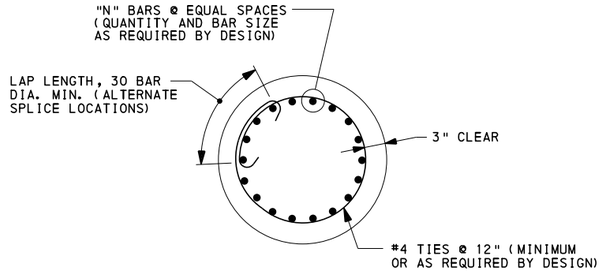
FOOTING				FOOTING REINFORCEMENT										
TYPE	DIMENSION		CU. YDS. CONC.	"L" BARS					"T" BARS					
				L1		L2		LENGTH	T1		T2		LENGTH
	G	F		NO.	SIZE	NO.	SIZE		NO.	SIZE	NO.	SIZE	
1224	12'-0"	24'-0"	21.3	20	8	23	6	23'-6"	43	6	40	5	11'-6"
1225	12'-0"	25'-0"	22.2	20	8	24	6	24'-6"	44	6	37	5	11'-6"
1226	12'-0"	26'-0"	23.1	20	8	23	6	25'-6"	44	6	38	5	11'-6"
1227	12'-0"	27'-0"	24.0	18	6	22	5	26'-6"	53	5	41	5	11'-6"
1236	12'-0"	36'-0"	32.0	23	10	20	9	35'-6"	57	6	52	5	11'-6"
1323	13'-0"	23'-0"	22.1	26	7	21	6	22'-6"	47	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	20	7	24'-6"	42	6	44	5	12'-6"
1326	13'-0"	26'-0"	25.0	22	8	24	7	25'-6"	46	6	38	6	12'-6"
1327	13'-0"	27'-0"	26.0	23	8	26	7	26'-6"	49	6	48	5	12'-6"
1328	13'-0"	28'-0"	27.0	24	7	25	6	27'-6"	49	6	51	5	12'-6"
1329	13'-0"	29'-0"	27.9	21	8	24	7	28'-6"	52	6	42	6	12'-6"
1330	13'-0"	30'-0"	28.9	21	8	25	7	29'-6"	54	6	56	5	12'-6"
1331	13'-0"	31'-0"	29.9	21	8	24	7	30'-6"	54	6	57	5	12'-6"
1425	14'-0"	25'-0"	25.9	24	7	23	6	24'-6"	40	7	41	6	13'-6"
1426	14'-0"	26'-0"	27.0	23	8	23	7	25'-6"	39	7	45	6	13'-6"
1427	14'-0"	27'-0"	28.0	23	8	24	7	26'-6"	44	7	42	6	13'-6"
1428	14'-0"	28'-0"	29.0	23	8	26	7	27'-6"	45	7	49	6	13'-6"
1429	14'-0"	29'-0"	30.1	29	8	23	8	28'-6"	47	7	52	6	13'-6"
1430	14'-0"	30'-0"	31.1	25	9	24	8	29'-6"	48	7	48	6	13'-6"
1431	14'-0"	31'-0"	32.1	27	9	24	8	30'-6"	51	7	49	6	13'-6"
1432	14'-0"	32'-0"	33.2	27	8	24	8	31'-6"	54	7	57	6	13'-6"
1433	14'-0"	33'-0"	34.2	27	9	24	8	32'-6"	55	7	61	6	13'-6"
1434	14'-0"	34'-0"	35.3	27	9	25	8	33'-6"	57	7	56	6	13'-6"
1435	14'-0"	35'-0"	36.3	26	9	28	8	34'-6"	59	7	63	6	13'-6"
1527	15'-0"	27'-0"	30.0	30	5	26	5	26'-6"	48	7	40	7	14'-6"
1528	15'-0"	28'-0"	31.1	28	7	28	6	27'-6"	53	7	42	7	14'-6"
1529	15'-0"	29'-0"	32.2	30	7	24	7	28'-6"	54	7	43	7	14'-6"
1530	15'-0"	30'-0"	33.3	25	8	28	7	29'-6"	59	7	50	7	14'-6"
1531	15'-0"	31'-0"	34.4	24	8	26	7	30'-6"	56	7	58	6	14'-6"
1532	15'-0"	32'-0"	35.6	25	8	24	8	31'-6"	58	7	63	6	14'-6"
1533	15'-0"	33'-0"	36.7	26	10	26	8	32'-6"	62	7	52	7	14'-6"
1534	15'-0"	34'-0"	37.8	27	9	26	8	33'-6"	66	7	65	6	14'-6"
1535	15'-0"	35'-0"	38.9	27	10	30	8	34'-6"	70	7	57	7	14'-6"
1536	15'-0"	36'-0"	40.0	28	10	27	9	35'-6"	73	7	70	6	14'-6"
1537	15'-0"	37'-0"	41.1	27	10	28	9	36'-6"	75	7	60	7	14'-6"
1538	15'-0"	38'-0"	42.2	27	11	25	10	37'-6"	61	8	77	6	14'-6"
1623	16'-0"	23'-0"	27.3	30	7	26	6	22'-6"	44	7	43	5	15'-6"
1627	16'-0"	27'-0"	32.0	24	7	25	6	26'-6"	45	8	41	7	15'-6"
1630	16'-0"	30'-0"	35.6	26	8	27	7	29'-6"	51	8	51	7	15'-6"
1637	16'-0"	37'-0"	43.9	27	11	31	9	36'-6"	65	8	57	7	15'-6"
1638	16'-0"	38'-0"	45.0	28	11	31	9	37'-6"	66	8	76	6	15'-6"
1639	16'-0"	39'-0"	46.2	32	10	31	9	38'-6"	65	8	61	7	15'-6"
1641	16'-0"	41'-0"	48.6	32	11	32	10	40'-6"	72	8	72	7	15'-6"
1726	17'-0"	26'-0"	32.7	29	5	25	5	25'-6"	44	8	40	8	16'-6"
1727	17'-0"	27'-0"	34.0	29	6	33	5	26'-6"	46	8	48	7	16'-6"
1728	17'-0"	28'-0"	35.3	28	8	31	7	27'-6"	48	8	52	7	16'-6"
1732	17'-0"	32'-0"	40.3	28	8	34	7	31'-6"	55	8	64	7	16'-6"
1828	18'-0"	28'-0"	37.3	31	6	26	6	27'-6"	48	8	46	8	17'-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.
- FOR ADDITIONAL FOUNDATION NOTES, SEE SHEET 3.



CAISSON ELEVATION
N.T.S.



SECTION A-A
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"
10"X.365"	3'-6"	EMBEDMENT LENGTH "L" AS REQUIRED BY DESIGN	QUANTITY AND BAR SIZE "N" AS REQUIRED BY DESIGN
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:

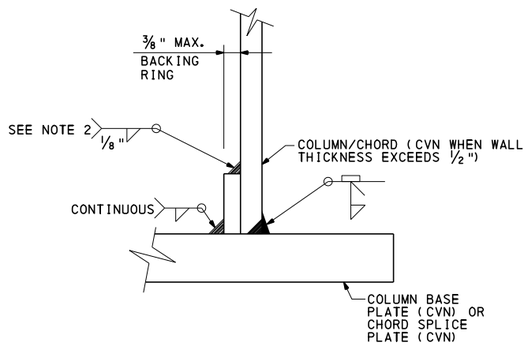
- ALTERNATE CAISSON FOUNDATIONS ARE PERMITTED IN PLACE OF THE SPREAD FOOTING SIZE SHOWN ON THE CONTRACT DRAWINGS.
- ALTERNATE CAISSON FOUNDATIONS MUST BE DESIGNED IN ACCORDANCE WITH DESIGN CRITERIA GIVEN ON SHEET 1.
- DESIGN COMPUTATIONS FOR THE REQUIRED CAISSON EMBEDMENT AND REINFORCEMENT MUST BE SUBMITTED 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.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

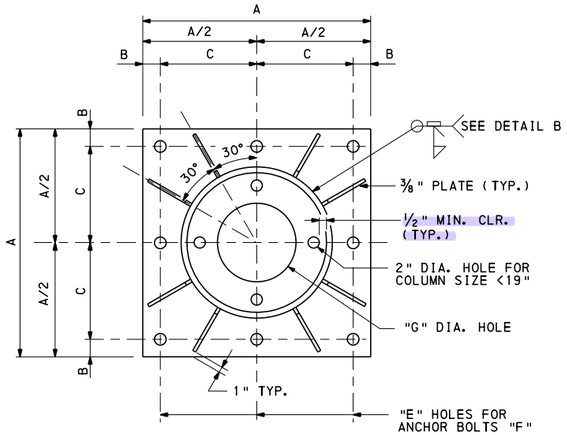
OVERHEAD SIGN STRUCTURES
2 POST AND 4 POST TRI-CHORD TRUSS
SPANS FROM 60' TO 240'

FOUNDATION DETAILS AND
ALTERNATE CAISSON FOUNDATION

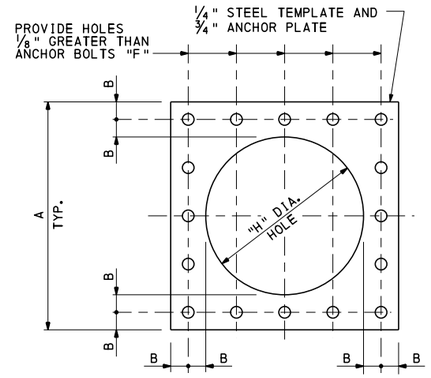
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 4 OF 12 BC-744M



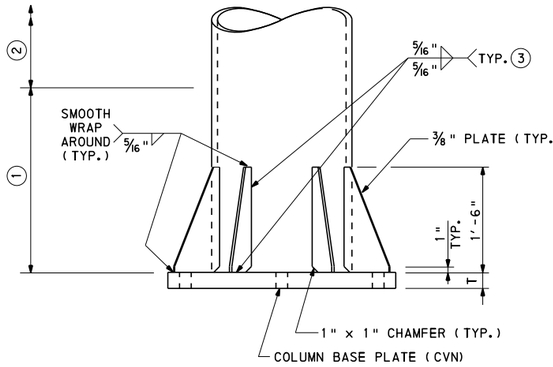
DETAIL B



PLAN OF COLUMN BASE TYPE Y



ANCHOR PLATE AND STEEL TEMPLATE DETAIL



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.

COLUMN BASES - 2 POST STRUCTURES

COLUMN NOMINAL SIZE X WALL THK.*	BASE TYPE	A	B	C	E	F	G	H	T	WASHER SIZE	PRO-JECTION	EMBED-MENT
10"x.365"	Y	1'-8"	2½"	7½"	1½"D	1¼"D	3¼"	10"	2"	3½"Dx⅜"	7¾"	2'-1"
12"x.375"	Y	1'-10"	2½"	8½"	1¾"D	1½"D	5¼"	1'-0"	2"	3½"Dx⅜"	8½"	2'-6"
14"x.375"	Y	2'-0"	2½"	9½"	1¾"D	1½"D	6½"	1'-2"	2"	3½"Dx⅜"	8½"	2'-6"
16"x.375"	Y	2'-2"	2½"	10½"	2"D	1¾"D	8"	1'-4"	2"	4"Dx⅜"	9¼"	2'-11"
18"x.375"	Y	2'-4"	2½"	11½"	2"D	1¾"D	9¼"	1'-6"	2"	4"Dx⅜"	9¼"	2'-11"
20"x.375"	Y	2'-7"	3"	1'-0½"	2¼"D	2"D	1'-5"	1'-7"	3"	5"Dx⅜"	11"	3'-4"
24"x.375"	Y	2'-11"	3"	1'-2½"	2¼"D	2"D	1'-6"	1'-11"	3"	5"Dx⅜"	11"	3'-4"
24"x.500"	Y	3'-0"	3½"	1'-2½"	2½"D	2¼"D	1'-6"	1'-10"	3"	5"Dx⅜"	11¾"	3'-9"

NOTE: D DENOTES DIAMETER
* CVN REQUIRED FOR WALL THICKNESSES EXCEEDING ½" (.500").

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, ½" BY ½" 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.

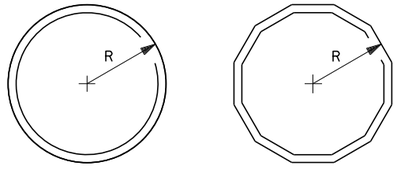
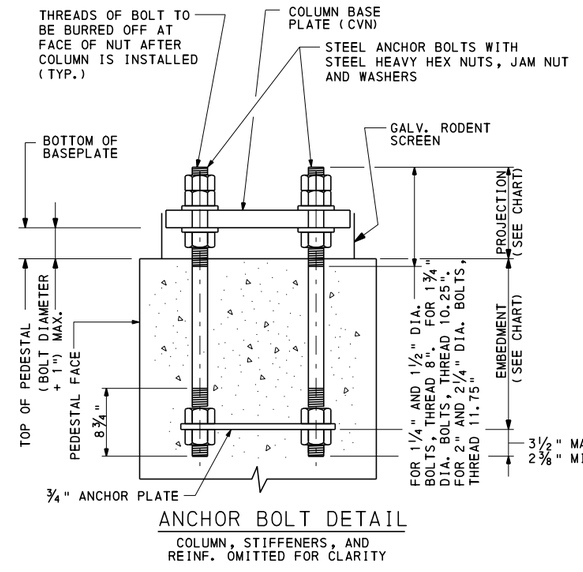


ILLUSTRATION OF DIMENSION "R" FOR CIRCULAR MEMBERS AND EQUIVALENT "PRESS-BREAK" MEMBERS

"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.



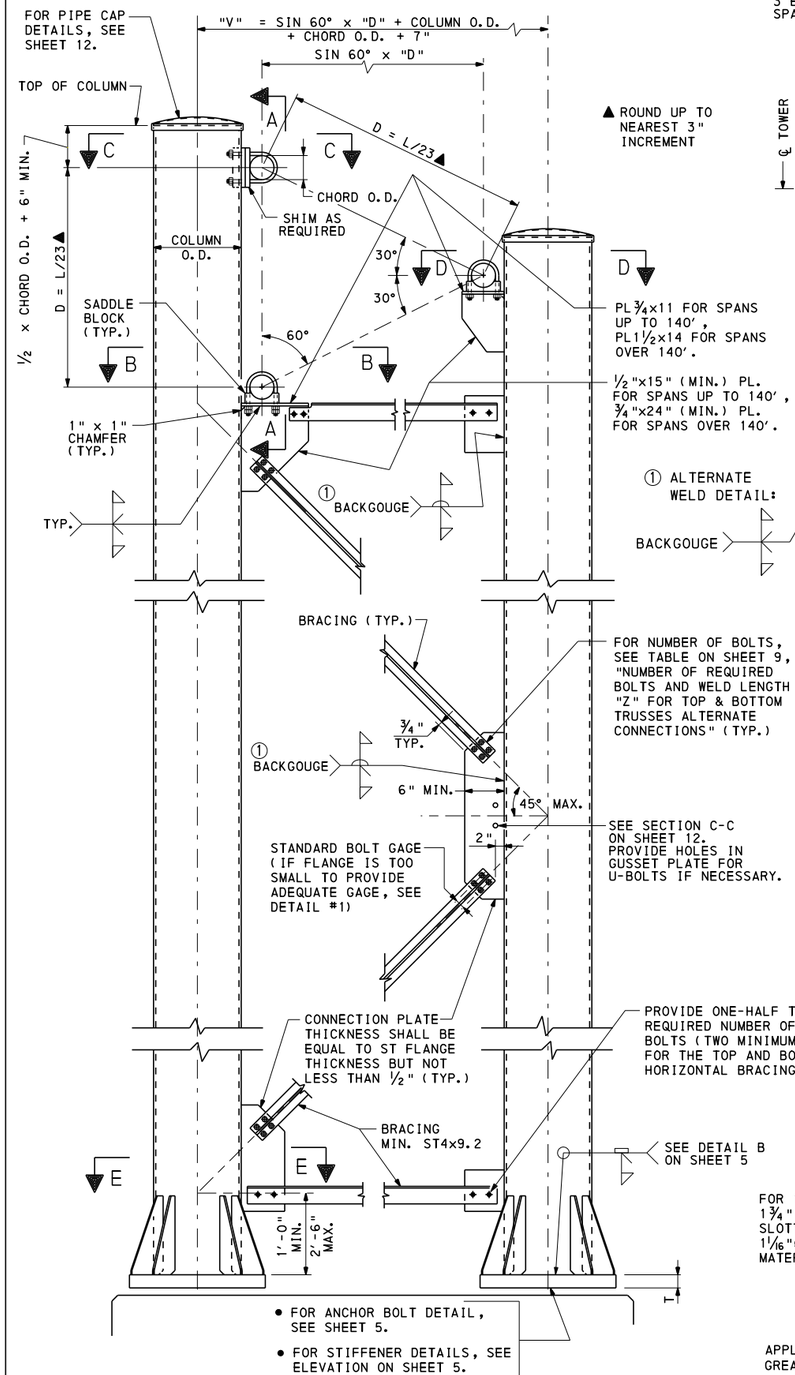
ANCHOR BOLT DETAIL
COLUMN, STIFFENERS, AND REINF. OMITTED FOR CLARITY

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

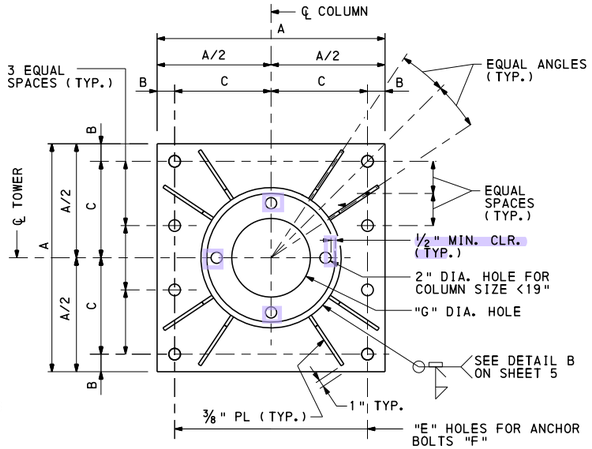
OVERHEAD SIGN STRUCTURES
2 POST AND 4 POST TRI-CHORD TRUSS
SPANS FROM 60' TO 240'

COLUMN BASE DETAILS

RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 5 OF 12 BC-744M



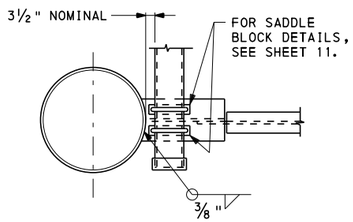
TOWER ELEVATION



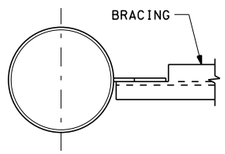
PLAN OF COLUMN BASE TYPE W

COLUMN BASES - 4 POST STRUCTURES												
COLUMN NOMINAL SIZE X WALL THK.✱	BASE TYPE	A	B	C	E	F	G	H	T	WASHER SIZE	PRO-JECTION	EMBED-MENT
8"x.322"	W	1'-6"	2½"	6½"	1½"D	1¼"D	2"	8"	2"	3½"Dx⅜"	7¾"	2'-1"
10"x.365"	W	1'-8"	2½"	7½"	1½"D	1¼"D	3¼"	10"	2"	3½"Dx⅜"	7¾"	2'-1"
12"x.375"	W	1'-10"	2½"	8½"	1¾"D	1½"D	5¼"	1'-0"	2"	3½"Dx⅜"	8½"	2'-6"
14"x.375"	W	2'-0"	2½"	9½"	1¾"D	1½"D	6½"	1'-2"	2"	3½"Dx⅜"	8½"	2'-6"
16"x.375"	W	2'-2"	2½"	10½"	2"D	1¾"D	8"	1'-4"	2"	4"Dx⅜"	9¼"	2'-11"
18"x.375"	W	2'-4"	2½"	11½"	2"D	1¾"D	9¼"	1'-6"	2"	4"Dx⅜"	9¼"	2'-11"
20"x.375"	W	2'-7"	3"	1'-0½"	2¼"D	2"D	1'-5"	1'-7"	3"	5"Dx⅜"	11"	3'-4"
24"x.375"	W	2'-11"	3"	1'-2½"	2¼"D	2"D	1'-6"	1'-11"	3"	5"Dx⅜"	11"	3'-4"
24"x.500"	W	3'-0"	3½"	1'-2½"	2½"D	2¼"D	1'-6"	1'-10"	3"	5"Dx⅜"	11¾"	3'-9"

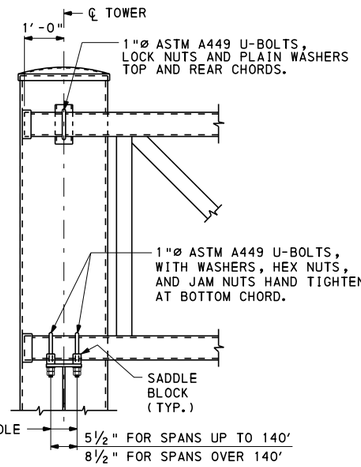
NOTE: D DENOTES DIAMETER
✱ CVN REQUIRED FOR WALL THICKNESSES EXCEEDING ½" (.500").



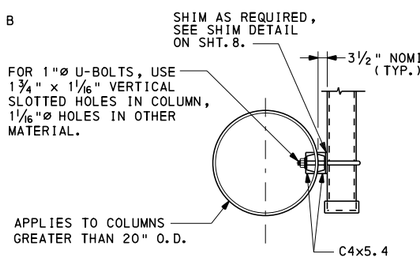
SECTION B-B
(SECTION D-D SIMILAR)



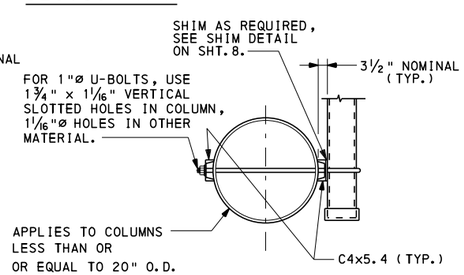
SECTION E-E



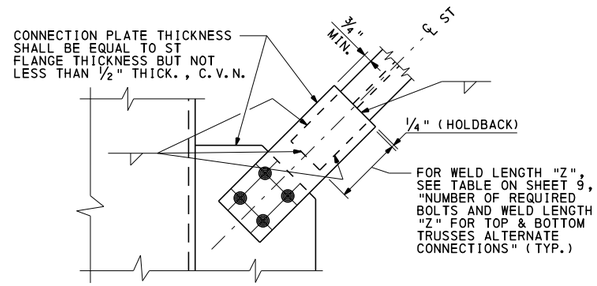
SECTION A-A



SECTION C-C
(COLUMNS > 20" O.D.)



SECTION C-C
(COLUMNS ≤ 20" O.D.)



DETAIL #1

NOTES:

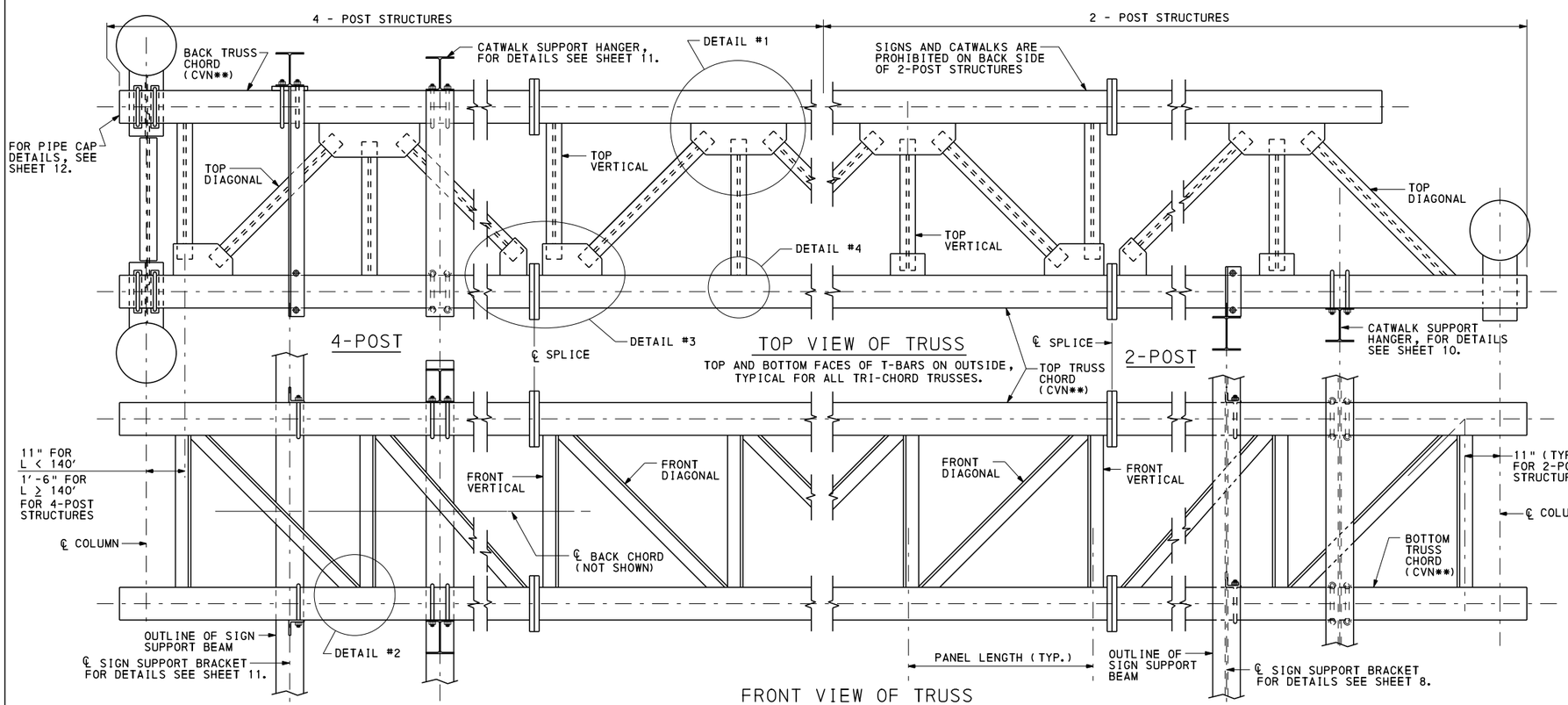
- FOR GENERAL NOTES, SEE SHEET 1.
- MEMBER SIZES INDICATED ON CONTRACT DRAWINGS OBTAINED FROM BD-644M SHEETS 9-13.
- FOR SADDLE BLOCK DETAILS, SEE SHEET 11.
- FOR ELEVATION AND ANCHOR BOLT DETAILS, SEE SHEET 5.
- FOR ANCHOR PLATE AND STEEL TEMPLATE DETAILS, SEE SHEET 5.
- TO PREVENT INTERSECTING FILLET 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.

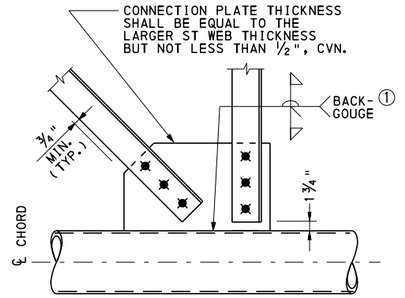
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

COLUMN DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 6 OF 12
Thomas P Macioce CHIEF BRIDGE ENGINEER	Brian D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-744M

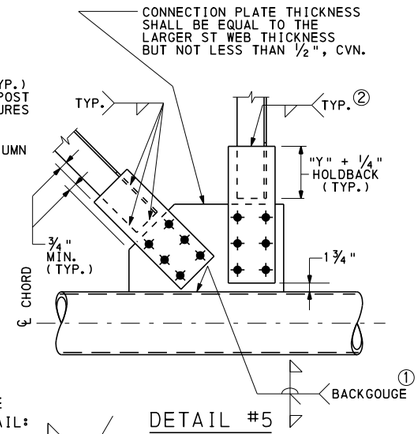




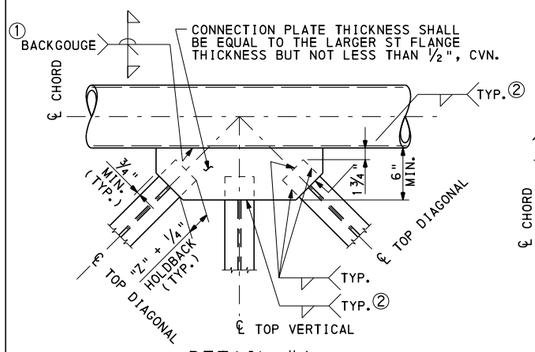
ALTERNATE BOLTED CONNECTION

(FRONT TRUSS)

FOR ST SECTIONS TOO SHALLOW TO BOLT THROUGH, USE DETAIL #5.

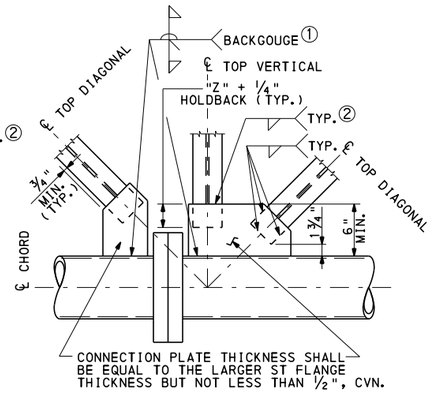


DETAIL #5



DETAIL #1

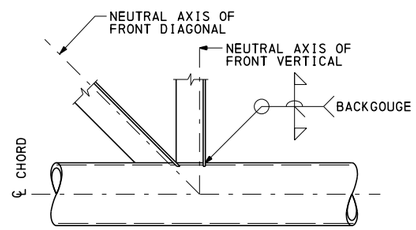
FOR WELD "Z" SEE TABLE ON SHEET 9



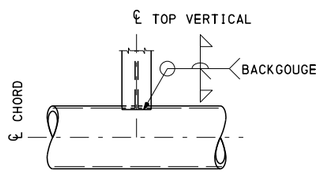
DETAIL #3

NOTE:

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



DETAIL #2

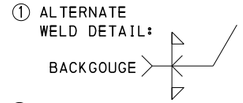


DETAIL #4

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	⅞"	*	4"
ST1.5x3.75	2	⅞"	¼"	4"
ST2x3.85	2	⅞"	*	4"
ST2x4.75	3	⅞"	¼"	4"
ST2.5x5	3	⅞"	*	4"
ST3x6.25	4	⅞"	*	4"
ST3x8.625	5	⅞"	⅜"	4"
ST4x9.2	5	⅞"	5/16"	6"
ST4x11.5	6	⅞"	⅜"	4"
ST5x12.7	7	⅞"	5/16"	9"
ST5x17.5	7	1"	½"	4"
ST6x15.9	7	1"	¼"	7"
ST6x17.5	7	1"	5/16"	6"
ST6x20.4	6	1¼"	⅜"	6"
ST6x25	8	1¼"	½"	4"
ST7.5x21.45	7	1¼"	5/16"	6"
ST7.5x25	8	1¼"	7/16"	4"
ST9x27.35	8	1¼"	⅜"	6"
ST9x35	11	1¼"	½"	6"
ST10x48	15	1¼"	½"	9"
WT10.5x73.5	22	1¼"	½"	1'-6"

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

① ALTERNATE WELD DETAIL:



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.

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 ½" (.500").

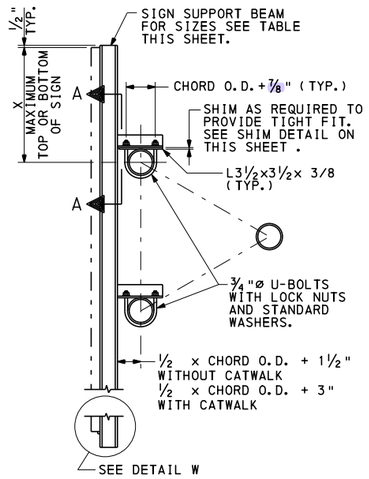
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

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

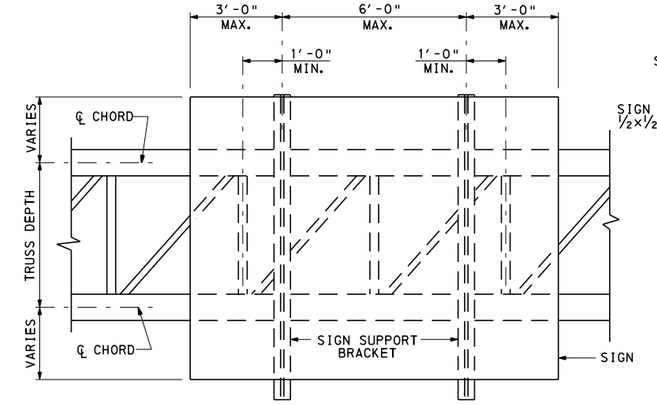
TRUSS DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 7 OF 12
Thomas P Macioce CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-744M



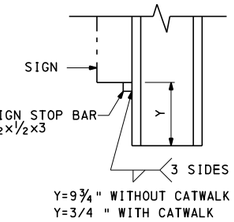
SIGN SUPPORT BRACKET DETAIL

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



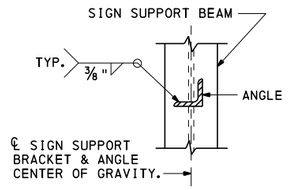
TYPICAL SIGN SUPPORT BRACKET SPACING DIAGRAM

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

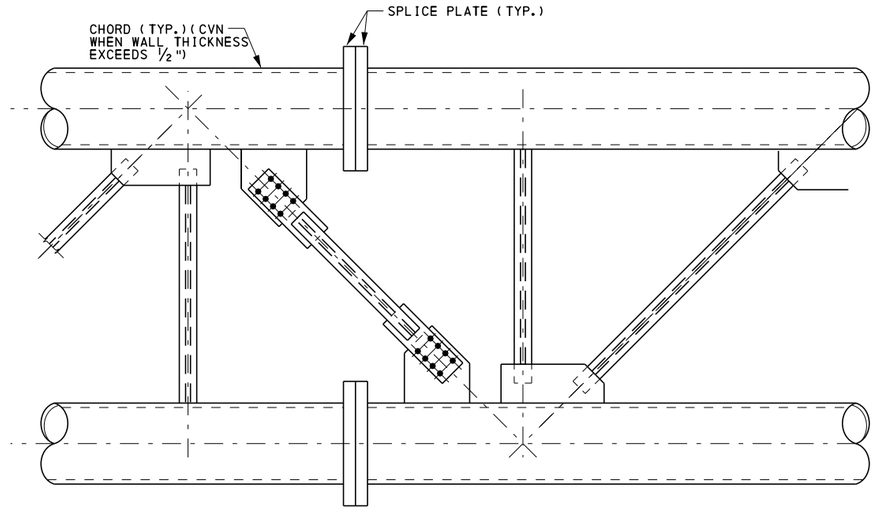


DETAIL W

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



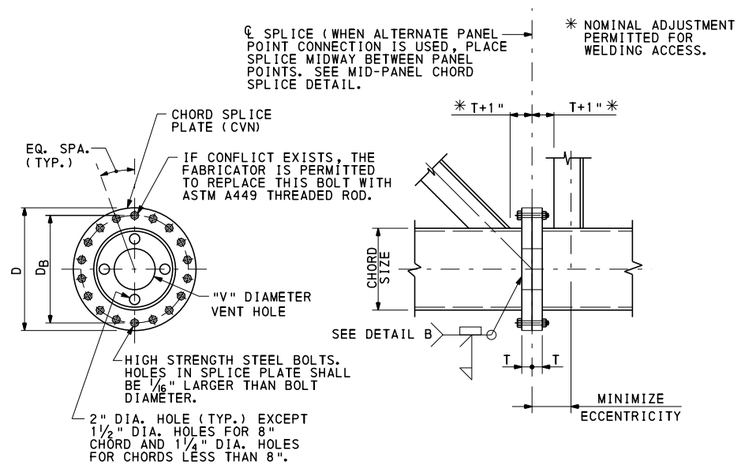
ELEVATION

(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

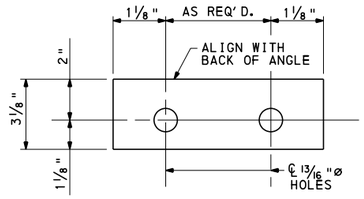
NOTES:

- 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 9/16"	10 9/16"	4-⅞"ø	2"	0
5"x.375"	1'-1 9/16"	10 9/16"	6-⅞"ø	2½"	0
6"x.280"	1'-2 5/8"	11 5/8"	6-⅞"ø	2"	0
6"x.432"	1'-2 5/8"	11 5/8"	8-⅞"ø	2½"	0
8"x.322"	1'-4 5/8"	1'-1 5/8"	8-⅞"ø	2¼"	2"
8"x.500"	1'-4 5/8"	1'-1 5/8"	12-⅞"ø	2¾"	2"
10"x.365"	1'-6¾"	1'-3¾"	12-⅞"ø	2½"	3¼"
10"x.500"	1'-6¾"	1'-3¾"	16-⅞"ø	2¾"	3¼"
12"x.375"	1'-8¾"	1'-5¾"	14-⅞"ø	2½"	5¼"
12"x.500"	1'-8¾"	1'-5¾"	18-⅞"ø	2¾"	5¼"
14"x.375"	1'-10"	1'-7"	16-⅞"ø	2½"	6½"
14"x.500"	1'-10"	1'-7"	20-⅞"ø	2¾"	6½"
16"x.375"	2'-0"	1'-9"	18-⅞"ø	2½"	8"
16"x.500"	2'-0"	1'-9"	22-⅞"ø	2¾"	8"
18"x.375"	2'-2"	1'-11"	20-⅞"ø	2½"	9¼"
18"x.500"	2'-2½"	1'-11"	20-1"ø	2¾"	9¼"
20"x.375"	2'-4"	2'-1"	22-⅞"ø	2½"	10½"
20"x.500"	2'-4½"	2'-1"	22-1"ø	2¾"	10½"
24"x.375"	2'-8½"	2'-5"	20-1"ø	2½"	1'-0¾"
24"x.500"	2'-8½"	2'-5"	26-1"ø	3"	1'-0¾"

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

▲ CVN REQUIRED FOR WALL THICKNESSES EXCEEDING ½" (0.500").



SHIM DETAIL

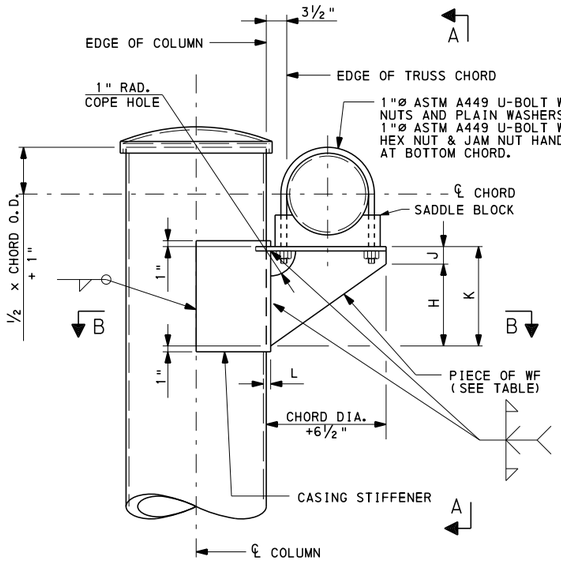
PROVIDE 1 AT ¼", 3 AT ⅛" AND 1 AT 1/16" THICKNESS FOR EACH UPPER SIGN SUPPORT CONNECTION ANGLE.

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'

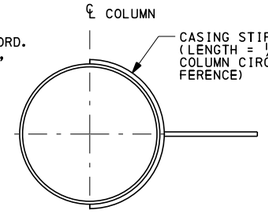
STRUCTURAL DETAILS-1

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 8 OF 12
Thomas P. Macioce	Brent D. Thompson	BC-744M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



ALTERNATE TRUSS SEAT DETAIL

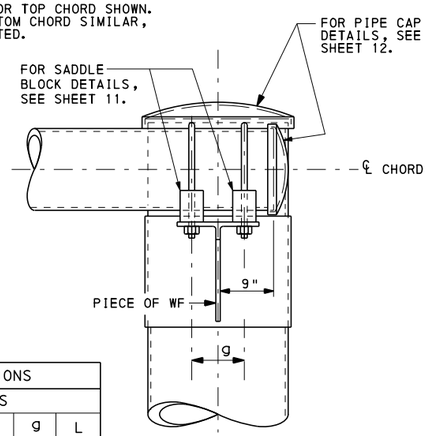
(2-POST STRUCTURES ONLY)



SECTION B-B

NOTE:

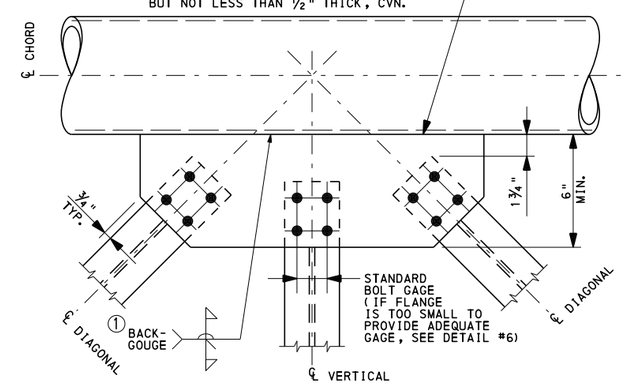
TRUSS SEAT FOR TOP CHORD SHOWN. SEAT FOR BOTTOM CHORD SIMILAR, EXCEPT AS NOTED.



VIEW A-A

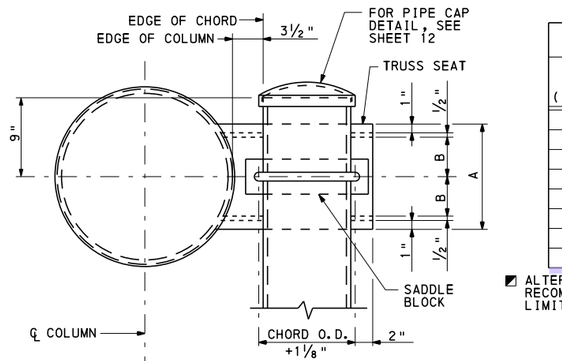
2-POST ALTERNATE TRUSS SEAT DIMENSIONS						
SPAN LENGTH	WF SIZE	DIMENSIONS				
		H	J	K	g	L
60′	W27x84	1′-8⅝"	3"	1′-11⅝"	5½"	1¼"
70′	W30x90	1′-11⅜"	3"	2′-2⅝"	5½"	1⅜"
80′	W33x118	2′-2¾"	3"	2′-5¾"	5½"	1⅝"
90′	W36x135	2′-5⅜"	3"	2′-8⅜"	5½"	1⅝"
100′	W36x135	2′-5⅜"	3"	2′-8⅜"	5½"	1¾"

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



ALTERNATE BOLTED CONNECTION DETAIL

(TOP AND BOTTOM TRUSSES)

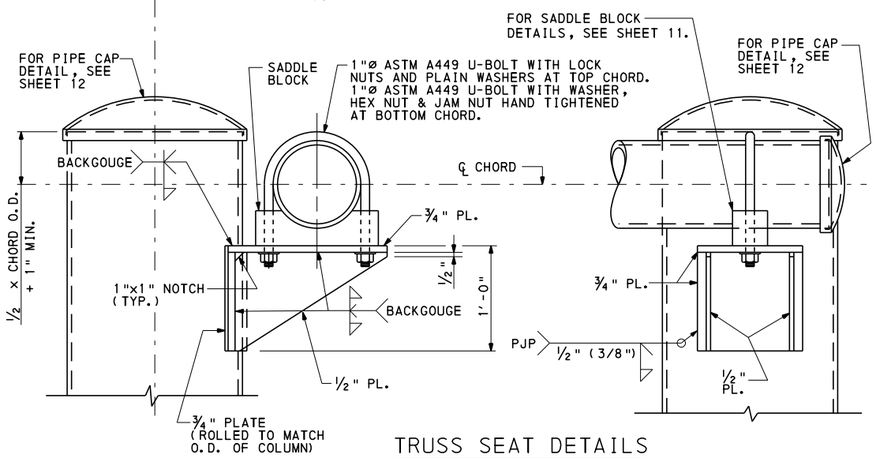


TRUSS SEAT		
COLUMN SIZE (NOMINAL)	DIMENSION	
	A	B
◩ 8"ø	7"	2"
◩ 10"ø	7"	2"
◩ 12"ø	8"	2½"
14"ø	9"	3"
16"ø	9"	3"
18"ø	9"	3"
20"ø	1′-0"	4½"
24"ø	1′-0"	4½"

◩ 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 ½" AT BOTTOM CHORD ONLY.



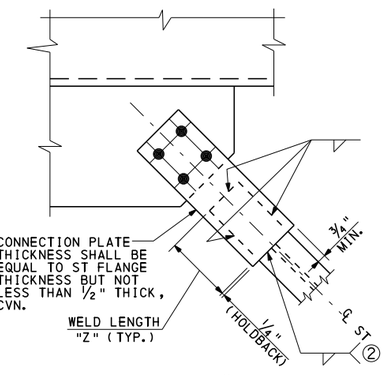
TRUSS SEAT DETAILS

(2-POST STRUCTURES ONLY)

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

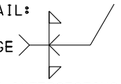
NUMBER OF REQUIRED BOLTS AND WELD LENGTH "Z" FOR TOP & BOTTOM TRUSSES ALTERNATE CONNECTIONS				
MEMBER	NO.	DIA.	WELD SIZE	MIN. LENGTH "Z"
ST1.5x2.85	2	⅞"	**	4"
ST1.5x3.75	2	⅞"	**	4"
ST2x3.85	2	⅞"	**	4"
ST2x4.75	2	⅞"	**	4"
ST2.5x5	2	⅞"	**	4"
ST3x6.25	4	⅞"	**	4"
ST3x8.625	4	⅞"	**	4"
ST4x9.2	4	⅞"	**	4"
ST4x11.5	6	⅞"	**	5"
ST5x12.7	6	⅞"	**	4"
ST5x17.5	8	⅞"	**	5"
ST6x15.9	8	⅞"	**	4"
ST6x17.5	8	⅞"	**	4"
ST6x20.4	8	⅞"	**	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	1¼"	**	6"

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



DETAIL #6

① ALTERNATE WELD DETAIL:

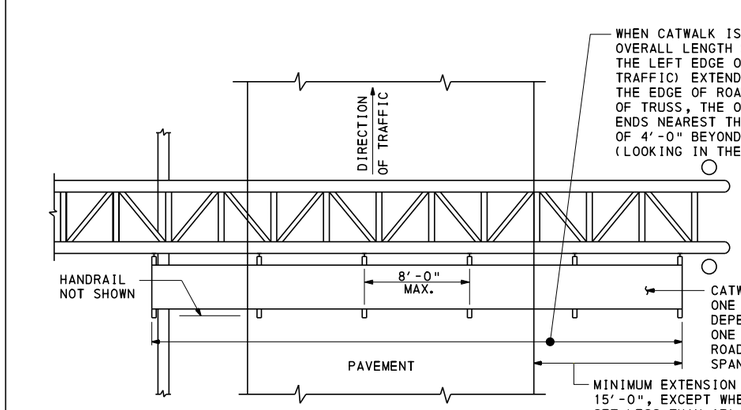


② TO PREVENT INTERSECTING FILLET WELDS ON OPPOSITE SIDES OF A COMMON PLANE, PROVIDE A WELD 'HOLDBACK' AT THE EDGE OF THE GUSSET PLATE IN THE BRACING MEMBERS EQUAL TO THE MINIMUM WELD SIZE REQUIRED. ENSURE MINIMUM TOTAL WELD LENGTHS ARE ACHIEVED.

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

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 9 OF 12
Thomas P. Macioce	Brian S. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-744M

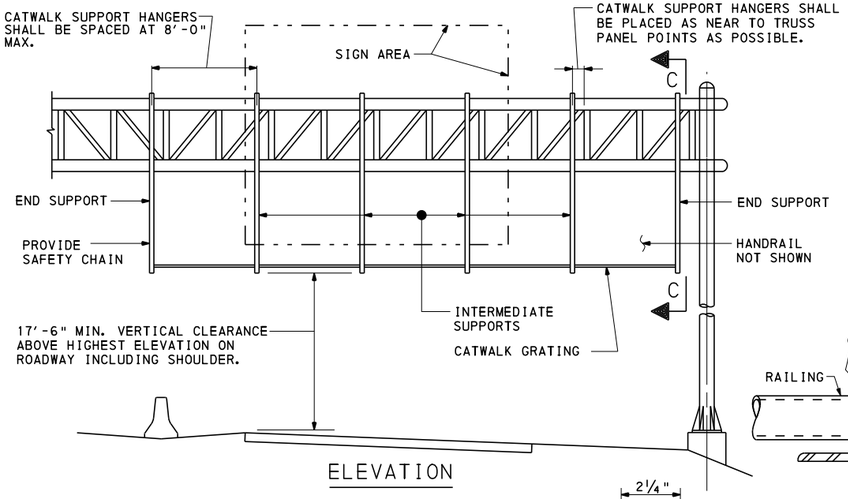


WHEN CATWALK IS ON ONE SIDE OF THE TRUSS ONLY, THE OVERALL LENGTH SHALL BE SUCH THAT THE END NEAREST THE LEFT EDGE OF ROADWAY (LOOKING IN DIRECTION OF TRAFFIC) EXTENDS A MINIMUM OF 4'-0" BEYOND THE EDGE OF ROADWAY. WHEN CATWALK IS ON BOTH SIDES OF TRUSS, THE OVERALL LENGTH SHALL BE SUCH THAT BOTH ENDS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

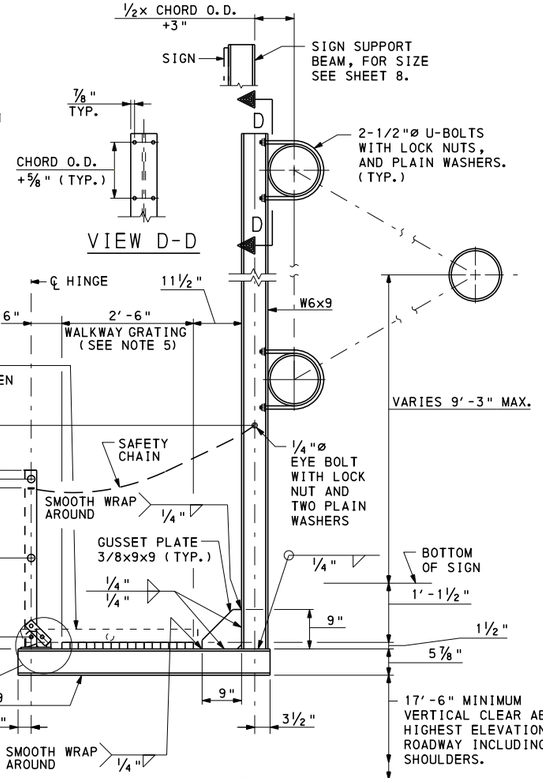
CATWALK MAY BE REQUIRED ON ONE OR BOTH SIDES OF THE TRUSS DEPENDING ON WHETHER THERE IS ONE OR TWO WAY TRAFFIC ON THE ROADWAY THAT THE SIGN STRUCTURE SPANS.

MINIMUM EXTENSION OF CATWALK SHALL BE 15'-0", EXCEPT WHEN TOWER IS SET LESS THAN 17'-0" FROM EDGE OF ROADWAY.

PLAN

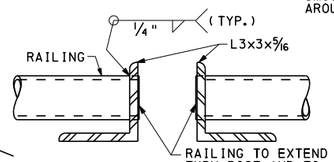


ELEVATION

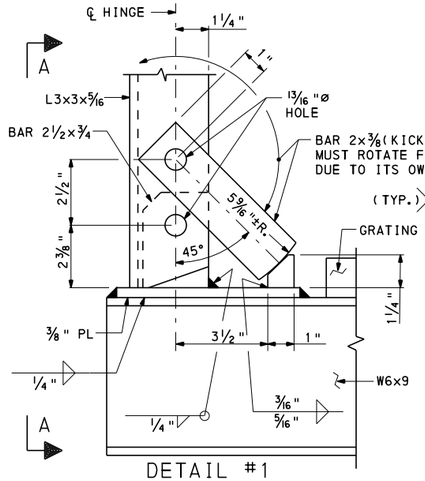


SECTION C-C

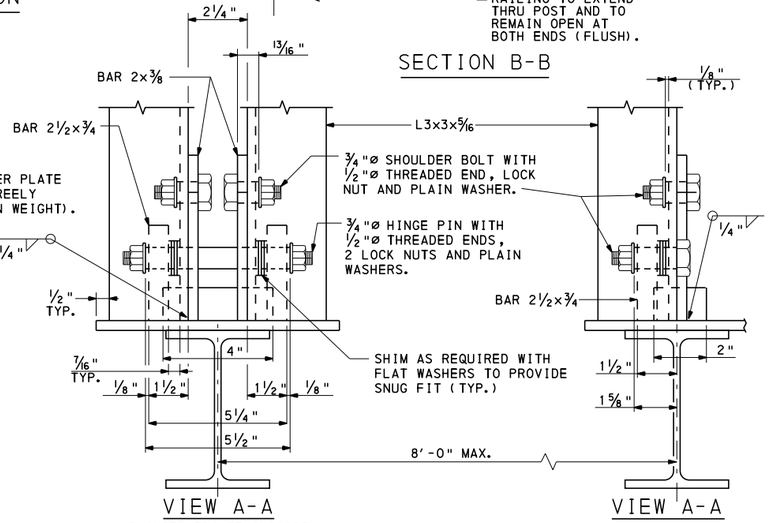
FOR CATWALK ATTACHMENT TO BACK OF TRUSS, SEE SECTION C-C ON SHEET 11.



SECTION B-B

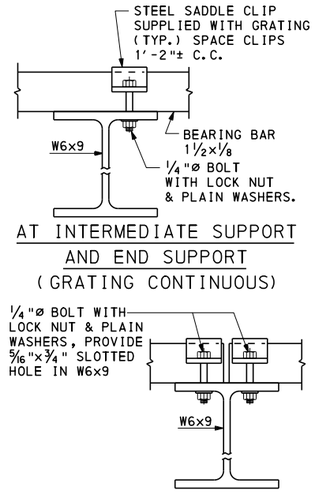


DETAIL #1



VIEW A-A
AT INTERMEDIATE SUPPORT

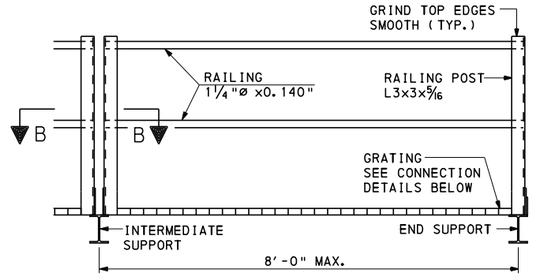
VIEW A-A
AT END SUPPORT



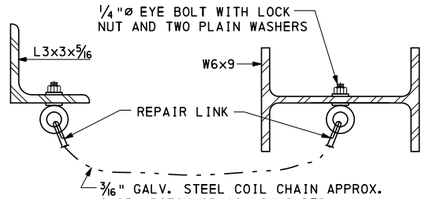
AT INTERMEDIATE SUPPORT AND END SUPPORT
(GRATING CONTINUOUS)

AT INTERMEDIATE SUPPORT
(GRATING BROKEN)

GRATING CONNECTION DETAILS



TYPICAL HANDRAIL UNIT



SAFETY CHAIN DETAILS

NOTES:

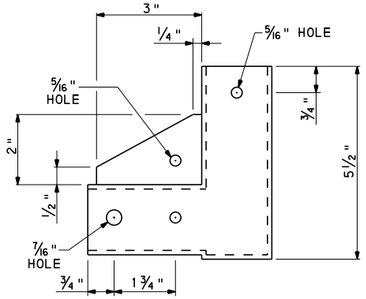
1. FOR GENERAL NOTES SEE SHEET 1.
2. FOR ALTERNATE HANDRAIL DETAILS, SEE SHEET 11.
3. SPECIAL CARE SHALL BE TAKEN TO INSURE THAT THE COMPLETED POST HINGE AND KICKER PLATE ASSEMBLY WILL HOLD THE SAFETY RAILING IN A STEADY MANNER, FREE OF WOBBLE WHILE IN THE RAISED POSITION. MAXIMUM ALLOWABLE DISPLACEMENT 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, 1½"x⅛" SERRATED BEARING BARS @ 1⅜6" CENTERS. THE CROSS BARS SHALL BE ¼" 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

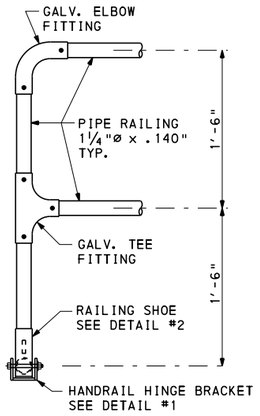
OVERHEAD SIGN STRUCTURES
2 POST AND 4 POST TRI-CHORD TRUSS SPANS FROM 60' TO 240'

CATWALK AND HANDRAIL DETAILS

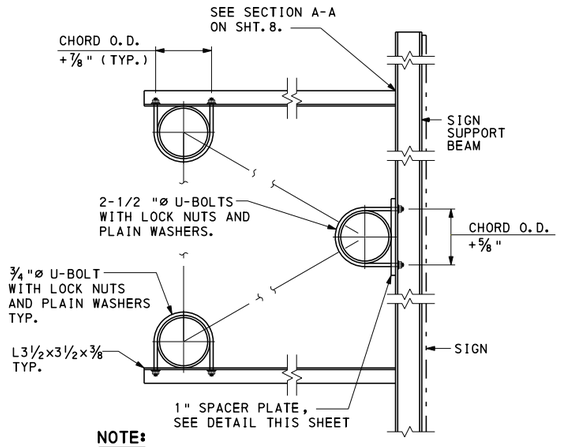
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Bruce B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 10 OF 12 BC-744M



RAILING SHOE UNIT
DETAIL #2

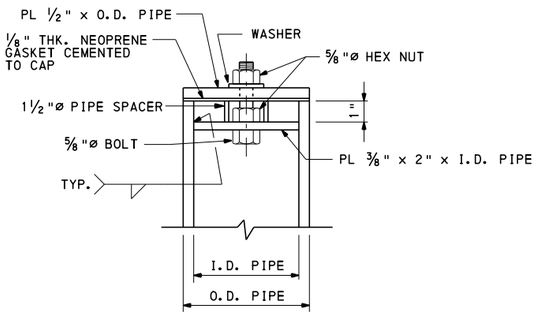


HANDRAIL ASSEMBLY
(ONE HALF UNIT SHOWN)



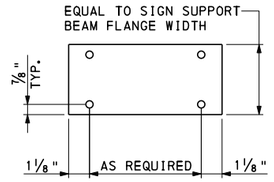
NOTE:
FOR DETAILS NOT SHOWN, SEE SHEET 8.

SIGN ATTACHMENT TO
BACK OF TRI-CHORD TRUSS

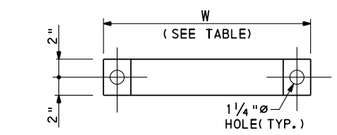


ALTERNATE PIPE CAP DETAIL

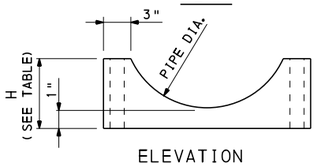
SADDLE BLOCK DIMENSIONS TABLE (NOMINAL)		
PIPE DIA.	1" U-BOLT DIA.	
	NOMINAL HEIGHT "H"	NOMINAL WIDTH "W"
6"	2"	10 3/4"
8"	2 5/8"	1'-0 3/4"
10"	3 3/8"	1'-2 7/8"
12"	4 1/16"	1'-4 7/8"
14"	4 1/2"	1'-6 1/8"
16"	5 1/4"	1'-8 1/8"
18"	6"	1'-10 1/8"
20"	6 3/4"	2'-0 1/8"
24"	8 5/16"	2'-4 1/8"



SPACER DETAIL



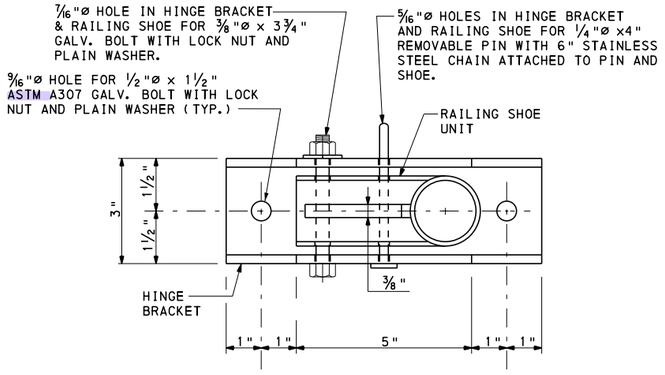
PLAN



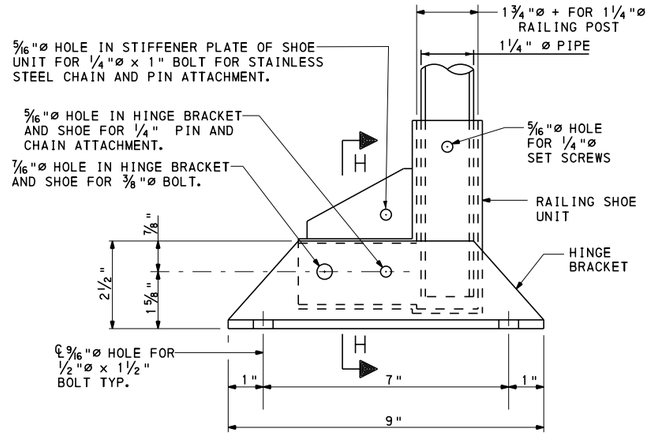
ELEVATION

SADDLE BLOCK DETAIL

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



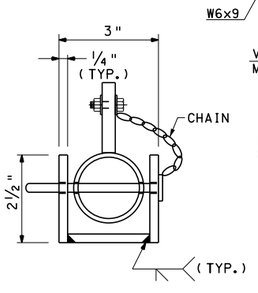
PLAN



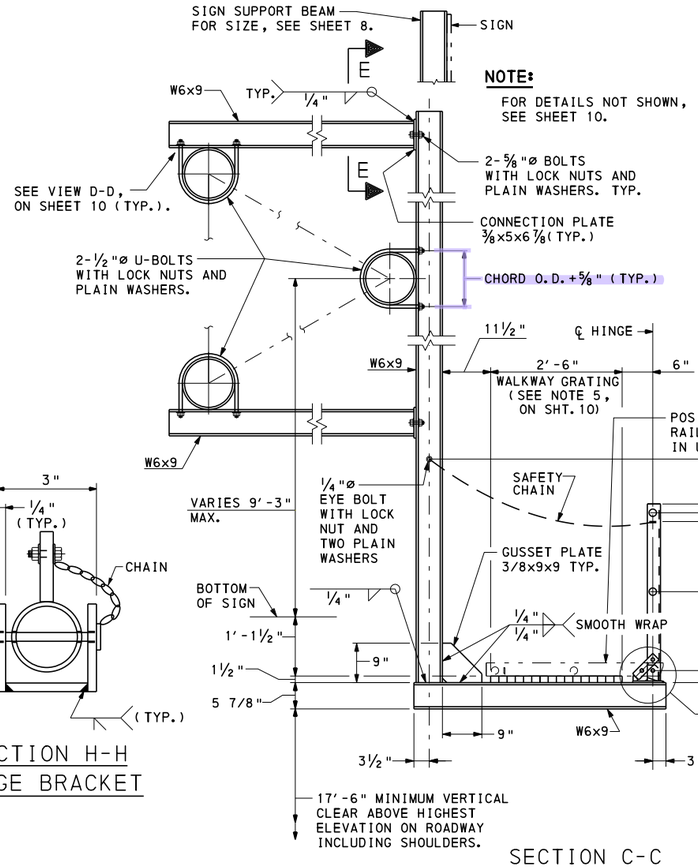
ELEVATION

ALTERNATE HANDRAIL HINGE BRACKET ASSEMBLY

DETAIL #1

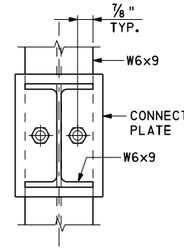


SECTION H-H
HINGE BRACKET



SECTION C-C
CATWALK ATTACHMENT
TO BACK OF TRI-CHORD TRUSS

- FOR SECTION CUT, SEE SHEET 10.



SECTION E-E

NOTE:
FOR DETAILS NOT SHOWN, SEE SHEET 10.

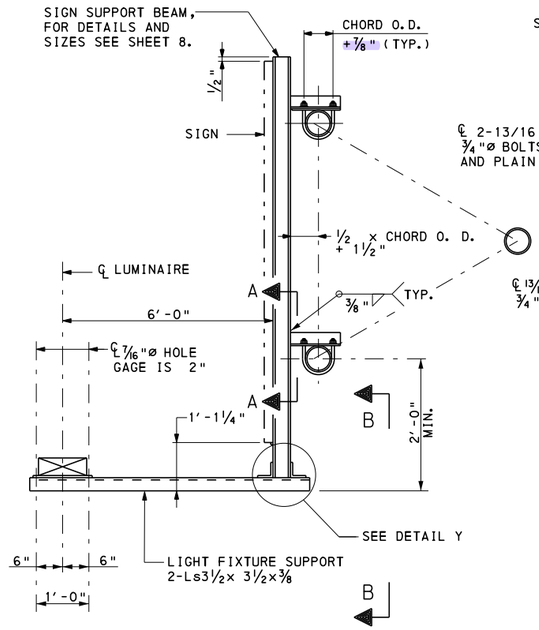
NOTES:

- 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

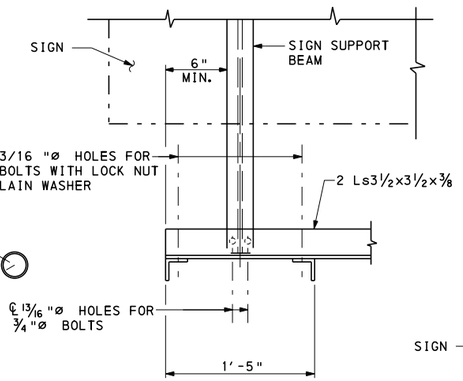
OVERHEAD SIGN STRUCTURES
2 POST AND 4 POST TRI-CHORD TRUSS
SPANS FROM 60' TO 240'
CONNECTIONS TO BACK OF TRI-CHORD TRUSS AND ALTERNATE CATWALK DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 11 OF 12
Thomas P Macioce CHIEF BRIDGE ENGINEER	Brenda B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-744M

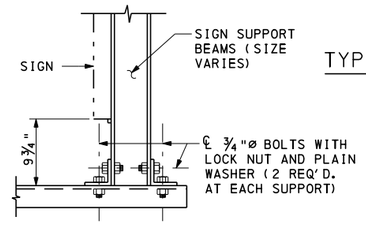


TYPICAL LIGHT FIXTURE SUPPORT DETAILS

FOR SECTION A-A, SEE SHT. 8.



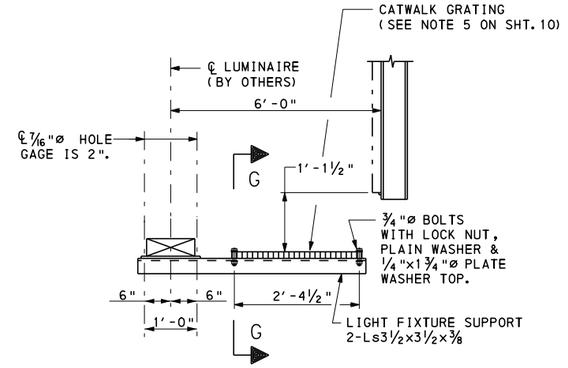
SECTION B-B



DETAIL Y

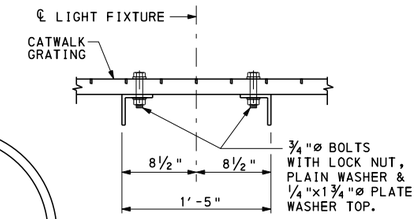
NOTE:

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

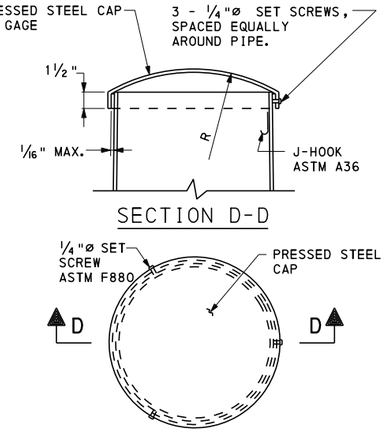


TYPICAL LIGHT FIXTURE SUPPORT DETAIL FOR STRUCTURE WITH CATWALK

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"

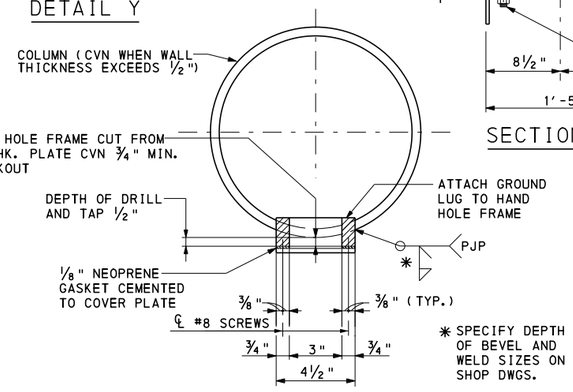


SECTION G-G

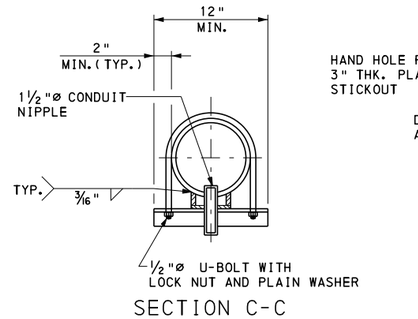


SECTION D-D

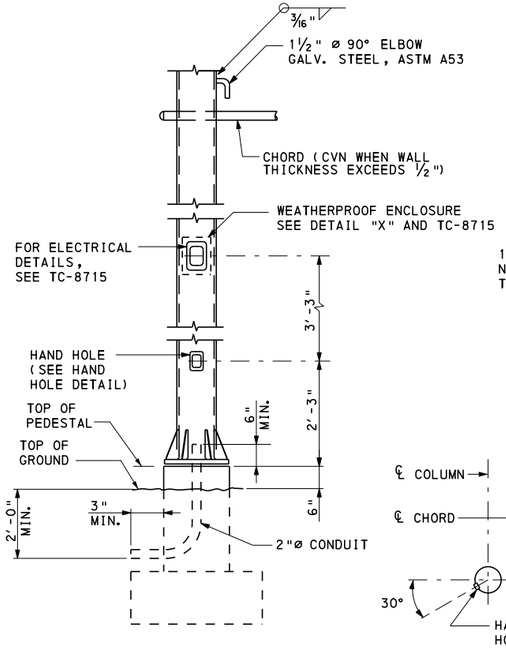
PIPE CAP DETAILS



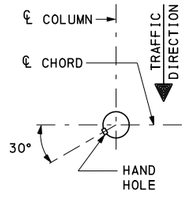
SECTION E-E



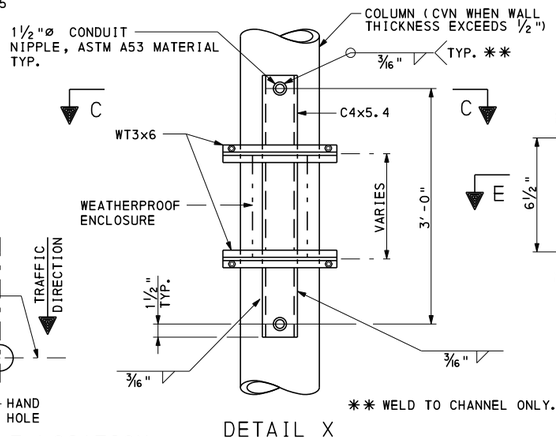
SECTION C-C



TYPICAL COLUMN DETAIL

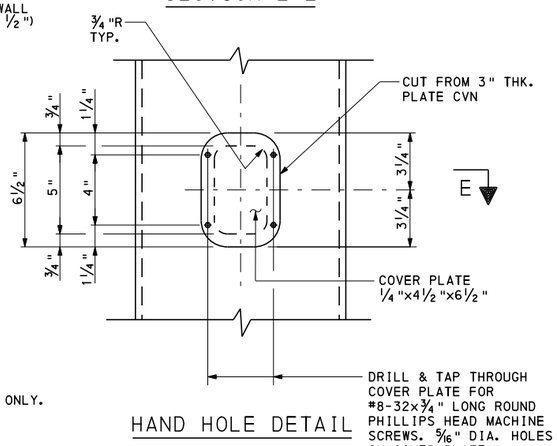


HAND HOLE LOCATION



DETAIL X

✱✱ WELD TO CHANNEL ONLY.



HAND HOLE DETAIL

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 SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Bruce B Thompson 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

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. SPREAD FOOTINGS MAY BE ORDERED BY THE ENGINEER TO BE AT ANY ELEVATION OR OF ANY DIMENSIONS NECESSARY TO PROVIDE A PROPER FOUNDATION.
10. GALVANIZE ALL STRUCTURAL STEEL, BOLTS, NUTS & WASHERS IN ACCORDANCE WITH PUB. 408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
11. PIPE DIAMETERS SHOWN UP TO AND INCLUDING 12 INCHES ARE NOMINAL DIAMETERS. PIPE DIAMETERS SHOWN FROM 14 INCHES AND UP ARE ACTUAL DIAMETERS.
12. 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".
13. 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.
14. PROVIDE ANCHOR BOLT HOLES 1/4" LARGER THAN BOLT DIAMETER.
15. PROVIDE A MINIMUM ANCHOR BOLT EMBEDMENT LENGTH OF 20 ANCHOR BOLT DIAMETERS.
16. PROVIDE DOUBLE NUTS AND WASHER FOR EACH ANCHOR BOLT.
17. 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 5/16". 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.

REFERENCE DRAWINGS

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-52M	TYPE 2 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

OVERHEAD SIGN STRUCTURES

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

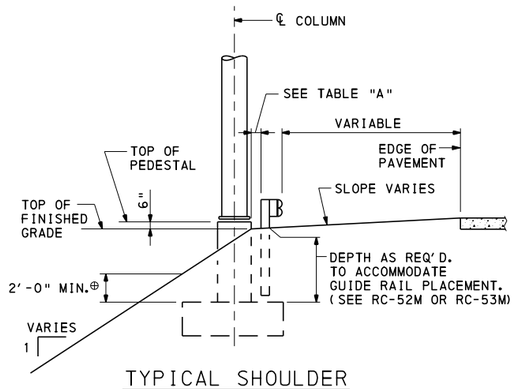
NOTES AND DESIGN CRITERIA

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

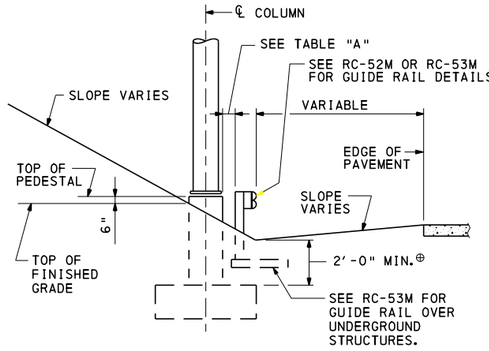
RECOMMENDED SEPT. 30, 2016
Brian S. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHT. 1 OF 10

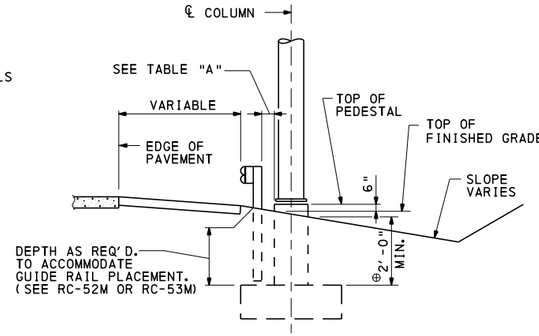
BC-745M



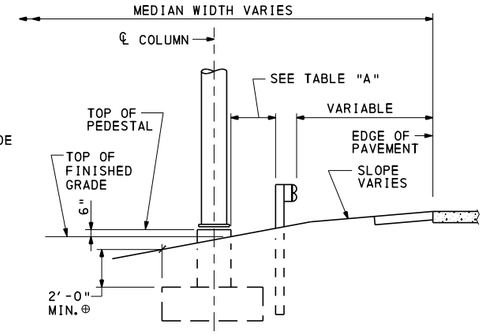
TYPICAL SHOULDER
INSTALLATION IN FILL



TYPICAL SHOULDER
INSTALLATION IN CUT

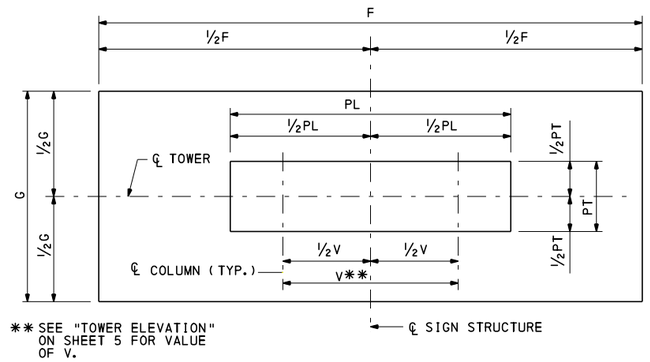


TYPICAL SHOULDER
INSTALLATION IN CUT WITH SWALE



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.

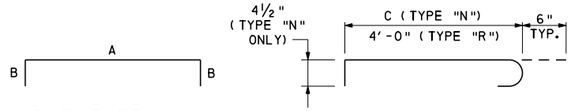


** SEE "TOWER ELEVATION" ON SHEET 5 FOR VALUE OF V.

PLAN OF FOUNDATION

FOUNDATION PEDESTAL REINFORCEMENT											
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'-1½"	2'-3"	5	35.0
FP16	3'-3"	10'-3"	1.23	38 - #10	14'-11"	9'-9"	2'-7"	3'-7½"	2'-9"	5	38.0
FP20	3'-9"	11'-0"	1.53	40 - #11	16'-2"	10'-6"	2'-10"	4'-1½"	3'-3"	5	41.4
FP24	4'-0"	11'-9"	1.74	46 - #11	17'-3"	11'-3"	3'-0"	4'-4½"	3'-6"	6	46.6
FP26	4'-3"	12'-3"	1.93	50 - #11	17'-11"	11'-9"	3'-1"	4'-7½"	3'-9"	6	48.5

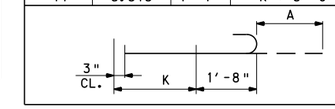
✱ ONE SET INCLUDES 2 "M" BARS, 2 "R" BARS AND NO. OF "N" BARS SHOWN IN TABLE.
(▲) CUBIC YARDS OF CONCRETE PER 1 FOOT HEIGHT OF PEDESTAL.



BAR TYPE "M"

BAR TYPES "N" & "R"

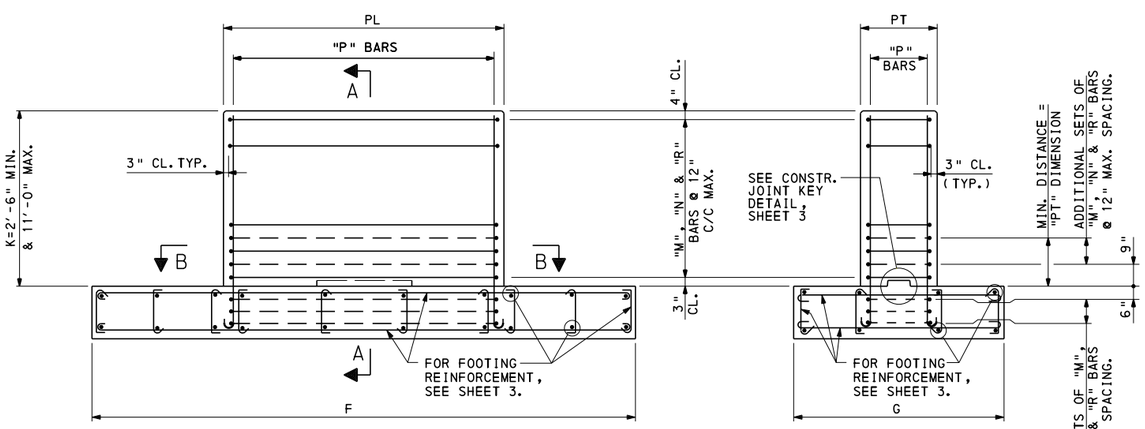
TABLE "P"			
BAR SIZE	WEIGHT LBS./FT.	A	LENGTH
9	3.400	1'-3"	K + 2'-8"
10	4.303	1'-5"	K + 2'-10"
11	5.313	1'-7"	K + 3'-0"



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.

TABLE "A"	
TYPE OF GUIDE RAIL	REQUIRED † CLEARANCES
2-SCC	1'-0"
2-SC	2'-0"
2-S	3'-0"
2-WCC	4'-0"
2-WC	5'-0"
2-W	7'-0"
MEDIAN BARRIER	2'-0"

† THE MINIMUM UNOBSTRUCTED DISTANCE FROM BACK OF GUIDE RAIL POST TO FACE OF PEDESTAL.



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.

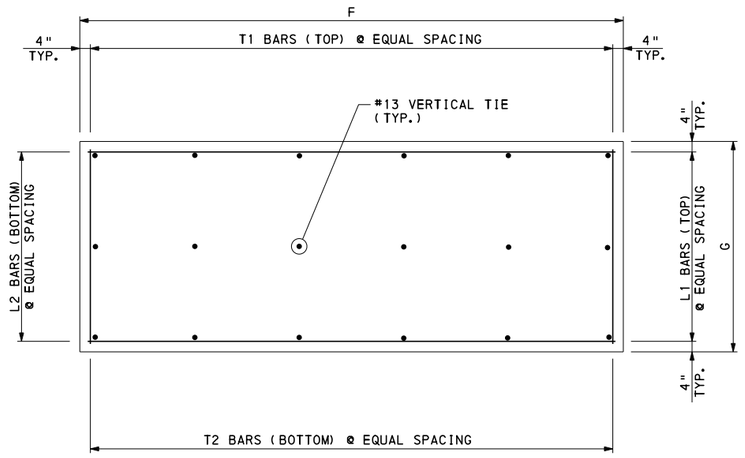
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

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

FOUNDATION DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 2 OF 10
Thomas P. Macioce	Brian D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-745M



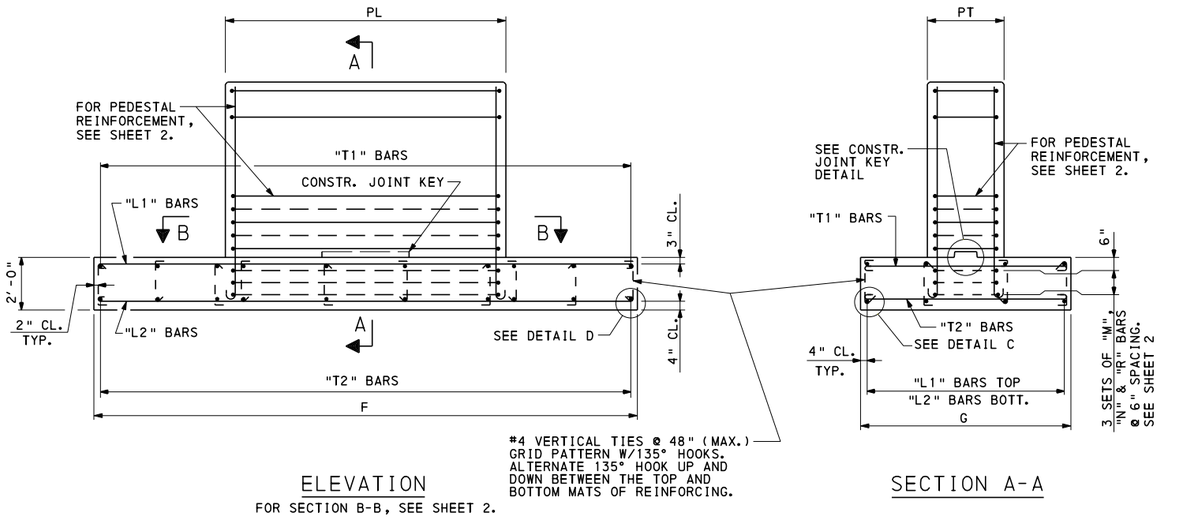
PLAN VIEW - FOOTING REINFORCEMENT

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
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				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
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"

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.



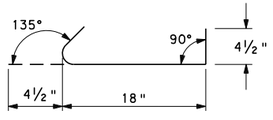
ELEVATION

FOR SECTION B-B, SEE SHEET 2.

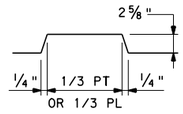
SECTION A-A

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.

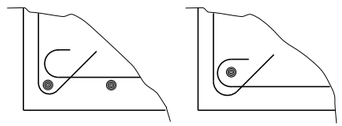


BAR TYPE
#4 VERTICAL TIE



CONSTRUCTION JOINT KEY DETAIL

SECTION A-A SHOWN, ELEVATION SIMILAR



DETAIL C DETAIL D

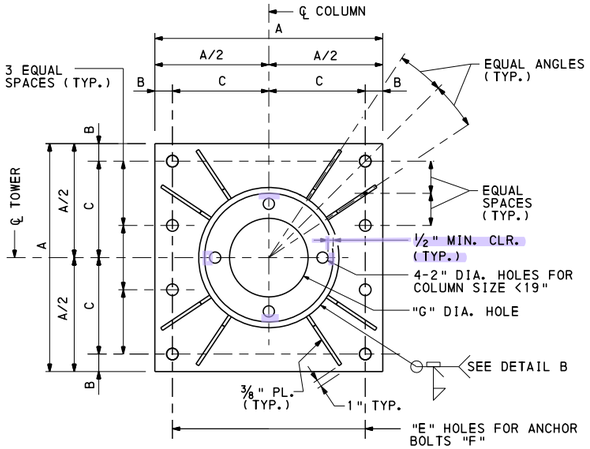
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

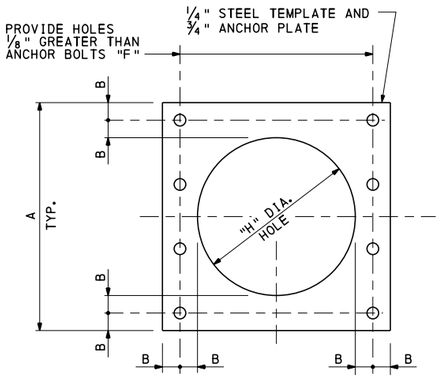
4 POST 4 CHORD TRUSS
SPANS FROM 100' TO 200'

FOUNDATION DETAILS

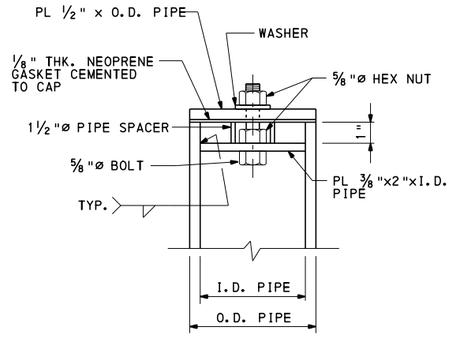
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 3 OF 10
Thomas P. Macioce	Brent D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-745M



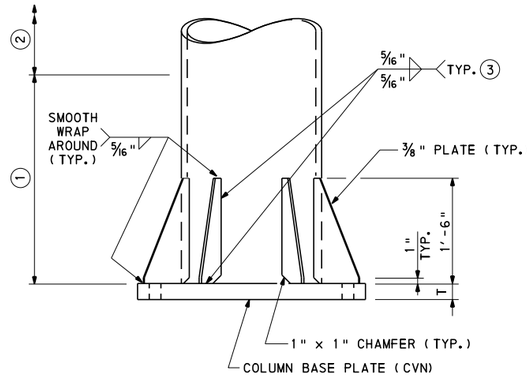
PLAN OF COLUMN BASE TYPE W



ANCHOR PLATE AND STEEL TEMPLATE DETAIL



ALTERNATE PIPE CAP DETAIL

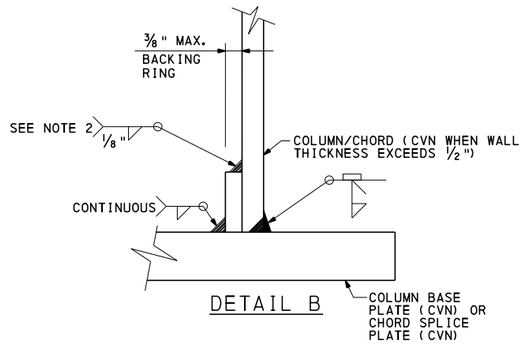


ELEVATION - TYPE W

(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 ¼" SHORT OF STIFFENER CHAMFER.



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", 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	PRO-JECTION	EMBED-MENT
10"x.365"	W	1'-8"	2½"	7½"	1½"D	1¼"D	3¼"	10"	2"	3½"Dx⅜"	7¾"	2'-1"
12"x.375"	W	1'-10"	2½"	8½"	1¾"D	1½"D	5¼"	1'-0"	2"	3½"Dx⅜"	8½"	2'-6"
14"x.375"	W	2'-0"	2½"	9½"	1¾"D	1½"D	6½"	1'-2"	2"	3½"Dx⅜"	8½"	2'-6"
16"x.375"	W	2'-2"	2½"	10½"	2"D	1¾"D	8"	1'-4"	2"	4"Dx⅜"	9¼"	2'-11"
18"x.375"	W	2'-4"	2½"	11½"	2"D	1¾"D	9¼"	1'-6"	2"	4"Dx⅜"	9¼"	2'-11"
20"x.375"	W	2'-9"	3"	1'-0½"	2¼"D	2"D	1'-5"	1'-7"	3"	5"Dx⅜"	11"	3'-4"
24"x.375"	W	2'-11"	3"	1'-2½"	2¼"D	2"D	1'-6"	1'-11"	3"	5"Dx⅜"	11"	3'-4"
24"x.500"	W	3'-0"	3½"	1'-2½"	2½"D	2¼"D	1'-6"	1'-10"	3"	5"Dx⅜"	11¾"	3'-9"

NOTE: D DENOTES DIAMETER
* CVN REQUIRED FOR WALL THICKNESSES EXCEEDING ½" (.500").

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, ½" BY ½" 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.

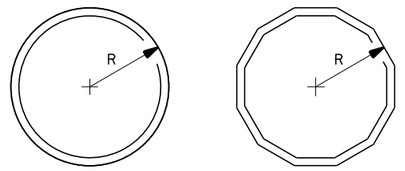


ILLUSTRATION OF DIMENSION "R" FOR CIRCULAR MEMBERS AND EQUIVALENT "PRESS-BREAK" MEMBERS

"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.

ANCHOR BOLT DETAIL

COLUMN, STIFFENERS, AND REINF. OMITTED FOR CLARITY

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

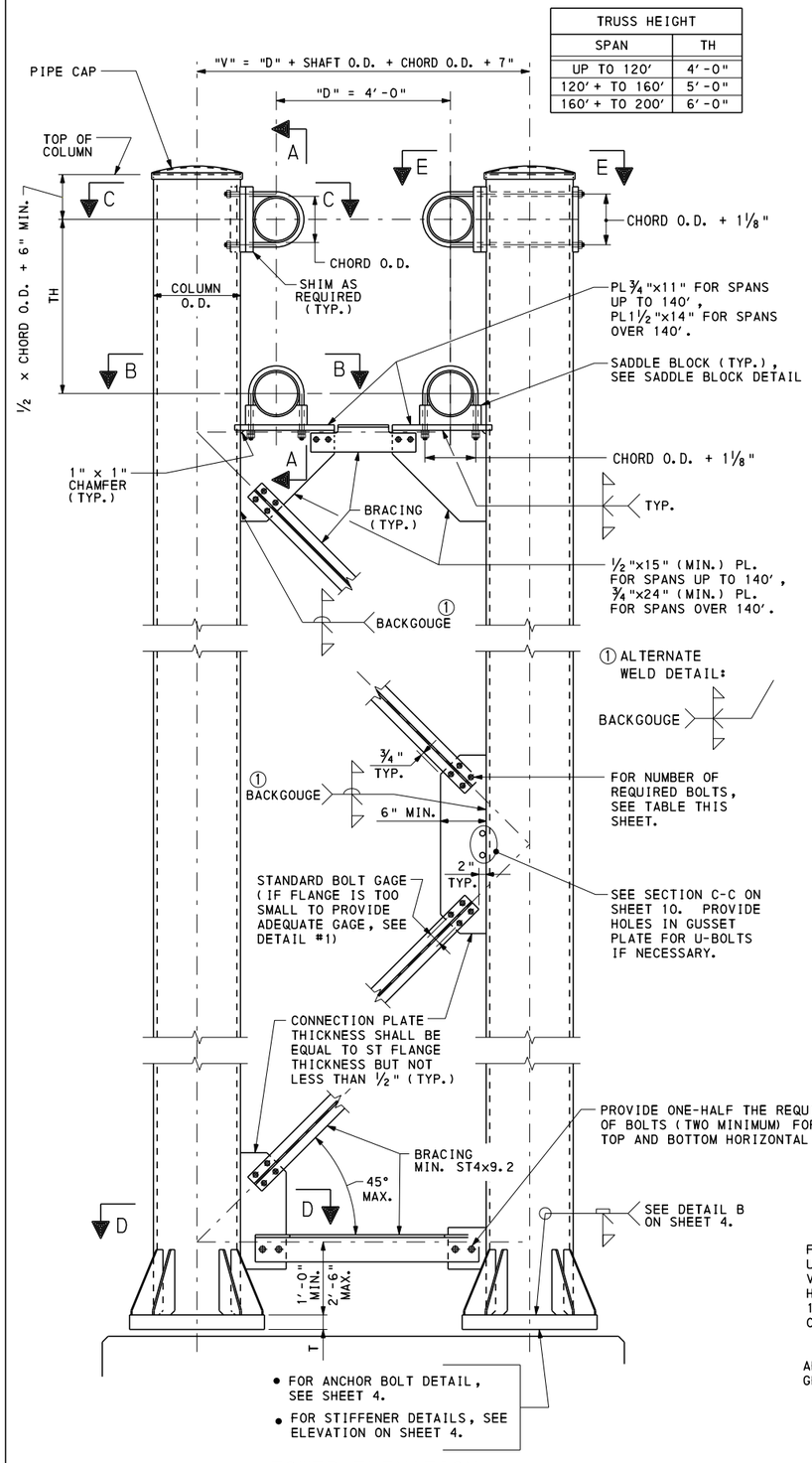
OVERHEAD SIGN STRUCTURES

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

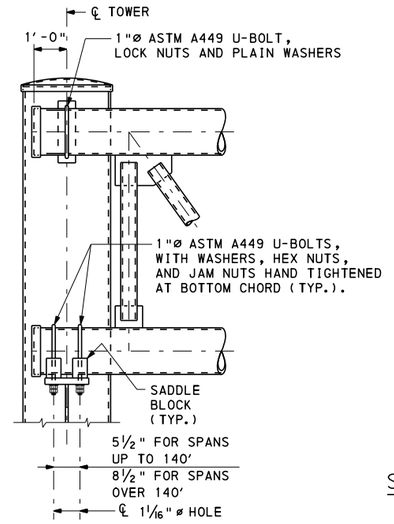
COLUMN BASE DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 4 OF 10
Thomas P Macioce	Brian D Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-745M

TRUSS HEIGHT	
SPAN	TH
UP TO 120′	4′-0"
120′ + TO 160′	5′-0"
160′ + TO 200′	6′-0"



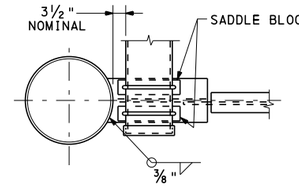
TOWER ELEVATION



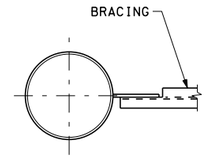
SECTION A-A

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

NUMBER OF REQUIRED BOLTS AND WELD LENGTH "Z" FOR TOWER BRACING CONNECTIONS				
MEMBER	NO. OF BOLTS	BOLT DIA.	WELD SIZE	MIN. LENGTH "Z"
ST2x3.85	2	⅞"	**	4"
ST2x4.75	2	⅞"	**	4"
ST2.5x5	2	⅞"	**	4"
ST3x6.25	4	⅞"	**	4"
ST3x8.625	4	⅞"	**	4"
ST4x9.2	4	⅞"	**	4"
ST4x11.5	6	⅞"	**	5"
ST5x12.7	6	⅞"	**	4"
ST5x17.5	8	⅞"	**	5"
ST6x15.9	8	⅞"	**	4"
ST6x17.5	8	⅞"	**	4"
ST6x20.4	8	⅞"	**	4"
ST6x25	8	1"	**	5"
ST7.5x21.45	8	1"	**	5"
ST7.5x25	8	1"	**	5"

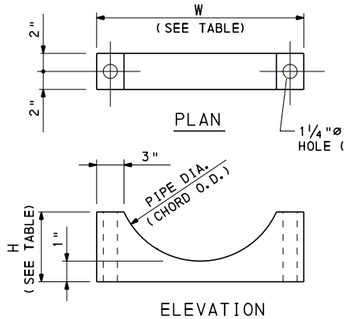


SECTION B-B



SECTION D-D

SADDLE BLOCK DIMENSIONS TABLE (NOMINAL)		
PIPE DIA. (NOMINAL)	1" U-BOLT DIA.	
	NOMINAL HEIGHT "H"	NOMINAL WIDTH "W"
6"	2"	10¾"
8"	2⅝"	1′-0¾"
10"	3⅜"	1′-2⅞"
12"	4 1/16"	1′-4⅞"

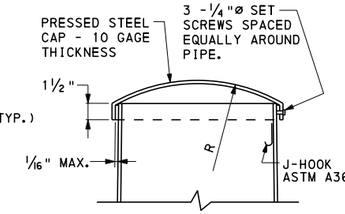


ELEVATION

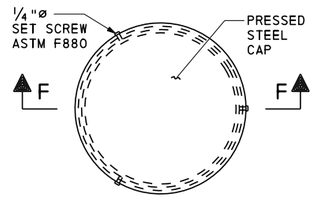
SADDLE BLOCK NOTE:
4" THICK PLATE, MATERIAL SHALL BE ASTM A36, GALVANIZED PER ASTM A123.

SADDLE BLOCK DETAIL

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"

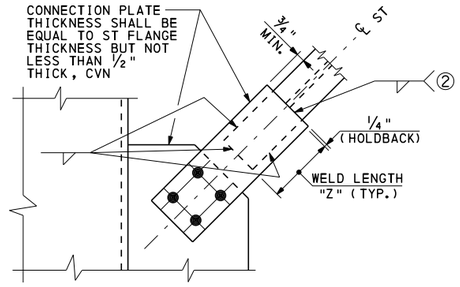


SECTION F-F



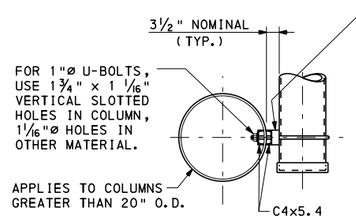
PIPE CAP DETAILS

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 ¼". ENSURE MINIMUM TOTAL WELD LENGTHS ARE ACHIEVED.

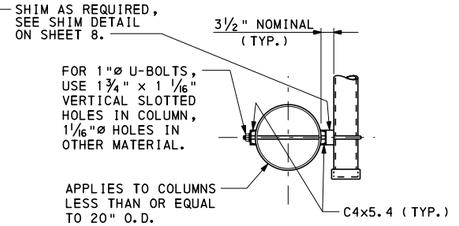


DETAIL #1

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.



SECTION C-C
(COLUMNS > 20" O.D.)



SECTION E-E
(COLUMNS ≤ 20" O.D.)

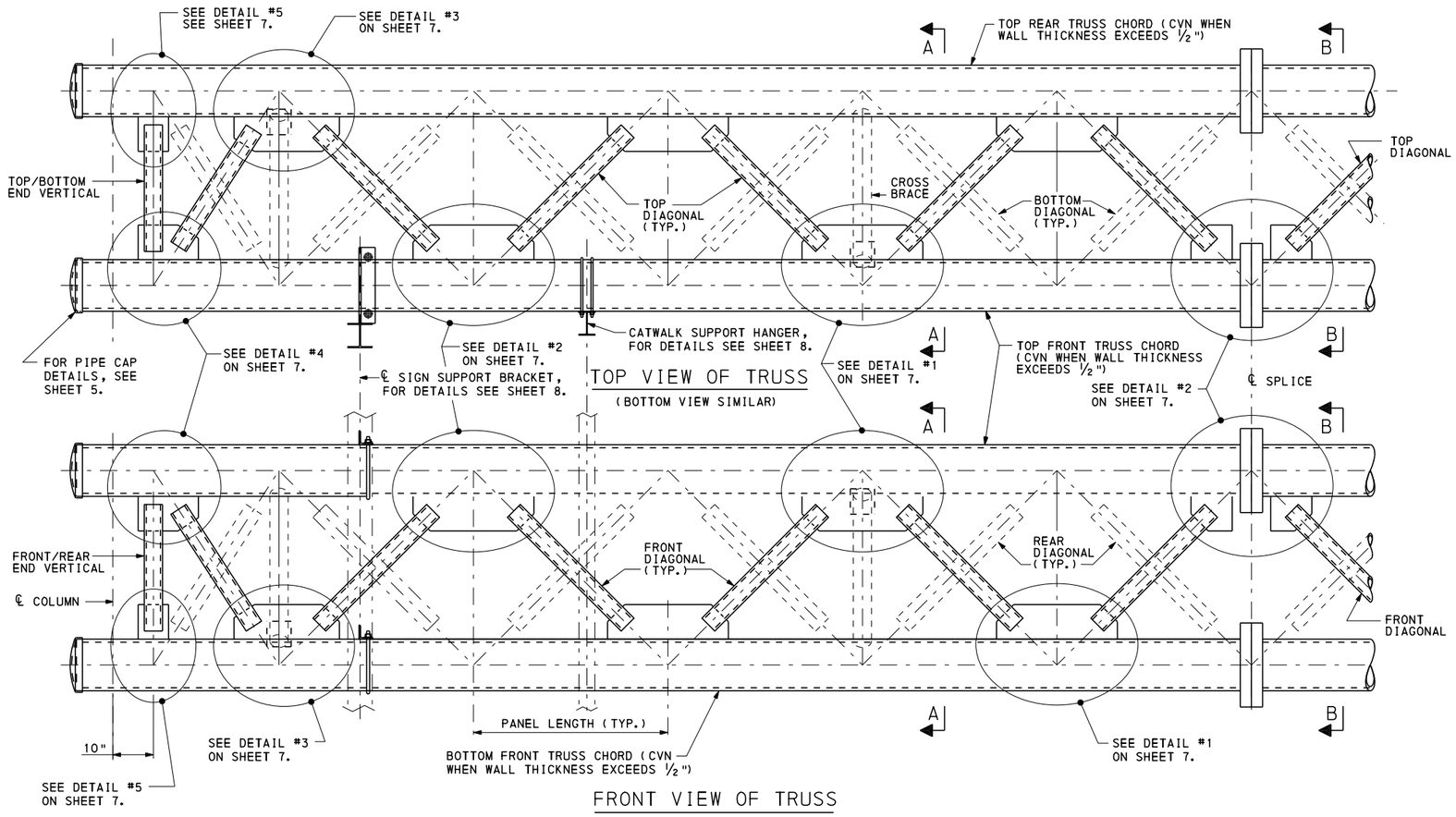
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

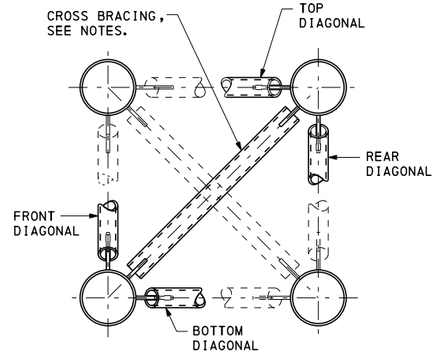
4 POST 4 CHORD TRUSS
SPANS FROM 100′ TO 200′

COLUMN DETAILS

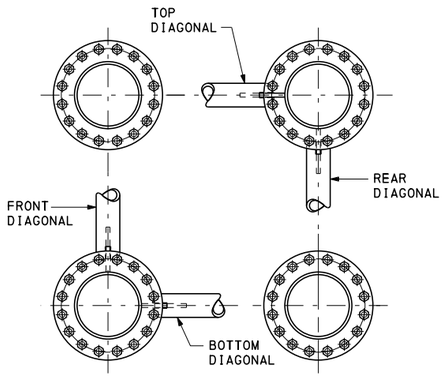
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 5 OF 10
Thomas P Macioce	Bruce B Thompson	BC-745M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



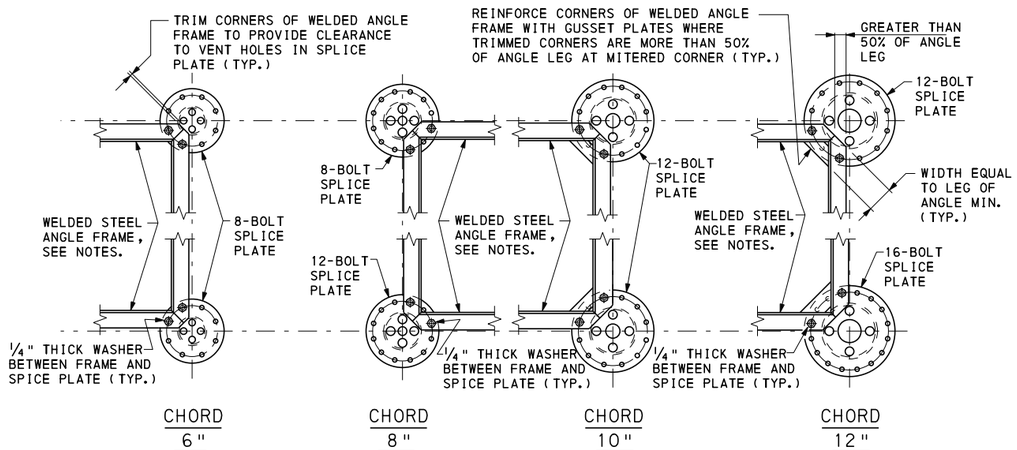
FRONT VIEW OF TRUSS



SECTION A-A



SECTION B-B



TEMPORARY END FRAME DETAILS

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.

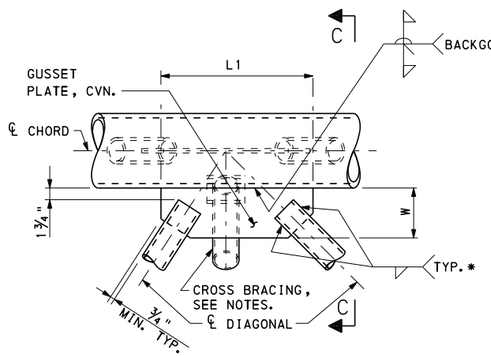
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

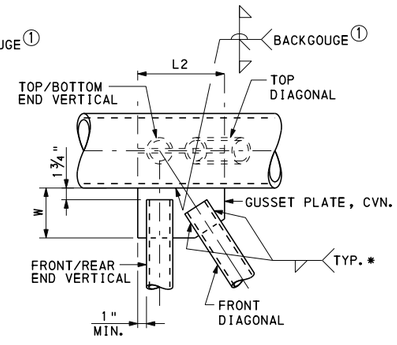
4 POST 4 CHORD TRUSS
SPANS FROM 100' TO 200'

TRUSS DETAILS

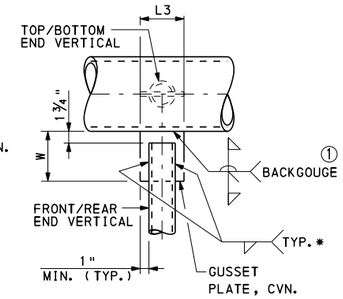
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 6 OF 10
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-745M



DETAIL #3



DETAIL #4



DETAIL #5

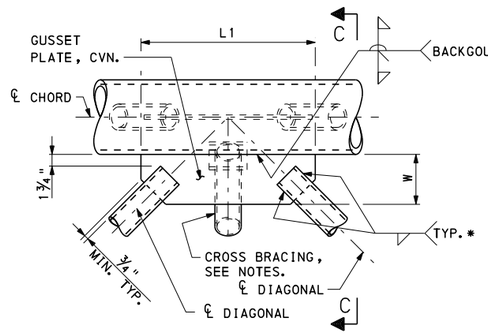
CHORD SPLICE					
CHORD NOMINAL SIZE X WALL THK. ▲	D	D_B	BOLTS	T	V
6"x. 280"	1'-2⅝"	11⅝"	8-⅞"ø	2"	0
8"x. 322"	1'-4⅝"	1'-1⅝"	8-⅞"ø	2¼"	2"
8"x. 500"	1'-4⅝"	1'-1⅝"	12-⅞"ø	2¾"	2"
10"x. 365"	1'-6¾"	1'-3¾"	12-⅞"ø	2⅜"	3¼"
12"x. 375"	1'-8¾"	1'-5¾"	16-⅞"ø	2½"	5¼"
12"x. 500"	1'-9¾"	1'-5¾"	12-1⅛"ø	2¾"	5¼"
12"x. 562"	1'-10¼"	1'-5¾"	12-1¼"ø	3"	5¼"
12"x. 688"	1'-10¾"	1'-5¾"	12-1⅜"ø	3¼"	5¼"
12"x. 844"	1'-11¼"	1'-5¾"	12-1½"ø	3½"	5¼"

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

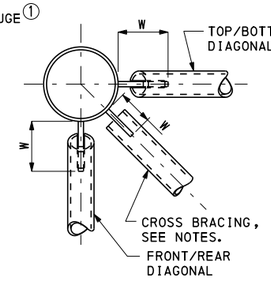
▲ CVN REQUIRED FOR WALL THICKNESSES EXCEEDING ½" (0.500").

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"	½"	2½"	.203"	¼	2½"	6⅜"	1'-7¼"	1'-0⅛"	4⅞"
8"	½"	2½"	.203"	¼	2½"	6⅜"	1'-11"	1'-2"	4⅞"
8"	½"	3"	.216"	¼	3¼"	7⅜"	1'-11¼"	1'-2⅜"	5½"
8"	½"	3"	.300"	¼	4½"	8¼"	2'-1"	1'-3¼"	5½"
10"	½"	2½"	.203"	¼	2½"	6½"	2'-6⅜"	1'-5⅝"	4⅞"
10"	½"	3"	.216"	¼	3¼"	7¼"	2'-0⅞"	1'-3¼"	5½"
12"	⅝"	3"	.216"	¼	3¼"	7⅜"	2'-8⅝"	1'-7⅛"	5½"
12"	⅝"	3½"	.226"	¼	4"	8¼"	3'-1½"	1'-9¾"	6"
12"	⅝"	4"	.237"	¼	4¾"	9⅛"	3'-0½"	1'-9¼"	6½"
12"	⅝"	4"	.337"	5⁄16	5¼"	9½"	3'-4⅜"	1'-11½"	6½"
12"	⅝"	5"	.258"	5⁄16	5"	10"	3'-5¾"	2'-0¾"	7⅝"

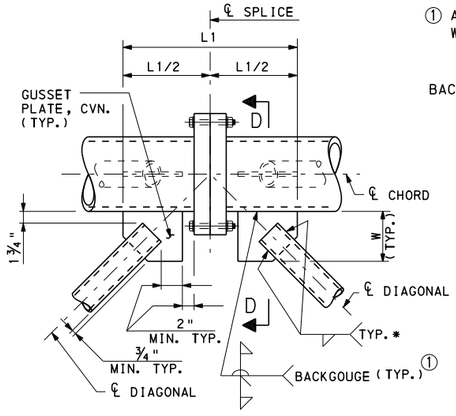
NOTE:
▲ CVN REQUIRED FOR WALL THICKNESSES EXCEEDING ½" (0.500").



DETAIL #1

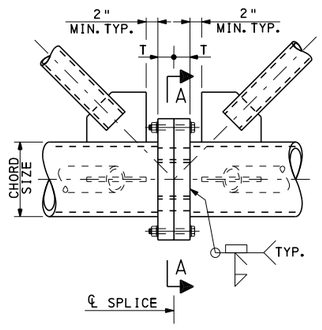


SECTION C-C

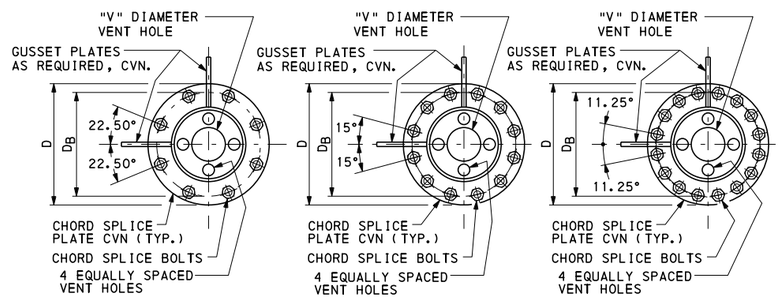


DETAIL #2

① ALTERNATE WELD DETAIL:



ELEVATION

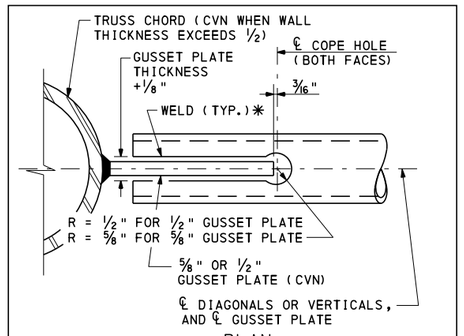


SECTION A-A (8-BOLT)

SECTION A-A (12-BOLT)

SECTION A-A (16-BOLT)

CHORD SPLICE DETAILS



PLAN

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.

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 1½" DIAMETER HOLES FOR 8" CHORD SIZE AND 1¼" 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
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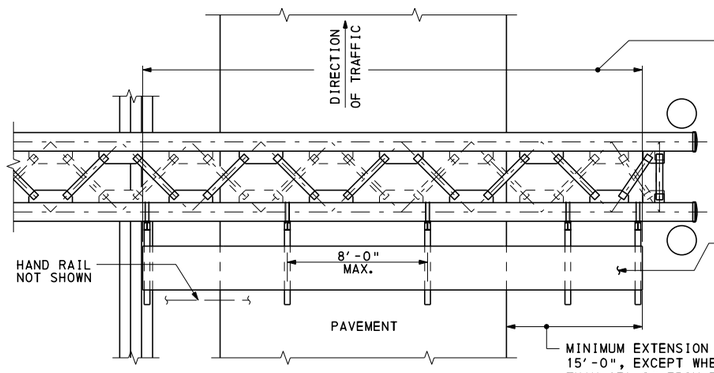
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

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

TRUSS DETAILS

RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian D Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 7 OF 10 BC-745M

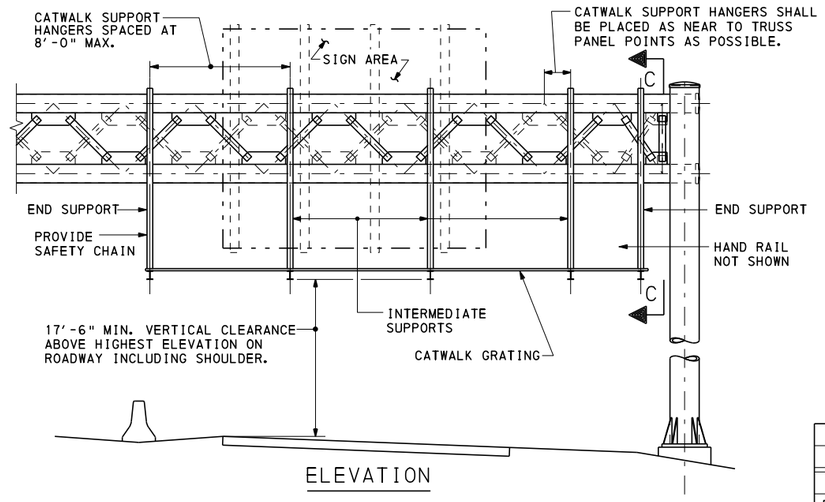


WHEN CATWALK IS ON ONE SIDE OF THE TRUSS ONLY, THE OVERALL LENGTH SHALL BE SUCH THAT THE END NEAREST THE LEFT EDGE OF ROADWAY (LOOKING IN DIRECTION OF TRAFFIC) EXTENDS A MINIMUM OF 4'-0" BEYOND THE EDGE OF ROADWAY. WHEN CATWALK IS ON BOTH SIDES OF TRUSS, THE OVERALL LENGTH SHALL BE SUCH THAT BOTH ENDS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

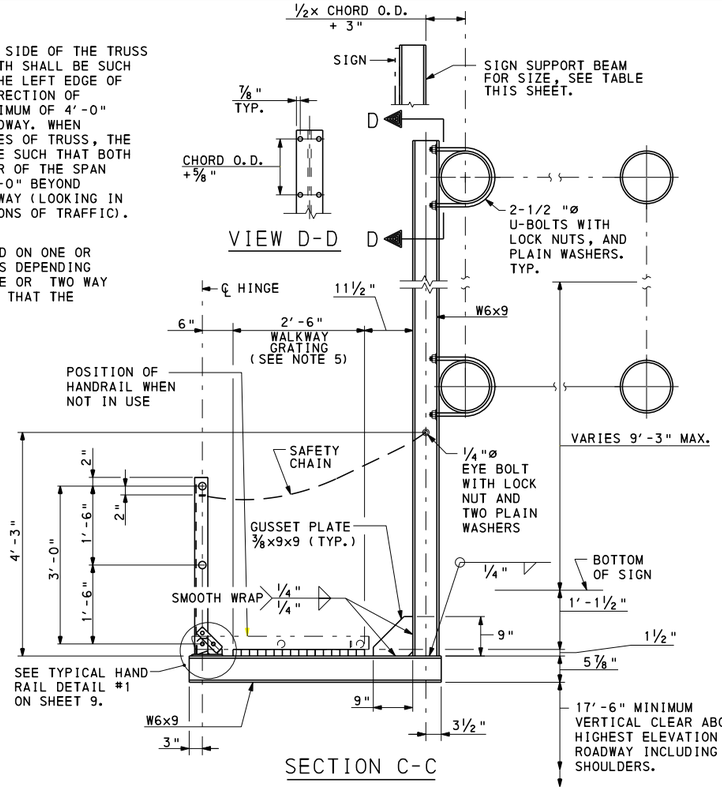
CATWALK MAY BE REQUIRED ON ONE OR BOTH SIDES OF THE TRUSS DEPENDING ON WHETHER THERE IS ONE OR TWO WAY TRAFFIC ON THE ROADWAY THAT THE SIGN STRUCTURE SPANS.

MINIMUM EXTENSION OF CATWALK SHALL BE 15'-0", EXCEPT WHEN TOWER IS SET LESS THAN 17'-0" FROM EDGE OF ROADWAY.

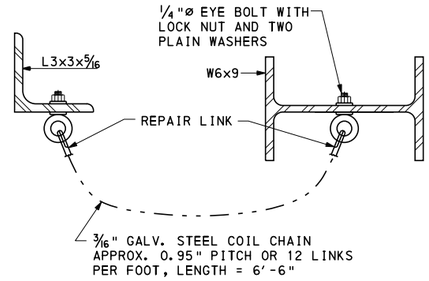
PLAN



ELEVATION



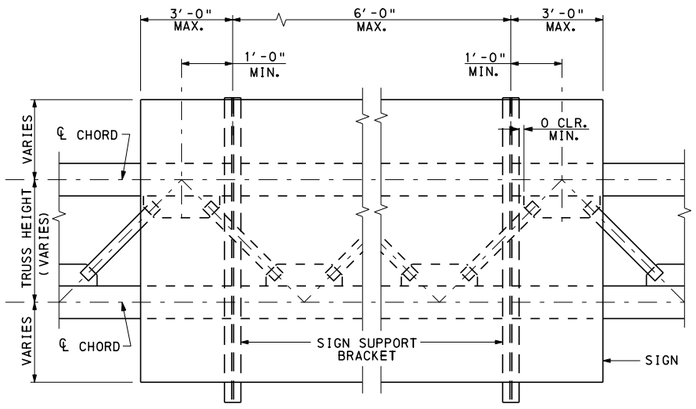
SECTION C-C



SAFETY CHAIN DETAILS

NOTES:

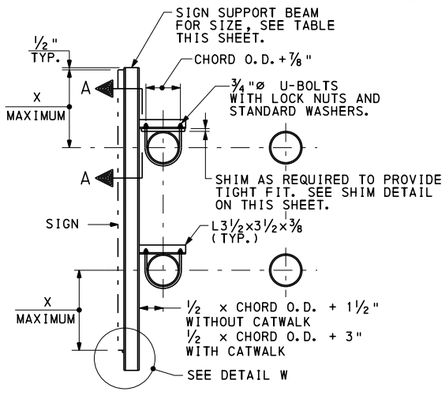
1. FOR GENERAL NOTES, SEE SHEET 1.
2. FOR HANDRAIL DETAILS, SEE SHEET 9.
3. SPECIAL CARE SHALL BE TAKEN TO INSURE THAT THE COMPLETED POST HINGE AND KICKER PLATE ASSEMBLY WILL HOLD THE SAFETY RAILING IN A STEADY MANNER, FREE OF WOBBLE WHILE IN THE RAISED POSITION. MAXIMUM ALLOWABLE DISPLACEMENT FROM VERTICAL 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"X1/8" SERRATED BEARING BARS @ 1 3/16" 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.



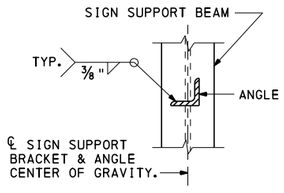
TYPICAL SIGN SUPPORT BRACKET SPACING DIAGRAM

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

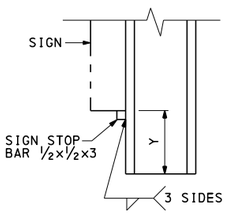
SIGN SUPPORT BEAM	
X	SIZE
0 TO 5'-6"	W6x15
5'-6"+ TO 6'-6"	W6x20
6'-6"+ TO 7'-6"	W6x25
7'-6"+ TO 8'-6"	W8x28
8'-6"+ TO 9'-6"	W8x31



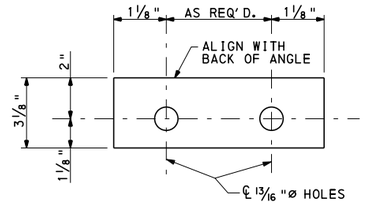
SIGN SUPPORT BRACKET DETAIL



SECTION A-A



DETAIL W



SHIM DETAIL

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

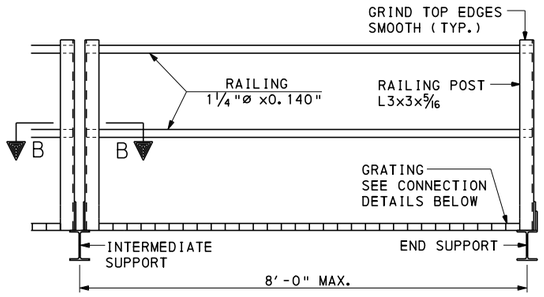
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

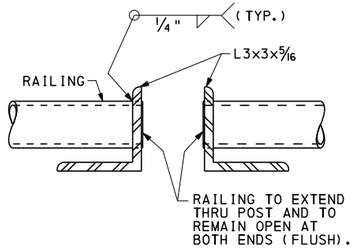
4 POST 4 CHORD TRUSS
SPANS FROM 100' TO 200'

STRUCTURAL DETAILS

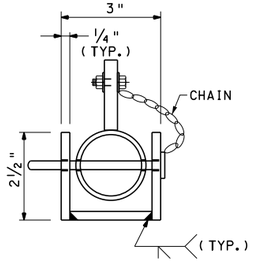
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHT. 8 OF 10
Thomas P Macioce	Bruce D Thompson	BC-745M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



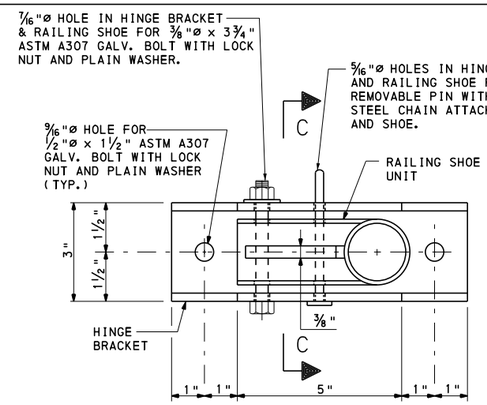
TYPICAL HANDRAIL UNIT



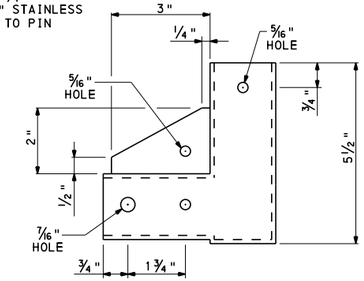
SECTION B-B



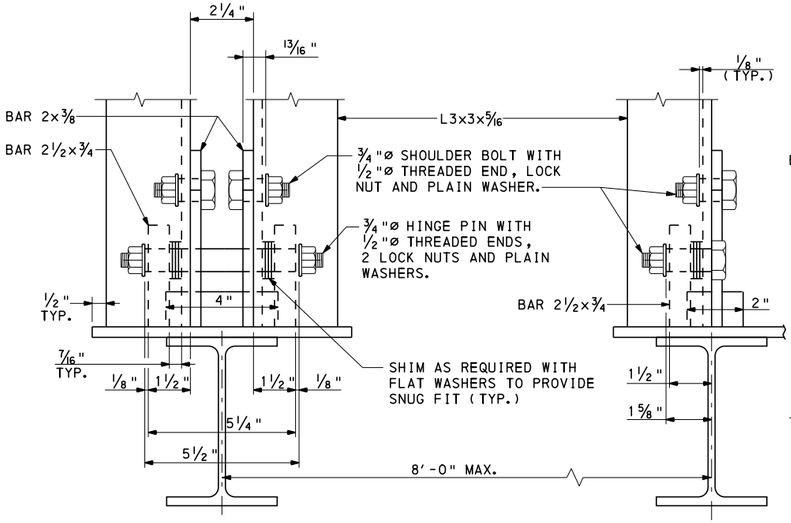
SECTION C-C
HINGE BRACKET



PLAN

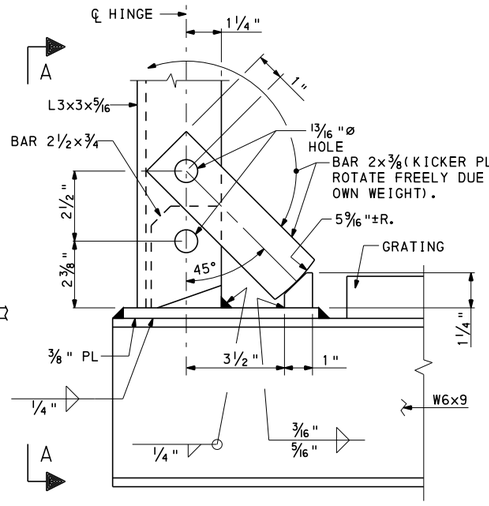


RAILING SHOE UNIT
DETAIL #2



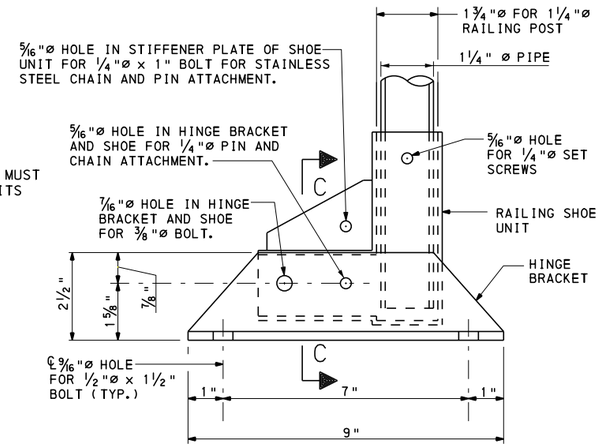
VIEW A-A
AT INTERMEDIATE SUPPORT

VIEW A-A
AT END SUPPORT

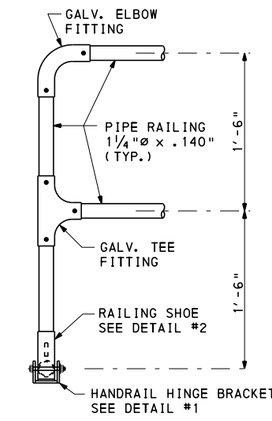


DETAIL #1

TYPICAL HANDRAIL DETAILS

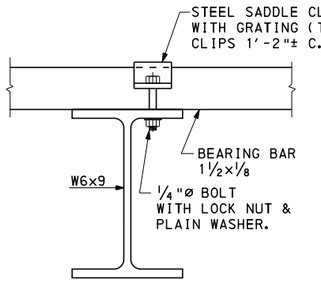


ELEVATION
DETAIL #1

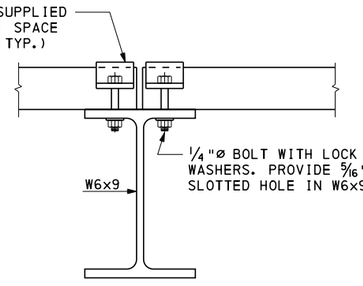


HANDRAIL ASSEMBLY
(ONE HALF UNIT SHOWN)

ALTERNATE HANDRAIL HINGE BRACKET ASSEMBLY



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, 1½"X⅛" SERRATED BEARING BARS @ 1 3/16" CENTERS. THE CROSS BARS SHALL BE ¼" TWISTED BAR @ 4" CENTERS. WEARING SURFACES OF ALL BARS SHALL BE SERRATED.
- PROVIDE 3 CLIPS EVENLY SPACED AT EACH GRATING SUPPORT.

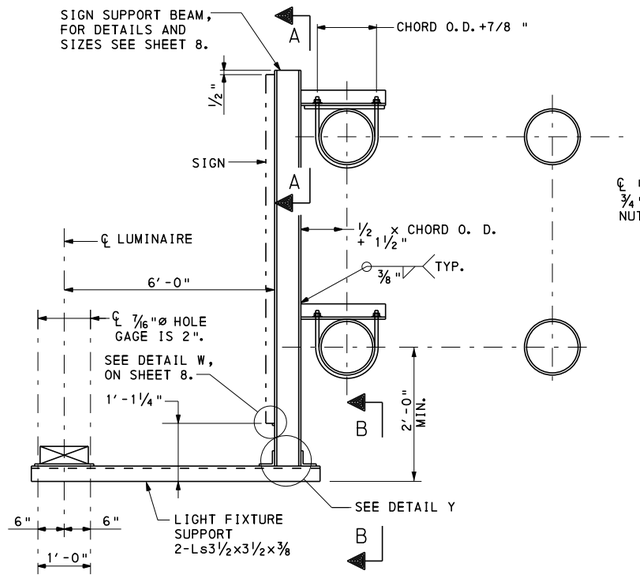
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

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

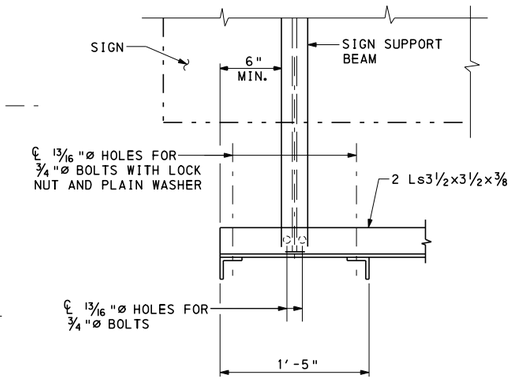
HANDRAIL DETAILS

RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian S Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 9 OF 10 BC-745M



TYPICAL LIGHT FIXTURE SUPPORT DETAILS

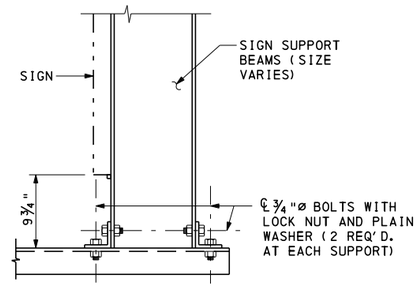
FOR SECTION A-A, SEE SHEET 8.



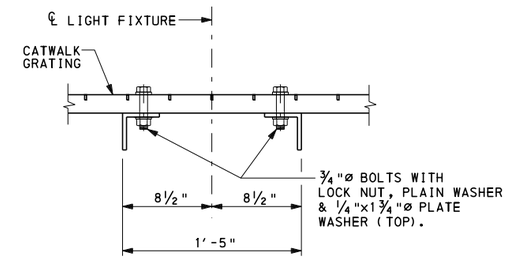
SECTION B-B

NOTE:

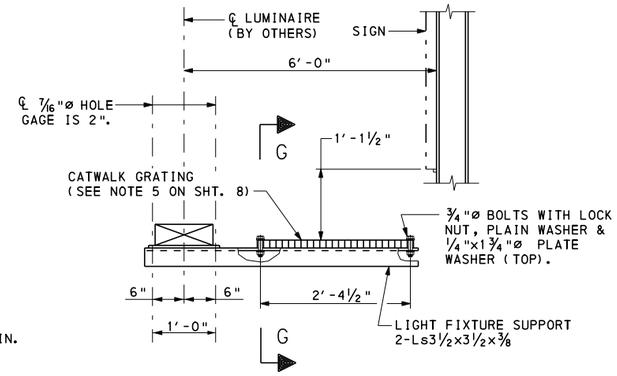
WEIGHT OF LUMINAIRE AND SUPPORT BRACKETS IS 400 lbs. BASED ON 10'-0" LUMINAIRE SPACING.



DETAIL Y



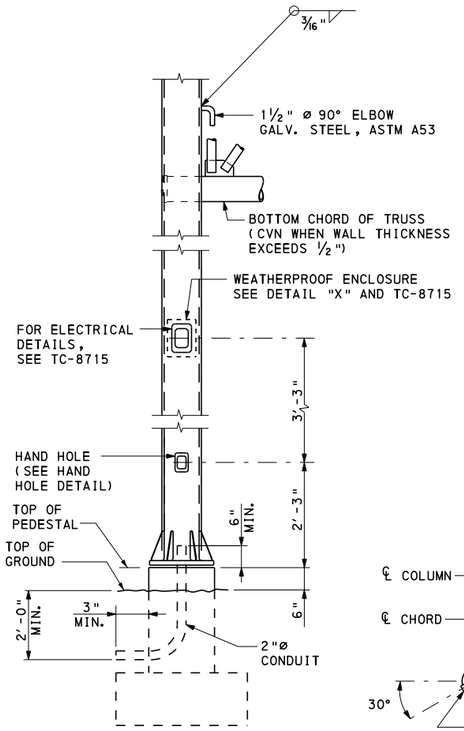
SECTION G-G



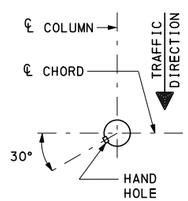
TYPICAL LIGHT FIXTURE SUPPORT DETAIL FOR STRUCTURE WITH CATWALK

NOTES:

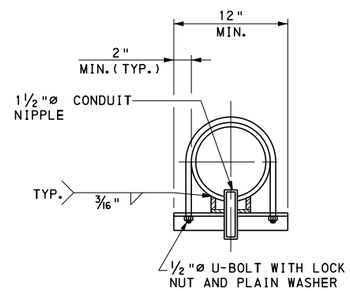
- ALL BOLTS TO BE ASTM A325 AND GALVANIZED IN ACCORDANCE WITH PUB.408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
- U-BOLTS PER PUBLICATION 408, SECTION 948.2
- FOR SIGN PANEL DETAILS AND LIGHTING DETAILS, SEE STANDARD DRAWINGS TC-8700C, TC-8701D, TC-8701E, TC-8701S AND TC-8715.
- ALL MATERIALS FOR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



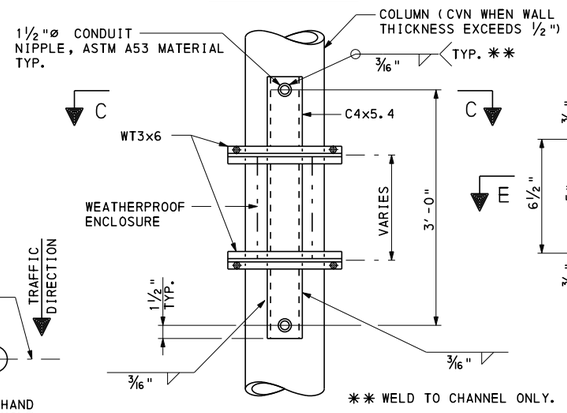
TYPICAL COLUMN DETAIL



HAND HOLE LOCATION

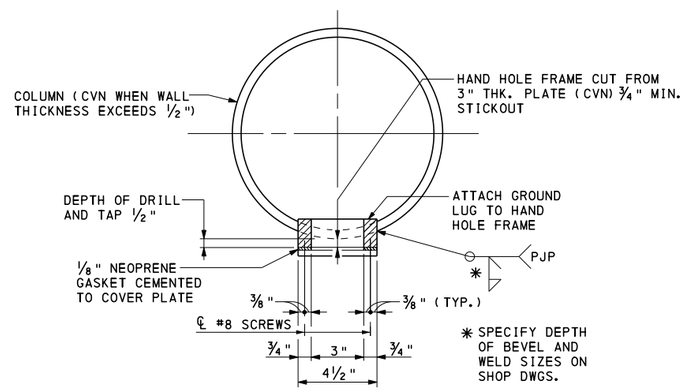


SECTION C-C

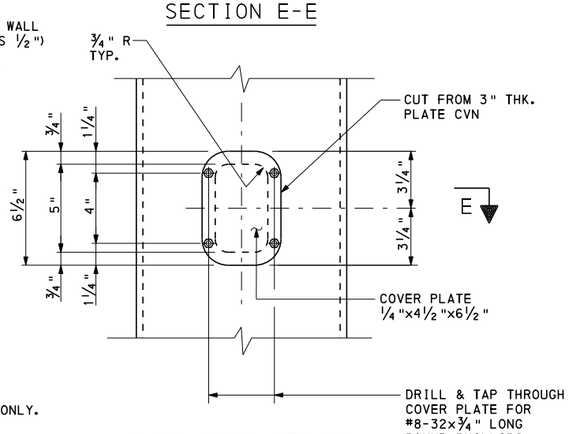


** WELD TO CHANNEL ONLY.

DETAIL X



SECTION E-E



HAND HOLE DETAIL

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

RECOMMENDED SEPT.30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT.30, 2016 Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHT. 10 OF 10 BC-745M

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(a)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

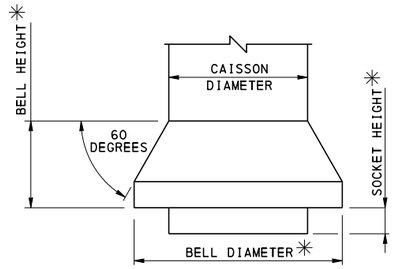
1. CONSTRUCT SIGN STRUCTURES TRUE TO DIMENSION, FREE FROM KINKS, TWISTS OR BENDS, AND UNIFORM IN APPEARANCE. ASSEMBLE COMPLETED SECTIONS IN THE SHOP AND CHECK FOR STRAIGHTNESS, ALIGNMENT, DIMENSION, AND THE FIRM SEATING OF THE SPLICE PLATES. CORRECT ANY VARIATIONS TO THE SATISFACTION OF THE ENGINEER.
2. FORM MASTS FOR SIGN STRUCTURES TO THE RADII 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.

CAISSON BELL DIAMETER FOR SOFT COHESIVE SOIL FRAME STRUCTURES

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

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-52M	TYPE 2 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

MONOPIPE SIGN STRUCTURES
FRAME STRUCTURE SPANS UP TO 160′ AND CANTILEVER MONOPIPE STRUCTURE STRUT LENGTHS UP TO 27′
GENERAL NOTES

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brian D Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

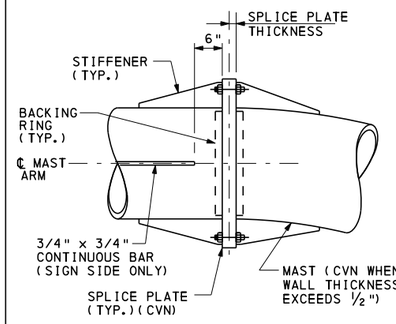
BC-747M

MAST ARM & END CONNECTION COMPONENT SELECTION TABLE (CANTILEVER STRUCTURES)

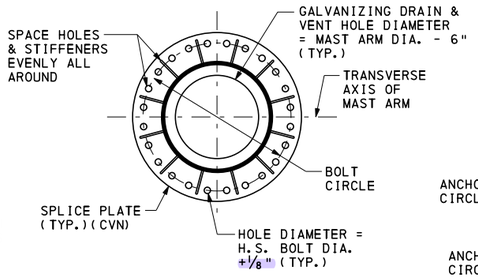
SPAN (FEET)	PANEL AREA (S.F.)	MAST ARM		H.S. BOLTS			SPLICE PLATE		STIFFENERS				
		DIAMETER (INCHES)	THICKNESS (INCHES)	NO.	DIAMETER (INCHES)	CIRCLE (INCHES)	DIAMETER (INCHES)	THICKNESS (INCHES)	NO.	THICKNESS (INCHES)	WIDTH (INCHES)	HEIGHT (INCHES)	WELD (INCHES)
27	350	24	0.375 (SCH. 20)	20	1	27 1/2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

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



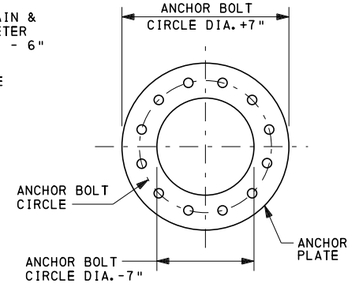
ELEVATION



SECTION

END CONNECTION DETAILS

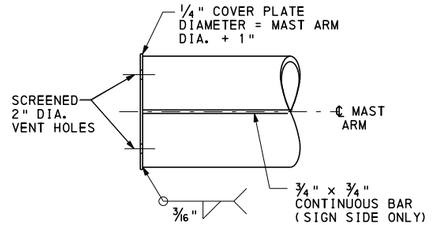
(MAST ARM SPLICE CONNECTION SIMILAR)
(24 BOLT CONFIGURATION SHOWN)



PLAN

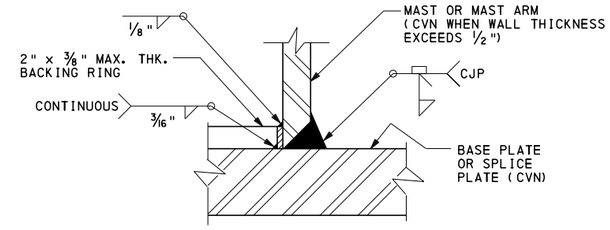
ANCHOR PLATE DETAIL

(12 BOLT CONFIGURATION SHOWN)

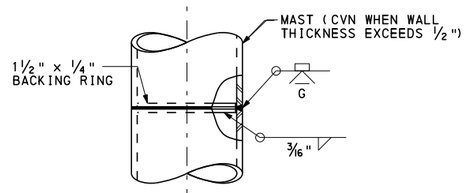


MAST ARM END DETAIL

(CANTILEVER STRUCTURES)



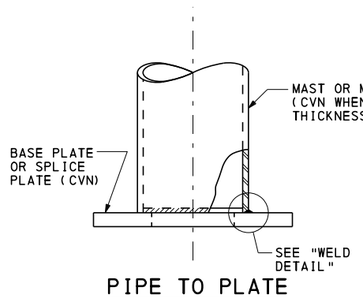
WELD DETAIL



OPTIONAL SHOP CONNECTION DETAIL

WELD DETAIL NOTE:

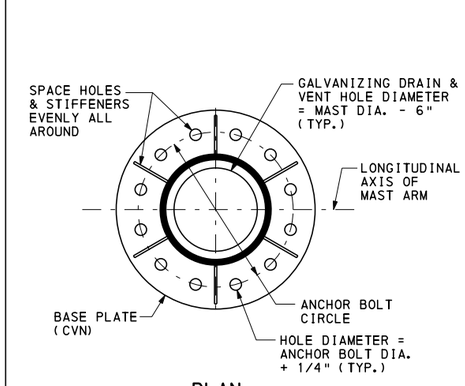
BACKING RING MUST BE FITTED/SIZED TO THE PIPE COLUMN AND CONTINUOUSLY FILLET WELDED TO THE BASE PLATE BEFORE THE FULL PENETRATION GROOVE WELD IS MADE. BACKING RING MUST BE FABRICATED AS A CONTINUOUS RING.



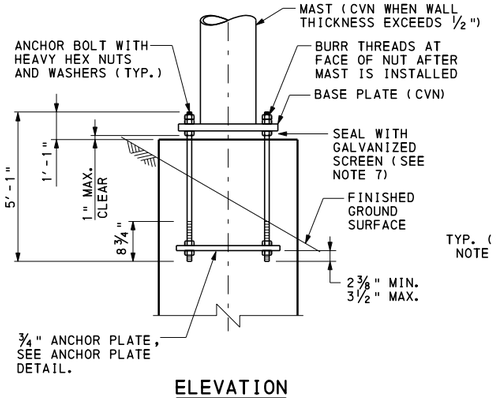
PIPE TO PLATE CONNECTION DETAIL

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. PROVIDE MAXIMUM 2'-0" SPACE BETWEEN ADJACENT SIGN PANELS WHEN PRESENT.
3. TERMINATE WELDS 1/4" SHORT OF STIFFENER CHAMFER.
4. PROVIDE STIFFENERS AS INDICATED IN CONNECTION COMPONENT SELECTION TABLES.
5. FOR CAISSON INFORMATION, SEE SHEET 6.
6. FOR SIGN PANEL SUPPORT BEAM DETAILS, SEE SHEET 5.
7. 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.
8. FOR FRAME STRUCTURE COMPONENT SELECTION TABLE, SEE SHEETS 3 AND 4.



PLAN

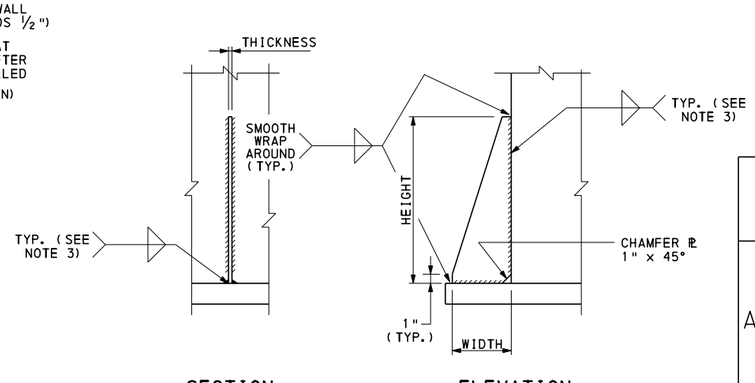


ELEVATION

NOTE: STIFFENERS NOT SHOWN FOR CLARITY

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 SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 5
Thomas P. Macioce	Brent D. Thompson	BC-747M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

MAST ARM & SPLICE CONNECTION COMPONENT SELECTION TABLE

SPAN (FEET)	PANEL AREA (S.F.)	USING MAXIMUM LENGTH OF MAST ARM SEGMENTS														USING MINIMUM LENGTH OF MAST ARM SEGMENTS											PANEL AREA (S.F.)	SPAN (FEET)
		MAST ARM		SEGMENT	H.S. BOLTS			SPLICE PLATE		STIFFENERS						MAST ARM		SEGMENT	H.S. BOLTS			SPLICE PLATE		STIFFENERS						
		DIAMETER (INCHES)	THICKNESS (INCHES)	ARRANGEMENT	NO.	DIAMETER (INCHES)	CIRCLE (INCHES)	DIAMETER (INCHES)	THICKNESS (INCHES)	NO.	THICKNESS (INCHES)	WIDTH (INCHES)	HEIGHT (INCHES)	WELD (INCHES)		DIAMETER (INCHES)	THICKNESS (INCHES)	ARRANGEMENT	NO.	DIAMETER (INCHES)	CIRCLE (INCHES)	DIAMETER (INCHES)	THICKNESS (INCHES)	NO.	THICKNESS (INCHES)	WIDTH (INCHES)	HEIGHT (INCHES)	WELD (INCHES)		
60	1,040	24	0.375 (SCH. 20)	A	-	-	-	-	-	-	-	-	-	-	24	0.375 (SCH. 20)	B	22	1	28	31 1/2	2	11	3/8	2 3/4	8	5/16	1,040	60
	760	24	0.375 (SCH. 20)	A	-	-	-	-	-	-	-	-	-	-	24	0.375 (SCH. 20)	B	22	1	28	31 1/2	2	11	3/8	2 3/4	8	5/16	760	
	440	20	0.375 (SCH. 20)	A	-	-	-	-	-	-	-	-	-	-	20	0.375 (SCH. 20)	B	20	1	23 1/2	27	2	10	3/8	2 1/2	7	5/16	440	
80	1,000	24	0.500 (WT. XS)	B	22	1 1/4	30 1/2	35	2	11	3/8	4 1/2	12 1/2	5/16	24	0.500 (WT. XS)	C	20	1 1/4	31	35 1/2	2	10	3/8	4 3/4	13 1/2	5/16	1,000	80
	880	24	0.500 (WT. XS)	B	22	1 1/4	29	33 1/2	2	11	3/8	3 3/4	10 1/2	5/16	24	0.500 (WT. XS)	C	20	1 1/4	29	33 1/2	2	10	3/8	3 3/4	10 1/2	5/16	880	
	600	24	0.375 (SCH. 20)	B	22	1 1/8	29 1/2	33 1/2	2	11	3/8	3 3/4	10 1/2	5/16	24	0.375 (SCH. 20)	C	20	1 1/8	29	33	2	10	3/8	3 1/2	10	5/16	600	
	360	20	0.375 (SCH. 20)	B	20	1 1/8	24	29	2	10	3/8	3 1/2	10	5/16	20	0.375 (SCH. 20)	C	18	1 1/8	24	28	2	9	3/8	3	8 1/2	5/16	360	
100	520	24	0.500 (WT. XS)	B	24	1 1/8	32 1/2	36 1/2	2	12	3/8	5 1/4	14 1/2	5/16	24	0.375 (SCH. 20)	C	22	1 1/8	29	33	2	11	3/8	3 1/2	10	5/16	520	100
	280	20	0.500 (SCH. 30)	B	22	1 1/8	27	31	2	11	3/8	4 1/2	12 1/2	5/16	20	0.375 (SCH. 20)	C	20	1 1/8	24	28	2	10	3/8	3	8 1/2	5/16	280	
120	520	24	0.500 (WT. XS)	C	22	1 1/4	32	36 1/2	2	11	3/8	5 1/4	14 1/2	5/16	24	0.688 (SCH. 40)	D	24	1 1/4	34 1/2	39	2	12	3/8	6 1/2	18	5/16	520	120
	360	24	0.375 (SCH. 20)	C	24	1 1/8	29	33	2	12	3/8	3 1/2	10	5/16	24	0.500 (WT. XS)	D	24	1 1/8	31 1/2	35 1/2	2	12	3/8	4 3/4	13 1/2	5/16	360	
140	420	24	0.500 (WT. XS)	C	22	1 1/4	31	35 1/2	2	11	3/8	4 3/4	13 1/2	5/16	24	0.688 (SCH. 40)	D	24	1 1/4	34 1/2	39	2	12	3/8	6 1/2	18	5/16	420	140
	300	24	0.375 (SCH. 20)	C	22	1 1/8	29	33	2	11	3/8	3 1/2	10	5/16	24	0.500 (WT. XS)	D	24	1 1/8	31 1/2	36	2	12	3/8	5	14	5/16	300	
160	300	24	0.500 (WT. XS)	D	22	1 1/4	30 1/2	35	2	11	3/8	4 1/2	12 1/2	5/16	24	0.500 (WT. XS)	E	20	1 1/4	32	36 1/2	2	10	3/8	5 1/4	14 1/2	5/16	300	160

MAST & BASE CONNECTION COMPONENT SELECTION TABLE

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)
60	1,040	24	0.500 (WT. XS)	10	2 1/4	31 1/2	39	2 1/2	10	3/8	6 1/2	18	5/16
	760	24	0.375 (SCH. 20)	10	2	32	39 1/2	2 1/4	10	3/8	6 3/4	19	5/16
	440	20	0.375 (SCH. 20)	8	2	27 1/2	35	2 1/2	8	3/8	6 1/2	18	5/16
80	1,000	24	0.500 (WT. XS)	12	2 1/4	31 1/2	40 1/2	2	12	3/8	7 1/4	20	5/16
	880	24	0.500 (WT. XS)	10	2 1/4	31 1/2	41	2 1/4	10	3/8	7 1/2	21	5/16
	600	24	0.375 (SCH. 20)	10	2	31 1/2	38 1/2	2 1/2	10	3/8	6 1/4	17 1/2	5/16
	360	20	0.375 (SCH. 20)	8	2	27	34	2 1/2	8	3/8	6	16 1/2	5/16
100	520	24	0.500 (WT. XS)	10	2	31 1/2	39	2 1/4	10	3/8	6 1/2	18	5/16
	280	20	0.375 (SCH. 20)	8	2	26 1/2	34	2 1/4	8	3/8	6	16 1/2	5/16
120	520	24	0.500 (WT. XS)	10	2 1/4	31 1/2	39	2 1/2	10	3/8	6 1/2	18	5/16
	360	24	0.375 (SCH. 20)	10	2	30 1/2	38	2	10	3/8	6	16 1/2	5/16
140	420	24	0.500 (WT. XS)	10	2	31 1/2	38	2 1/2	-	-	-	-	-
	300	24	0.375 (SCH. 20)	10	2	30 1/2	37 1/2	2	-	-	-	-	-
160	300	24	0.500 (WT. XS)	10	2	30 1/2	37	2 1/4	-	-	-	-	-

END CONNECTION COMPONENT SELECTION TABLE

SPAN (FEET)	PANEL AREA (S.F.)	H.S. BOLTS		SPLICE PLATE		STIFFENERS				
		NO.	DIAMETER (INCHES)	CIRCLE (INCHES)	DIAMETER (INCHES)	THICKNESS (INCHES)	NO.	THICKNESS (INCHES)	WIDTH (INCHES)	HEIGHT (INCHES)	WELD (INCHES)
60	1,040	12	1	27 1/2	31	2	-	-	-	-	-
	760	12	1	27 1/2	31	2	-	-	-	-	-
	440	11	1	23 1/2	27	2	-	-	-	-	-
80	1,000	18	1 1/8	28	32	2	-	-	-	-	-
	880	18	1 1/8	28	32	2	-	-	-	-	-
	600	14	1 1/8	28	32	2	-	-	-	-	-
	360	11	1 1/8	24	28	2	-	-	-	-	-
100	520	20	1 1/8	28 1/2	32 1/2	2	10	3/8	3 1/4	9	5/16
	280	12	1 1/8	24	28	2	-	-	-	-	-
120	520	20	1 1/4	29	33 1/2	2	10	3/8	3 3/4	10 1/2	5/16
	360	18	1 1/8	28	32	2	9	3/8	3	8 1/2	5/16
140	420	20	1 1/4	30	34 1/2	2	10	3/8	4 1/4	12	5/16
	300	20	1 1/8	28	32	2	10	3/8	3	8 1/2	5/16
160	300	22	1 1/8	29	33	2	11	3/8	3 1/2	10	5/16

MAST ARM SEGMENT ARRANGEMENT TABLE

ARRANGEMENT	SEGMENT LENGTH / MAST ARM LENGTH
A	1.00
B	0.50 | 0.50
C	0.33 | 0.33 | 0.33
D	0.25 | 0.25 | 0.25 | 0.25
E	0.20 | 0.20 | 0.20 | 0.20 | 0.20
F	0.17 | 0.17 | 0.16 | 0.16 | 0.17 | 0.17

NOTES:

1. FOR ADDITIONAL NOTES, SEE SHEET 2.
2. FABRICATOR HAS THE OPTION TO ADD OR ELIMINATE SPLICES ALONG MAST ARM.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

MONOPIPE SIGN STRUCTURES

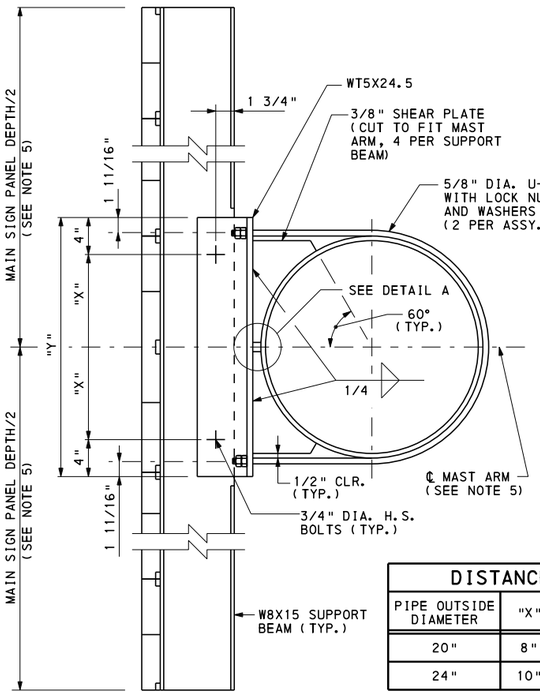
FRAME STRUCTURE SPANS UP TO 160'

MAST AND MAST ARM DETAILS - 2

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

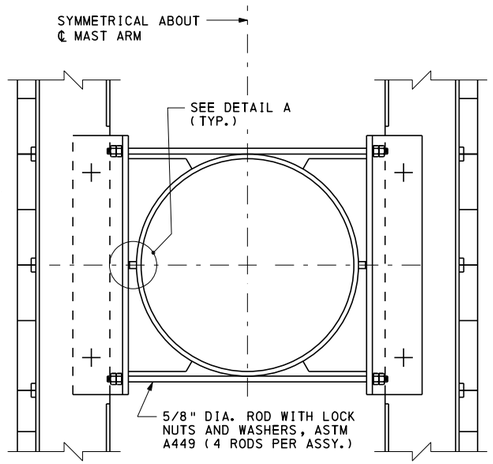
RECOMMENDED SEPT. 30, 2016
Brian D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-747M

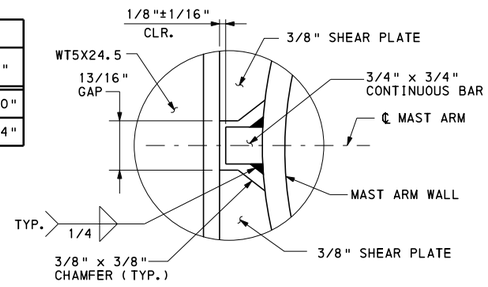


SINGLE SIGN PANEL SECTION

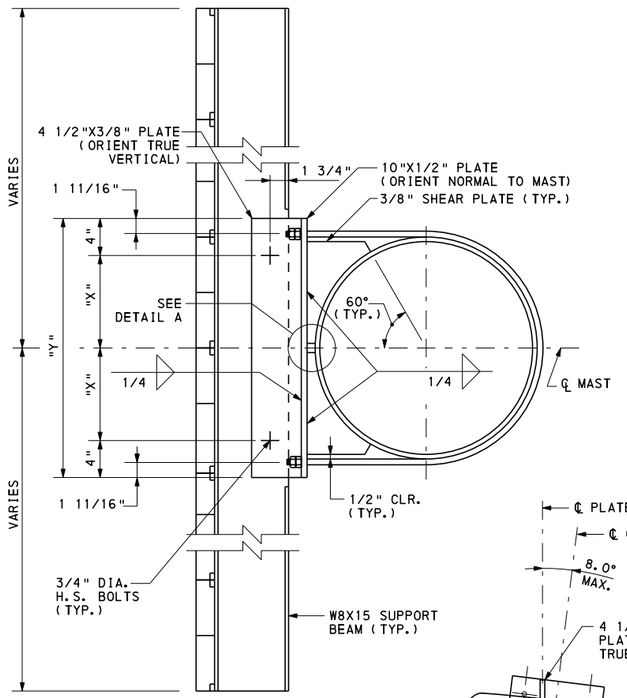
DISTANCE		
PIPE OUTSIDE DIAMETER	"X"	"Y"
20"	8"	2'-0"
24"	10"	2'-4"



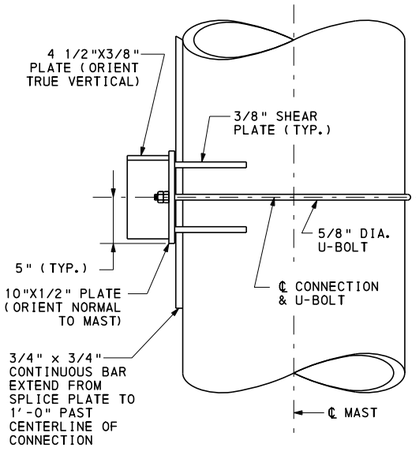
BACK-TO-BACK SIGN PANEL SECTION
(SEE NOTE 2)



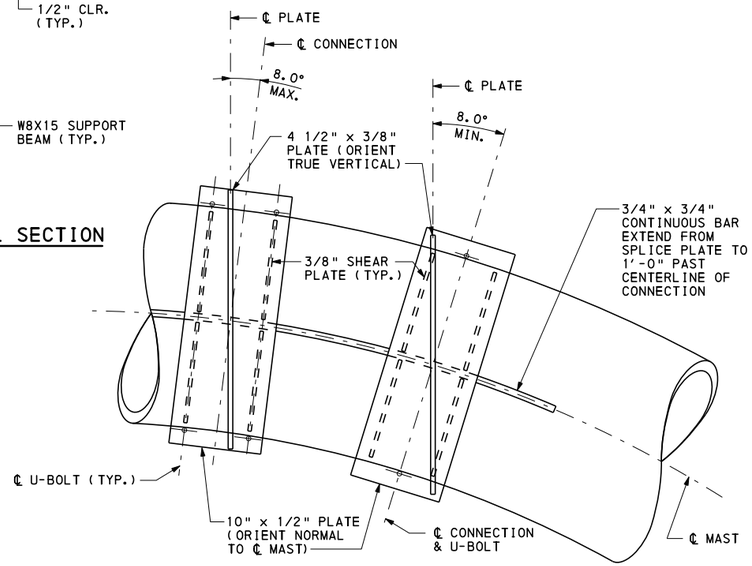
DETAIL A



SINGLE SIGN PANEL SECTION



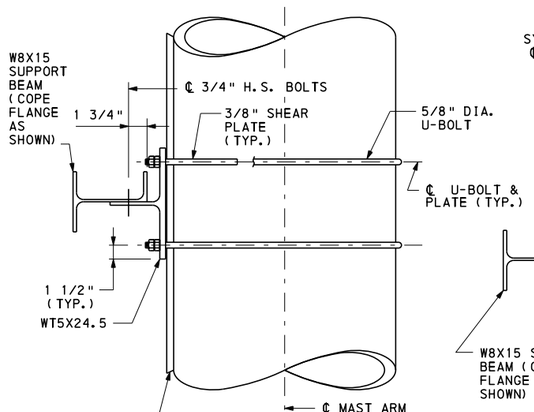
SINGLE U-BOLT PLAN



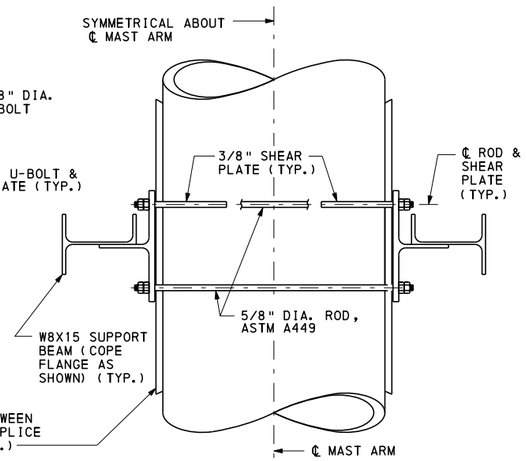
DOUBLE U-BOLT SINGLE U-BOLT

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)



SINGLE SIGN PANEL PLAN



BACK-TO-BACK SIGN PANEL PLAN
(SEE NOTE 2)

SUPPORT BEAM TO MAST ARM CONNECTION DETAILS

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. FOR DETAILS NOT SHOWN OR NOTED, SEE SINGLE SIGN PANEL DETAILS, THIS SHEET.
3. FOR SIGN PANEL DETAILS, SEE TRAFFIC CONTROL STANDARD TC-8701E.
4. LOCATE SUPPORT BEAMS TO AVOID END AND SPLICE CONNECTIONS. MAXIMUM SPACING = 5'-0". MAXIMUM DISTANCE TO PANEL EDGE = 2'-6".
5. 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

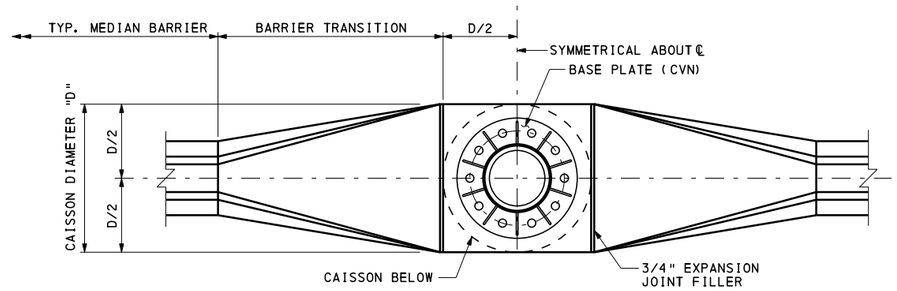
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 4 OF 5
Thomas P Macioce	Brent D Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-747M

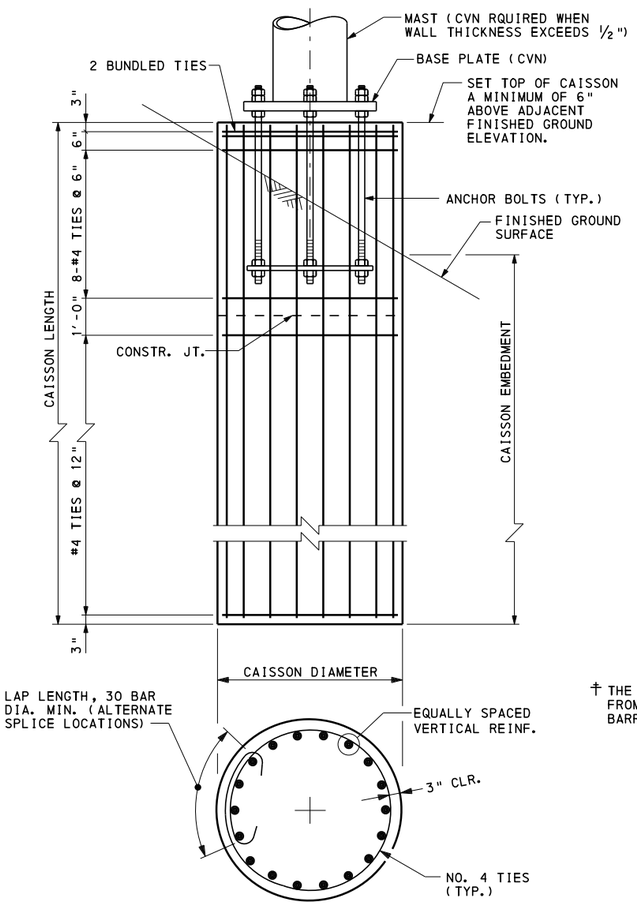
CAISSON COMPONENT SELECTION TABLE FRAME STRUCTURES

SPAN (FEET)	PANEL AREA (S.F.)	CAISSON DIAMETER (INCHES)	SOIL	CAISSON EMBEDMENT (FEET) MAX. GROUND SLOPE 8:1	4:1	2:1	1.5:1	VERT. REINF. NO.	SIZE
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	-		
	440	48	C	18.5	19.0	19.5	20.0	13	#8
			G	16.0	16.5	18.0	-		
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	-		
	600	48	C	22.0	22.5	23.5	24.5	16	#8
			G	18.5	19.0	21.0	-		
	360	48	C	18.0	18.5	19.5	20.0	12	#8
			G	16.0	16.5	18.0	-		
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	-		

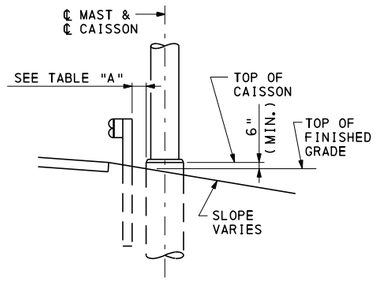
OPTIONAL CAISSON COMPONENT SELECTION TABLE FRAME STRUCTURES - MEDIAN BARRIER INSTALLATION

SPAN (FEET)	PANEL AREA (S.F.)	CAISSON DIAMETER (INCHES)	SOIL	CAISSON EMBEDMENT (FEET) MAX. GROUND SLOPE 8:1	4:1	2:1	1.5:1	VERT. REINF. NO.	SIZE
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	-		





CAISSON FOUNDATION DETAILS
ROADSIDE INSTALLATION

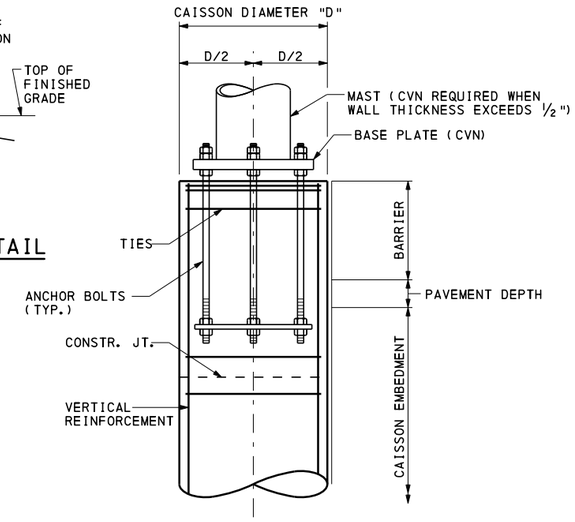


TYPICAL SHOULDER DETAIL

TABLE "A"	
TYPE OF GUIDE RAIL	REQUIRED † CLEARANCES
2-SCC	1'-0"
2-SC	2'-0"
2-S	3'-0"
2-WCC	4'-0"
2-WC	5'-0"
2-W	7'-0"
BARRIER	2'-0"

† THE MINIMUM UNOBSTRUCTED DISTANCE FROM BACK OF GUIDE RAIL POST OR BARRIER TO FACE OF CAISSON.

PLAN



ELEVATION

CAISSON FOUNDATION DETAILS MEDIAN BARRIER INSTALLATION

(SEE ROADSIDE INSTALLATION, THIS SHEET, FOR ADDITIONAL INFORMATION)
(10 BOLT CONFIGURATION SHOWN)

CAISSON COMPONENT SELECTION TABLE CANTILEVER STRUCTURES

SPAN (FEET)	PANEL AREA (S.F.)	CAISSON DIAMETER (INCHES)	SOIL	CAISSON EMBEDMENT (FEET) MAX. GROUND SLOPE 8:1	4:1	2:1	1.5:1	VERT. REINF. NO.	SIZE
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 SELECTION NOTES:

1. SOIL TYPE "C" IS SOFT COHESIVE SOIL AND SOIL TYPE "G" IS LOOSE GRANULAR SOIL, SEE DESIGN NOTE 3 ON SHEET 1 OF 6.
2. *REPRESENTS THAT A BELLED CAISSON IS REQUIRED FOR THE SOFT COHESIVE SOIL, SEE SHEET 1 OF 6.

CAISSON DRILLING AND INSTALLATION NOTES:

1. CONTACT THE STRUCTURE CONTROL ENGINEER IF ANY OF THE FOLLOWING SOIL CONDITIONS ARE ENCOUNTERED DURING DRILLING:
   A) THE SOIL HAS A HIGH ORGANIC CONTENT OR CONSISTS OF SATURATED SILT AND CLAY.
   B) THE SITE WILL NOT SUPPORT THE WEIGHT OF THE DRILLING RIG.
   C) FIRM BEDROCK IS ENCOUNTERED.
2. CONSTRUCT DRILLED CAISSONS PER PUB.408, SECTION 1006.3
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.

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. FOR ANCHOR BOLT INFORMATION, SEE SHEET 2 (CANTILEVER STRUCTURES) OR SHEET 4 (FRAME STRUCTURES).

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

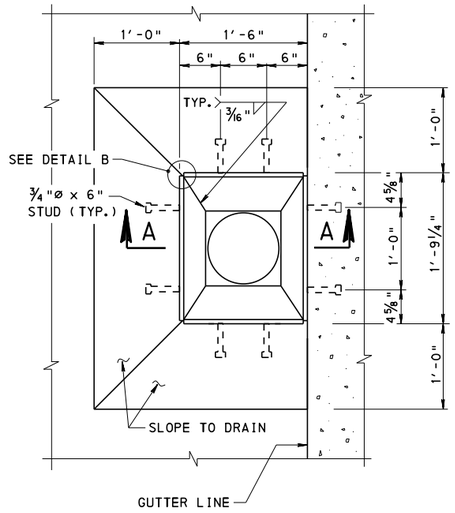
MONOPIPE SIGN STRUCTURES
FRAME STRUCTURE SPANS UP TO 160'
AND CANTILEVER MONOPIPE STRUCTURE
STRUT LENGTHS UP TO 27'

FOUNDATION DETAILS

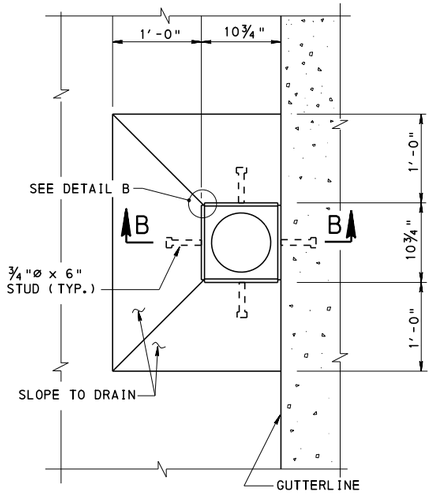
RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brent D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-747M



PLAN



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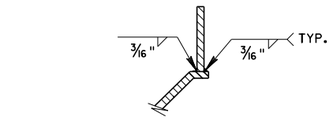
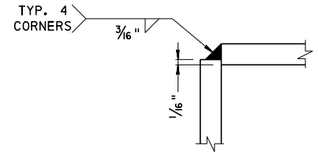


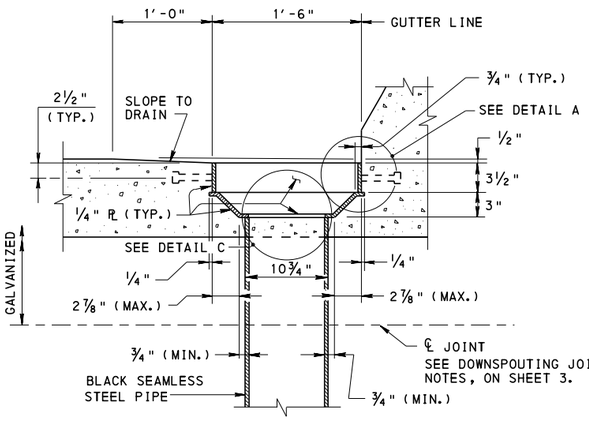
DETAIL A

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 REINFORCEMENT STEEL BARS SHOWN MEET THE REQUIREMENTS OF ASTM A615/A615M OR A706/A706M.
12. ALL DIAMETERS SPECIFIED ARE NOMINAL.
13. MANUFACTURE METAL CURB DRAIN PER PUB.408, SECTION 1052.
14. METAL CURB DRAINS DESIGNED AND MANUFACTURED IN ACCORDANCE WITH THIS STANDARD DRAWING DO NOT REQUIRE SHOP DRAWINGS.
15. PROVIDE FLOOR DRAINS OF EITHER GALVANIZED STEEL OR ALUMINUM PIPE AS INDICATED UNLESS FIBERGLASS OR PVC PIPE IS SPECIFIED BY THE DISTRICT BRIDGE ENGINEER.
16. ALUMINUM CURB OR FLOOR DRAINS IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALKALINE-RESISTANT BITUMINOUS PAINT.



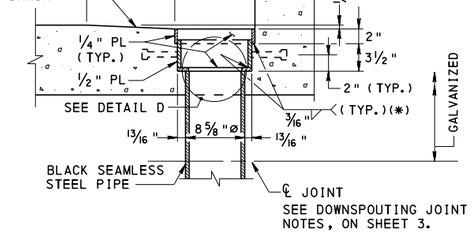
DETAIL B



SECTION A-A

TYPE 1 SCUPPER

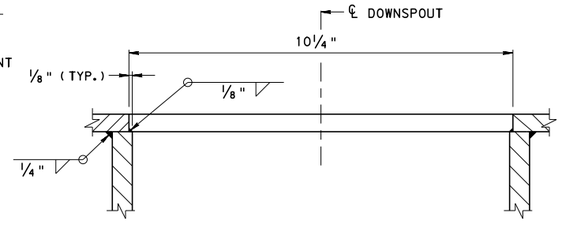
SHOWN WITHOUT GRATE, SEE TYPE 1 GRATE DETAIL THIS SHT.



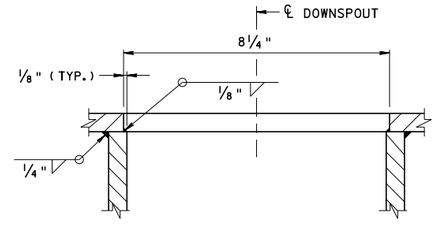
SECTION B-B

TYPE 2 SCUPPER

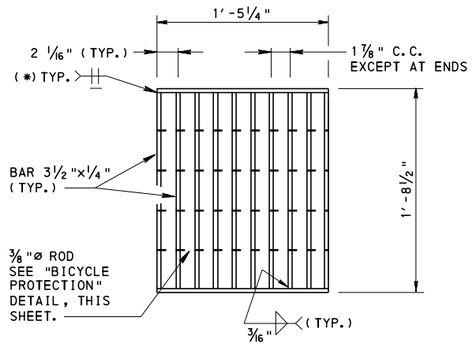
SHOWN WITHOUT GRATE, SEE TYPE 2 GRATE DETAIL THIS SHT.



DETAIL C

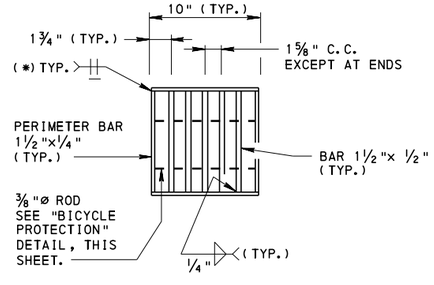


DETAIL D



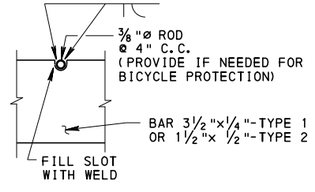
PLAN

TYPE 1 GRATE



PLAN

TYPE 2 GRATE



BICYCLE PROTECTION

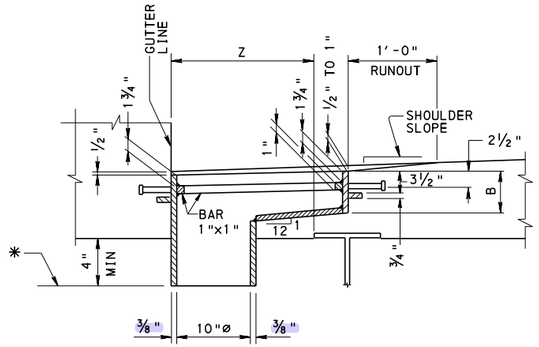
(UNLESS DELETED BY CONTRACT DRAWINGS)

(*) = OR EQUIVALENT FULL PENETRATION WELD.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

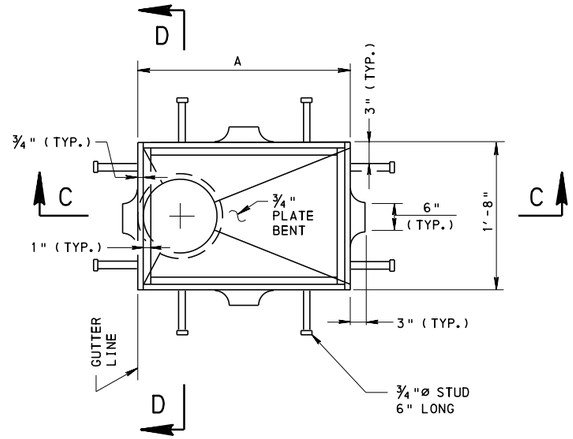
STANDARD BRIDGE DRAINAGE SCUPPER DETAILS TYPE 1 & TYPE 2

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 1 OF 7
Thomas P Macioce	Bruce B Thompson	BC-751M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



NOTES:
1. USE CONTINUOUS FILLET WELD FOR INSIDE AND OUTSIDE. ¼" MIN. SIZE.
2. GRATING NOT SHOWN

SECTION C-C
(TYPE A OR B SCUPPER)



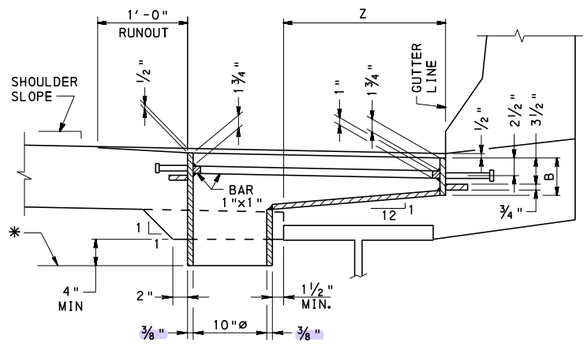
PLAN

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'-10½"
SPECIFY TYPE D SCUPPER FOR Z OVER 1'-10½" TO 2'-8¼"

TABLE II - U.S. CUSTOMARY UNITS						
	DIMENSIONS				APPROXIMATE WEIGHT	
	A	B	C	D	SCUPPER	W/ GRATE
TYPE A SCUPPER	1'-10½"	6"	1'-8¾"	1'-6¼"	295 LB	395 LB
TYPE B SCUPPER	2'-8¼"	5"	2'-6½"	1'-6¼"	380 LB	525 LB
TYPE C SCUPPER	2'-11½"	5"	2'-9¾"	1'-6¼"	400 LB	545 LB
TYPE D SCUPPER	3'-9¼"	5"	3'-7½"	1'-6¼"	465 LB	655 LB

SCUPPER WEIGHTS LISTED ARE FOR A SCUPPER ASSEMBLY DEPTH OF 1'-3".

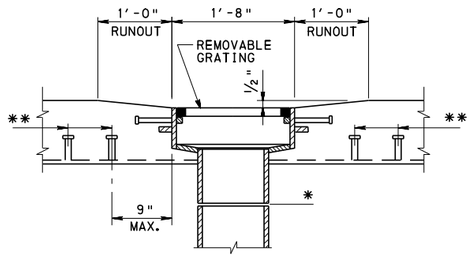


NOTES:
1. USE CONTINUOUS FILLET WELD FOR INSIDE AND OUTSIDE. ¼" MIN. SIZE.
2. GRATING NOT SHOWN

SECTION C-C
(TYPE C OR D SCUPPER)

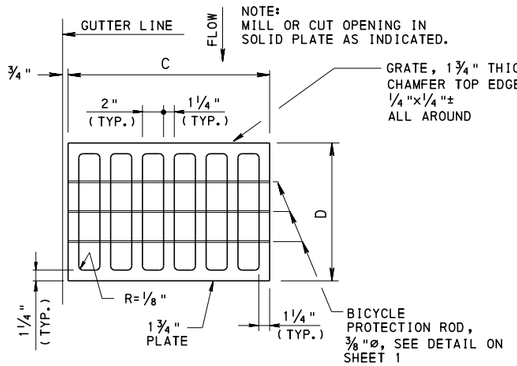
✳ SEE DOWNSPOUTING JOINT NOTES ON SHEET 3.

✳✳ RESPACE SHEAR CONNECTORS ON COMPOSITE CONSTRUCTION TO CLEAR SCUPPERS.

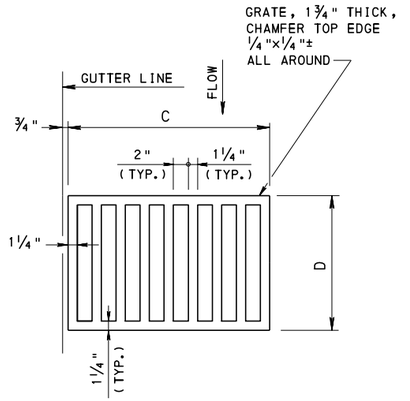


SECTION D-D

WELDED SCUPPER DETAILS



ALTERNATE
STRUCTURAL STEEL SCUPPER GRATE



CAST GRATING PLAN

NOTE:
PROVIDE ALTERNATE STRUCTURAL STEEL GRATE WHEN BICYCLE PROTECTION IS REQUIRED, SEE DETAIL THIS SHEET.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

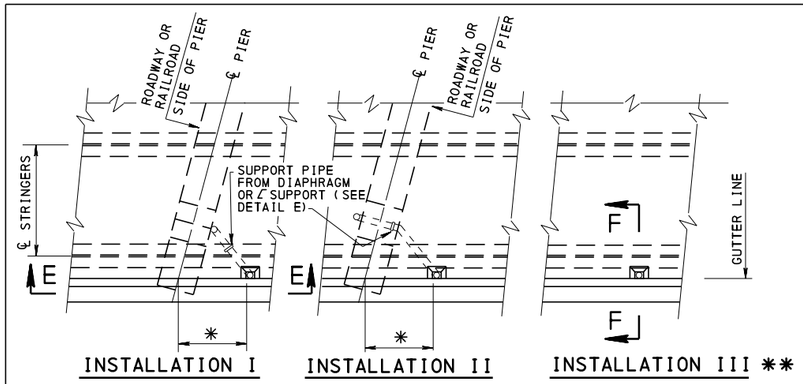
STANDARD BRIDGE DRAINAGE SCUPPER DETAILS TYPE A, B, C & D

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 2 OF 7

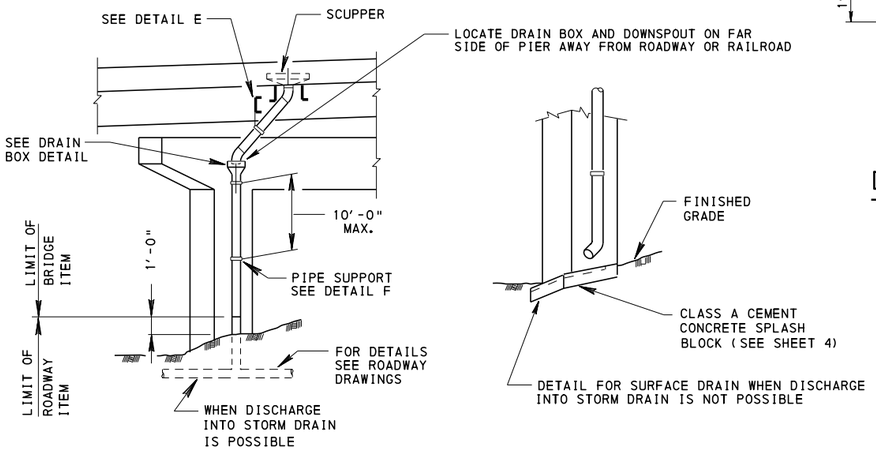
BC-751M



PLAN SHOWING TYPICAL INSTALLATION OF SCUPPERS

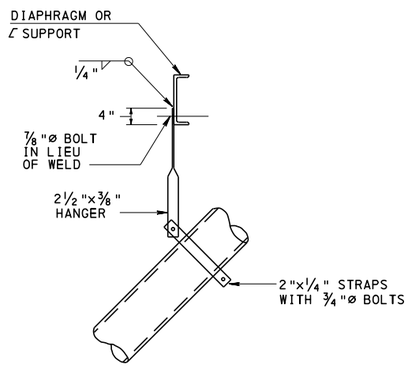
* AS REQUIRED FOR A MIN. 45° DRAIN PIPE SLOPE

** USE INSTALLATION III IN SPANS OVER STREAMS AND OVER GROUND WHERE DISCHARGE IS NOT OBJECTIONABLE.



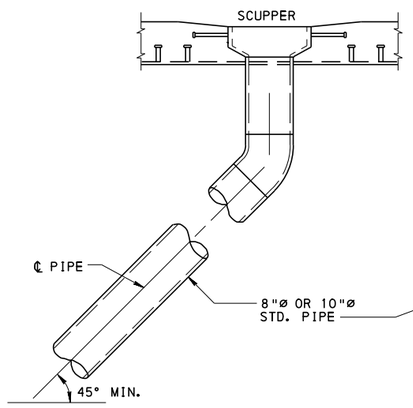
ELEVATION E-E

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.

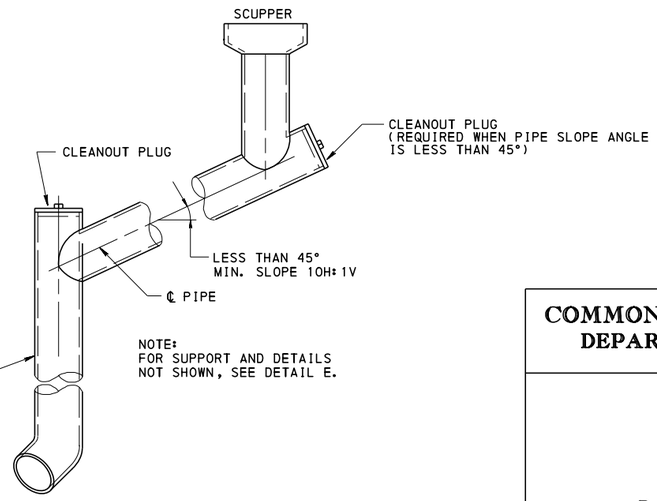


DETAIL E

SPACING OF HANGER SUPPORTS TO BE BASED ON FULL PIPE (SELF WEIGHT, WATER, ICE AND ANTI-SKID DEBRIS)



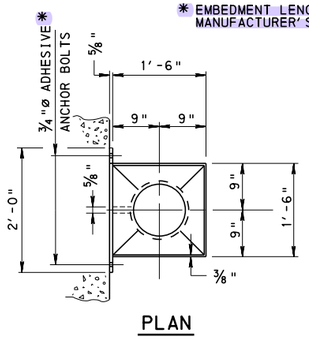
PIPES SLOPED AT 45° MIN.



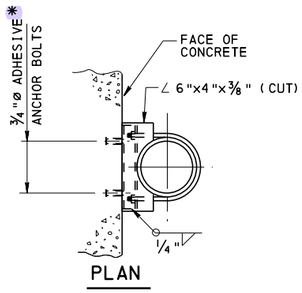
PIPES SLOPED LESS THAN 45°

INSTALLATIONS I & II

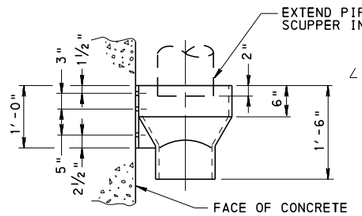
* EMBEDMENT LENGTH ACCORDING TO MANUFACTURER'S SPECIFICATIONS.



PLAN

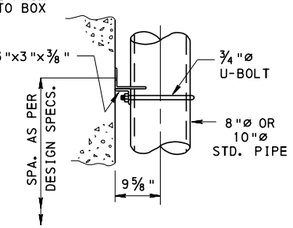


PLAN



ELEVATION

DRAIN BOX DETAIL



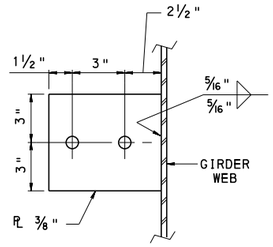
ELEVATION

DETAIL F

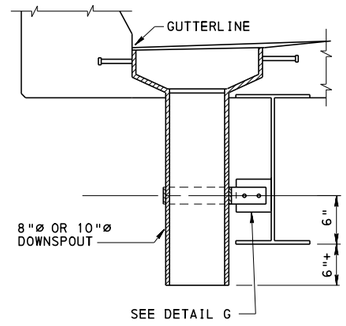
DETAILS SHOWN ARE SUITABLE FOR PLANE CONCRETE SURFACES. MODIFY THE DETAILS AS REQUIRED FOR ROUND CONCRETE SURFACES.

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.



DETAIL G



SECTION F-F

STEEL GIRDER

SECTION F-F

PRESTRESSED I-BEAM

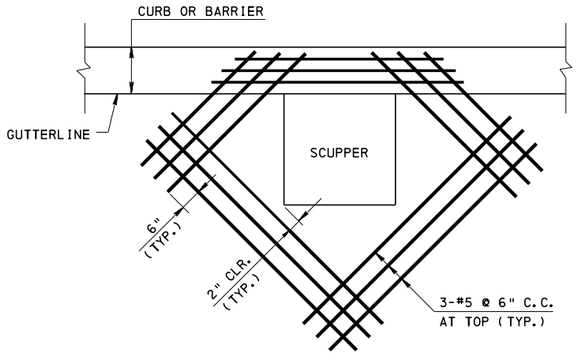
INSTALLATION III

FOR ADDITIONAL INFORMATION SEE DOWNSPOUTING DETAILS ON SHEET 4

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

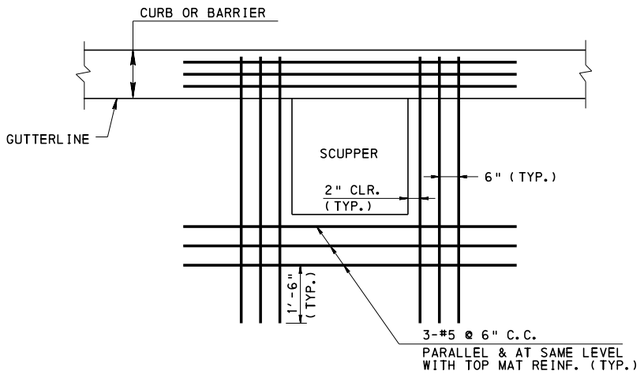
STANDARD BRIDGE DRAINAGE DOWNSPOUTING DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 7
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-751M



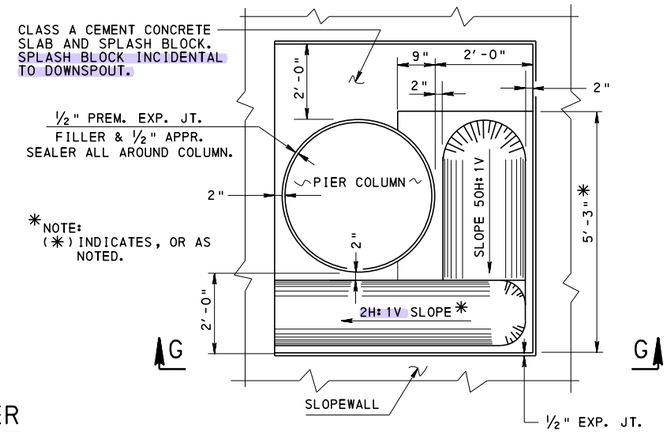
ADDITIONAL DECK REINFORCEMENT AT SCUPPER

CUT AND/OR REPOSITION DECK REINFORCEMENT
TO ACCOMMODATE SCUPPERS OR DRAINS

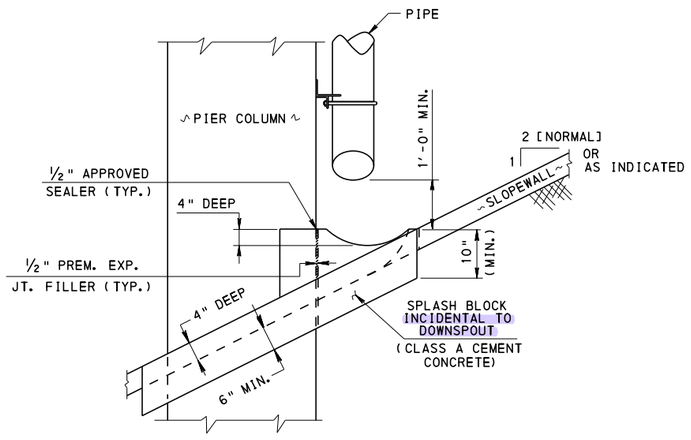


ALTERNATE DECK REINFORCEMENT AT SCUPPER

CUT AND/OR REPOSITION DECK REINFORCEMENT
TO ACCOMMODATE SCUPPERS OR DRAINS
(ALTERNATE TO DETAIL ABOVE)

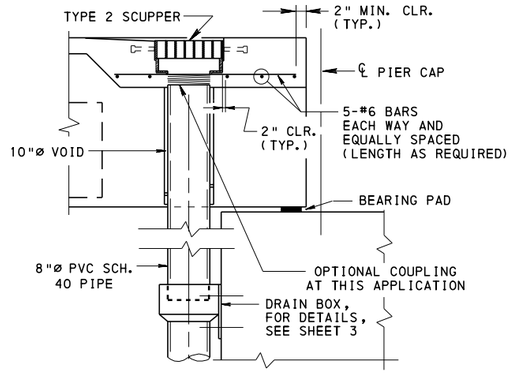


PLAN

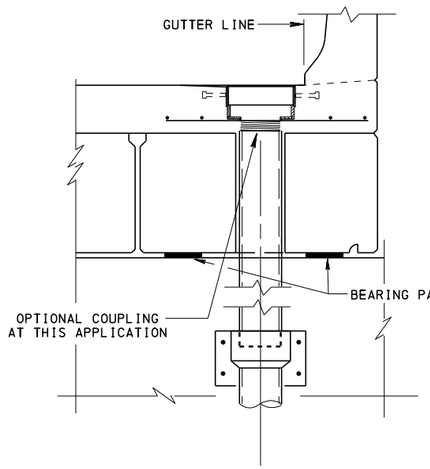


VIEW G-G

SPLASH BLOCK DETAIL



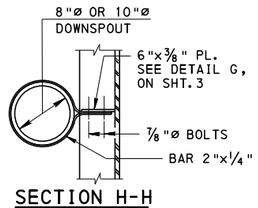
SECTION ALONG ℄ BEAM



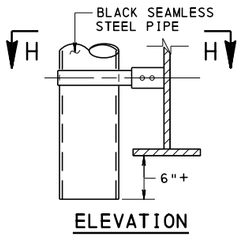
SECTION THRU BEAM

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.

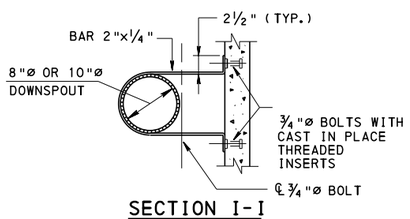


SECTION H-H

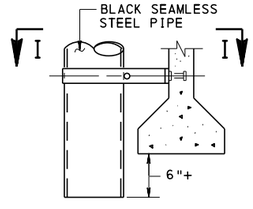


ELEVATION

STEEL GIRDER

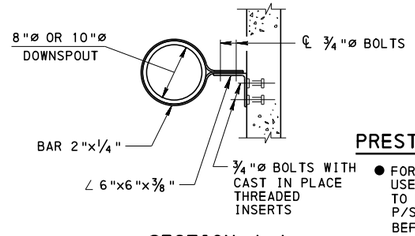


SECTION I-I

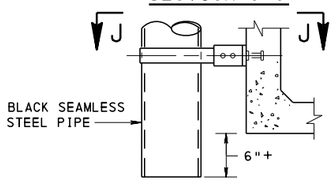


ELEVATION

PRESTRESSED I-BEAM



SECTION J-J



ELEVATION

PRESTRESSED BOX BEAM

PRESTRESSED DRILLING NOTES:

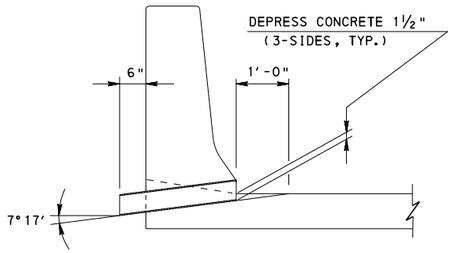
- FOR REHABILITATION PROJECTS ONLY: USE A PACHOMETER (OR EQUIVALENT) TO LOCATE ALL REINFORCEMENT AND P/S STRANDS IN PRESTRESSED I-BEAMS BEFORE DRILLING HOLES THROUGH WEB. NO DRILLING OF PRESTRESSED BOX BEAMS IS PERMITTED.
- ANY DRILLING OF A PRESTRESSED I-BEAM REQUIRES THE PRIOR APPROVAL OF THE DISTRICT BRIDGE ENGINEER.
- CAST IN PLACE THREADED INSERTS ARE TO BE USED IN NEW P/S BEAMS.

DOWNSPOUTING CONNECTION DETAILS

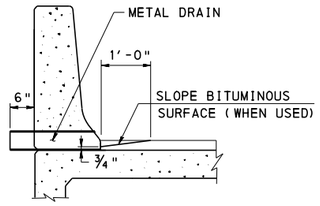
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
BRIDGE DRAINAGE
MISCELLANEOUS DETAILS

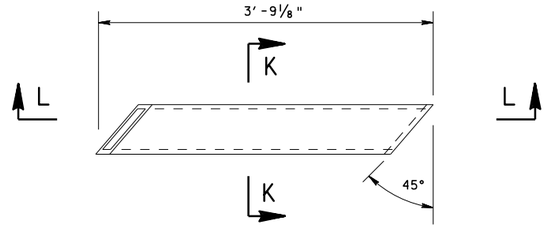
RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 4 OF 7 BC-751M



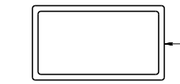
ELEVATION - CONCRETE DECK



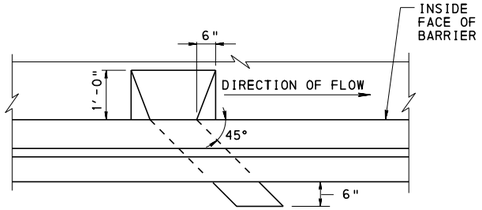
ELEVATION - BITUMINOUS DECK ONLY



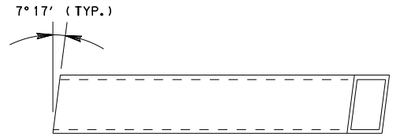
PLAN



SECTION K-K

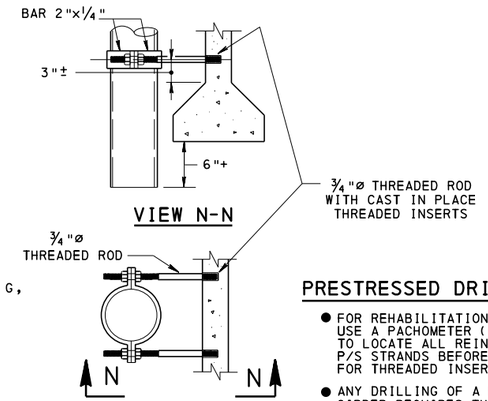


PLAN

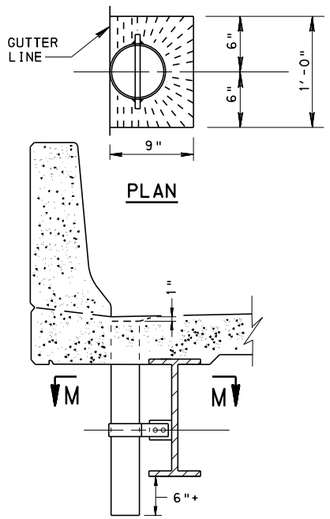


VIEW L-L

TYPICAL METAL CURB DRAIN DETAILS

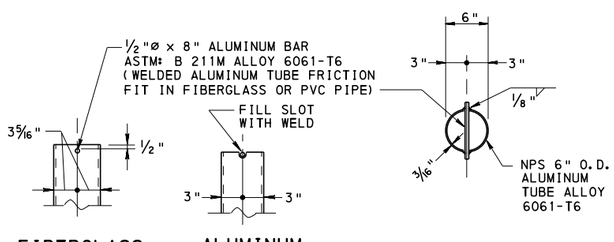


VIEW N-N



PLAN

SECTION AT BARRIER
(FLOOR DRAIN)

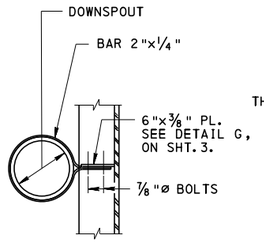


FIBERGLASS OR PVC PIPE

ALUMINUM TUBE

TOP PLAN
(SHOWING ALUMINUM TUBE)

FLOOR DRAIN



STEEL GIRDER

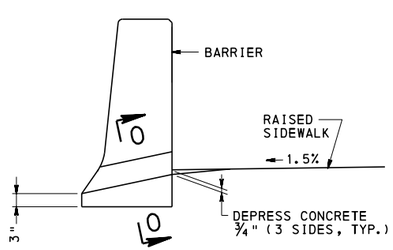
PRESTRESSED GIRDER

SECTION M-M

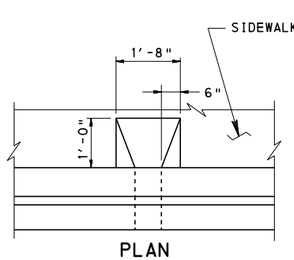
PRESTRESSED DRILLING NOTES:

- 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

TYPICAL FLOOR DRAIN DETAILS

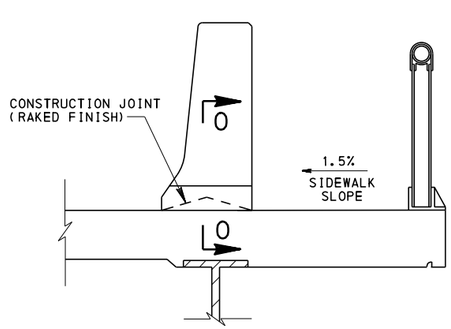


ELEVATION

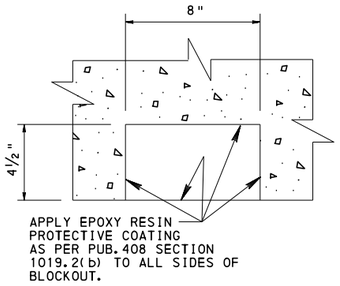


PLAN

RAISED SIDEWALK DRAINAGE DETAIL



TYPICAL SIDEWALK & BARRIER DRAIN



SECTION O-O

BARRIER DRAIN BLOCKOUTS

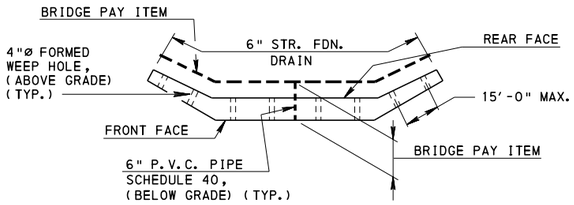
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
BRIDGE DRAINAGE
METAL CURB AND FLOOR DRAINS

RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent L. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 5 OF 7 BC-751M

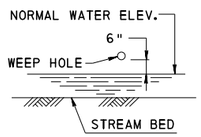
DRAINAGE NOTES:

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.

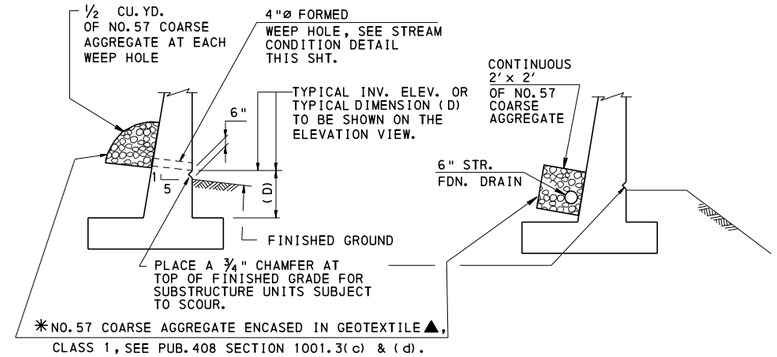


SCHEME A

PROVIDE DRAINAGE BY USE OF EITHER WEEP HOLES OR STRUCTURE FOUNDATION DRAIN, DISCHARGED AT FRONT OF WALL, BASED UPON FIELD CONDITIONS.

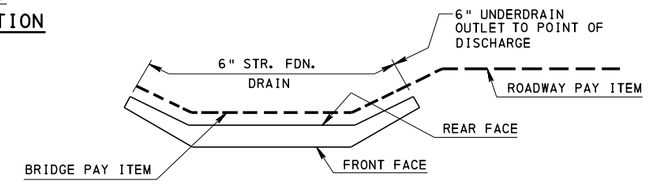


STREAM CONDITION



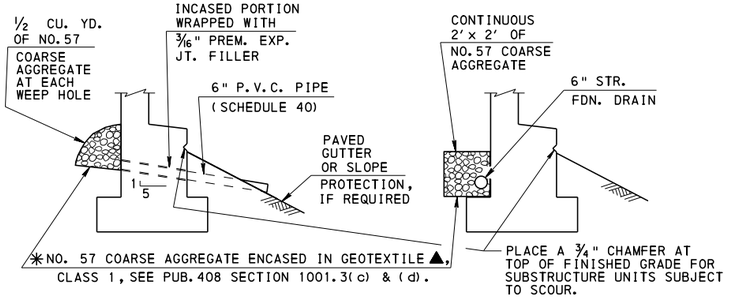
SCHEME A SCHEME B

ABOVE GRADE CONDITION



SCHEME B

DRAINAGE SCHEMES



SCHEME A SCHEME B

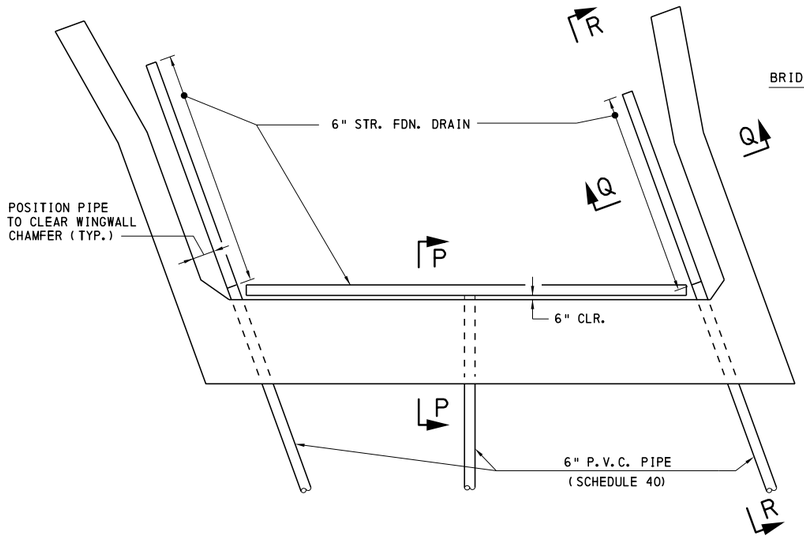
BELOW GRADE CONDITION

ABUTMENT, WING & RETAINING WALL DRAINAGE DETAILS

✳ NO. 57 COARSE AGGREGATE ENCASED IN GEOTEXTILE IS NOT REQUIRED IF NO. 57 COARSE AGGREGATE BACKFILL IS USED.

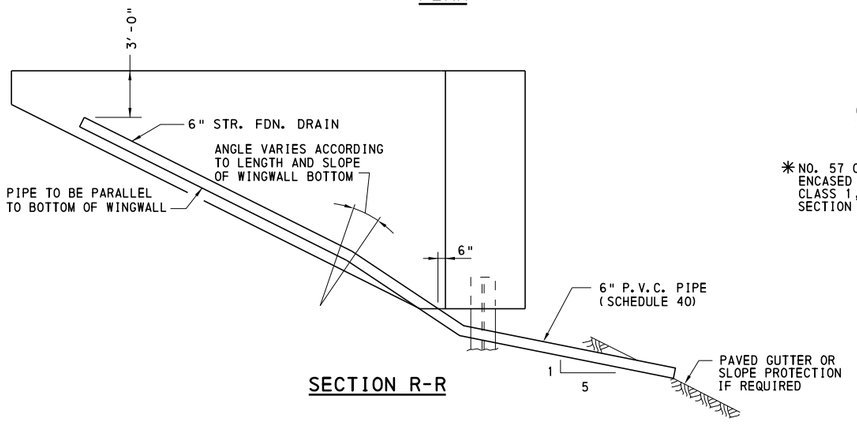
▲ COST OF GEOTEXTILE IS INCIDENTAL TO THE COST OF THE NO. 57 COARSE AGGREGATE.

SEE SHEET 7 FOR ADDITIONAL DRAINAGE AT ABUTMENT WITHOUT BACKWALL DETAIL.

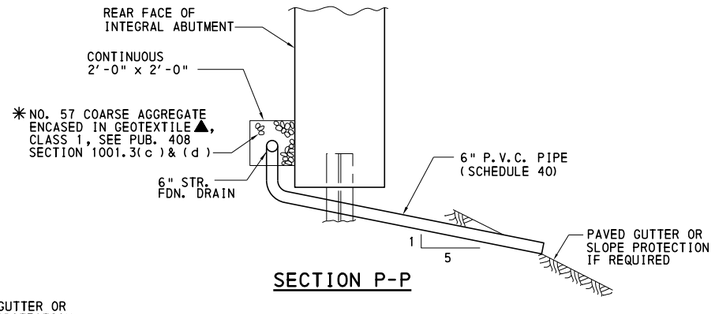


PLAN

SECTION Q-Q



SECTION R-R



SECTION P-P

INTEGRAL ABUTMENT SUBSTRUCTURE DRAINAGE

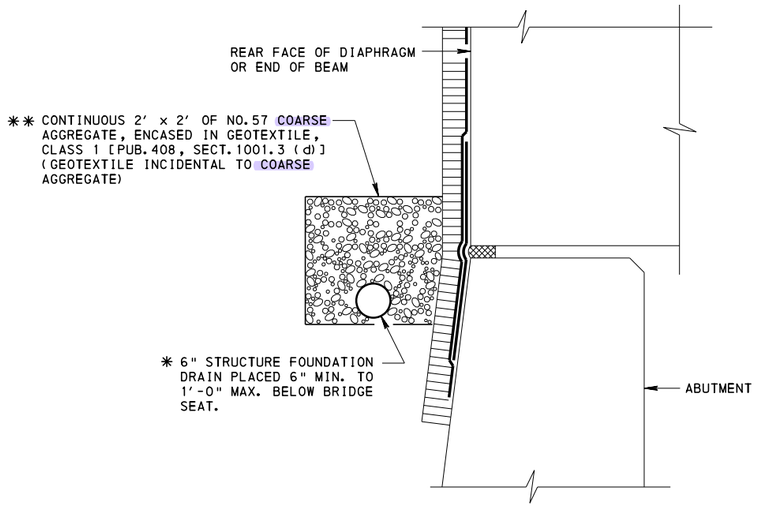
LEGEND:

STR. FDN. DRAIN = STRUCTURE FOUNDATION DRAIN
P.V.C. = POLYVINYL CHLORIDE (SCHEDULE 40)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD BRIDGE DRAINAGE MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 6 OF 7
Thomas P Macioce CHIEF BRIDGE ENGINEER	Brenda B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-751M



ADDITIONAL DRAINAGE DETAIL AT ABUTMENT WITHOUT BACKWALL

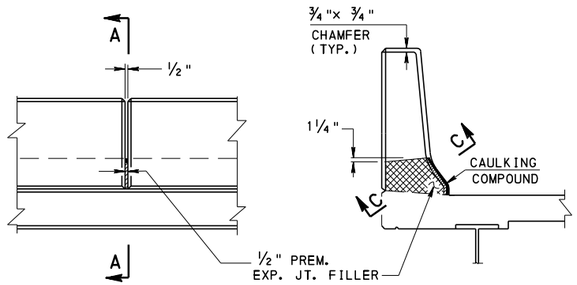
* SLOPE FOUNDATION DRAIN A MINIMUM OF 1/4" PER FOOT. CONNECT TO LOWER STRUCTURE FOUNDATION DRAIN OR OUTLET TO GRADE SIMILAR TO SECTION P-P ON SHEET 6.

** 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

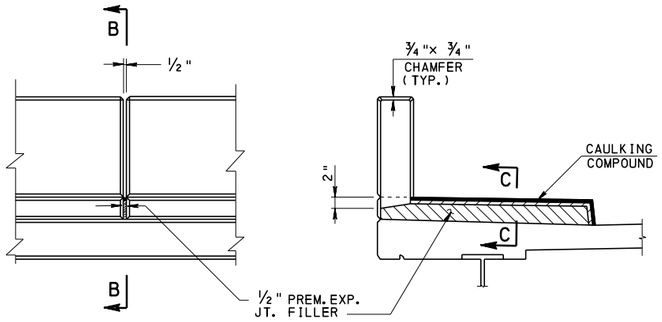
STANDARD
BRIDGE DRAINAGE
MISCELLANEOUS DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 7 OF 7
Thomas P Macioce CHIEF BRIDGE ENGINEER	Brian D Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-751M



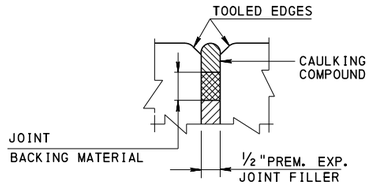
ELEVATION SECTION A-A

BARRIER OPEN JOINT DETAIL

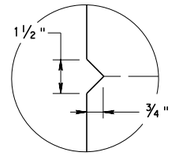


ELEVATION SECTION B-B

SIDEWALK OPEN JOINT DETAIL



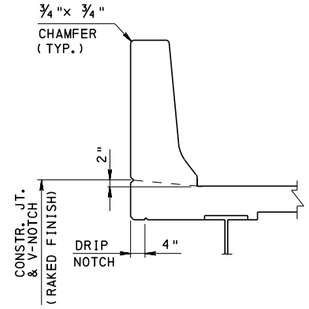
SECTION C-C



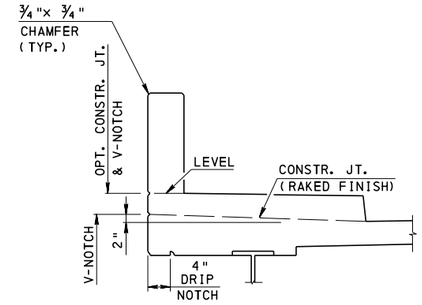
V-NOTCH DETAIL

NOTES:

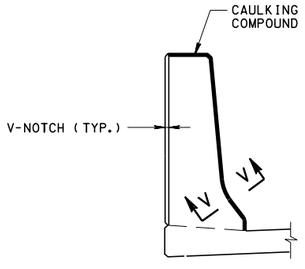
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. ALL REINFORCEMENT STEEL BARS SHOWN MEET THE REQUIREMENTS OF ASTM A 615, A 996, OR A 706.
3. FOR LOCATION OF CONSTRUCTION JOINTS AND OPEN JOINTS, REFER TO DESIGN DRAWINGS.
4. REMOVE ALL BULKHEAD MATERIAL AT THE CONSTRUCTION JOINT AFTER HARDENING OF THE CONCRETE. APPLY AN EPOXY BONDING COMPOUND TO THE HARDENED CONCRETE AT THE JOINT PRIOR TO PLACING NEW CONCRETE.
5. OPEN JOINT DETAILS AND MODIFIED DEFLECTION JOINTS APPLY TO THE FOLLOWING TYPES OF BARRIERS: TYPICAL CONCRETE BARRIER, ALTERNATE CONCRETE BARRIER, SPLIT CONCRETE GLARE SCREEN MEDIAN BARRIER, ALTERNATE SPLIT CONCRETE MEDIAN BARRIER, ALTERNATE SIDEWALK DETAIL, RAISED SIDEWALK DETAIL AND CONCRETE MEDIAN BARRIER.
6. PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH SECTION 705.8 (b) OF PUB. 408.
7. PROVIDE JOINT BACKING MATERIAL IN ACCORDANCE WITH SECTION 705.9 OF PUB. 408.
8. FOR DRIP NOTCH DETAILS, SEE BC-775M.
9. PROVIDE AN EPOXY BONDING COMPOUND, TYPE I, GRADE 3, IN ACCORDANCE WITH SECTION 706.1 OF PUB.408.
10. PROVIDE PREMOLDED EXPANSION JOINT FILLER IN ACCORDANCE WITH SECTION 705.1 OF PUB.408.



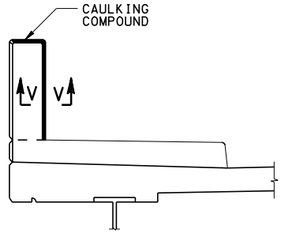
SLOPED BARRIER DETAIL



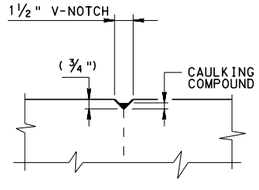
ALTERNATE SIDEWALK DETAIL



SLOPED BARRIER



SIDEWALK



SECTION V-V

NOTE: LONGITUDINAL REINFORCEMENT IS CONTINUOUS THROUGH THE JOINT

MODIFIED DEFLECTION JOINT DETAILS

BC-775M	MISCELLANEOUS PRESTRESS DETAILS
BC-788M	TYPICAL WATERPROOFING AND EXPANSION DETAILS

REFERENCE DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

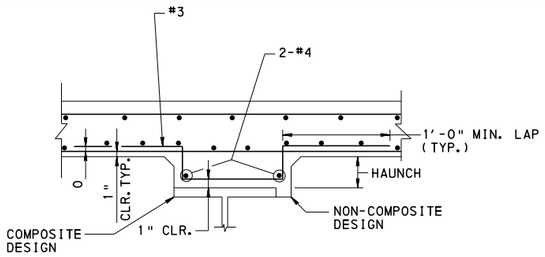
STANDARD
CONCRETE DECK SLAB DETAILS

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brent B Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

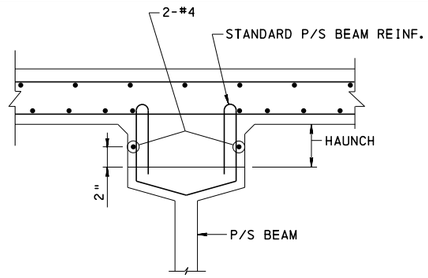
SHEET 1 OF 2

BC-752M



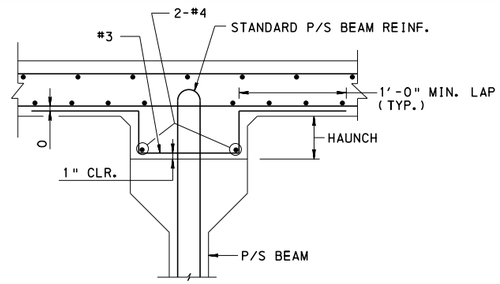
STEEL BEAMS

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

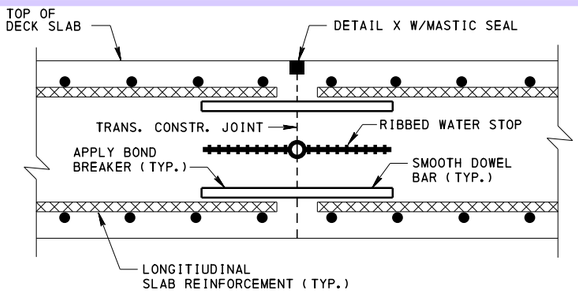


P/S CONC. PA I-BEAM & PA BULB-TEE BEAMS

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.

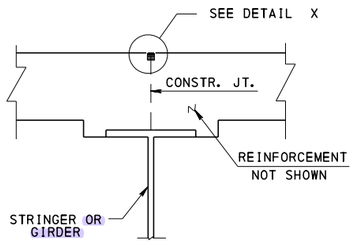
HAUNCH REINFORCEMENT DETAILS

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.

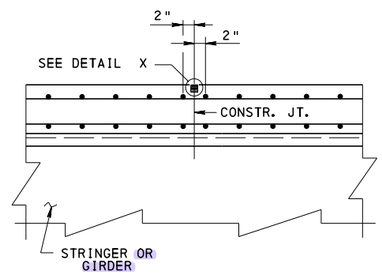


ALTERNATE TRANSVERSE CONSTRUCTION AND CRACK CONTROL JOINT

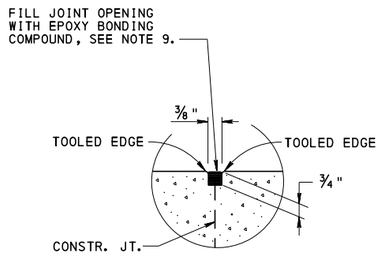
- FOR CONTINUOUS BRIDGES USING ALTERNATE PLACEMENT SEQUENCE SEE BD-660M.
- FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.
- DOWELS ARE SAME NOMINAL SIZE AS LAPPED BAR AND 3 FT. LONG.



LONGITUDINAL DETAIL



TRANSVERSE DETAIL



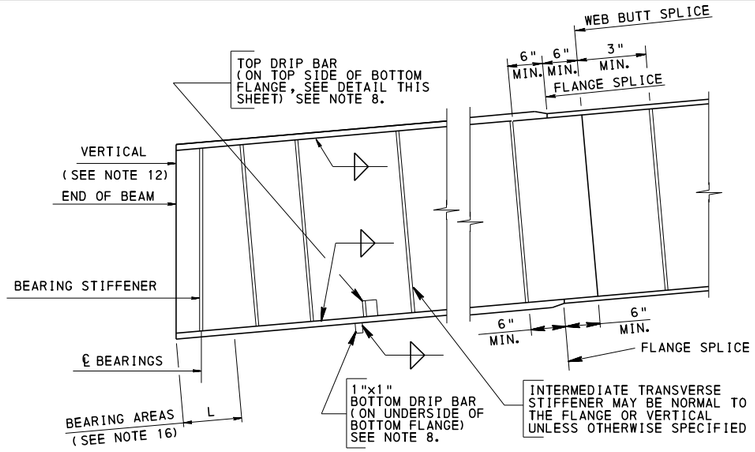
DETAIL X

CONSTRUCTION JOINT DETAILS

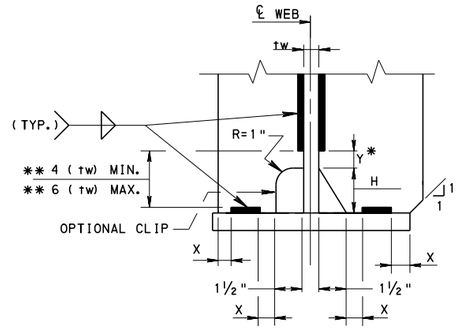
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD CONCRETE DECK SLAB DETAILS

RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Bruce D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 2 OF 2 BC-752M



TYPICAL GIRDER DETAIL



CORNER CHAMFER DETAIL (TYP。)

SHOW STIFFENER PLATE AND FILLET WELD SIZES ON THE PLAN

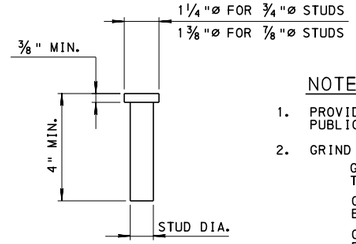
X = 0" TO ¼" ± ⅛"

Y = 0" TO ½" ± ¼" (FOR SKEWED PLATES, VALUE IS DIFFERENT ON EITHER SIDE OF PLATE. VALUE SHOWN IS NOMINAL.)

H = 2½" FOR GIRDERS WITH WEBS (tw) ≤ ½" ;
2½" MIN. FOR GIRDERS WITH WEBS > ½"

* 0 FOR GROOVE WELD.

** DOES NOT APPLY TO GIRDERS WITH tw ≤ ½"



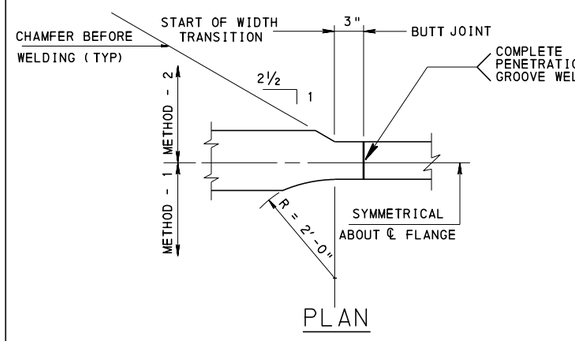
STUD DETAIL

NOTES:

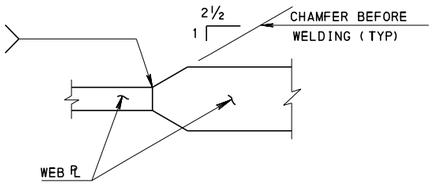
1. PROVIDE MATERIALS AND WORKMANSHIP CONFORMING TO PUBLICATION 408, AND AASHTO/AWS D1.5 WELDING CODE.
2. GRIND GROOVE WELDED SPLICES AS FOLLOWS:
   GRIND FLUSH ALL WELDS SUBJECTED TO NON-DESTRUCTIVE TESTING.
   GRIND FLUSH ALL EXPOSED WELDS OF FASCIA WEBS AND FASCIA BOTTOM FLANGES.
   GRIND SMOOTH ALL OTHER WELDS THAT EXCEED ⅛" REINFORCEMENT AND WHERE REQUIRED TO PRODUCE A GRADUAL TRANSITION TO THE PLANE OF THE BASE METAL ALONG WITH REMOVING ANY DISCONTINUITIES.
3. FOR DIAPHRAGM CONNECTION PLATE DETAILS, SEE BC-754M.
4. SEE DESIGN DRAWINGS FOR LOCATION OF LONGITUDINAL, BEARING, AND INTERMEDIATE TRANSVERSE STIFFENERS.
5. PROVIDE ALL INTERMEDIATE STIFFENERS ON OPPOSITE SIDE OF WEB FROM LONGITUDINAL STIFFENER.
6. FOR ALL GROOVE WELDS USE PREQUALIFIED COMPLETE PENETRATION WELDS.
7. PROVIDE CONTROLLED PEENING IF INDICATED OR SPECIFIED.

☆ THE FOLLOWING NOTES ARE TO BE USED WHEN REFERENCED ON THE DRAWINGS:

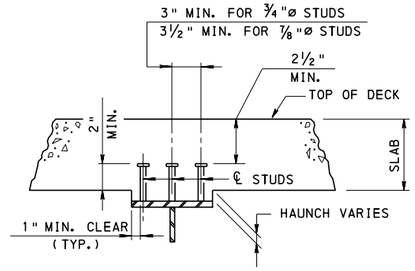
8. DRIP BARS TO BE PROVIDED FOR WEATHERING STEEL GIRDERS ONLY. DRIP BARS SHOULD NOT BE PROVIDED AT THE ABUTMENT WHEN THE BEAM SLOPE IS AWAY FROM THE ABUTMENT.
9. USE HANDRAILS AS SHOWN ON GIRDERS 6'-0" DEEP OR GREATER. REFER TO DESIGN MANUAL PART 4 FOR ADDITIONAL INSPECTION DEVICES.
10. WELD AT TOP AND BOTTOM WHEN THE BEARING STIFFNER 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.



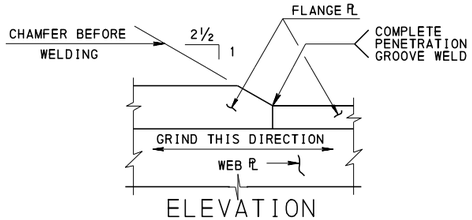
PLAN



WEB SPLICE DETAIL (PLAN)

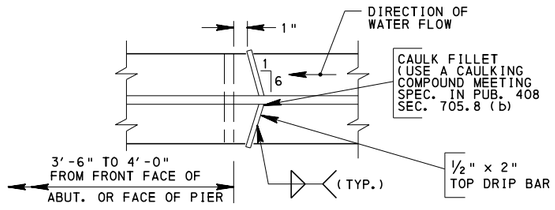


SHEAR CONNECTOR DETAILS



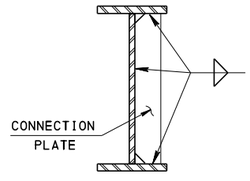
ELEVATION

FLANGE SPLICE DETAILS

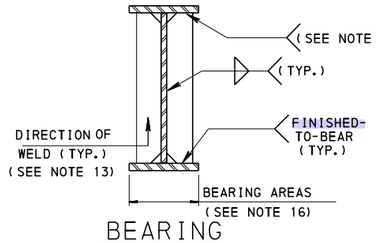


DRIP BAR DETAIL

SEE NOTE 8

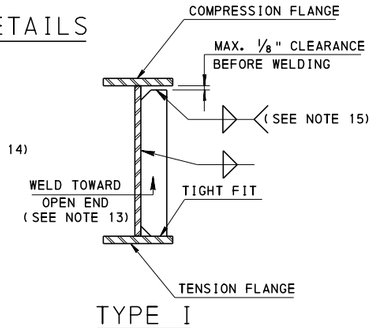


DIAPHRAGM CONNECTION PLATE***

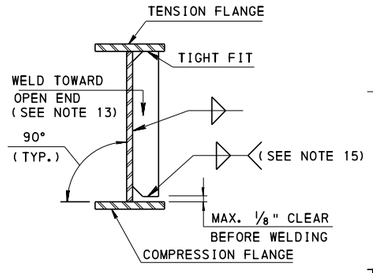


BEARING STIFFENER***

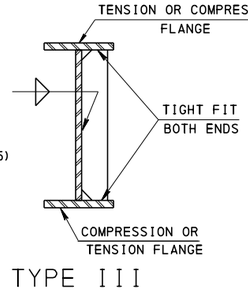
(SEE NOTE 10)



TYPE I



TYPE II



TYPE III

(IN STRESS REVERSAL ZONE)

***INTERMEDIATE STIFFENER DETAILS

*** SEE CORNER CHAMFER DETAIL FOR LIMITS OF WELDS.

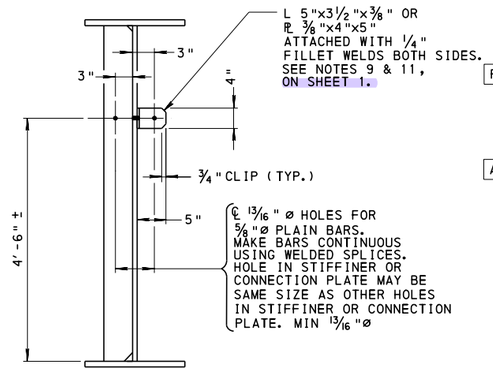
BC-754M	STEEL DIAPHRAGMS FOR STEEL BEAM/GIRDER STRUCTURES

REFERENCE DRAWINGS

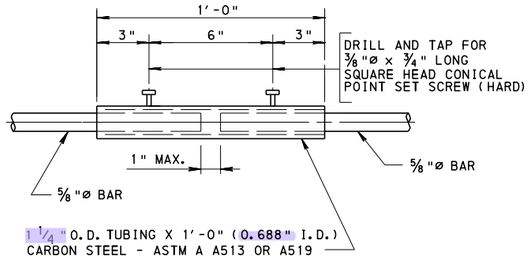
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STEEL GIRDER DETAILS

RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian S. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 1 OF 2 BC-753M

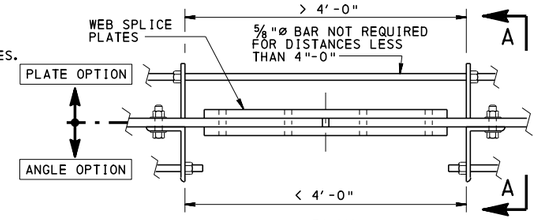


SECTION



ALTERNATE BOLTED SPLICE DETAIL AT MAIN MEMBER FIELD SPLICE

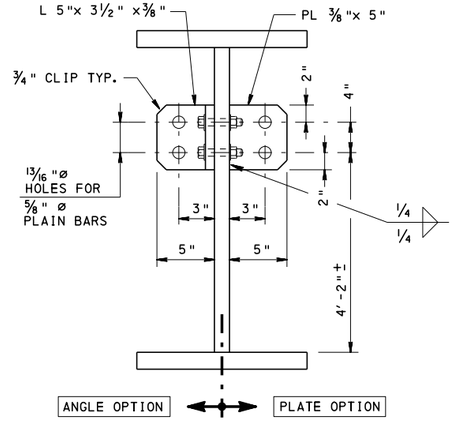
(FOR HANDRAIL)



PLAN

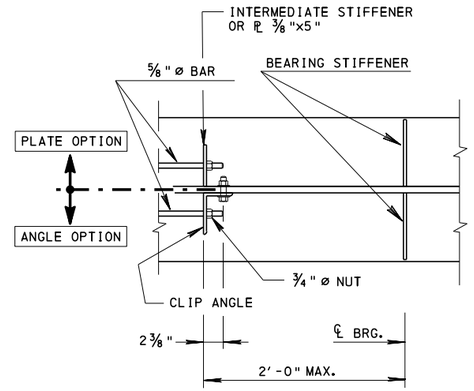
MAIN MEMBER FIELD SPLICE

(FOR HANDRAIL)



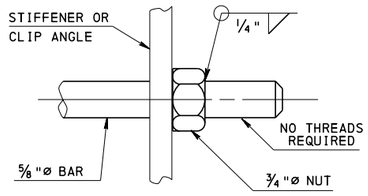
SECTION A-A

(> 4'-0")



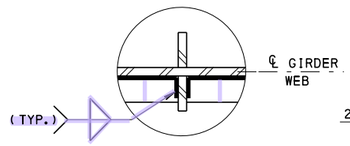
HANDRAIL PLAN AT END BEARING

(FOR HANDRAIL)



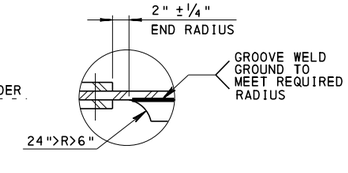
END CONNECTION DETAIL

(FOR HANDRAIL)



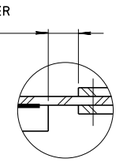
DETAIL A

SEE CORNER CHAMFER DETAIL
AND NOTE 18, ON SHEET 1



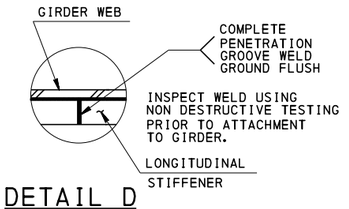
DETAIL C

SEE NOTE 18,
ON SHEET 1



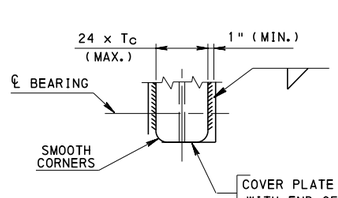
DETAIL B

SEE NOTE 18,
ON SHEET 1

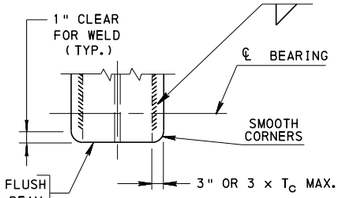


DETAIL D

SEE NOTE 17,
ON SHEET 1

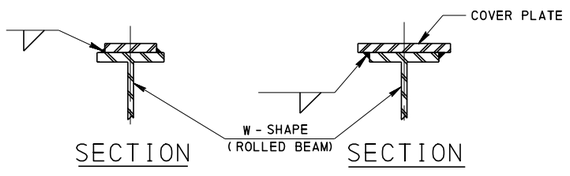


PLAN



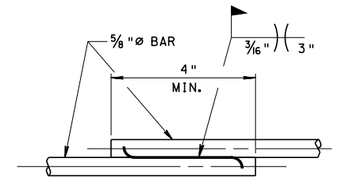
PLAN

Tc = THICKNESS OF COVER PLATE



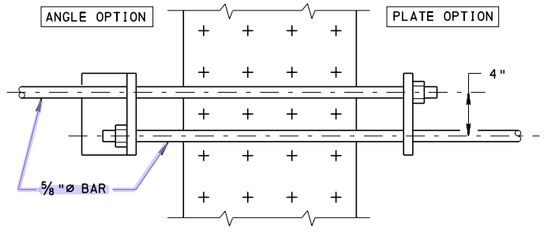
SECTION SECTION

COVER PLATE DETAILS



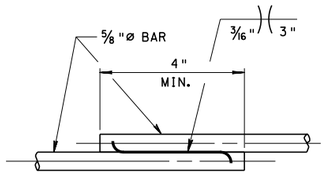
WELDED SPLICE DETAIL AT MAIN MEMBER FIELD SPLICE

(FOR HANDRAIL)



ELEVATION

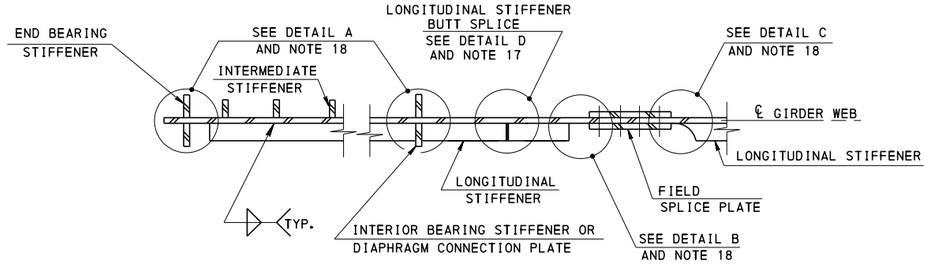
(> 4'-0")



WELDED SPLICE DETAIL

(FOR HANDRAIL)

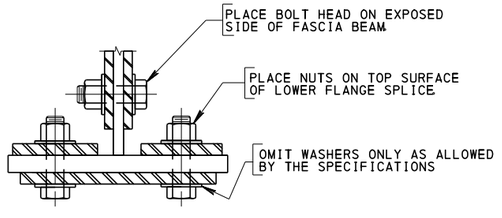
HANDRAIL DETAILS



PLAN VIEW

LONGITUDINAL-TRANSVERSE STIFFENER INTERSECTION DETAILS

FOR NOTES, SEE SHEET 1.



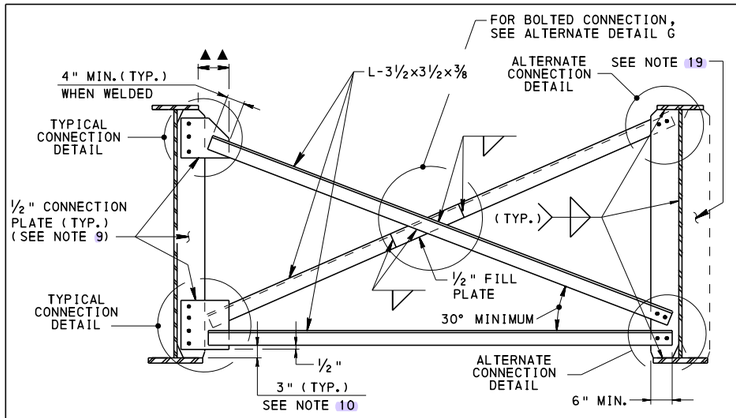
BOLTED SPLICE DETAIL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

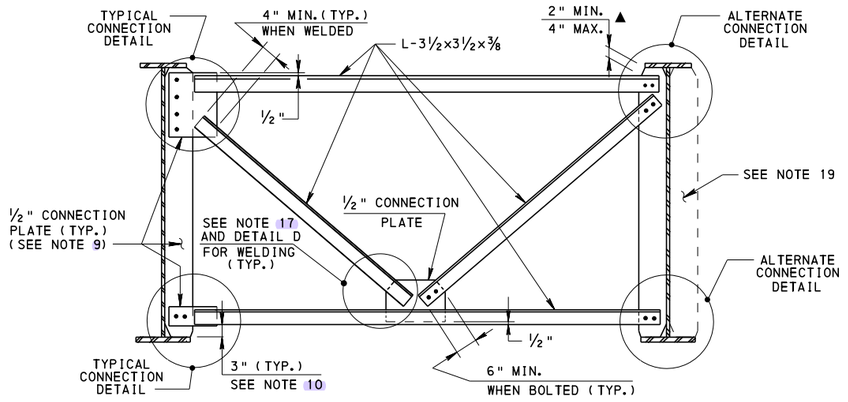
STANDARD

STEEL GIRDER DETAILS

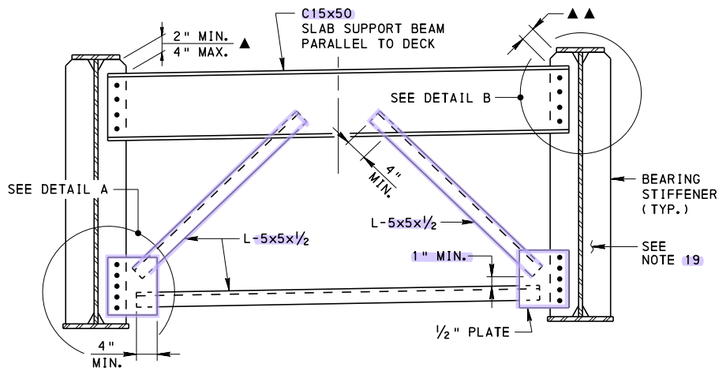
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 2
Thomas P Macioce	Brent B Thompson	BC-753M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



INTERMEDIATE DIAPHRAGM DETAIL



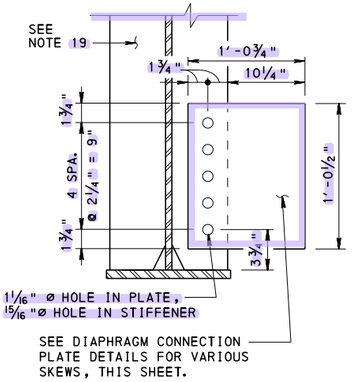
ALTERNATE INTERMEDIATE DIAPHRAGM DETAIL



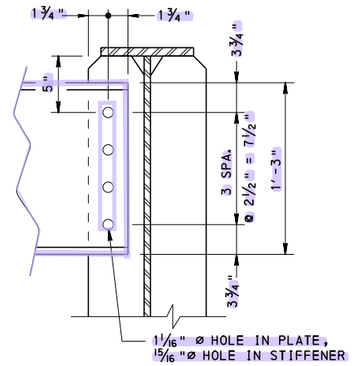
END DIAPHRAGM DETAIL

▲ MAY BE EXCEEDED UP TO DECK PAN DEPTH PLUS 1"

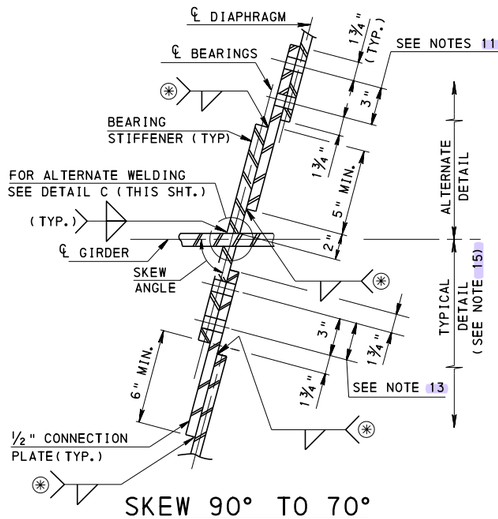
▲▲ DETAIL SHOULD BE COORDINATED WITH METAL DECK FORMS TO ENSURE PROPER FIT.



DETAIL A

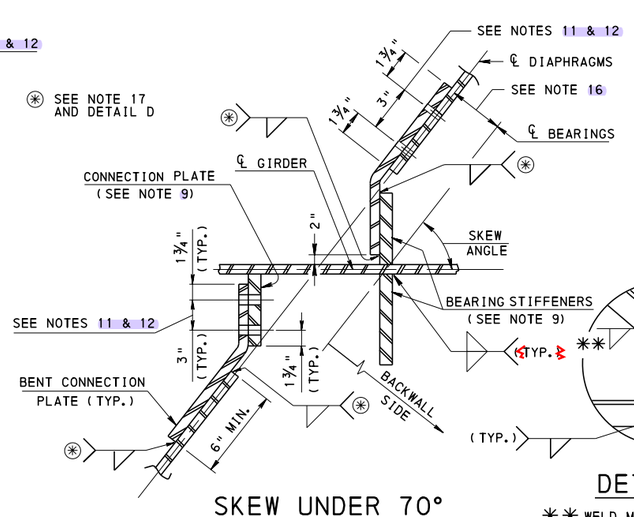


DETAIL B



SKEW 90° TO 70°

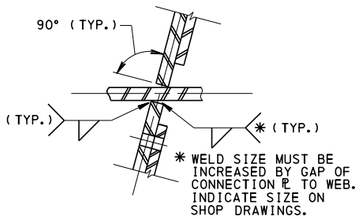
(END DIAPHRAGM SHOWN, INTERMEDIATE DIAPHRAGM SIMILAR)



SKEW UNDER 70°

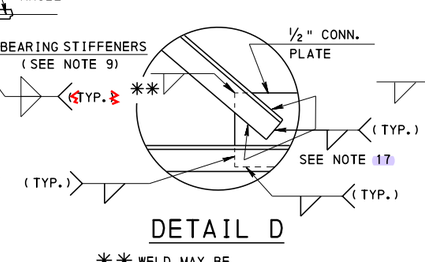
(END DIAPHRAGM SHOWN, SEE NOTES 3 & 7)

DIAPHRAGM CONNECTION PLATE DETAILS



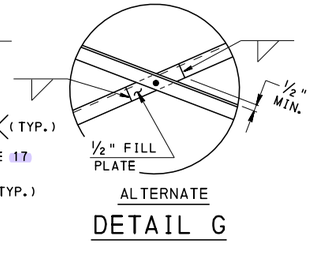
DETAIL C

SIMILAR TO NORMAL CONNECTION EXCEPT AS NOTED



DETAIL D

✱✱ WELD MAY BE ELIMINATED IF AASHTO SEALING REQUIREMENTS ARE SATISFIED.



ALTERNATE

DETAIL G

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408 AND AASHTO/AWS D1.5 SPECIFICATIONS.
2. 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 DIAPHRAM MEMBERS, WELDS AND PLATE SIZES WHEN THE GIRDER SPACING EXCEEDS 8'-0"AND/OR THE SKEW ANGLE IS LESS THAN 70°.
3. THE DETAILS SHOWN ARE VALID FOR SKEW ANGLES 25°TO 70°. PROVIDE SPECIAL DETAILS FOR SKEW ANGLES LESS THAN 25°.
4. FILLET WELD SIZES ARE GOVERNED BY MATERIAL THICKNESS IN ACCORANCE WITH AASHTO/AWS EXCEPT AS NOTED.
5. 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).
6. 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.
7. PROVIDE INTERMEDIATE DIAPHRAGMS NORMAL TO THE MAIN MEMBERS FOR SKEWS <70°.
8. 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:

9. SEE BC-753M FOR THE BEARING STIFFENER AND CONNECTION PLATE INSTALLATION DETAILS.
10. 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.
11. 1 1/16" DIAMETER HOLE IN CONNECTION PLATE; 15/16" DIAMETER HOLE IN CONNECTION MEMBER, FOR ⅞" DIAMETER ASTM A325 BOLTS. OVERSIZE HOLE IN CONNECTION PLATE IS OPTIONAL. STANDARD SIZE HOLE IS PERMITTED.
12. USE ⅞" DIAMETER ASTM DESIGNATION 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).
13. 1 1/16" DIAMETER HOLE IN BEARING STIFFENERS; 15/16" DIAMETER HOLE IN CONNECTION PLATE FOR ⅞" DIAMETER ASTM DESIGNATION 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 1½".
14. "K" = FLANGE THICKNESS + FILLET, AS INDICATED IN AISC TABLES OF BEAM DIMENSIONS.
15. 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.
16. POSITION DIAPHRAGM CONNECTION COMPONENTS SO AS TO CREATE MINIMUM OFFSET FROM ℄ BEARINGS. DIAPHRAGM BENT CONNECTION PLATE MAY BE PLACED BEHIND THE BEARING STIFFENER TO MINIMIZE OFFSET.
17. PROVIDE WELDING AS SHOWN IN "DETAIL D". THIS DETAIL IS TYPICAL FOR ALL WELDED CONNECTIONS. TERMINATE WELDS ½" SHORT OF EDGE AT EACH END OF EACH WELD.
18. CHECK ANCHOR BOLT CLEARANCES WHEN STIFFENERS ARE WIDER THAN FLANGE.
19. PROVIDE CONNECTION PLATES ON THE OUTSIDE FACE OF FASCIA GIRDERS FOR TWO AND THREE GIRDER SYSTEMS.
20. 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.

REFERENCE DRAWINGS	
BC-732M	PERMANENT METAL DECK FORMS
BC-753M	STEEL GIRDER DETAILS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

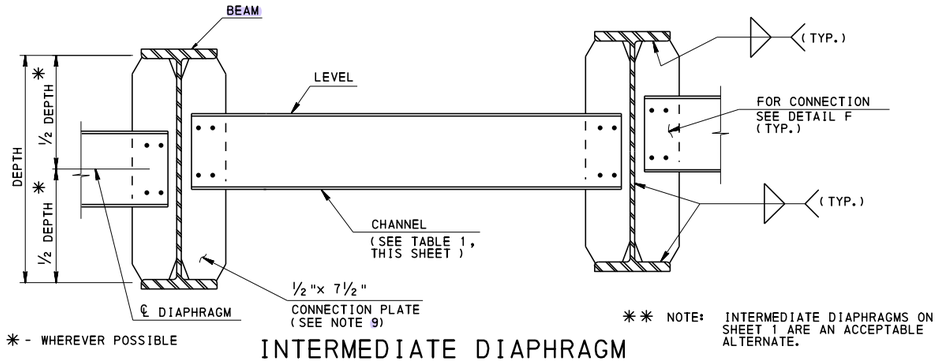
STANDARD
STEEL DIAPHRAGMS
FOR STEEL BEAM/GIRDER STRUCTURES
(STRAIGHT PLATE GIRDERS ONLY)

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brenda S. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 1 OF 2

BC-754M

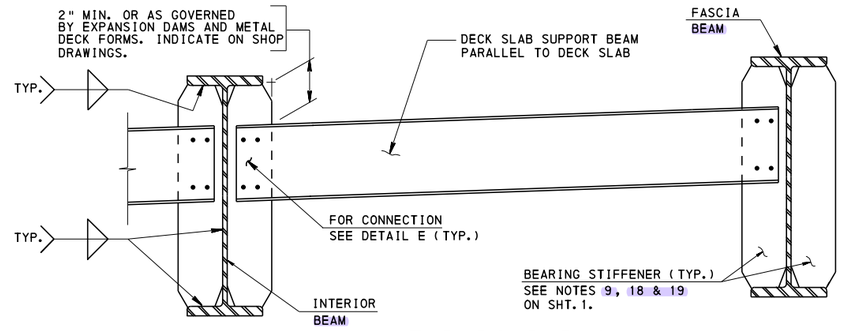


✳ - WHEREVER POSSIBLE

✳✳ NOTE: INTERMEDIATE DIAPHRAGMS ON SHEET 1 ARE AN ACCEPTABLE ALTERNATE.

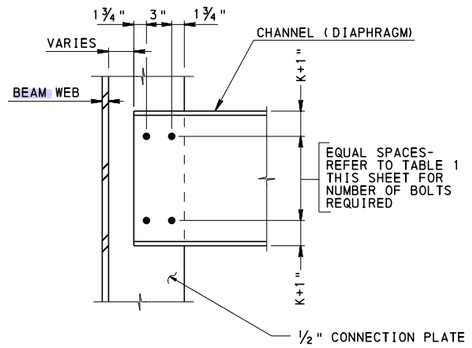
INTERMEDIATE DIAPHRAGM

FOR ROLLED SECTIONS ✳✳



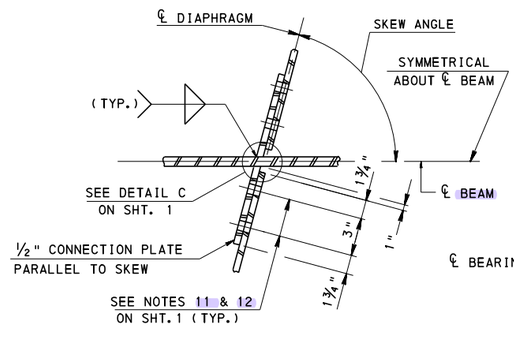
END DIAPHRAGM

FOR ROLLED SECTIONS



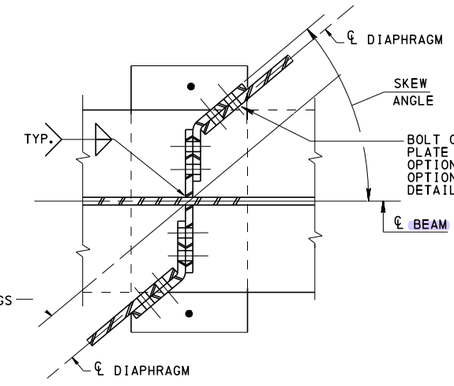
DETAIL F

INTERMEDIATE DIAPHRAGM
SEE NOTES 11 & 12 ON SHT. 1



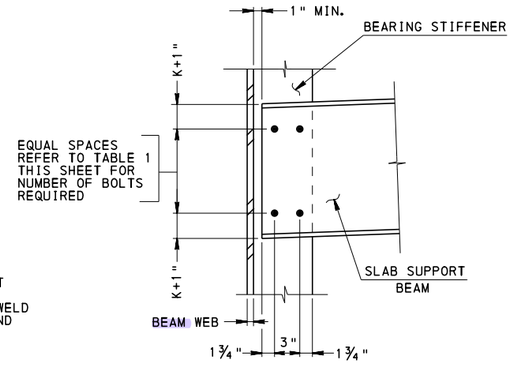
SKEW 90° TO 70°

(INTERMEDIATE DIAPHRAGM SHOWN, END DIAPHRAGM SIMILAR)



SKEWS <70°

(END DIAPHRAGM SHOWN, SEE NOTES 3 & 7 ON SHT. 1)



DETAIL E

END DIAPHRAGM
(SEE NOTES 13 & 14
ON SHT. 1)

DIAPHRAGM CONNECTION PLATE DETAILS

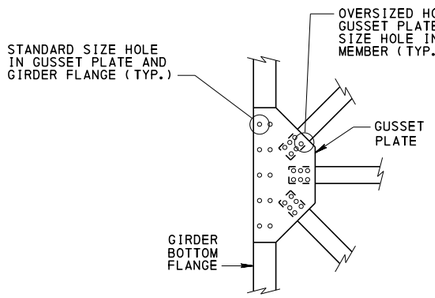
(SEE NOTE 10 ON SHT. 1)

TABLE 1

BEAM SIZE	DIAPHRAGM SIZE	NO. OF BOLTS
≥ 27" DEPTH	C 15x33.9	8
UP TO 24" DEPTH	C 12x25	6

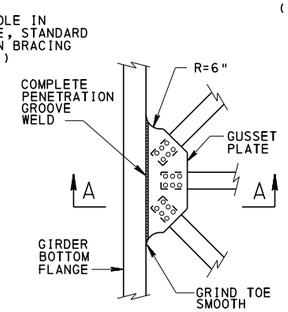
NOTE:

FOR NOTES, SEE SHEET 1.



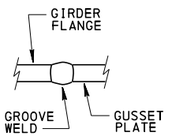
BOLTED ATTACHMENT

(CATEGORY B)



GROOVE WELDED ATTACHMENT

(CATEGORY C)▲



SECTION A-A

▲ CATEGORY B DETAIL IF THE WELD REINFORCEMENT IS GROUND AND THE GUSSET PLATE TRANSITION RADIUS IS 24".

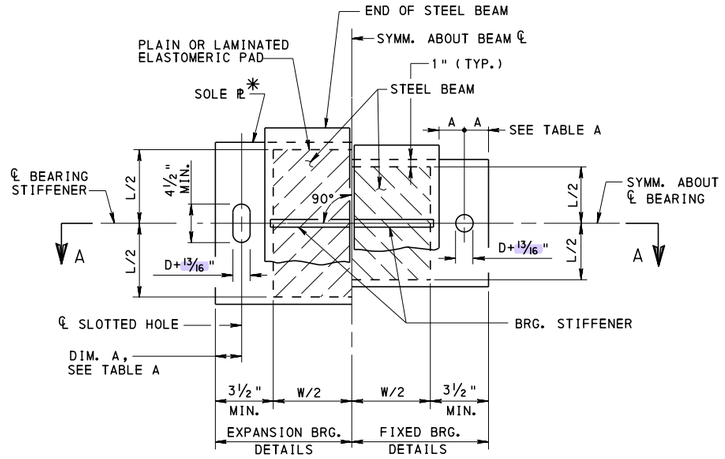
NOTE: CHIEF BRIDGE ENG. APPROVAL REQUIRED FOR GROOVE WELDED ATTACHMENT.

LATERAL BRACING ATTACHMENTS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

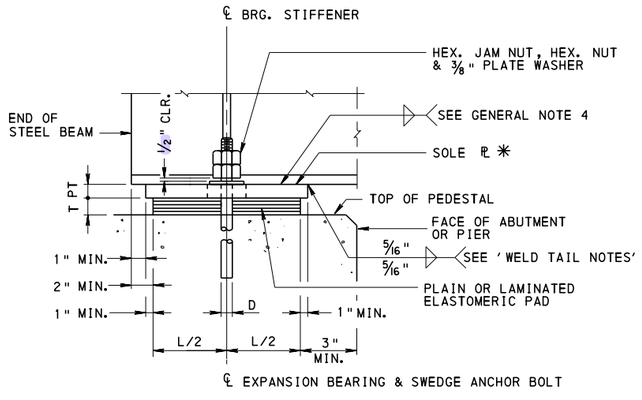
STANDARD
STEEL DIAPHRAGMS
FOR STEEL BEAM/GIRDER STRUCTURES
(ROLLED BEAMS ONLY)

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 2
Thomas P Macioce CHIEF BRIDGE ENGINEER	Burton B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-754M



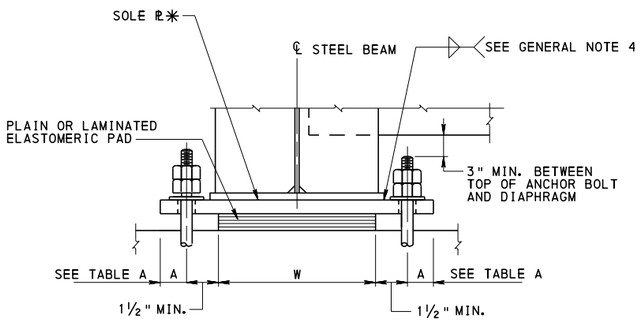
PLAN VIEW

✳ 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

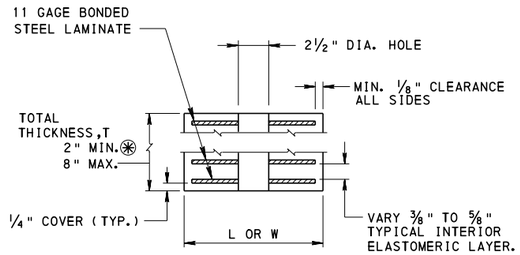
PT = SOLE PLATE THICKNESS AT ℄ BEARING 1" MIN.



BEARING SECTION A-A

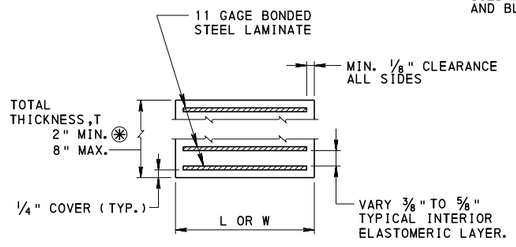
ELASTOMERIC BEARING PADS NOTES:

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 ±5 DUROMETER.
6. VULCANIZE PATCH PIN GROOVES.
7. PROVIDE MINIMUM LOW-TEMPERATURE NEOPRENE GRADE 3.

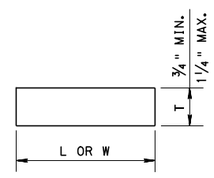


LAMINATED ELASTOMERIC PAD WITH HOLE

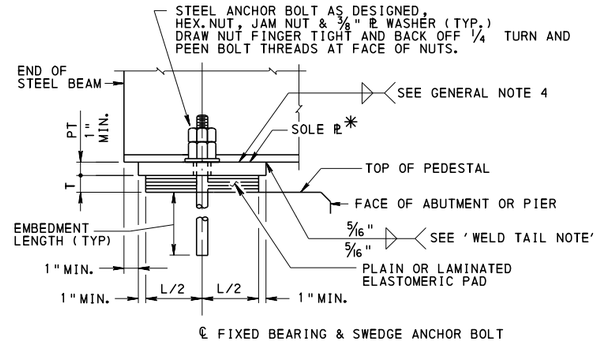
✳ A LESSER THICKNESS MAY BE USED FOR REHABILITATIONS AND BLC STANDARDS.



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 "1¼" HOLD BACK".

TABLE A ANCHOR BOLT CLEARANCE	
INCHES	
BOLT DIA.	DIM. A
1"	1 13/16"
1⅛"	2 1/16"
1¼"	2 1/16"
1⅜"	2 3/16"
1½"	2 5/16"
1¾"	2 3/4"
2"	3 1/4"

BC-753M	STEEL GIRDER DETAILS
BC-788M	TYPICAL WATERPROOFING AND EXPANSION DETAILS

REFERENCE DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

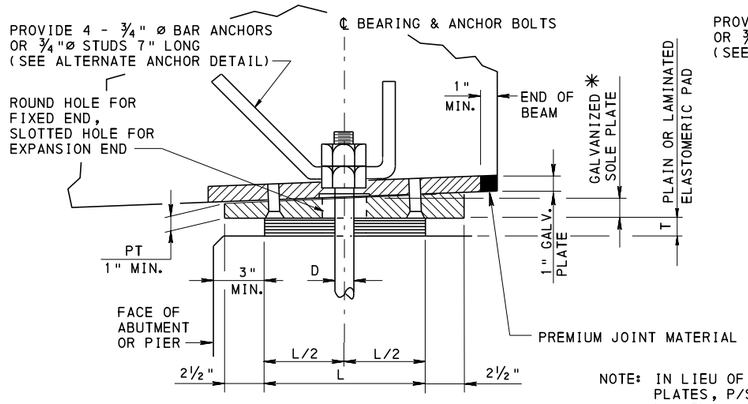
STANDARD BEARINGS ELASTOMERIC BEARING PADS FOR STEEL BEAM BRIDGES AND GENERAL

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

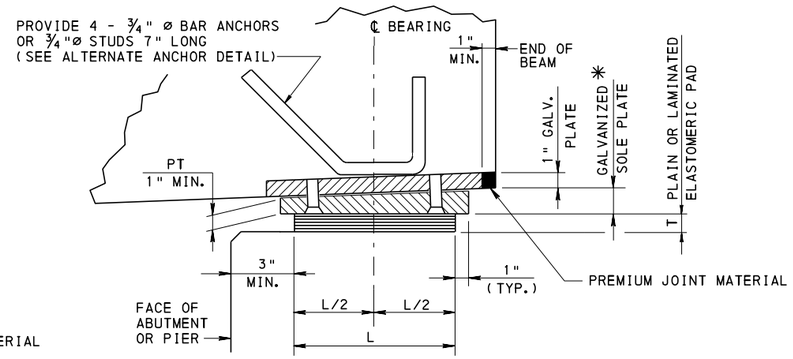
RECOMMENDED SEPT. 30, 2016
Brian D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 1 OF 4

BC-755M



SECTION B-B

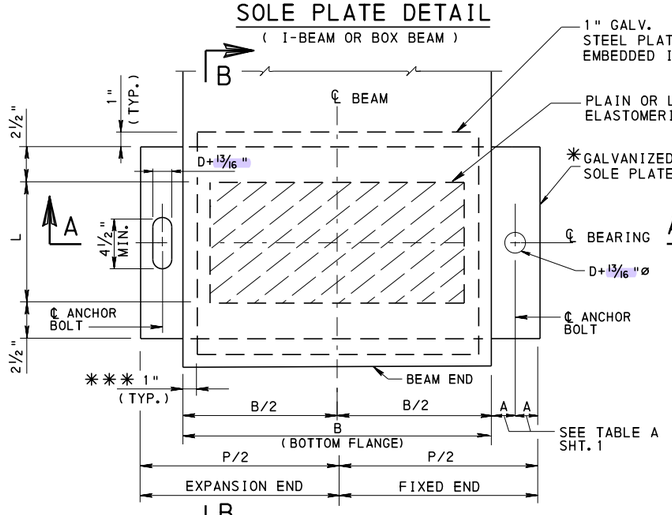


SECTION D-D

NOTE: IN LIEU OF BEVELED SOLE PLATES, P/S BEAMS MAY BE DAPPED ACCORDING TO DAPPING CRITERIA.

SOLE PLATE DETAIL

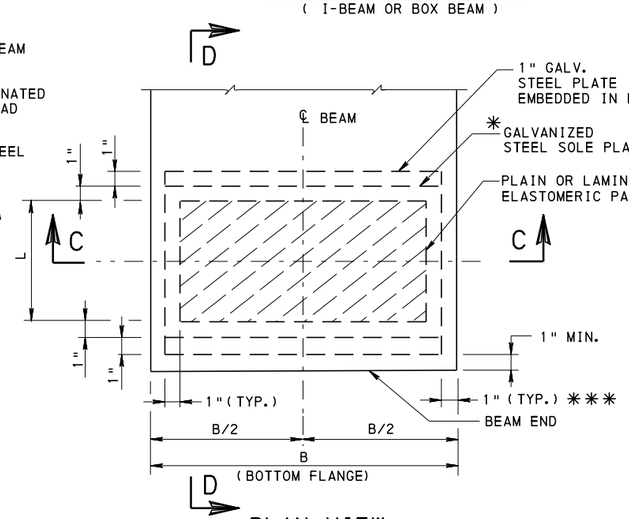
(I-BEAM OR BOX BEAM)



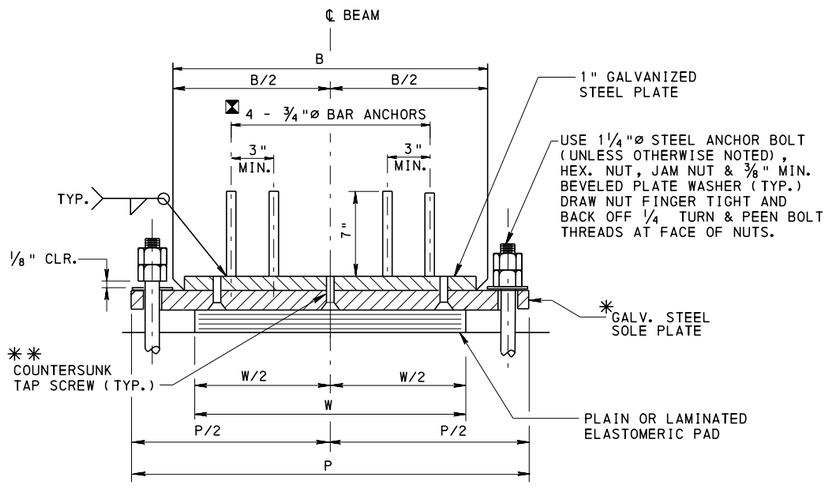
B PLAN VIEW

SOLE PLATE DETAIL

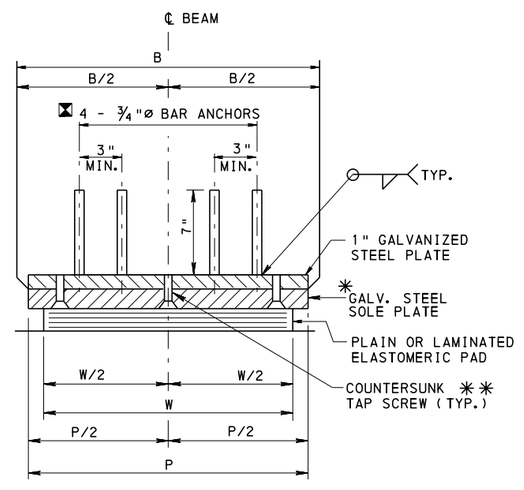
(I-BEAM OR BOX BEAM)



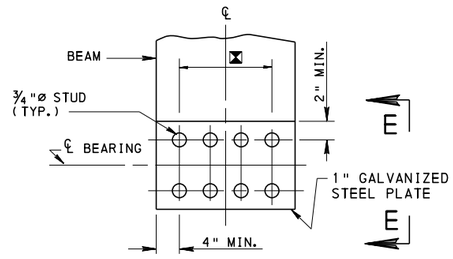
D PLAN VIEW



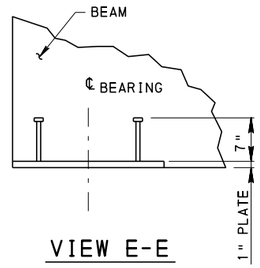
SECTION A-A
OPTION I



SECTION C-C
OPTION II



ALTERNATE ANCHOR DETAIL



VIEW E-E

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 REQURIED TO MISS STRAND PATTERN

* PROVIDE FLATNESS TOLERANCE IN ACCORDANCE WITH PUB. 408, SECTION 1105.03(g).
PROVIDE SOLE PLATE IN ACCORDANCE WITH DESIGN MANUAL PART 4, D14.7.6.3.9P

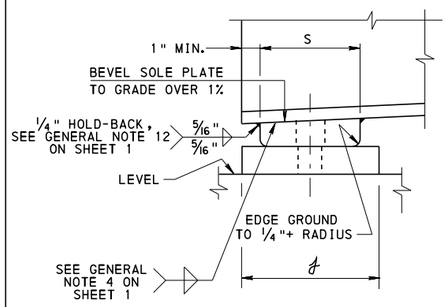
** USE ¾"ø STAINLESS STEEL COUNTERSUNK TAP SCREWS FOR AN ULTIMATE STRENGTH OF 100 KSI ON 8" CENTERS AND A 2" MIN. EDGE DISTANCE TO CONNECT THE BEVELED SOLE PLATE.

*** FOR VERY LARGE PADS, THIS 1" MAY BE ELIMINATED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

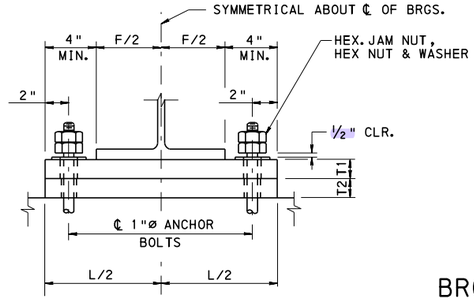
STANDARD
BEARINGS
ELASTOMERIC BEARING PADS
FOR P/S CONCRETE BRIDGES

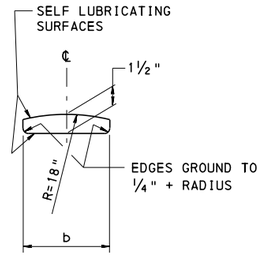
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 4
Thomas P. Macioce	Brent D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-755M



FIX. 1½" ø HOLES IN MASONRY PLATE AND SOLE PLATE

EXP. 1½" ø HOLES IN MASONRY PLATE 2"x3" SLOTTED HOLE IN SOLE PLATE





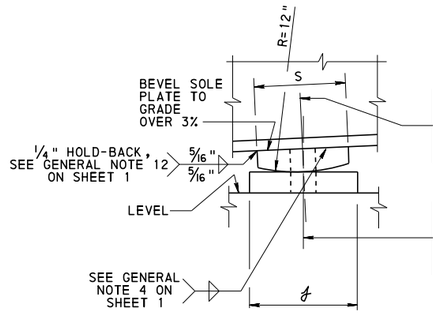
BRONZE BEARING PLATE DETAIL

METAL BEARING NOTES - FOR SKEWS > 75°

1. THICKNESS SHOWN IS AT ℄ BEARINGS.
2. 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.
3. THE DESIGNER IS REQUIRED TO COMPLETE THE APPROPRIATE BEARING DATA TABLE/TABLES BASED ON THE DESIGN CALCULATIONS.
4. USE SERVICE LOADS (UNFACTORED) IN THE TABLES.
5. DO NOT USE THESE BEARINGS FOR SKEW LESS THAN 75°. SEE SHEET 4 FOR APPROPRIATE BEARINGS FOR SKEW LESS THAN 75°.
6. PROVIDE 1/8" THICK TYPE II BEDDING MATERIAL FOR BRIDGE SHOES. CONFORMING TO THE REQUIREMENTS OF PUB. 408, SECTION 1113.03(h).

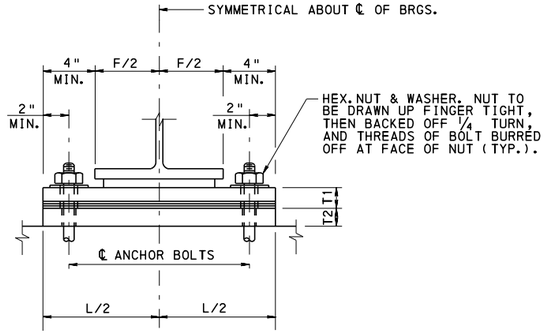
FIXED BEARINGS IF & EXPANSION BEARINGS IE FOR SPANS UP TO 50 FT.

(EXPANSION BEARING SHOWN)

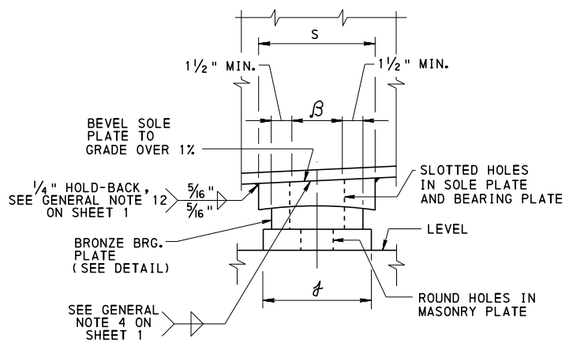


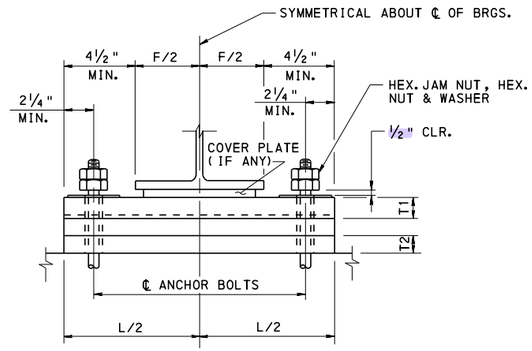
℄ HOLES IN SOLE PLATE
1⅝"ø HOLES FOR 1"ø ANCHOR BOLTS
1⅞"ø HOLES FOR 1¼"ø ANCHOR BOLTS
2⅛"ø HOLES FOR 1½"ø ANCHOR BOLTS

℄ HOLES IN MASONRY PLATE
1½"ø HOLES FOR 1"ø ANCHOR BOLTS
1¾"ø HOLES FOR 1¼"ø ANCHOR BOLTS
2"ø HOLES FOR 1½"ø ANCHOR BOLTS



FIXED BEARINGS IIF





HOLES IN MASONRY PLATE:
- 2"ø HOLES FOR 1"ø ANCHOR BOLTS
- 2¼"ø HOLES FOR 1¼"ø ANCHOR BOLTS
- 2½"ø HOLES FOR 1½"ø ANCHOR BOLTS

HOLES IN SOLE PLATE & BEARING PLATE:
- 2"ø x 5" SLOTTED HOLE FOR 1"ø ANCHOR BOLTS
- 2¼"ø x 5¼" SLOTTED HOLE FOR 1¼"ø ANCHOR BOLTS
- 2½"ø x 5½" SLOTTED HOLE FOR 1½"ø ANCHOR BOLTS

EXPANSION BEARINGS IIIE

USE THE FOLLOWING INFORMATION AS A GUIDE WHEN DESIGNING EXPANSION BEARINGS IIIE:

MINIMUM ß = DIA. OF HOLE IN MASONRY PLATE + Δℓ

MINIMUM b = (ß + Δℓ) BUT NOT LESS THAN (ß + 3")

MINIMUM ℓ = (b + Δℓ) BUT NOT LESS THAN (b + 2") IN WHICH Δℓ = TOTAL LONGITUDINAL MOVEMENT

MINIMUM L = F + 9"

MINIMUM S = b + 1½"

FIXED BEARINGS IF & EXPANSION BEARINGS IE

DEAD LOAD	LIVE LOAD	TOTAL LOAD	MARK	DIMENSIONS S	ℓ	L	T1	T2	WEIGHT

MINIMUM L = F + 8" FOR BEARINGS IF OR IE

FIXED BEARINGS IIF

DEAD LOAD	LIVE LOAD	TOTAL LOAD	MARK	DIMENSIONS S	ℓ	L	T1	T2	WEIGHT

MINIMUM L = F + 8"

EXPANSION BEARINGS IIIE

DEAD LOAD	LIVE LOAD	TOTAL LOAD	MARK	DIMENSIONS b	ℓ	L	T1	T2	WEIGHT

DESIGN BEARINGS TO PROVIDE FOR A TOTAL LONGITUDINAL MOVEMENT OF 3". FOR LARGER MOVEMENT, SPECIAL DESIGN IS REQUIRED.

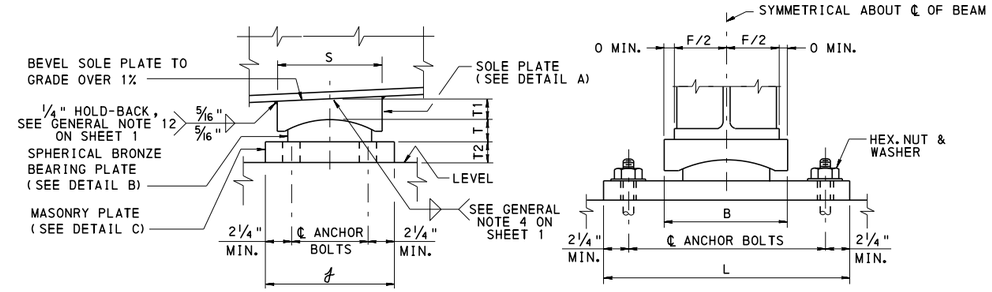
LEGEND

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

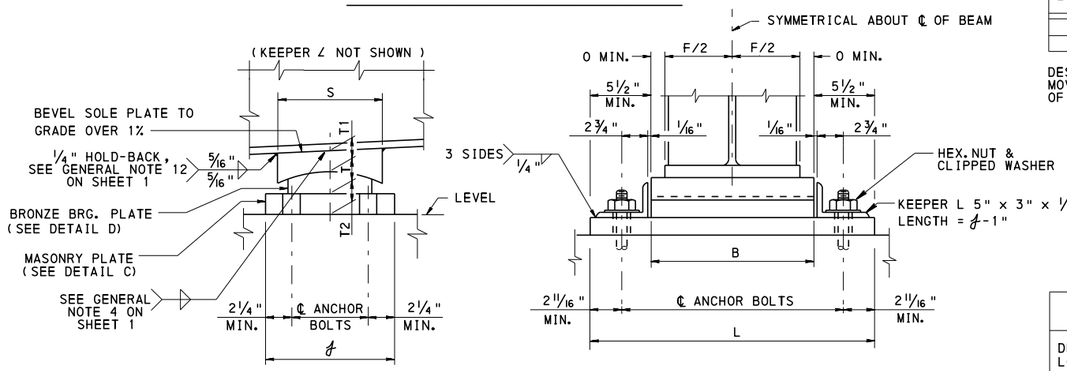
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD BEARINGS METAL BEARINGS FOR STEEL BEAM BRIDGES

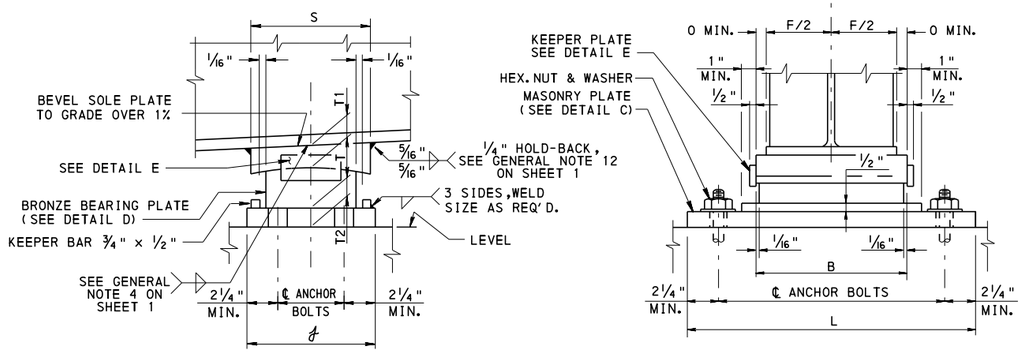
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 4
Thomas P Macioce, CHIEF BRIDGE ENGINEER	Brent D Thompson, DIRECTOR, BUR. OF PROJECT DELIVERY	BC-755M



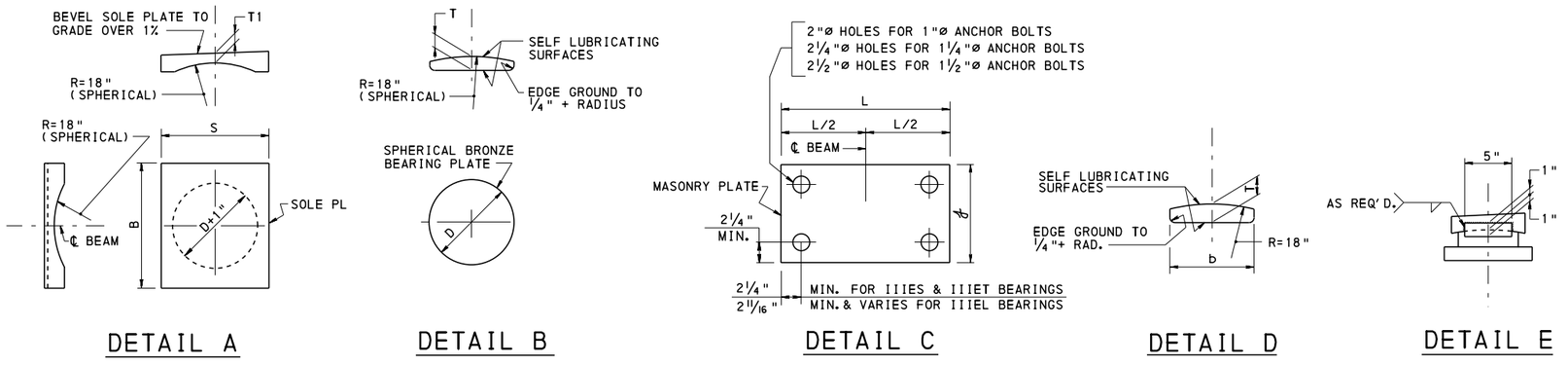
EXPANSION BEARINGS IIIES



EXPANSION BEARINGS IIIEL



EXPANSION BEARINGS IIIET



EXPANSION BEARINGS IIIES												
DEAD LOAD	LIVE LOAD	TOTAL LOAD	MARK	DIMENSIONS								WEIGHT
				D	S	B	ℊ	L	T1	T2	T	

DESIGN BEARINGS TO PROVIDE FOR A TOTAL LONGITUDINAL MOVEMENT OF 3" AND A TOTAL TRANSVERSE MOVEMENT OF 1 1/2".

EXPANSION BEARINGS IIIEL												
DEAD LOAD	LIVE LOAD	TOTAL LOAD	MARK	DIMENSIONS								WEIGHT
				b	B	ℊ	L	S	T1	T2	T	

DESIGN BEARINGS TO PROVIDE FOR A TOTAL LONGITUDINAL MOVEMENT OF 3" AND ARE RESTRAINED TRANSVERSLY. MAXIMUM RESTRAINED FORCE = COEFFICIENT OF FRICTION X DEAD LOAD REACTION + F_K, FORCE RESISTED BY KEEPER ANGLE.

EXPANSION BEARINGS IIIET												
DEAD LOAD	LIVE LOAD	TOTAL LOAD	MARK	DIMENSIONS								WEIGHT
				b	B	ℊ	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.

METAL BEARING NOTES - FOR SKEW ≤ 75° OR CURVED STEEL BEAM BRIDGES

1. THICKNESS SHOWN IS AT ℄ BEARING.
2. 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.
3. THE DESIGNER IS REQUIRED TO COMPLETE THE APPROPRIATE BEARING DATA TABLE/TABLES BASED ON THE DESIGN CALCULATIONS.
4. USE SERVICE LOADS (UNFACTORED) IN THE TABLES.
5. USE THESE BEARINGS FOR SKEW LESS THAN OR EQUAL TO 75° AND CURVED STEEL BRIDGES.
6. PROVIDE 1/8" THICK TYPE II BEDDING MATERIAL CONFORMING TO THE REQUIREMENTS OF PUB. 408, SECTION 1113.03 (h).
7. USE THE FOLLOWING AS A GUIDE:

MINIMUM VALUES OF	TYPES OF BEARINGS (In)		
	III ES	III EL	III ET
B	=F BUT. ≮ S	=F	=F
ℊ	=D+Δℓ+ 1/2" MIN.	=b+Δℓ + 1/2" MIN.	=b+ 2" MIN.
L	=B+Δt+ 8"	=B+ 11" MIN.	=B+Δt+ 9"
S	=D+ 2"	=b+ 1 1/2"	=b+ 1 1/2"

SPECIFY TYPE OF STEEL ON THE DESIGN DRAWINGS.
Δℓ = TOTAL LONGITUDINAL MOVEMENT
Δt = TOTAL TRANSVERSE MOVEMENT
≮ = NOT LESS THAN

8. SEE LEGEND ON SHEET 3.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD BEARINGS METAL BEARINGS FOR SKEW ≤ 75° OR CURVED STEEL BEAM BRIDGES

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brian G. Thompson
DIRECTOR, BUR. 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:

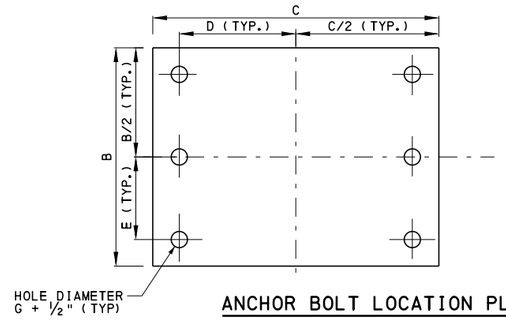
1. STRUCTURAL STEEL:
   - MATERIAL 4" THICK OR LESS - AASHTO M270 (ASTM A709/ A709M) GRADE 50
   - MATERIAL GREATER THAN 4" THICK - ASTM A572 GRADE 50
2. ANCHOR BOLTS: ASTM F1554, GRADE 55
3. NUTS: ASTM A563, GRADE DH
4. WASHERS: ASTM F436, TYPE 1
5. GALVANIZING OF ANCHOR BOLTS, NUTS AND WASHERS: PUBLICATION 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 II.

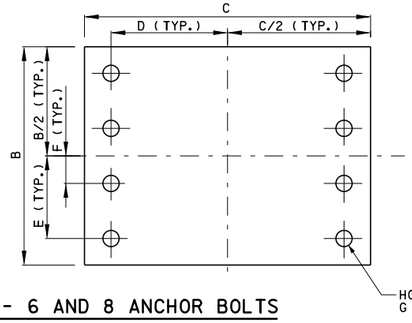
C. MATERIAL DESIGN PARAMETERS:

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

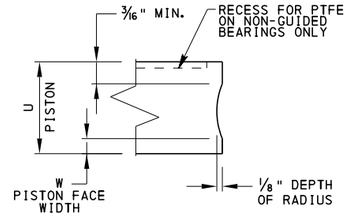
D. ANCHOR BOLT INSTALLATION:

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.

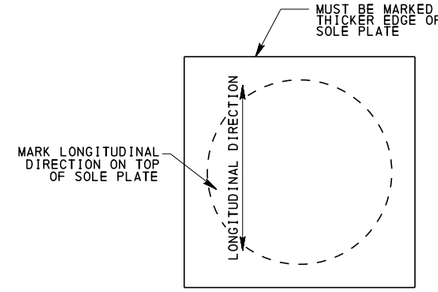




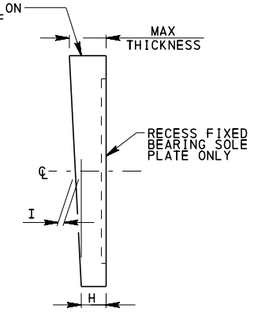
ANCHOR BOLT LOCATION PLAN - 6 AND 8 ANCHOR BOLTS



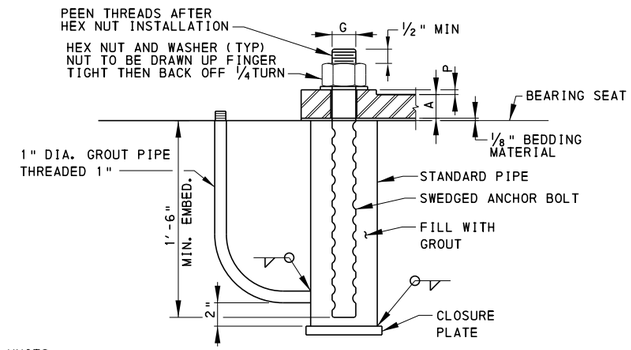
PISTON DETAIL



SOLE PLATE PLAN



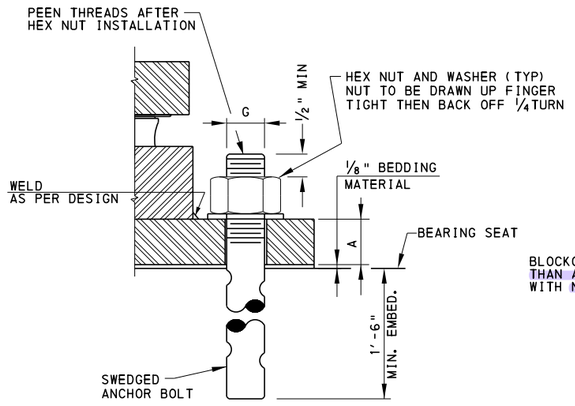
SIDE VIEW



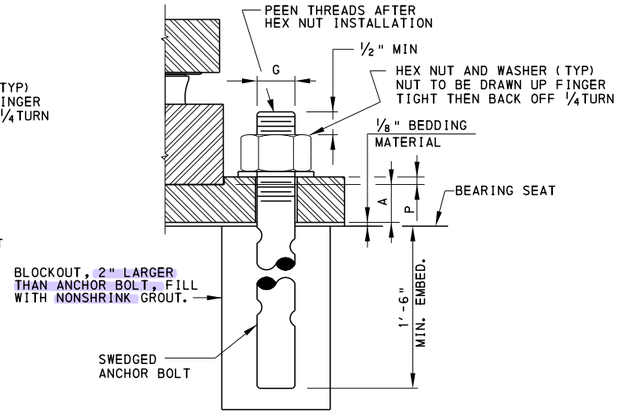
ANCHOR BOLT DETAIL 2
ALTERNATE

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.



ALTERNATE POT PLATE ATTACHMENT
NOTE: CAN BE USED IN LIEU OF RECESSING POT PLATE.

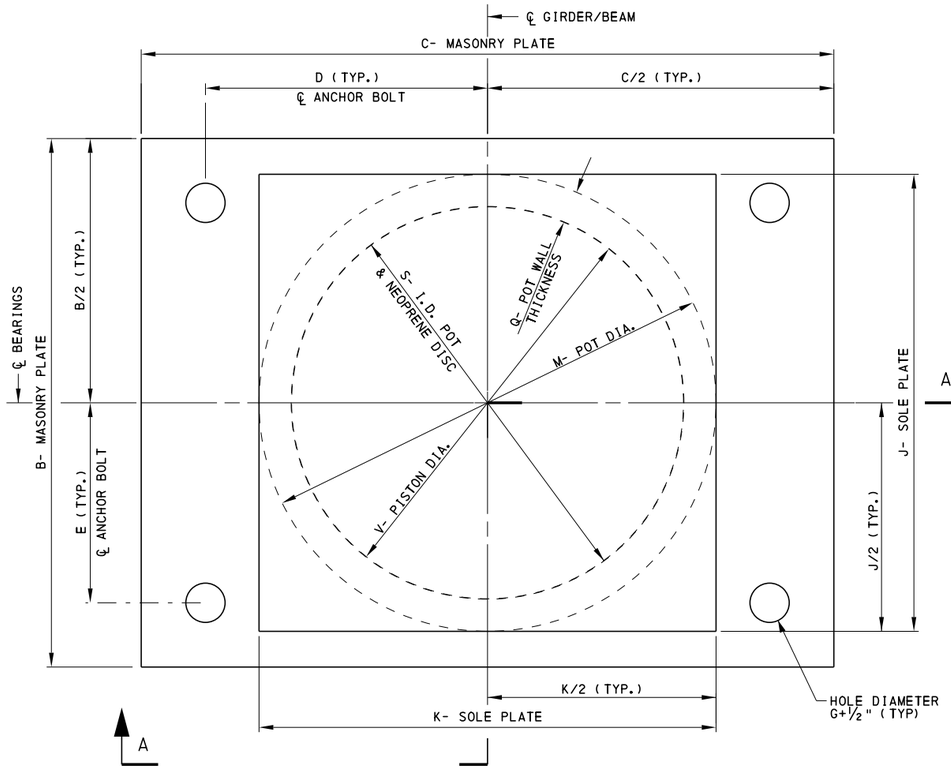


ANCHOR BOLT DETAIL 1
PREFERRED

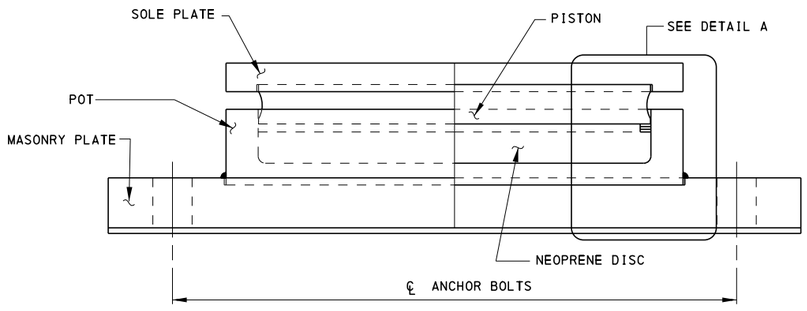
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
HIGH LOAD MULTI-ROTATIONAL
POT BEARINGS
GENERAL NOTES AND DETAILS

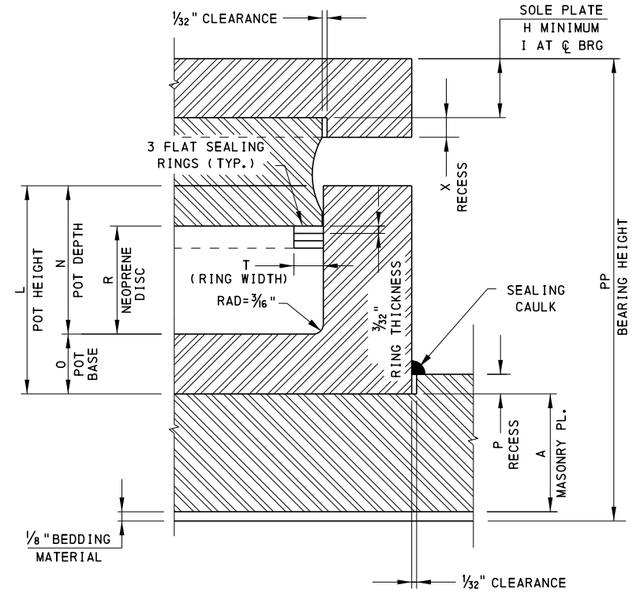
RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 1 OF 6 BC-756M



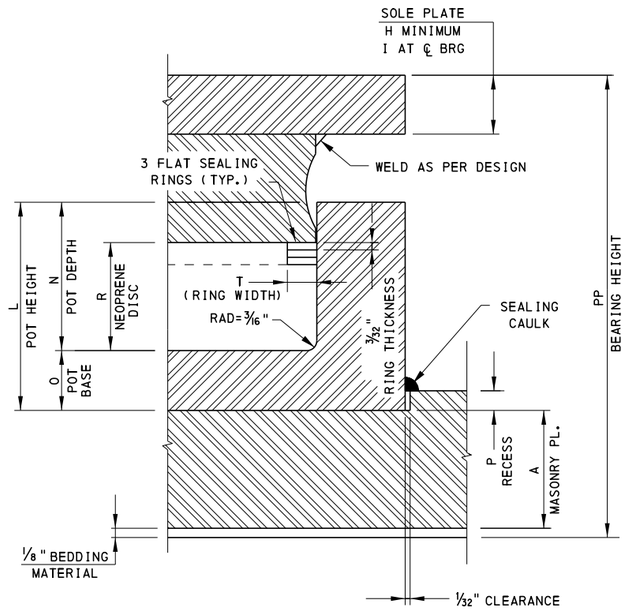
FIXED POT BEARING PLAN



SECTION A-A



DETAIL A



ALTERNATE SOLE PLATE ATTACHMENT
FOR FIXED BEARINGS ONLY

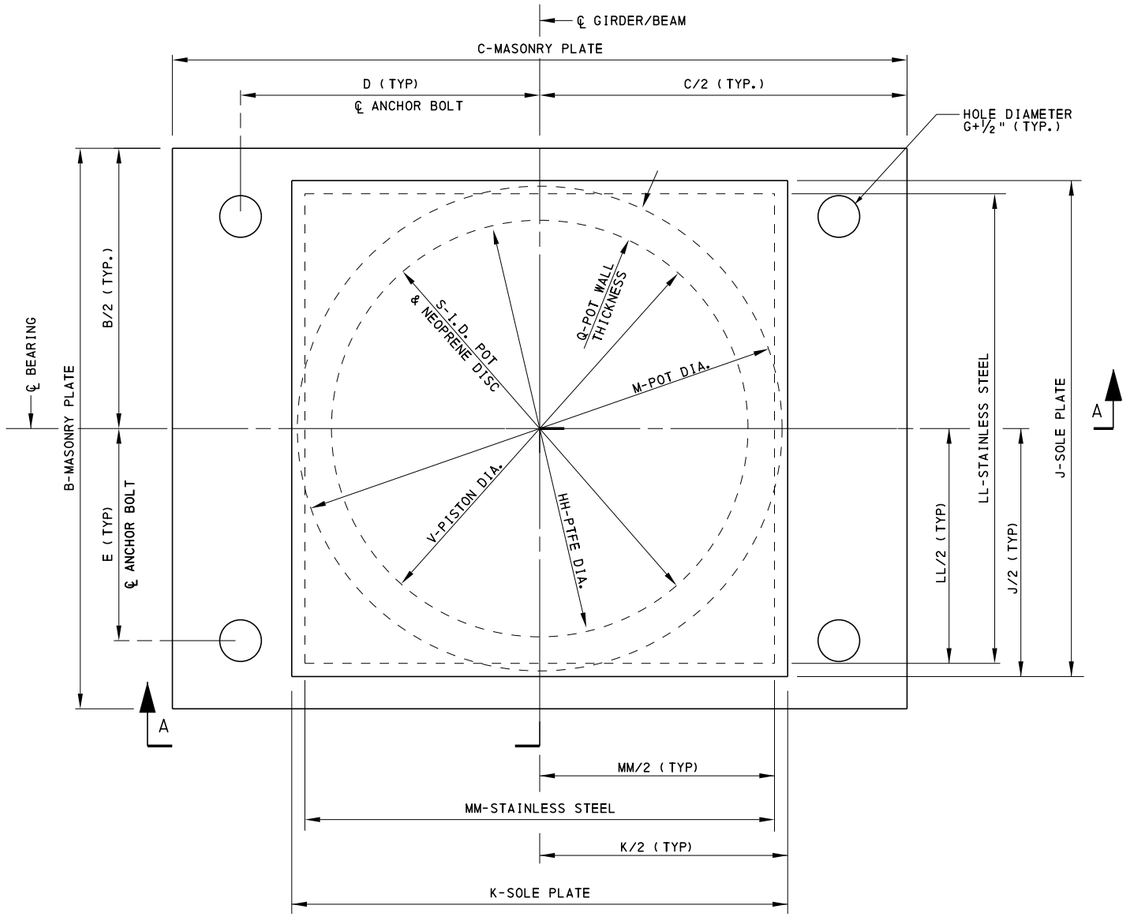
NOTE:
THE INDICATED BEARING COMPONENT DIMENSION VARIABLES TO BE TAKEN FROM CONTRACT DRAWINGS.

FOR ADDITIONAL DETAILS, SEE SHEETS 1 AND 6.

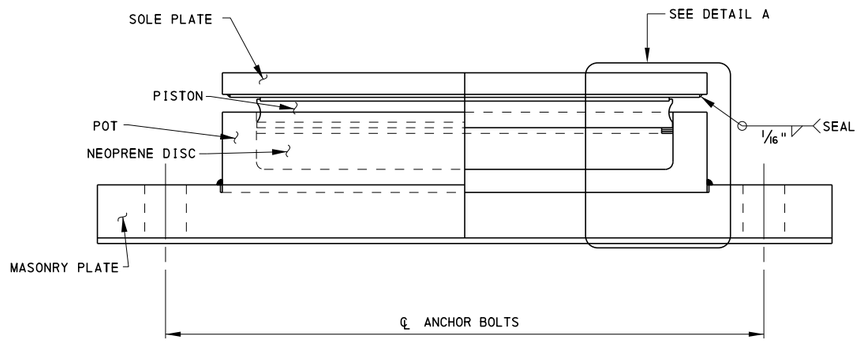
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD HIGH LOAD MULTI ROTATIONAL POT BEARINGS - FIXED DETAILS

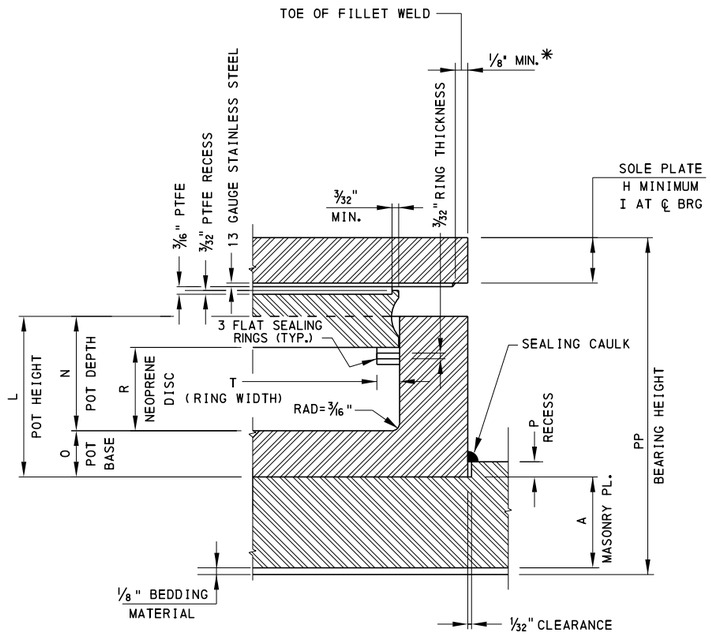
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 6
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-756M



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:

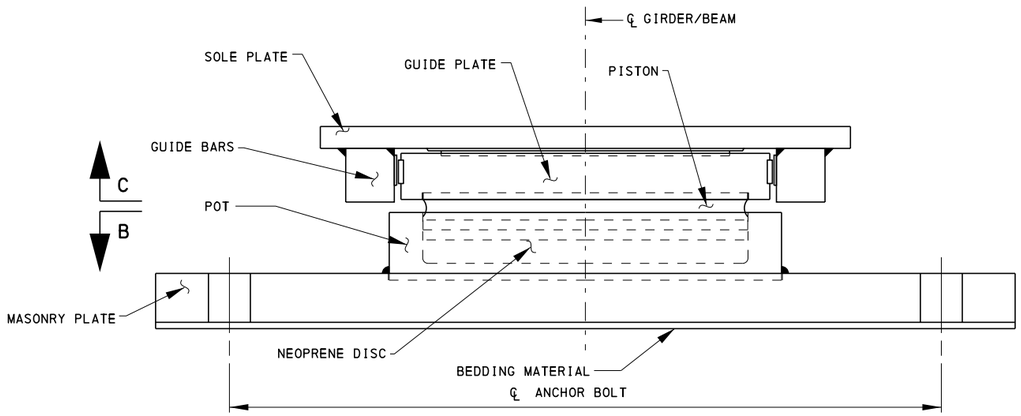
THE INDICATED BEARING COMPONENT DIMENSION VARIABLES TO BE TAKEN FROM CONTRACT DRAWINGS.

FOR ADDITIONAL DETAILS, SEE SHEETS 1 AND 6.

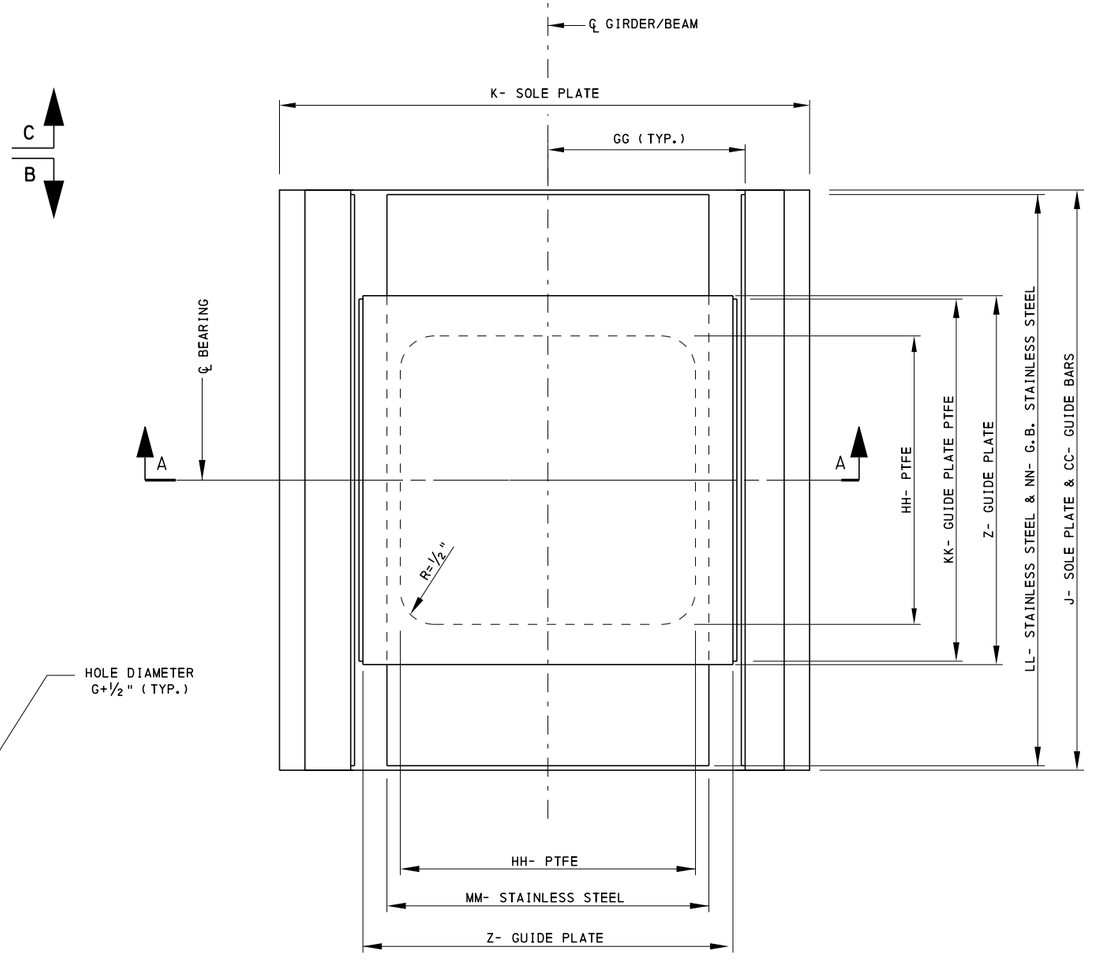
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD HIGH LOAD MULTI ROTATIONAL POT BEARINGS - NON-GUIDED DETAILS

RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 3 OF 6 BC-756M

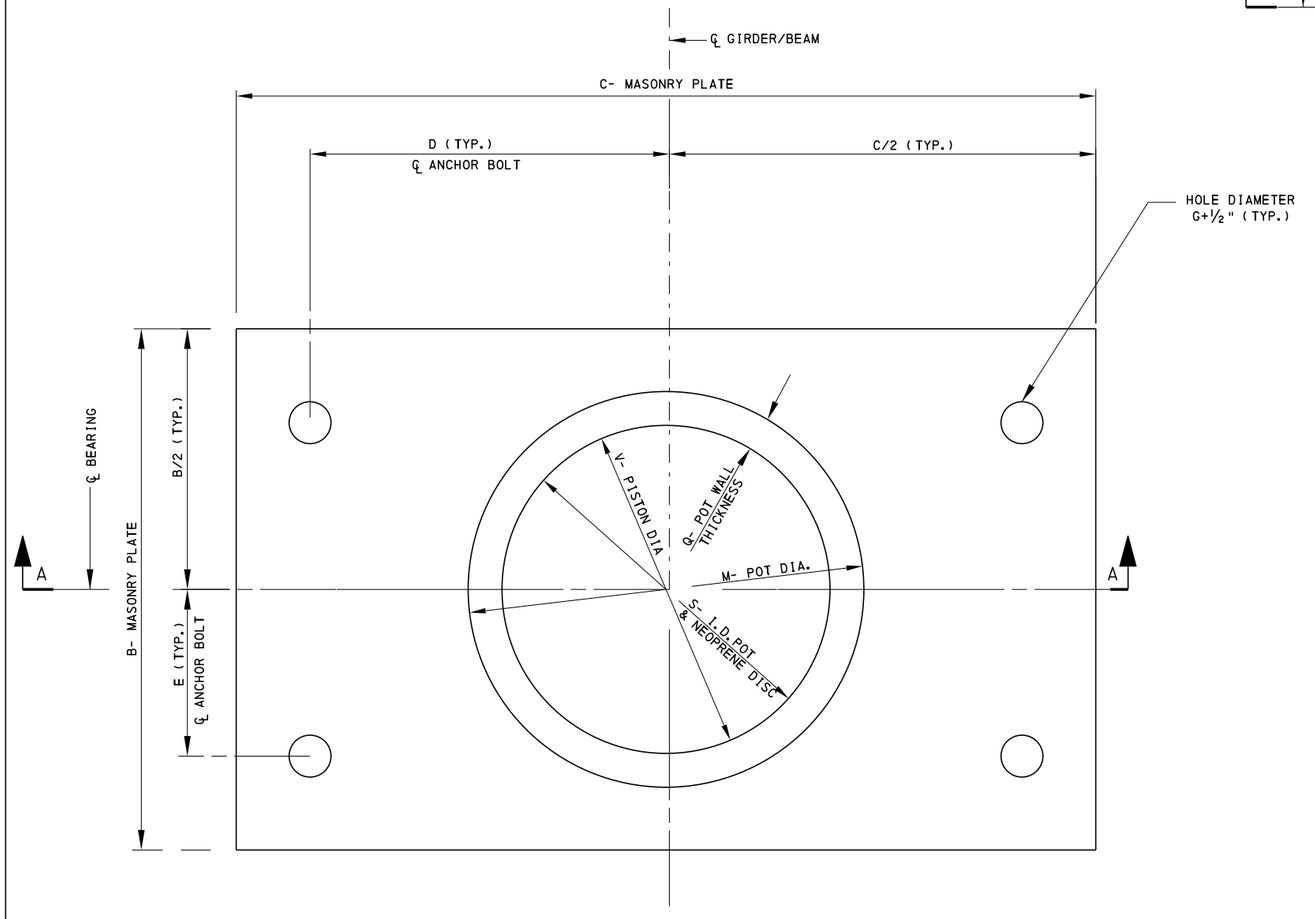


ELEVATION



SECTION C-C

(NOTE: PISTON NOT SHOWN FOR CLARITY)



SECTION B-B

NOTE:

THE INDICATED BEARING COMPONENT DIMENSION VARIABLES TO BE TAKEN FROM CONTRACT DRAWINGS.

FOR ADDITIONAL DETAILS, SEE SHEETS 1, 5 AND 6.

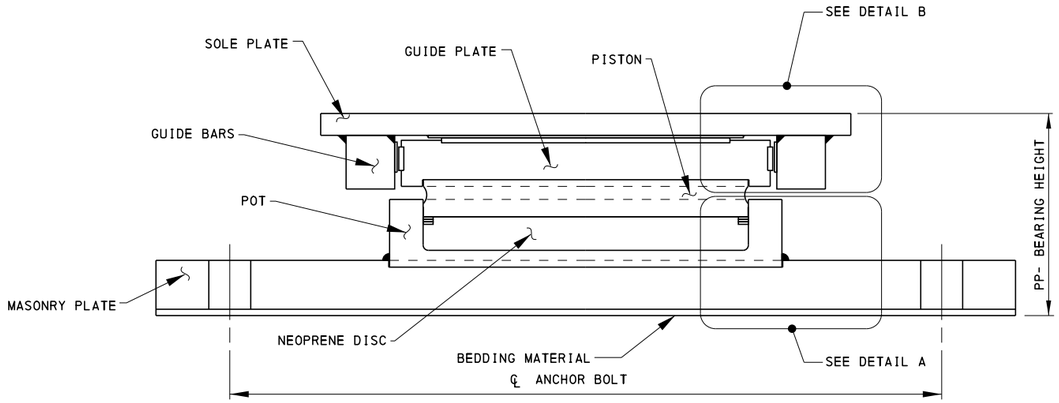
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
HIGH LOAD MULTI ROTATIONAL
POT BEARINGS - GUIDED
DETAILS - 1

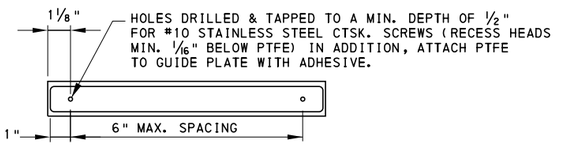
RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY

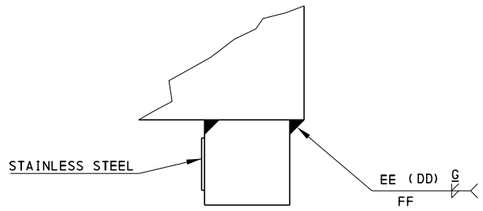
BC-756M



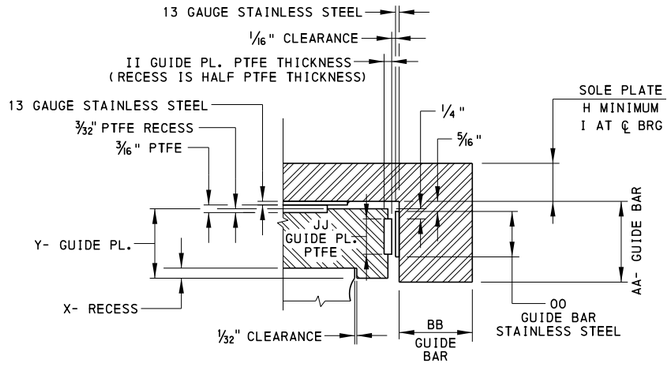
SECTION A-A



GUIDE PLATE PTFE DETAIL

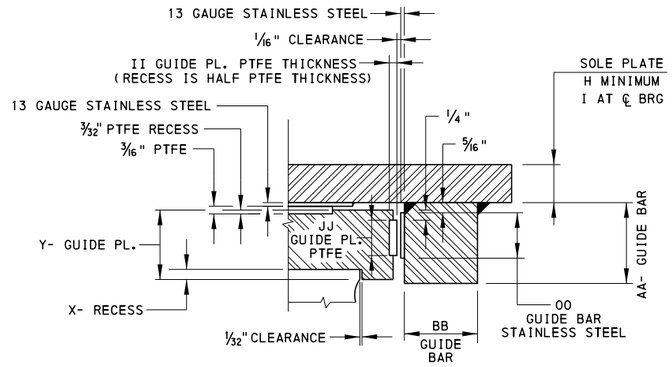


GUIDE BAR WELD DETAIL

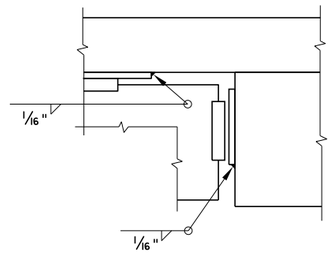


ALTERNATE GUIDE BAR FABRICATION DETAIL

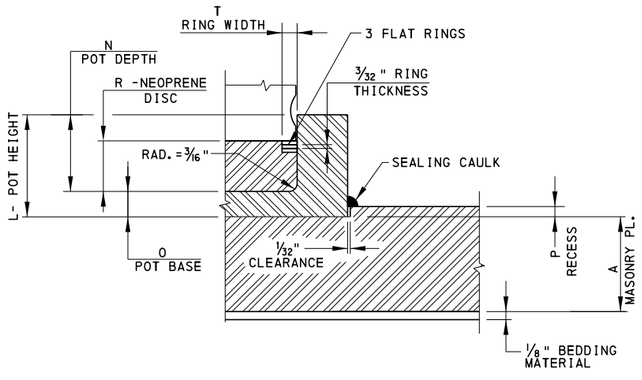
(GUIDE BAR FABRICATED FROM SINGLE PLATE)



DETAIL B



STAINLESS STEEL WELD DETAIL



DETAIL A

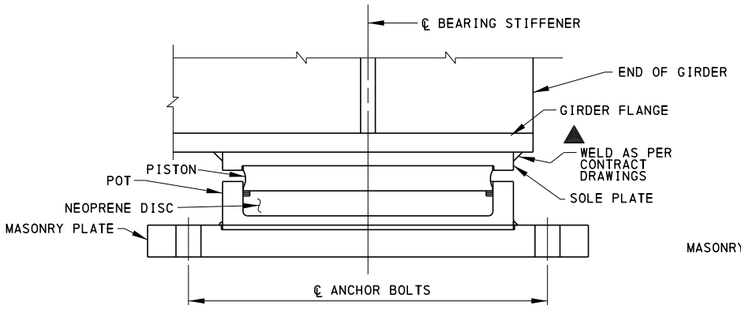
NOTE:
THE INDICATED BEARING COMPONENT DIMENSION VARIABLES TO BE TAKEN FROM CONTRACT DRAWINGS.

FOR ADDITIONAL DETAILS, SEE SHEETS 1, 4 AND 6.

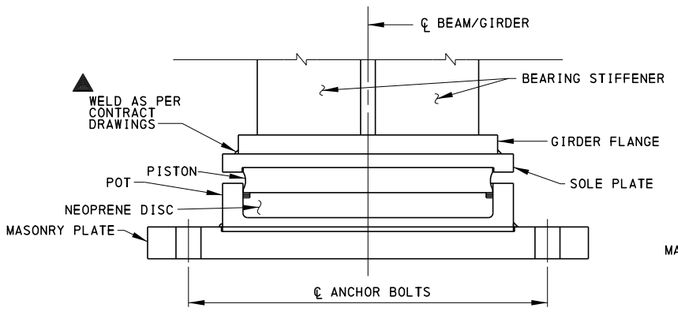
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
HIGH LOAD MULTI ROTATIONAL
POT BEARINGS
GUIDED DETAILS - 2

RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 5 OF 6 BC-756M

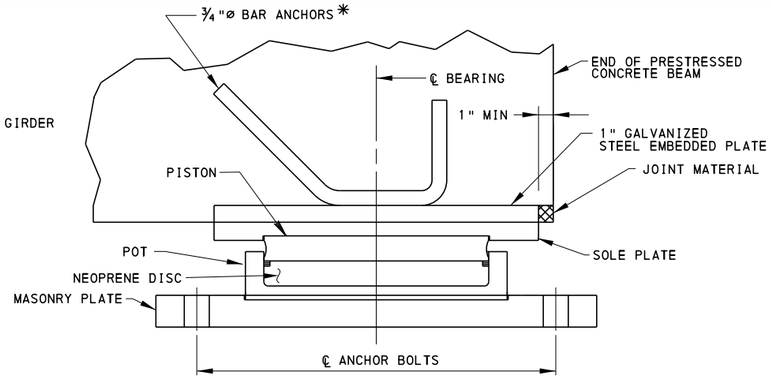


SIDE VIEW

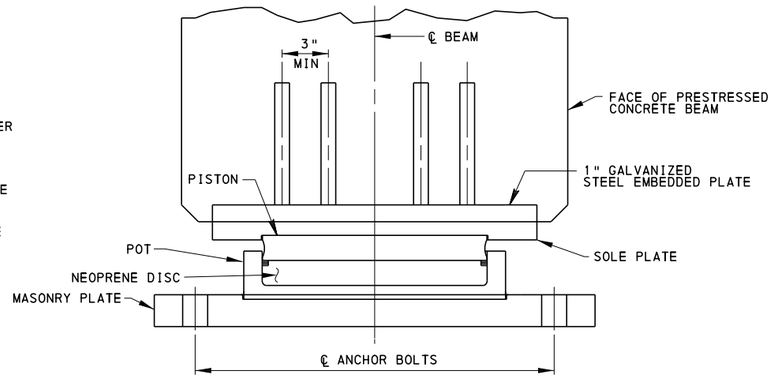


END VIEW

WELDED CONNECTION FOR STEEL BEAM

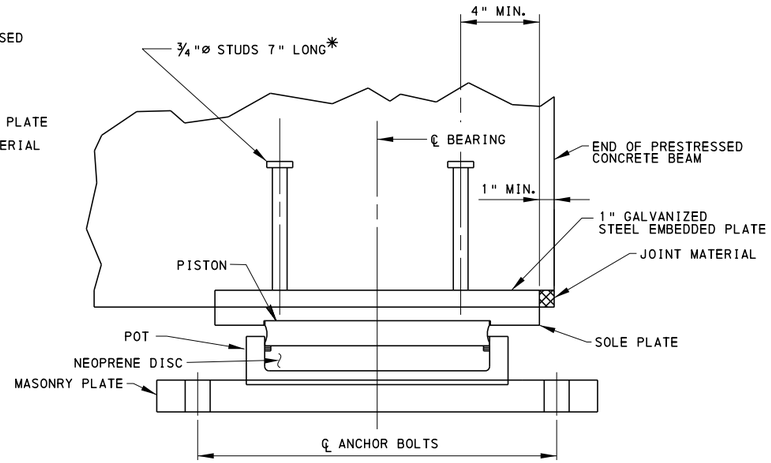


SIDE VIEW

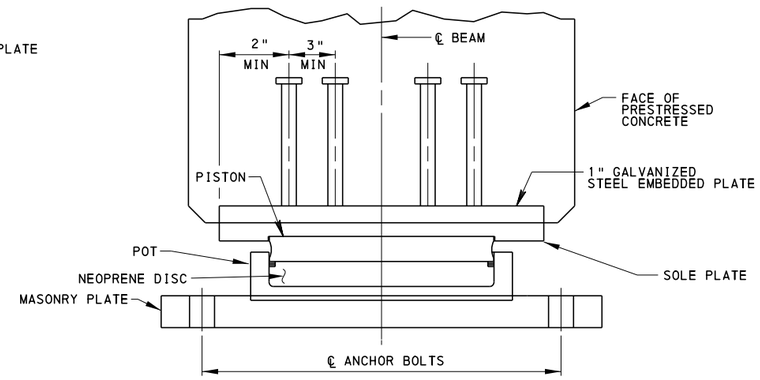


END VIEW

ANCHOR CONNECTION FOR PRESTRESSED CONCRETE BEAM

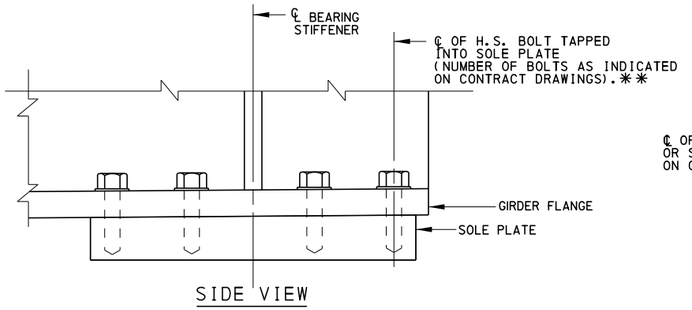


SIDE VIEW



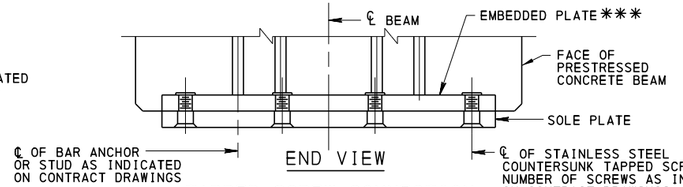
END VIEW

STUD CONNECTION FOR PRESTRESSED CONCRETE BEAM



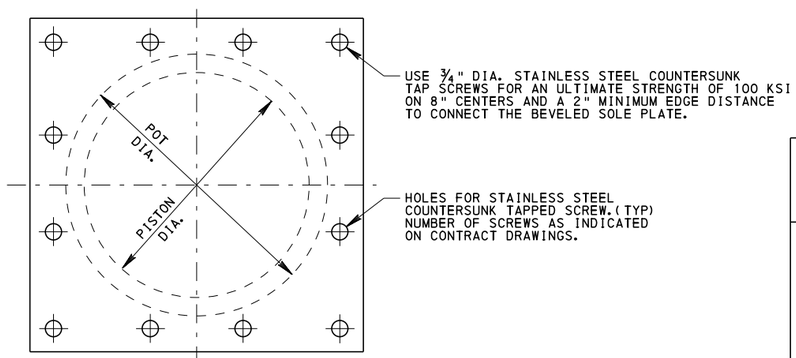
SIDE VIEW

TAPPED BOLT CONNECTION FOR STEEL BEAM



END VIEW

TAPPED SCREW CONNECTION FOR PRESTRESSED CONCRETE BEAM



PLAN - SOLE PLATE

TAPPED SCREW CONNECTION FOR PRESTRESSED CONCRETE 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.

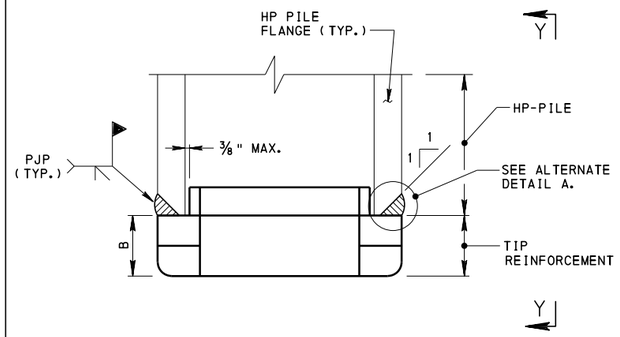
NOTE:

THE CONNECTIONS SHOWN ARE FOR INFORMATION ONLY. THE DESIGN OF THE CONNECTION IS THE RESPONSIBILITY OF THE ENGINEER AND INDICATED ON THE CONTRACT DRAWINGS.

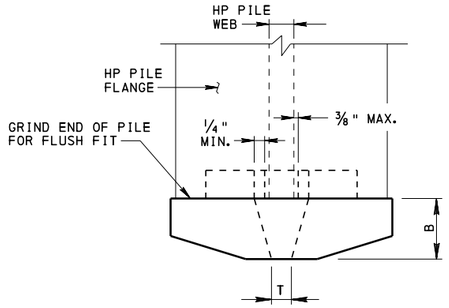
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
HIGH LOAD MULTI ROTATIONAL POT BEARINGS CONNECTION OPTIONS

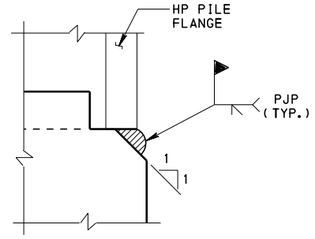
RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent D. Thomas DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 6 OF 6 BC-756M



ELEVATION VIEW



VIEW Y-Y



ALTERNATE
DETAIL A

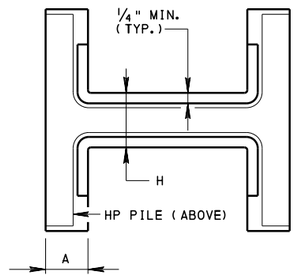
GENERAL NOTES:

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 WTIH 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.



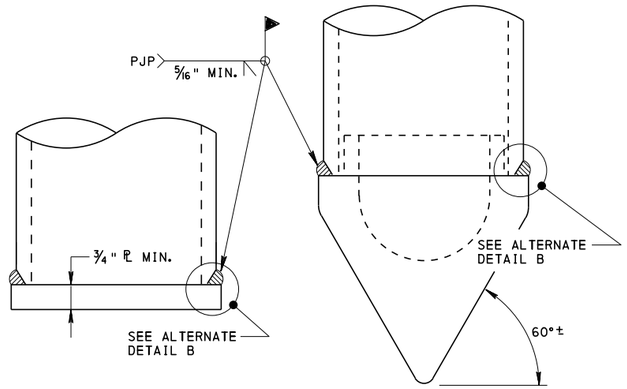
PLAN

TYPICAL HP-PILE TIP

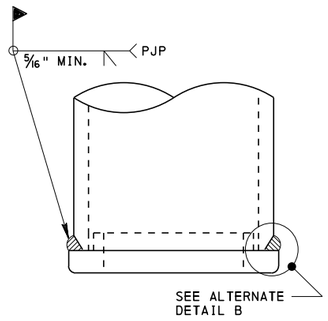
HP-PILE TYPE	WELD SIZE ▲	CAST TIPS			
		A (MIN.)	B (MIN.)	H (MIN.)	T (MIN.)
14 X 117	3/16	*	3	**	1
14 X 102	3/16				
14 X 89	3/16				
14 X 73	3/16				
12 X 84	3/16	*	2 1/2	**	3/4
12 X 74	3/16				
12 X 63	3/16				
12 X 53	3/16				
10 X 57	3/16	*	2 1/8	**	11/16

▲ = 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.

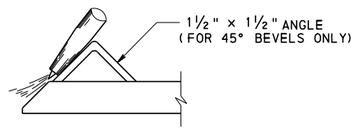
HP-PILE TIP REINFORCEMENT DETAILS



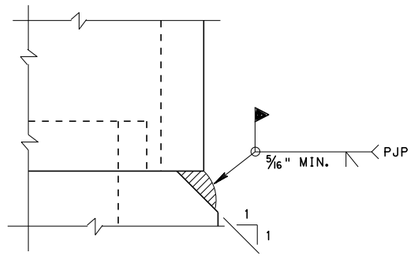
CLOSED END PILE



OPEN END PILES



SCARFING END OF PILE
(H OR PIPE PILE)



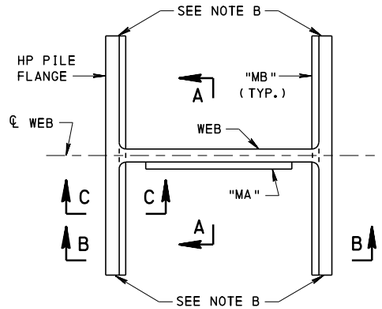
ALTERNATE
DETAIL B

PIPE PILE TIP REINFORCEMENT

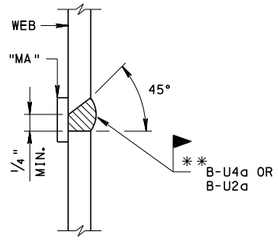
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STEEL PILE TIP REINFORCEMENTS
& SPLICES

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 1 OF 3
Thomas P. Macioce	Brent D. Thompson	BC-757M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



PLAN



SECTION A-A

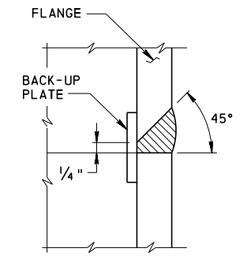
METHOD 1

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

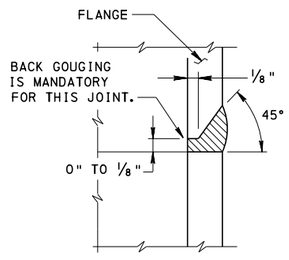
* - B-U4a (TYP.) OR B-U2a AT SPLICER, B-U4a/B-U4b OR B-U2a/B-U2 BEYOND SPLICER

** - THE SINGLE BEVEL GROOVE WELDS B-U4a AND B-U4b ARE LIMITED TO THE HORIZONTAL WELDING POSITION ONLY PER THE AWS CODE.

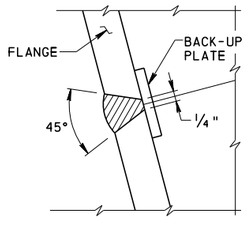


B-U4a** (RECOMMENDED)

OR



B-U4b**



B-U2a (RECOMMENDED)

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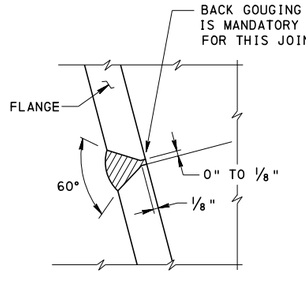
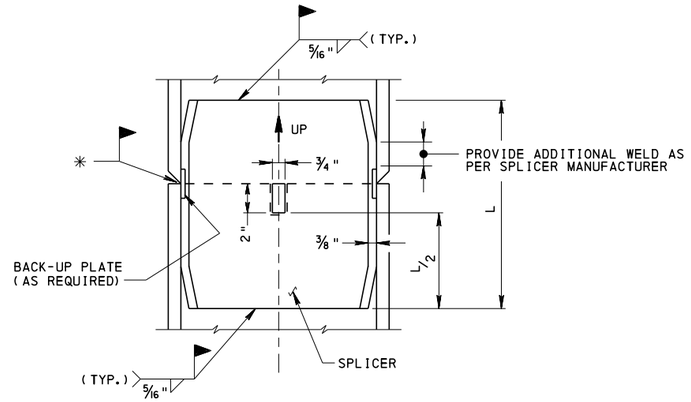


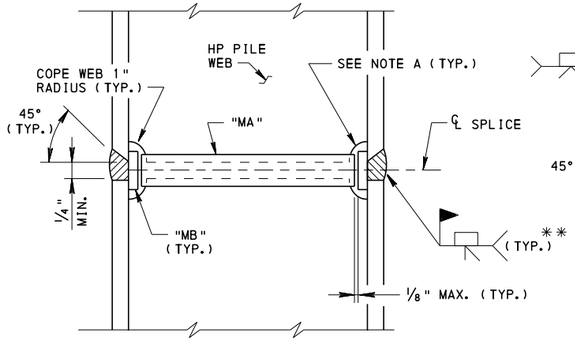
B-U2

JOINT DETAILS

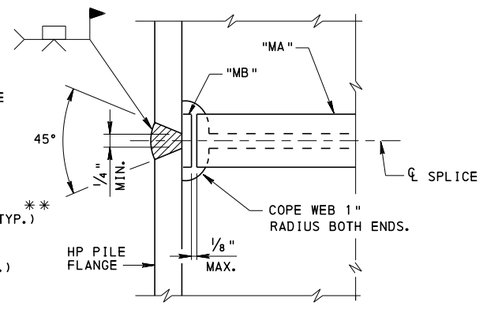
WEB COPE NOT SHOWN, SEE SECTION B-B AND C-C FOR DETAILS. THE CONTRACTOR MAY ELECT TO USE THE BACK GOUGED JOINT DETAILS B-U4b OR B-U2 IN LIEU OF DETAILS B-U4a OR B-U2a.



METHOD 2



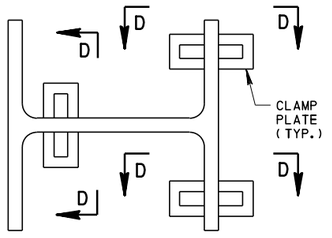
SECTION B-B
(B-U4a FLANGE WELD SHOWN)



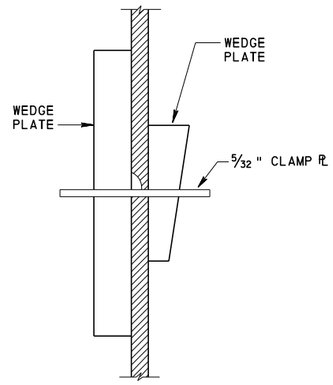
SECTION C-C
(B-U2a ALTERNATE FLANGE WELD SHOWN)

WEB COPE AND BACK-UP PLATE DETAIL

NOTE A: END OF WEAR 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 1¼" x ⅜".

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:

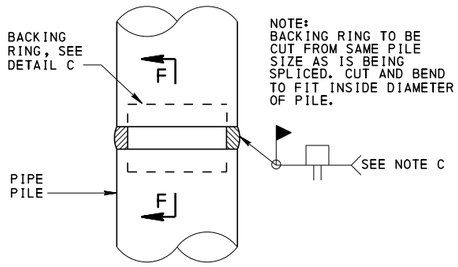
1. DO NOT ALLOW PILE SPLICING ON ANY PORTION OF PILE THAT IS TO REMAIN EXPOSED ABOVE FINISHED GROUND LINE IN COMPLETED STRUCTURE.
2. PROVIDE SPLICED SLEEVE MATERIAL SAME AS PILE MATERIAL.
3. USE EITHER THE "SPLICER SLEEVE" OR "ALL WELDED ALTERNATES".
4. LET WELDS COOL TO AIR TEMPERATURE BEFORE DRIVING 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).

HP-PILE SPLICE DETAILS

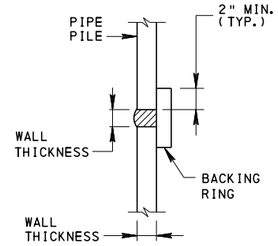
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STEEL PILE TIP REINFORCEMENTS
& SPLICES

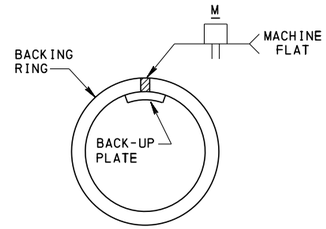
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 2 OF 3 BC-757M



ELEVATION - SPLICE
USING ALL WELDED ALTERNATE



SECTION F-F



PLAN

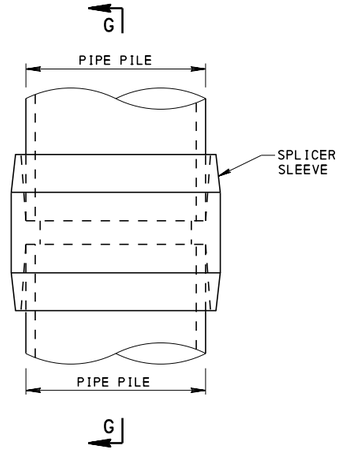
(PIPE PILE NOT SHOWN FOR CLARITY)

DETAIL C

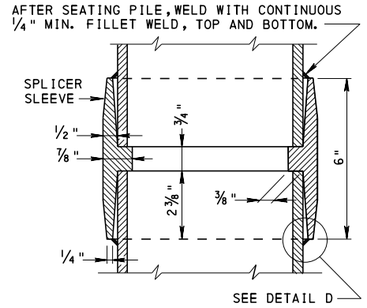
SPLICE NOTES:

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-U2a OR B-U4a SHOWN ON SHEET 2 OF 3.

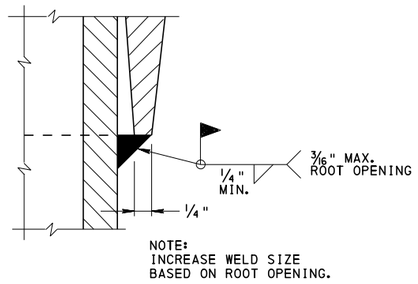


ELEVATION - SPLICE
(USING SPLICER SLEEVE)

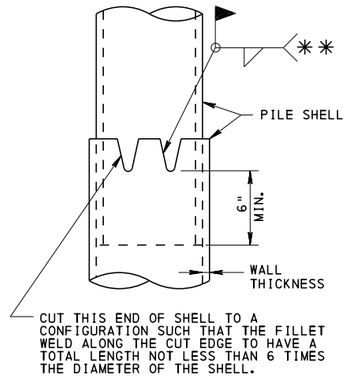


SECTION G-G

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
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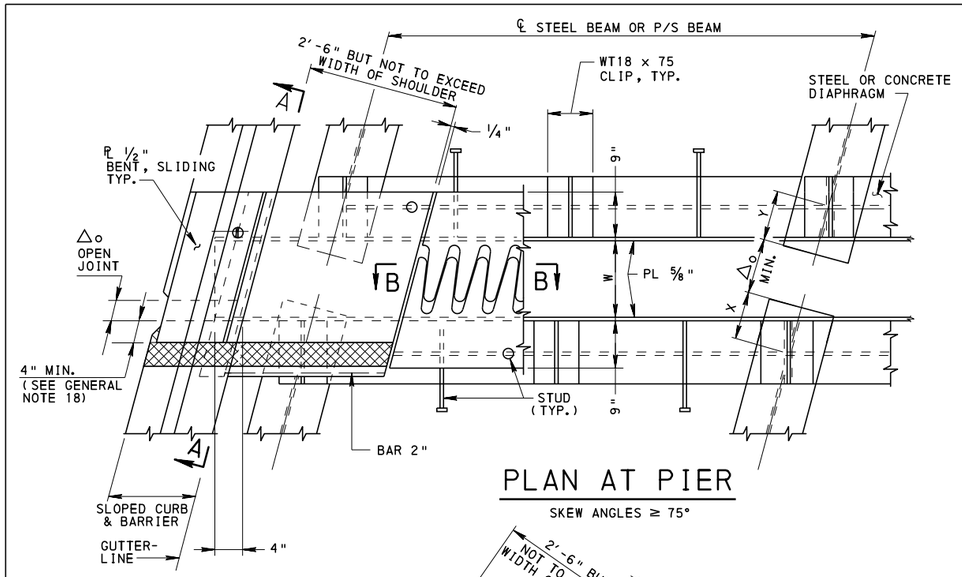
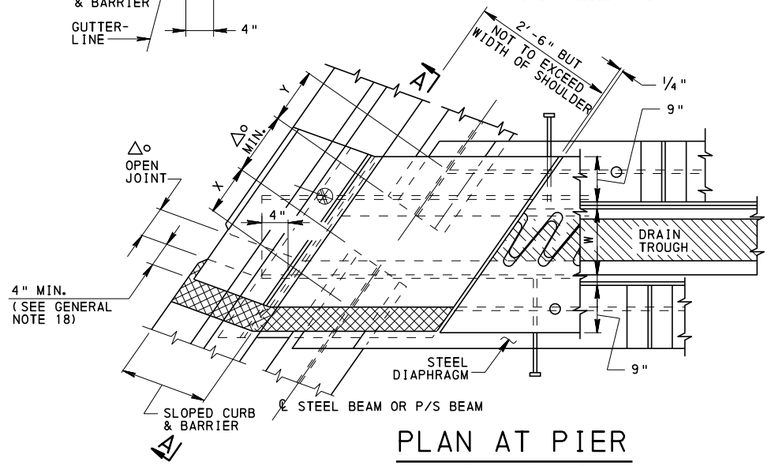
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 3
Thomas P Macioce	Brent B Thompson	BC-757M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



PLAN AT PIER

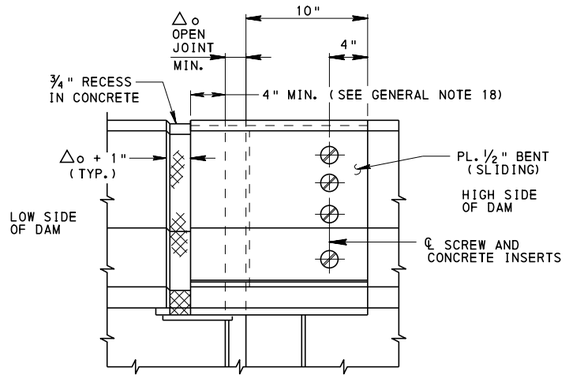
SKEW ANGLES ≥ 75°



PLAN AT PIER

SKEW ANGLES < 75°

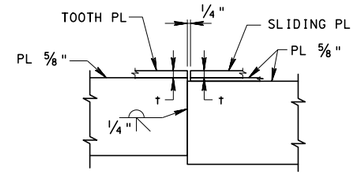
PLAN AT ABUTMENT SIMILAR. FOR SECTION AT ABUTMENT, SEE SHEETS 3 AND 5.



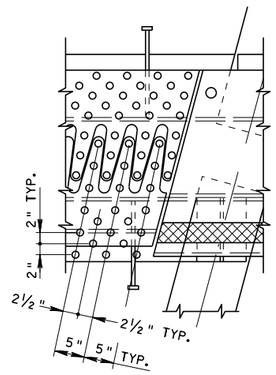
SECTION A-A

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.



SECTION B-B



BALL STUD DETAIL

(SEE GENERAL NOTE 6)

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 = 0.0000065 PER °F FOR STEEL & 0.0000060 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. △o = δ + ξ Tc L (L IN IN.) = 0.00672 L @ 68 °F (L IN FT.)
CONTRACTION: MIN. △ = δ + ξ Tc 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 △o(T) FOR TEMPERATURE OF TIME OF DAM ERECTION OTHER THAN 68° F:
△o(T) = △o(68° F) - (T-68° F)L
△o(68°F) = △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
△o(IN.)	1⅝	2	2⅜	2⅝	3	3⅜	3¾	4	4⅜	4¾	5	5⅜	5¾	6	6⅜	6¾
△ (IN.)	2⅜	2⅞	3⅜	3¾	4¼	4¾	5¼	5¾	6¼	6⅝	7⅛	7⅝	8	8⅝	9	9½
t (IN.)	1	1	1	1	1	1	1	1½	1½	1½	1½	1½	1½	2	2	2

* FOR P/S BRIDGES, USE ¾ OF △o & △ VALUES IN THIS TABLE.

GENERAL NOTES:

1. ALL REINFORCEMENT STEEL BARS SHOWN MEET THE REQUIREMENTS OF ASTM A 615, A 996 OR A 706. DO NOT WELD GRADE 60 STEEL BARS UNLESS SPECIFIED.
2. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408 AND AASHTO/AWS WELDING SPECIFICATIONS.
3. PAINT ALL STEEL SURFACES 3 COATS IN THE SHOP IN ACCORDANCE WITH SECTION 1060 OF PUBLICATION 408. GALVANIZED STEEL IN ACCORDANCE WITH SECTION 1105.02 (S) OF PUBLICATION 408 CAN BE USED AS AN ALTERNATE.
4. PROVIDE AASHTO M 270, GRADE 36 (ASTM A 709, GRADE 36) UNLESS OTHERWISE SPECIFIED ON DESIGN DRAWINGS. ANCHOR STUDS TO BE IN ACCORDANCE WITH SECTION 1105.02 (e) OF PUB. 408. STUDS MAY BE PIGGY BACKED TO ACHIEVE REQUIRED LENGTH.
5. 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 ¾" DIAMETER UNLESS OTHERWISE NOTED.
6. BALL TYPE OR MILD STEEL KNOCK-OFF STUDS SHOULD BE PROVIDED UNLESS OTHERWISE SPECIFIED. BALL STUDS ARE TO BE ⅜" DIAMETER BY ¼" HEIGHT. KNOCK-OFF STUDS WILL BE ANTI-SKID TYPE. KNOCK-OFF STUDS ARE TO BE ⅝" NOMINAL DIAMETER BY ¼" HEIGHT. ALTERNATE PATTERNS OTHER THAN SHOWN ON BALL OR KNOCK-OFF STUD DETAIL MUST BE APPROVED BY THE DEPARTMENT.
7. ALL BOLTS TO CONFORM TO ASTM A 325.
8. USE THIS DRAWING AS A GUIDE IN THE PREPARATION OF SHOP DRAWINGS.
9. CONSTRUCT EXPANSION DAM TO MATCH ROADWAY GRADE AND CROSS SLOPE.
10. PLACE CONCRETE UNDER THE DAM AND VIBRATE UNTIL THE CONCRETE IS FORCED THROUGH THE ⅛" 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.
11. CONTROL THE MAXIMUM DEPTH OF THE TROUGH SUCH THAT IT DOES NOT COME INTO CONTACT WITH THE SUBSTRUCTURE OF THE BRIDGE.
12. 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.
13. 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.
14. PERFORM NON-DESTRUCTIVE TESTING OF WELDS AS REQUIRED IN ACCORDANCE WITH AASHTO/AWS SPECIFICATIONS.
15. BEFORE PLACING BLOCKOUT CONCRETE APPLY APPROVED EPOXY BONDING AGENT TO TRANSVERSE DECK CONSTRUCTION JOINTS.
16. 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.
17. 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.
18. 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.

REFERENCE DRAWINGS	
BC-734M	STANDARD ANCHOR SYSTEMS
BC-735M	WALL CONSTR. & EXPANSION JT. DETAILS
BC-751M	BRIDGE DRAINAGE
BC-788M	TYPICAL WATERPROOFING AND EXPANSION DETAILS

05-OCT-2016 10:17

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

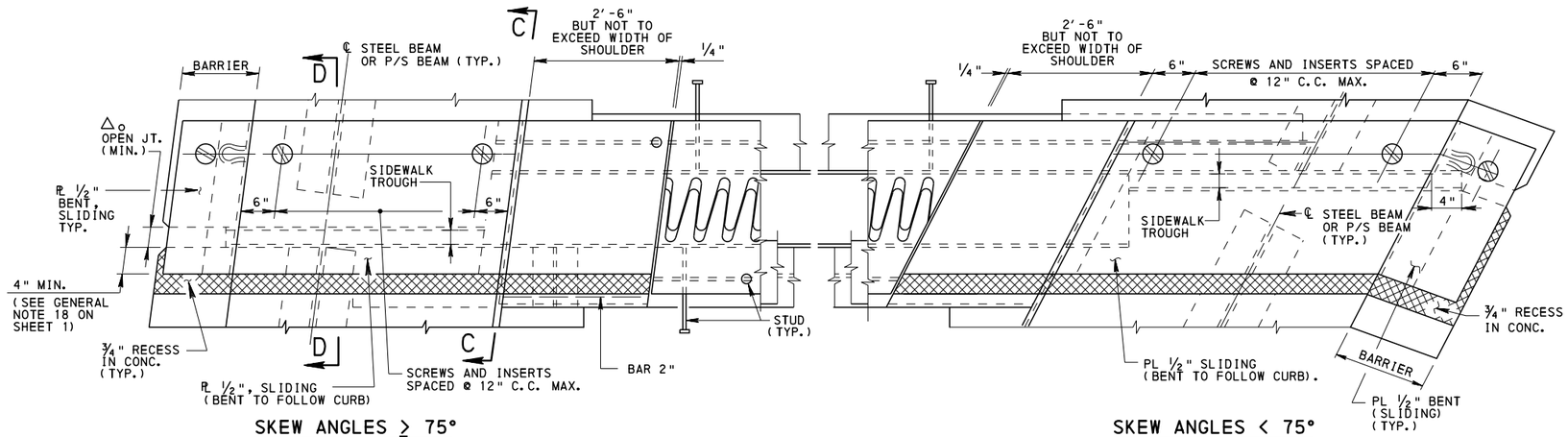
STANDARD TOOTH EXPANSION DAM FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

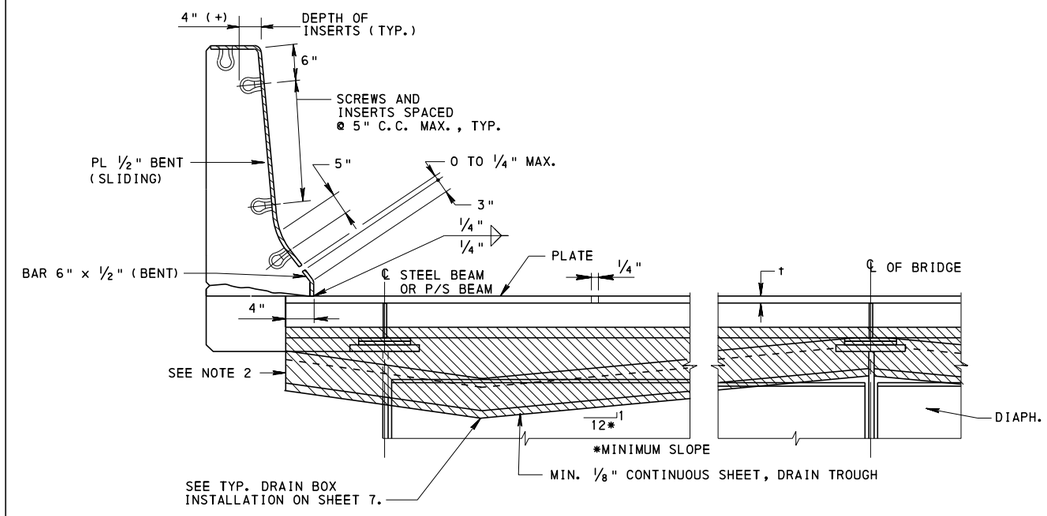
RECOMMENDED SEPT. 30, 2016
Brent D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 1 OF 7

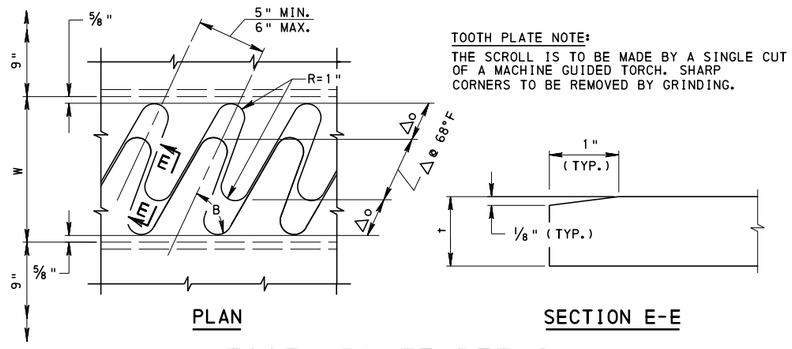
BC-762M



PLAN AT SIDEWALK



TYPICAL SECTION

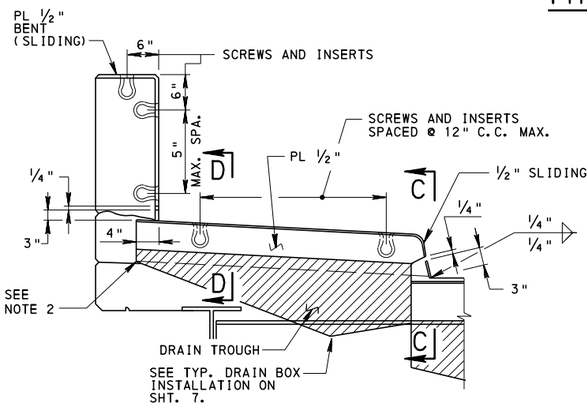


TOOTH PLATE NOTE:
THE SCROLL IS TO BE MADE BY A SINGLE CUT OF A MACHINE GUIDED TORCH. SHARP CORNERS TO BE REMOVED BY GRINDING.

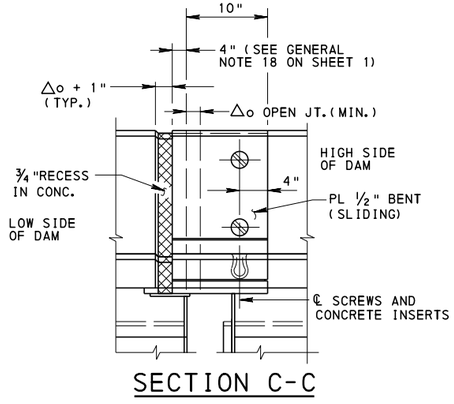
PLAN

SECTION E-E

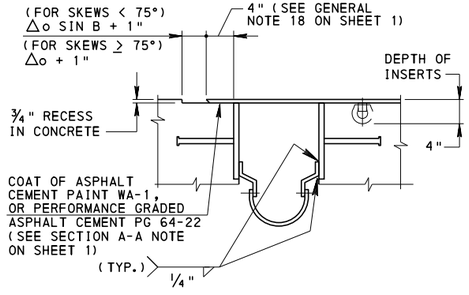
TOOTH PLATE DETAIL



SECTION AT ALTERNATE SIDEWALK



SECTION C-C



SECTION D-D

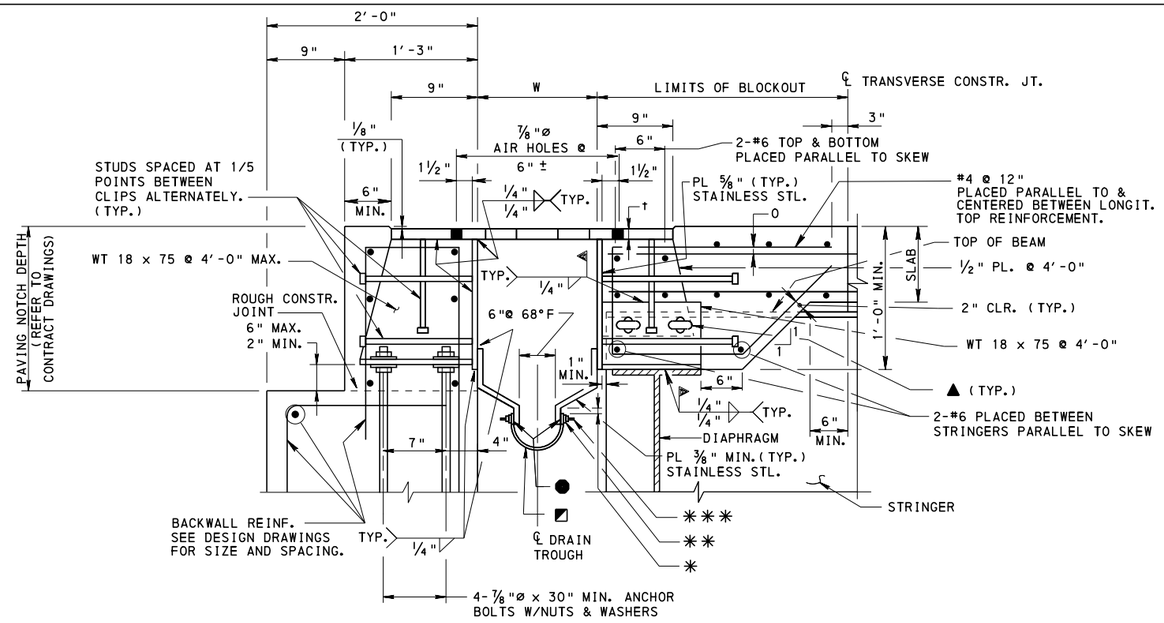
NOTES:

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.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD TOOTH EXPANSION DAM FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 7
Thomas P Macioce	Bruce B Thompson	BC-762M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



SECTION AT ABUTMENT FOR STEEL BEAMS

FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.

LEGEND:

✱ VARY TO PROVIDE MINIMUM 1V:12H. SLOPE TO DRAIN. SEE DESIGN DWG. FOR ACTUAL DESIGN SLOPE.

✱✱ 1½" × ¼" PL. STAINLESS STEEL (TYPE 304), FULL LENGTH OF DRAIN TROUGH.

✱✱✱ ⅜"ø STAINLESS STEEL STUDS WITH SELF LOCKING NUT & WASHER @ 12" C.C..

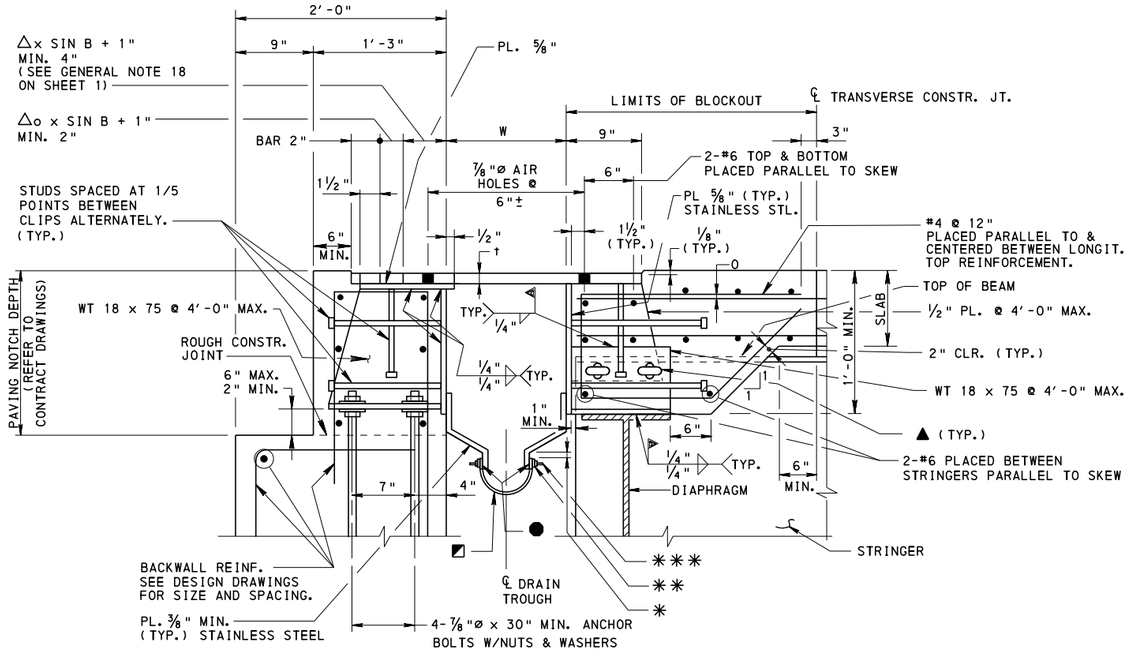
▲ 1" × 1¾" SLOTTED HOLES FOR ⅞"ø H.S. BOLTS.

● APPLY ¼" BEAD OF AN EXTERIOR RATED SILICONE CAULK SEALANT PRIOR TO ASSEMBLY.

◩ SEE PUBLICATION 408 SECTION 1020.3 FOR MATERIAL SPECIFICATION.

SECTION NOTES:

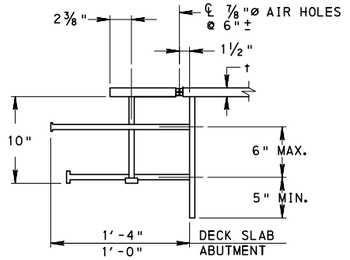
1. ALL VERTICAL STUDS ARE ¾"ø × 10" LONG.
2. HORIZONTAL STUDS IN ABUTMENT ARE ¾"ø × 12" LONG.
3. HORIZONTAL STUDS IN SLAB ARE ¾"ø × 16" LONG.
4. MINIMUM DEPTH OF CONCRETE OVER DIAPHRAGMS IS 12".
5. BEFORE PLACING BLOCKOUT APPLY APPROVED EPOXY BONDING AGENT TO TRANSVERSE CONSTRUCTION JOINTS.



SECTION AT ABUTMENT (@ SHOULDER) FOR STEEL BEAMS

FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.

TYPICAL STUD



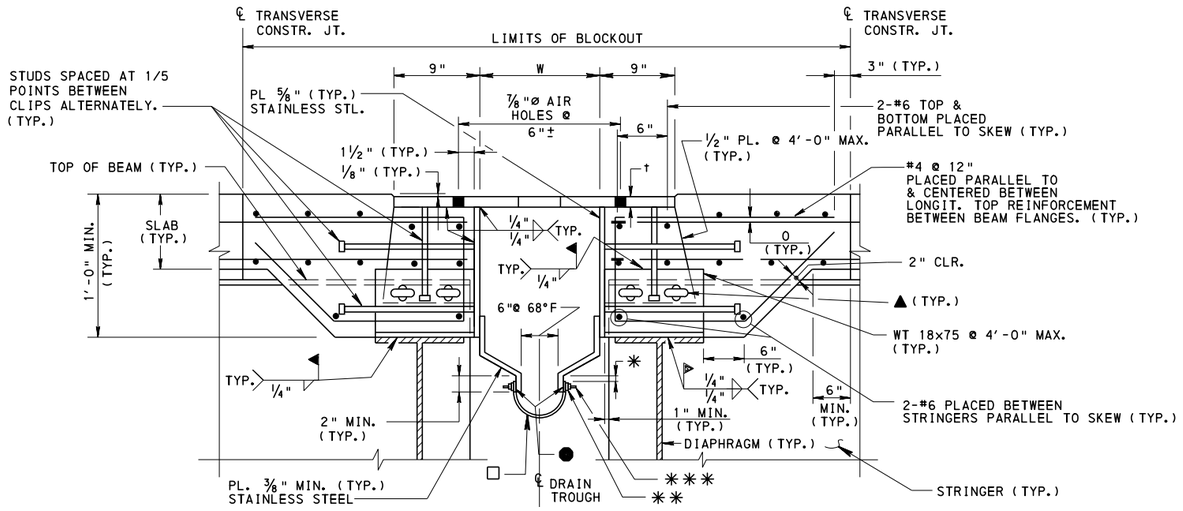
INDIVIDUAL STUDS MAY BE BENT OR SHORTER STUDS MAY BE USED (WHERE CLEARANCE IS LIMITED), IF PERMITTED BY THE STRUCTURE CONTROL ENGINEER OR DISTRICT BRIDGE ENGINEER.

STUD DETAIL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

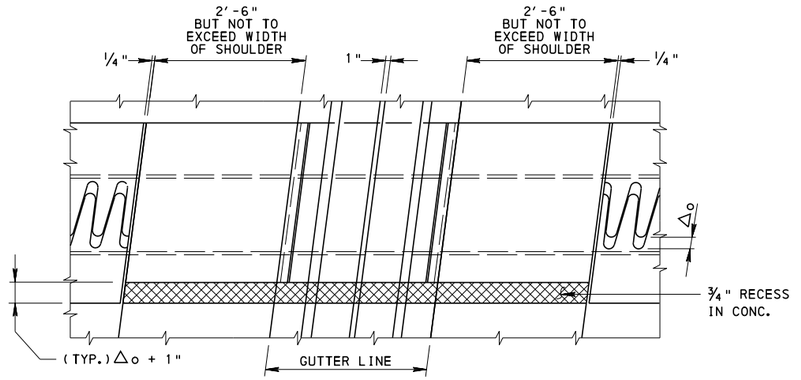
STANDARD TOOTH EXPANSION DAM FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 7
Thomas P. Macioce	Brenda S. Thompson	BC-762M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



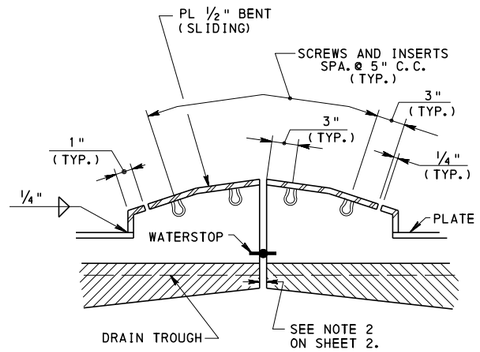
SECTION AT PIER FOR STEEL BEAMS

FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.



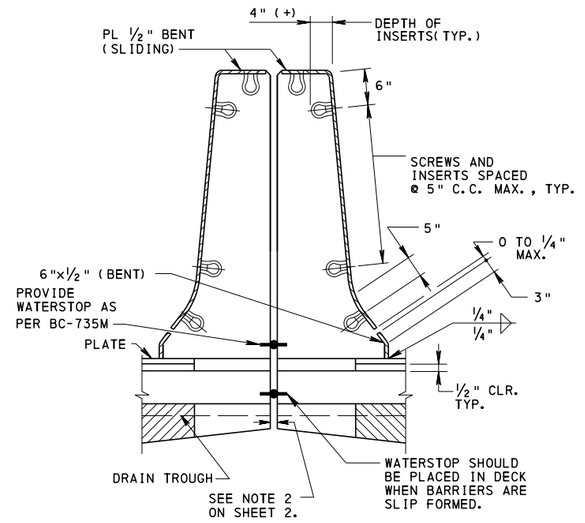
PLAN AT SPLIT MEDIAN BARRIER

NOTE: PLAN AT SPLIT CONCRETE DIVISOR SIMILAR



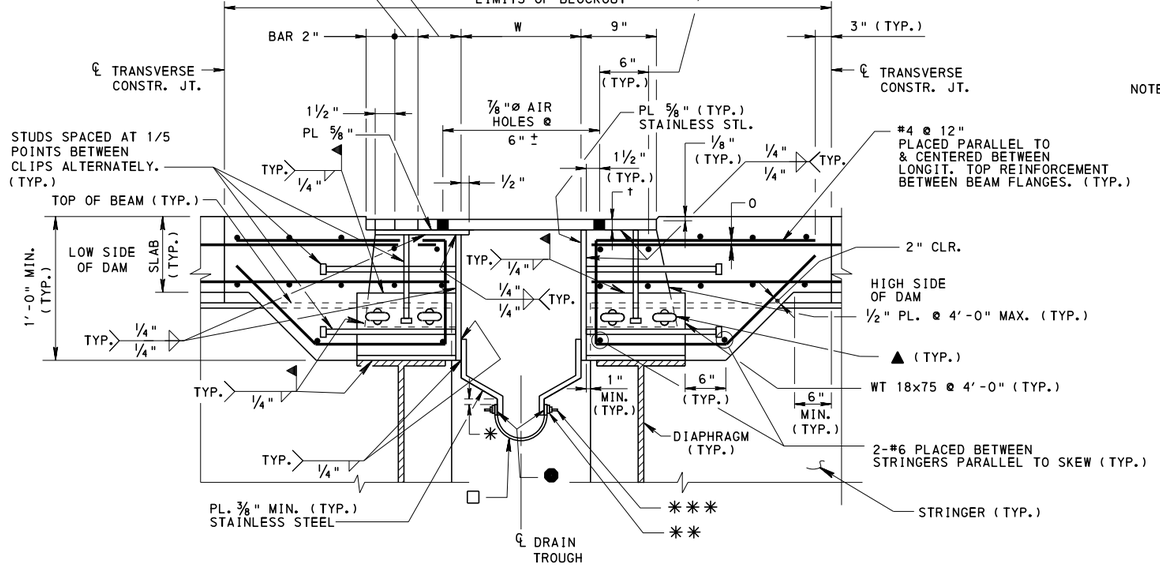
SECTION AT SPLIT CONCRETE DIVISOR

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.

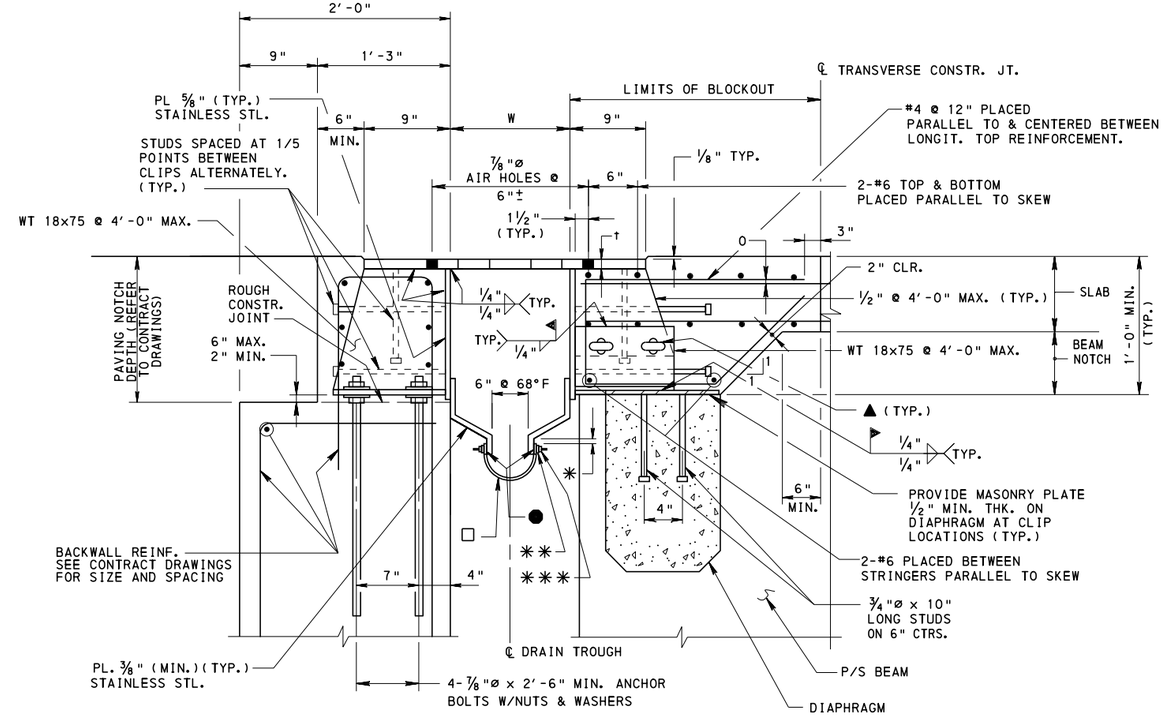
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD TOOTH EXPANSION DAM FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

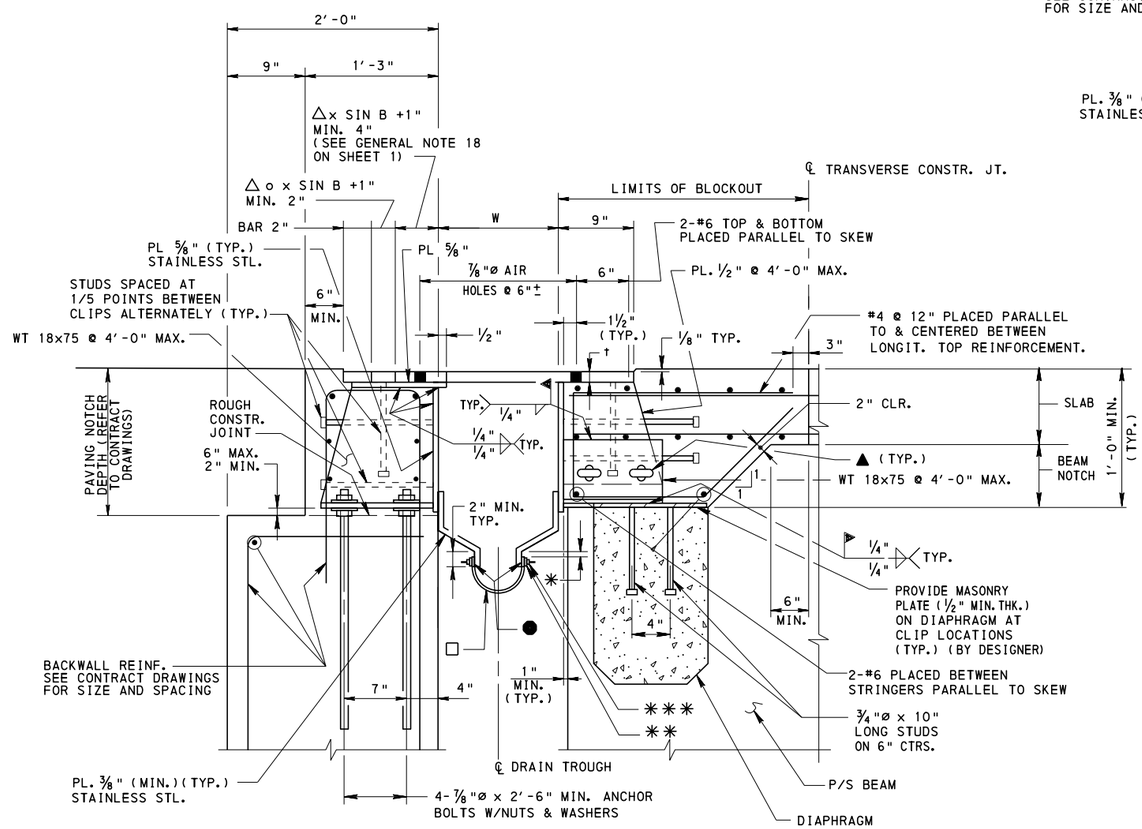
RECOMMENDED SEPT. 30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY

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.

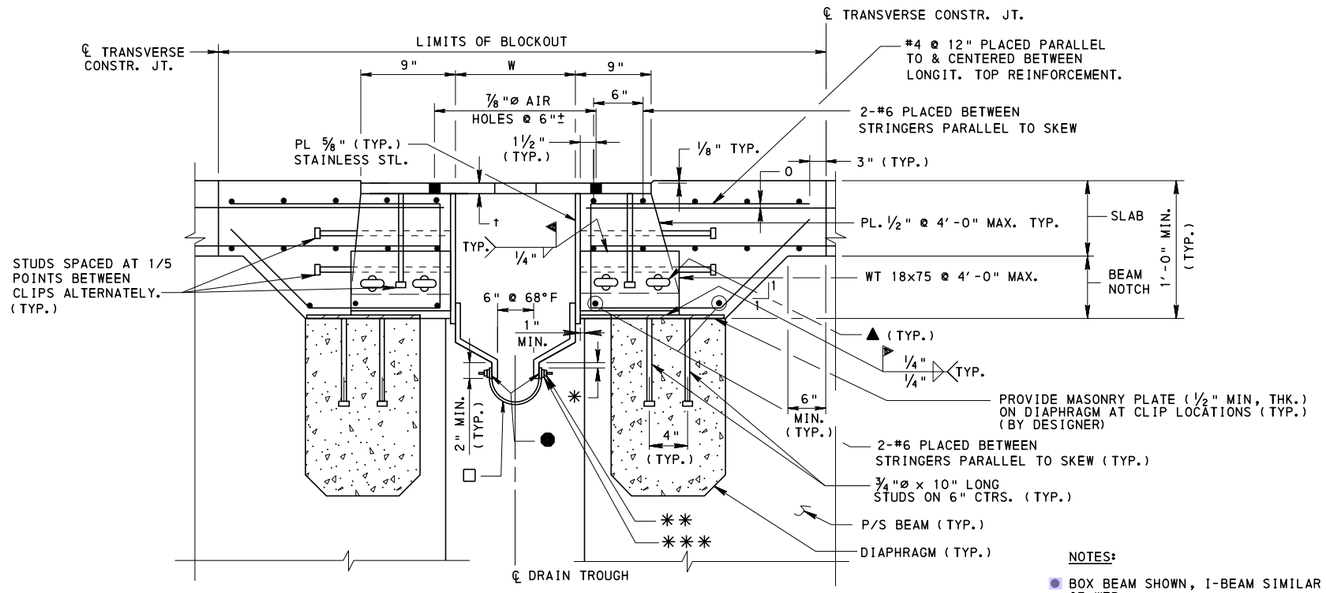
NOTES:

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

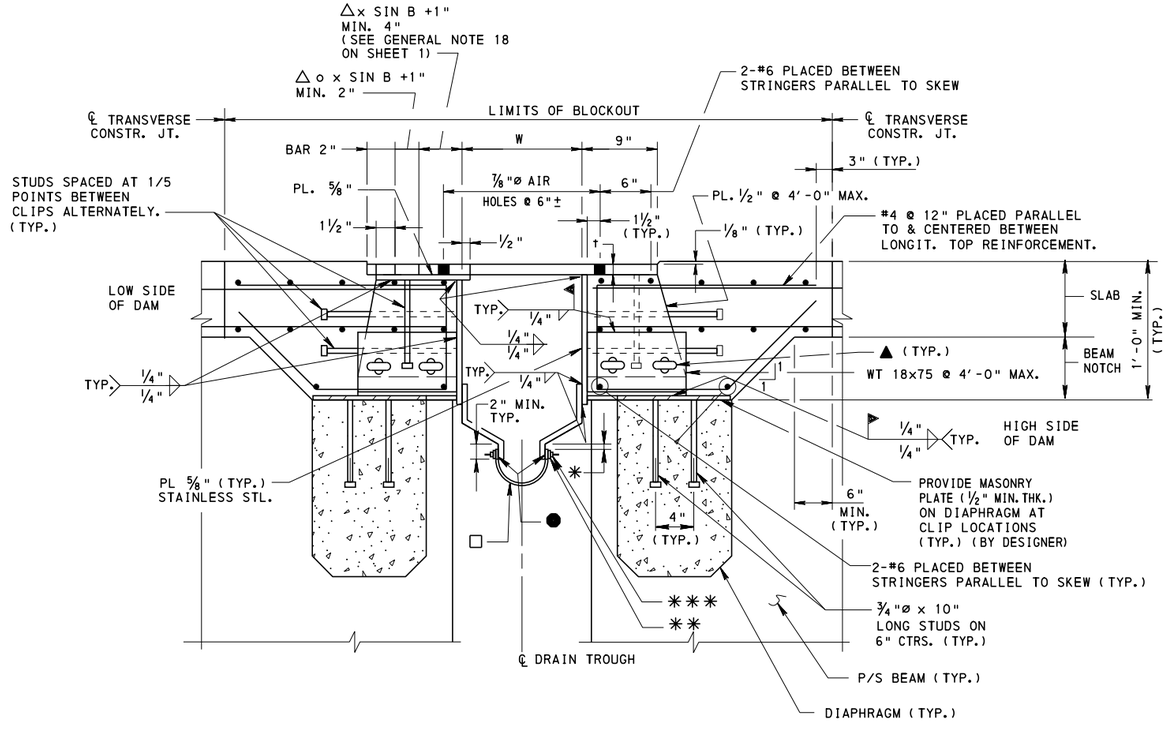
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian D Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 5 OF 7 BC-762M



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.

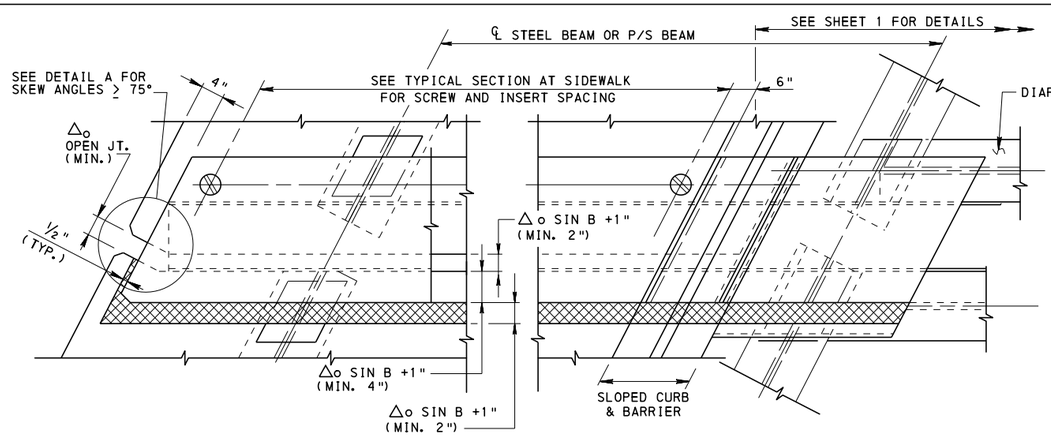
NOTES:

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.

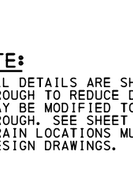
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD TOOTH EXPANSION DAM FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 6 OF 7
Thomas P Macioce	Brent D Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-762M



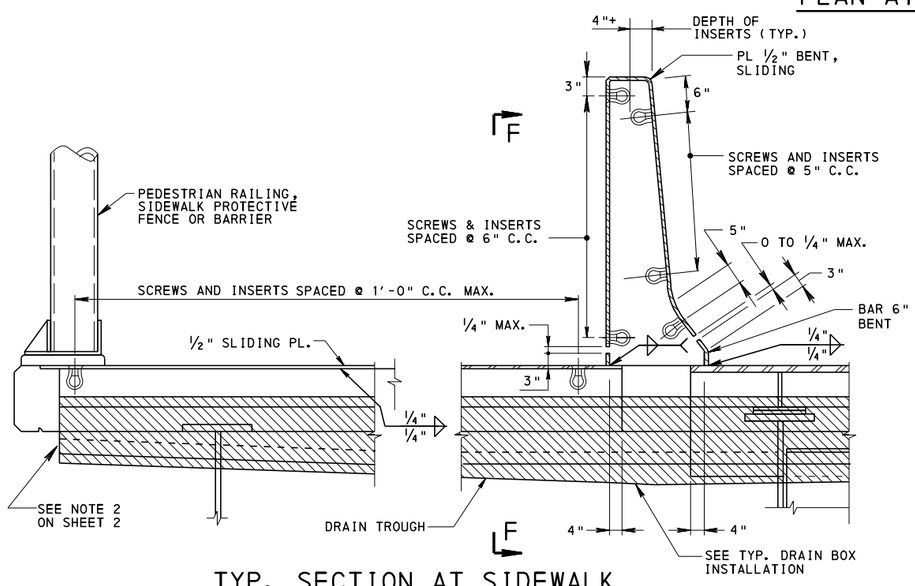
PLAN AT SIDEWALK



DETAIL A
SKEW ANGLES ≥ 75°

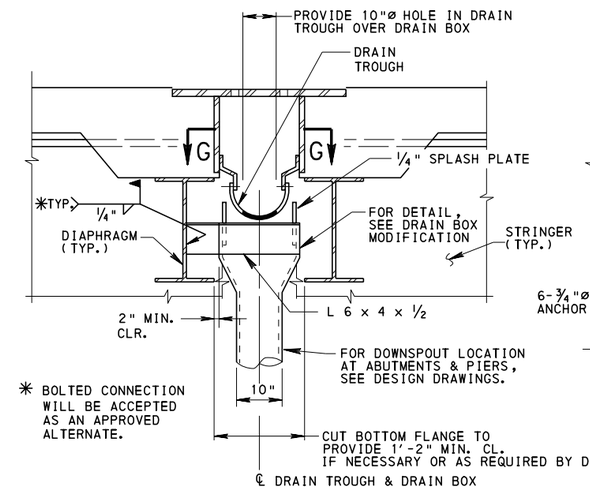
NOTE:

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.



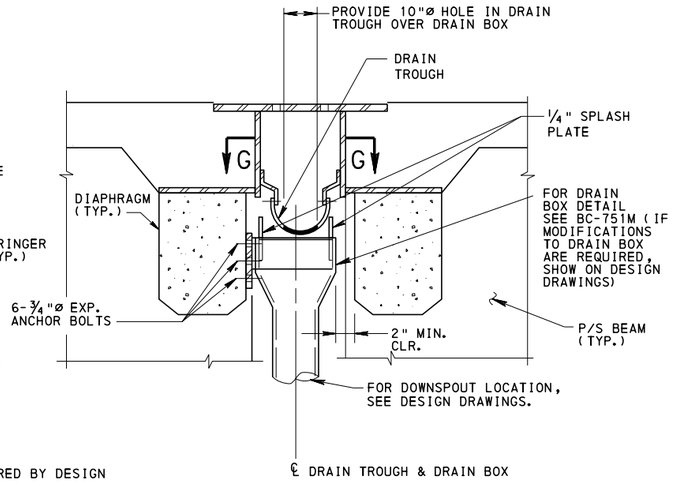
TYP. SECTION AT SIDEWALK

NOTE: SECTION IS SIMILAR FOR RAISED SIDEWALK. FOR SIDEWALK DRAINAGE SLOPES, SEE BC-767M, SHEET 4.



* BOLTED CONNECTION WILL BE ACCEPTED AS AN APPROVED ALTERNATE.

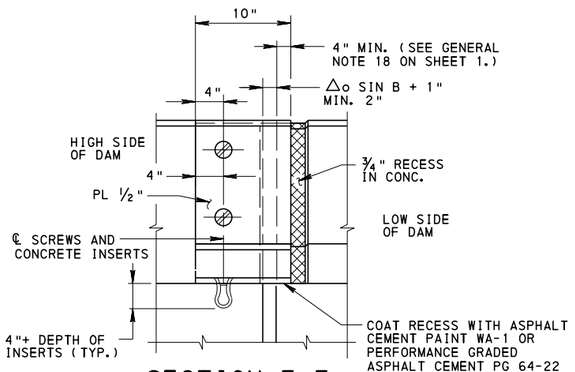
FOR STEEL BEAM



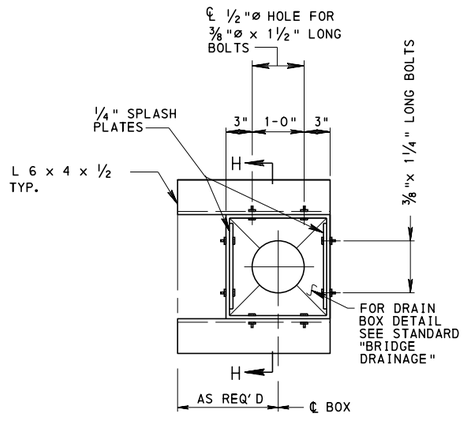
FOR P/S BEAMS

TYP. DRAIN BOX INSTALLATION @ PIERS

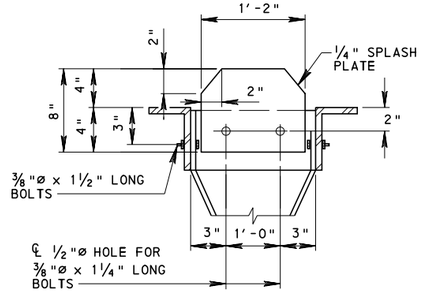
INSTALLATION AT ABUTMENTS SIMILAR



SECTION F-F



SECTION G-G



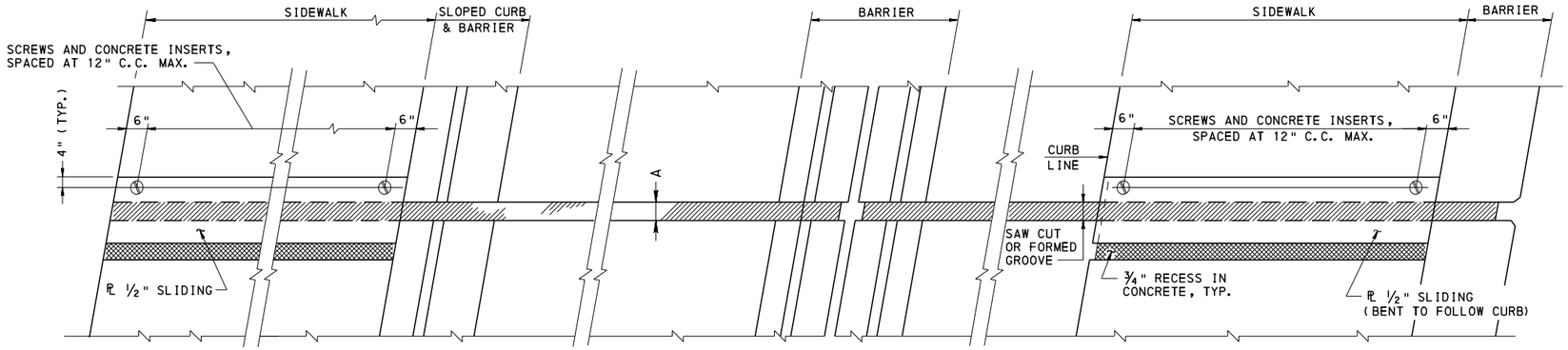
SECTION H-H

DRAIN BOX MODIFICATION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
TOOTH EXPANSION DAM
FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 7 OF 7
Thomas P. Macioce	Brian D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-762M

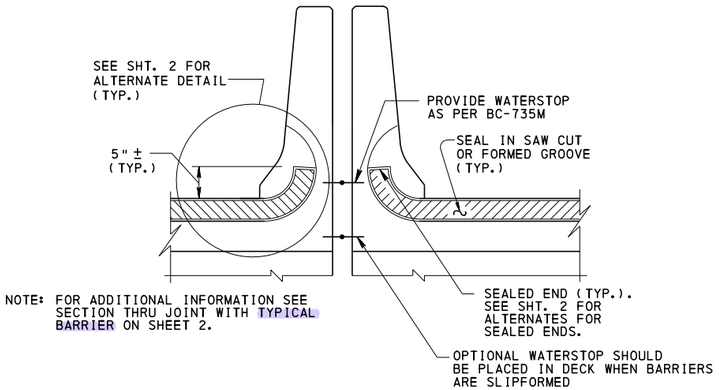


PLAN AT SIDEWALK

SIDEWALK SEPARATED BY SLOPED BARRIER & CURB

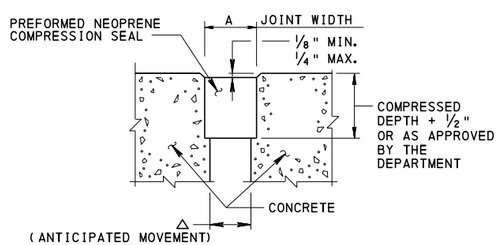
PLAN AT BARRIER

PLAN AT SIDEWALK



NOTE: FOR ADDITIONAL INFORMATION SEE SECTION THRU JOINT WITH TYPICAL BARRIER ON SHEET 2.

SECTION AT BARRIER



TYPICAL JOINT DETAIL

GENERAL NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408.
2. ALL STEEL TO CONFORM TO AASHTO M 270, GR. 36 (ASTM A 709 GR.36) UNLESS OTHERWISE SPECIFIED ON DESIGN DRAWINGS.
3. PAINT ALL STEEL SURFACES WITH 3 COATS IN THE SHOP IN ACCORDANCE WITH SECTION 1060 OF PUBLICATION 408. GALVANIZED STEEL IN ACCORDANCE WITH SECTION 1105.02 (S) OF PUBLICATION 408 CAN BE USED AS AN ALTERNATE.
4. USE FLATHEAD STAINLESS STEEL ASTM F 738M (TYPE 304) FOR COUNTERSUNK SCREWS WITH INSERTS. ALL CONCRETE INSERTS AND M20 COUNTERSUNK MACHINE SCREWS ARE ¾" DIAMETER.
5. USE THIS STANDARD AS A GUIDE IN THE PREPARATION OF SHOP DRAWINGS.
6. ERECT EXPANSION DAM TO MATCH ROADWAY GRADE AND CROSS SLOPE.
7. MOVEMENT CLASSIFICATION OF THE SEAL TO BE NOT LESS THAN THE CLASSIFICATION SPECIFIED ON THE DESIGN DRAWINGS. ALL SEALS CONFORM TO THE REQUIREMENTS OF SECTION 705 OF PUBLICATION 408. OBTAIN APPROVAL FOR THE USE OF THE SEAL FROM THE CHIEF MATERIALS ENGINEER, LABORATORY TESTING SECTION, INNOVATION AND SUPPORT SERVICES DIVISION, BUREAU OF PROJECT DELIVERY.
8. 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.
9. PROVIDE PREFORMED NEOPRENE COMPRESSION SEAL CONTINUOUS THROUGH THE DECK (BARRIER TO BARRIER). SPLICING OF SEAL IS NOT PERMITTED. TEMPORARY SEAL MAY BE REQUIRED DEPENDING ON STAGES OF CONSTRUCTION.
10. ASCERTAIN THAT THE TOP OF THE INSTALLED SEAL IS ¼" MINIMUM TO ½" MAXIMUM BELOW THE DECK SURFACE AND THAT THE INTERSECTION OF THE VERTICAL AND THE HORIZONTAL SEALS AT THE GUTTER LINE IS WATERPROOF.
11. FOR JOINTS AT SHARP SKEWS, MODIFICATIONS TO BE MADE AS REQUIRED, BY THE DESIGNER, AND SHOWN ON THE DESIGN DRAWINGS.
12. USE THIS STANDARD FOR PREFORMED COMPRESSION SEALS ADJACENT TO APPROACH SLABS.
13. EITHER SAW-CUT OR FORM JOINT FOR PREFORMED NEOPRENE COMPRESSION SEAL. USE DOUBLE BLADE FOR SAW-CUTTING WHERE PERMITTED.
14. FABRICATOR TO PROVIDE A CHART SHOWING JOINT OPENING FOR TEMPERATURES BETWEEN -9°F TO 109°F FOR STEEL STRUCTURES AND 10°F TO 100°F FOR P/S CONCRETE STRUCTURES, IN 5° INTERVALS ON SHOP DRAWINGS.
15. MINIMUM MOVEMENT CLASSIFICATION 1".
16. TO INSURE THAT INSERTS AND SCREWS ARE ALIGNED PROPERLY, PLACE CURBS AND SIDEWALKS WITH ½" SLIDING PLATES IN PLACE. APPLY BOND BREAKER TO SLIDING PLATES PRIOR TO INSTALLATION.

BC-735M	WALL CONSTRUCTION & EXPANSION JOINT DETAILS
REFERENCE DRAWINGS	

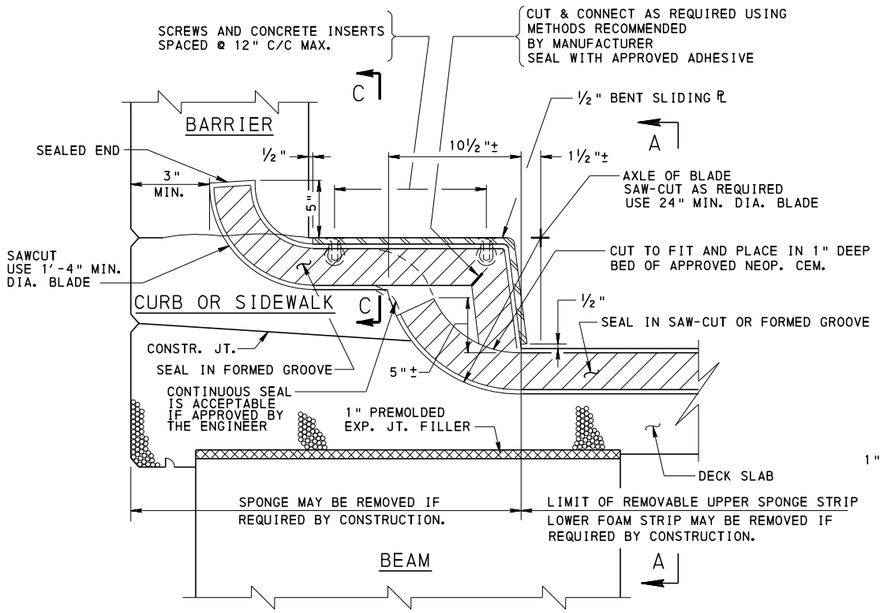
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PREFORMED NEOPRENE COMPRESSION SEAL JOINT FOR APPROACH SLABS

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

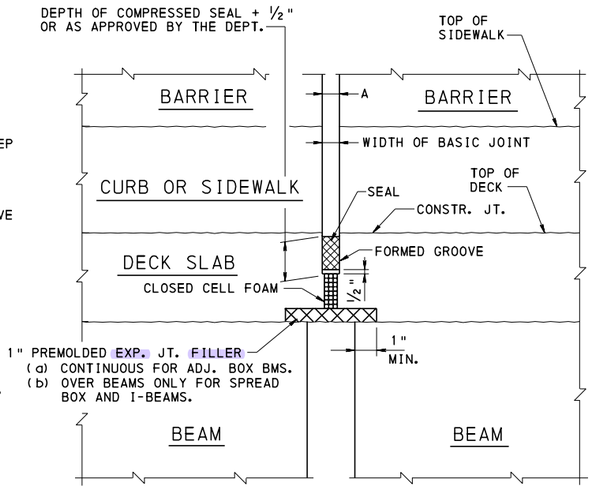
RECOMMENDED SEPT. 30, 2016
Brian D Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-766M

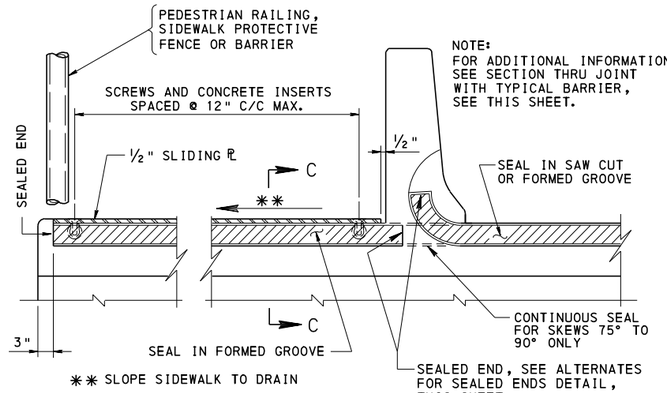


SECTION THRU JOINT WITH SIDEWALK

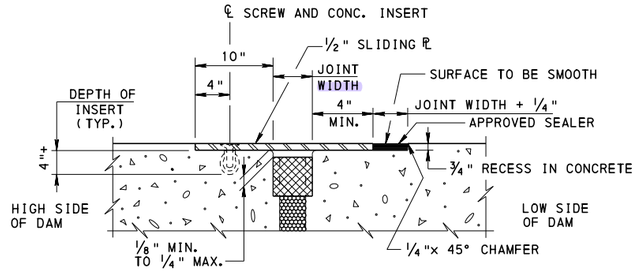
(DETAILS OF JOINT FOR PRESTRESSED CONCRETE AND STEEL I-BEAM BRIDGES SIMILAR.)



SECTION A-A

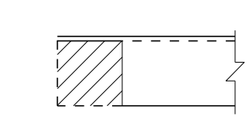


AT SIDEWALK

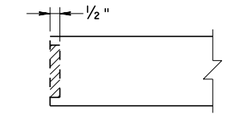


SECTION C-C

NOTE:
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.



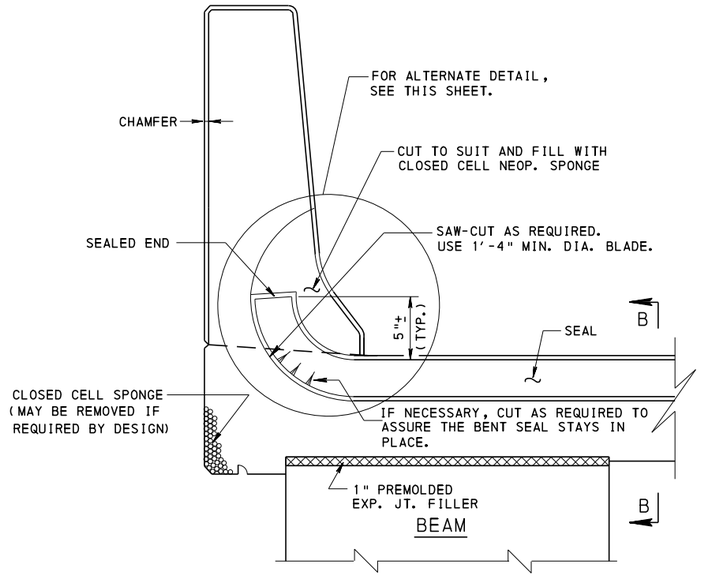
ALTERNATE "A"



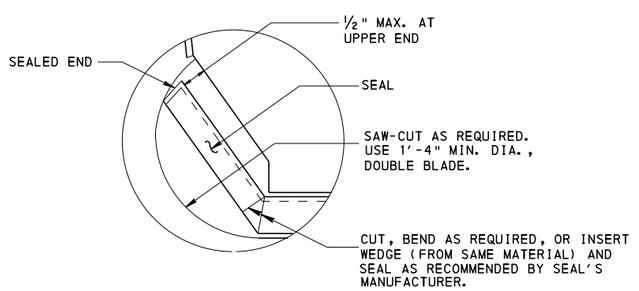
ALTERNATE "B"

ALTERNATES FOR SEALED ENDS

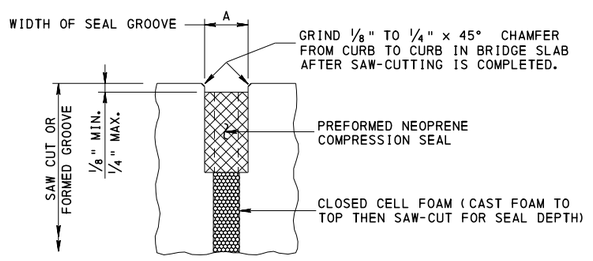
SEAL CONTACT AREA WITH APPROVED ADHESIVE.



SECTION THRU JOINT WITH TYPICAL BARRIER



ALTERNATE DETAIL

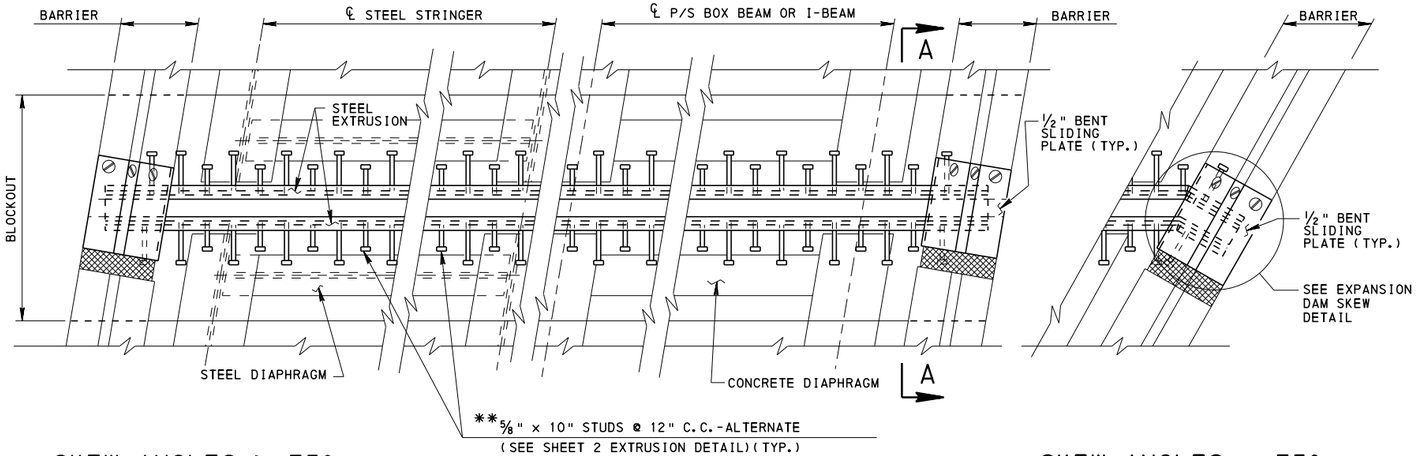


SECTION B-B

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD PREFORMED NEOPRENE COMPRESSION SEAL JOINT FOR APPROACH SLABS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 2
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-766M

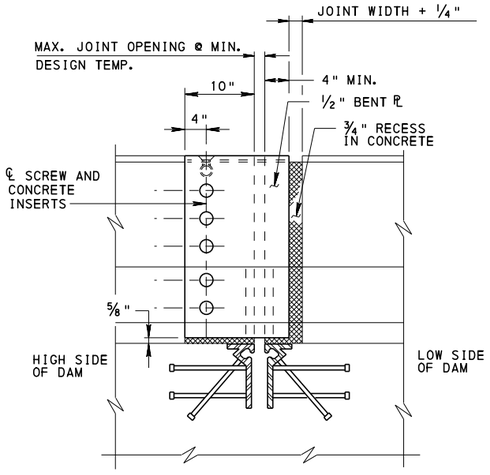


SKEW ANGLES ≥ 75°

PLAN AT BARRIER

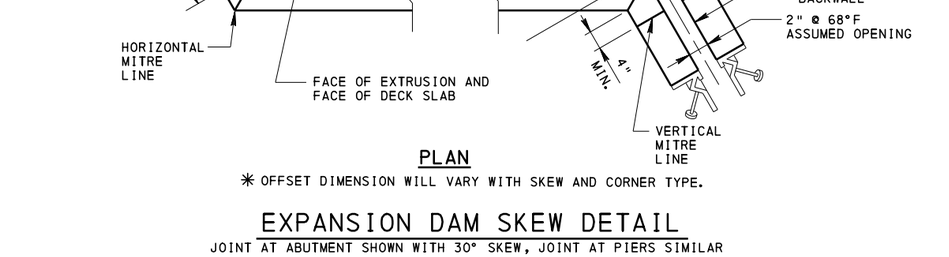
SKEW ANGLES < 75°

** 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

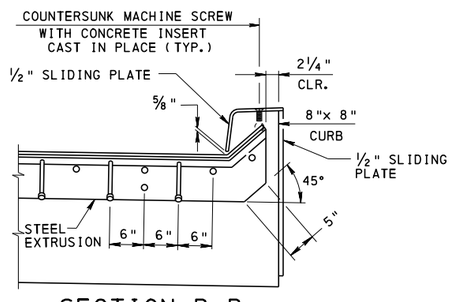


PLAN

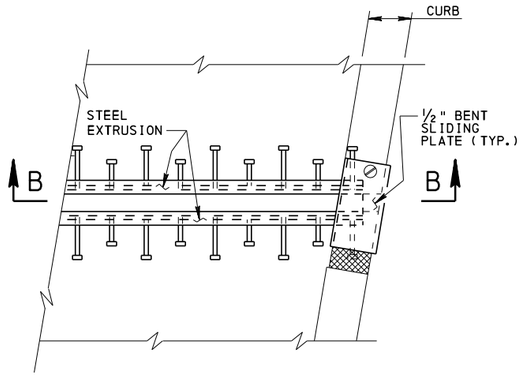
* OFFSET DIMENSION WILL VARY WITH SKEW AND CORNER TYPE.

EXPANSION DAM SKEW DETAIL

JOINT AT ABUTMENT SHOWN WITH 30° SKEW, JOINT AT PIERS SIMILAR



SECTION B-B



PLAN AT FAR END OF BRIDGE APPROACH SLAB

GENERAL NOTES:

1. ALL REINFORCEMENT STEEL BARS SHOWN MEET THE REQUIREMENTS OF ASTM A 615, A 996 OR A 706. DO NOT WELD GRADE 60 STEEL UNLESS SPECIFIED.
2. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408 AND AASHTO/AWS WELDING SPECIFICATIONS.
3. PAINT ALL STEEL SURFACES WITH 3 COATS IN THE SHOP IN ACCORDANCE WITH SECTION 1060 OF PUBLICATION 408. GALVANIZED STEEL IN ACCORDANCE WITH SECTION 1105.02 (S) OF PUBLICATION 408 CAN BE USED AS AN ALTERNATE.
4. PROVIDE AASHTO M 270, GRADE 36 ASTM A 709 GRADE 36 FOR STEEL EXTRUSION UNLESS OTHERWISE SPECIFIED ON THE DESIGN DRAWINGS. ANCHOR STUDS TO BE IN ACCORDANCE WITH SECTION 1105.02(e) OF PUB 408. STUDS MAY BE PIGGY BACKED TO ACHIEVE REQUIRED LENGTH.
5. USE FLATHEAD STAINLESS STEEL ASTM F 738M OR F 593 (TYPE 304) FOR COUNTERSUNK SCREWS WITH INSERTS. ALL CONCRETE INSERTS AND M 20 COUNTERSUNK MACHINE SCREWS ARE ¾" DIAMETER UNLESS OTHERWISE NOTED.
6. USE THIS STANDARD DRAWING AS A GUIDE IN THE PREPARATION OF SHOP DRAWINGS.
7. INSTALL CONTINUOUS NEOPRENE STRIP SEAL IN THE FIELD. SPLICING OF SEAL IS NOT PERMITTED. TEMPORARY SEAL MAY BE REQUIRED DEPENDING ON STAGES OF CONSTRUCTION.
8. CONSTRUCT EXPANSION DAM TO MATCH ROADWAY GRADE AND CROSS SLOPE.
9. 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.
10. 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.
11. 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 DELIVERY.
12. MINIMUM MOVEMENT CLASSIFICATION IS 3".
13. 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.
14. BOND NEOPRENE STRIP SEAL TO EXTRUSION WITH APPROVED ADHESIVE.
15. THE SEALS FURNISHED WITH THE RETAINERS MUST BE COMPATIBLE WITH THE RETAINER AND PROVIDE A WATERTIGHT JOINT.
16. 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.
17. BEFORE PLACING BLOCKOUT CONCRETE, APPLY APPROVED EPOXY BONDING AGENT TO TRANSVERSE CONSTRUCTION JOINTS.
18. 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.
19. GRIND ALL STEEL EDGES EXPOSED TO TRAFFIC OR PEDESTRIANS TO 3/16" MIN. RADIUS.
20. 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.

REFERENCE DRAWINGS	
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

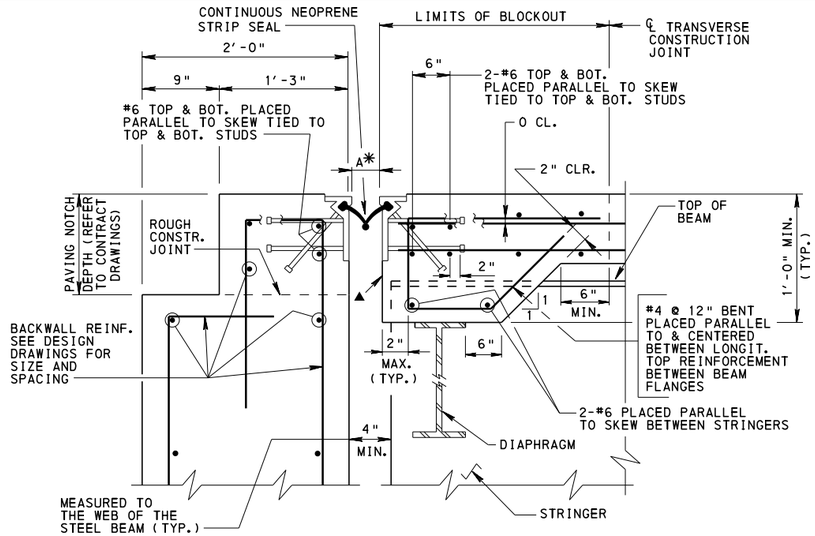
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD NEOPRENE STRIP SEAL DAM FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

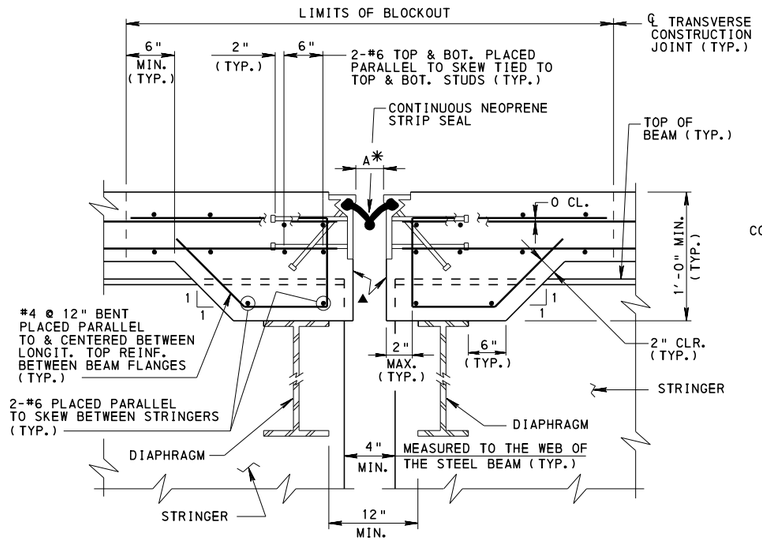
RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-767M



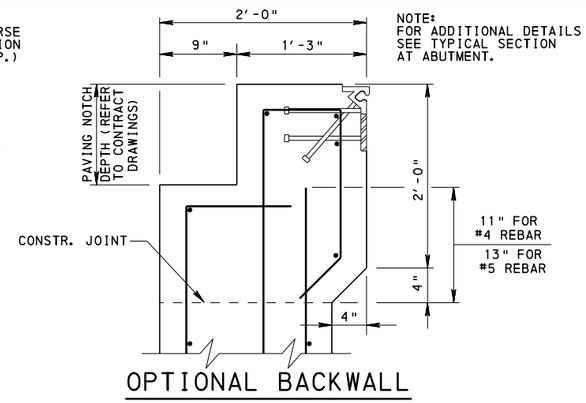
TYPICAL SECTION AT ABUTMENT
FIXED & EXPANSION
FOR STEEL BEAMS



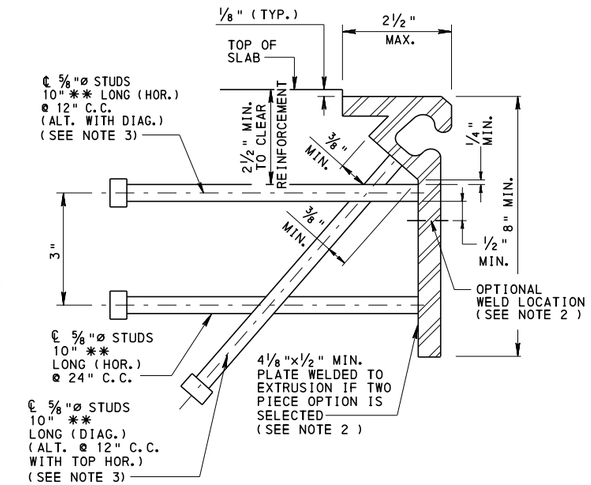
TYPICAL SECTION AT PIER
FIXED & EXPANSION
FOR STEEL BEAMS

✱ - "A", IS INSTALLATION WIDTH AS PER DIMENSION "A" TABLE

▲ - SEE NOTE 20 ON SHEET 1



OPTIONAL BACKWALL

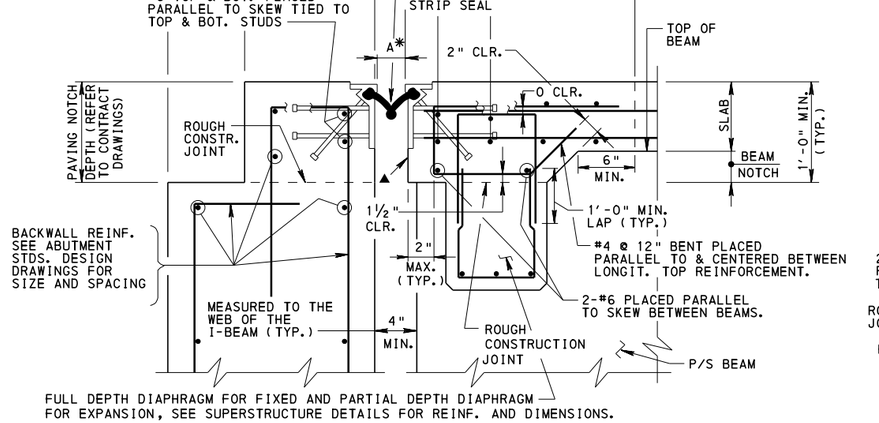


EXTRUSION SCHEMATIC

** 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.

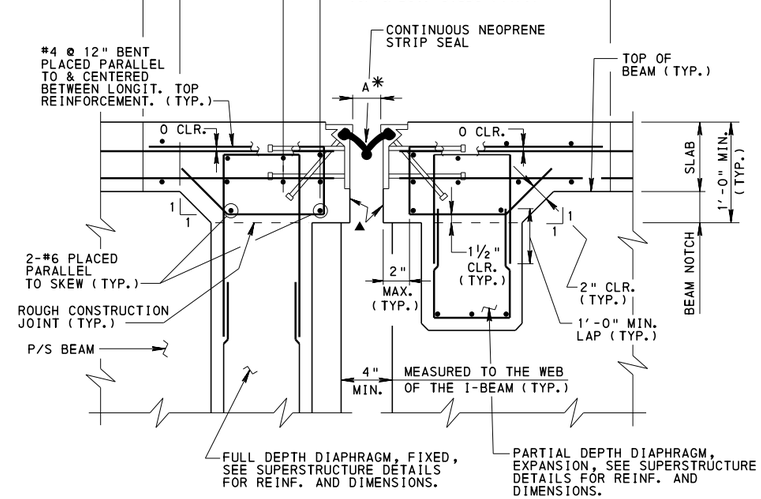
EXTRUSION NOTES:

1. EXTRUSION THICKNESS ½".
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)
3. 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.

DIMENSION "A" TABLE
(INSTALLATION DIMENSION "A" @ VARIOUS TEMPERATURES)

LOCATION	TEMPERATURE															
	(°F)	-10	-5	5	15	25	32	40	50	60	68	80	85	95	105	110

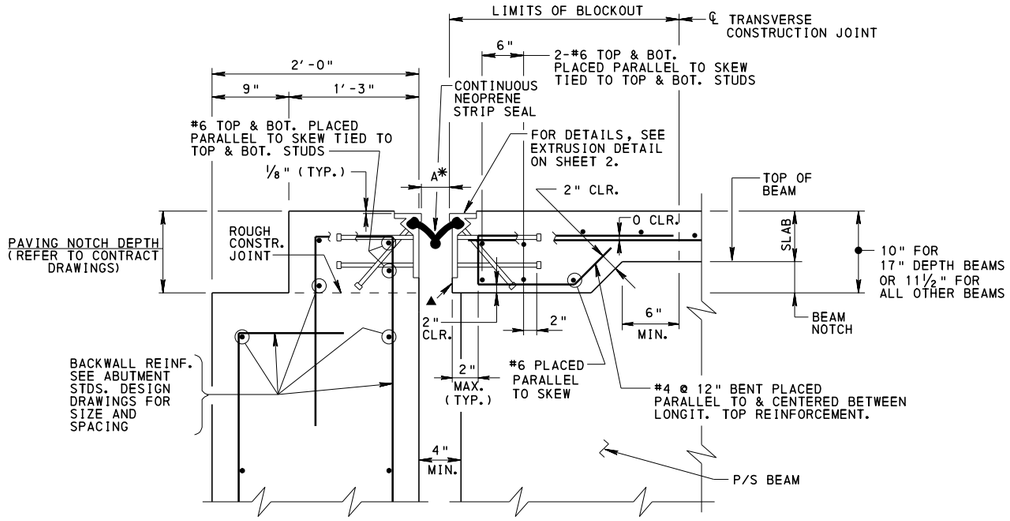
NOTE: TABLE TO BE SHOWN AND COMPLETED ON FABRICATORS SHOP DRAWINGS.

NOTE:
FOR DECK TOP REINFORCEMENT MAT: TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.

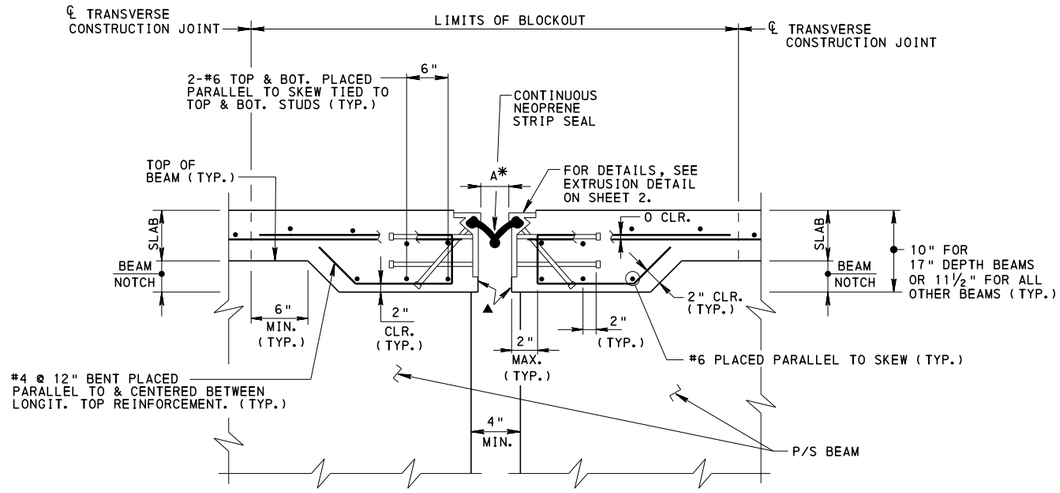
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
NEOPRENE STRIP SEAL DAM
FOR PRESTRESSED CONCRETE
& STEEL I-BEAM BRIDGES

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 6
Thomas P Macioce	Bruce D Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	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

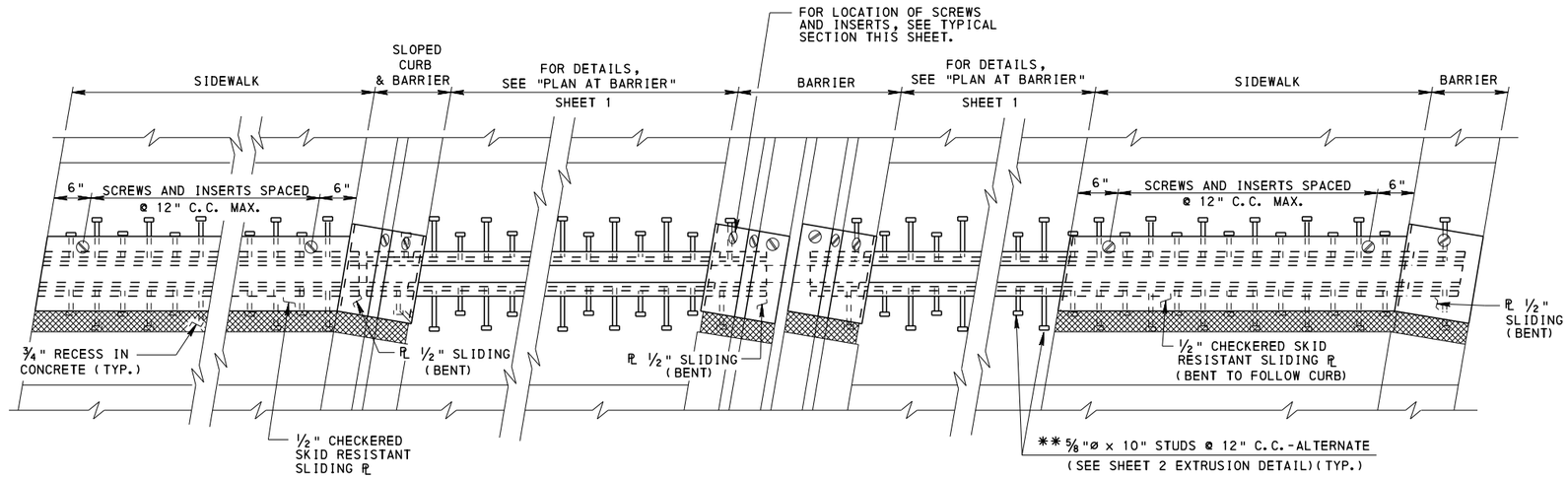
NOTE:

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 NEOPRENE STRIP SEAL DAM FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

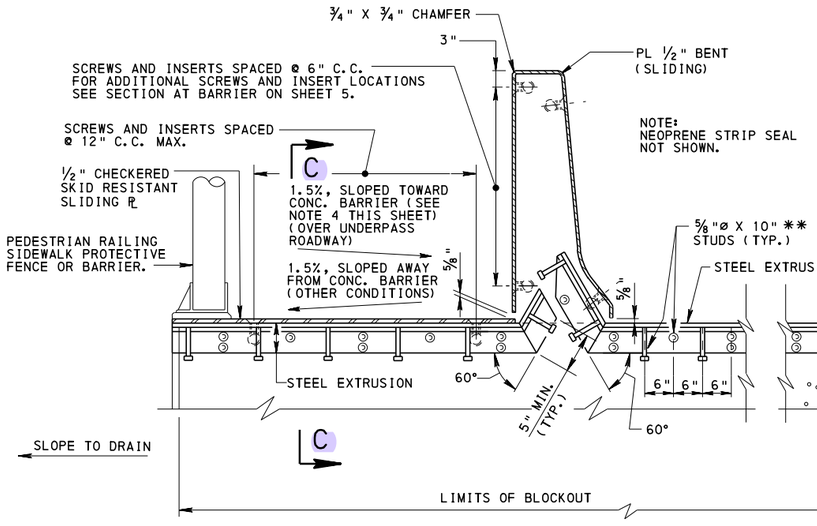
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent D Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 3 OF 6 BC-767M



PLAN AT SIDEWALK

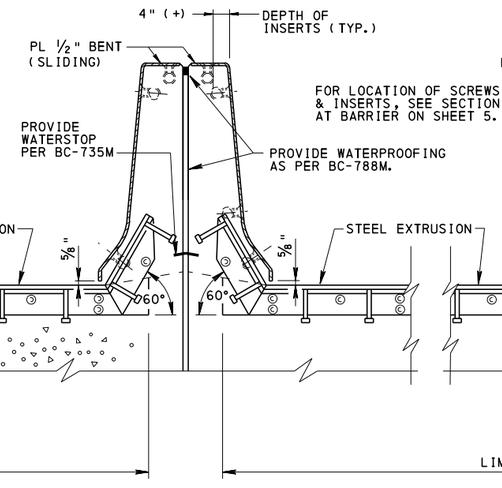
PLAN AT SPLIT MEDIAN BARRIER

PLAN AT ALTERNATE SIDEWALK



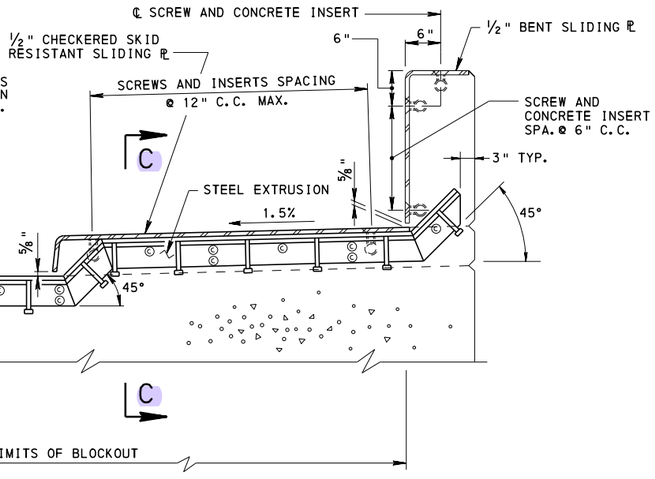
SECTION AT SIDEWALK

NOTE: SECTION IS SIMILAR FOR RAISED SIDEWALK.



SECTION AT SPLIT MEDIAN BARRIER

NOTE: FOR MEDIAN BARRIER NOT SPLIT, USE ONE PIECE ½" BENT SLIDING PLATE. STEEL EXTRUSION IS SHOWN FOR 90° SKEW. DETAIL STEEL EXTRUSION AS REQUIRED FOR SKEWS LESS THAN 90°.



SECTION AT ALTERNATE SIDEWALK

** 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
BUREAU OF PROJECT DELIVERY

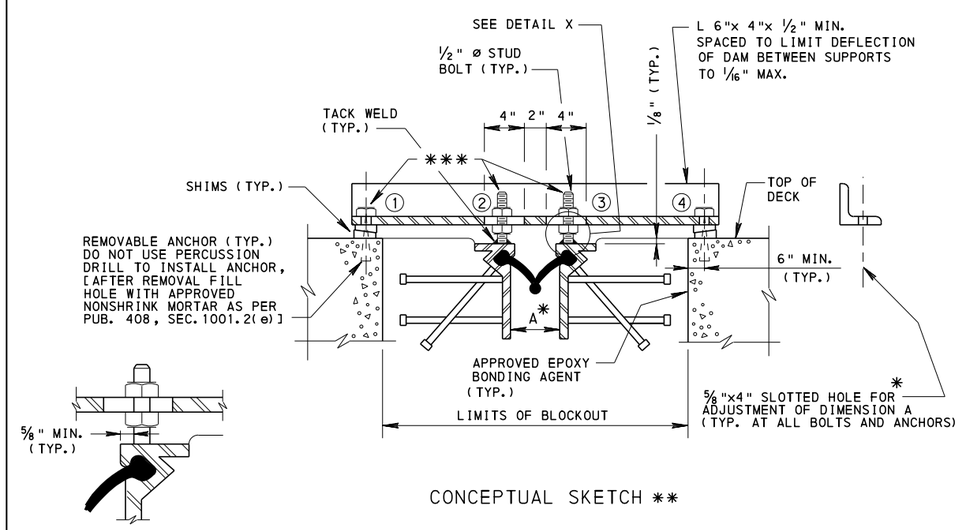
STANDARD NEOPRENE STRIP SEAL DAM FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brent D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 4 OF 6

BC-767M

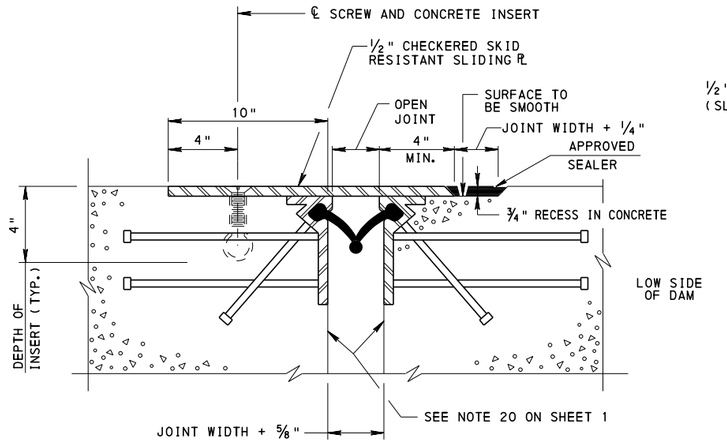


CONCEPTUAL SKETCH **

DETAIL X

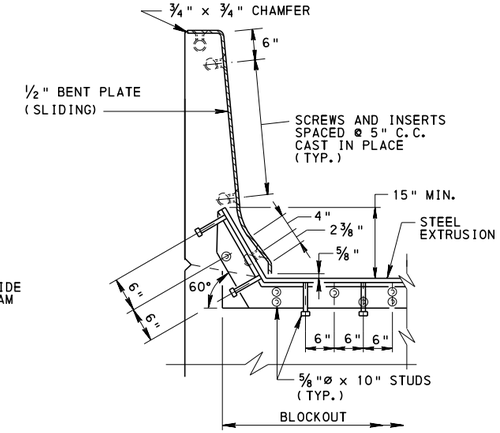
JOINT INSTALLATION SCHEME

(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 THE ALTERNATE BARRIER. 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 PUB. 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.

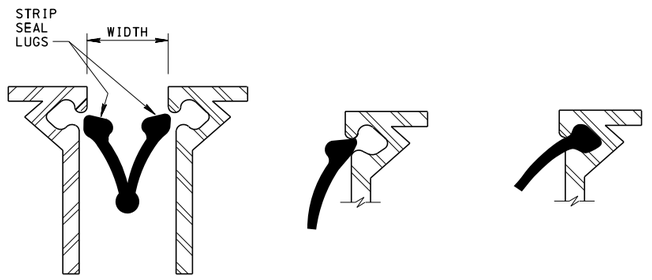
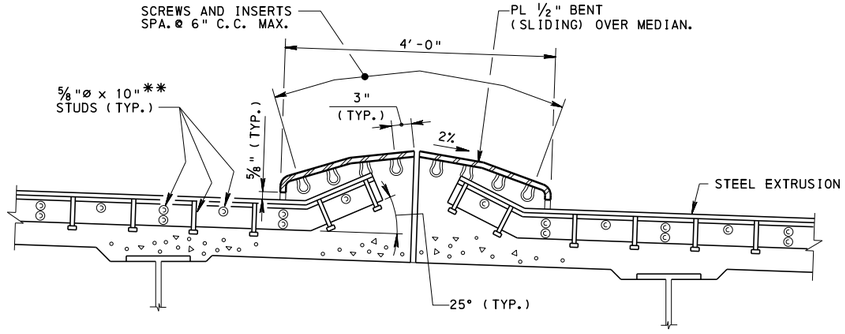


FIGURE 1 FIGURE 2 FIGURE 3

STRIP SEAL INSTALLATION PROCEDURE



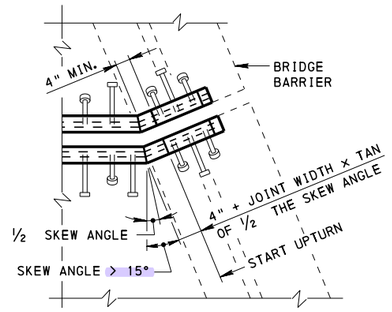
SECTION AT SPLIT CONCRETE DIVISOR

NOTE: FOR CONCRETE DIVISOR NOT SPLIT, USE ONE PIECE ½" BENT SLIDING PLATE.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

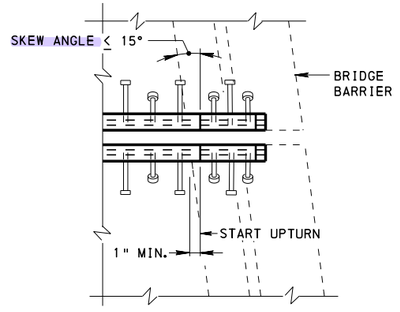
STANDARD NEOPRENE STRIP SEAL DAM FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 5 OF 6
Thomas P Macioce	Bruce D Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-767M



PLAN

SHOWN WITHOUT BENT SLIDING PLATE FOR CLARITY



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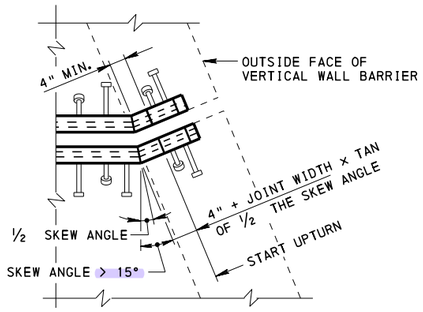

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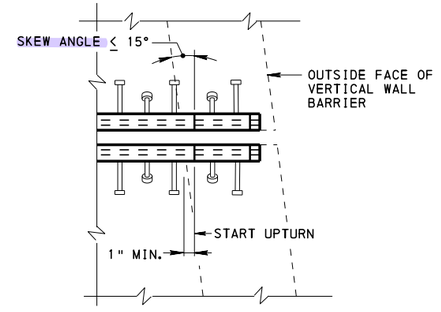

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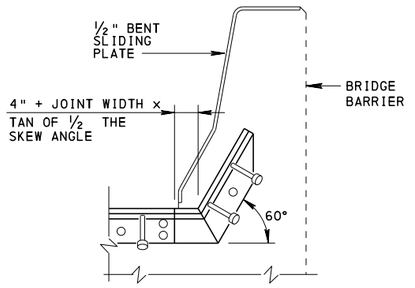
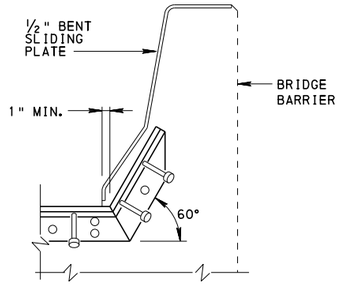
SHOWN WITHOUT BENT SLIDING PLATE FOR CLARITY



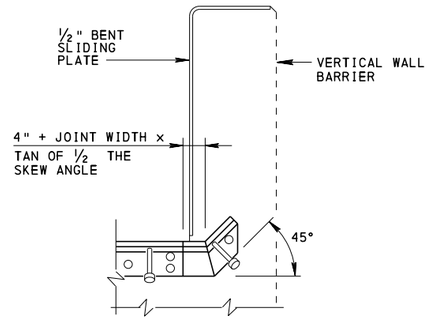
SECTION

EXPANSION DAM JOINT
MITERED AT BARRIER FACE
SKEW ANGLES > 15° PERPENDICULAR



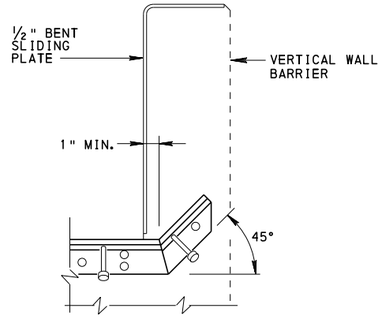
SECTION

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

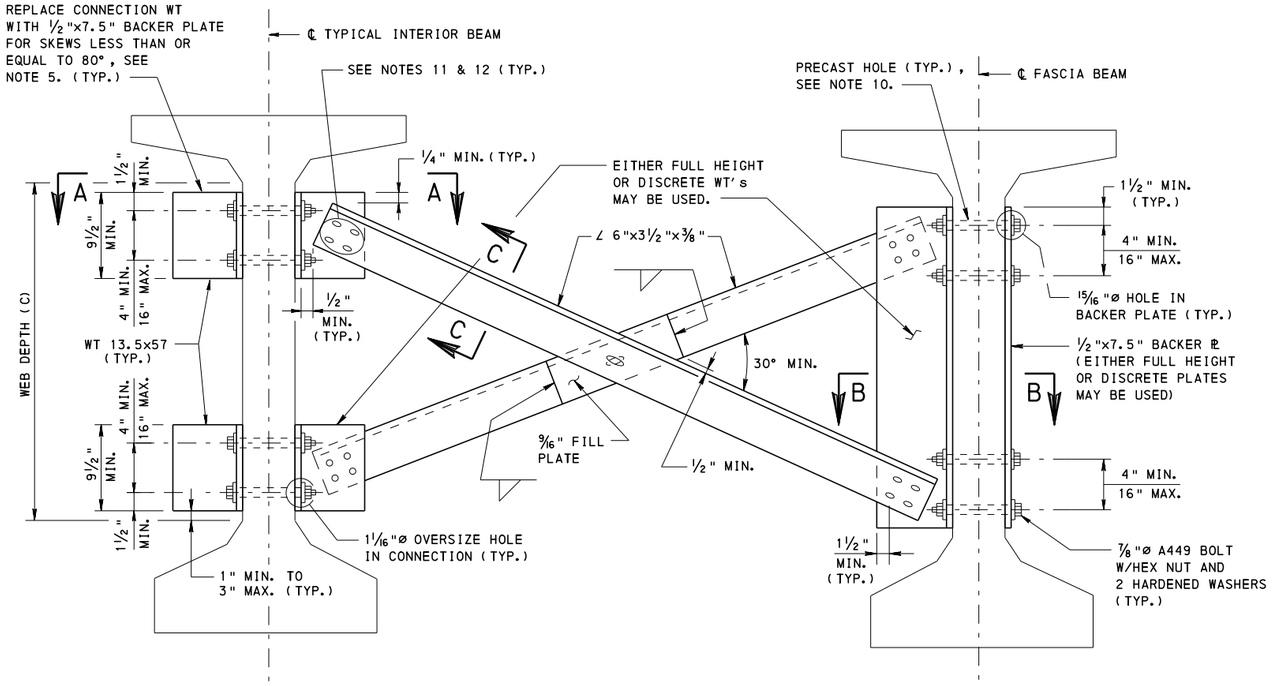
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD NEOPRENE STRIP SEAL DAM MISCELLANEOUS DETAILS FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

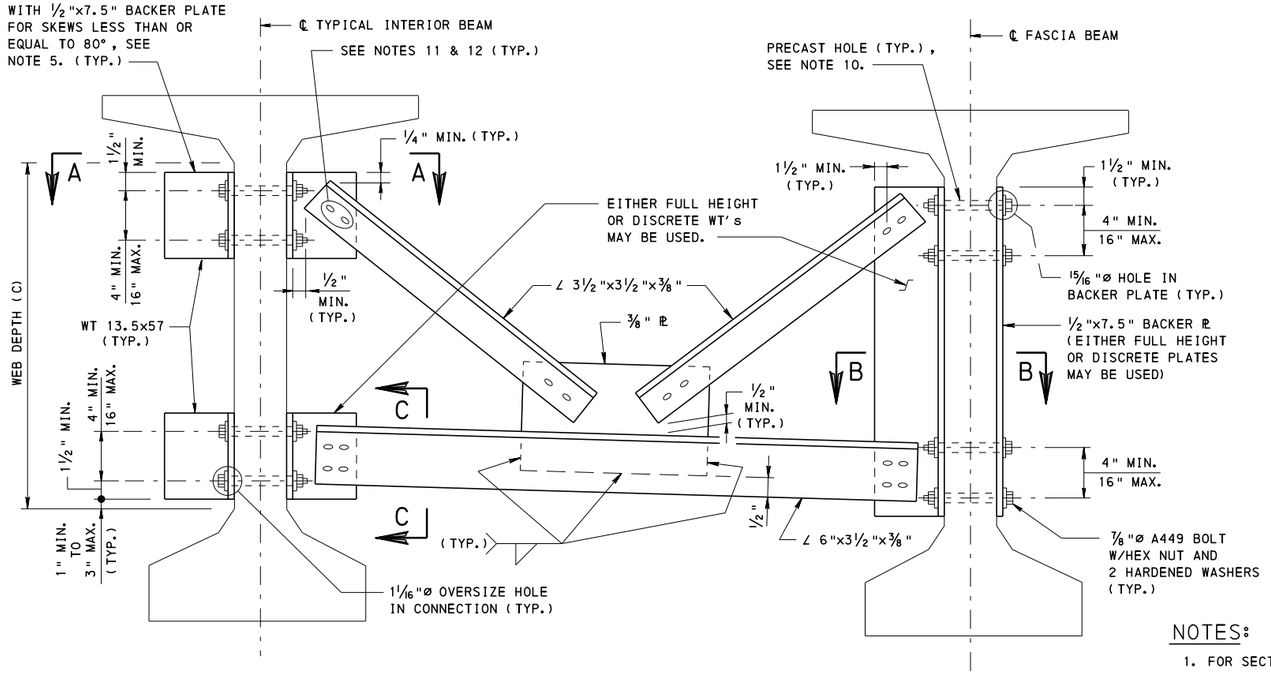
RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY

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 ⅞"ø ASTM A 325 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 ⅞"ø ASTM A449 BOLTS SHALL BE CAST INTO THE BEAM WEB USING 1¼" I.D. P.V.C. TUBING OR GALVANIZED STEEL SLEEVES (CHROMATED) AND AVOID PRESTRESSING STRANDS AND OTHER REINFORCEMENT. DRILLING IS NOT ALLOWED.
11. 1 1/16" DIAMETER HOLE IN CONNECTION WT's OR DOUBLE ANGLES; 15/16"x 2 3/16" LONG SLOTTED HOLE IN DIAPHRAGM MEMBER, FOR ⅞" DIAMETER ASTM 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 2¼" EDGE DISTANCE IN THE DIRECTION OF THE SLOTS AND 1" EDGE DISTANCE IN THE DIRECTION PERPENDICULAR TO THE SLOTS.
13. THE ⅞" DIAMETER ASTM 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 ½" 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.

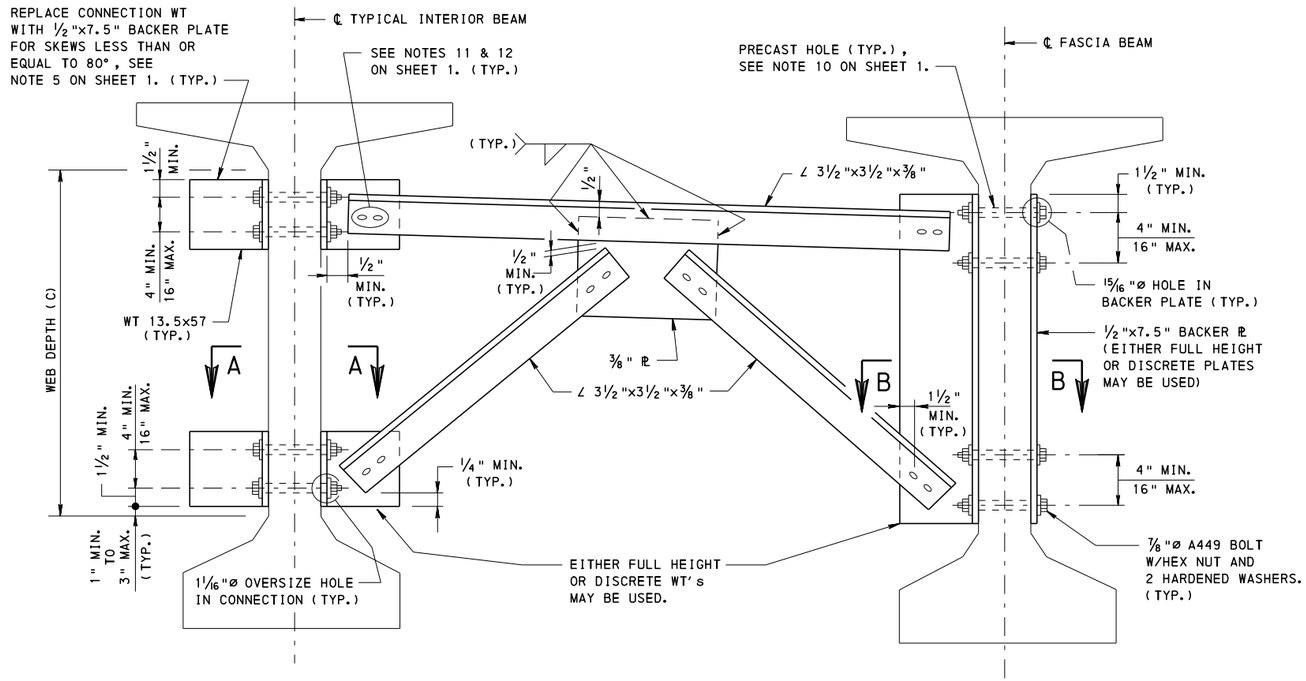
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD STEEL MID-SPAN DIAPHRAGMS FOR P/S CONCRETE AASHTO I-BEAM AND PA BULB-TEE BEAM BRIDGES WEB DEPTH ≥40"

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

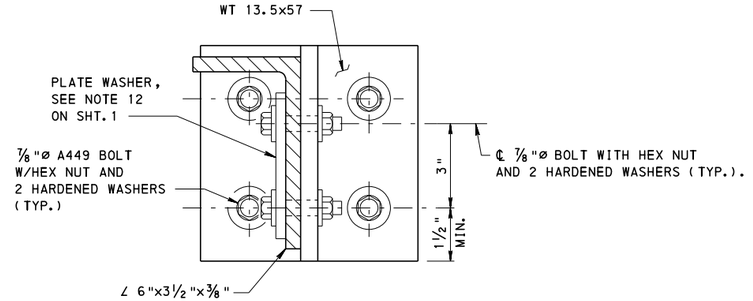
RECOMMENDED SEPT. 30, 2016
Brian D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-770M



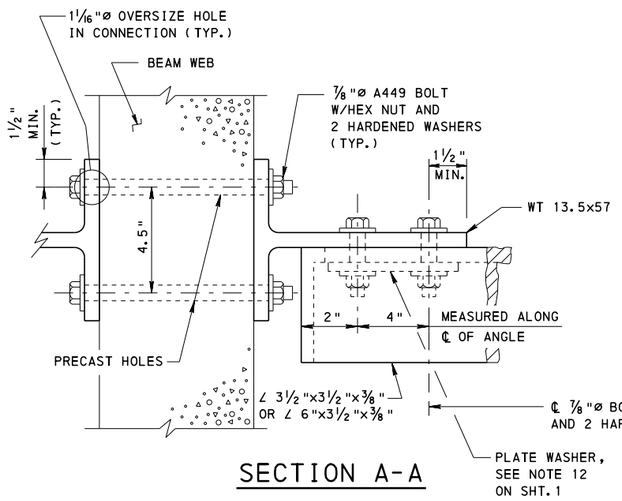
ALTERNATE DIAPHRAGM DETAIL FOR UTILITY ACCESS

THIS DETAIL MAY BE USED IN BAYS WITH UTILITIES

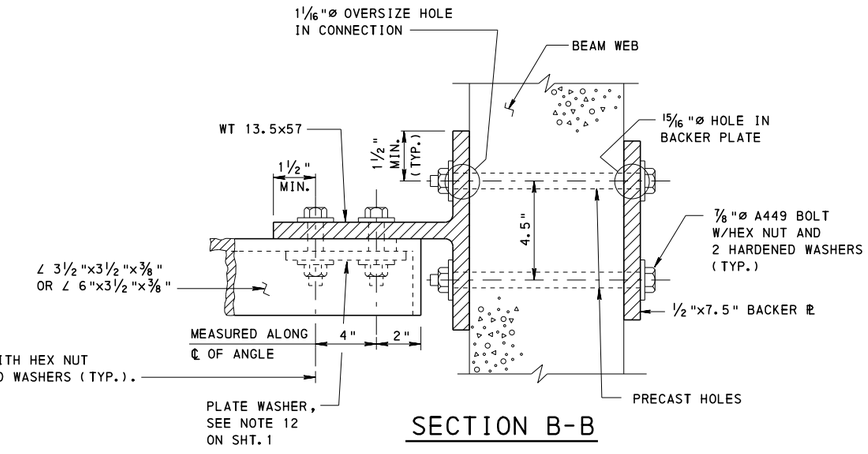


SECTION C-C

FOR SECTION C-C CUT LINES SEE SHEET 1.



SECTION A-A



SECTION B-B

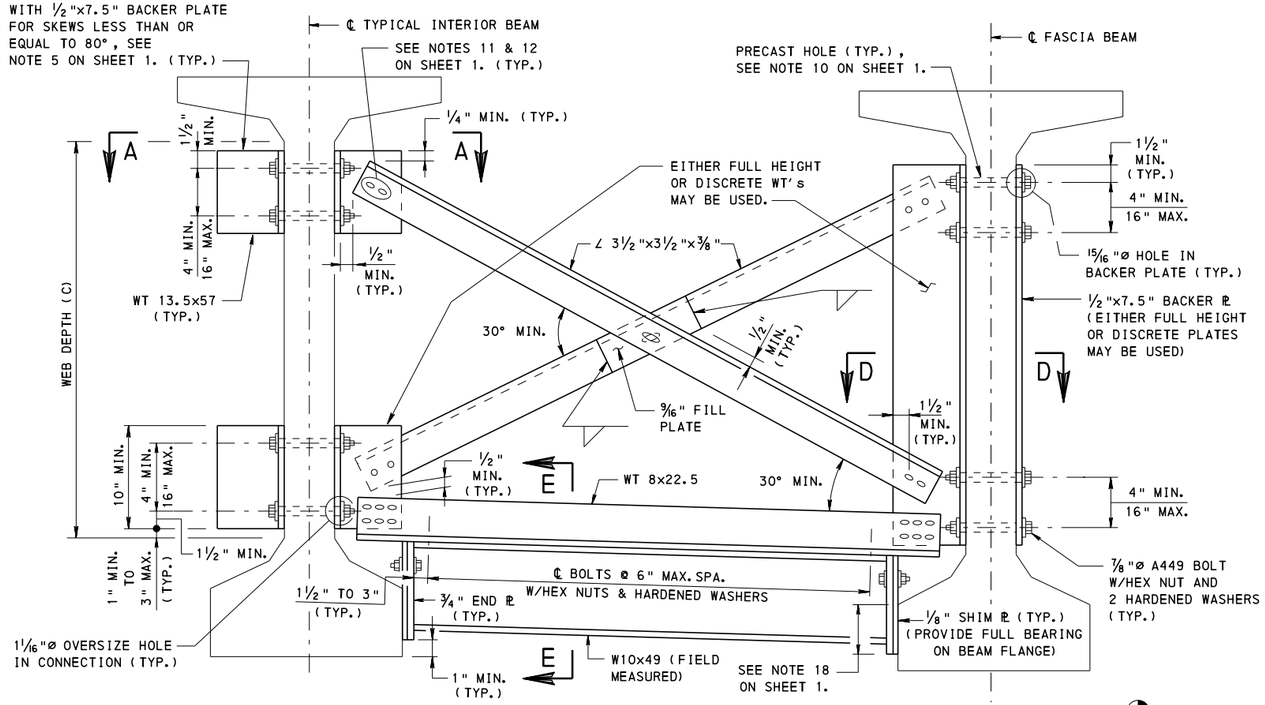
NOTE:

1. FOR GENERAL NOTES SEE SHEET 1.

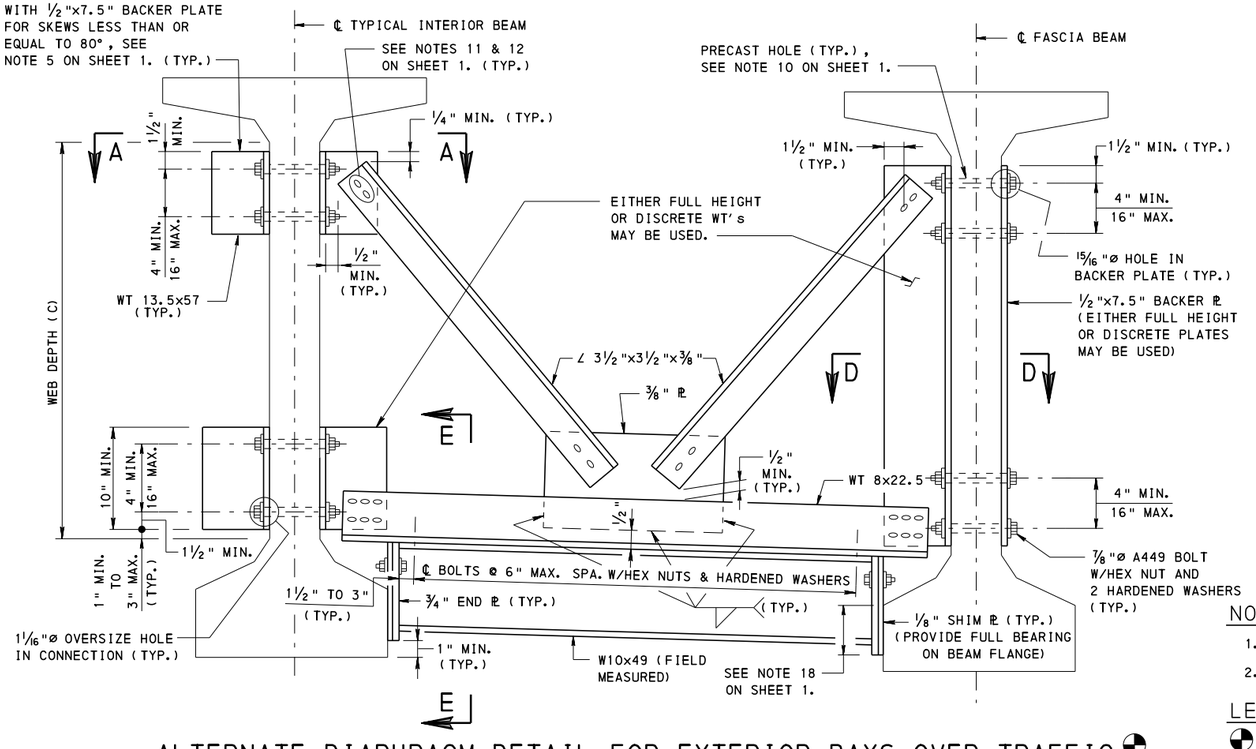
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD STEEL MID-SPAN DIAPHRAGMS FOR P/S CONCRETE AASHTO I-BEAM AND PA BULB-TEE BEAM BRIDGES WEB DEPTH ≥40"

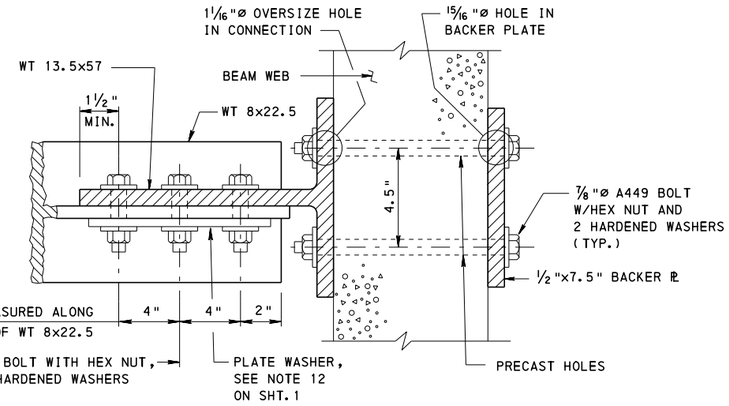
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 4
Thomas P Macioce	Brian B Thompson	BC-770M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



TYPICAL DIAPHRAGM DETAIL FOR EXTERIOR BAYS OVER TRAFFIC ◔

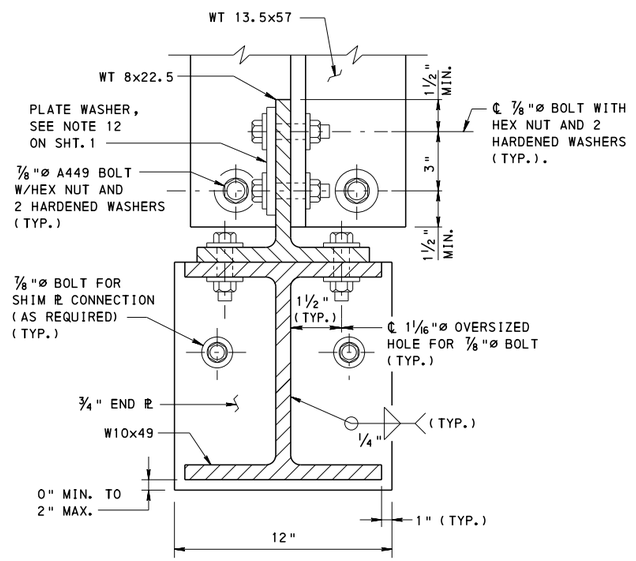


ALTERNATE DIAPHRAGM DETAIL FOR EXTERIOR BAYS OVER TRAFFIC ◔



SECTION D-D

∠ 3½"x3½"x⅜" DIAGONAL NOT SHOWN FOR CLARITY



SECTION E-E

NOTES:

1. FOR GENERAL NOTES SEE SHEET 1.
2. FOR SECTION A-A SEE SHEET 2.

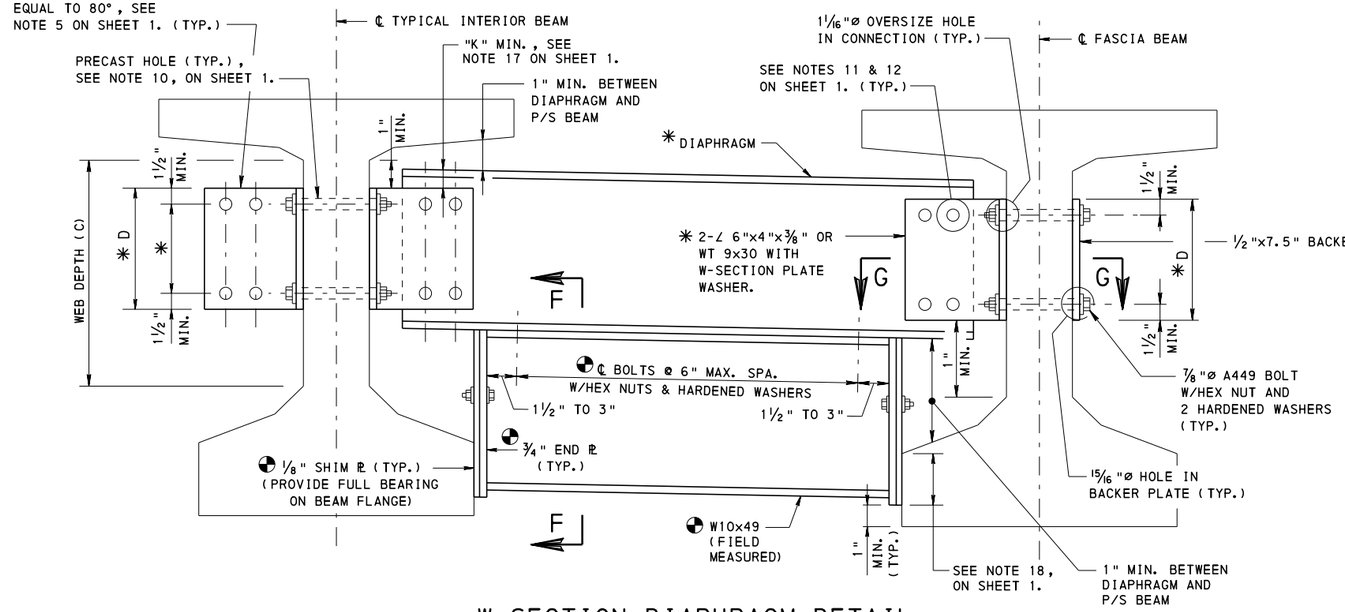
LEGEND:

◔ – 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

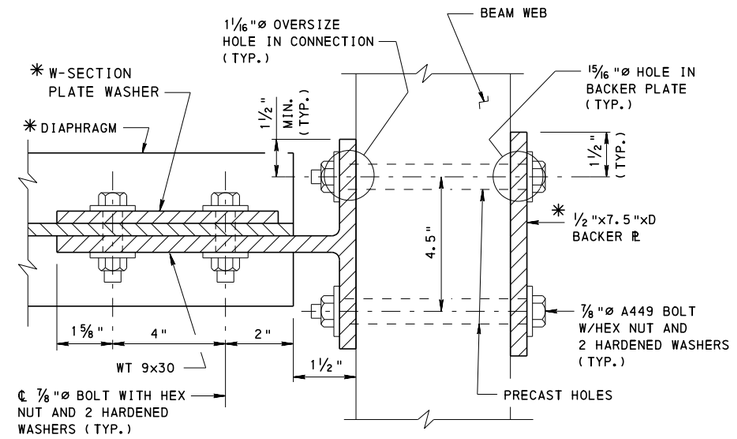
STANDARD STEEL MID-SPAN DIAPHRAGMS FOR P/S CONCRETE AASHTO I-BEAM AND PA BULB-TEE BEAM BRIDGES WEB DEPTH ≥40"

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 4
Thomas P Macioce	Brian D Thompson	BC-770M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

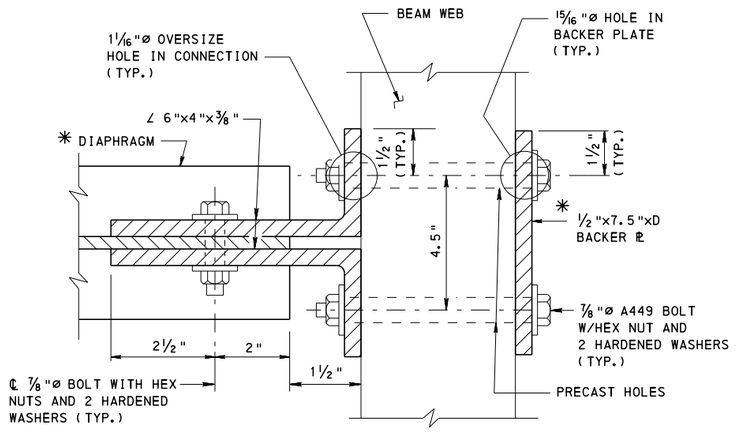


W-SECTION DIAPHRAGM DETAIL

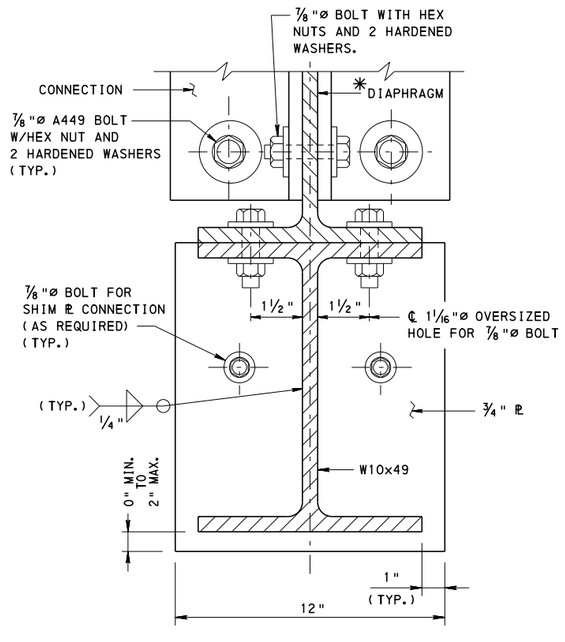
STRUCTURAL TEE CONNECTION SHOWN, SEE SECTION G-G FOR ALTERNATE DOUBLE ANGLE CONNECTION.



CONNECTION WITH STRUCTURAL TEE



CONNECTION WITH DOUBLE ANGLES



SECTION F-F

DOUBLE ANGLE CONNECTION SHOWN, STRUCTURAL TEE CONNECTION SIMILAR.

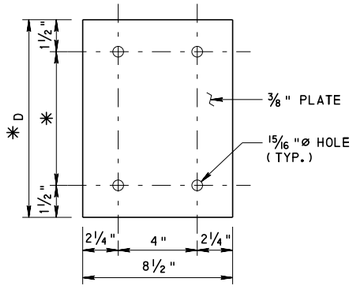


PLATE WASHER FOR W-SECTION

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.

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.

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

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 4 OF 4
Thomas P Macioce	Bruce B Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-770M

TEMPORARY LATERAL STABILITY (TLSB) BRACING DESIGN CRITERIA FOR PRESTRESSED CONCRETE I-BEAM TYPE GIRDERS

GENERAL

1. 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.
2. BRACING SHALL BE DESIGNED TO PERMIT INSTALLATION, WHEN REQUIRED, PRIOR TO RELEASE OF CRANES.
3. BRACING IS TO REMAIN IN PLACE UNTIL SUFFICIENT SUPPORT IS PROVIDED BY MID SPAN DIAPHRAGMS AND POSITIVE MOMENT REGION DECK SLABS.
4. BOX BEAM TYPE GIRDERS ARE NOT INCLUDED IN THIS STANDARD.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF THE BRACING SYSTEM.
6. BRACING CALCULATIONS AND ERECTION DRAWINGS SHALL BE SEALED BY A PROFFESSIONAL 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.
7. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408 AND ITS CHANGE NUMBER.
8. 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.

DESIGN CRITERIA

PROVIDE LATERAL BRACING FOR ALL I-BEAM TYPE STRUCTURES, INCLUDING BULB-TEE BEAMS.

EVALUATE THE LEVEL OF LATERAL BRACING REQUIRED FOR THE BEAMS BASED ON THE FOLLOWING CRITERIA:

a. BEAMS WHICH ARE DETERMINED TO BE INHERENTLY UNSTABLE, OR BEAR ON HIGH LOAD MULTIROTATIONAL BEARINGS (HLMR BEARINGS), SHALL BE RESTRAINED BY PRIMARY BRACING.

b. BEAMS WHICH ARE DETERMINED TO BE INHERENTLY STABLE SHALL BE RESTRAINED BY SECONDARY BRACING.

STABILITY CRITERIA:

a. 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.

b. 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 BEAM'S 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.

c. 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 TOP FLANGE OF THE BEAM. RESULTANT FORCE ACTING AT MID POINT OF LOAD.

e_{LB}, LATERAL BOW = ECCENTRICITY RESULTING FROM 1½" LATERAL BOW WHICH ADDS TO WIND AND CONSTRUCTION LOADS, EQUAL TO THE ⅔ POINT OF THE 1½" LATERAL BOW. TO BE USED FOR LOCATING THE BEAM WT. REACTION, P.

W_C, CONSTRUCTION LOAD = 20 PSF ACTING ACROSS ½ 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+Wc*b/2*L/2)]

SECONDARY BRACING

a. SECONDARY BRACING SHALL BE DESIGNED TO RESIST THE LOADS DESCRIBED FOR STABILITY CRITERIA USING WORKING STRESS METHOD. HORIZONTAL WIND PRESSURE, W_{WH}, NEED ONLY BE APPLIED TO THE EXTERIOR BEAM.
b. 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.
c. THE SECONDARY BRACING SYSTEM SHALL HAVE TWO FIXED CONNECTIONS TO EACH SUPPORT, PREFERABLY LOCATED AT THE FIRST AND LAST GIRDER ON EACH SUPPORT.
d. DRILLED ANCHORS SHALL BE LOAD TESTED TO 120% OF THE DESIGN LOAD.
   c.1. DESIGN LOAD AND TEST LOAD SHALL BE SHOWN ON THE ERECTION DRAWING.
e. THE QUANTITY OF DRILLED ANCHORS TO BE LOAD TESTED SHALL BE 2 ANCHORS PER SUBSTRUCTURE UNIT.

PRIMARY BRACING

a. PRIMARY BRACING SHALL BE DESIGNED TO RESIST THE LOADS DESCRIBED FOR STABILITY CRITERIA.
b. PRIMARY BRACING MUST BE INSTALLED PRIOR TO THE BEAM BEING RELEASED FROM THE CRANE.
c. THE BRACING SYSTEM SHALL BE DESIGNED TO WITHSTAND THE ABOVE FORCES USING WORKING STRESS METHOD, WITH CONSIDERATION OF THE DEFLECTION OF THE BRACING SYSTEM.
d. DRILLED ANCHORS SHALL BE LOAD TESTED TO 120% OF THE DESIGN LOAD.
   c.1. DESIGN LOAD AND TEST LOAD SHALL BE SHOWN ON THE ERECTION DRAWING.
e. THE QUANTITY OF DRILLED ANCHORS TO BE LOAD TESTED SHALL BE 2 ANCHORS PER SUBSTRUCTURE UNIT.

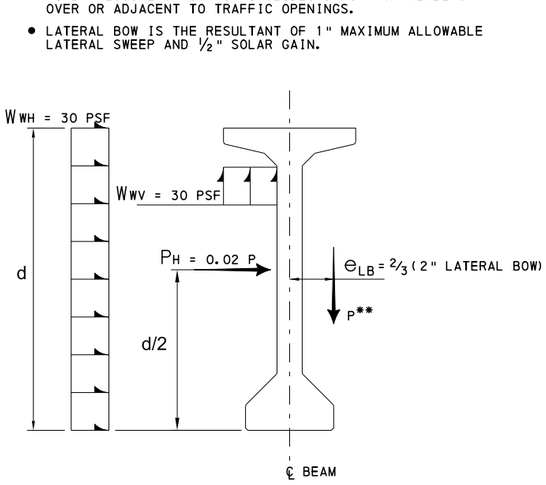
BEARINGS

a. BEARING PADS
   a.1. THE LATERAL LOAD TRANSFERRED TO THE BEARING SHALL BE LESS THAN OR EQUAL TO 20% OF THE VERTICAL REACTION (BEAM WEIGHT ONLY).
   a.2. IF THE ABOVE CRITERIA CAN NOT BE MET, BEAM MUST BE BRACED TO PREVENT SLIDING.
b. GUIDED HLMR BEARINGS
   b.1. 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.
   b.2. IF THE ABOVE CRITERIA CAN NOT BE MET, BEAM MUST BE BRACED TO PREVENT SLIDING.
   b.3. 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.
   b.4. BEARING LOCK SHALL NOT BE REMOVED UNTIL FINAL RESTRAINTS ARE IN PLACE. (I.E. END DIAPHRAGM, OR SHEAR BLOCKS)
c. NON-GUIDED HLMR BEARINGS
   c.1. THE LATERAL LOAD TRANSFERRED TO THE BEARING SHALL BE RESISTED BY A NON-GUIDED HLMR BEARING LOCK.
   c.2. BEARING LOCK SHALL BE INSTALLED TO RESIST LATERAL MOVEMENT WHILE ALLOWING LONGITUDINAL MOVEMENT, IF REQUIRED.
   c.3. BEARING LOCK SHALL NOT BE REMOVED UNTIL FINAL RESTRAINTS ARE IN PLACE. (I.E. END DIAPHRAGM, OR SHEAR BLOCKS)

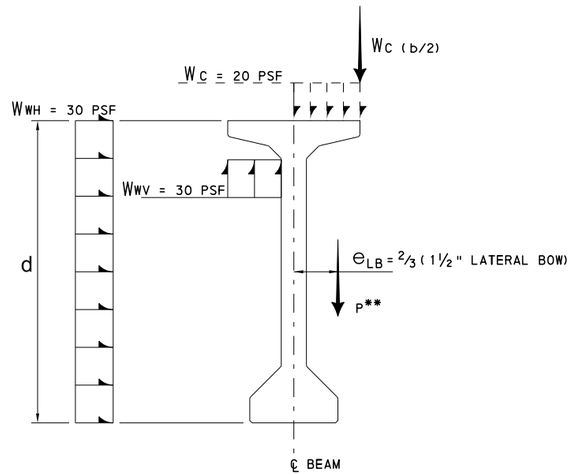
DESIGN LOAD COMMENTARY

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 1½" MAXIMUM ALLOWABLE LATERAL SWEEP AND ½" 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 ½" SOLAR GAIN.



CASE I



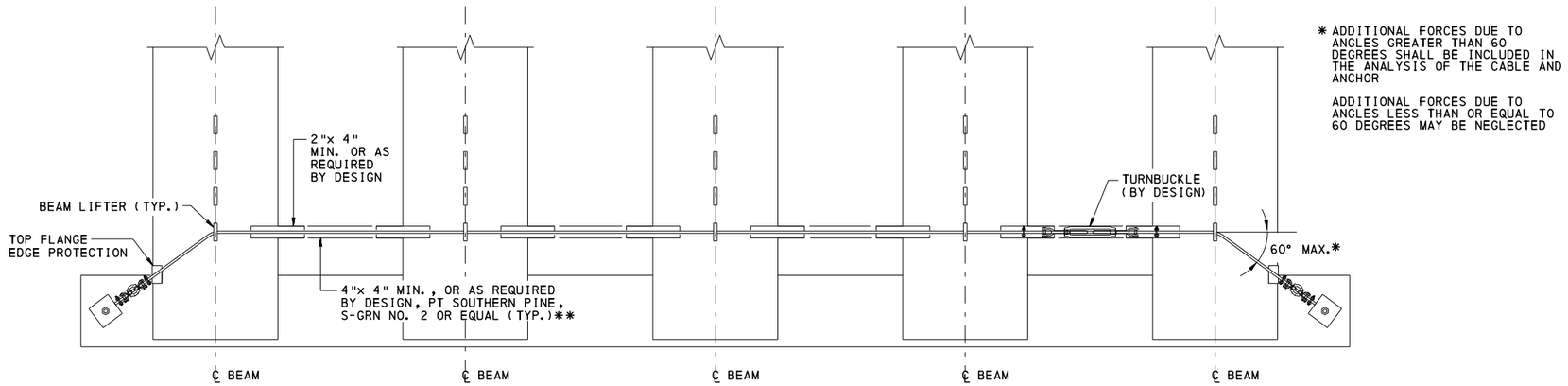
CASE II

** P = BEAM WEIGHT REACTION
= BEAM UNIT WEIGHT/FT x SPAN LENGTH/2

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PRESTRESSED CONCRETE BEAM BRACING
NOTES

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 1 OF 5
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-772M

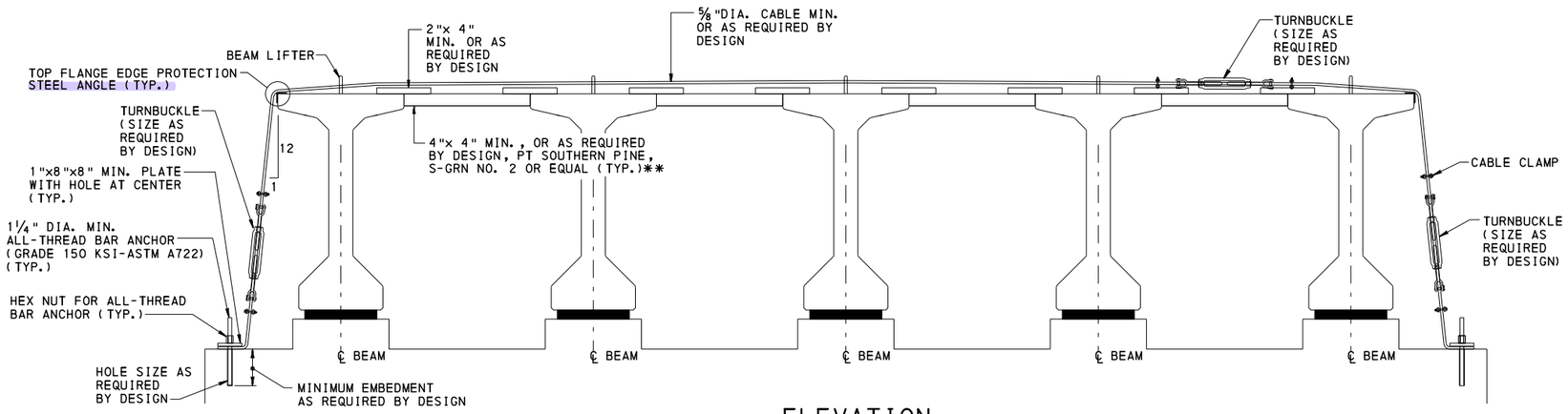


* ADDITIONAL FORCES DUE TO ANGLES GREATER THAN 60 DEGREES SHALL BE INCLUDED IN THE ANALYSIS OF THE CABLE AND ANCHOR

ADDITIONAL FORCES DUE TO ANGLES LESS THAN OR EQUAL TO 60 DEGREES MAY BE NEGLECTED

** ADDITIONAL TIMBER BRACES MAY BE REQUIRED BETWEEN BEAMS FOR HIGHER LOAD CASES.

PLAN



ELEVATION

CONCEPTUAL SECONDARY BRACING DETAILS

INSTALLATION

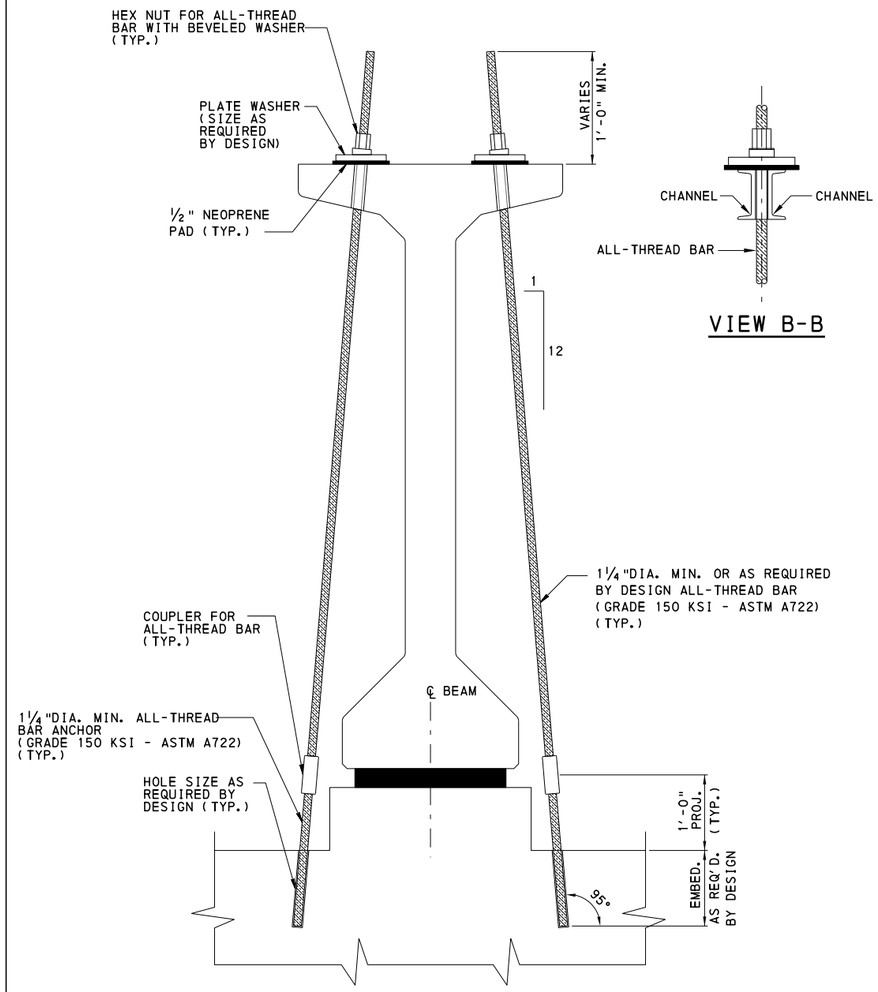
SECONDARY BRACING INSTALLATION:

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
BUREAU OF PROJECT DELIVERY

STANDARD
PRESTRESSED CONCRETE BEAM BRACING
CONCEPTUAL SECONDARY BRACING

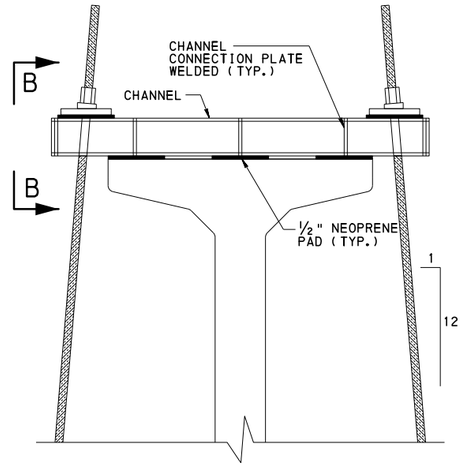
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 5
Thomas P. Macioce	Brent D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-772M



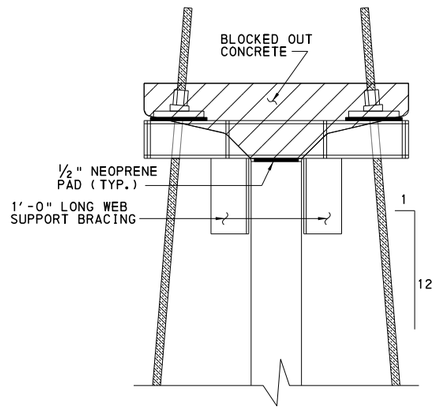
VIEW B-B

CONCEPTUAL PRIMARY BRACING DETAILS

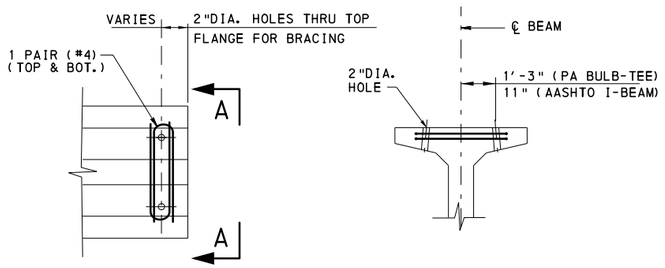
N.T.S.



ALTERNATE #1
(NO BEAM NOTCH)



ALTERNATE #2
(AT BEAM NOTCH)



PLAN VIEW A-A

ADDITIONAL BEAM REINFORCEMENT FOR BRACING

N.T.S.

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 1¼" 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.

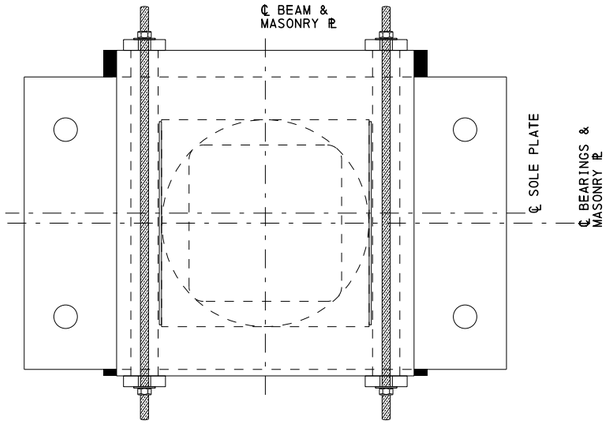
NOTE:

ALL-THREAD BAR ANCHORS MAY BE CAST INTO THE SUBSTRUCTURE AT THE CONTRACTOR'S OPTION.

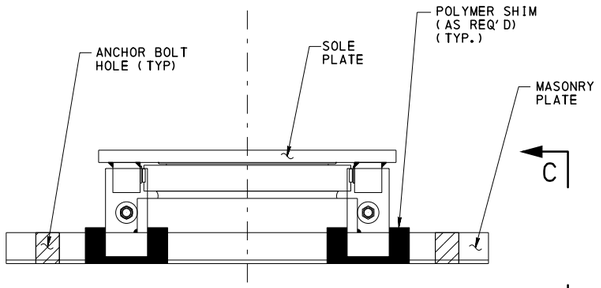
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PRESTRESSED CONCRETE BEAM BRACING
CONCEPTUAL PRIMARY BRACING

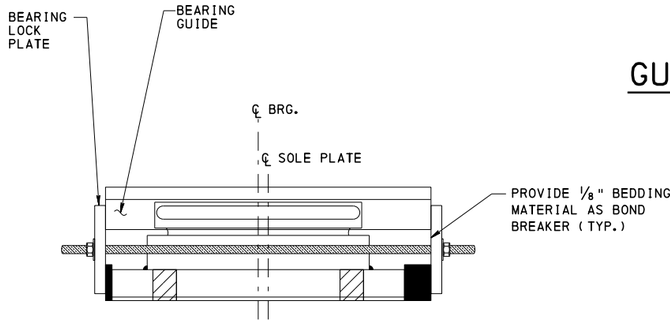
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 5
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-772M



PLAN-LOCK INSTALLED



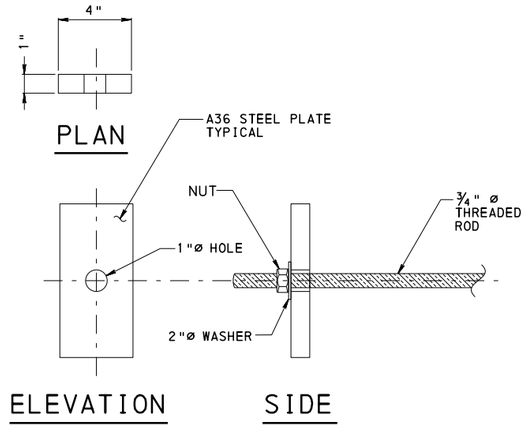
ELEVATION



SECTION C-C

CONCEPTUAL GUIDED HLMR BEARING LOCK

N.T.S.



PLAN

ELEVATION SIDE

GUIDED POT BEARING LOCK DETAILS

N.T.S.

INSTALLATION

GUIDED HLMR BEARING LOCK INSTALLATION:

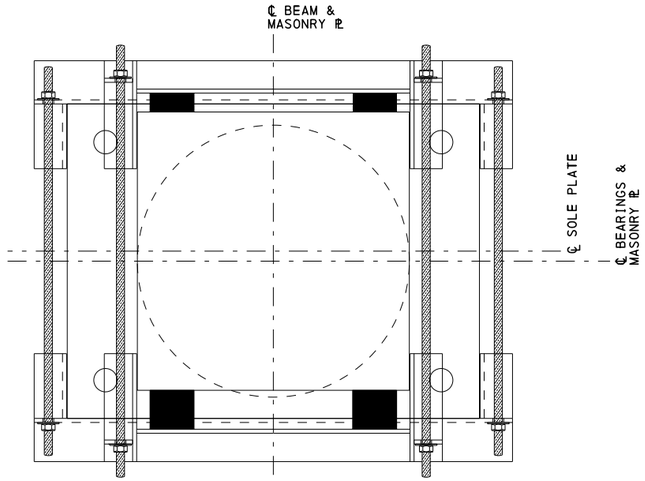
1. MATE BEAM TO BEARING SOLE PLATE.
   1.a. CRANE TO MAINTAIN CONTROL OF BEAM.
2. PLACE BEARING LOCK AND SNUG FASTENERS.
3. SHIM CENTER LINE OF BEARING SOLE PLATE STATION AHEAD OR BEHIND AS DESIGNATED BY DESIGN TO AIR TEMPERATURE AT ERECTION, TO A LOCKED CONDITION.
   3.a. ONLY ONE END OF BEAM IS TO BE LOCKED IN A LONGITUDINAL POSITION. OPPOSITE BEAM END IS TO HAVE FREEDOM OF MOVEMENT LONGITUDINALLY.

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.

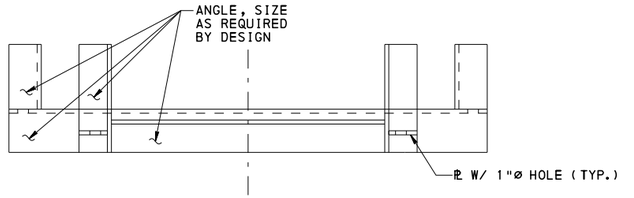
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PRESTRESSED CONCRETE BEAM BRACING
CONCEPTUAL GUIDED HLMR
BEARING LOCK

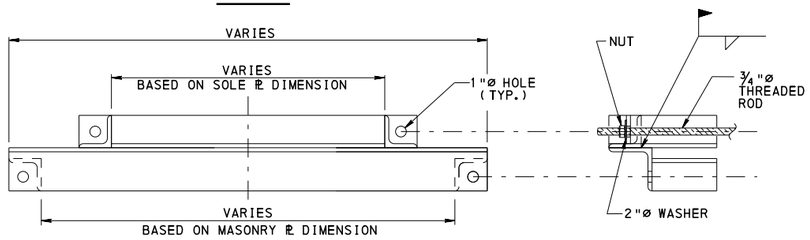
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 4 OF 5
Thomas P Macioce	Brian D Thompson	BC-772M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



PLAN - LOCK INSTALLED

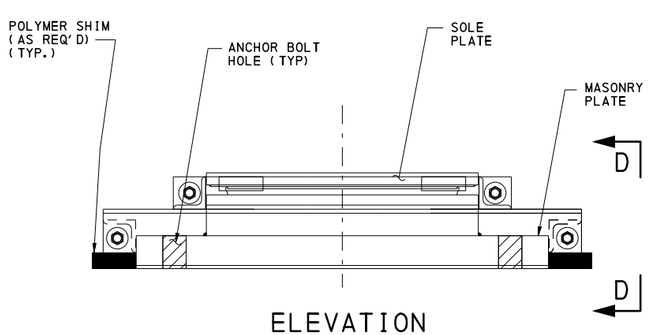


PLAN

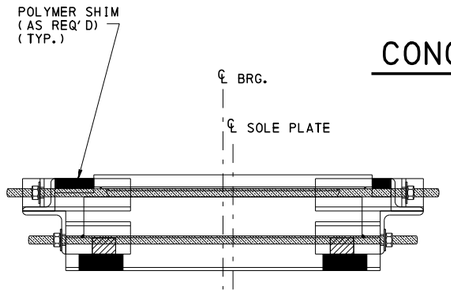


ELEVATION

SIDE



ELEVATION



SECTION D-D

CONCEPTUAL NON-GUIDED HLMR BEARING LOCK DETAILS

N.T.S.

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
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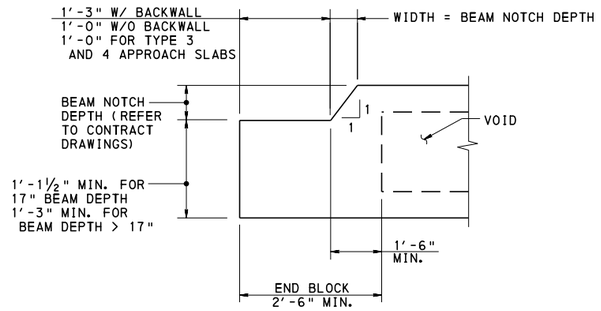
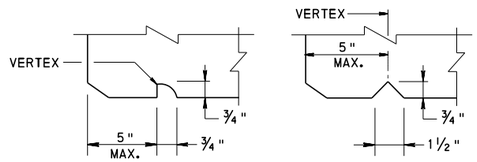
STANDARD
PRESTRESSED CONCRETE BEAM BRACING
CONCEPTUAL NON-GUIDED
HLMR BEARING LOCK

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 5 OF 5
Thomas P Macioce CHIEF BRIDGE ENGINEER	Brian D Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-772M



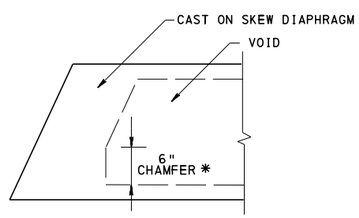
BEAM NOTCH DETAIL
SPREAD BOX BEAM



ACCEPTABLE DRIP NOTCH DETAILS

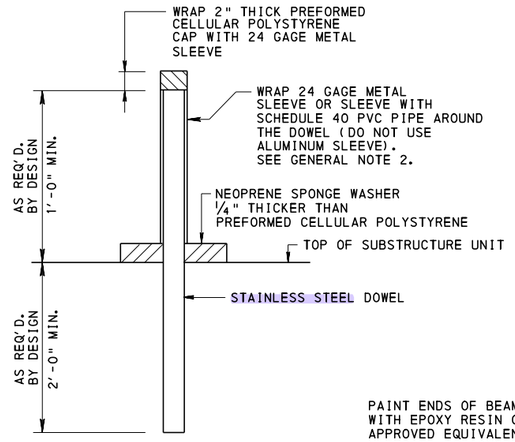
NOTE:

LOCATE THE VERTEX OF THE DRIP NOTCH AT THE MIDPOINT BETWEEN THE STRANDS

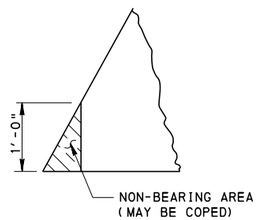


* NO CHAMFER REQUIRED FOR SKEWS 75° TO 90°

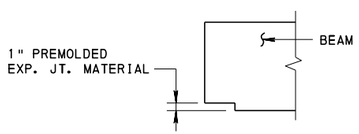
CHAMFER DETAIL FOR
SKEWED END BLOCK



DOWEL DETAIL
(FOR DOWELS IN DIAPHRAGMS)



PLAN



ELEVATION

TYPICAL CORNER
BLOCKOUT-SKEWS < 85°

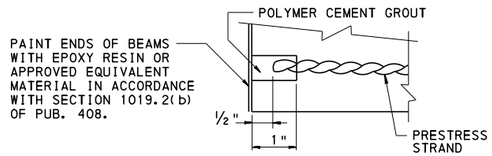
NOTES:

(1) MODIFY IF REQUIRED TO ACCOMMODATE BEARING PAD ARRANGEMENT FOR SHARP SKEWS.

(2) NOT PERMITTED IN CONJUNCTION WITH DAPPING.

GENERAL NOTES:

1. INCLUDE APPLICABLE DETAILS SHOWN ON THESE SHEETS ON FABRICATOR'S SHOP DRAWINGS.
2. BITUMINOUS TAR 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)6.1.5. ONLY PAINT BEAM ENDS WITH EPOXY RESIN OR APPROVED EQUIVALENT MATERIAL IN ACCORDANCE WITH PUBLICATION 408 SECTION 1019.2(b) IF SPECIFIED.



NOTES:

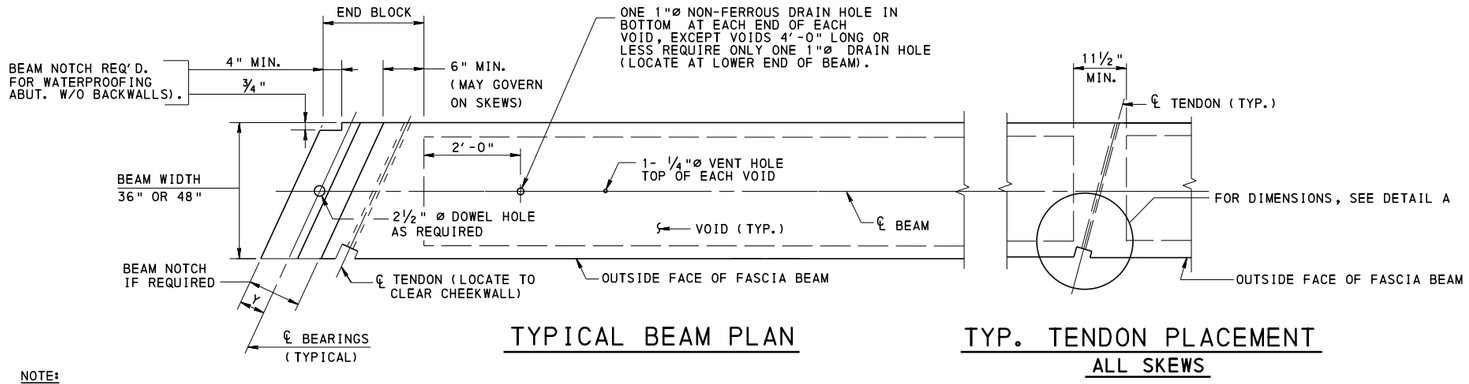
1. RECESS CAN BE MADE FOR A SINGLE STRAND OR A GROUP OF STRANDS.
2. CLEAN THE STRANDS FROM ALL FOREIGN MATERIALS SUCH AS RUST, SLAG, ETC. PRIOR TO APPLICATION OF POLYMER CEMENT GROUT OR EPOXY RESIN.
3. PAINT BEAM ENDS PRIOR TO SHIPMENT OR STORAGE.

GROUTED RECESS FOR STRANDS AT BEAM ENDS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
MISCELLANEOUS PRESTRESS DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 1 OF 3
Thomas P. Macioce	Brent L. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-775M

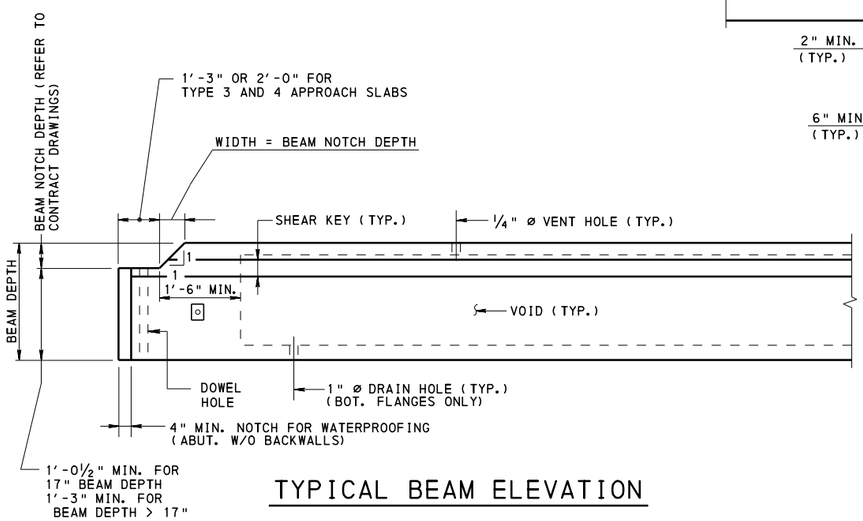


TYPICAL BEAM PLAN

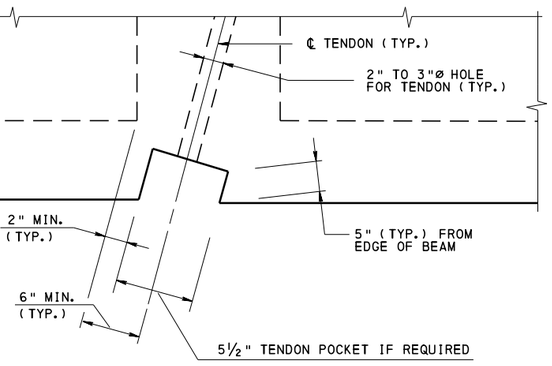
TYP. TENDON PLACEMENT
ALL SKEWS

NOTE:

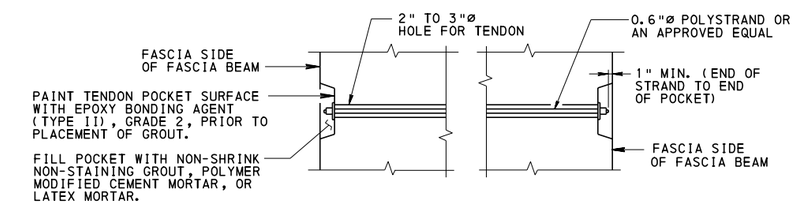
"Y" = 9" MIN. (ABUTMENTS WITHOUT BACKWALLS AND WITH PAVING NOTCH)
"Y" = 6" MIN. (PIERS WITH AN EXPANSION DAM)
"Y" = 6" MIN. (ABUTMENTS WITH BACKWALLS)



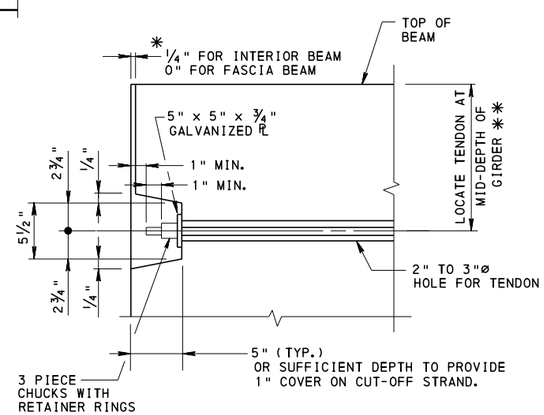
TYPICAL BEAM ELEVATION



DETAIL A



TYPICAL SECTION OF TENDON PLACEMENT



TYPICAL SECTION OF TENDON POCKET

CUT OFF TENDON 1" MIN. FROM THE END OF CHUCK (BURNING THE TENDON OFF IS NOT PERMITTED).

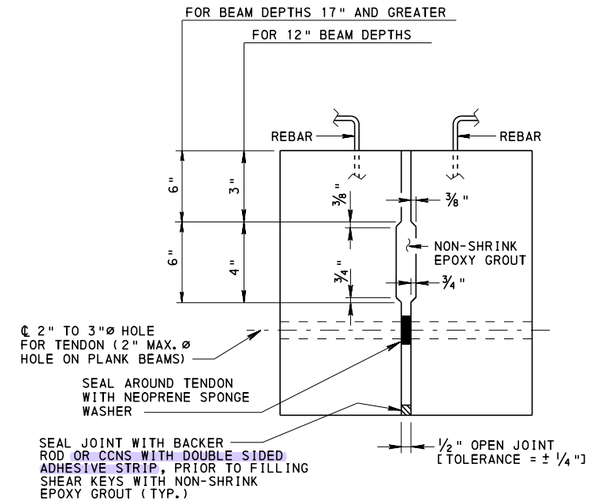
LEGEND

* DENOTES STAGED CONSTRUCTION

** SHIFTING OF TENDON BY UP TO 1½" 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 ¼"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(a) 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.



SHEAR KEY DETAIL

OMIT SHEAR KEYS ON OUTSIDE FACE OF FASCIA BEAM.

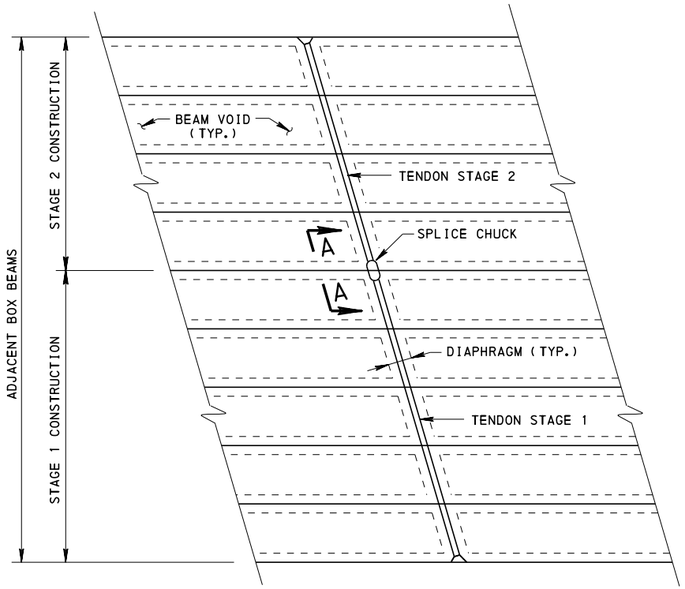
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
MISCELLANEOUS PRESTRESS DETAILS
ADJACENT BOX BEAM

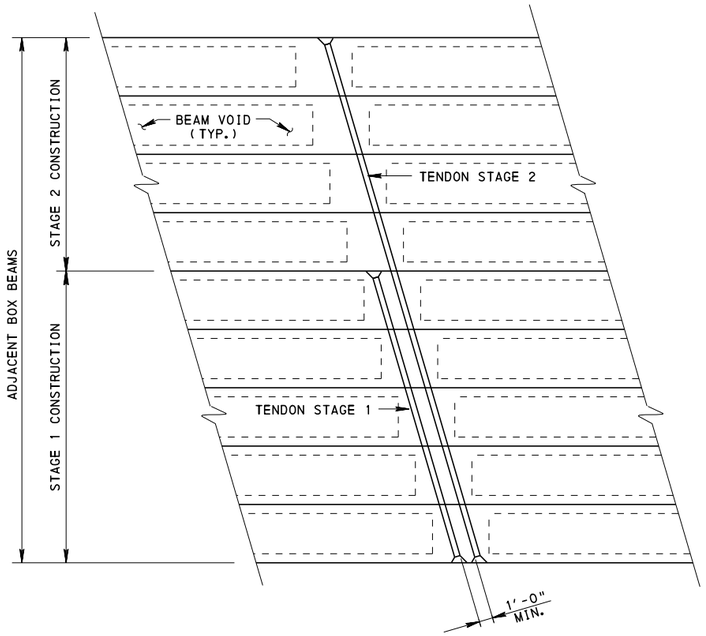
RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-775M



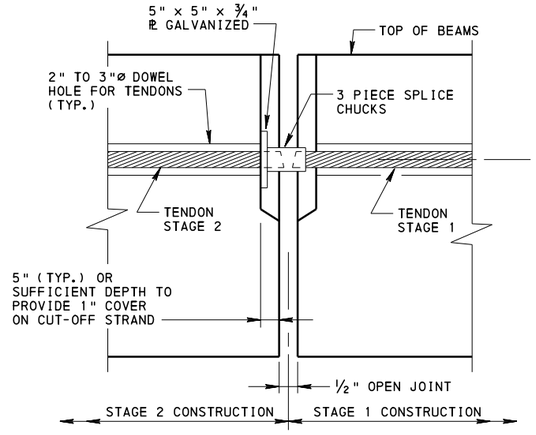
PARTIAL PLAN - BEAMS FOR STAGED CONSTRUCTION
SPLICE CHUCK ALTERNATE



PARTIAL PLAN - BEAMS FOR STAGED CONSTRUCTION
DOUBLE DUCT ALTERNATE

STAGED CONSTRUCTION NOTE:

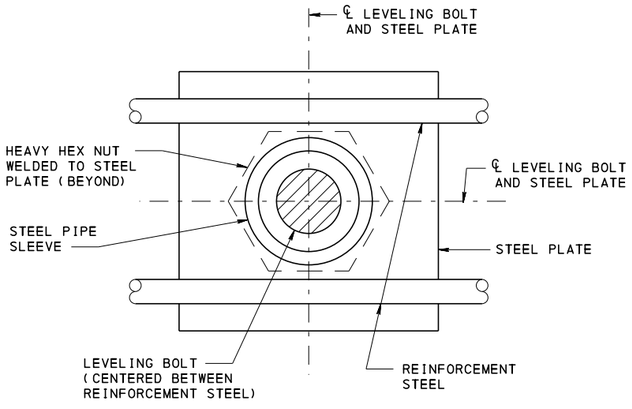
1. THE LOCATION OF THE TRANSVERSE TENDONS FOR STAGED CONSTRUCTION MUST BE SHOWN ON THE SHOP DRAWINGS TO ACCOUNT FOR DIFFERENCES IN CAMBER OF THE BEAMS IN EACH STAGE.
2. SHIFTING OF TENDON BY UP TO 1½" PERMITTED TO AVOID LOSS OF STRAND POSITIONS.
3. CONTRACTOR IS RESPONSIBLE TO VERIFY POST-TENSIONING TUBE ALIGNMENT BETWEEN STAGES.
4. CONTRACTOR TO PROTECT SPLICE CHUCK FOR TIME LAPSE BETWEEN PHASES.



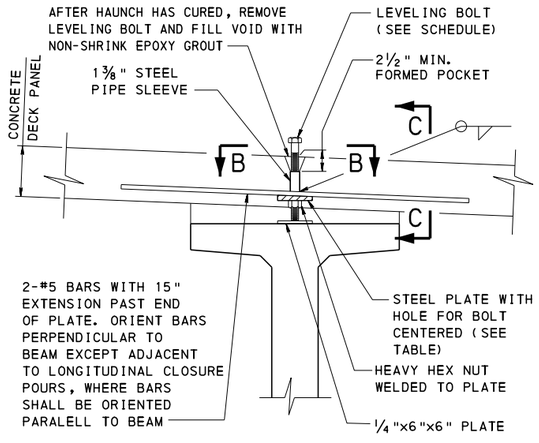
SECTION A-A

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.



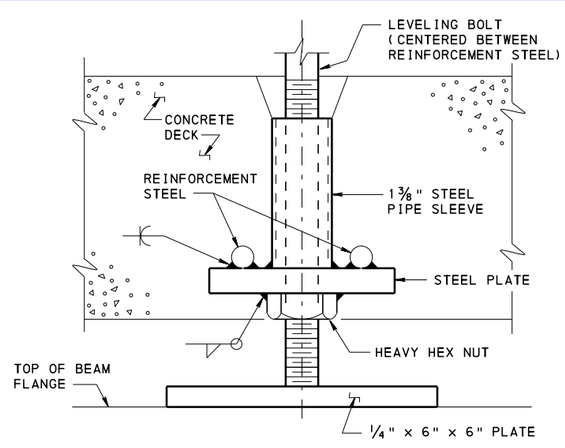
SECTION B-B



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"x⅝"
20 KIPS	1¼"	4"x4"x⅞"



SECTION C-C

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
MISCELLANEOUS PRESTRESS DETAILS
ADJACENT BOX BEAM AND
VERTICAL ADJUSTMENT DEVICE DETAILS

RECOMMENDED SEPT. 30, 2016 CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 3 OF 3 BC-775M

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 ½" × ½", 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 1½ INCH, BUT THE TOTAL AVERAGE ARCHITECTURAL SURFACE TREATMENT, ON BOTH SIDES OF THE PANEL, MUST NOT BE GREATER THAN 1½ 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

REFERENCE DRAWINGS

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE PANELS

GENERAL NOTES - 1

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brent D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

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.
     fs = 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.
     fs = 24,000 PSI
   - ALL WELDED WIRE FABRIC SHOWN IS SOFT CONVERTED METRIC SIZES.
   - 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(a).
   - 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.

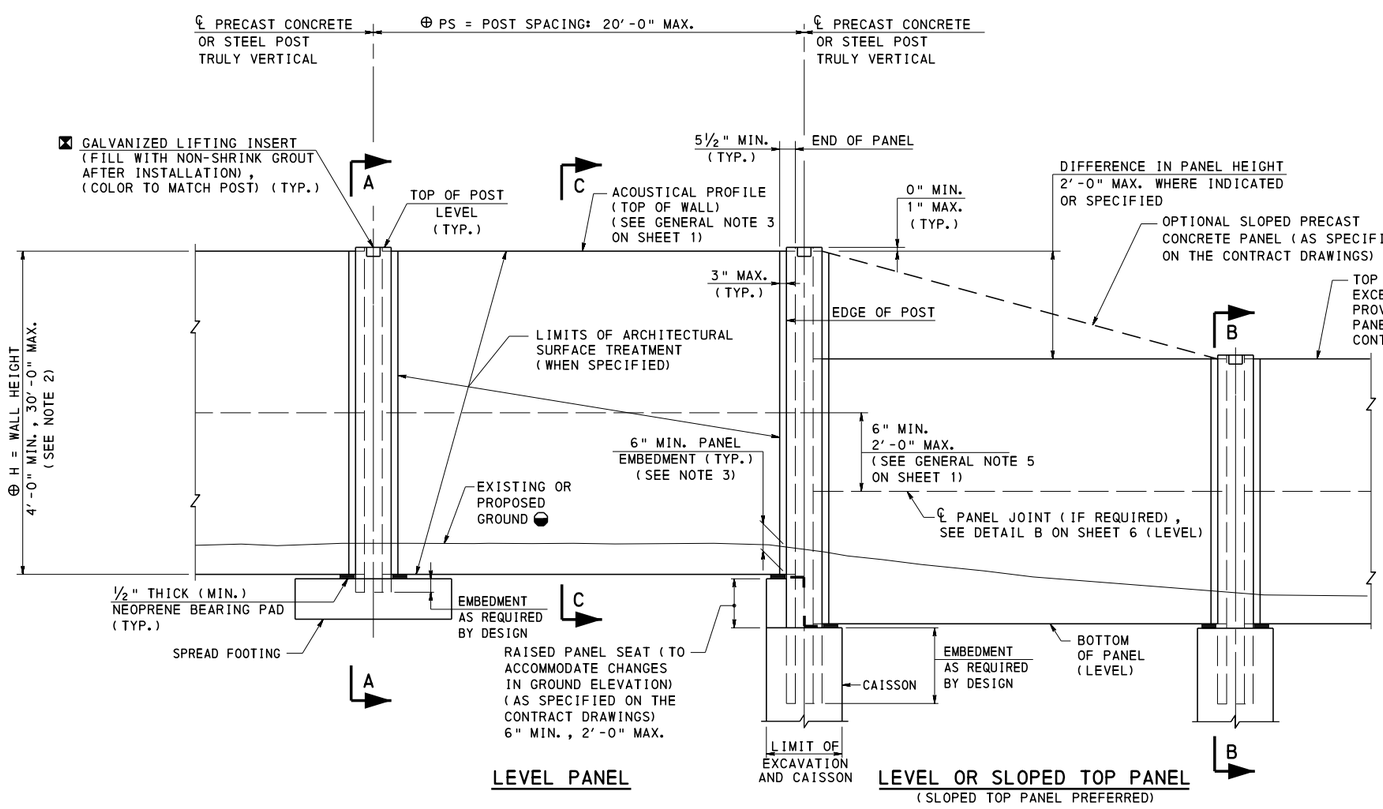
10. PENETRATING CONCRETE STAIN:
    - APPLY STAIN IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIAL PROVISIONS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE PANELS

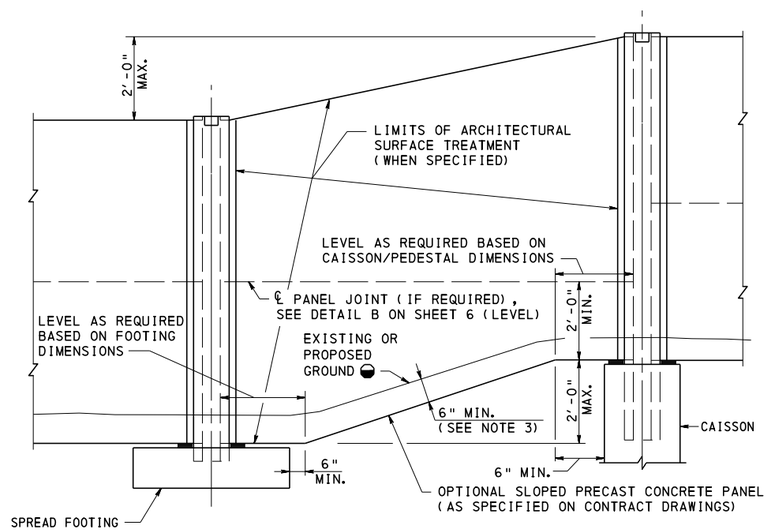
GENERAL NOTES - 2

RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian D. Thompson DIRECTOR, 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:

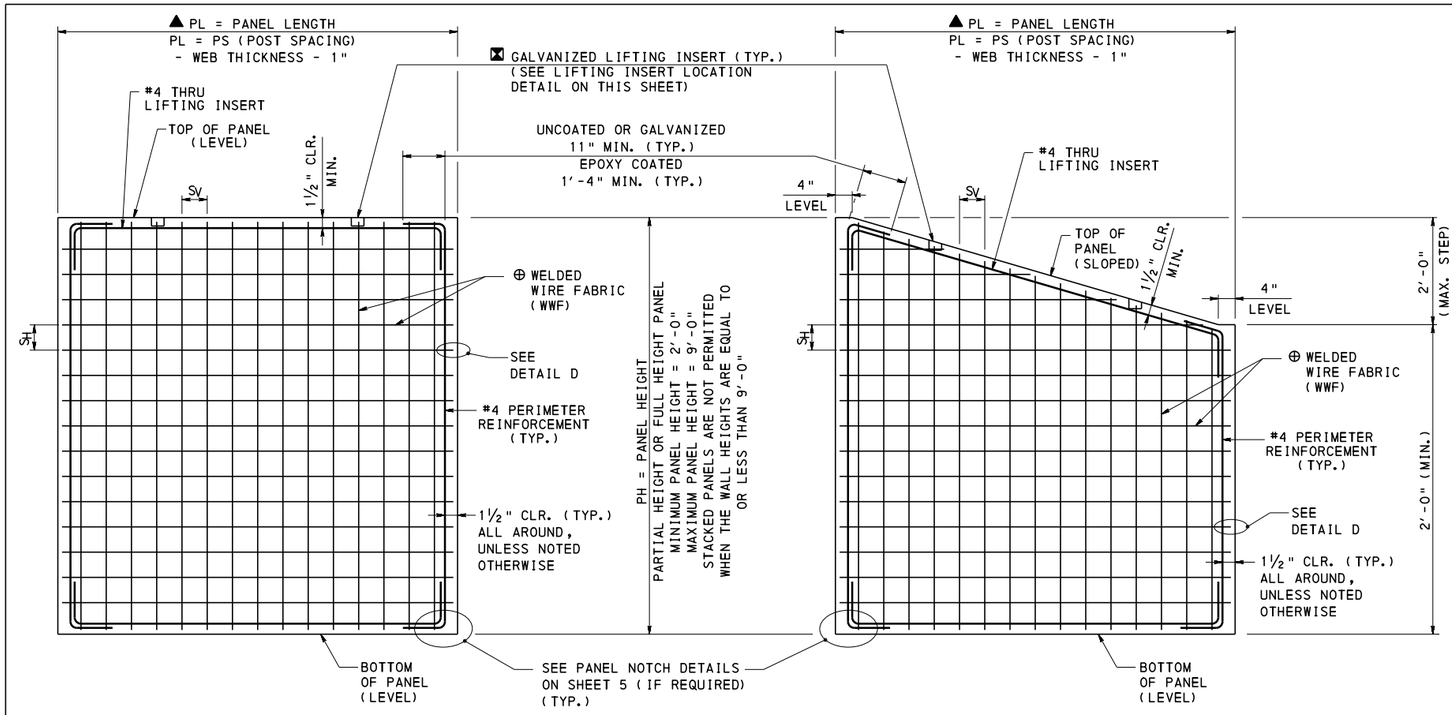
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. WALL HEIGHT IS DEFINED AS FOLLOWS:
   - POST WITH BASE PLATE: H = HEIGHT FROM TOP OF BASE PLATE TO TOP OF WALL
   - POST WITHOUT BASE PLATE: H = HEIGHT FROM TOP OF FOOTING/CAISSON TO TOP OF WALL
3. PANEL EMBEDMENT MAY NEED TO BE INCREASED 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

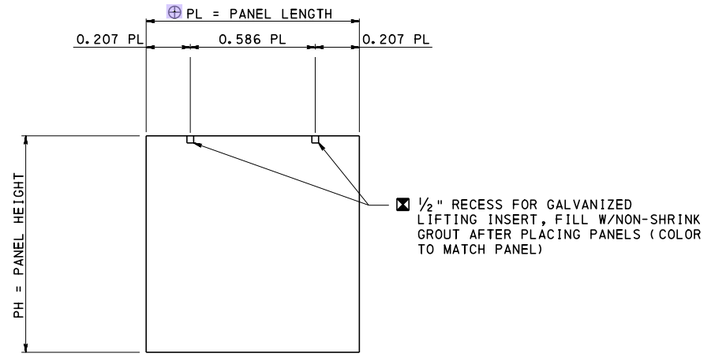
GEOMETRY AND LAYOUT

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 7
Thomas P Macioce	Brent D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-776M

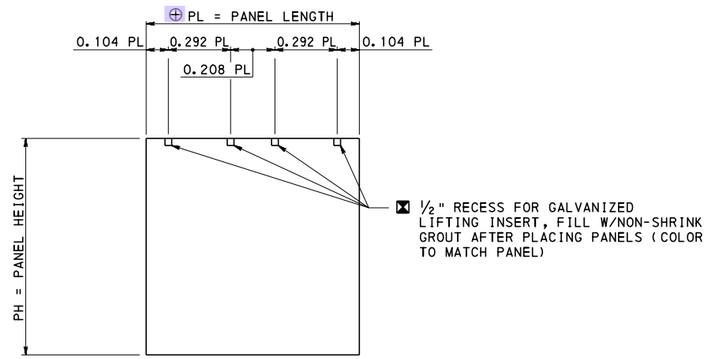


ELEVATION - LEVEL TOP

ELEVATION - SLOPED TOP

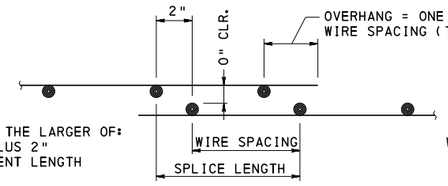


TWO POINT PICK-UP



FOUR POINT PICK-UP

PRECAST CONCRETE PANEL



SPLICE LENGTH SHALL BE THE LARGER OF:
- ONE WIRE SPACING PLUS 2"
- 1.5 TIMES DEVELOPMENT LENGTH
- 6"

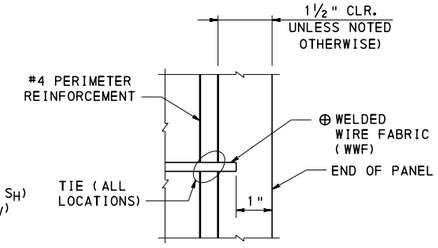
WWF SPLICE DETAIL

(IF REQUIRED)

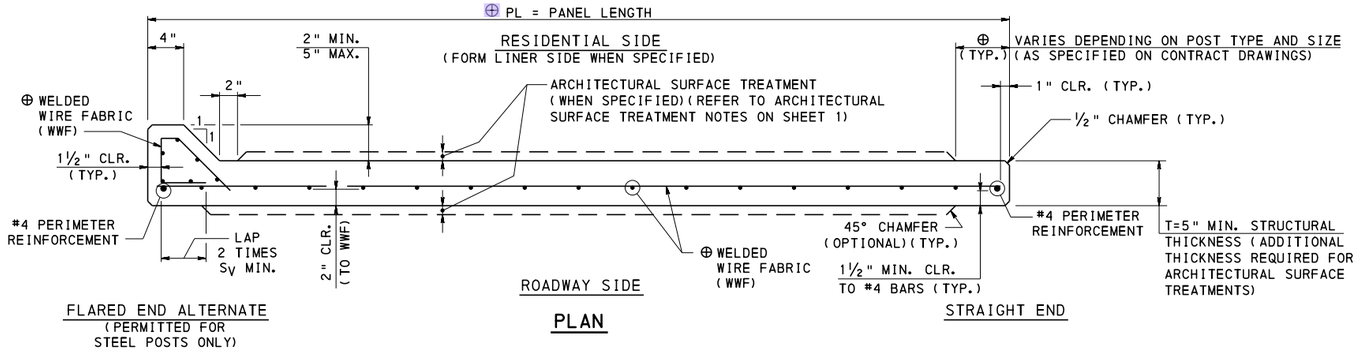
LEGEND FOR WELDED WIRE FABRIC

WWF AxB-WCxWD

WHERE: A = SPACING OF HORIZONTAL BARS (S_H)
B = SPACING OF VERTICAL BARS (S_V)
C = HORIZONTAL WIRE SIZE
D = VERTICAL WIRE SIZE
WWF = WELDED WIRE FABRIC



DETAIL D



FLARED END ALTERNATE
(PERMITTED FOR STEEL POSTS ONLY)

PLAN

STRAIGHT END

PRECAST CONCRETE PANEL

PRECAST CONCRETE PANEL LIFTING INSERT LOCATION DETAIL

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.

LEGEND:

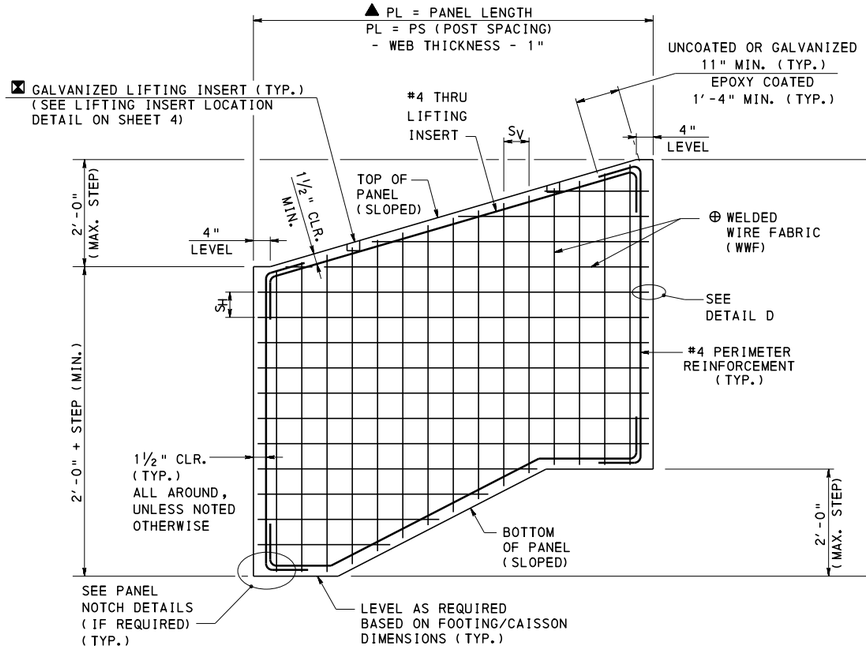
- ⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS
- ⊠ FABRICATOR TO VERIFY ADEQUACY OF LIFTING INSERTS
- ▲ PANEL LENGTH MAY NEED ADJUSTED TO ACCOMMODATE ANGLED AND CORNER POSTS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

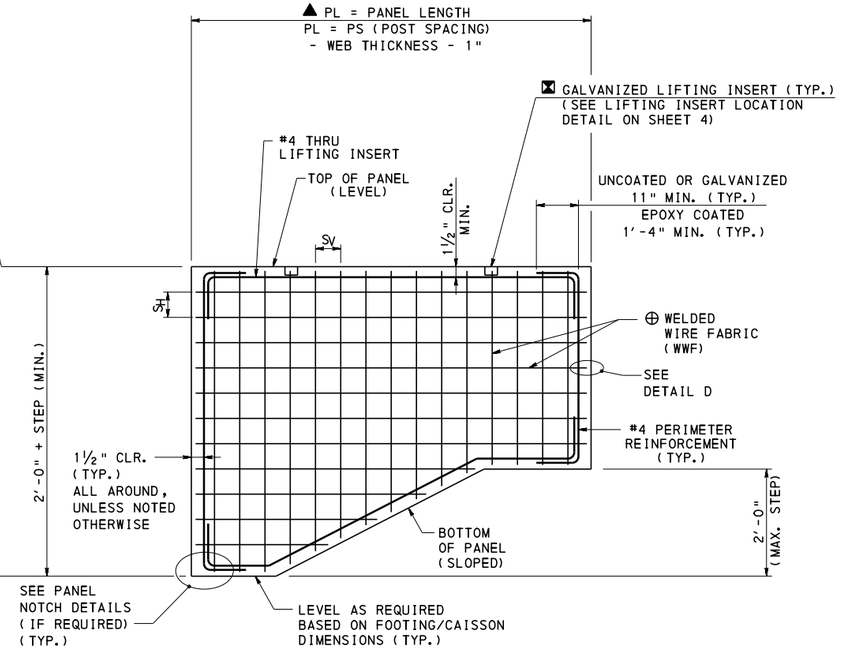
STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE PANELS

PRECAST CONCRETE PANEL DETAILS - 1

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 4 OF 7
Thomas P Macioce	Bruce D Thompson	BC-776M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

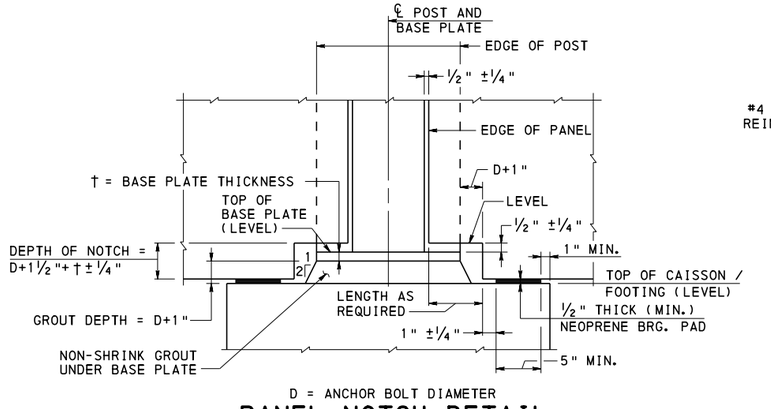


ELEVATION - SLOPED TOP



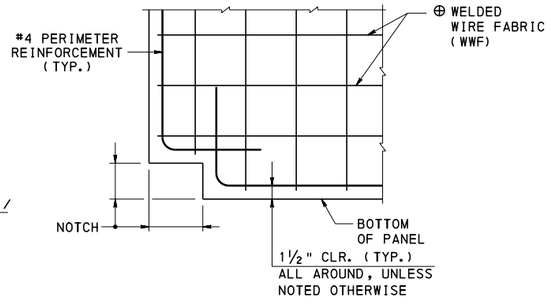
ELEVATION - LEVEL TOP

PRECAST CONCRETE PANEL
WITH OPTIONAL SLOPED BOTTOM



PANEL NOTCH DETAIL
FOR BASE PLATE CONNECTIONS

(FOR DETAILS 1 AND 2)
(PRECAST POST SHOWN / STEEL POST SIMILAR)



REINFORCEMENT DETAIL
FOR PANEL NOTCH

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. FOR DETAIL D, REFER TO SHEET 4.

LEGEND:

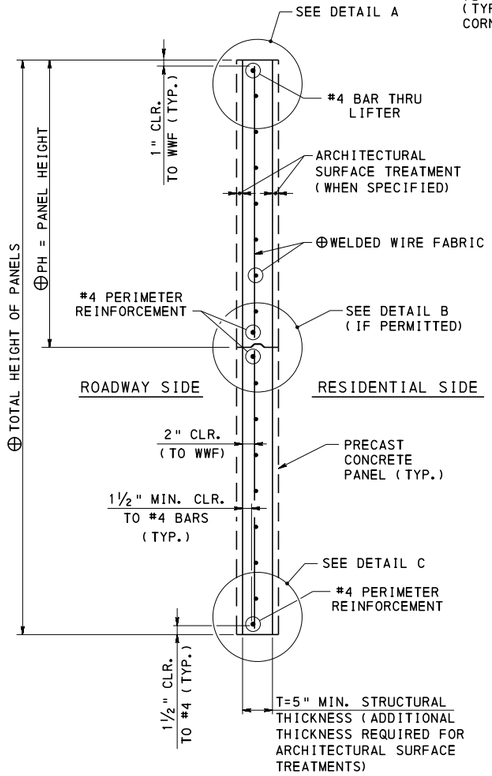
⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS
☒ FABRICATOR TO VERIFY ADEQUACY
OF LIFTING INSERTS
▲ PANEL LENGTH MAY NEED ADJUSTED TO
ACCOMMODATE ANGLED AND CORNER POSTS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE PANELS

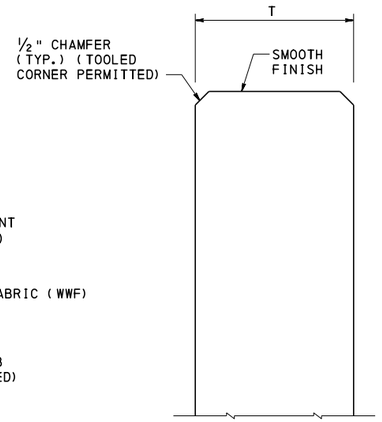
PRECAST CONCRETE PANEL DETAILS - 2

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 5 OF 7
Thomas P. Macioce	Brian D. Thompson	BC-776M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



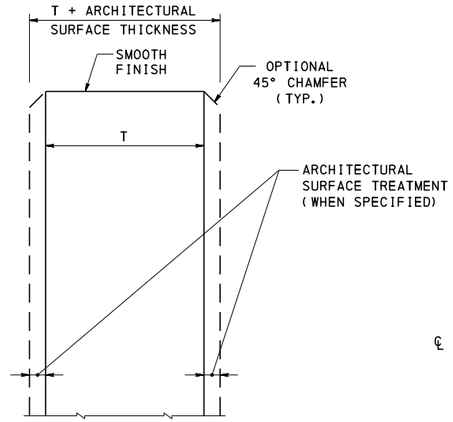
SECTION C-C

WITH ARCHITECTURAL SURFACE TREATMENT



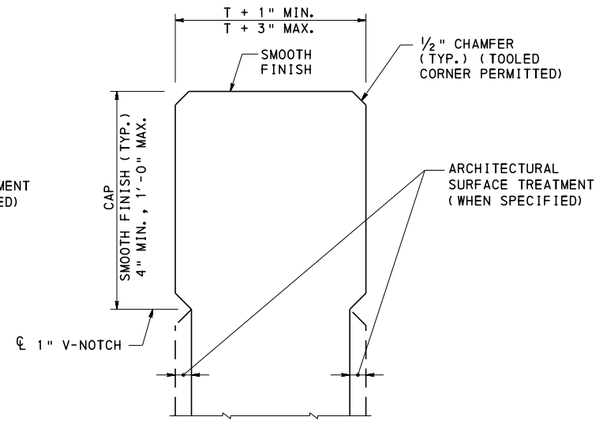
DETAIL A

NO ARCHITECTURAL SURFACE TREATMENT



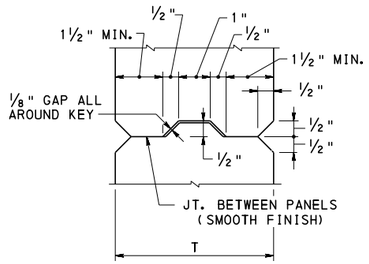
DETAIL A

WITH ARCHITECTURAL SURFACE TREATMENT



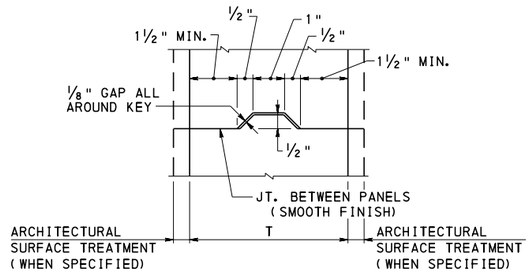
DETAIL A

WITH ARCHITECTURAL SURFACE TREATMENT AND CAP



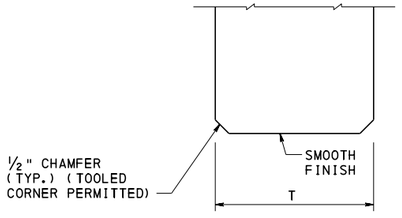
DETAIL B

NO ARCHITECTURAL SURFACE TREATMENT



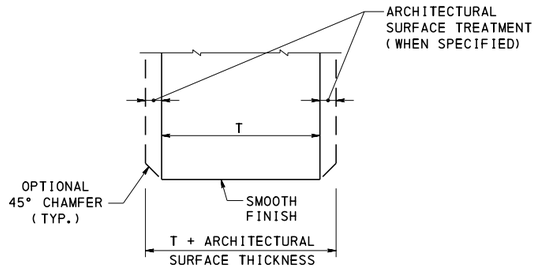
DETAIL B

WITH ARCHITECTURAL SURFACE TREATMENT



DETAIL C

NO ARCHITECTURAL SURFACE TREATMENT



DETAIL C

WITH ARCHITECTURAL SURFACE TREATMENT

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. REFER TO SHEET 3 FOR LOCATION OF SECTION C-C.

LEGEND:

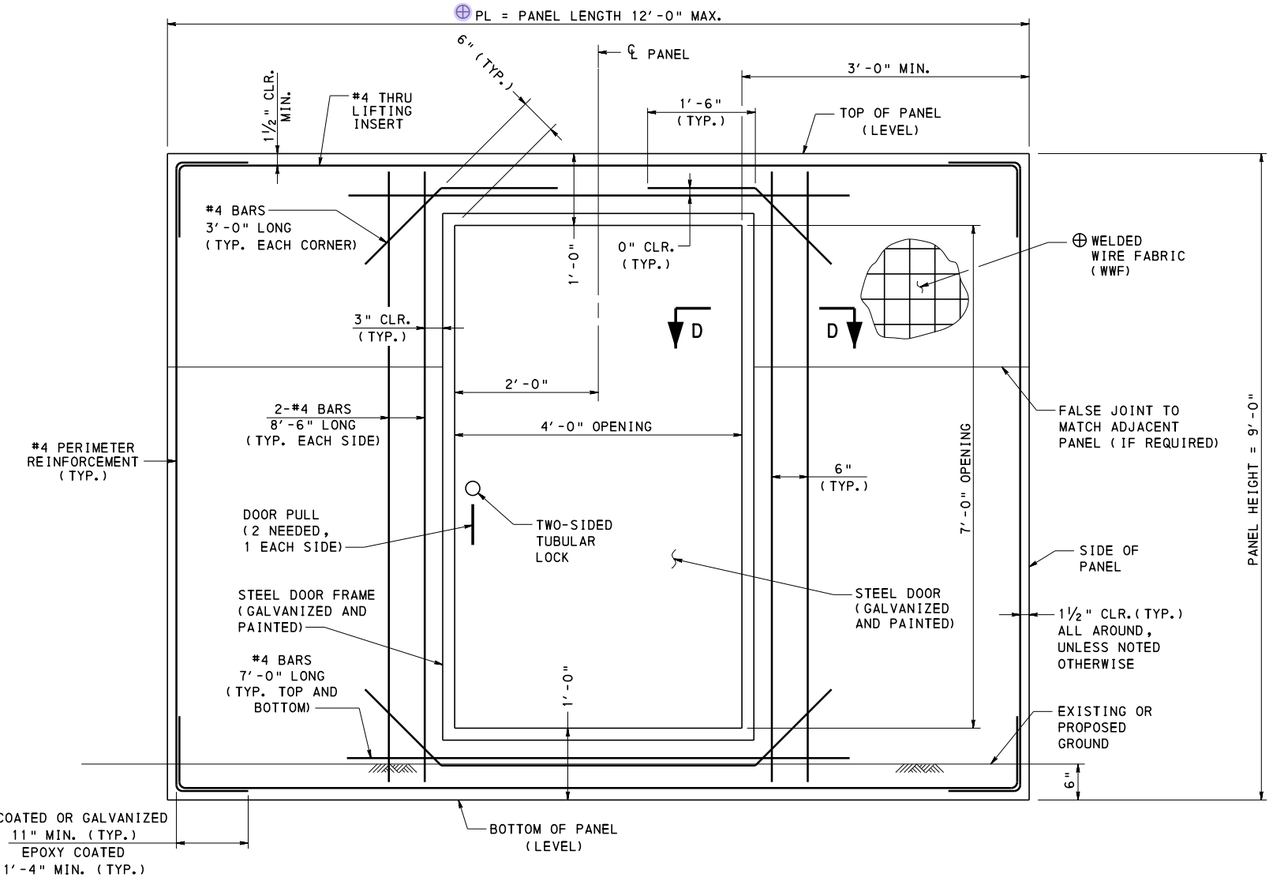
⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

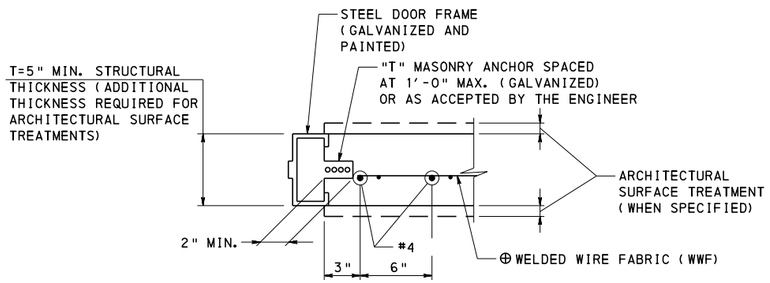
STANDARD GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE PANELS

PRECAST CONCRETE PANEL DETAILS - 3

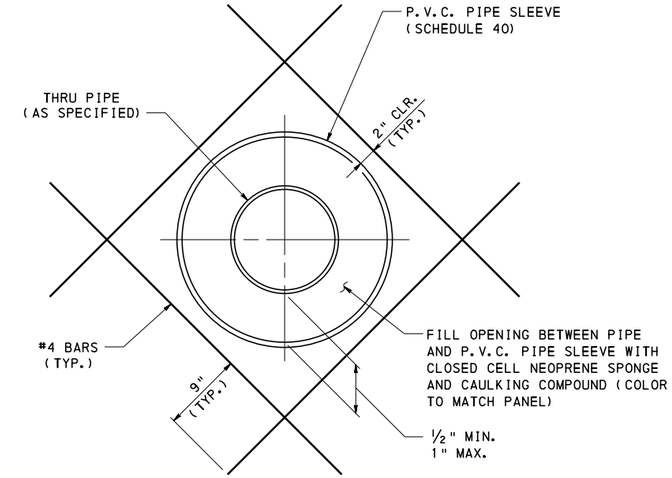
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 6 OF 7 BC-776M



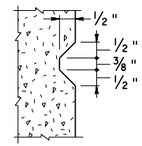
ACCESS DOOR DETAIL



SECTION D-D



SLEEVE DETAIL AT OPENINGS



FALSE JOINT

(WHERE AND WHEN SPECIFIED)

LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.

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 1¾" 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.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE PANELS

PRECAST CONCRETE PANEL DETAILS - 4

RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent B Thompson DIRECTOR, 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 ½" × ½", EXCEPT AS NOTED.

12. CHAMFER EXPOSED CONCRETE EDGES ON CAST-IN-PLACE CONCRETE 1" × 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.
     fs = 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.
     fs = 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)3a.
   - 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(a).
   - 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

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)

REFERENCE DRAWINGS

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE POSTS

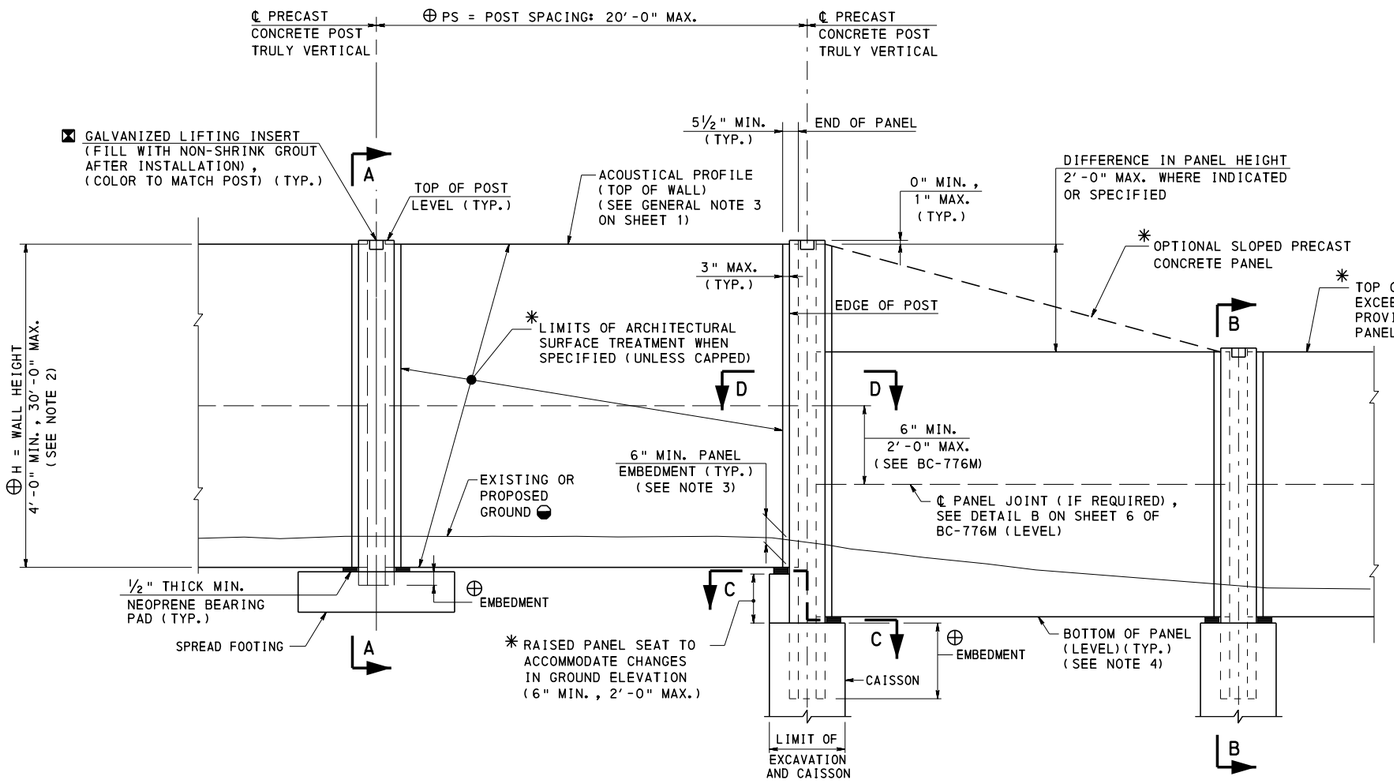
GENERAL NOTES

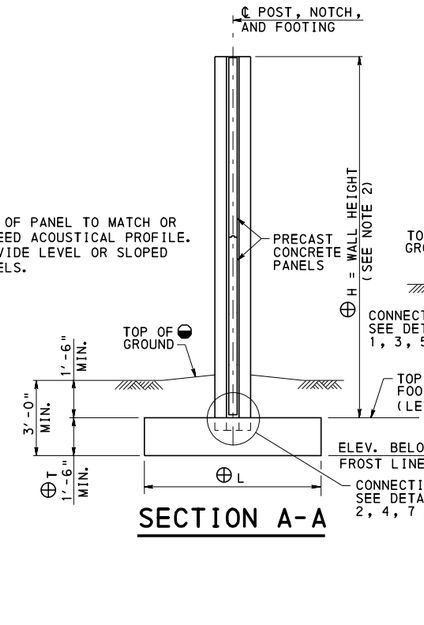
RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brian D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

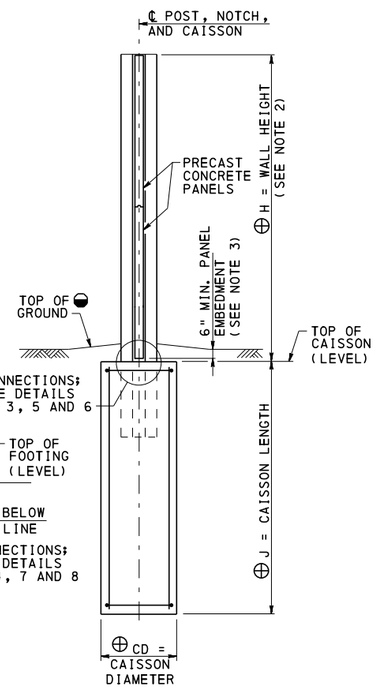
SHEET 1 OF 12

BC-777M



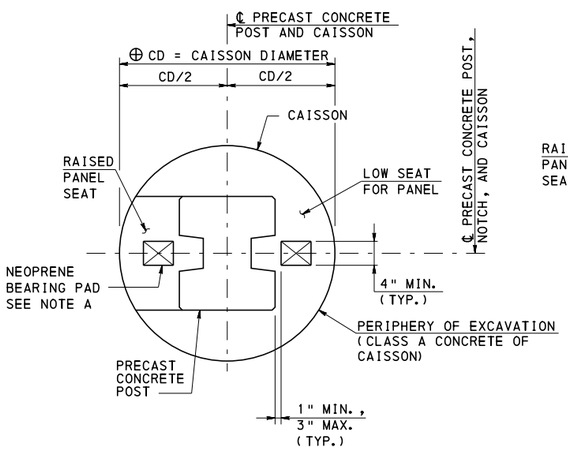


SECTION A-A

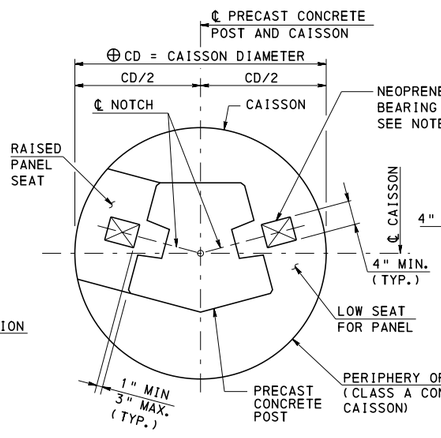


SECTION B-B

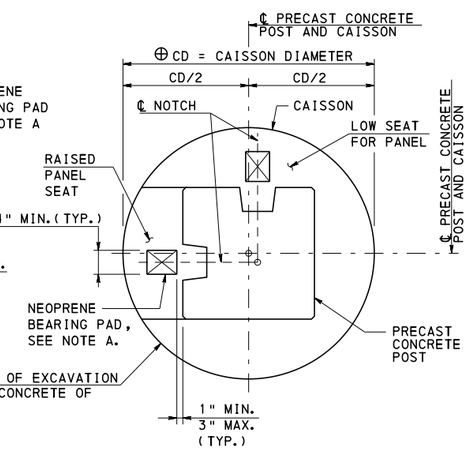
GROUND MOUNTED SOUND BARRIER ELEVATION



IN-LINE POST



ANGLED IN-LINE POST



CORNER POST

NOTE A:
NEOPRENE BEARING PAD ½" 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:

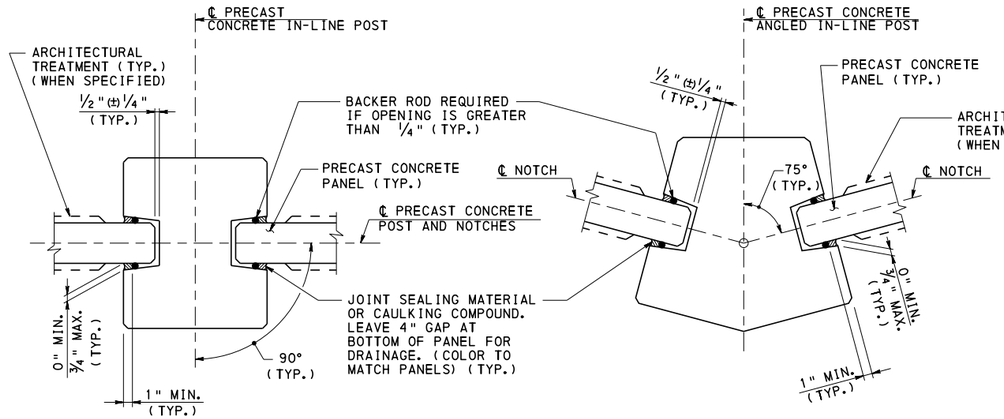
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. WALL HEIGHT IS DEFINED AS FOLLOWS:
   - POST WITH BASE PLATE: H = HEIGHT FROM TOP OF BASE PLATE TO TOP OF WALL
   - POST WITHOUT BASE PLATE: H = HEIGHT FROM TOP OF FOOTING/ CAISSON TO TOP OF WALL
3. PANEL EMBEDMENT MAY NEED TO BE INCREASED TO 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

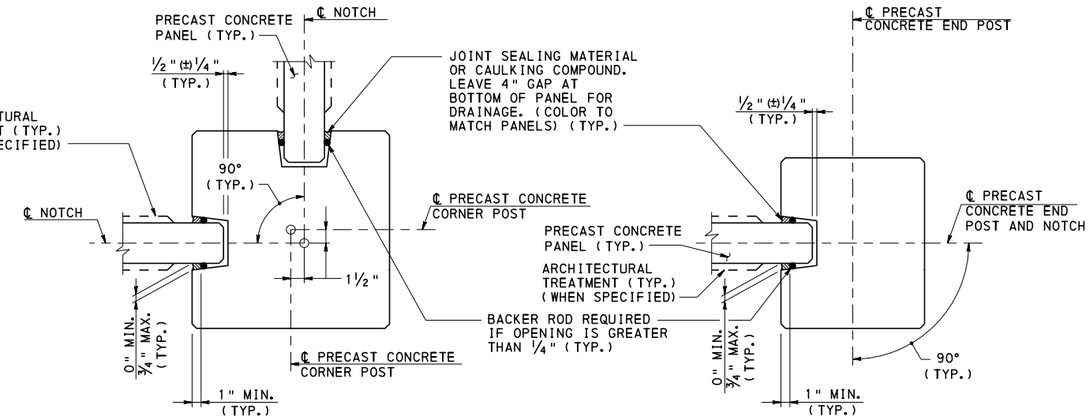
STANDARD GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE POSTS

GEOMETRY AND LAYOUT

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 12
Thomas P Macioce	Brian D Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-777M

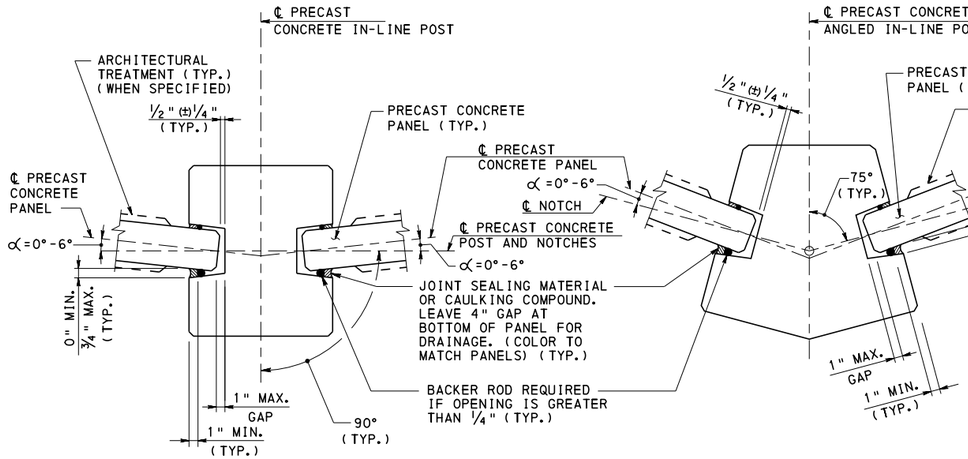


IN-LINE POST ANGLED IN-LINE POST

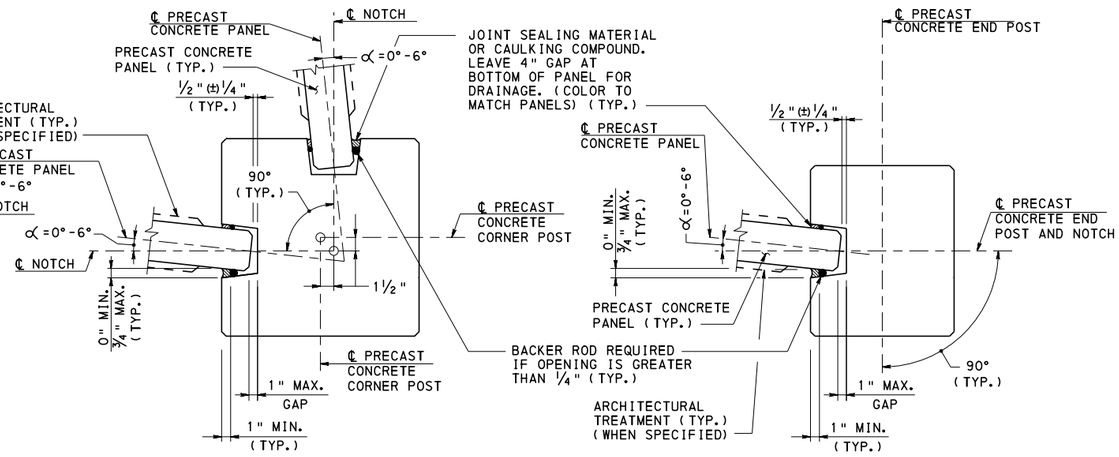


CORNER POST END POST

SECTION D-D
POST TYPES WITH STRAIGHT PANELS



IN-LINE POST ANGLED IN-LINE POST



CORNER POST END POST

SECTION D-D
POST TYPES WITH ANGLED PANELS

∝ = PANEL ORIENTATION IN RELATIONSHIP TO CENTERLINE OF NOTCH.

NOTES:

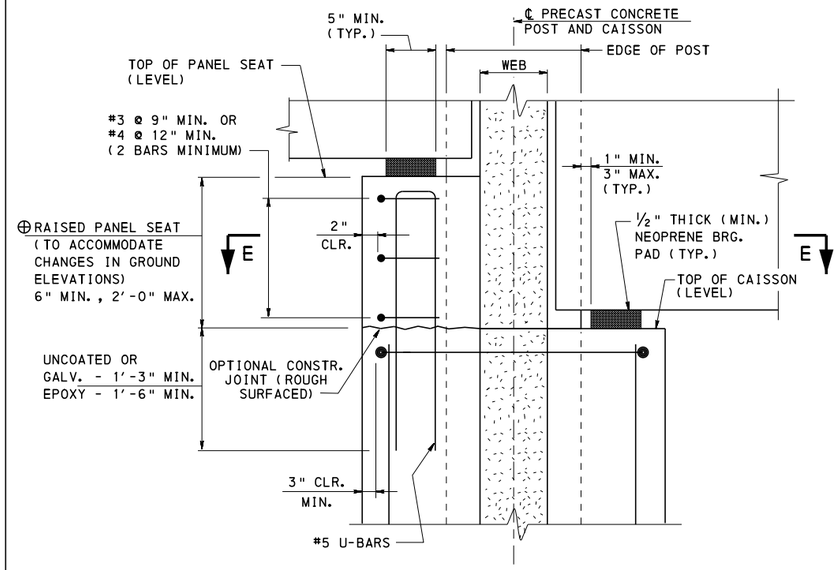
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. REFER TO SHEET 2 FOR LOCATION OF SECTION D-D.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

POST DETAILS

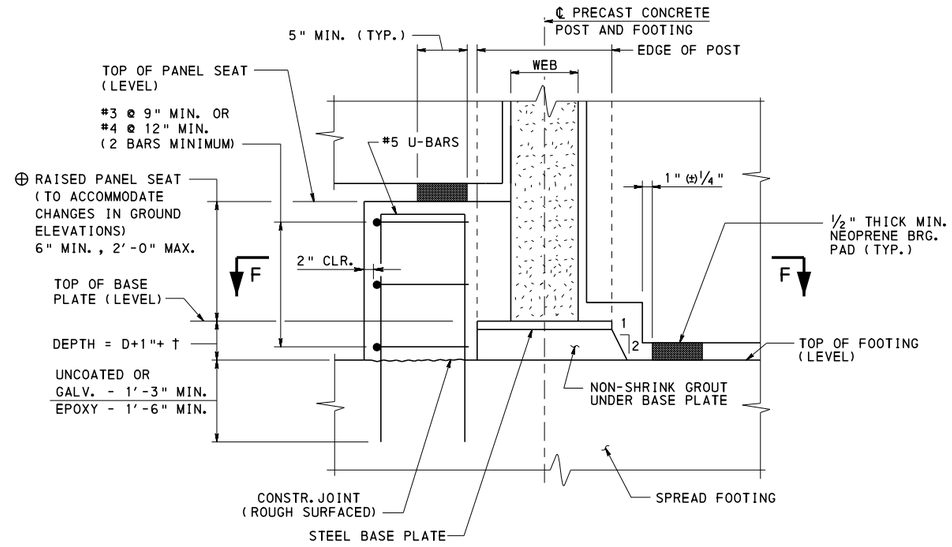
RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 3 OF 12 BC-777M



RAISED PANEL SEAT TYPICAL PANEL SEAT

PANEL SEAT ELEVATION WITHOUT BASE PLATE

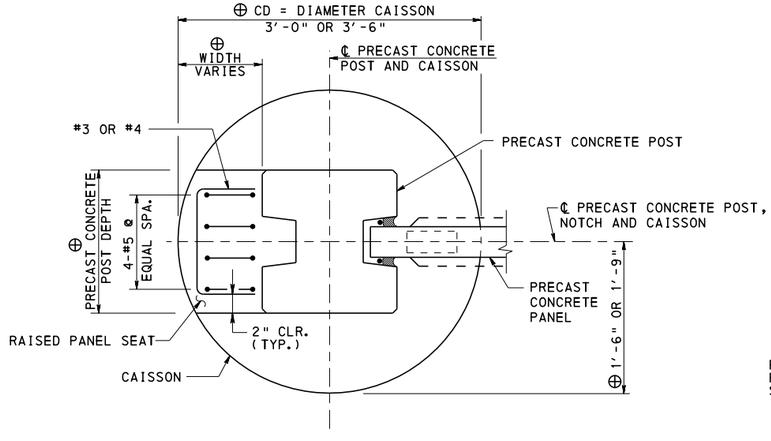
(DETAIL FOR CAISSON SHOWN
DETAIL FOR FOOTING IS SIMILAR)



RAISED PANEL SEAT TYPICAL PANEL SEAT

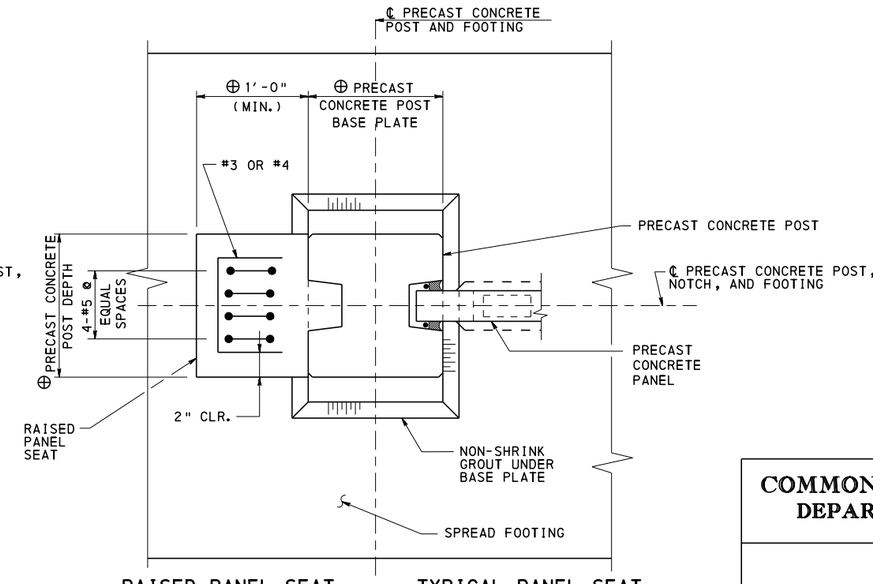
PANEL SEAT ELEVATION WITH BASE PLATE

(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:

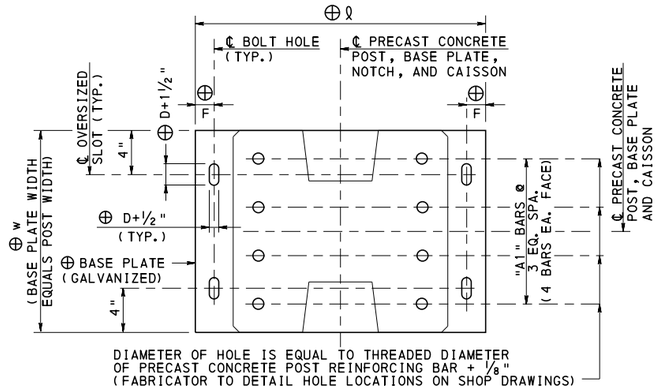
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. RAISED PANEL SEATS, IF REQUIRED, TO BE DETAILED ON THE CONTRACT DRAWINGS.
3. DETAILS FOR ANGLED POST AND CORNER POST NOT SHOWN, BUT SIMILAR TO DETAILS SHOWN. PROVIDE DETAILS ON CONTRACT DRAWINGS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

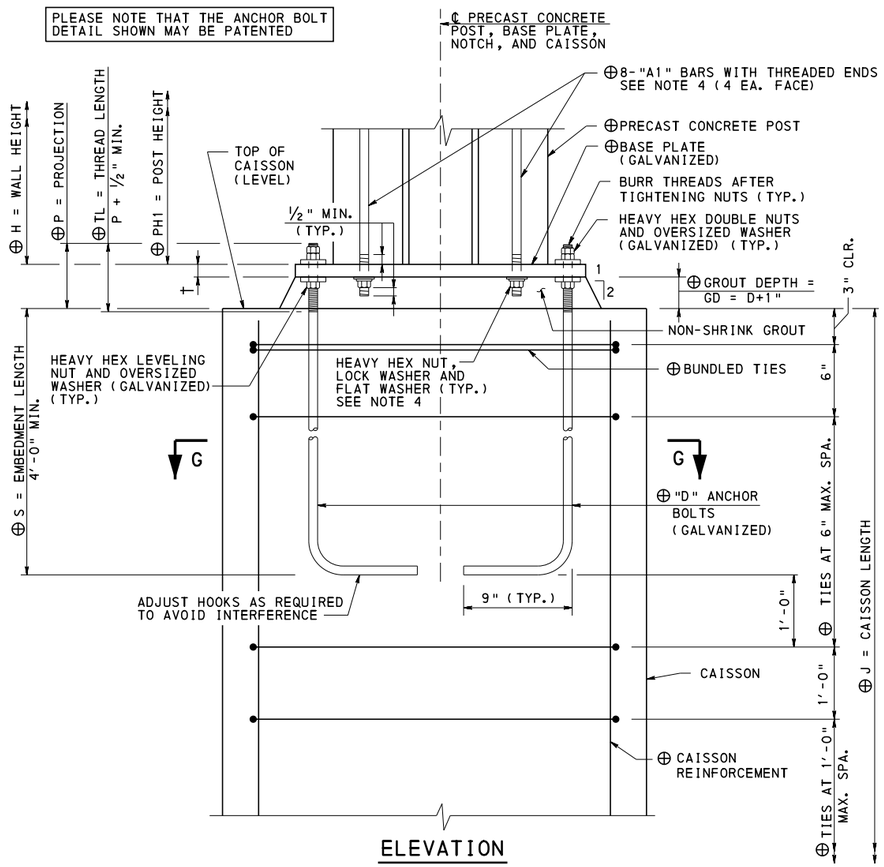
STANDARD GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE POSTS

PANEL SEAT DETAILS

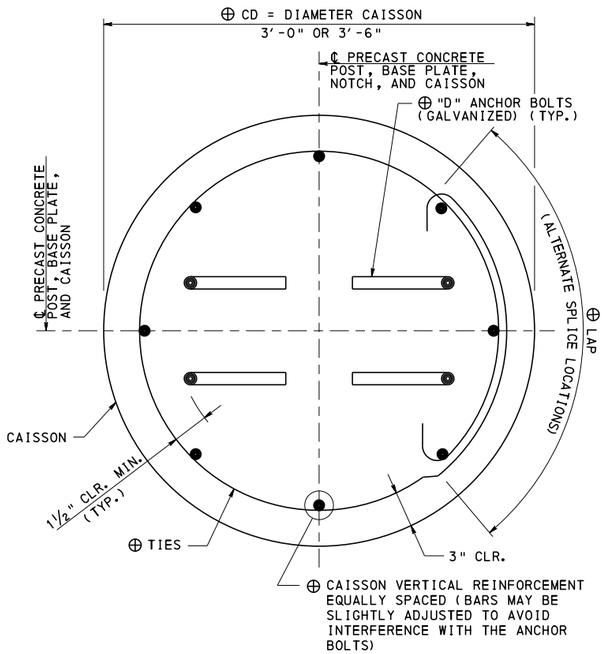
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 4 OF 12
Thomas P Macioce	Brian D Thompson	BC-777M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



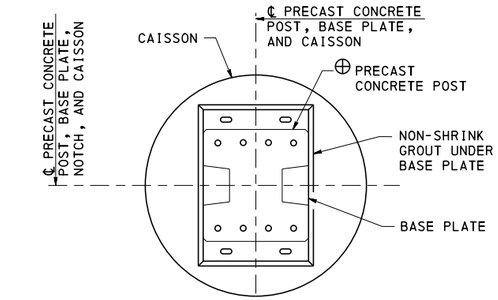
PLAN



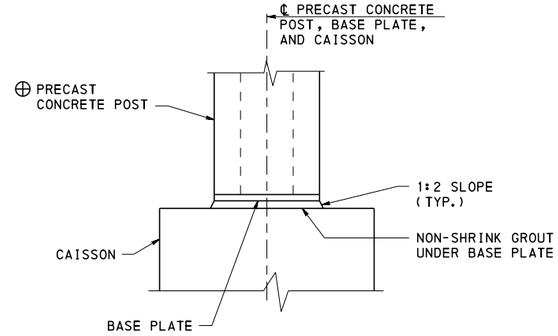
ELEVATION



SECTION G-G



PANEL SEAT PLAN



PANEL SEAT ELEVATION

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

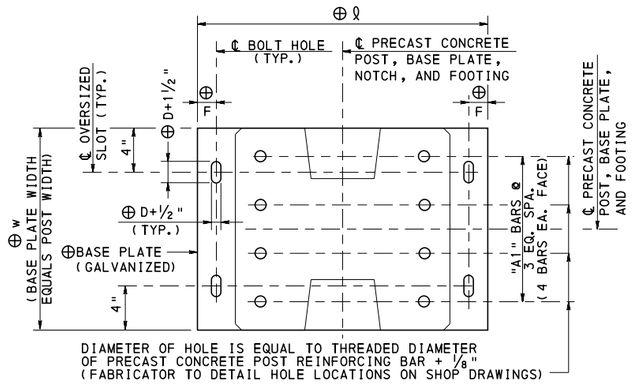
DETAIL 1
PRECAST CONCRETE POST WITH BASE PLATE CONNECTION TO CAISSON

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

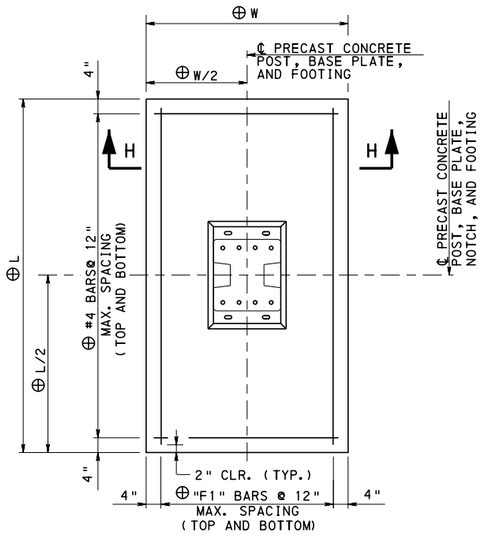
STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

DETAIL 1

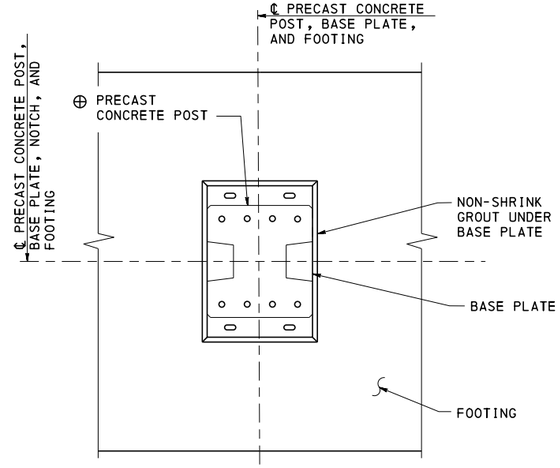
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 5 OF 12
Thomas P. Macioce	Brent D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-777M



PLAN

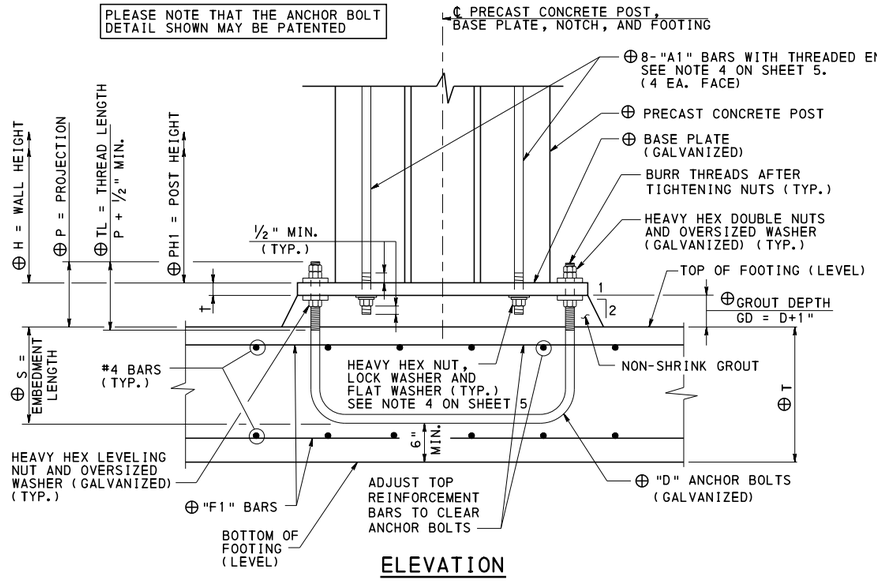


SPREAD FOOTING PLAN



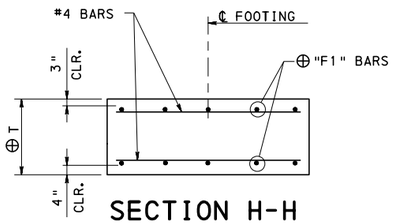
PANEL SEAT PLAN

PLEASE NOTE THAT THE ANCHOR BOLT DETAIL SHOWN MAY BE PATENTED

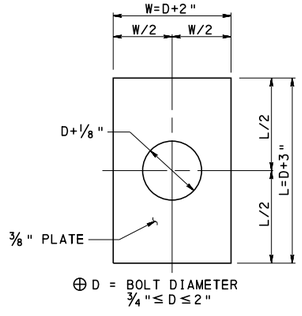


ELEVATION

DETAIL 2
PRECAST CONCRETE POST WITH BASE PLATE CONNECTION TO SPREAD FOOTING



SECTION H-H



OVERSIZED WASHER DETAIL

PANEL SEAT ELEVATION

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR PANEL SEAT DETAILS REFER TO SHEET 4.

LEGEND:

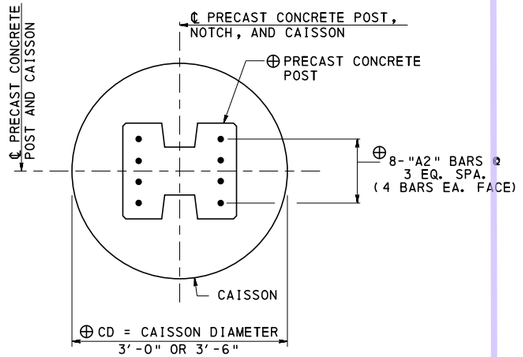
⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

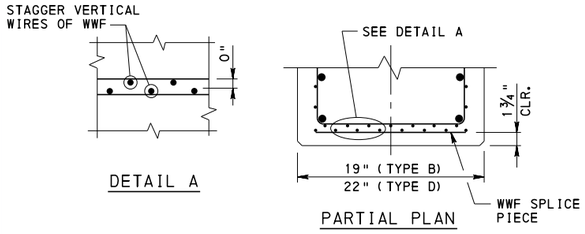
STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

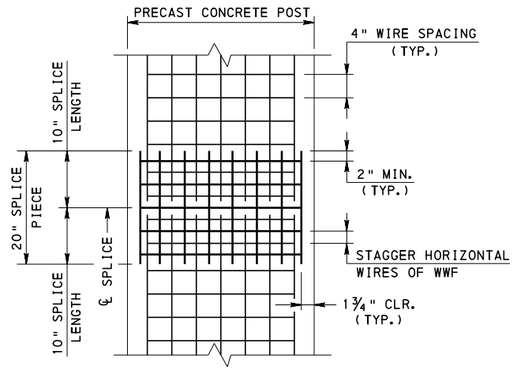
DETAIL 2

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 6 OF 12
Thomas P Macioce	Brent B Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-777M

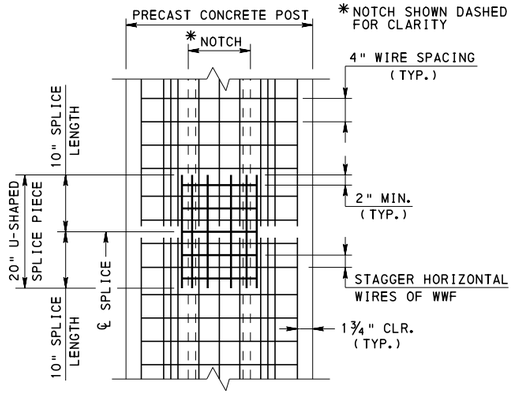


PLAN





FLAT FACE OF END POST
(END POST)



NOTCHED FACE OF POST
(IN-LINE POST)

WWF VERTICAL SPLICE DETAIL FOR PRECAST CONCRETE POST

(IF REQUIRED)

VERTICAL SPLICE NOTES:

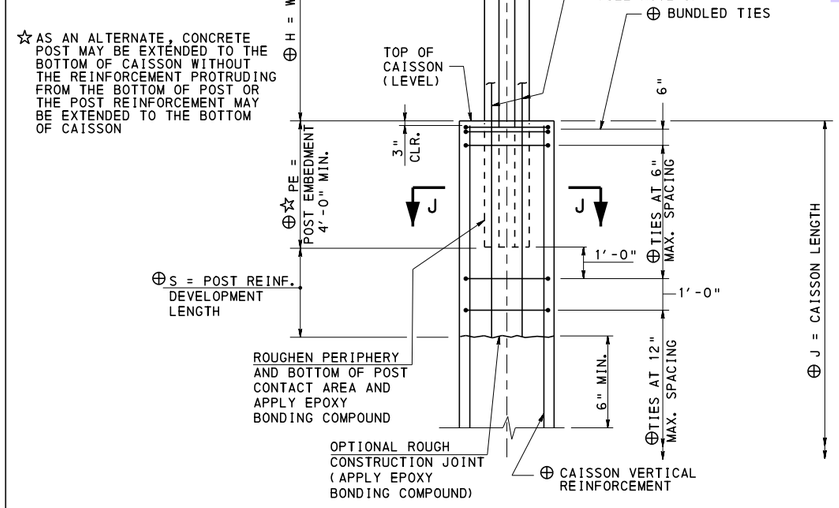
1. SPLICE SHOWN IS FOR WWF 4 x 4 - D4.0 x D4.0
2. STAGGER THE VERTICAL SPLICE LOCATIONS OF THE WWF TO AVOID ALIGNING THE SPLICES ON OPPOSING FACES OF THE POST.
3. STAGGER THE L-SHAPE CORNER PIECE WITH THE REGULAR WWF ALONG THE LENGTH FOR CORNER POST IF VERTICAL SPLICE IS REQUIRED.
4. PRIMARY VERTICAL REINFORCEMENT SPLICE NOT SHOWN FOR CLARITY.

LEGEND:

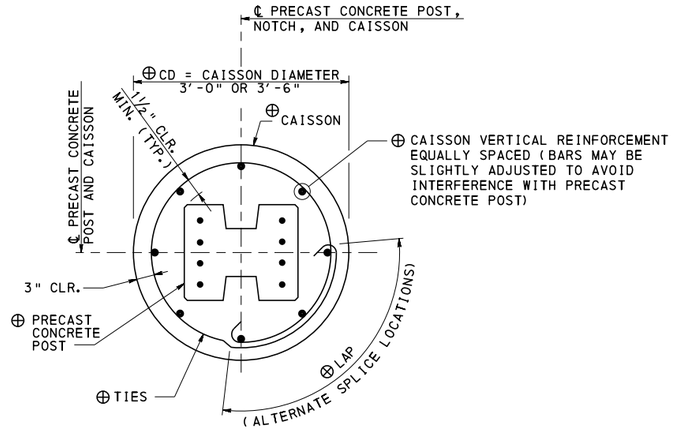
⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

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.



ELEVATION



SECTION J-J

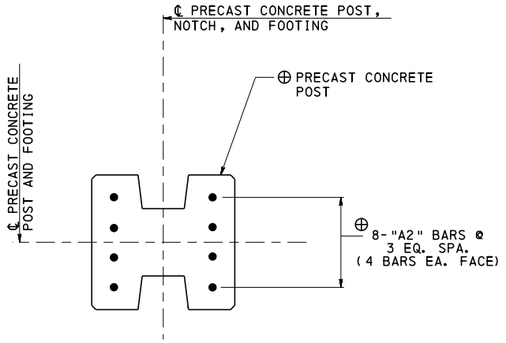
DETAIL 3
PRECAST CONCRETE POST EMBEDDED IN CAISSON

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

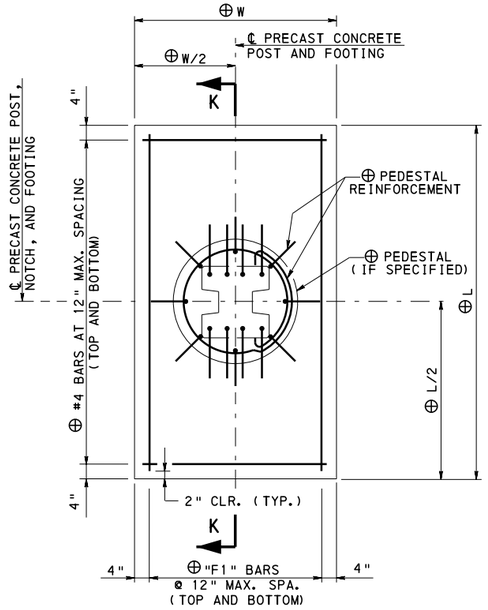
STANDARD GROUND MOUNTED SOUND BARRIERS PRECAST CONCRETE POSTS

DETAIL 3

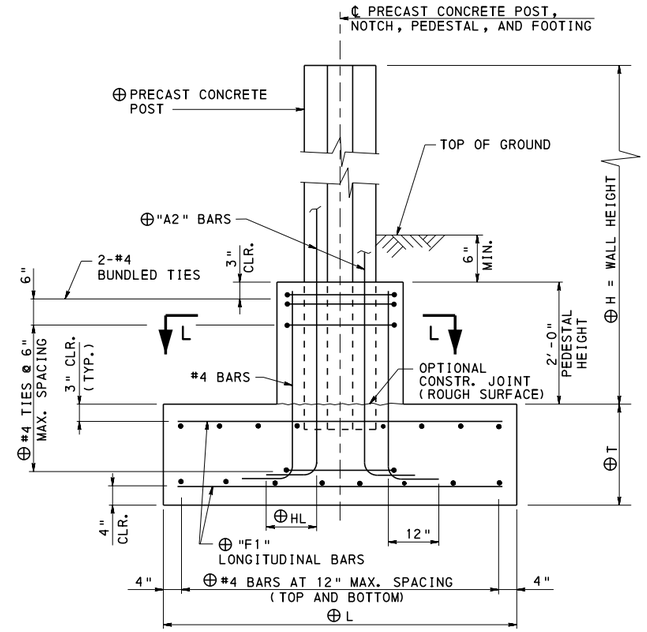
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 7 OF 12
Thomas P Macioce	Brian D Thompson	BC-777M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



PLAN

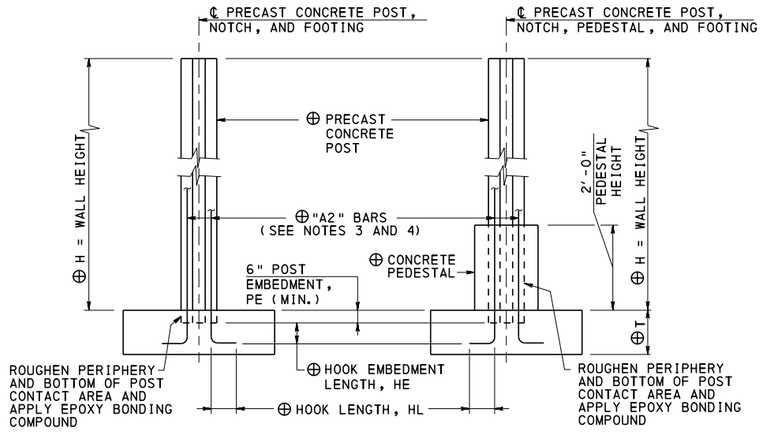


SPREAD FOOTING PLAN



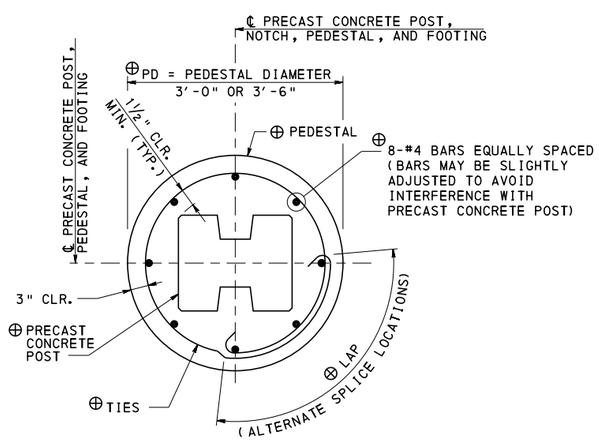
SECTION K-K (WITH PEDESTAL)

ADJUST FOOTING TOP REINFORCING SPACING TO CLEAR POST.



WITHOUT PEDESTAL WITH PEDESTAL

ELEVATION



SECTION L-L

PEDESTAL (IF SPECIFIED)

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.

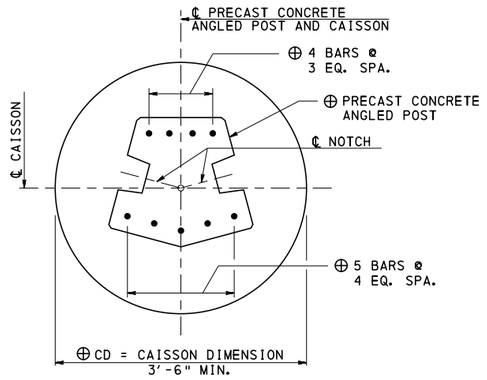
DETAIL 4
PRECAST CONCRETE POST EMBEDDED IN SPREAD FOOTING (WITH OR WITHOUT PEDESTAL)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

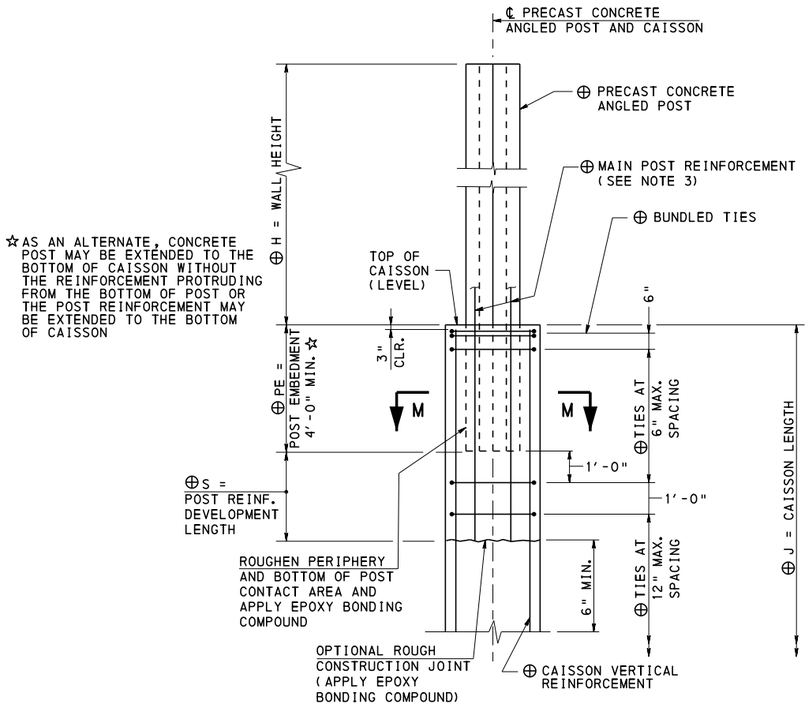
STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

DETAIL 4

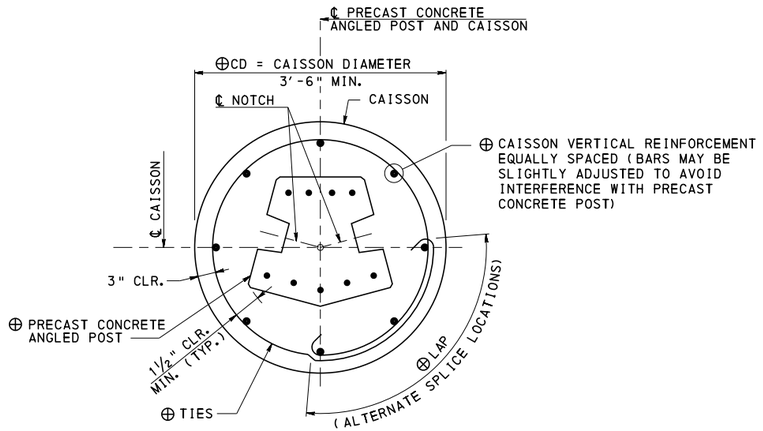
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 8 OF 12
Thomas P. Macioce	Brian D. Thompson	BC-777M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



PLAN



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.

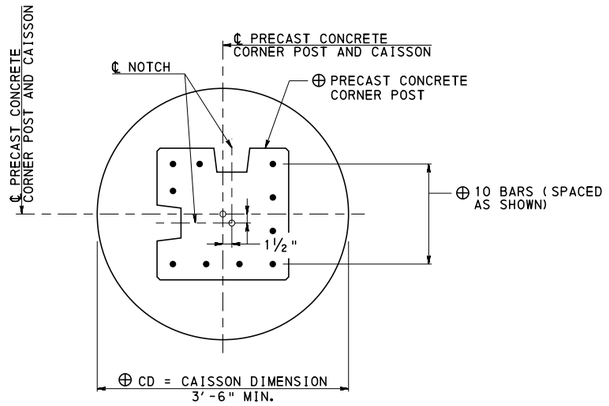
DETAIL 5
PRECAST CONCRETE ANGLED POST - TYPE E
EMBEDDED IN CAISSON

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

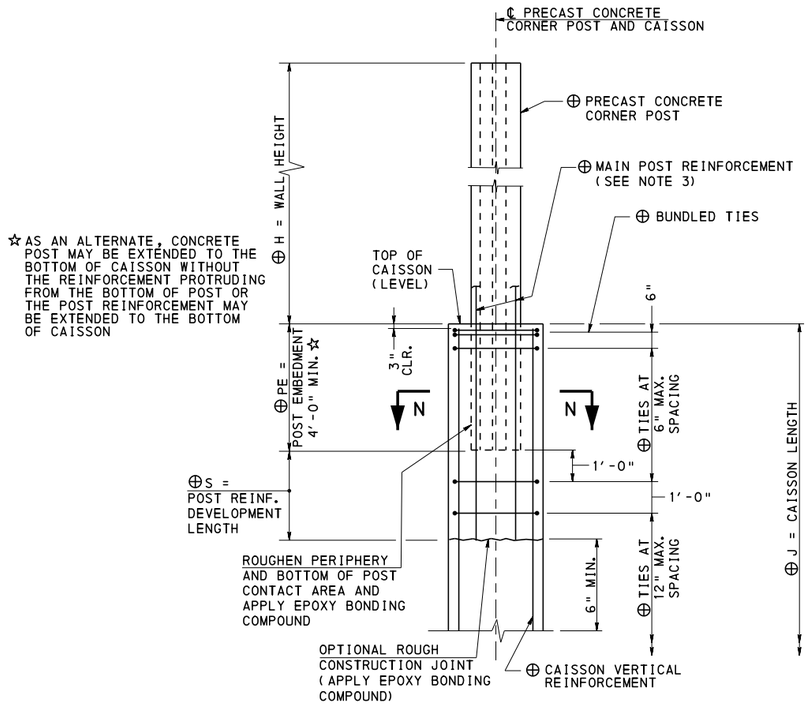
STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

DETAIL 5

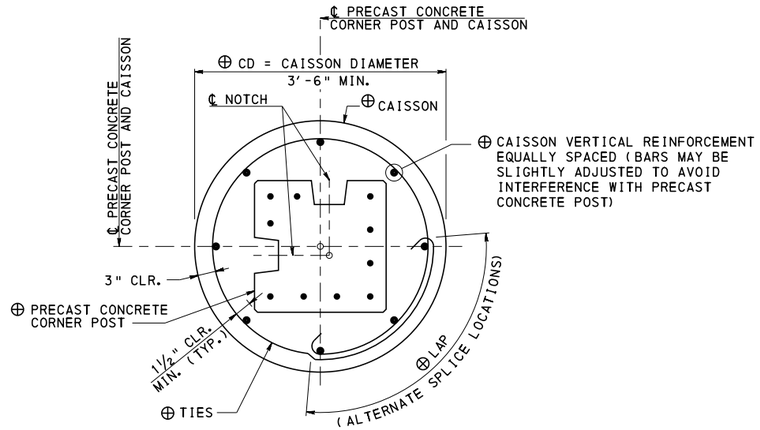
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 9 OF 12 BC-777M



PLAN



ELEVATION



SECTION N-N

DETAIL 6
PRECAST CONCRETE CORNER POST EMBEDDED IN CAISSON

LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

NOTES:

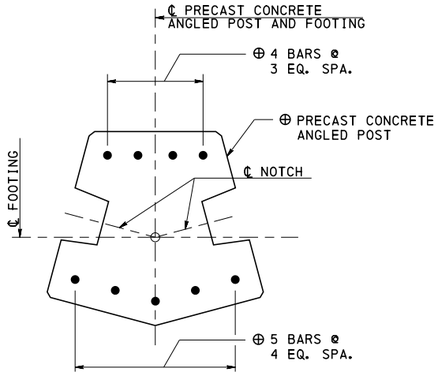
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR PANEL SEAT DETAILS REFER TO SHEET 4.
3. PROVIDE UNCOATED, EPOXY COATED, OR GALVANIZED BARS IN ACCORDANCE WITH THE CONTRACT DRAWINGS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

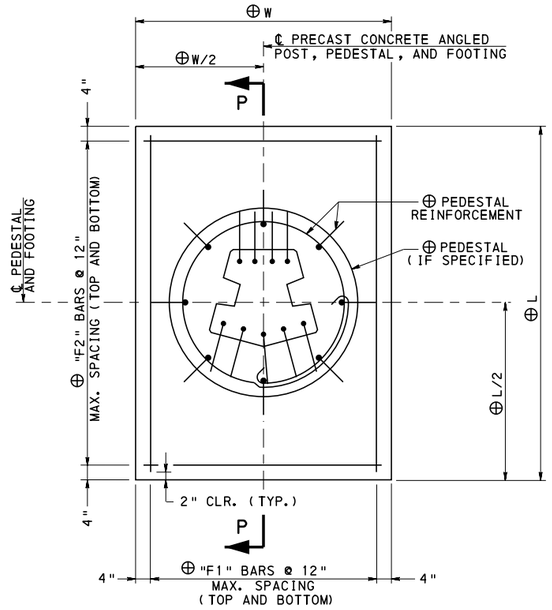
STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

DETAIL 6

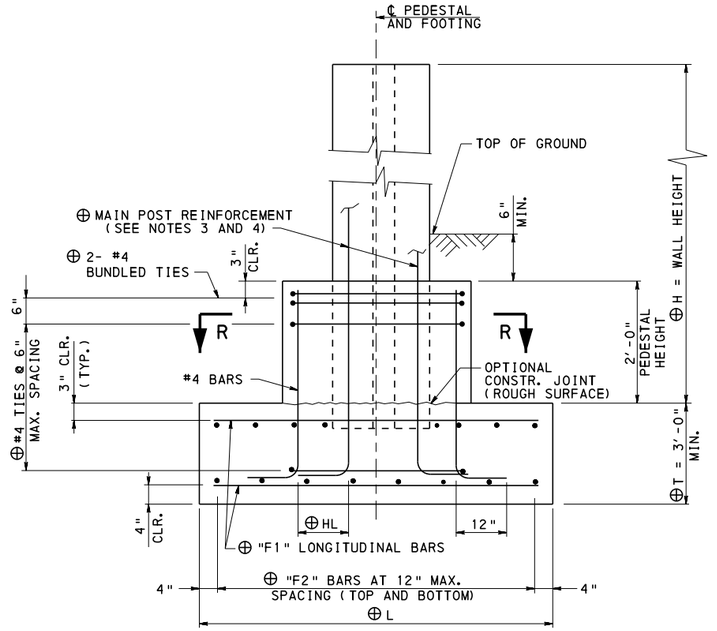
RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 10 OF 12 BC-777M



PLAN

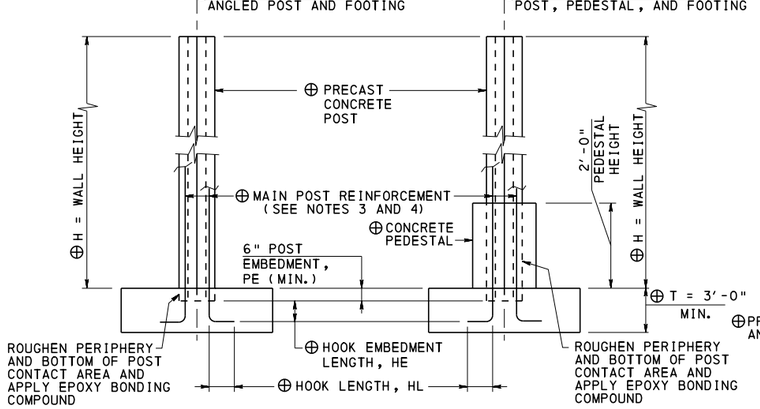


SPREAD FOOTING PLAN



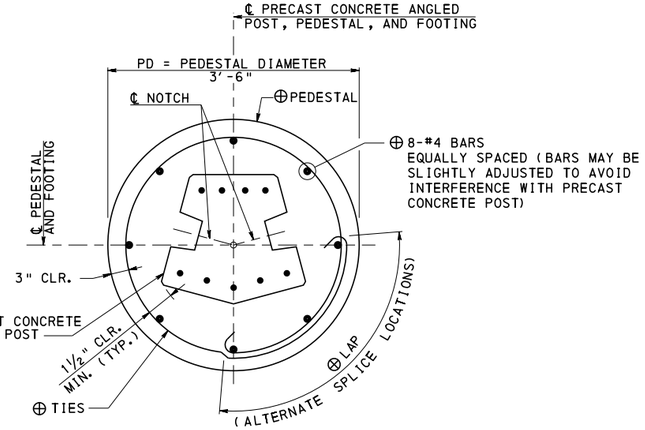
SECTION P-P (WITH PEDESTAL)

ADJUST FOOTING TOP REINFORCING SPACING TO CLEAR POST.



WITHOUT PEDESTAL WITH PEDESTAL

ELEVATION



SECTION R-R

PEDESTAL (IF SPECIFIED)

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.

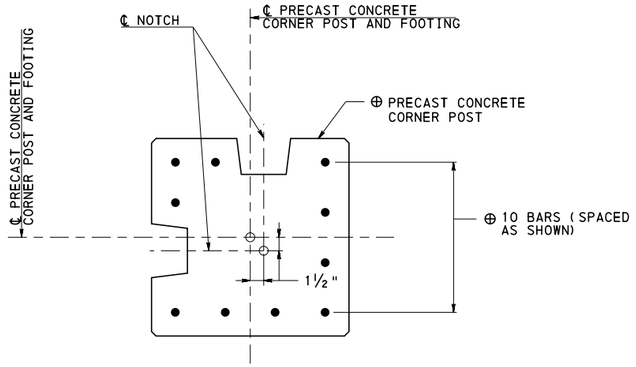
DETAIL 7
PRECAST CONCRETE ANGLED POST - TYPE E EMBEDDED IN SPREAD FOOTING (WITH OR WITHOUT PEDESTAL)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

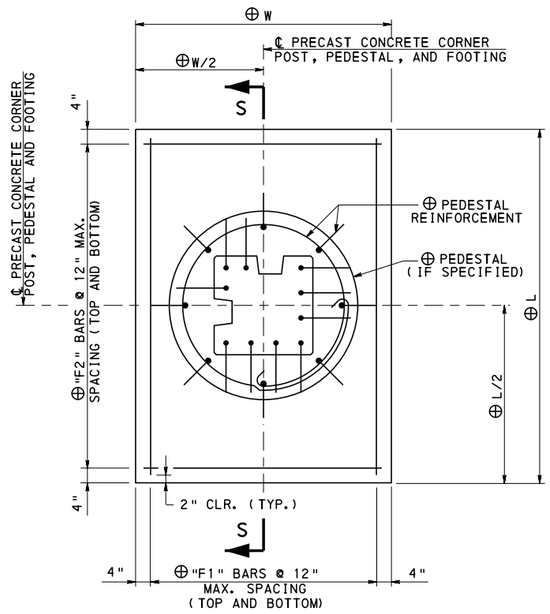
STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

DETAIL 7

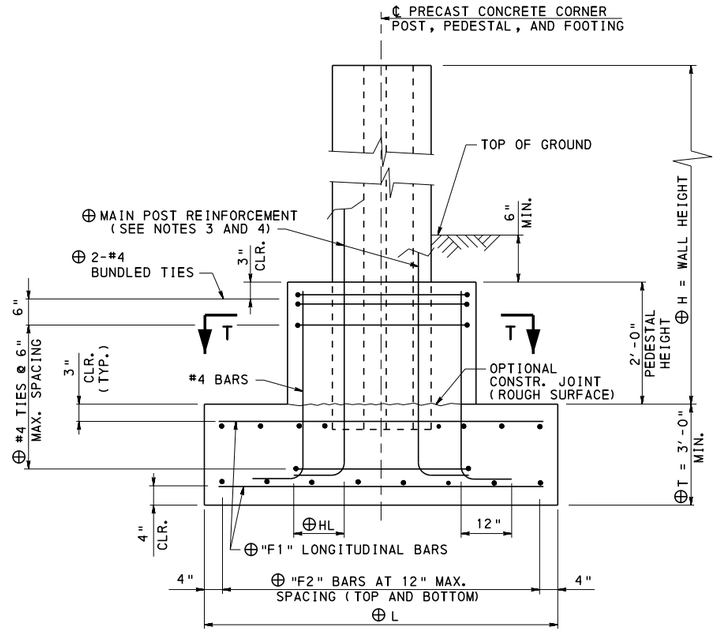
RECOMMENDED SEPT. 30, 2016 CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 11 OF 12 BC-777M



PLAN

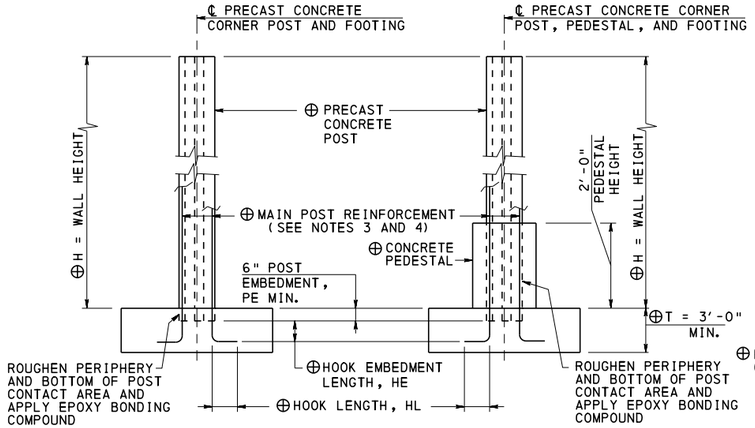


SPREAD FOOTING PLAN



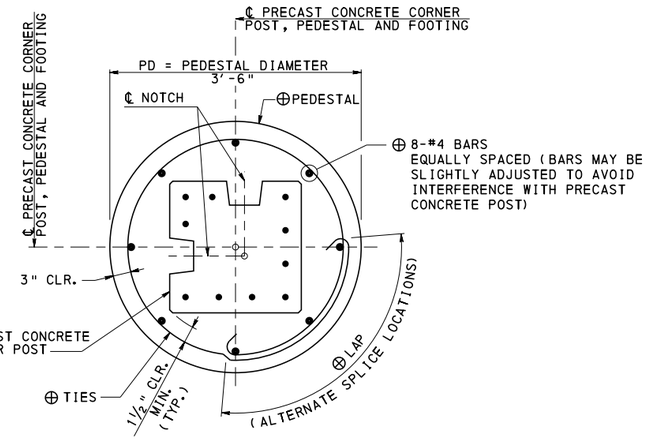
SECTION S-S (WITH PEDESTAL)

ADJUST FOOTING TOP REINFORCING SPACING TO CLEAR POST.



WITHOUT PEDESTAL WITH PEDESTAL

ELEVATION



SECTION T-T

PEDESTAL (IF SPECIFIED)

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

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 12 OF 12
Thomas P. Macioce	Brent D. Thompson	BC-777M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

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(a) 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.
     fs = 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. (Fy = 35 KSI)
   - WEATHERING STEEL (ASTM A 558) IS NOT PERMITTED.
   - PROVIDE MINIMUM WELD SIZE OF ⅜".
   - 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 ⅞" 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)3a.
   - 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(a).
   - 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

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.

REFERENCE DRAWINGS

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD GROUND MOUNTED SOUND BARRIERS STEEL POSTS

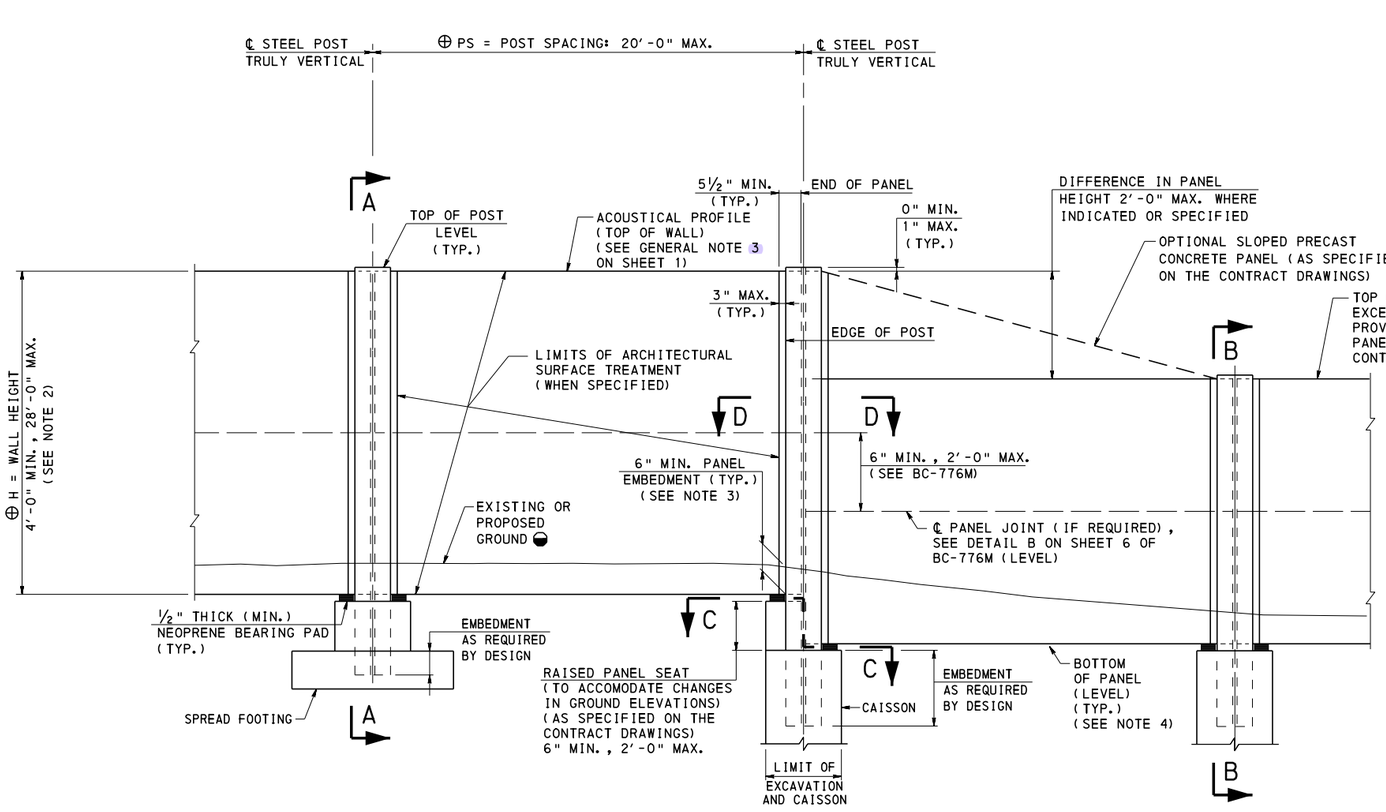
GENERAL NOTES

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brent B Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 1 OF 10

BC-778M



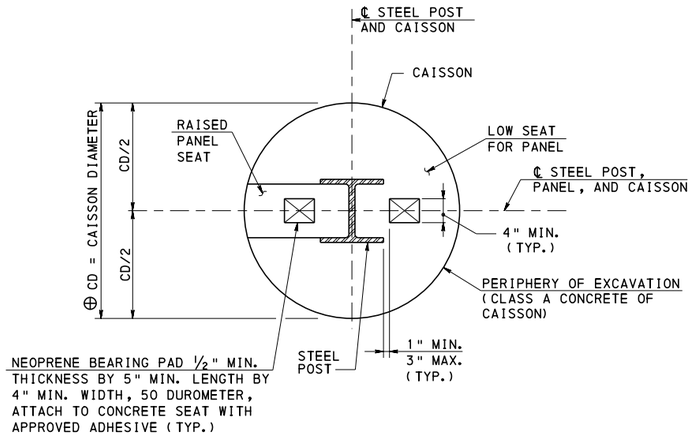
LEVEL PANEL

LEVEL OR SLOPED TOP PANEL
(SLOPED TOP PANEL PREFERRED)

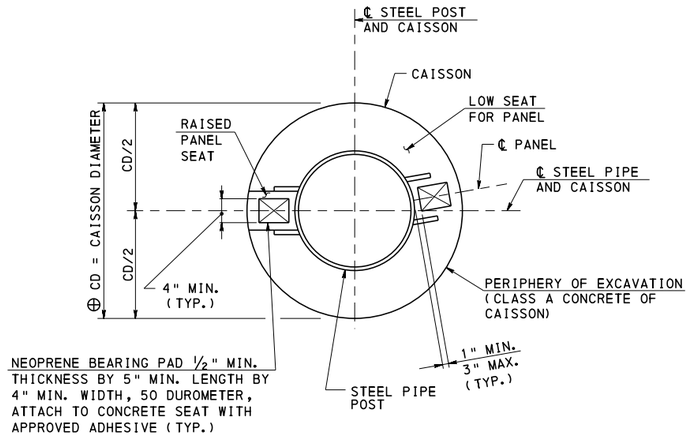
SECTION A-A

SECTION B-B

GROUND MOUNTED SOUND BARRIER ELEVATION



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)

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:

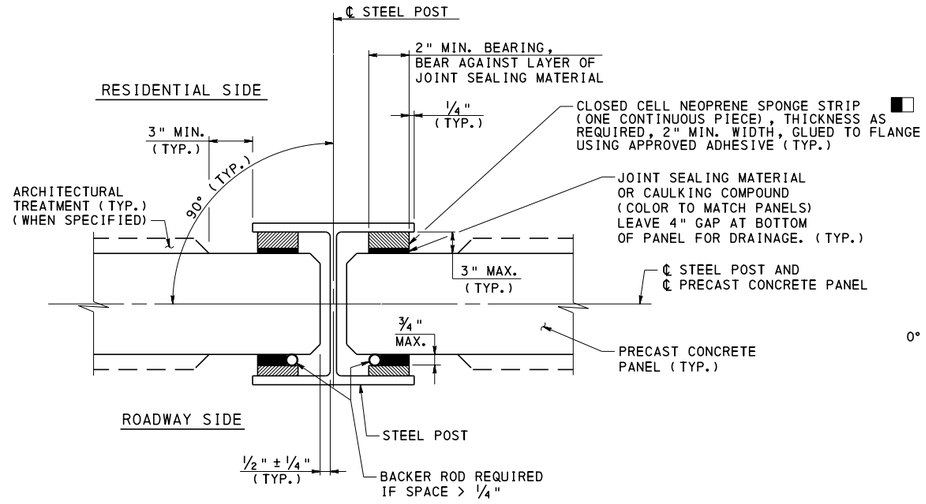
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. WALL HEIGHT IS DEFINED AS FOLLOWS:
   - POST WITH BASE PLATE: H = HEIGHT FROM TOP OF BASE PLATE TO TOP OF WALL.
   - POST WITHOUT BASE PLATE: H = HEIGHT FROM TOP OF FOOTING/CAISSON TO TOP OF WALL.
3. PANEL EMBEDMENT MAY NEED TO BE INCREASED TO ACCOMODATE 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 STEEL POSTS

GEOMETRY AND LAYOUT

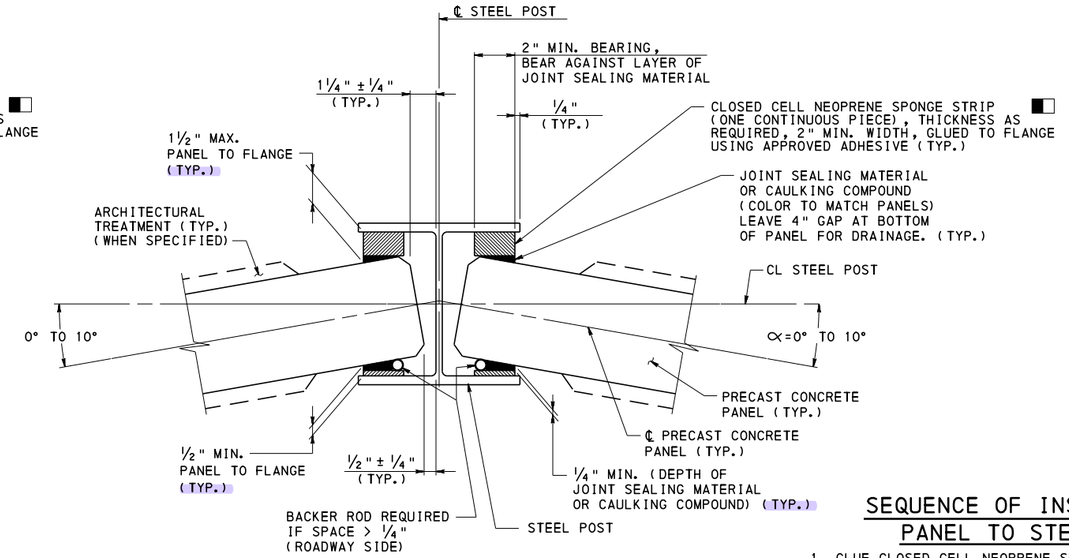
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 10
Thomas P. Macioce	Brian D. Thompson	BC-778M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



STRAIGHT PANELS

SECTION D-D (STEEL H-BEAM)

(CENTERLINE OF PANEL DOES NOT HAVE TO BE AT CENTERLINE OF POST)



ANGLED PANELS

SECTION D-D (STEEL H-BEAM)

∝=PANEL ORIENTATION IN RELATIONSHIP TO CENTERLINE OF POST.

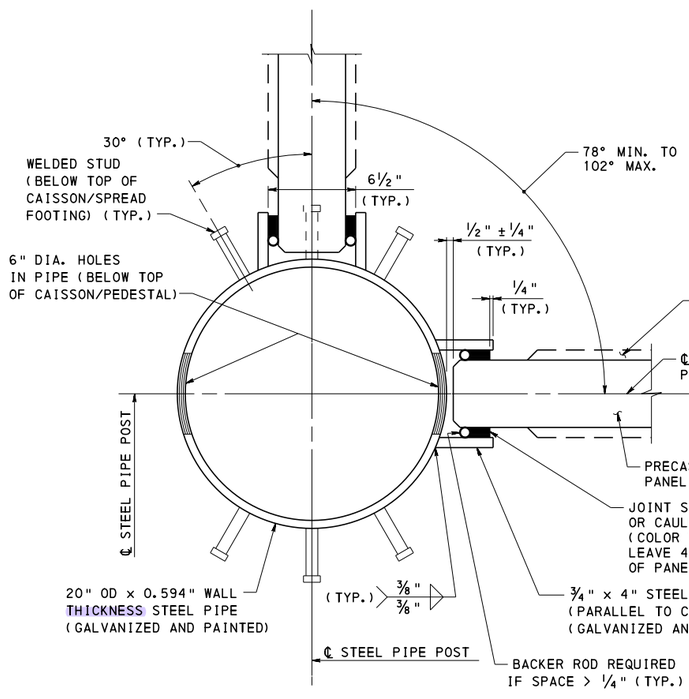
SEQUENCE OF INSTALLATION PANEL TO STEEL POST

1. GLUE CLOSED CELL NEOPRENE SPONGE STRIP TO POST ON RESIDENTAL 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 RESIDENTAL 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".

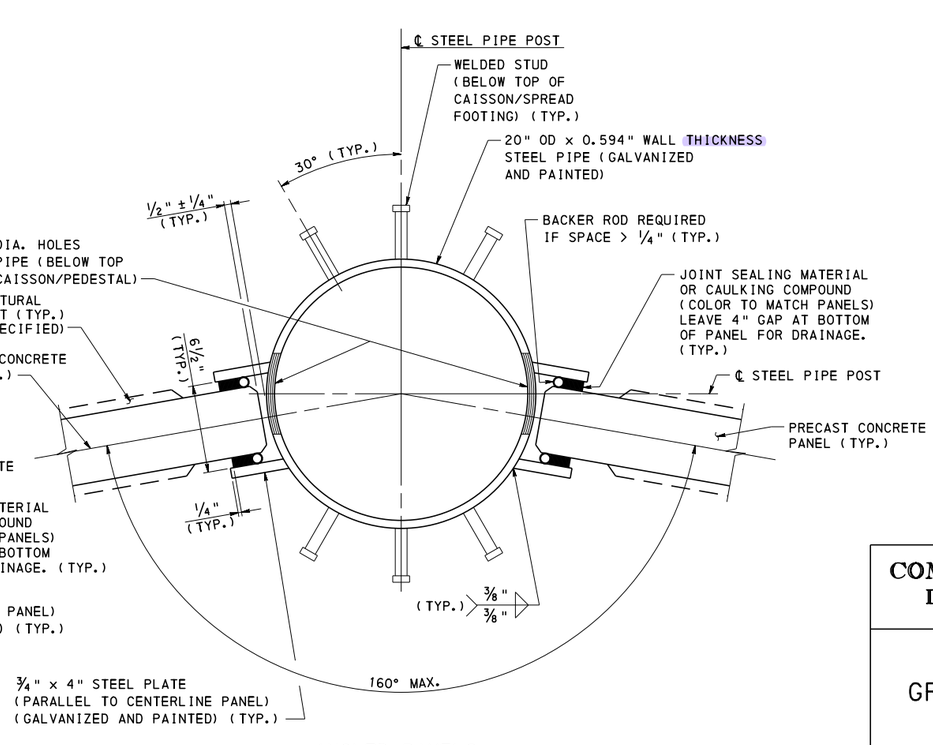
NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR ADDITIONAL STEEL PIPE POST DETAILS REFER TO SHEETS 9 AND 10.



CORNER PANELS

SECTION D-D (STEEL PIPE POST)



ANGLED PANELS

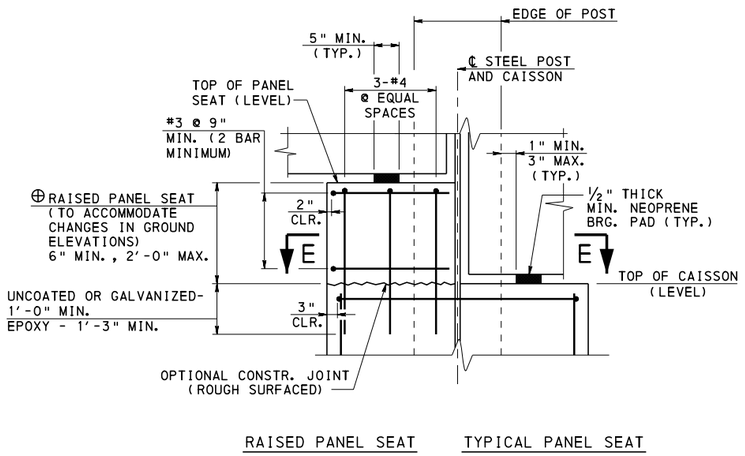
SECTION D-D (STEEL PIPE POST)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD GROUND MOUNTED SOUND BARRIERS STEEL POSTS

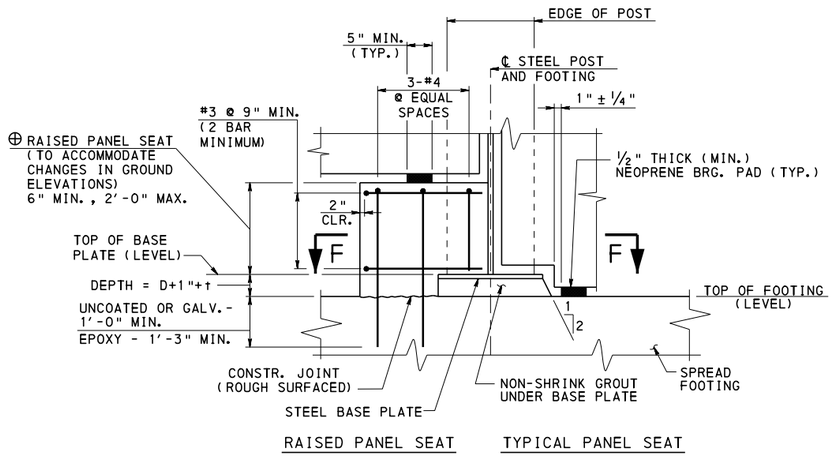
POST DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 10
Thomas P Macioce CHIEF BRIDGE ENGINEER	Brian B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-778M



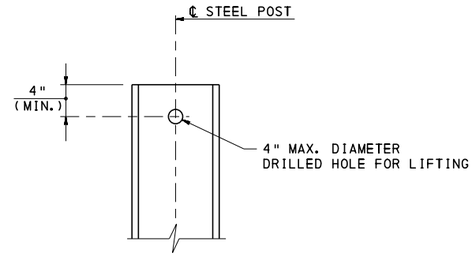
PANEL SEAT ELEVATION WITHOUT BASE PLATE

(DETAIL FOR CAISSON SHOWN
DETAIL FOR FOOTING IS SIMILAR)

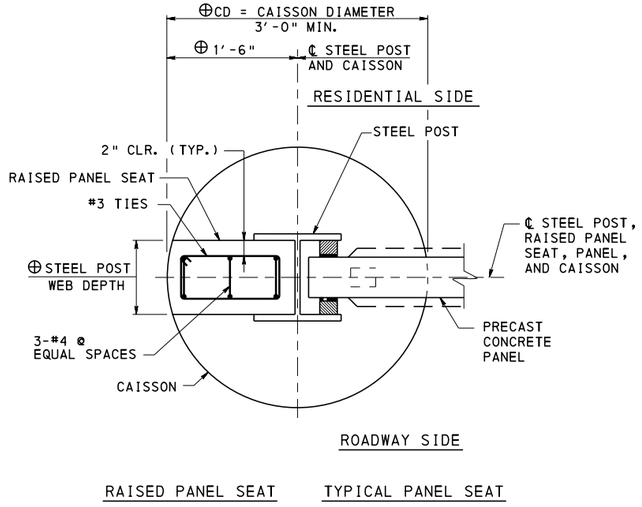


PANEL SEAT ELEVATION WITH BASE PLATE

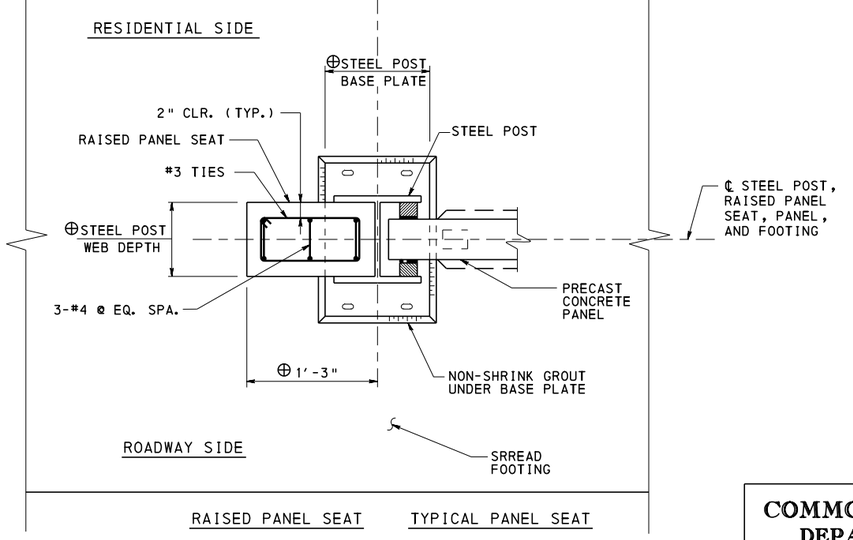
(DETAIL FOR FOOTING SHOWN
DETAIL FOR CAISSON IS SIMILAR)



LIFTING HOLE IN STEEL POST (OPTIONAL)



SECTION E-E



SECTION F-F

LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

NOTES:

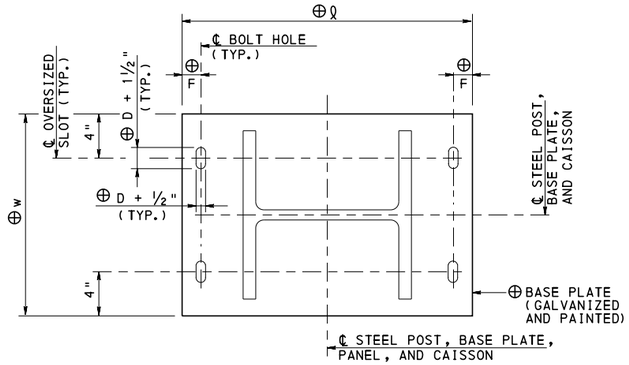
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. RAISED PANEL SEATS (IF REQUIRED) TO BE DETAILED ON THE CONTRACT DRAWINGS.
3. DETAILS FOR STEEL PIPE POST NOT SHOWN BUT SIMILAR TO DETAILS SHOWN. REFER TO CONTRACT DRAWINGS FOR DETAILS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

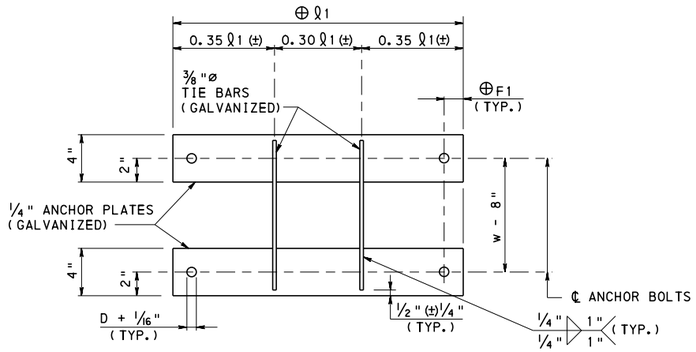
STANDARD GROUND MOUNTED SOUND BARRIERS STEEL POSTS

PANEL SEAT DETAILS

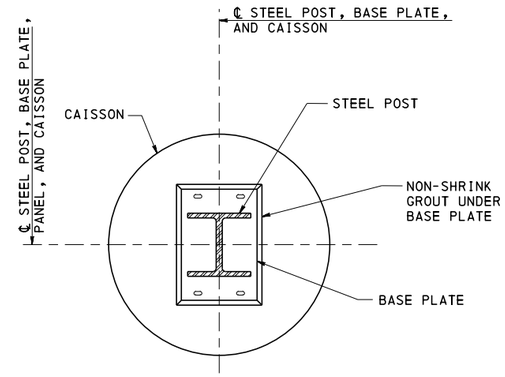
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 4 OF 10
Thomas P. Macioce	Brian D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-778M



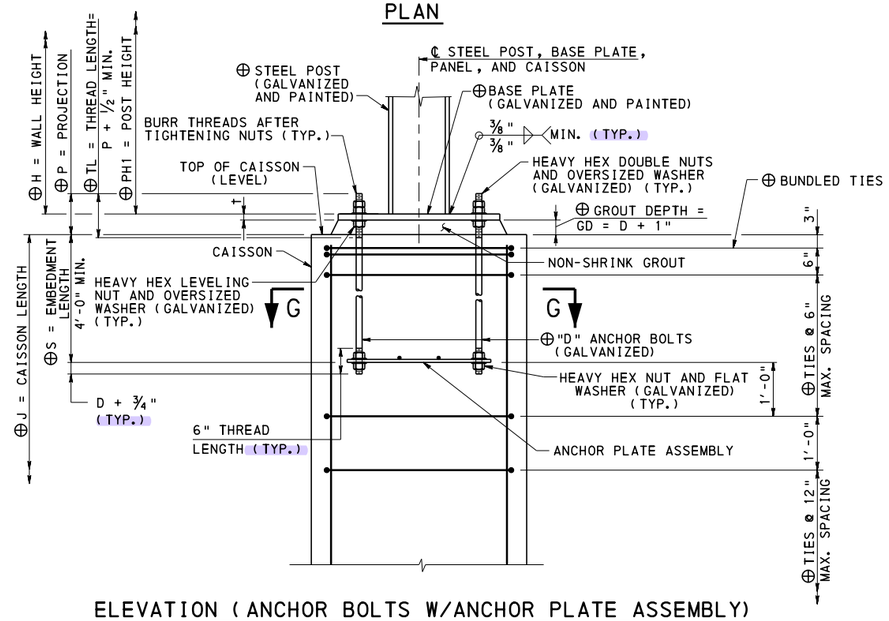
PLAN



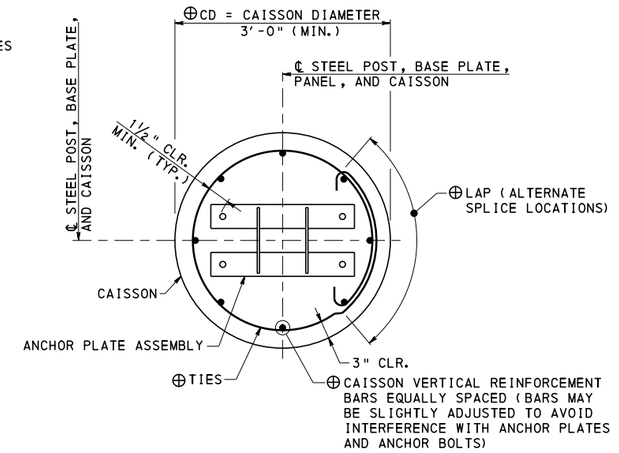
PLAN - ANCHOR PLATE ASSEMBLY



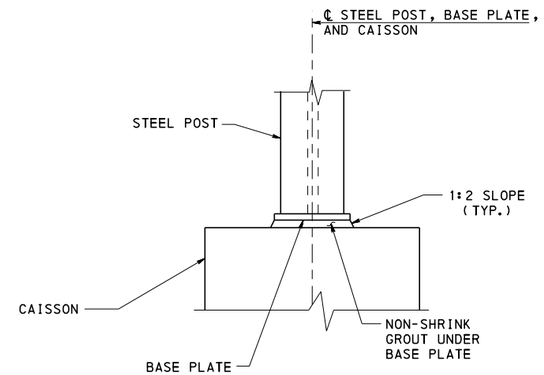
PANEL SEAT PLAN



ELEVATION (ANCHOR BOLTS W/ANCHOR PLATE ASSEMBLY)

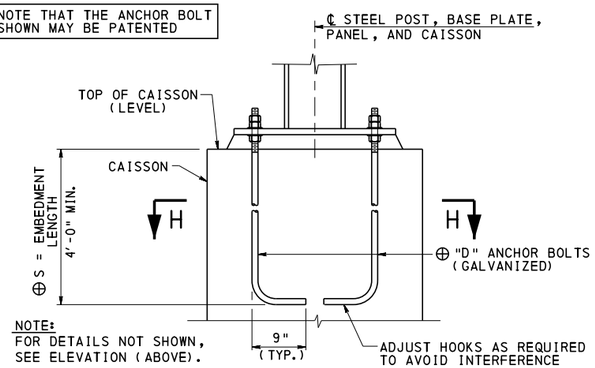


SECTION G-G



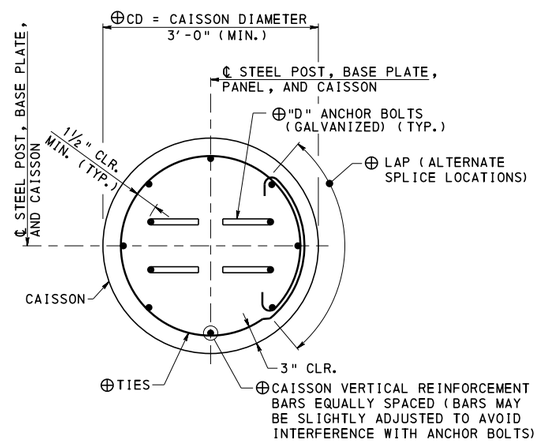
PANEL SEAT ELEVATION

PLEASE NOTE THAT THE ANCHOR BOLT DETAIL SHOWN MAY BE PATENTED



ELEVATION (ANCHOR BOLTS W/HOOKS)

CAISSON REINFORCEMENT NOT SHOWN FOR CLARITY



SECTION H-H

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.

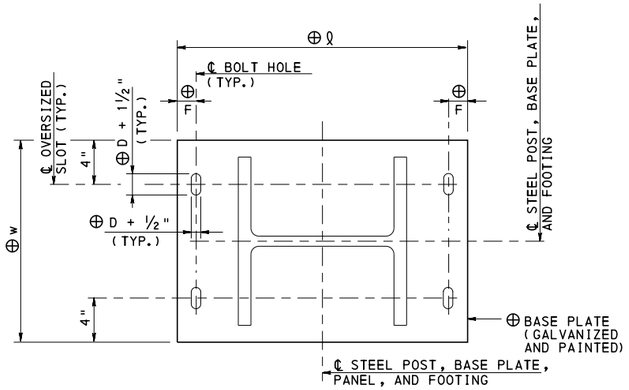
DETAIL 1
STEEL POST WITH BASE PLATE CONNECTION TO CAISSON

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

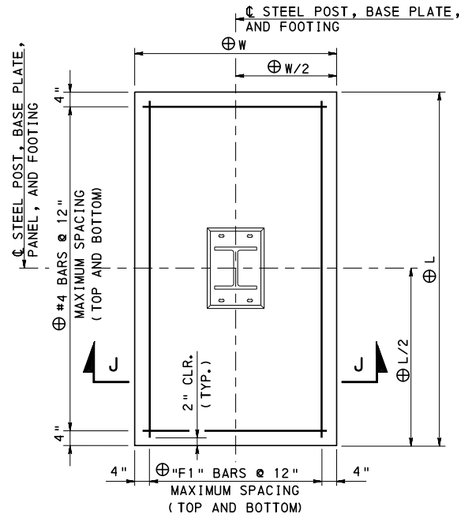
STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS

DETAIL 1

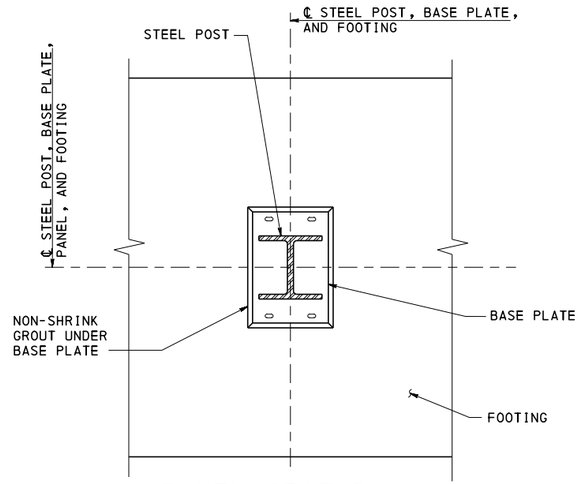
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 5 OF 10
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brent L. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-778M



PLAN

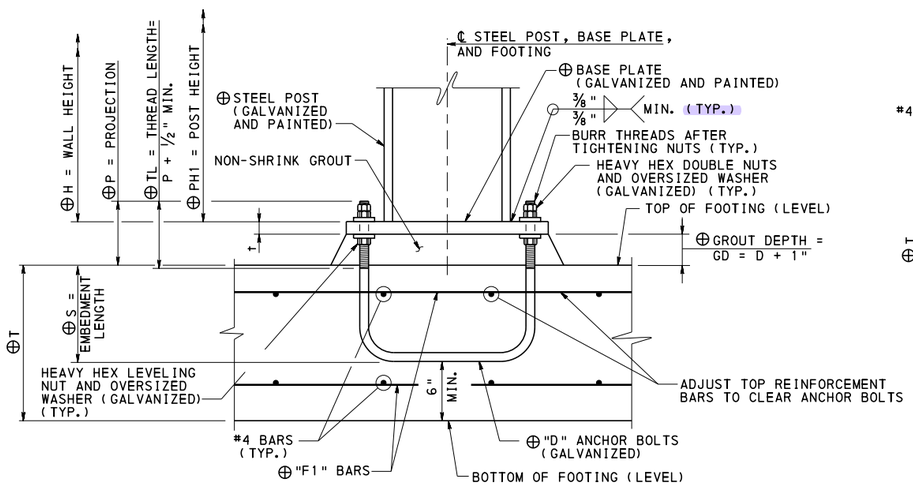


SPREAD FOOTING PLAN



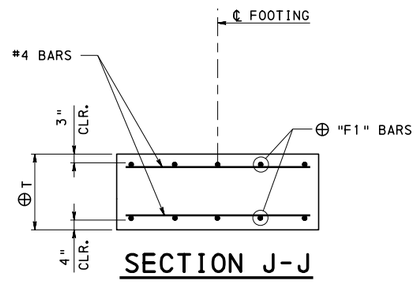
PANEL SEAT PLAN

PLEASE NOTE THAT THE ANCHOR BOLT DETAIL SHOWN MAY BE PATENTED.

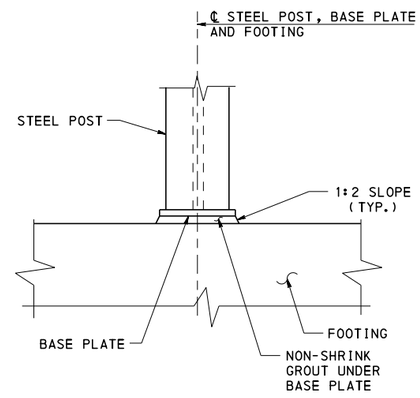


ELEVATION

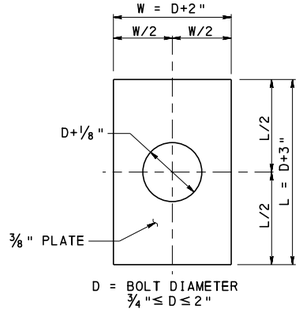
DETAIL 2
STEEL POST WITH BASE PLATE CONNECTION TO SPREAD FOOTING



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

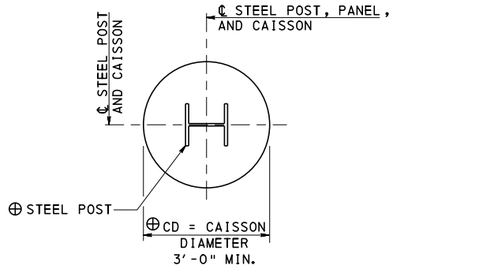
STANDARD GROUND MOUNTED SOUND BARRIERS STEEL POSTS

DETAIL 2

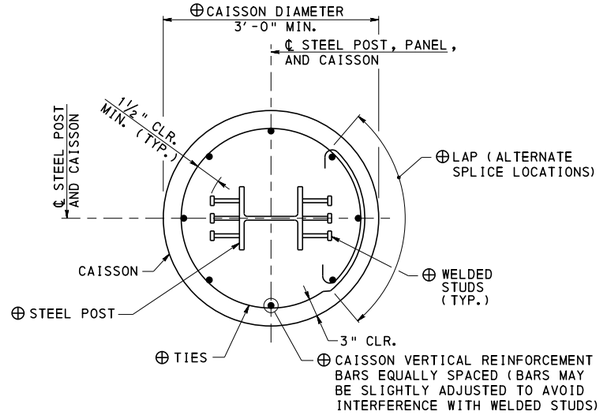
RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY

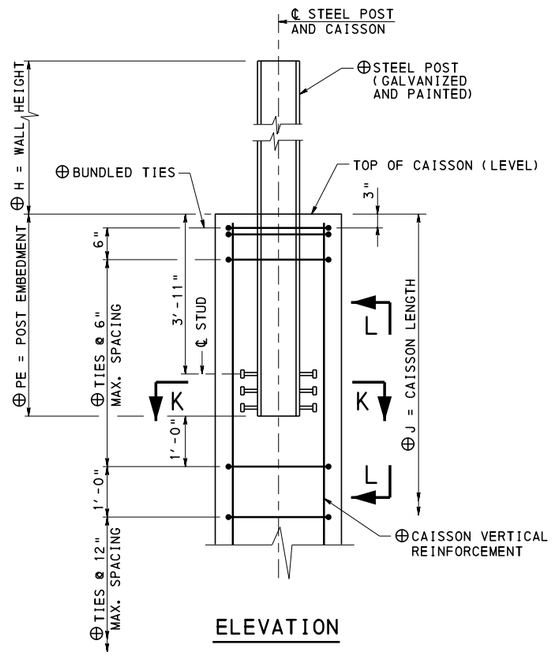
BC-778M



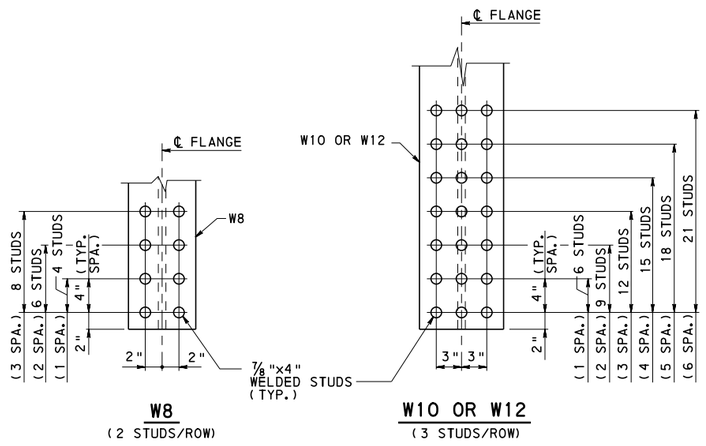
PLAN



SECTION K-K



ELEVATION



W8
(2 STUDS/ROW)

W10 OR W12
(3 STUDS/ROW)

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.

DETAIL 3
STEEL POST
EMBEDDED IN CAISSON

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS

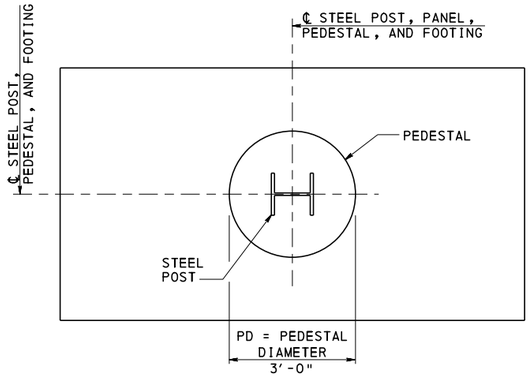
DETAIL 3

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

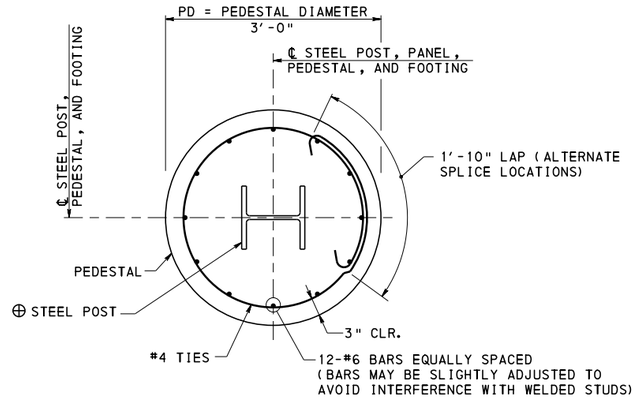
RECOMMENDED SEPT. 30, 2016
Brian D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 7 OF 10

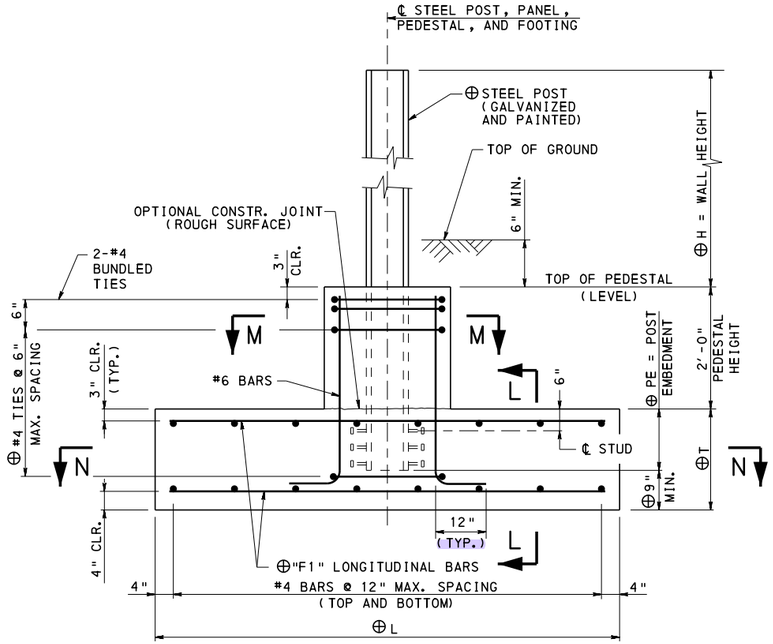
BC-778M



PLAN

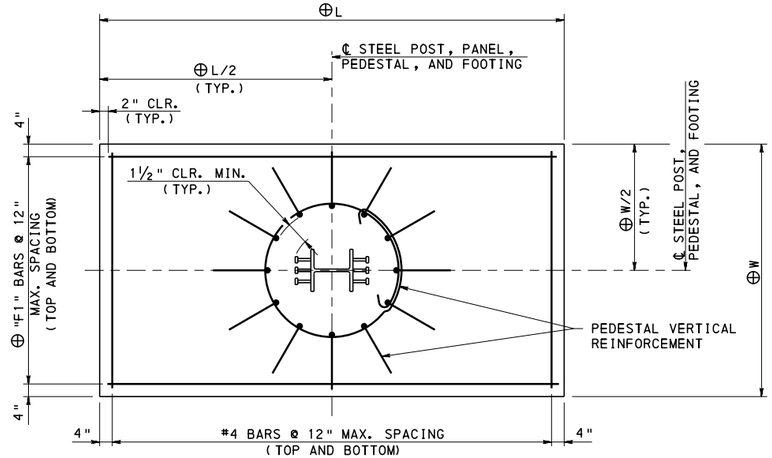


SECTION M-M



ELEVATION

ADJUST FOOTING TOP REINFORCEMENT SPACING TO CLEAR POST.



SECTION N-N

DETAIL 4
STEEL POST EMBEDDED IN SPREAD FOOTING WITH PEDESTAL

LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

NOTES:

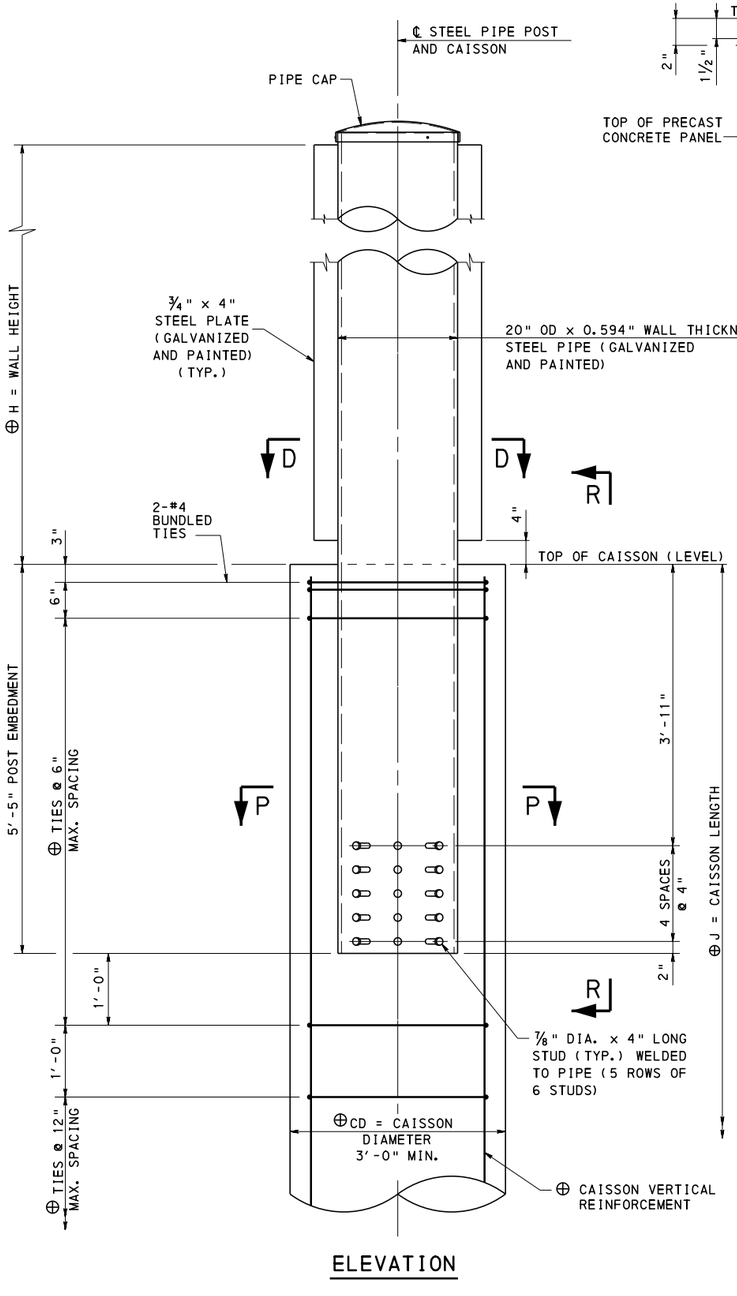
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR SECTION L-L REFER TO SHEET 7.
3. FOR PANEL SEAT DETAILS REFER TO SHEET 4.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

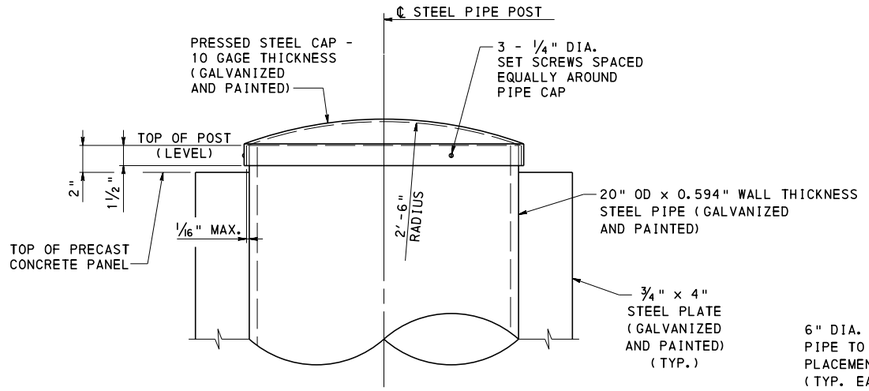
STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS

DETAIL 4

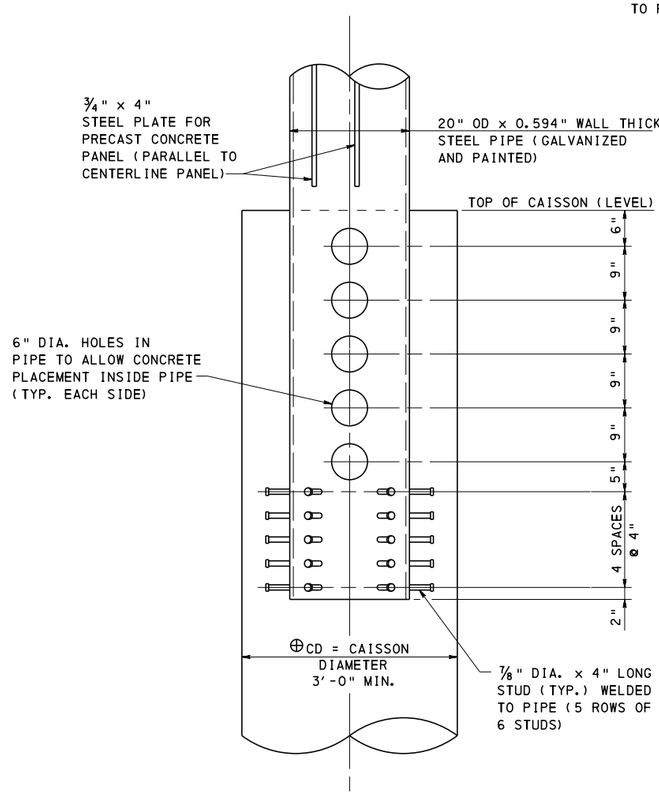
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 8 OF 10
Thomas P Macioce	Brian B Thompson	BC-778M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



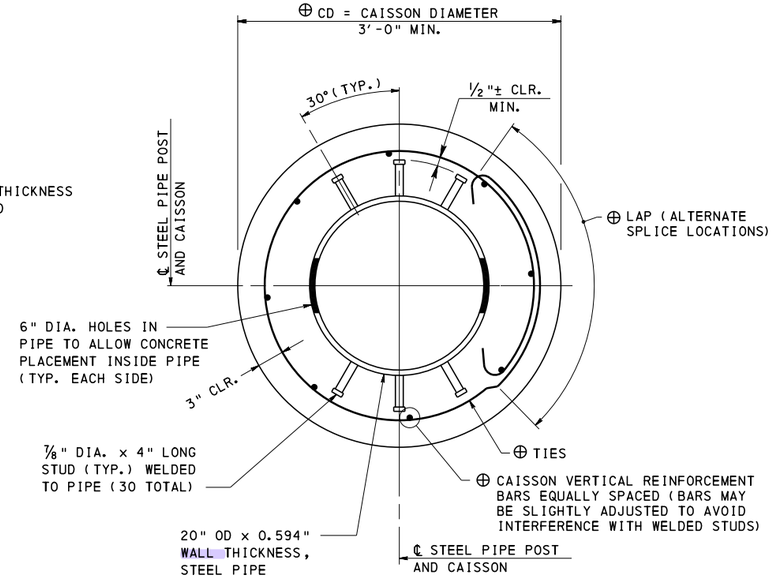
ELEVATION



PIPE CAP DETAIL



SECTION R-R



SECTION P-P

DETAIL 5
CORNER/ANGLED STEEL PIPE POST EMBEDDED IN CAISSON

LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

NOTES:

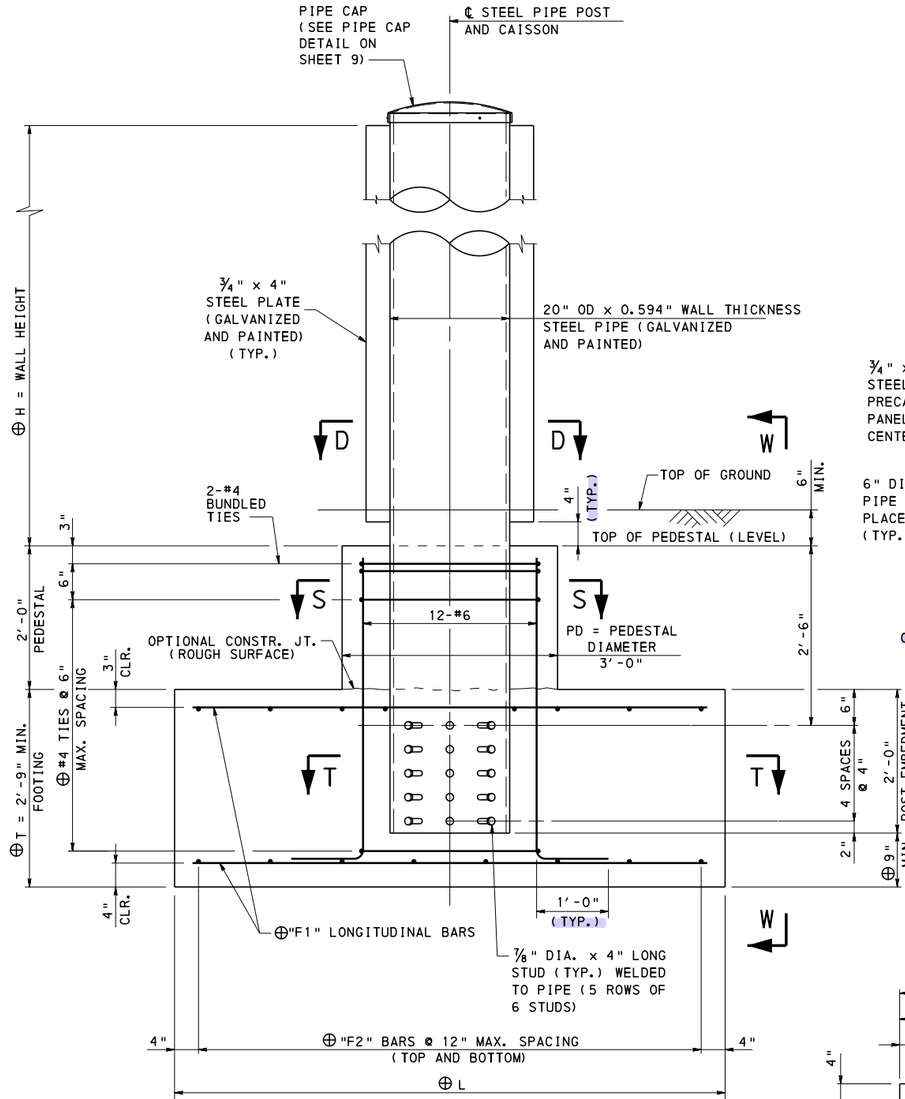
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR SECTION D-D REFER TO SHEET 3.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS

DETAIL 5

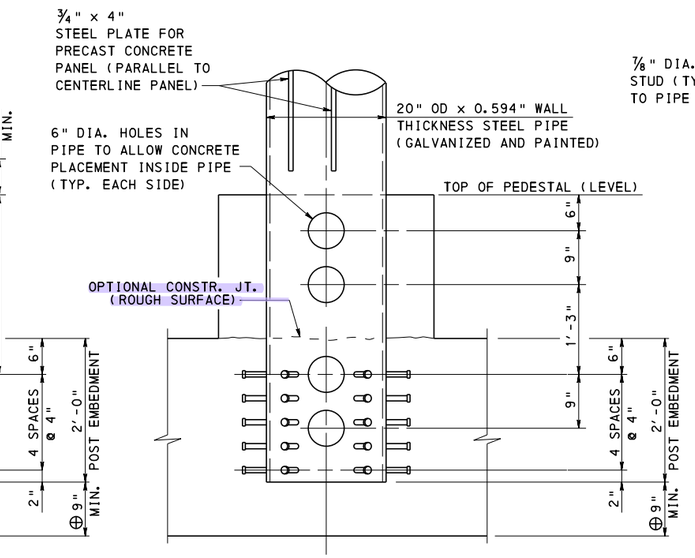
RECOMMENDED SEPT. 30, 2016 CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 9 OF 10 BC-778M



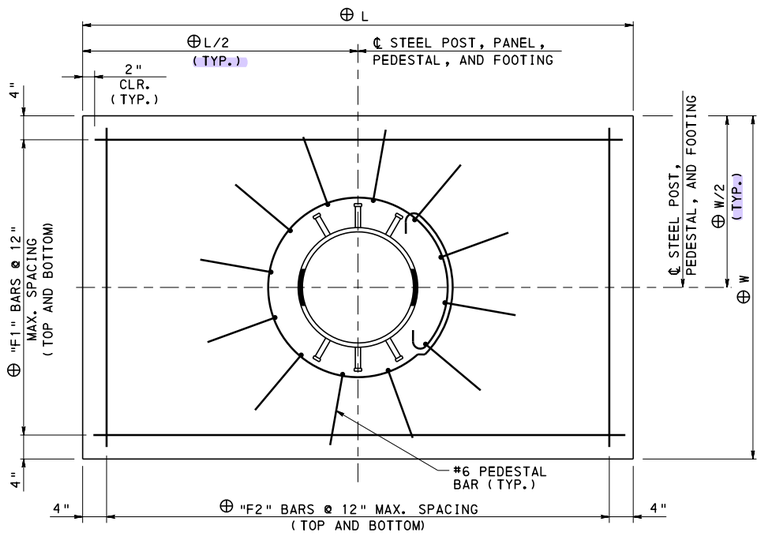
ELEVATION

ADJUST FOOTING TOP REINFORCEMENT SPACING TO CLEAR POST.

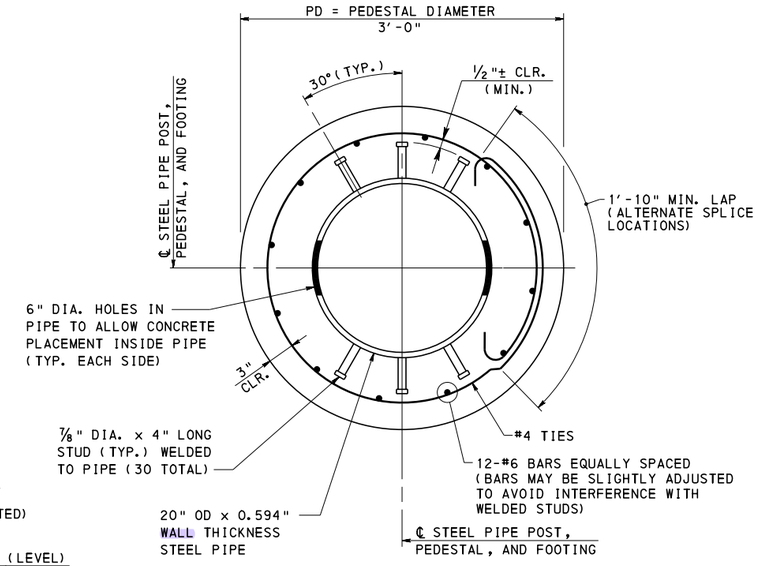
DETAIL 6
CORNER/ANGLED STEEL PIPE POST EMBEDDED IN SPREAD FOOTING WITH PEDESTAL



SECTION W-W



SECTION T-T



SECTION S-S

LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. 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

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 10 OF 10
Thomas P. Macioce	Brent D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-778M

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 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 AASHTOAWS 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 ½" x ½", 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.

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

REFERENCE DRAWINGS

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
GENERAL NOTES - 1

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY

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 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 BARRIERS, FOOTINGS, CAISSONS, OR WHERE BENDING OR WELDING OF REINFORCEMENT BARS IS INDICATED.
     fs = 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 THAT MEET THE REQUIREMENTS OF ASTM A 185 IN THE PRECAST CONCRETE PANELS.
     fs = 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 M 270 GRADE 36 (ASTM A 709, GRADE 36) UNLESS OTHERWISE NOTED.
   - WEATHERING STEEL (ASTM A 588) IS NOT PERMITTED.
   - PROVIDE MINIMUM BASE PLATE THICKNESS OF ¾".
   - PROVIDE MINIMUM WELD SIZE OF ⅜".
   - 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 F 1554, GRADE 36 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c)3.
   - PROVIDE MINIMUM ANCHOR BOLT DIAMETER OF ¾".
   - 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 F 436 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 A 307, GRADE A, IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c)1.
   - PROVIDE HEAVY HEX NUTS CONFORMING TO ASTM A 307, GRADE A, IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(c)1a.
   - PROVIDE FLAT WASHERS AND LOCK WASHERS CONFORMING TO ASTM F 436 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 ⅜", 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 A 53
   - IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(j)1. GALVANIZE STEEL PIPE ACCORDING TO ASTM A 153 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 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.

12. CAULKING COMPOUND:
    - PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.8(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(a).
    - 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 705.9.

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 1½", BUT THE TOTAL AVERAGE ARCHITECTURAL SURFACE TREATMENT, ON BOTH SIDES OF THE PANEL, MUST NOT BE GREATER THAN 1½" 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
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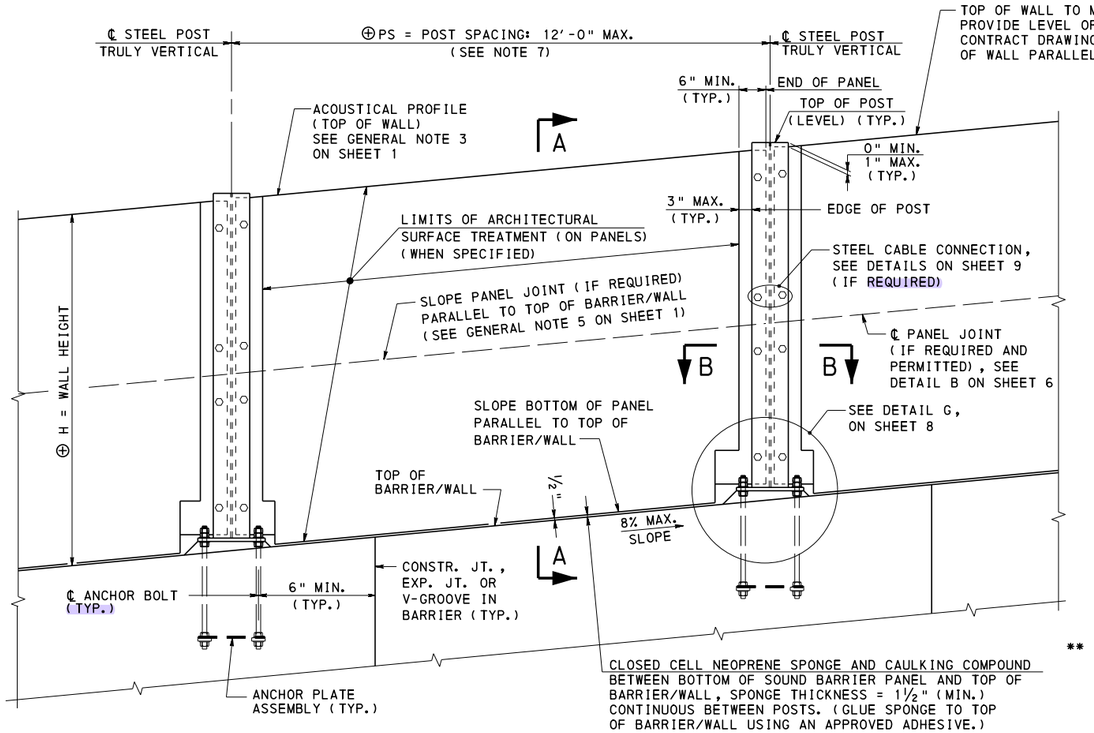
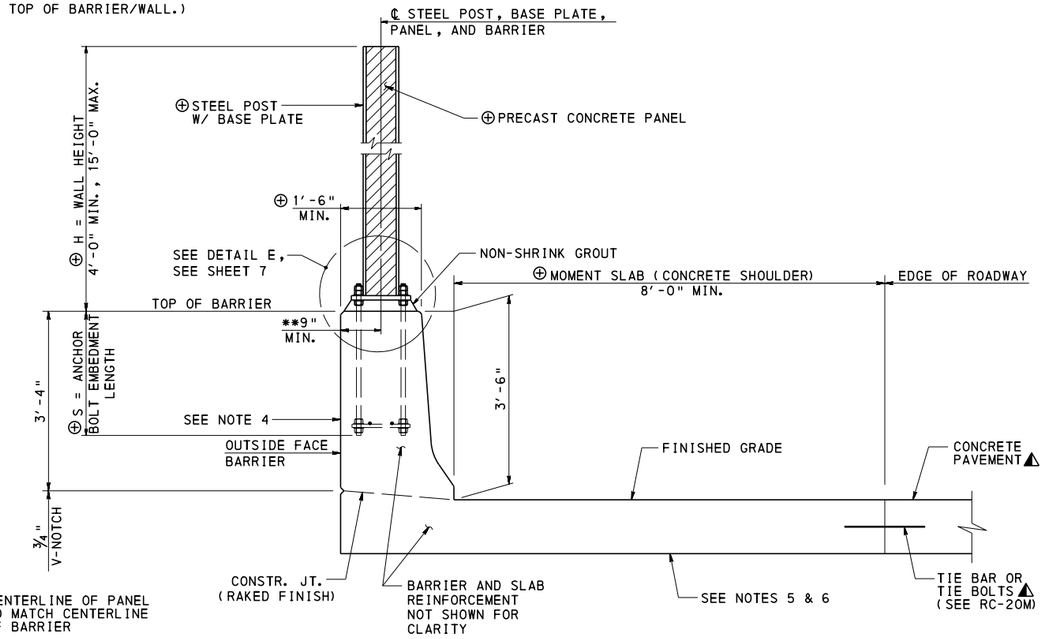
STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
GENERAL NOTES - 2

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 9
Thomas P. Macioce	Brent D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-779M



BARRIER MOUNTED/RETAINING WALL MOUNTED SOUND BARRIER ELEVATION

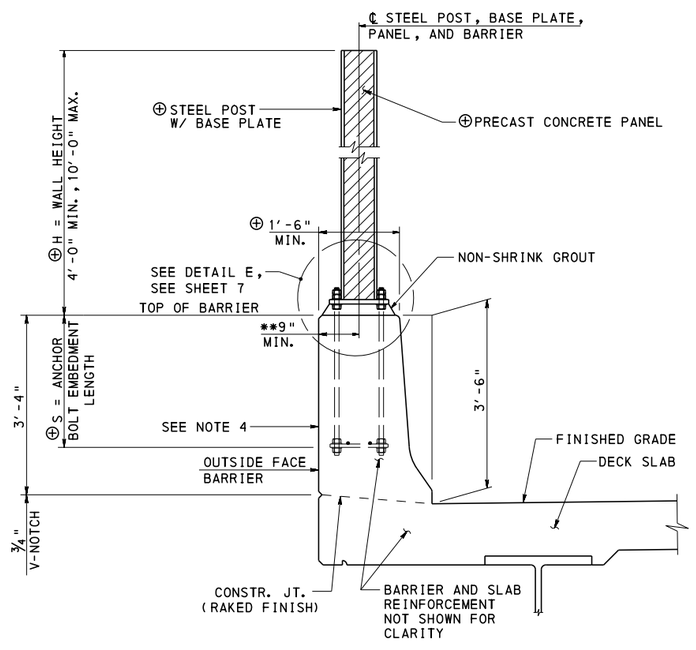
(TOP OF BARRIER/WALL SLOPED)



** - CENTERLINE OF PANEL TO MATCH CENTERLINE OF BARRIER

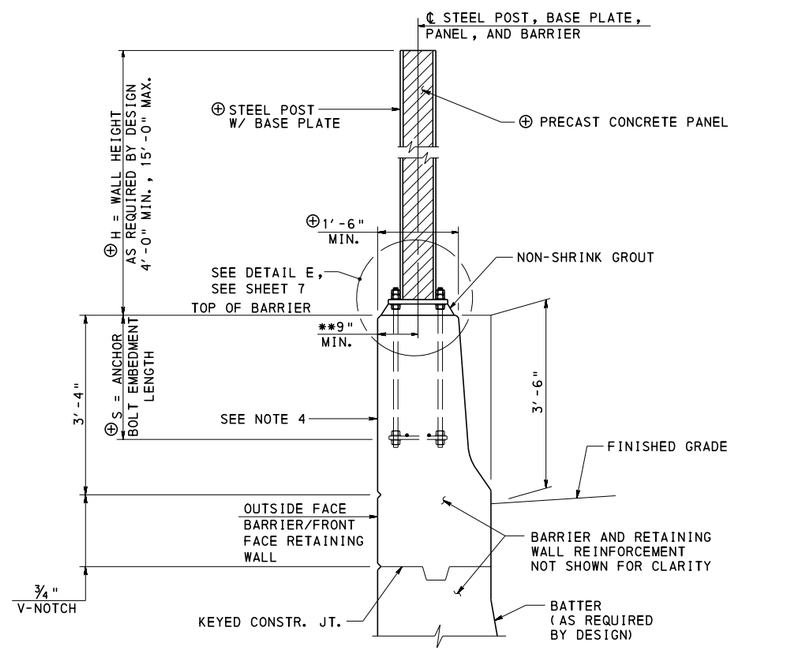
BARRIER MOUNTED SOUND BARRIER ON MOMENT SLAB

TYPICAL SECTION



BARRIER MOUNTED SOUND BARRIER ON BRIDGE

TYPICAL SECTION



BARRIER MOUNTED SOUND BARRIER ON RETAINING WALL

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.
4. CONCRETE BARRIER SHOWN, CONCRETE VERTICAL WALL BRIDGE BARRIER SIMILAR.
5. MOMENT SLAB ON MECHANICALLY STABILIZED EARTH WALLS SIMILAR, REFER TO CONTRACT DRAWINGS AND BC-799M FOR ADDITIONAL DETAILS.
6. CONCRETE SHOULDER SHOWN, BITUMINOUS CONCRETE SHOULDER SIMILAR, REFER TO CONTRACT DRAWINGS AND BC-799M FOR ADDITIONAL DETAILS.
7. 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

COMMONWEALTH OF PENNSYLVANIA
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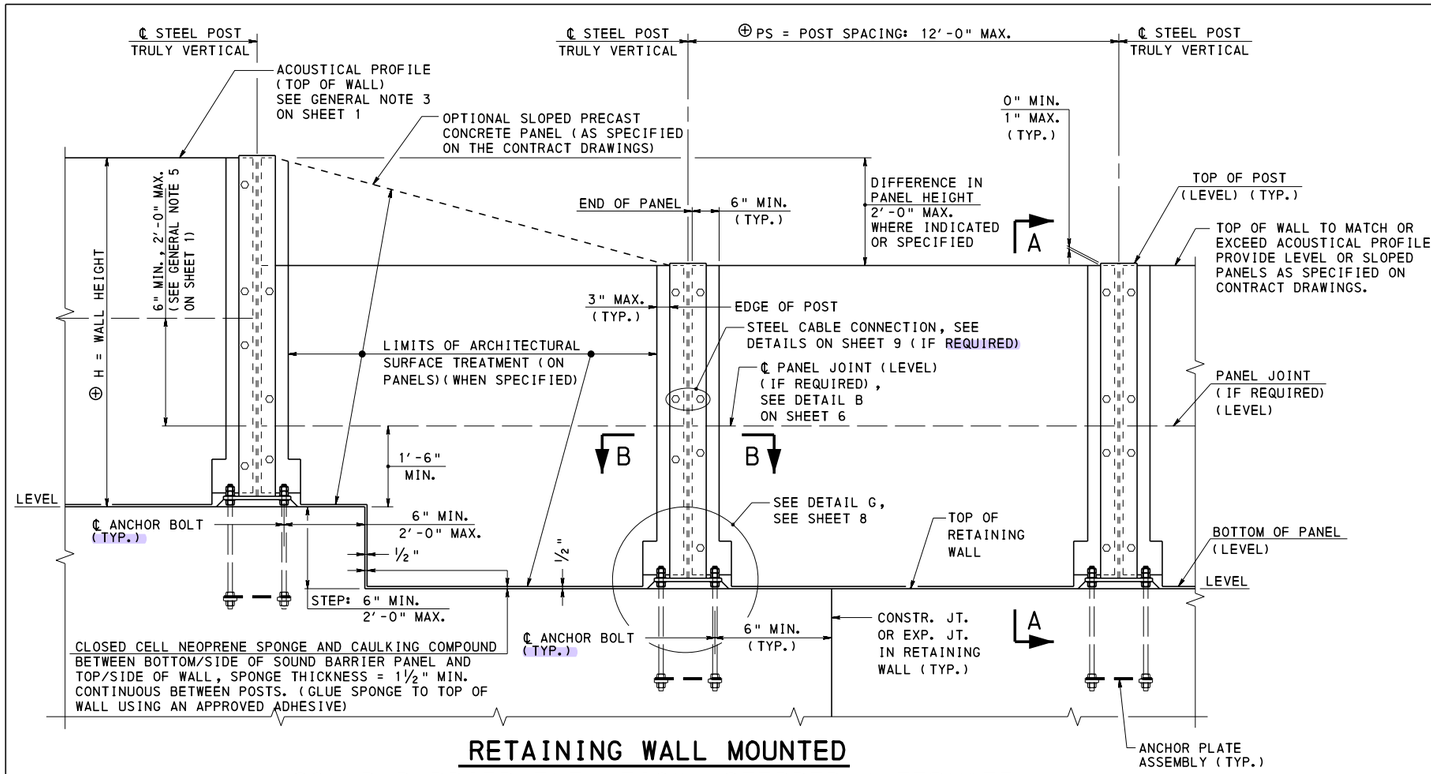
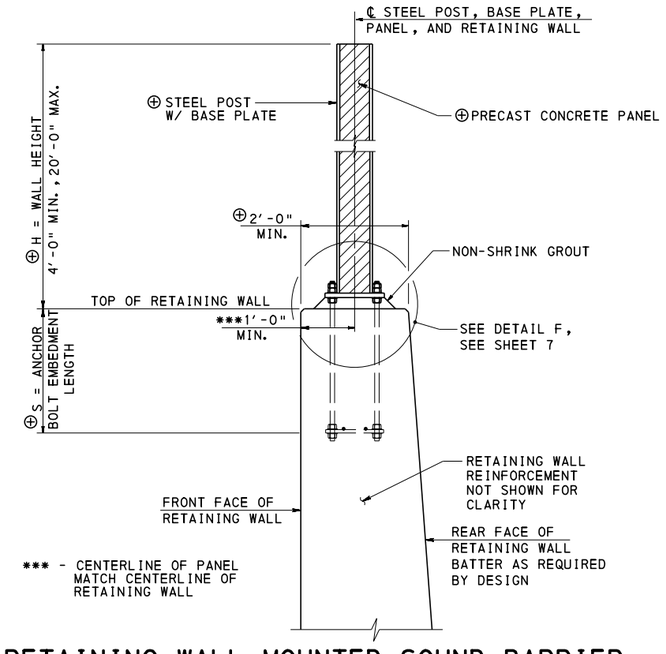
STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
GEOMETRY AND LAYOUT - BARRIER MOUNTED

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 9
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brian D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-779M



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

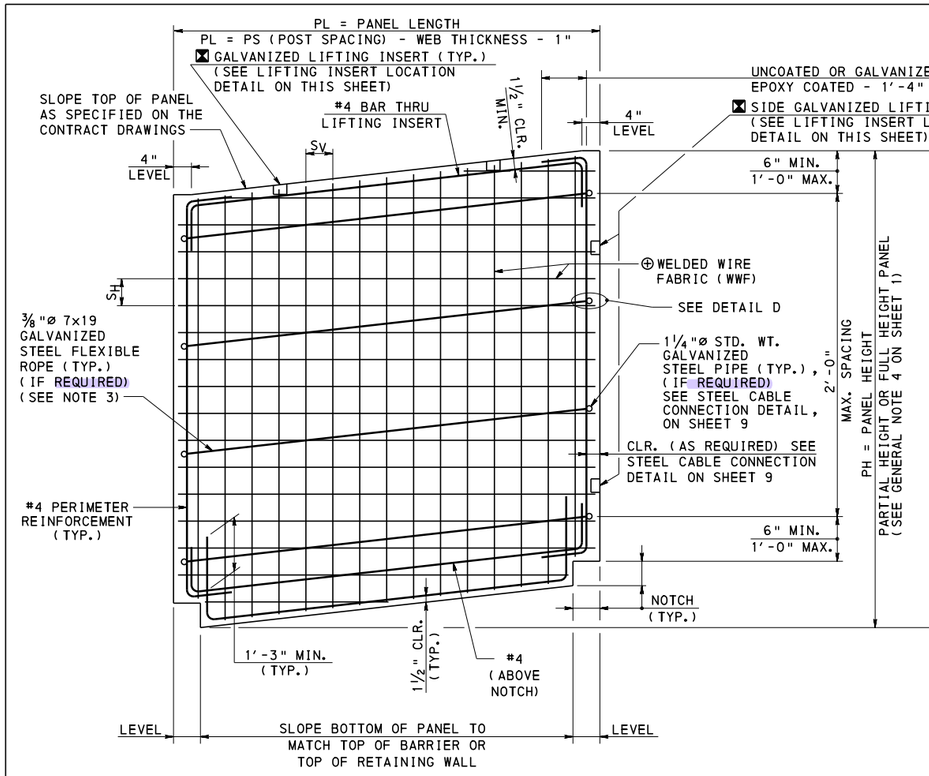
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

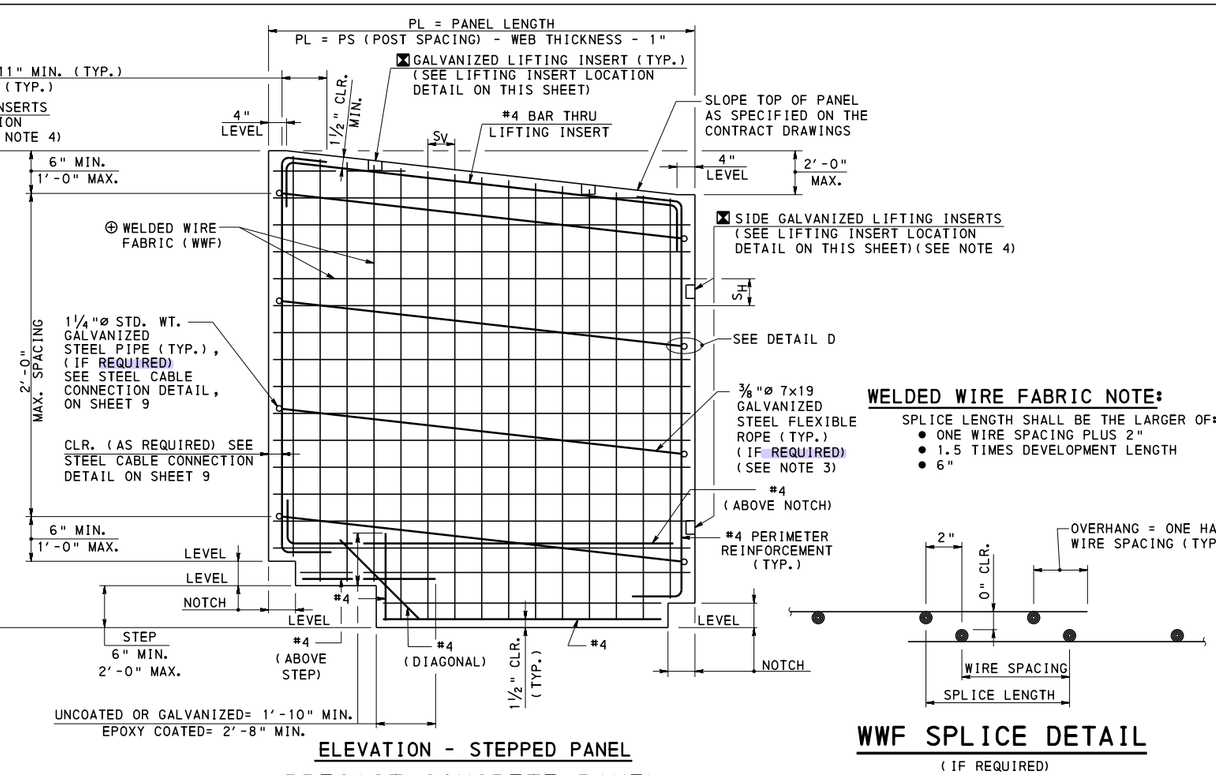
STANDARD

STRUCTURE MOUNTED SOUND BARRIER WALLS

GEOMETRY AND LAYOUT - WALL MOUNTED

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 4 OF 9
Thomas P Macioce	Bruce B Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-779M





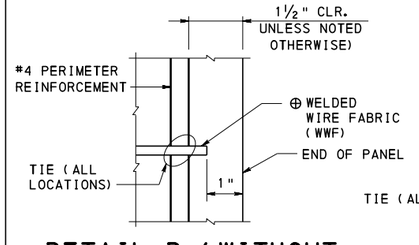
WELDED WIRE FABRIC NOTE:

SPLICE LENGTH SHALL BE THE LARGER OF:

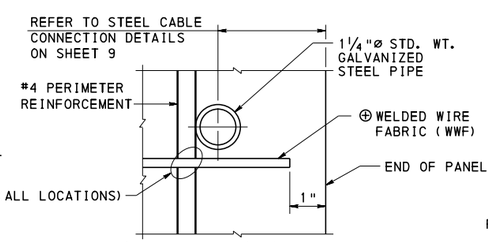
- ONE WIRE SPACING PLUS 2"
- 1.5 TIMES DEVELOPMENT LENGTH
- 6"

WWF SPLICE DETAIL

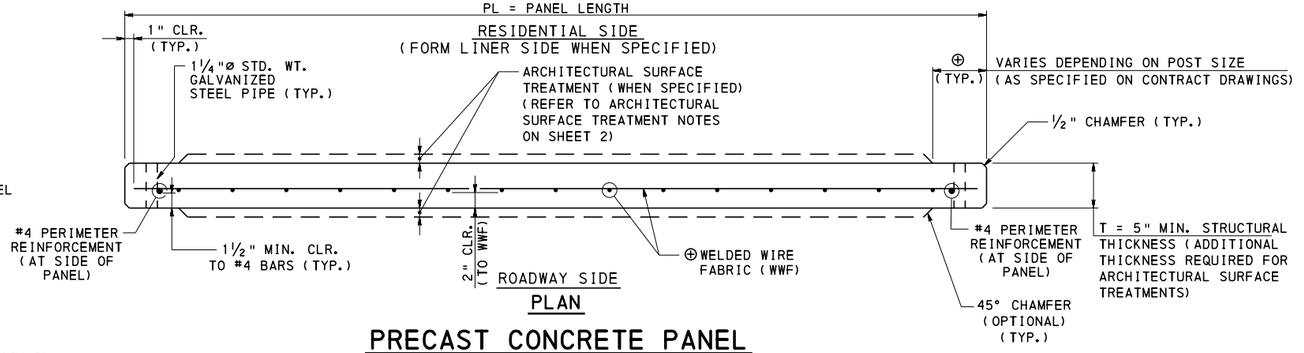
(IF REQUIRED)

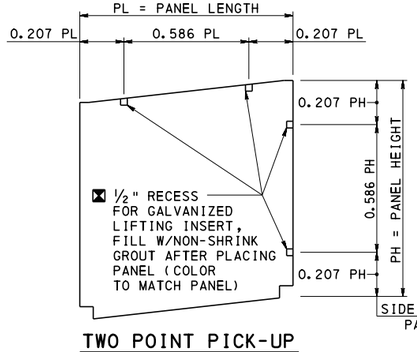


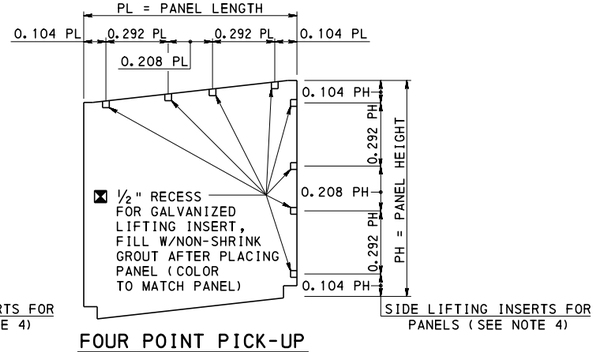
DETAIL D (WITHOUT CABLE CONNECTION)



DETAIL D (WITH CABLE CONNECTION)







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
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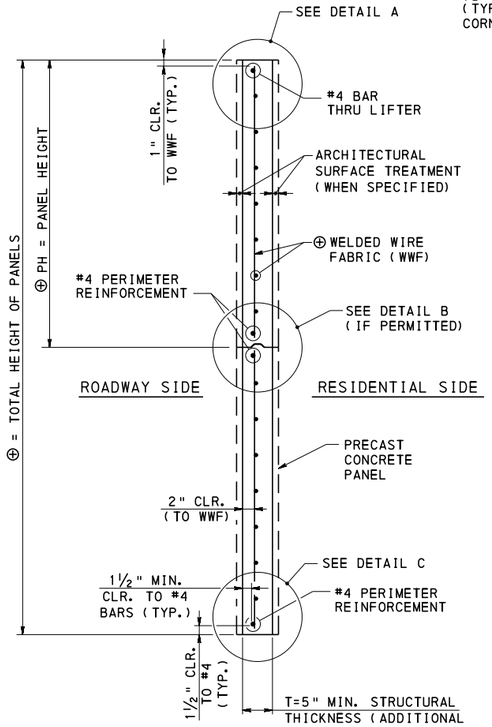
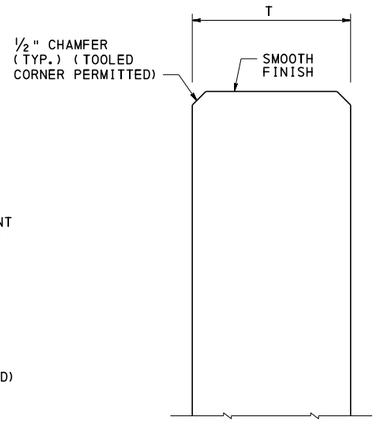
STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
PRECAST CONCRETE PANEL DETAILS -1

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 5 OF 9
Thomas P Macioce	Brian B Thompson	BC-779M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



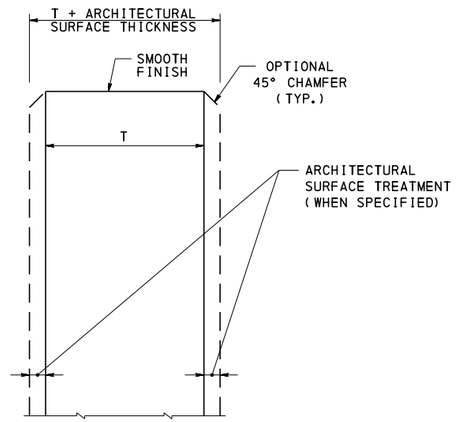
SECTION A-A

WITH ARCHITECTURAL SURFACE TREATMENT



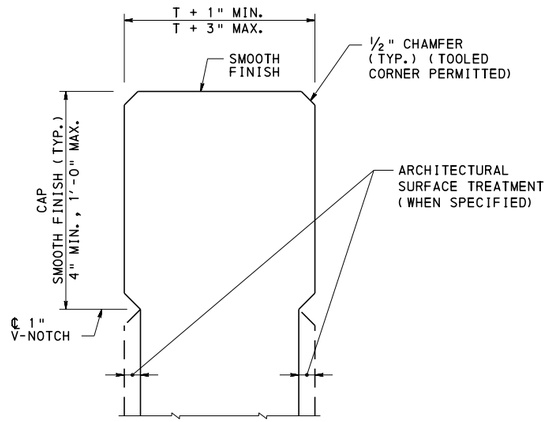
DETAIL A

NO ARCHITECTURAL SURFACE TREATMENT



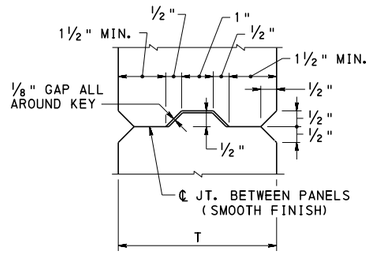
DETAIL A

WITH ARCHITECTURAL SURFACE TREATMENT AND NO CAP



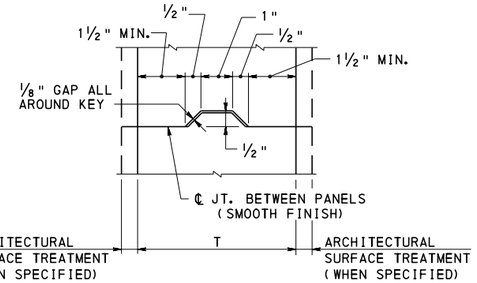
DETAIL A

WITH ARCHITECTURAL SURFACE TREATMENT AND CAP



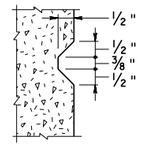
DETAIL B

NO ARCHITECTURAL SURFACE TREATMENT



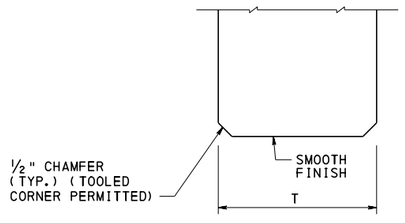
DETAIL B

WITH ARCHITECTURAL SURFACE TREATMENT



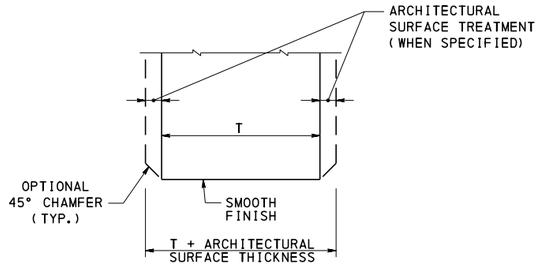
FALSE JOINT

(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.

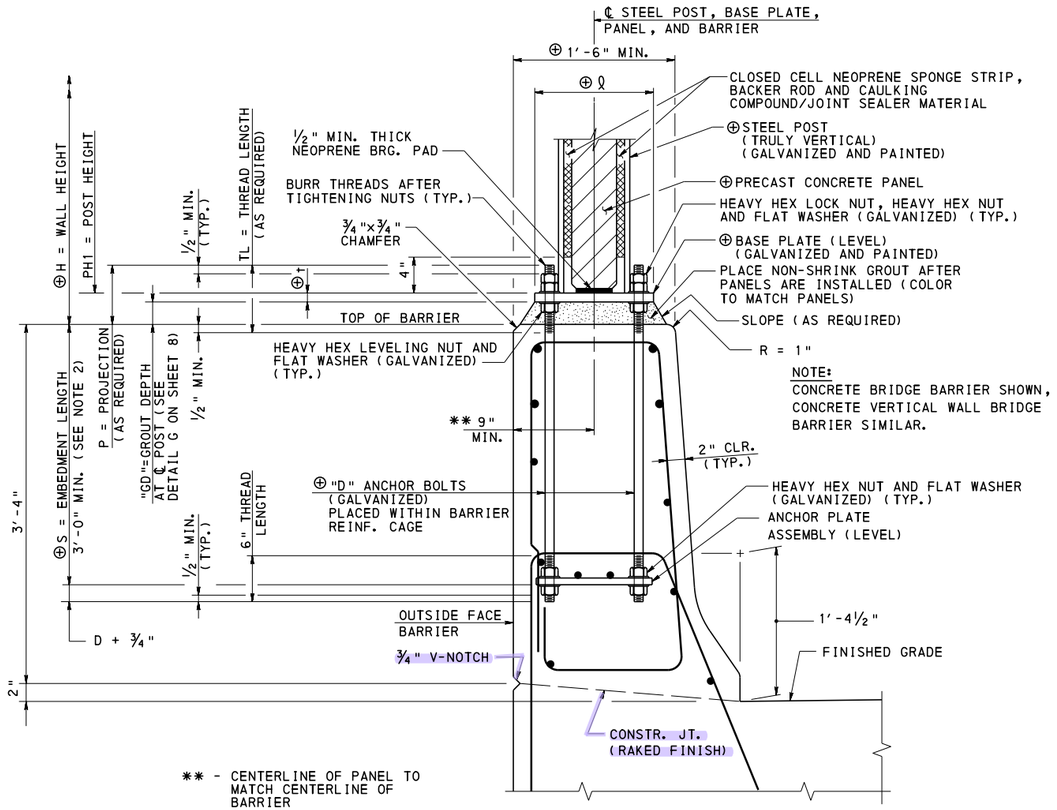
LEGEND:

⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS

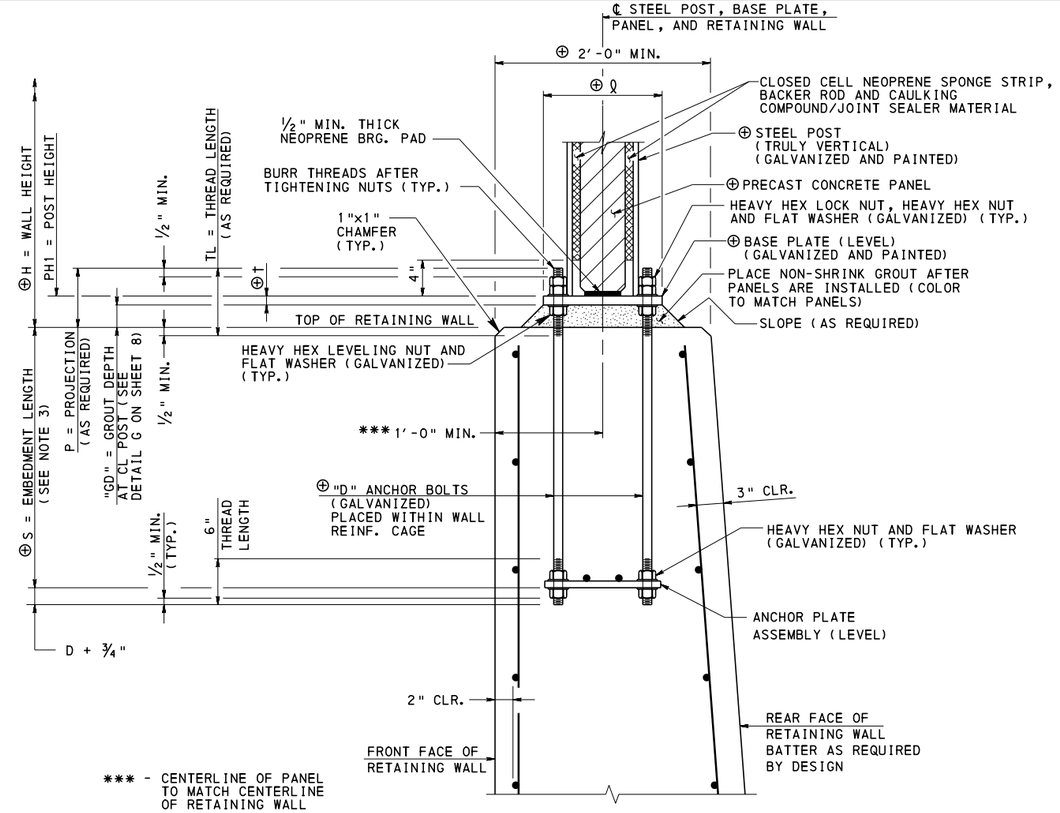
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
PRECAST CONCRETE PANEL DETAILS - 2

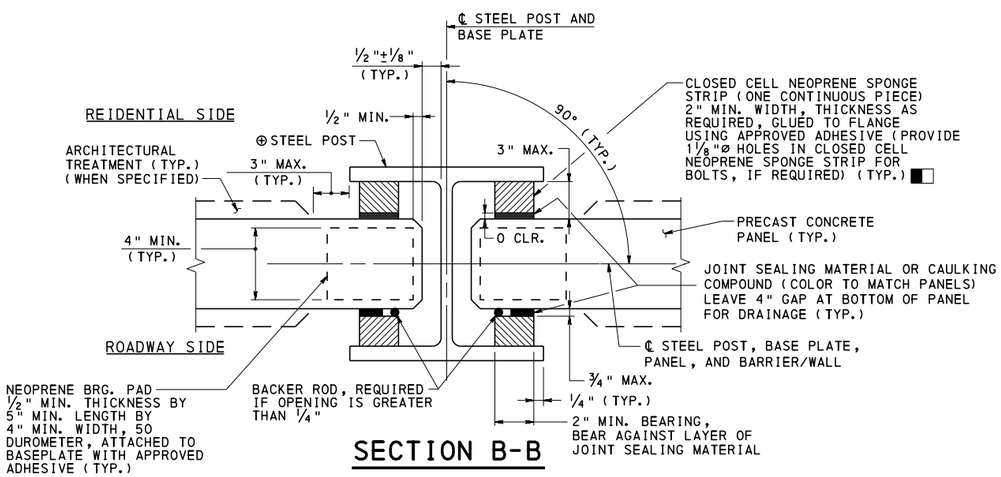
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 6 OF 9
Thomas P. Macioce	Brent D. Thompson	BC-779M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



DETAIL E



DETAIL F



SECTION B-B

NOTE: BOLTS FOR CABLE CONNECTION NOT SHOWN. REFER TO SHEET 9 FOR DETAILS.

SEQUENCE OF INSTALLATION PANEL TO STEEL POST

1. INSTALL POST AND BASE PLATE ASSEMBLY ON THE LEVELING NUTS AT CORRECT ELEVATION.
2. GLUE NEOPRENE BEARING PADS TO BASE PLATE USING AN APPROVED ADHESIVE.
3. GLUE CLOSED CELL NEOPRENE SPONGE STRIP TO POST ON RESIDENTIAL SIDE OF BARRIER USING AN APPROVED ADHESIVE. APPLY ¼" MIN. JOINT SEALING MATERIAL TO FACE OF CLOSED CELL NEOPRENE SPONGE STRIP. STOP CLOSED CELL NEOPRENE SPONGE STRIP 4" ABOVE BASE PLATE FOR DRAINAGE.
4. 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.
5. GLUE CLOSED CELL NEOPRENE SPONGE STRIP TO POST ON ROADWAY SIDE OF BARRIER.
6. INSERT BACKER RODS IF OPENINGS ARE GREATER THAN ¼" AND APPLY JOINT SEALING MATERIAL OR CAULKING COMPOUND.
7. 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.
8. INSTALL BOLTS (FOR STEEL CABLE CONNECTION) THRU FLANGES AND PANEL (IF REQUIRED).
9. 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 ¾". ZERO, ONE, OR TWO STRIPS MAY BE REQUIRED DEPENDING UPON SIZE OF STEEL POST. GLUING TWO CLOSED CELL NEOPRENE SPONGE STRIPS TOGETHER, USING AND 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 ¼".

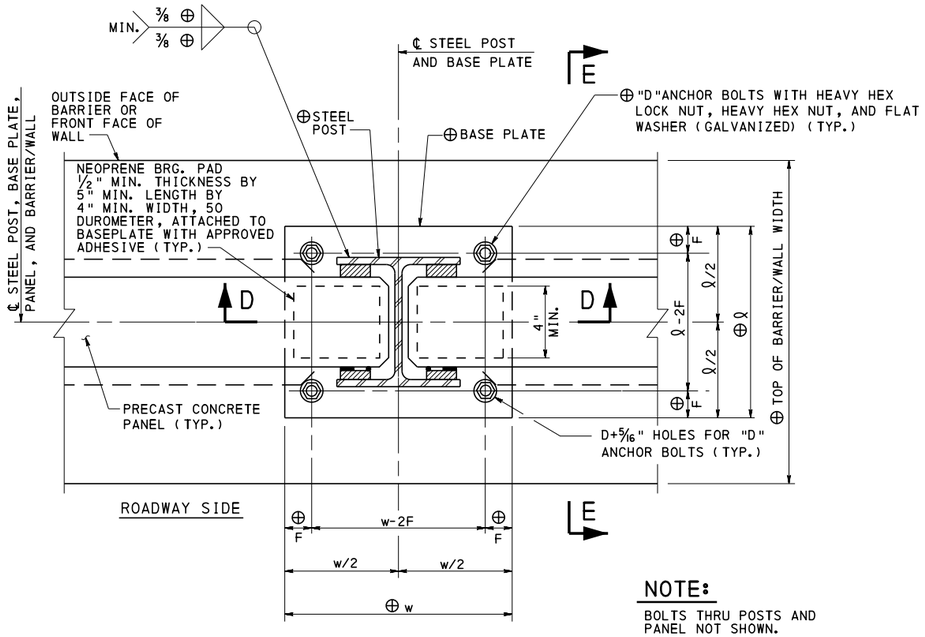
NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. ANCHOR PLATES MUST BE WITHIN CAGE FORMED BY LOWER BARRIER REINFORCEMENT EXTENDING OUT OF DECK SLAB, MOMENT SLAB OR RETAINING WALL.
3. EMBEDMENT OF ANCHOR BOLTS MUST EXTEND TO A DEPTH WHERE THE VERTICAL WALL REINFORCEMENT IS FULLY DEVELOPED.
4. REFER TO SHEETS 3 AND 4 FOR LOCATION OF SECTION B-B.
5. REFER TO SHEET 3 FOR LOCATION OF DETAIL E.
6. REFER TO SHEET 4 FOR LOCATION OF DETAIL F.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
DETAILS - 1

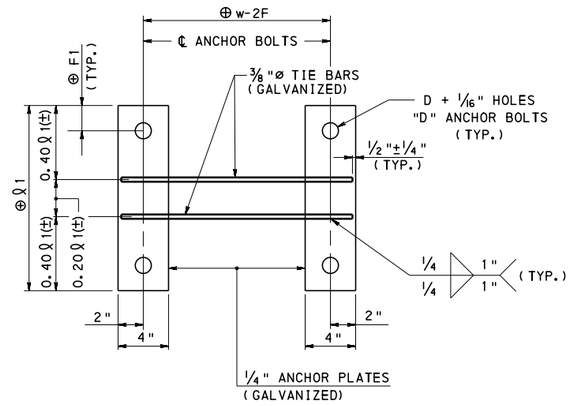
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 7 OF 9
Thomas P. Macioce	Brent D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-779M



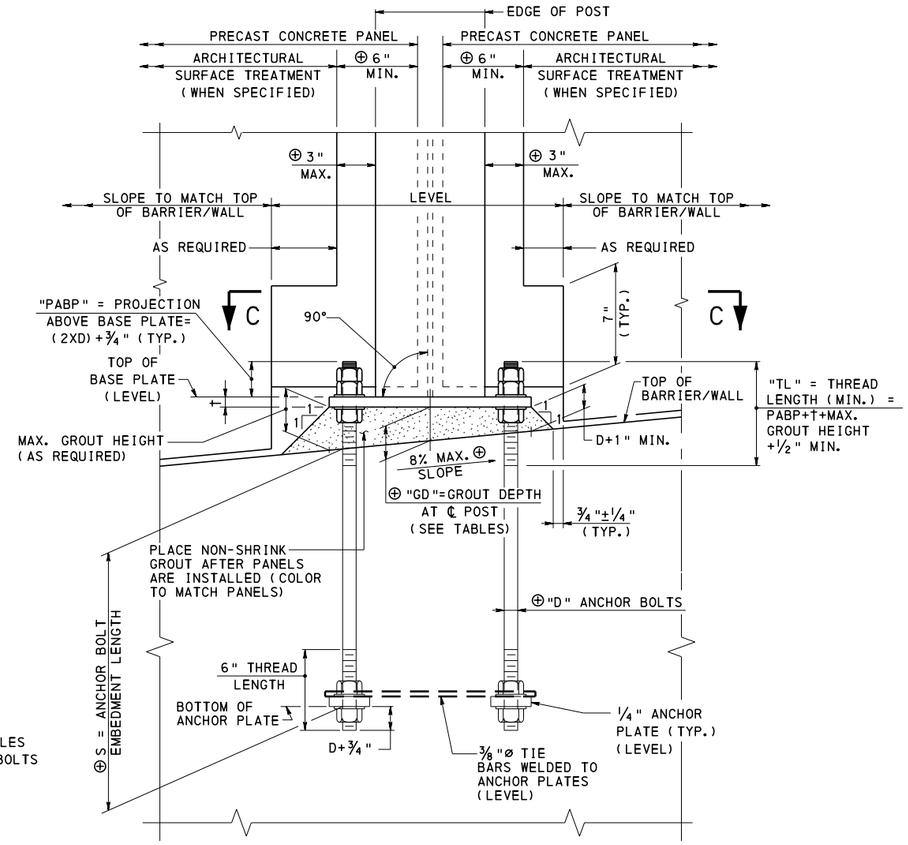
SECTION C-C

"GD" = GROUT DEPTH AT ℄ POST	
"S1" - SLOPE OF BARRIER/WALL	"GD"
LEVEL	D+1"
0 < S1 ≤ 2%	D+1¼"
2% < S1 ≤ 4%	D+1½"
4% < S1 ≤ 6%	D+1¾"
6% < S1 ≤ 8%	D+2"

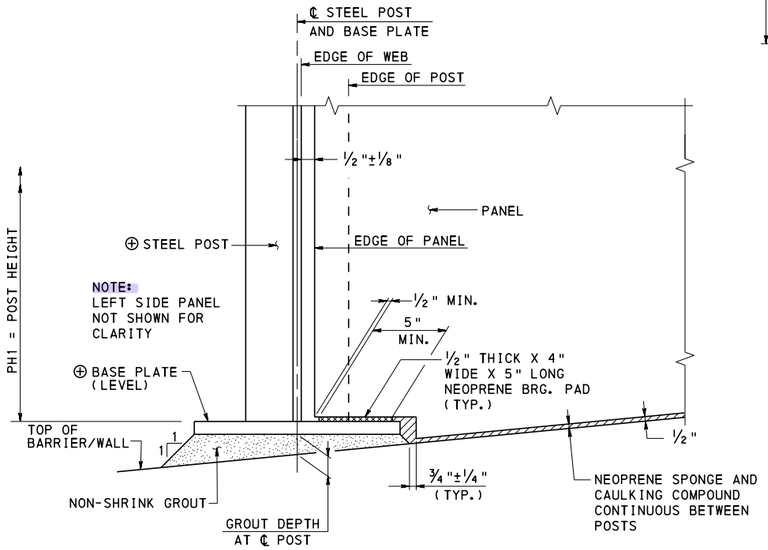
NOTE:
BOLTS THRU POSTS AND PANEL NOT SHOWN.



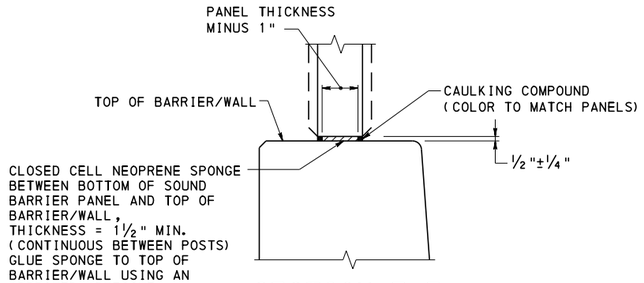
ANCHOR PLATE ASSEMBLY



DETAIL G



SECTION D-D



SECTION E-E

LEGEND:

⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS

† BASE PLATE THICKNESS

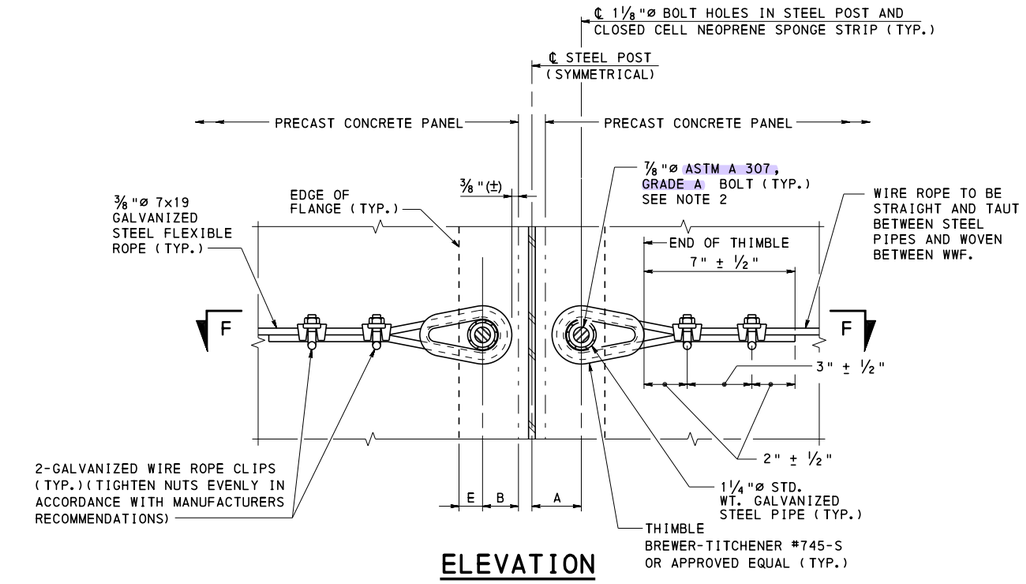
NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

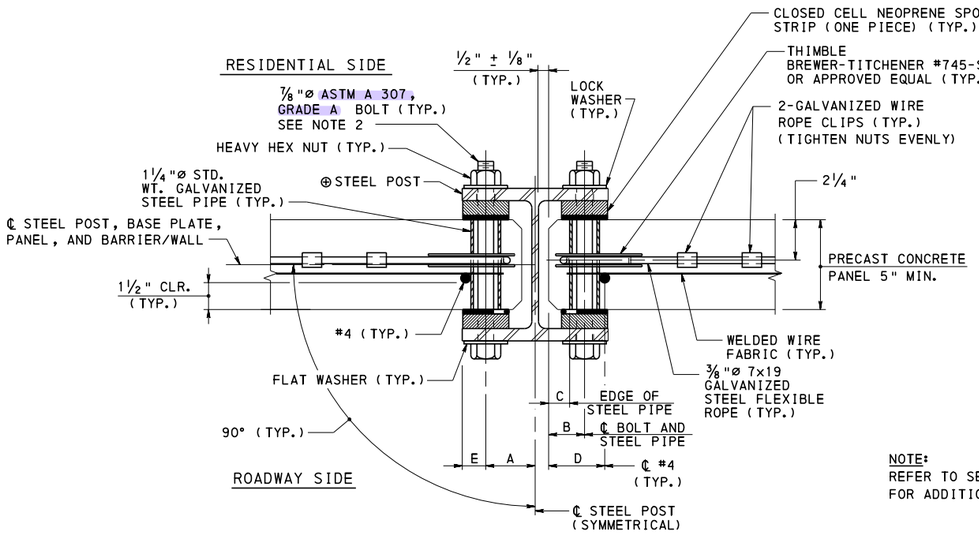
STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
DETAILS - 2

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 8 OF 9
Thomas P. Macioce	Brian D. Thompson	BC-779M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

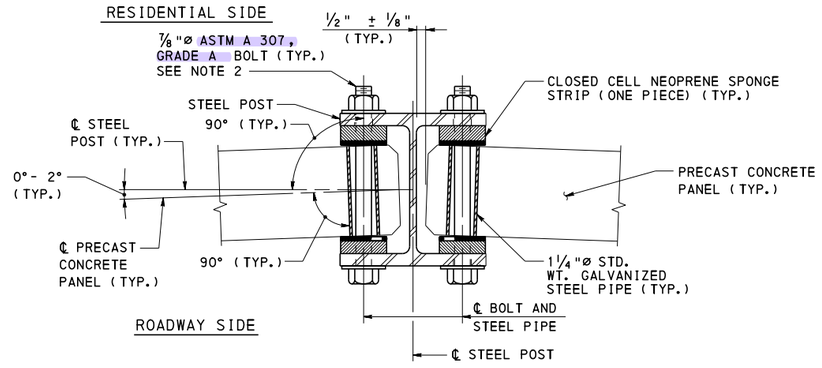


ELEVATION

STEEL CABLE CONNECTION DIMENSIONS						
POST SIZE	A	B	C	D	E	F
W8x48	2¾"	2"	1⅜"	3⅛"	1⅝"	10½"
W10x68	3¼"	2½"	1 11/16"	3⅝"	1 13/16"	12½"
W10x88	3⅝"	2½"	1 11/16"	3⅝"	1 13/16"	13"



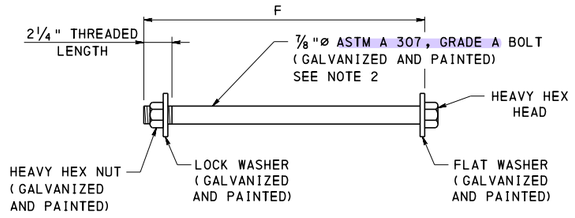
SECTION F-F
(STRAIGHT PANELS)



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. ¾" DIAMETER BOLTS ARE PERMITTED TO BE SUBSTITUTED ON A LIMITED BASIS IF THE ⅞" 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 SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 9 OF 9
Thomas P. Macioce	Brian D. Thompson	BC-779M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

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 ½" x ½", 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 OR 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

REFERENCE DRAWINGS

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
OFFSET SOUND BARRIER WALLS
GENERAL NOTES - 1

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brian D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-780M

MATERIAL NOTES

1. 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.

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 CONCRETE = 150 LB./CU. FT.
   - PROVIDE A MINIMUM CONCRETE STRENGTH OF 4,000 PSI BEFORE STRIPPING THE PANELS FROM THE FORMS.

3. 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.
     fs = 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.

4. WELDED WIRE FABRIC:
   - PROVIDE GRADE 65 PLAIN WELDED WIRE FABRIC THAT MEET THE REQUIREMENTS OF ASTM A185 IN THE PRECAST CONCRETE PANELS.
     fs = 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.
   - 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.

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 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).

7. 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).

8. STEEL CABLES AND ACCESSORIES:
   - PROVIDE 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 5/8" OUTSIDE DIAMETER STAINLESS STEEL (302 OR 304) INTERNALLY THREADED TERMINALS SWAGED TO CABLE IN ACCORDANCE WITH MIL-T-6117.
   - PROVIDE 1/2" - 13 UNC STAINLESS STEEL (304) HEX HEAD CAP SCREWS. PROVIDE LENGTH AS REQUIRED.
   - PROVIDE 9/16" INSIDE DIAMETER x 1 3/4" OUTSIDE DIAMETER STAINLESS STEEL (304) WASHERS UNDER 9/16" 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.

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).
    - 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 705.8(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(a).
    - JOINT SEALING MATERIAL TO MATCH FINAL COLOR OF PANEL.

14. ANTIGRAFFITI COATING:
    - APPLY ANTIGRAFFITI COATING IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIAL PROVISIONS.

15. PENETRATING CONCRETE STAIN:
    - APPLY STAIN IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIAL PROVISIONS.

CONSTRUCTION AND INSTALLATION PROCEDURES

(1) 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 THAN 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.

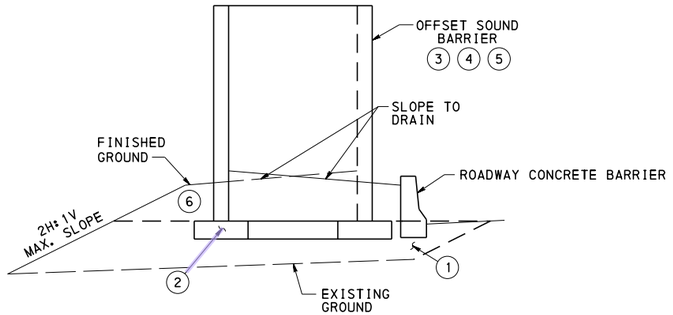
(2) CONSTRUCT FOOTING. FOOTING MAY BE POURED NEXT TO EXCAVATION.

(3) PANEL INSTALLATION:
   A. CHECK TOP OF FOOTING FOR SMOOTHNESS. GRIND IF NECESSARY SO THAT DISCREPANCIES CAN BE ACCOMMODATED WITH NON-SHRINK GROUT.
      - FLATNESS TOLERANCES: 1/4" WITHIN PANEL LENGTH
   B. 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: 1/4" +/- 1/8"
      - GROUT WIDTH: 12" +/- 1/2"
   C. PLACE FIRST PANEL ONTO THE FOOTING AND INSTALL TEMPORARY BRACING, IF REQUIRED. ADJUST PANEL UNTIL ALL FACES ARE PLUMB.
   D. 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.
   E. CONTINUE SETTING BOTTOM PANELS.
   F. 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.
   G. AFTER 2 PANELS ARE SET IN A COURSE THEY ARE FREE STANDING.
   H. PROCEED SEQUENTIALLY SETTING ALL PANELS FOR THE LENGTH OF THE WALL.
   I. FILL ALL LIFTING INSERTS WITH NON-SHRINK GROUT.

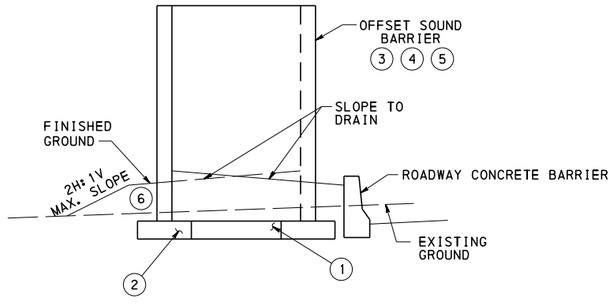
(4) SEAL ALL OPEN JOINTS, HORIZONTAL JOINTS BETWEEN PANELS, AND OPENINGS IN THE PVC PIPES WITH JOINT SEALING MATERIAL/CAULKING COMPOUND (COLOR TO MATCH PANEL).

(5) APPLY ANTIGRAFFITI COATING AND/OR PENETRATING CONCRETE STAIN, IF SPECIFIED.

(6) COMPLETE BACKFILL OPERATION ON BOTH SIDES OF THE WALL. MAXIMUM FILL DIFFERENTIAL BETWEEN SIDES OF PANELS IS LIMITED TO 2'-0" UNLESS OTHERWISE SPECIFIED.



SEQUENCE OF CONSTRUCTION (FILL)



SEQUENCE OF CONSTRUCTION (CUT)

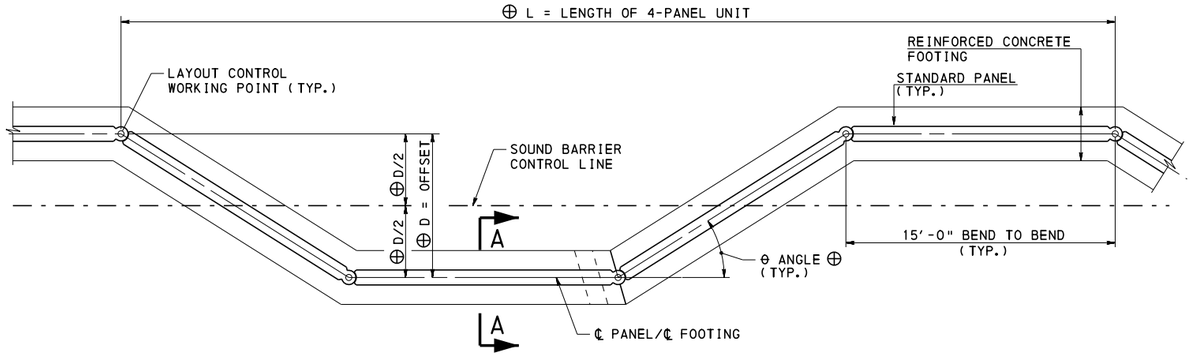
ARCHITECTURAL SURFACE TREATMENTS

1. THE AVERAGE ARCHITECTURAL SURFACE TREATMENT THICKNESS, PER SIDE OF PANEL, IS PERMITTED TO VARY FROM 0 TO 1 1/2 INCH, BUT THE TOTAL AVERAGE ARCHITECTURAL SURFACE TREATMENT, ON BOTH SIDES OF THE PANEL, MUST NOT BE GREATER THAN 1 1/2 INCH UNLESS OTHERWISE INDICATED ON THE CONTRACT DRAWINGS.
2. STAMPED FINISHES MAY BE PERMITTED IF ACCEPTED BY THE DISTRICT BRIDGE ENGINEER.
3. REFER TO PUBLICATION 408, SECTION 1086.3 AND/OR THE CONTRACT DOCUMENTS FOR ARCHITECTURAL SURFACE TOLERANCES.
4. REFER TO CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

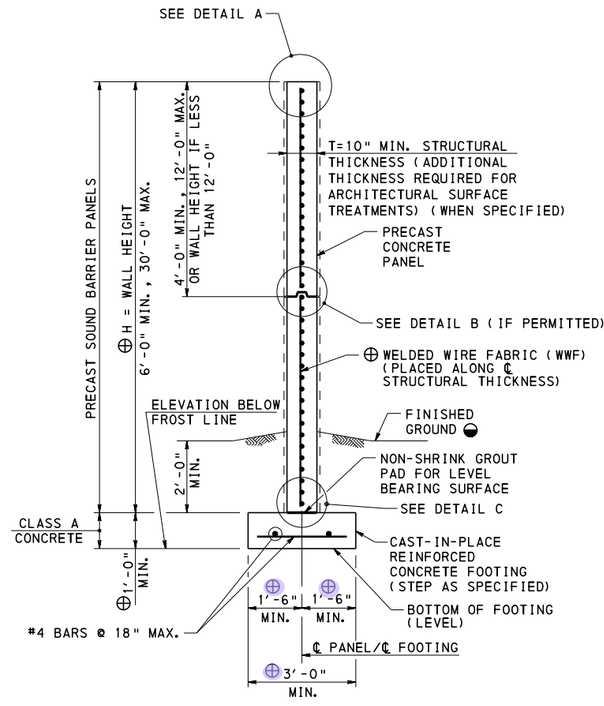
STANDARD
OFFSET SOUND BARRIER WALLS
GENERAL NOTES - 2

RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 2 OF 8 BC-780M

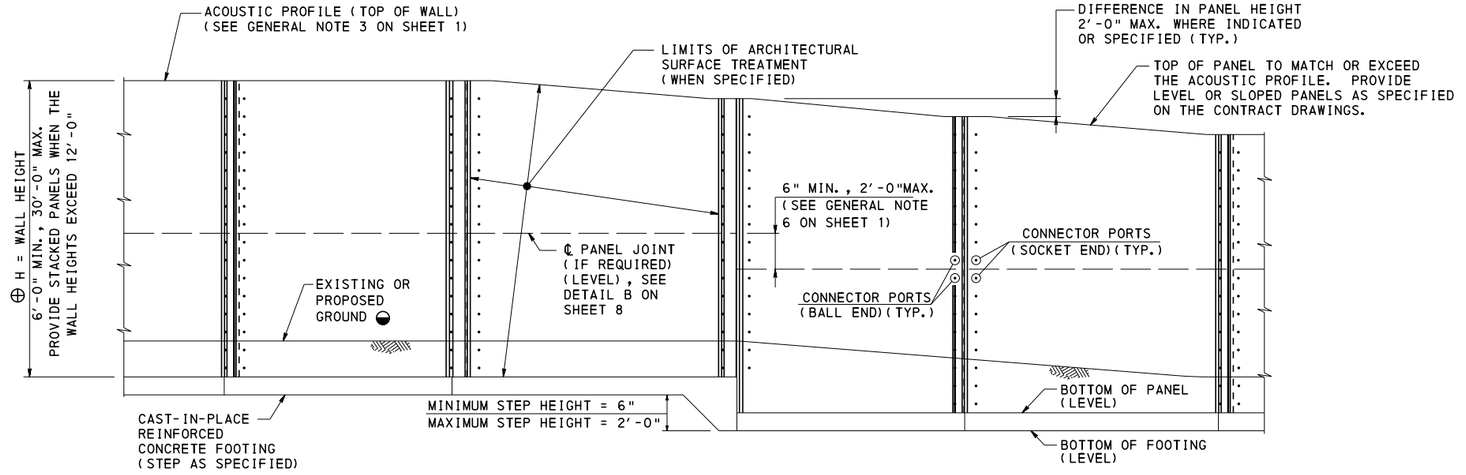


PLAN - OFFSET SOUND BARRIER

(END PANEL NOT SHOWN)



SECTION A-A



ELEVATION - OFFSET SOUND BARRIER

(END PANEL NOT SHOWN)

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.

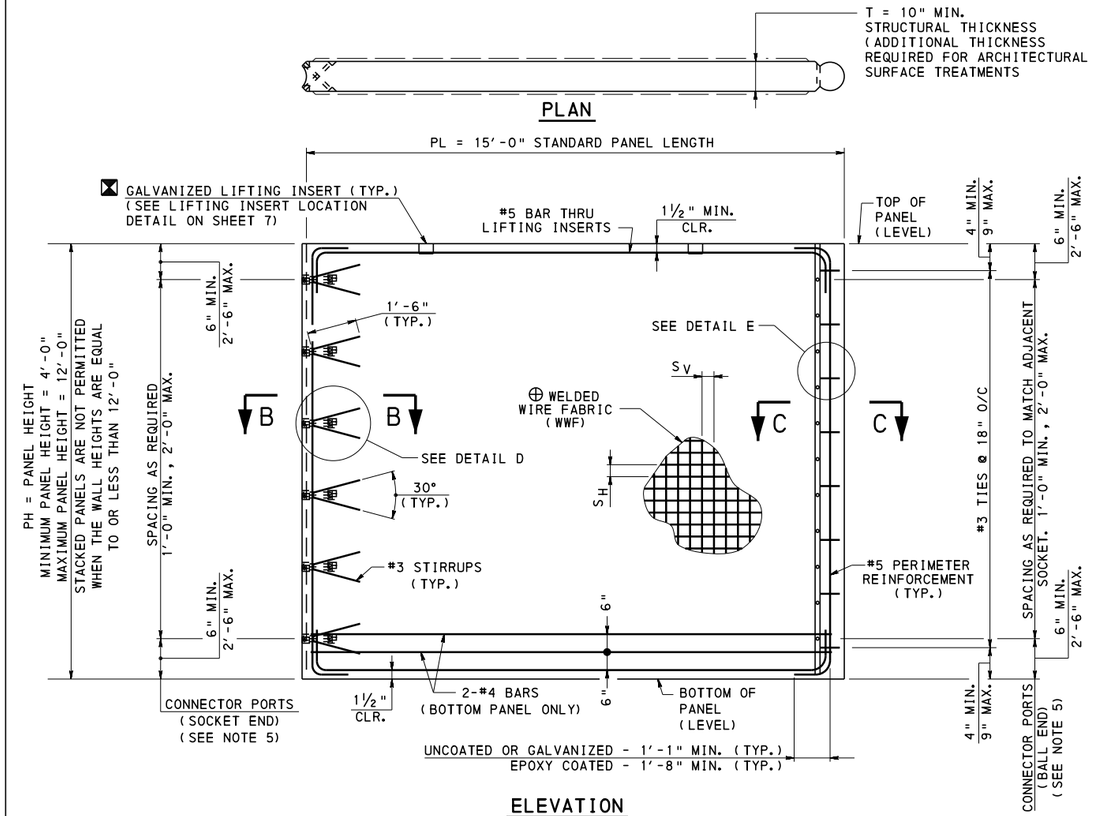
NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. FOR DETAILS A, B, AND C REFER TO SHEET 8.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

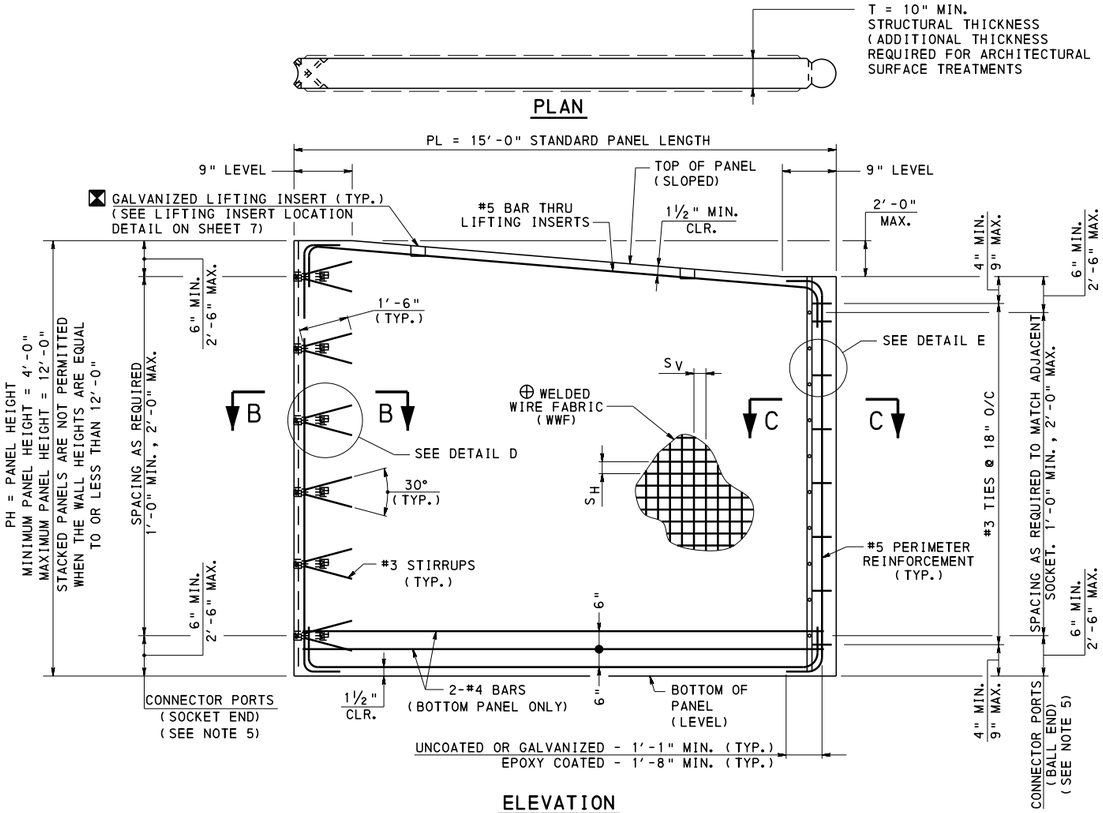
STANDARD
OFFSET SOUND BARRIER WALLS
GEOMETRY AND LAYOUT

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 8
Thomas P Macioce	Brian G Thompson	BC-780M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



ELEVATION

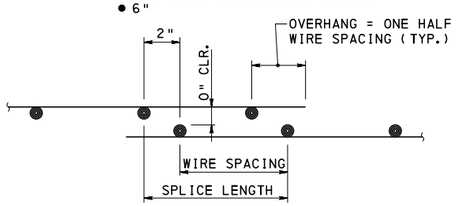
STANDARD PANEL



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 A×B-WC×WD

WHERE A = SPACING OF HORIZONTAL BARS (S_H)
B = SPACING OF VERTICAL BARS (S_V)
C = HORIZONTAL WIRE SIZE
D = VERTICAL WIRE SIZE
WWF = WELDED WIRE FABRIC

LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

⊠ FABRICATOR TO VERIFY ADEQUACY
OF LIFTING INSERTS

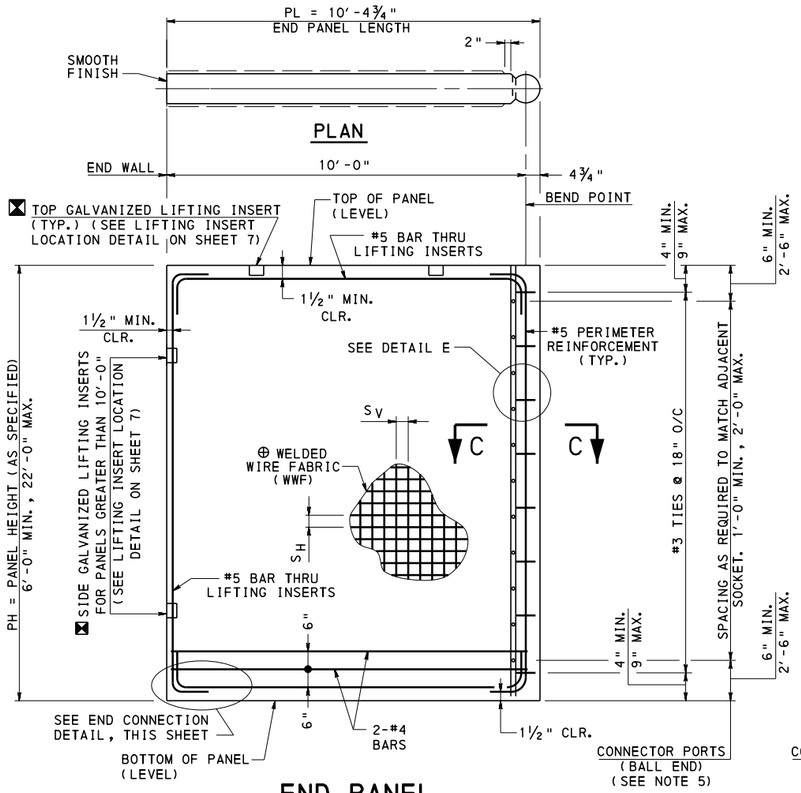
NOTES:

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

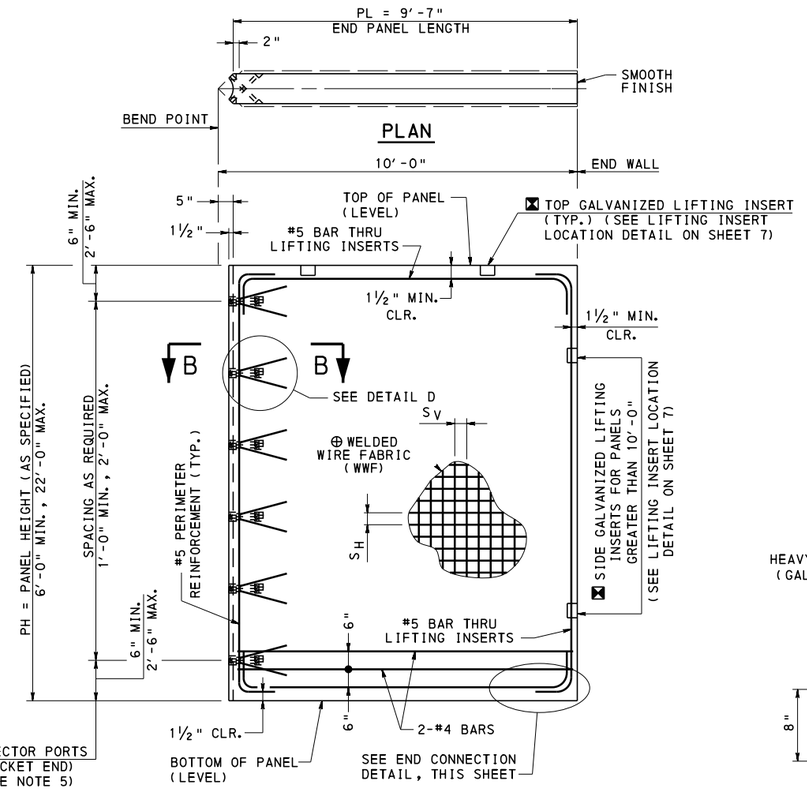
STANDARD
OFFSET SOUND BARRIER WALLS
PRECAST CONCRETE STANDARD PANEL DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 4 OF 8
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-780M

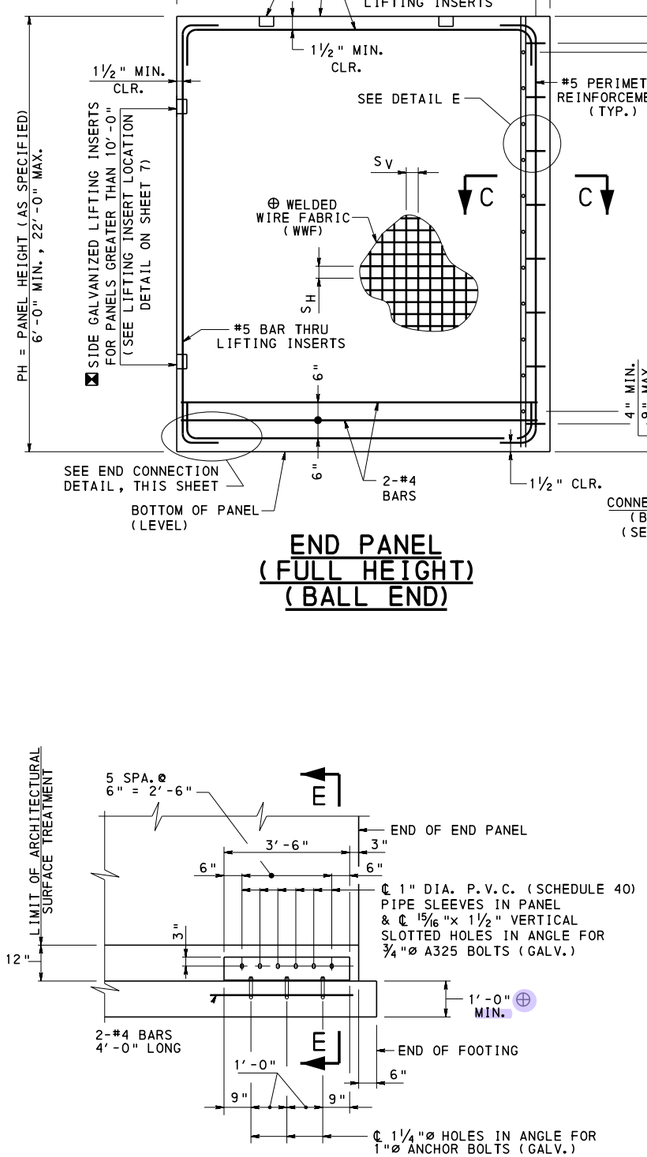


END PANEL (FULL HEIGHT) (BALL END)

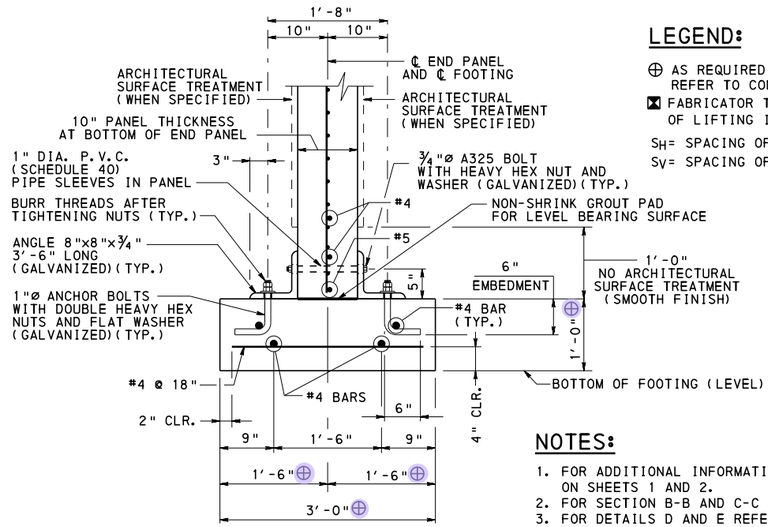
NOTE:
FOR INFORMATION NOT SHOWN, SEE STANDARD PANEL DETAILS ON SHEET 4.



END PANEL (FULL HEIGHT) (SOCKET END)



ELEVATION



SECTION E-E

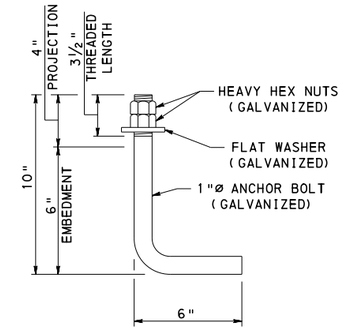
LEGEND:

⊕ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS
☒ FABRICATOR TO VERIFY ADEQUACY OF LIFTING INSERTS
S_H = SPACING OF HORIZONTAL BARS
S_V = SPACING OF VERTICAL BARS

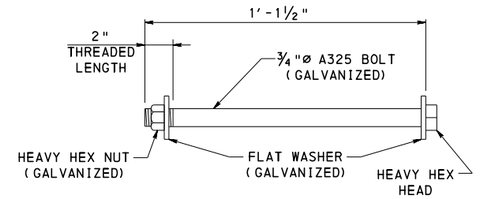
NOTES:

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 THREE CABLE CONNECTIONS FOR THE END PANEL TO ADJACENT PANEL(S) CONNECTION.
6. PROVIDE SINGLE END PANELS, STACKED PANELS NOT PERMITTED.

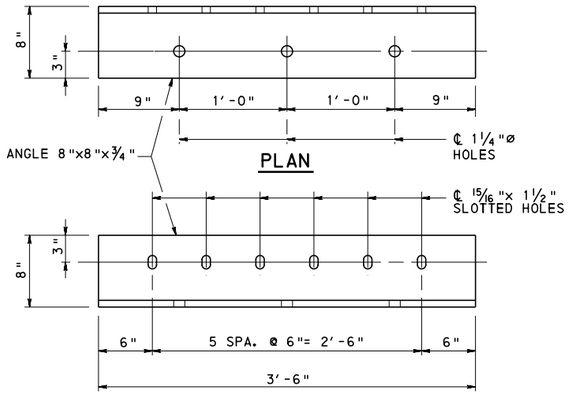
END PANEL CONNECTION DETAILS



ANCHOR BOLT DETAIL FOR END PANEL CONNECTION



THRU BOLT DETAIL FOR END PANEL CONNECTION

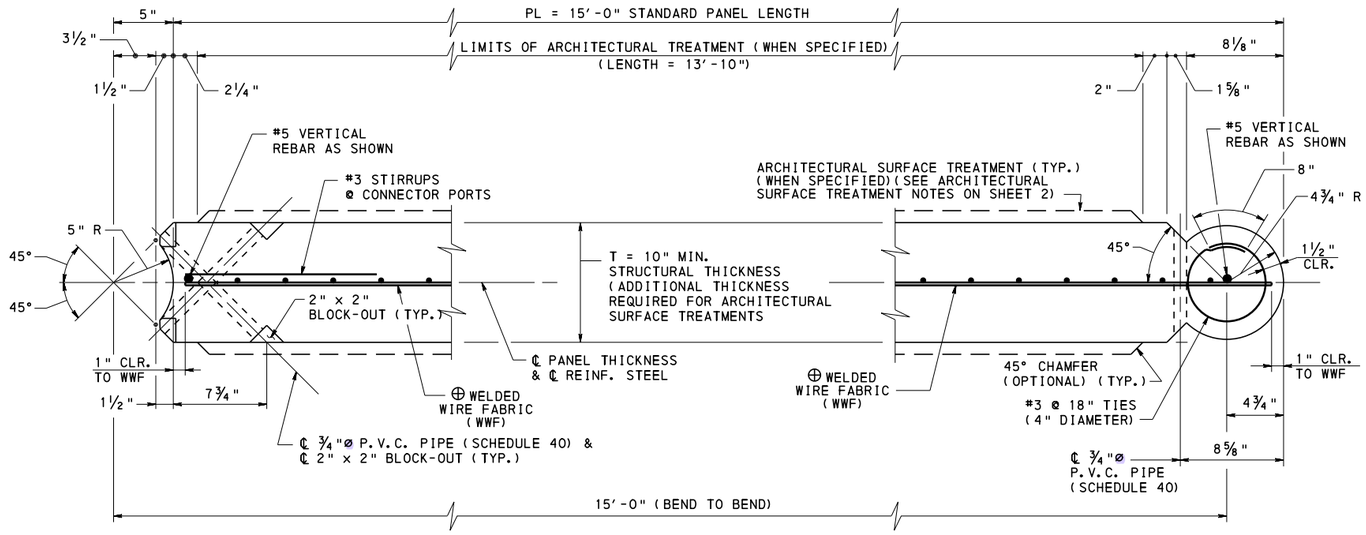


ANGLE DETAIL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

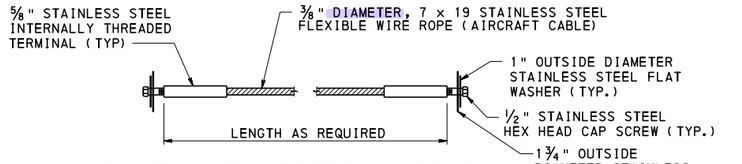
STANDARD
OFFSET SOUND BARRIER WALLS
PRECAST CONCRETE END PANEL DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 5 OF 8
Thomas P. Macioce	Brent L. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-780M



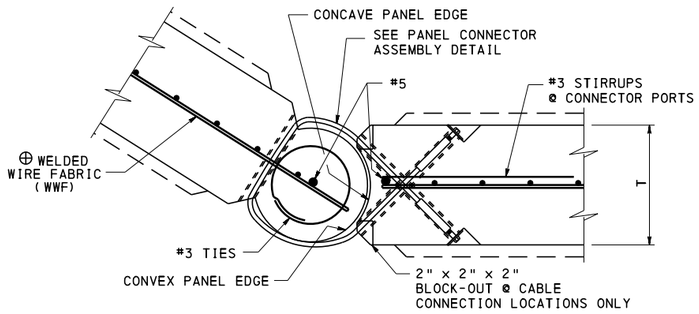
SECTION B-B

SECTION C-C

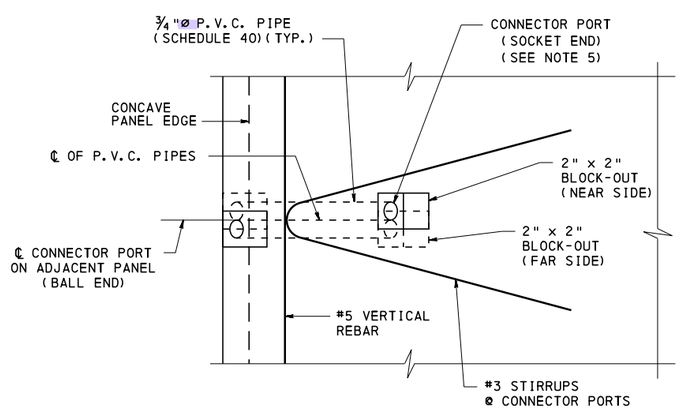


PANEL CONNECTOR ASSEMBLY

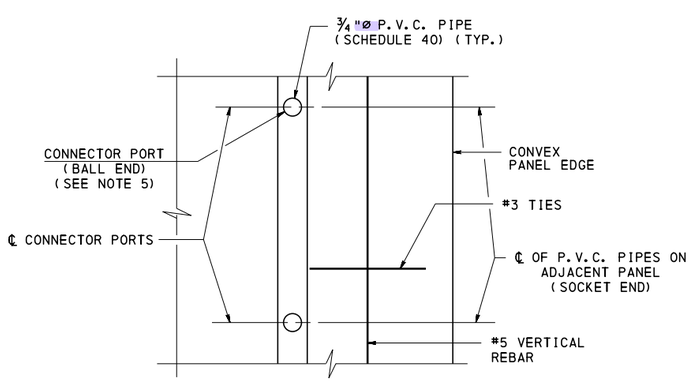
NOTE: INSTALL CAP SCREWS A MINIMUM OF SIX FULL TURNS INTO TERMINAL.



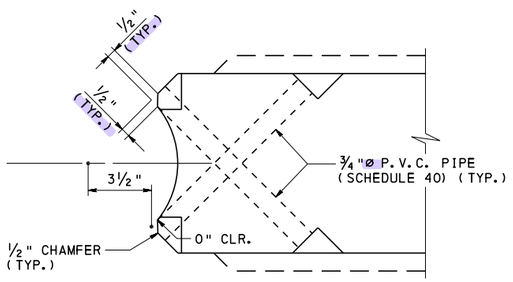
PANEL JOINT



DETAIL D



DETAIL E



SOCKET END CHAMFERS

LEGEND:

⊕ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

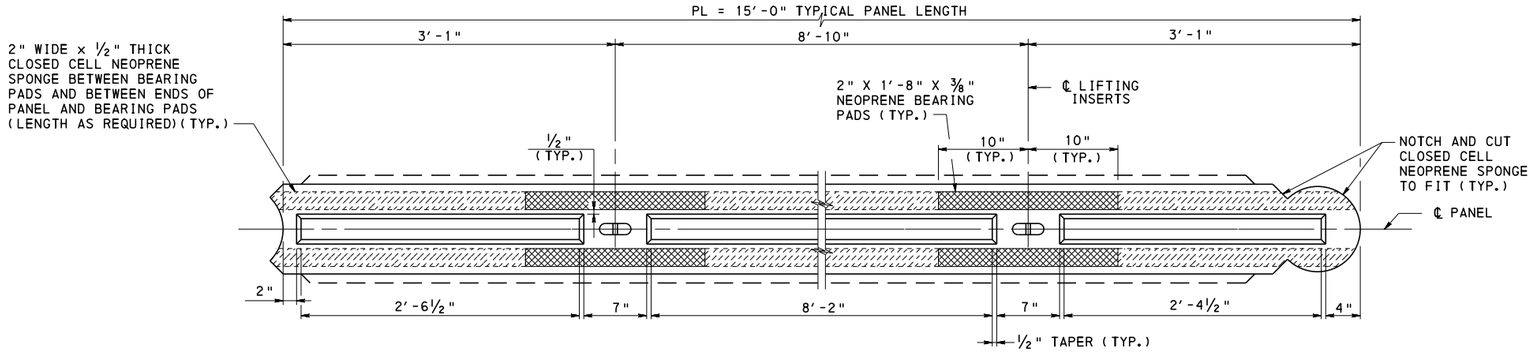
NOTES:

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 ℄ 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).

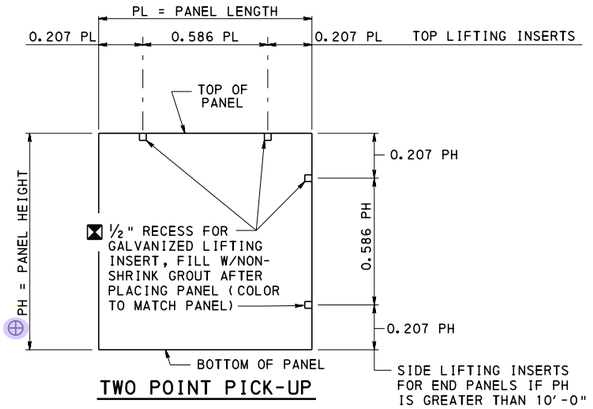
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
OFFSET SOUND BARRIER WALLS
PRECAST CONCRETE PANEL DETAILS - 1

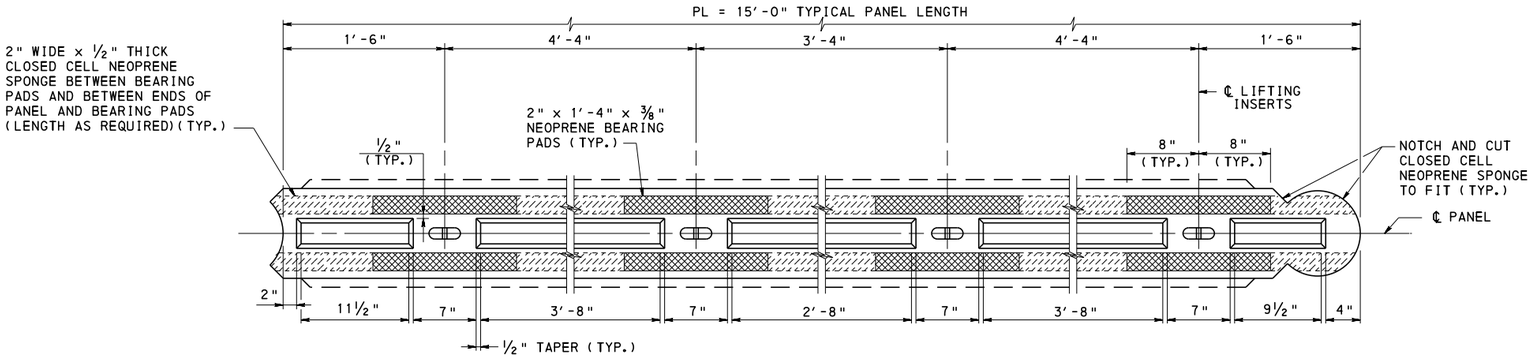
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 6 OF 8
Thomas P. Macioce	Brent L. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-780M



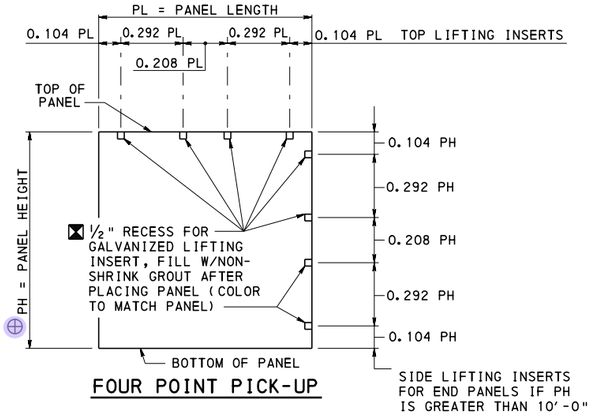
TOP OF PANEL AT JOINT PLAN VIEW
TWO POINT PICK-UP



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

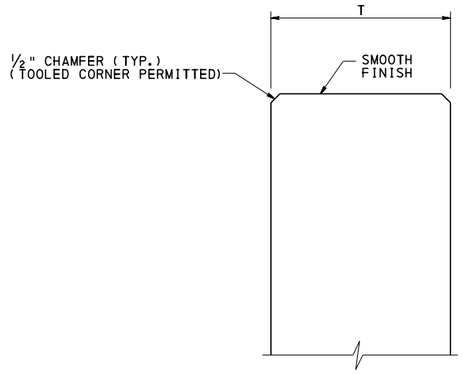
NOTES:

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

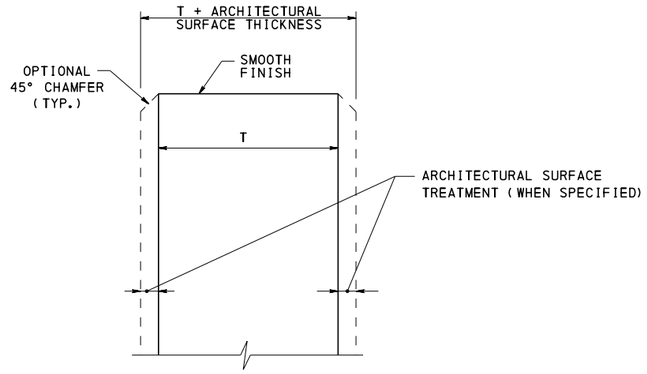
STANDARD
OFFSET SOUND BARRIER WALLS
PRECAST CONCRETE PANEL DETAILS - 2

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 7 OF 8
Thomas P Macioce CHIEF BRIDGE ENGINEER	Brian B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-780M



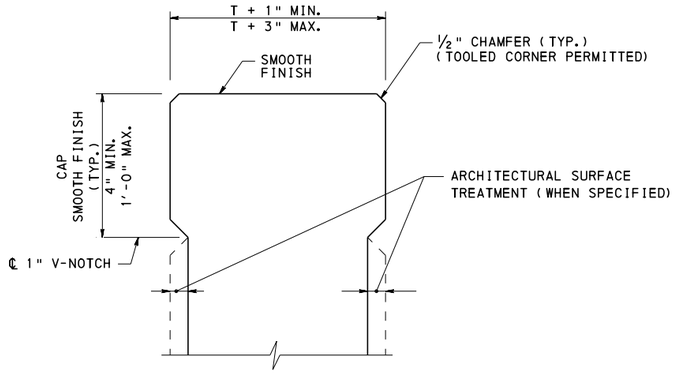
DETAIL A

NO ARCHITECTURAL SURFACE TREATMENT



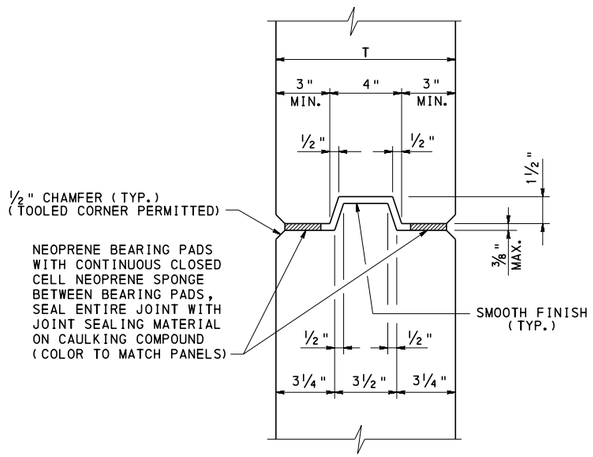
DETAIL A

WITH ARCHITECTURAL
SURFACE TREATMENT



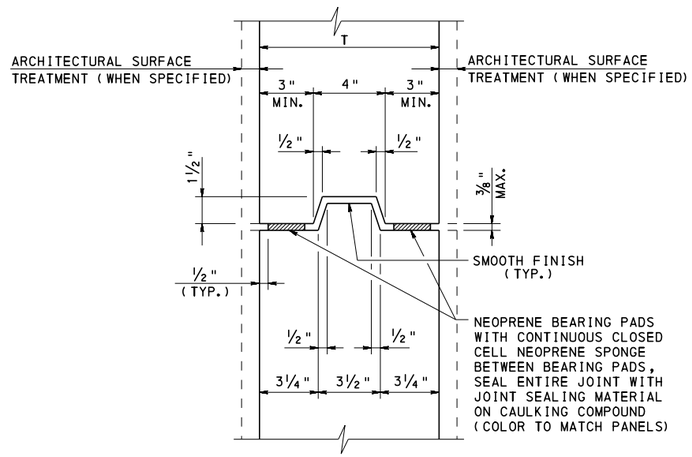
DETAIL A

WITH ARCHITECTURAL
SURFACE TREATMENT AND CAP



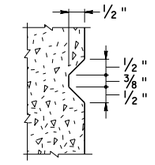
DETAIL B

NO ARCHITECTURAL SURFACE TREATMENT



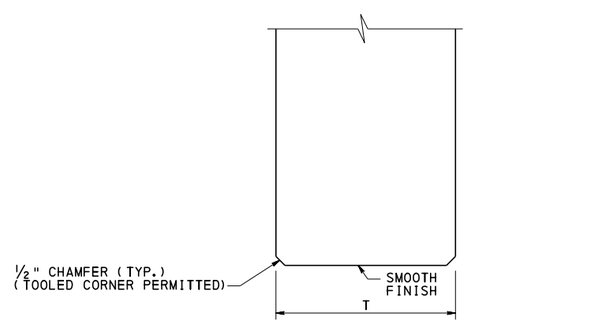
DETAIL B

WITH ARCHITECTURAL SURFACE TREATMENT



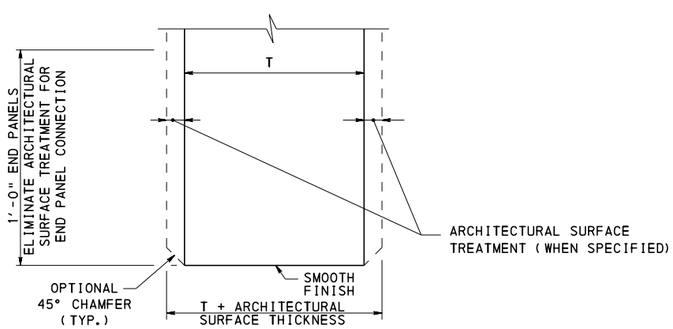
FALSE JOINT

(WHERE SPECIFIED)



DETAIL C

NO ARCHITECTURAL SURFACE TREATMENT



DETAIL C

WITH ARCHITECTURAL SURFACE TREATMENT

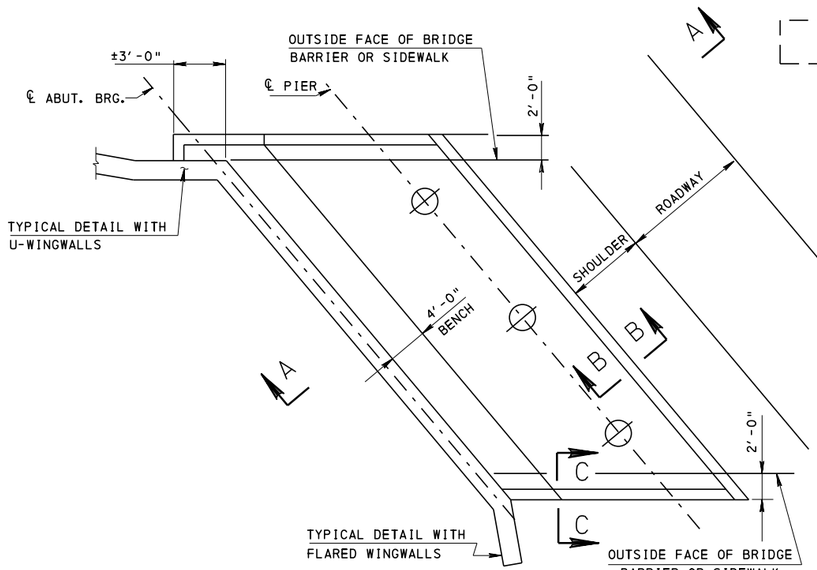
NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. FOR SLEEVE DETAIL AT OPENINGS AND DOOR DETAILS REFER TO BC-776M.

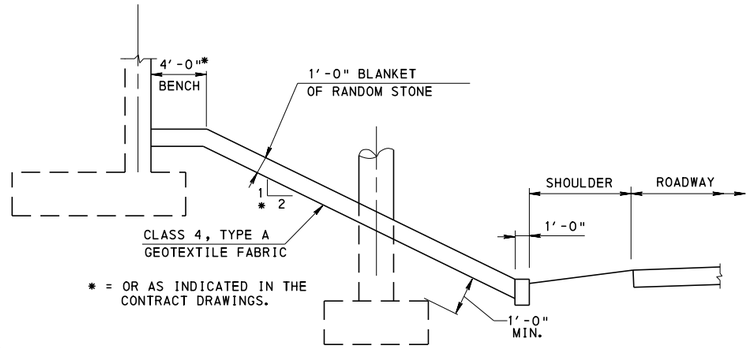
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
OFFSET SOUND BARRIER WALLS
PRECAST CONCRETE PANEL DETAILS - 3

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 8 OF 8
Thomas P Macioce	Brian D Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-780M

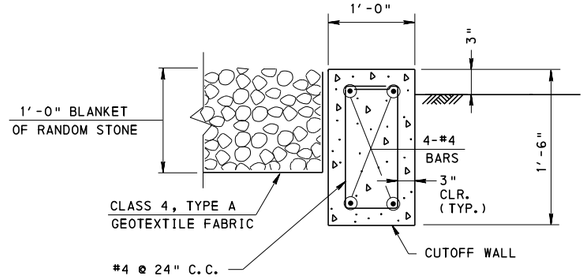


PLAN



* = OR AS INDICATED IN THE CONTRACT DRAWINGS.

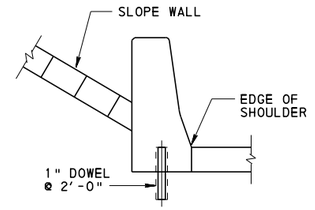
SECTION A-A



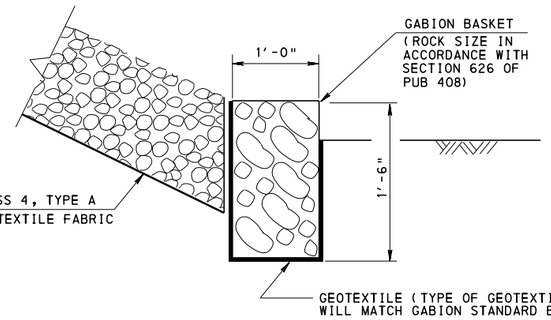
SECTION C-C

NOTES:

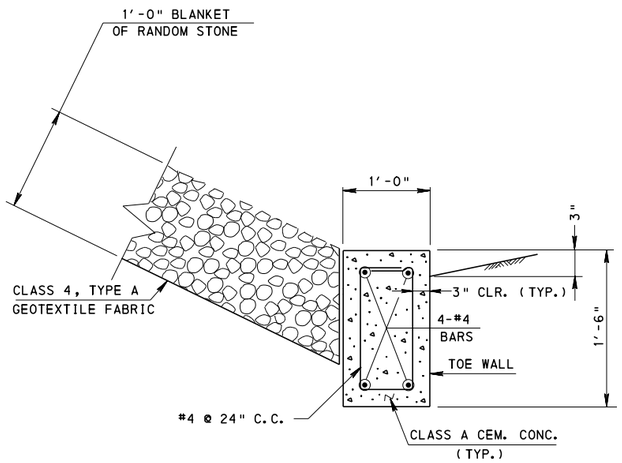
1. PROVIDE MATERIALS AND WORKMANSHIP AND CONSTRUCT RANDOM STONE SLOPE WALL IN ACCORDANCE WITH SECTION 675 OF PUBLICATION 408.
2. PROTECT STONE SLOPE WALL FROM DOWNSPOUT DRAINAGE WITH CONCRETE SPLASH BLOCK PROTECTION, SEE BC-751M FOR DETAILS.
3. ALL REINFORCEMENT STEEL BARS SHOWN MEET THE REQUIREMENTS OF ASTM A615, A996 OR A706.



PRECAST BARRIER TOE WALL

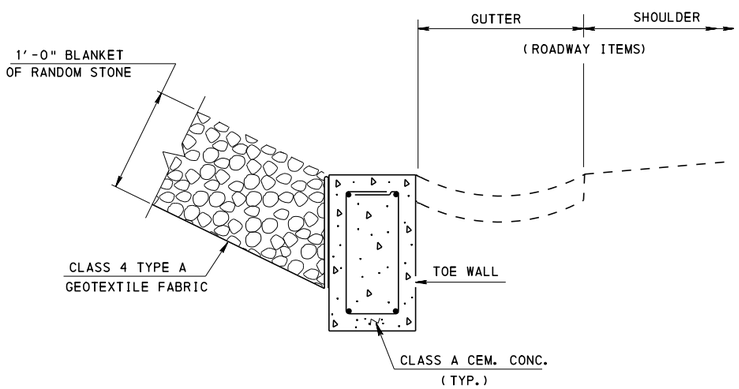


ALTERNATE GABION TOEWALL



SECTION B-B

THE CLASS 4, TYPE A GEOTEXTILE DETAIL IS SAME FOR ABUTMENT SECTION.



ALTERNATE SECTION B-B

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
RANDOM STONE SLOPE WALL

BC-751M	BRIDGE DRAINAGE
BC-782M	GABION SLOPE WALL DETAILS

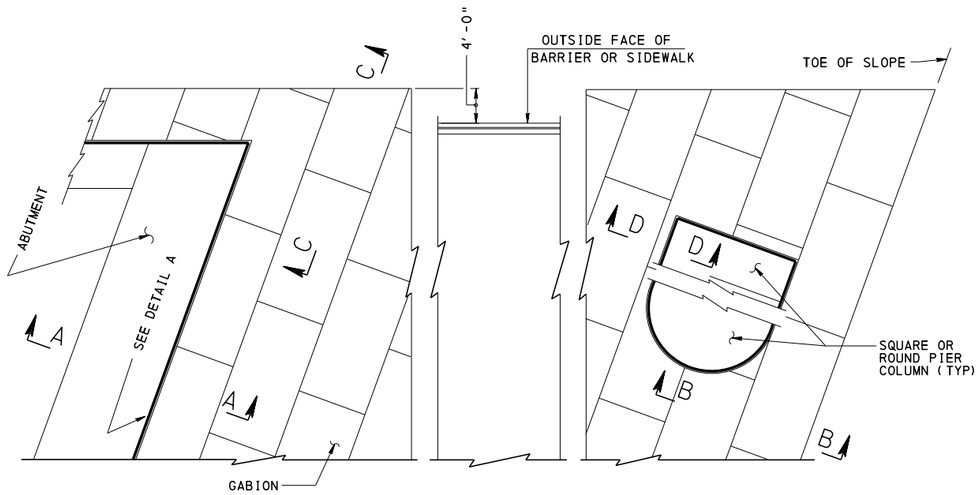
REFERENCE DRAWINGS

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

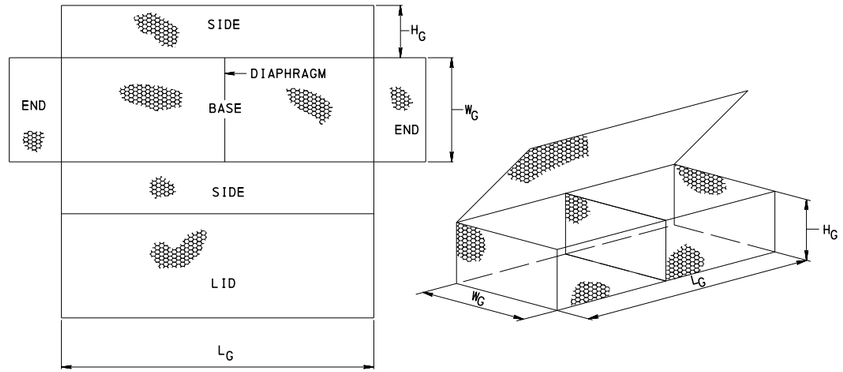
RECOMMENDED SEPT. 30, 2016
Brian D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 1 OF 1

BC-781M



PLAN

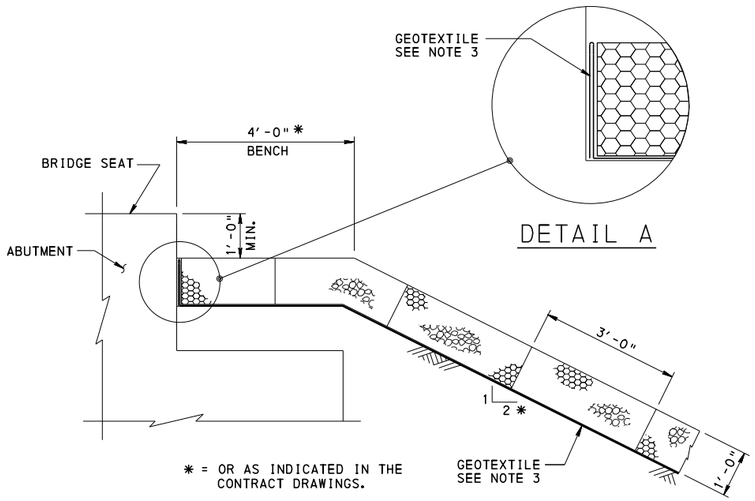


WIRE MESH BASKETS

GABION SIZES

W_G	L_G	H_G
3'-0"	6'-0"	1'-0"
3'-0"	12'-0"	1'-0"

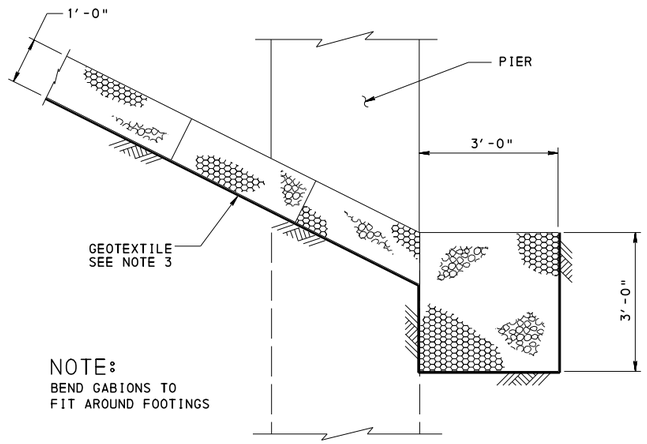
ADDITIONAL SIZES MAY BE AVAILABLE ON A SPECIAL ORDER BASIS.



DETAIL A

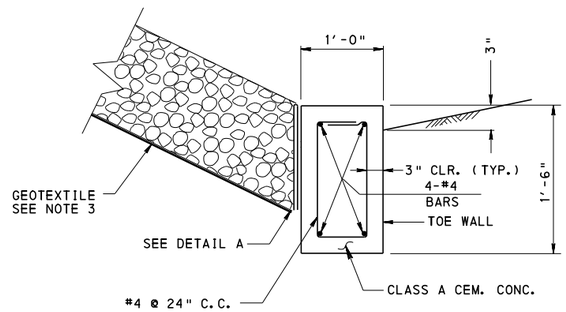
* = OR AS INDICATED IN THE CONTRACT DRAWINGS.

SECTION A-A

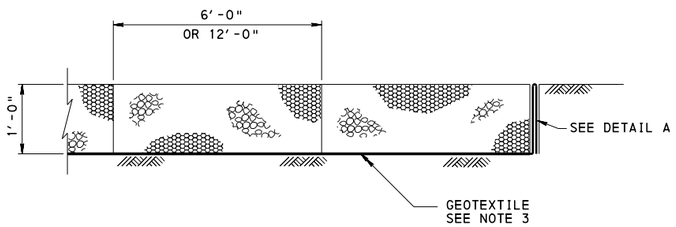


NOTE:
BEND GABIONS TO
FIT AROUND FOOTINGS

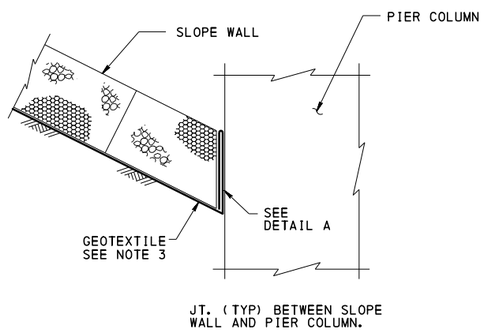
SECTION B-B



ALTERNATE SECTION B-B



SECTION C-C



JT. (TYP) BETWEEN SLOPE WALL AND PIER COLUMN.

SECTION D-D

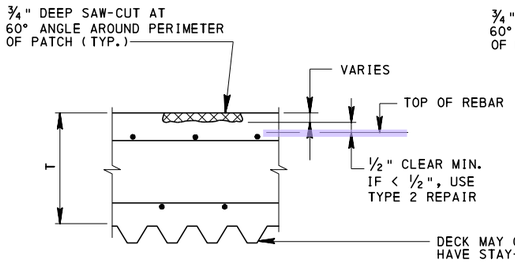
NOTES:

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD GABION SLOPE WALL DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 1 OF 1
Thomas P Macioce CHIEF BRIDGE ENGINEER	Brian D Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-782M

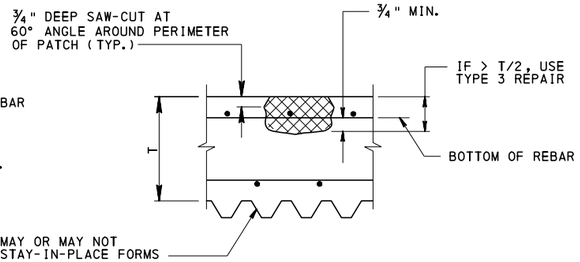


DECK REPAIR TYPE 1**

** TYPE 1 REPAIR IS TO BE RARELY USED.
USE TYPE 2 REPAIRS IN MOST SITUATIONS.

DECK REPAIR TYPE 1 NOTES:

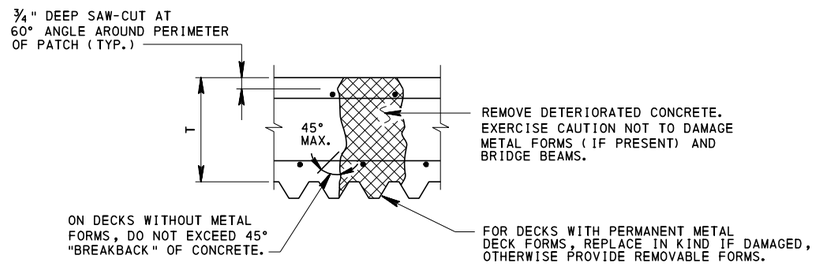
1. BRIDGE DECKS WITH A SINGLE LAYER OF REINFORCEMENT ARE SIMILAR (ADJ. BOX BEAMS).
2. DECK REPAIR TYPE 2 OR TYPE 3 MAY BE REQUIRED WITHIN THE AREA OF A DECK REPAIR TYPE 1.



DECK REPAIR TYPE 2

DECK REPAIR TYPE 2 NOTES:

1. DECK REPAIR TYPE 3 MAY BE REQUIRED WITHIN THE AREA OF A DECK REPAIR TYPE 2.



DECK REPAIR TYPE 3

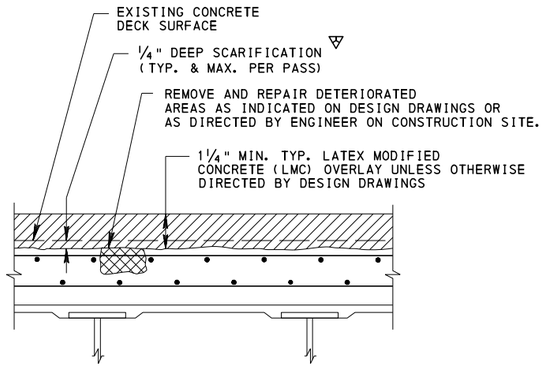
GENERAL NOTES

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. PROVIDE REINFORCEMENT BARS CONFORMING TO THE REQUIREMENTS OF ASTM A 615, A 616 OR A 706.
3. PROVIDE LAP SPLICE LENGTHS AND EMBEDMENT LENGTHS IN ACCORDANCE WITH BC-736M.
4. 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.
5. 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.
6. APPLY AN EPOXY BONDING COMPOUND CONFORMING TO THE REQUIREMENTS OF SECTION 1040.3(e)1 OF PUB. 408.
7. CONSTRUCTION, EQUIPMENT, SURFACE PREPARATION AND PATCHING MATERIAL FOR CONCRETE BRIDGE DECK REPAIR MUST CONFORM TO SECTION 1040 OF PUB. 408.
8. CONSTRUCTION, EQUIPMENT, SURFACE PREPARATION, PLACING AND FINISHING FOR LATEX MODIFIED CONCRETE OVERLAY MUST CONFORM TO SECTION 1042 OF PUB. 408.
9. TYPE OF REPAIRS DEPICTED ON THIS STANDARD ASSUME THAT THE STRUCTURAL INTEGRITY OF THE DECK IS NOT COMPROMISED BY THE EXTENT OF THE REPAIRS.
10. 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.

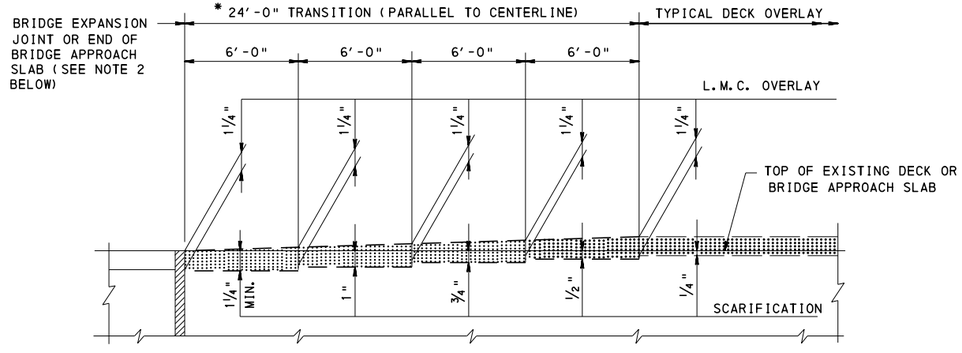
▨ - REMOVE DETERIORATED CONCRETE.



DETAILS FOR LATEX MODIFIED CONCRETE OVERLAY

(TRANSVERSE SECTION)

▽ IF DEEPER SCARIFICATION IS NEEDED, SCARIFY IN MULTIPLE PASSES.



VERTICAL TRANSITION DETAIL FOR 1¼" LATEX MODIFIED CONCRETE BRIDGE DECK OVERLAY

(LONGITUDINAL SECTION)
(ADJUST SCARIFICATION FOR OVERLAY THICKNESS OTHER THAN 1¼")

*TRANSITION LENGTH MORE THAN 24'-0" REQUIRES DISTRICT BRIDGE ENGINEER'S APPROVAL.

NOTE:

1. PROVIDE THE TRANSITION ENTIRELY ON THE BRIDGE APPROACH SLAB, IF PRESENT.
2. 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.

BC-736M	REINFORCEMENT BAR FABRICATION DETAILS

REFERENCE DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

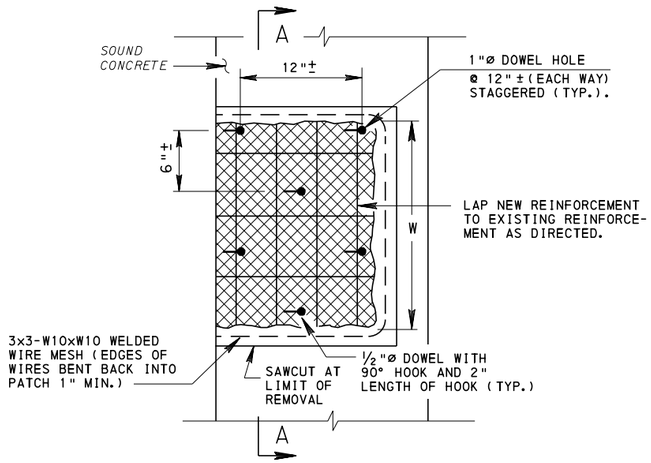
STANDARD
REINFORCED CONCRETE REPAIR
BRIDGE DECKS

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

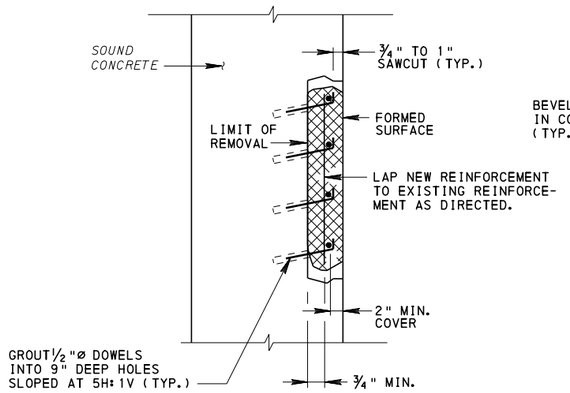
RECOMMENDED SEPT. 30, 2016
Brent D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 1 OF 4

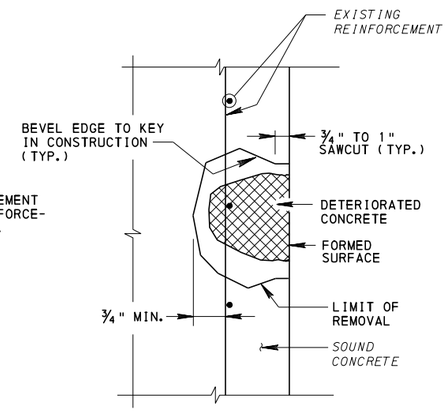
BC-783M



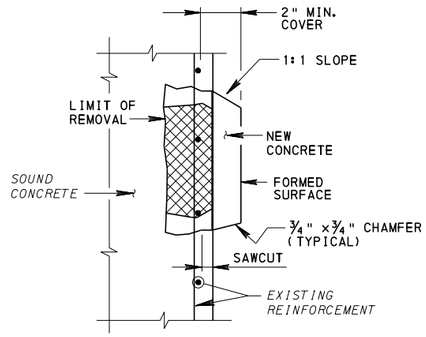
ELEVATION VIEW



SECTION A-A
NEW REINFORCEMENT

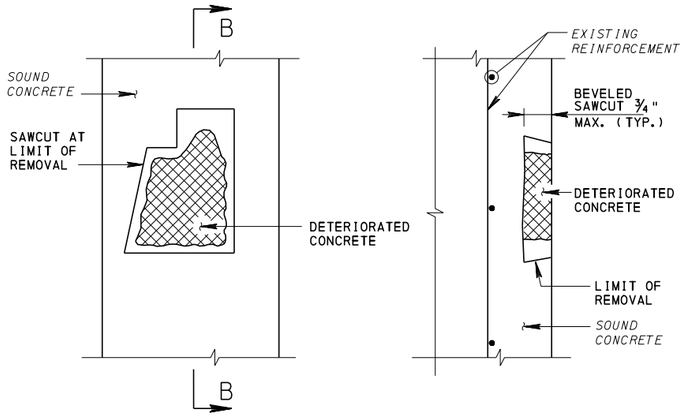


SECTION A-A
EXISTING REINFORCEMENT



SECTION A-A
BLISTER DETAIL

NOTE: CONCRETE REPAIR TYPE 2 DETAIL FOR AREAS WITH EXISTING REINFORCEMENT HAVING LESS THAN 2" OF COVER.

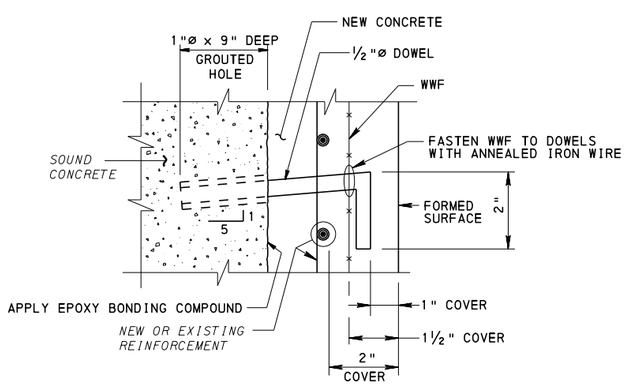


ELEVATION VIEW

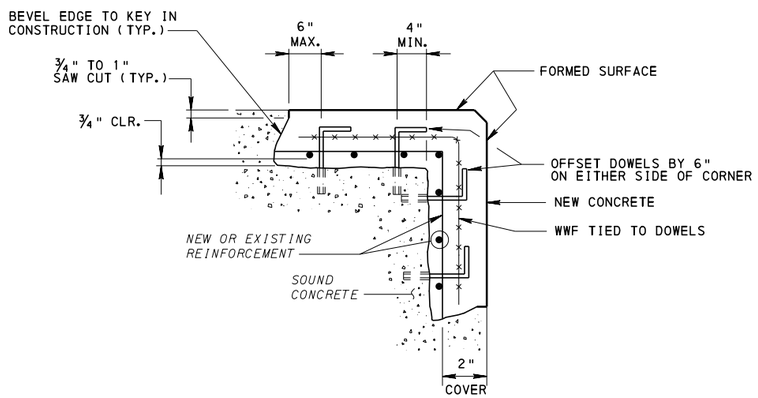
SECTION B-B

CONCRETE REPAIR TYPE 1

NOTE: REPAIR TYPE 1 IS USED WHEN DEPTH OF DETERIORATED CONCRETE IS LESS THAN OR EQUAL TO ¾".



TYPICAL DOWEL DETAIL



TYPICAL CORNER REPAIR DETAIL

CONCRETE REPAIR TYPE 2

NOTE: REPAIR TYPE 2 IS USED WHEN DEPTH OF DETERIORATED CONCRETE IS GREATER THAN ¾" 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 ¾" 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.

LEGEND

▨ - REMOVE DETERIORATED CONCRETE.

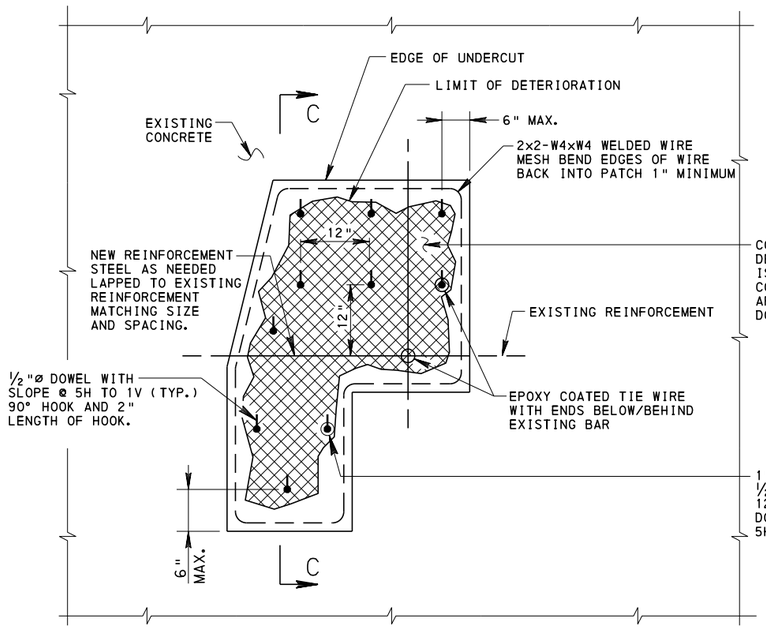
REINFORCED CONCRETE REPAIR TYPE 2 NOTES:

1. SQUARE OFF DETERIORATED CONCRETE TO SOUND CONCRETE WITH A SAWCUT OF ¾" 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 ¾" 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 ½"ø DOWEL HOOK.
10. ALTERNATE WIRE MESH MAY BE SUBSTITUTED FOR 3x3-W10xW10, 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.

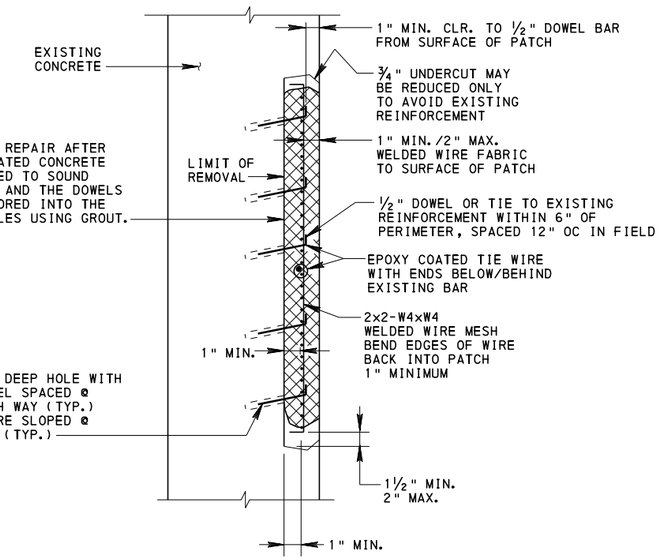
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
REINFORCED CONCRETE REPAIR

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 4
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brenda S. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-783M



ELEVATION VIEW



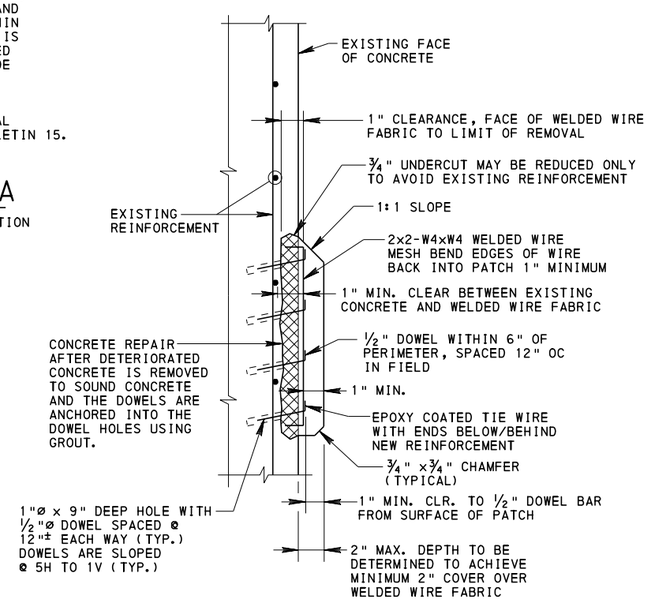
SECTION C-C

NOTE: PROVIDE EPOXY COATED WIRE TIE TO CONNECT EXISTING REINFORCEMENT AND 2x2-W4xW4 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 ½" GROUTED 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 ¾" AND EXISTING REINFORCEMENT IS SPACED GREATER THAN 12" ON CENTERS.



SECTION C-C
BLISTER DETAIL

NOTE: SHALLOW REMOVAL CONDITION IF PATCH CANNOT ENGAGE EXISTING REINFORCEMENT.

REINFORCED CONCRETE REPAIR TYPE 2A NOTES:

1. SQUARE OFF DETERIORATED CONCRETE TO SOUND CONCRETE WITH A SAWCUT OF ¾" 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.

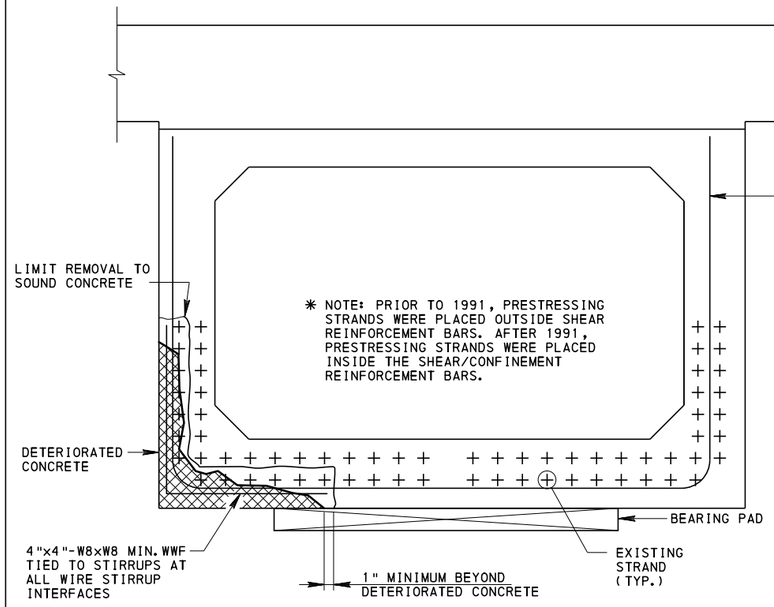
LEGEND

▨ - REMOVE DETERIORATED CONCRETE.

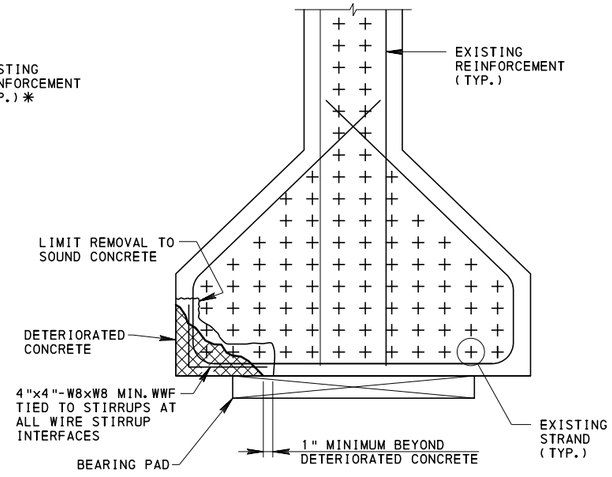
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
REINFORCED CONCRETE REPAIR

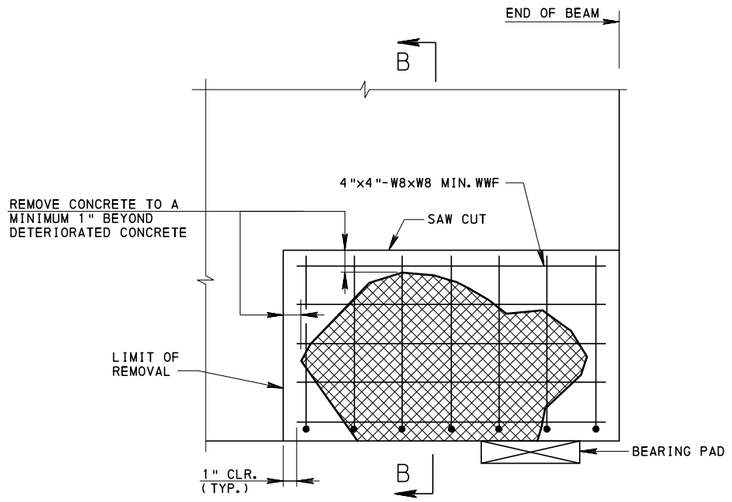
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 4
Thomas P Macioce CHIEF BRIDGE ENGINEER	Bruce D Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-783M



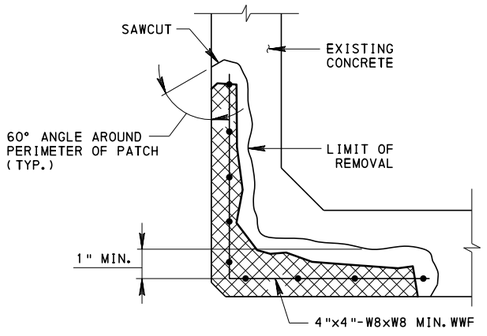
CONCRETE REPAIR - PRESTRESSED CONCRETE SPREAD BOX BEAM (ADJACENT BOX BEAM SIMILAR)



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 4"x4"-W8xW8 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.

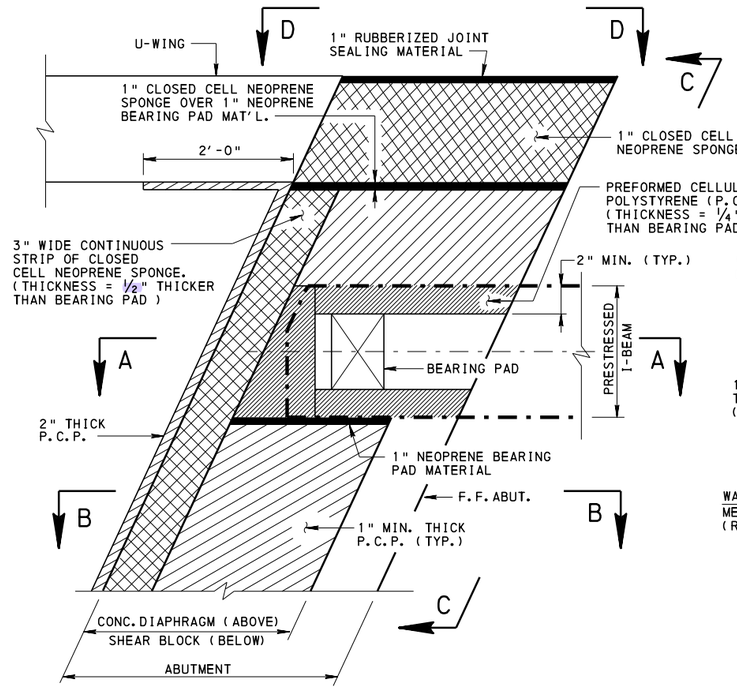
LEGEND

- REMOVE DETERIORATED CONCRETE.

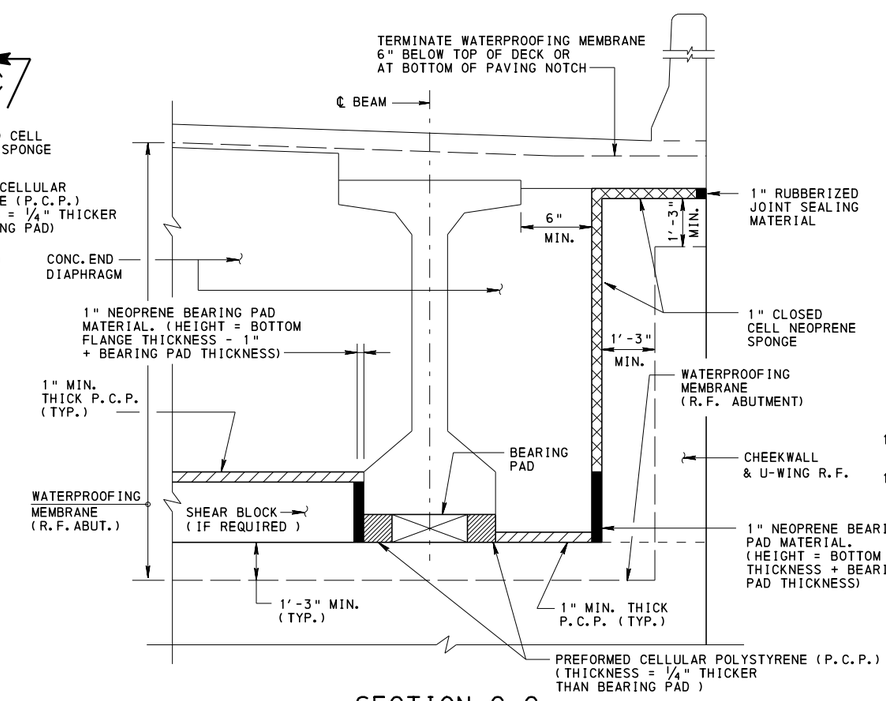
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD REINFORCED CONCRETE REPAIR PRESTRESSED CONCRETE BEAM

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 4 OF 4
Thomas P. Macioce	Burton B. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-783M



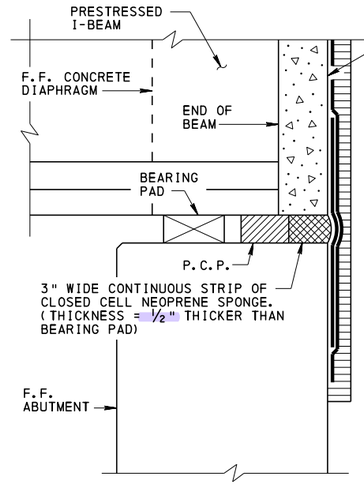
U-WING ABUTMENT PLAN - FULL DEPTH END DIAPHRAGM



SECTION C-C

NOTES:

1. PLANS AND DETAILS ARE APPLICABLE FOR COMPOSITE BRIDGE DECKS.
2. DOWEL, SHEAR BLOCK AND BACKWALL REQUIREMENTS ARE LISTED IN DESIGN STANDARDS.
3. 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.
4. 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.
5. CUT CLOSED CELL NEOPRENE SPONGE WITH CONVEX CURVE.
6. WATERPROOFING IDENTICAL TO PARTIAL PLAN FOR SPREAD BOX BEAMS (WITHOUT DOWELS).
7. R.F. DENOTES REAR FACE. F.F. DENOTES FRONT FACE.
8. 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 BITUMINOUS MATERIAL PAVEMENTS.
9. PROVIDE WATERPROOFING MEMBRANE IN ACCORDANCE WITH SECTION 680.2(b) ADHESIVE BACKED PREFORMED MEMBRANE.
10. PROVIDE NEOPRENE BEARING PAD MATERIAL WITH A DUROMETER OF 50 (+/-5).
11. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.

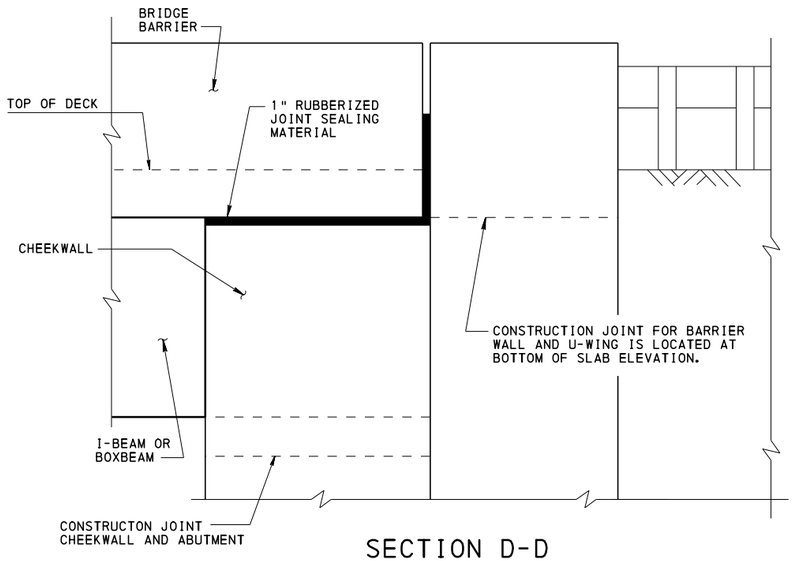


SECTION A-A

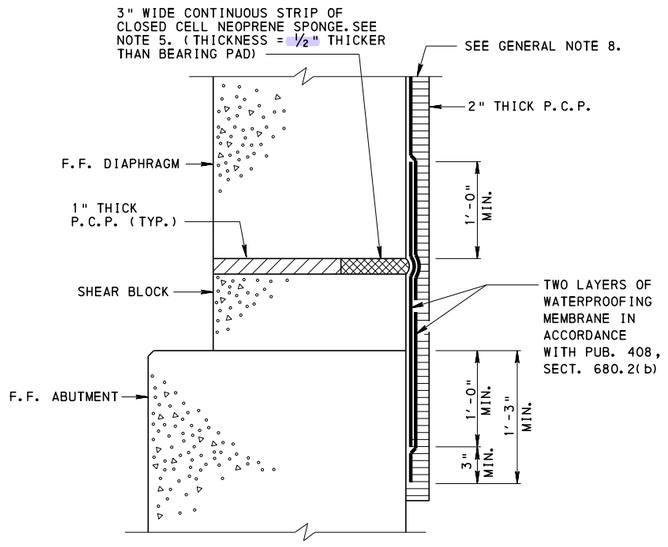
NOTE:
FOR ADDITIONAL INFORMATION REFER TO DETAILS ON SHEET 12.

PRESTRESSED I-BEAM BRIDGE

WITHOUT BACKWALL



SECTION D-D



SECTION B-B

LEGEND:

P.C.P. = PREFORMED CELLULAR POLYSTYRENE (SEE NOTE 3)

BC-735M	WALL CONSTR. & EXP. JOINT DETAILS
BC-775M	MISCELLANEOUS PRESTRESS DETAILS
REFERENCE DRAWINGS	

TYPICAL FOR STEEL AND PRESTRESSED BRIDGES

(EXCEPT FOR CHANNEL BEAM BRIDGES)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

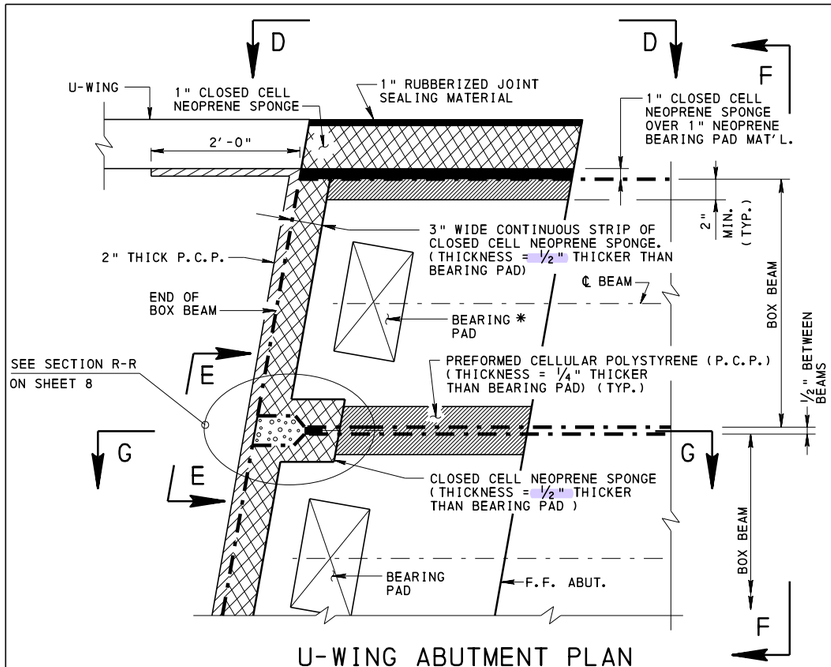
STANDARD TYPICAL WATERPROOFING AND EXPANSION DETAILS - ABUTMENT PRESTRESSED I-BEAM BRIDGES

RECOMMENDED SEPT. 30, 2016
Thomas P. Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Brent D. Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

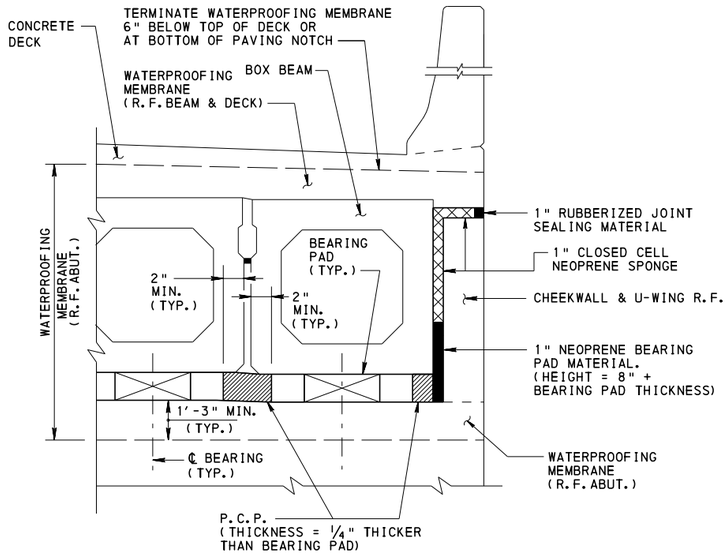
SHEET 1 OF 12

BC-788M

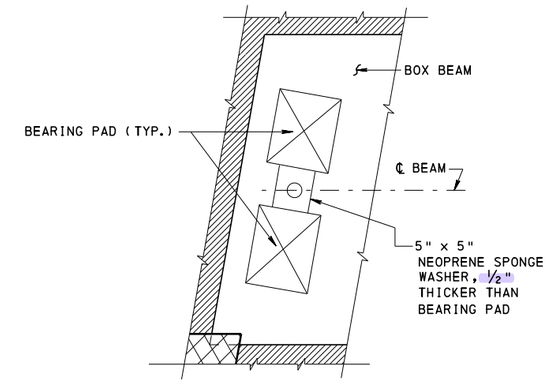


U-WING ABUTMENT PLAN
PRESTRESSED ADJACENT BOX BEAMS

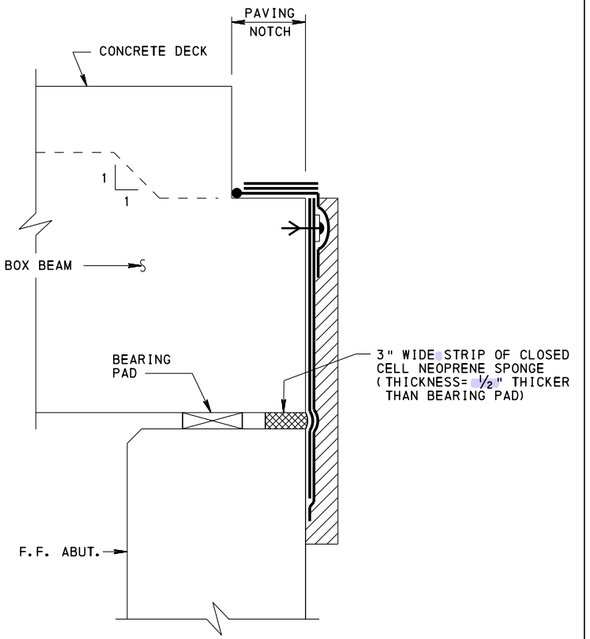
* EXPANSION CONDITION SHOWN, FOR FIXED CONDITION SEE DETAIL "B" THIS SHEET



SECTION F-F

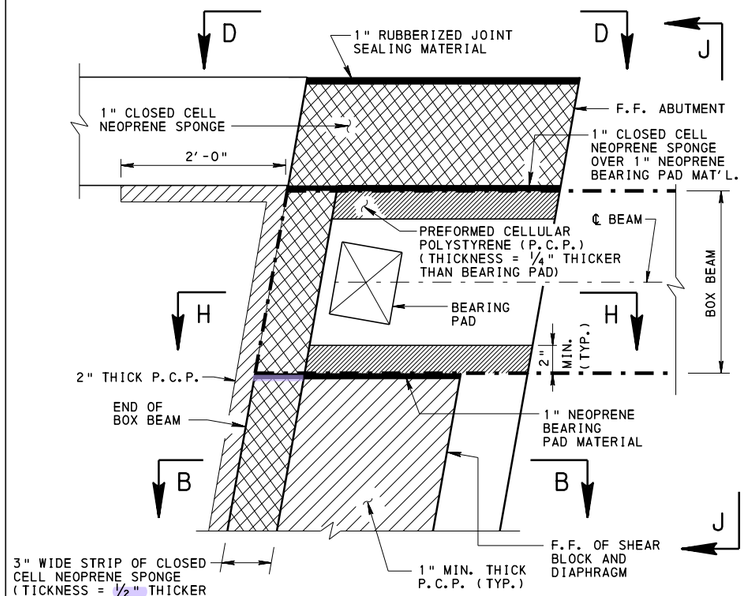


DETAIL "B"

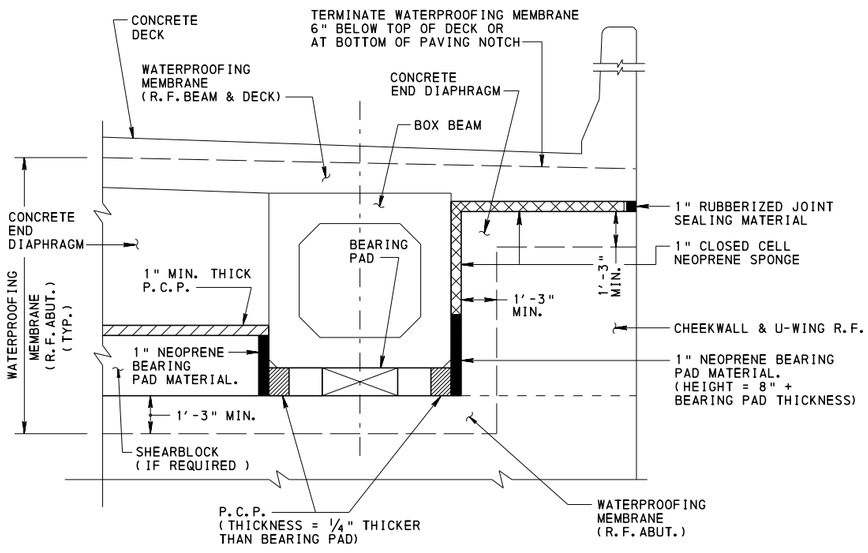


SECTION H-H

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

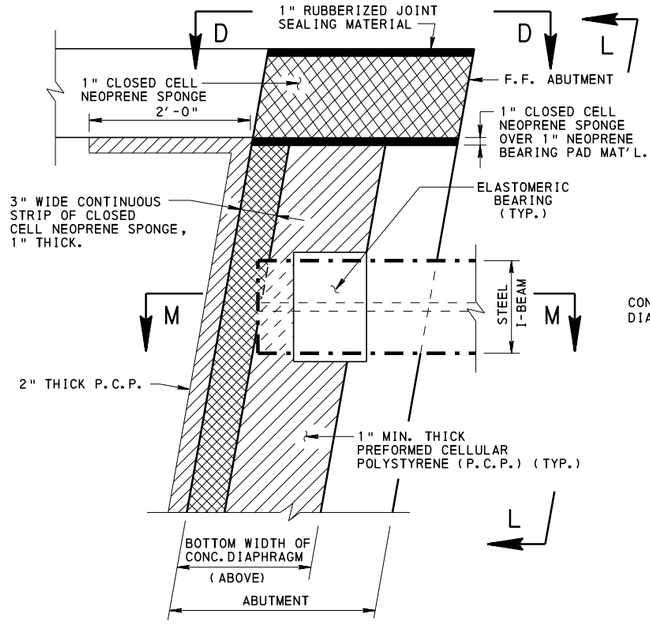
NOTES:

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
BUREAU OF PROJECT DELIVERY

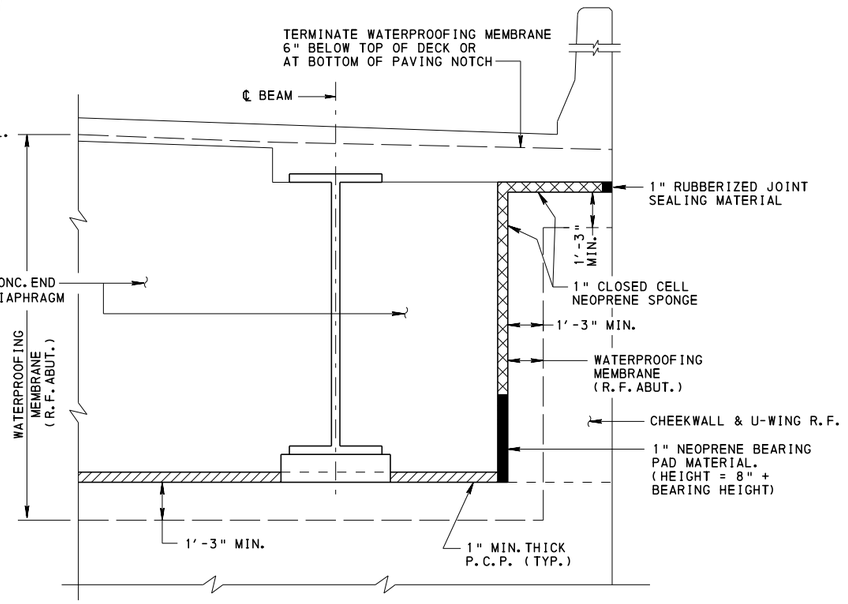
STANDARD
TYPICAL WATERPROOFING AND EXPANSION DETAILS - ABUTMENT PRESTRESSED BOX BEAM BRIDGES

RECOMMENDED SEPT.30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT.30, 2016 Brent D Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 2 OF 12 BC-788M

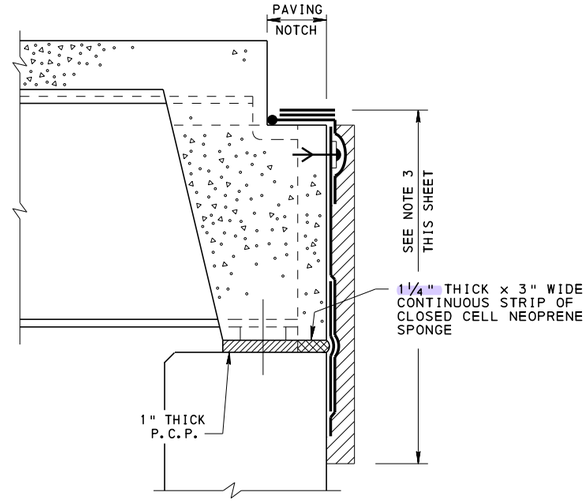


PLAN

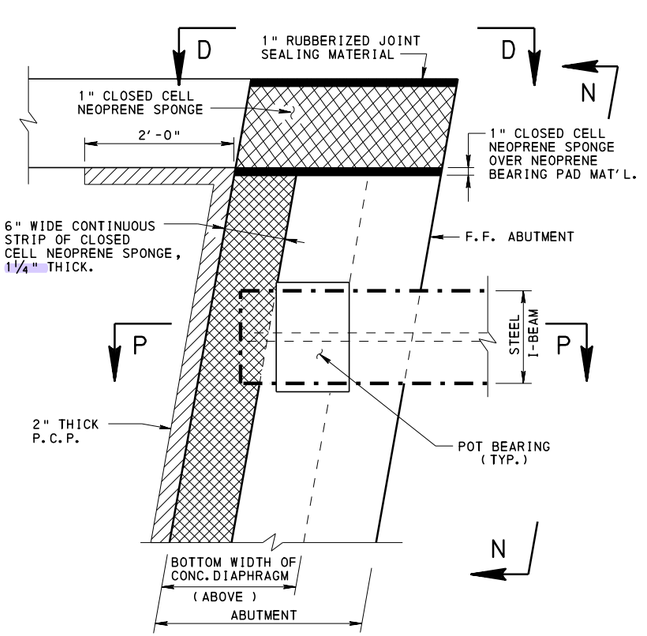
U-WING ABUTMENT WITHOUT BACKWALL
FULL DEPTH END DIAPHRAGM
AND ELASTOMERIC BEARING



SECTION L-L

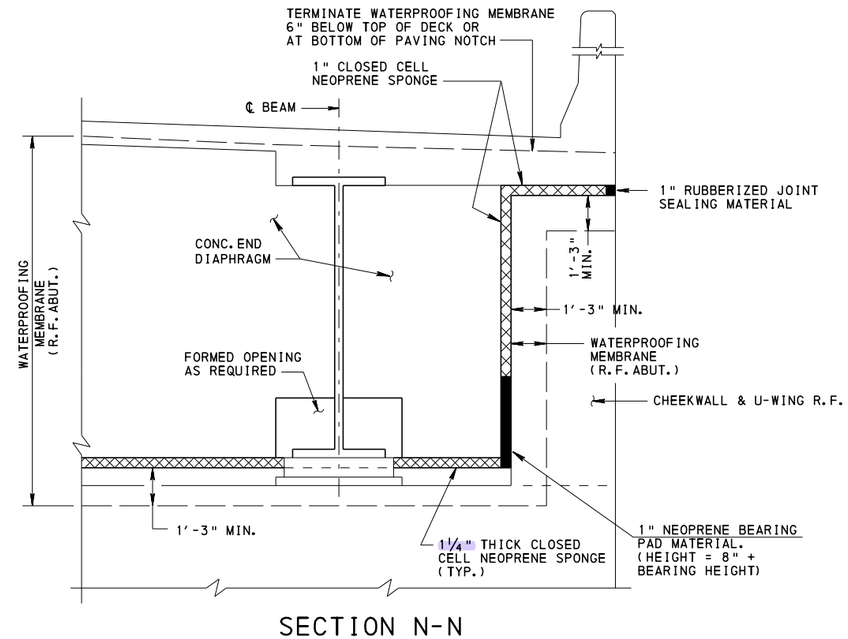


SECTION M-M

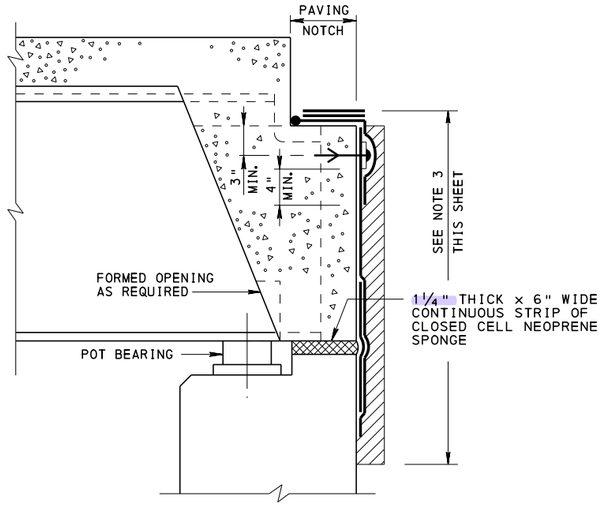


PLAN

U-WING ABUTMENT WITHOUT BACKWALL
FULL DEPTH END DIAPHRAGM
AND POT BEARING



SECTION N-N



SECTION P-P

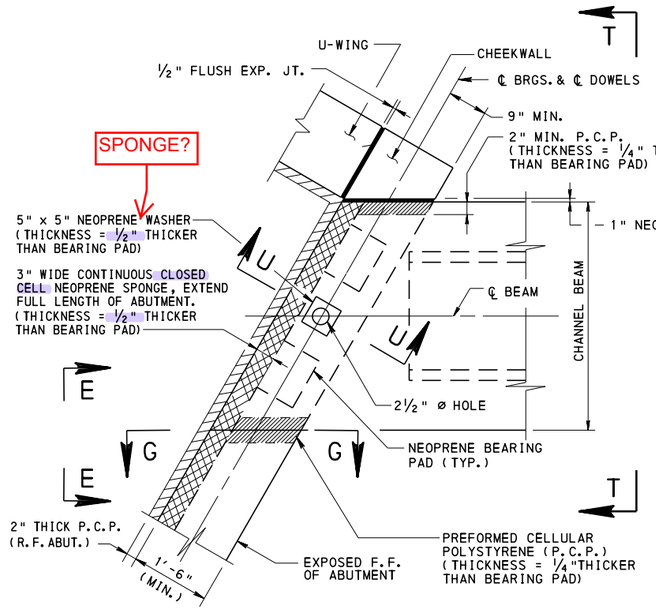
NOTES:

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.

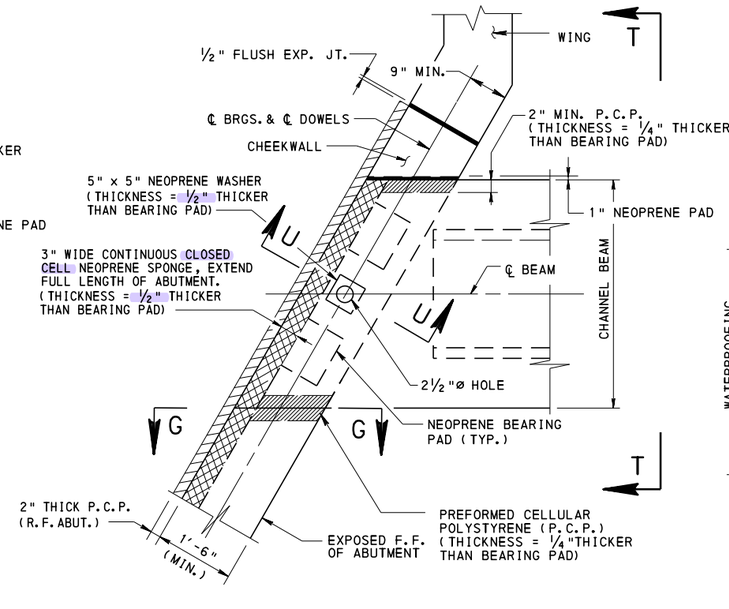
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD TYPICAL WATERPROOFING AND EXPANSION DETAILS - ABUTMENT STEEL I-BEAM BRIDGES

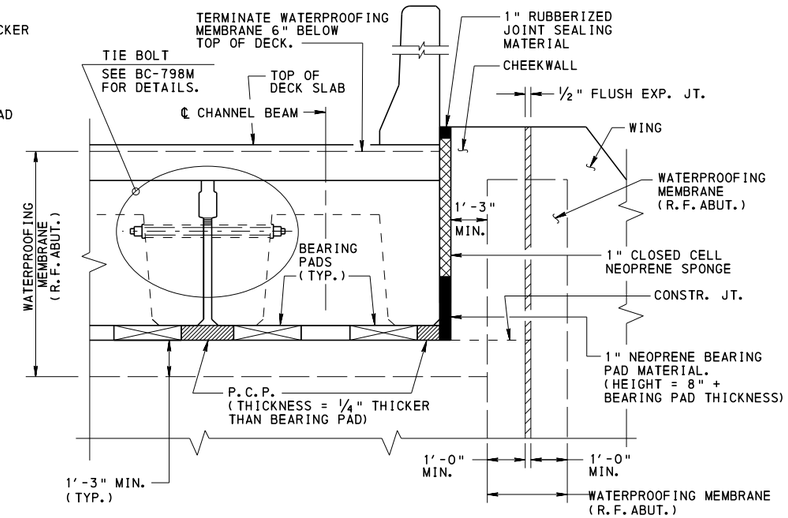
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 12
Thomas P Macioce	Brian D Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-788M



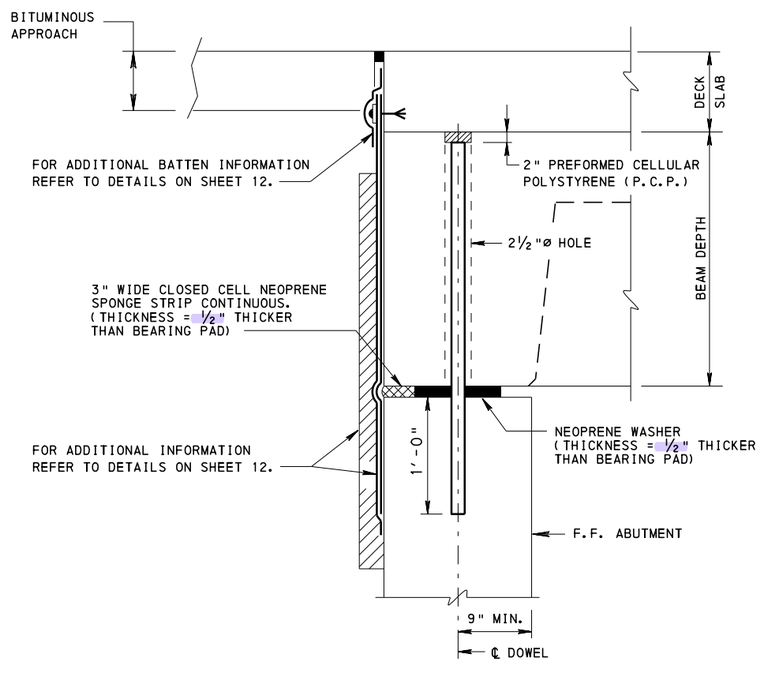
ABUTMENT PLAN - U-WING
PRECAST CHANNEL BEAM BRIDGES



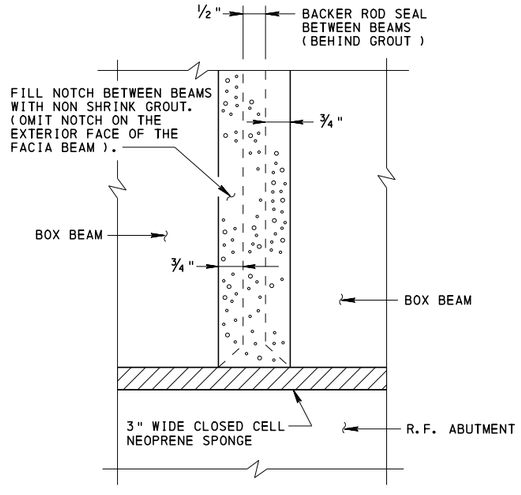
ABUTMENT PLAN - FLARED WING
PRECAST CHANNEL BEAM BRIDGES



SECTION T-T
NOTE: FLARED WING SHOWN U-WING SIMILAR



SECTION U-U



SECTION E-E

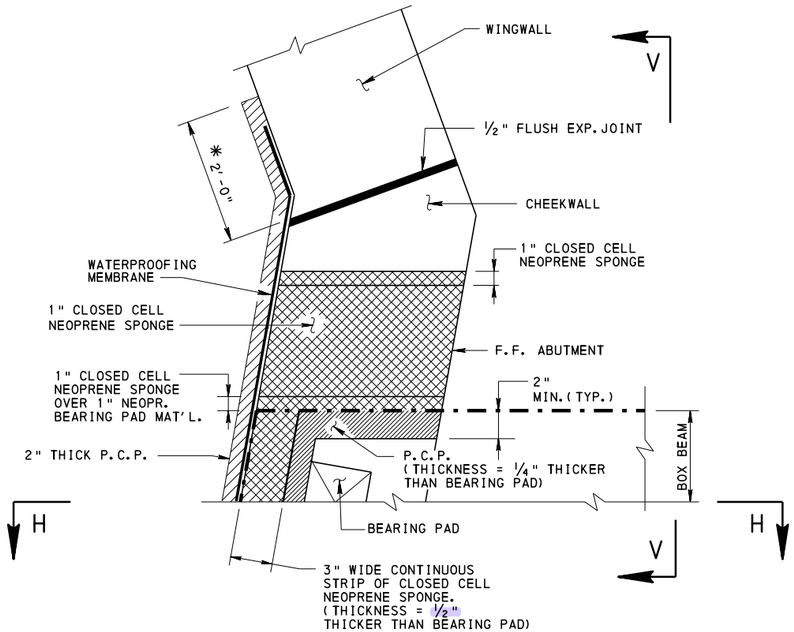
NOTES:

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
BUREAU OF PROJECT DELIVERY

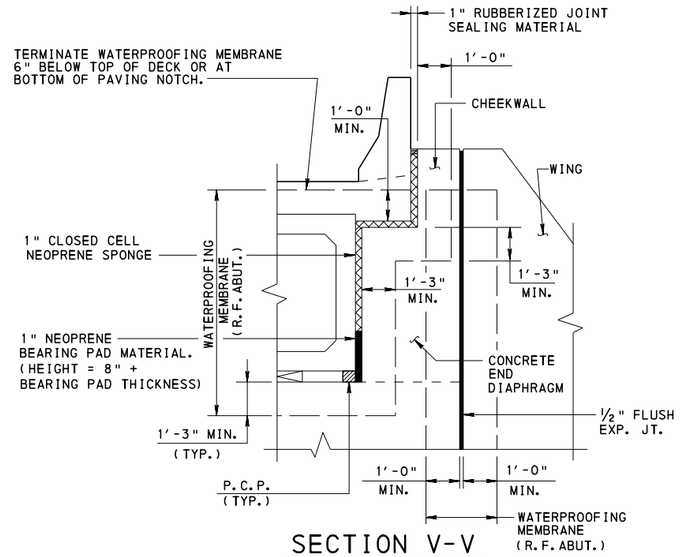
STANDARD TYPICAL WATERPROOFING AND EXPANSION DETAILS - ABUTMENT PRECAST CHANNEL BEAM BRIDGES

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 4 OF 12
Thomas P Macioce	Brian B Thompson	BC-788M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

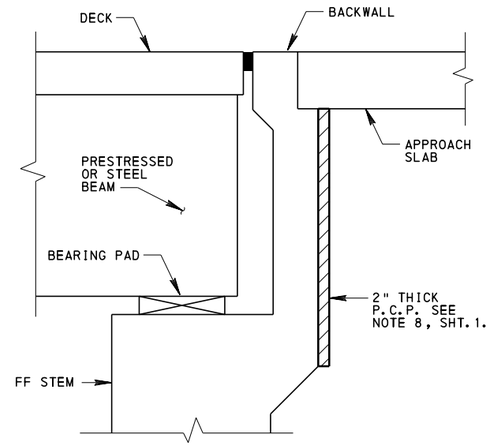


BOX BEAMS WITHOUT BACKWALL

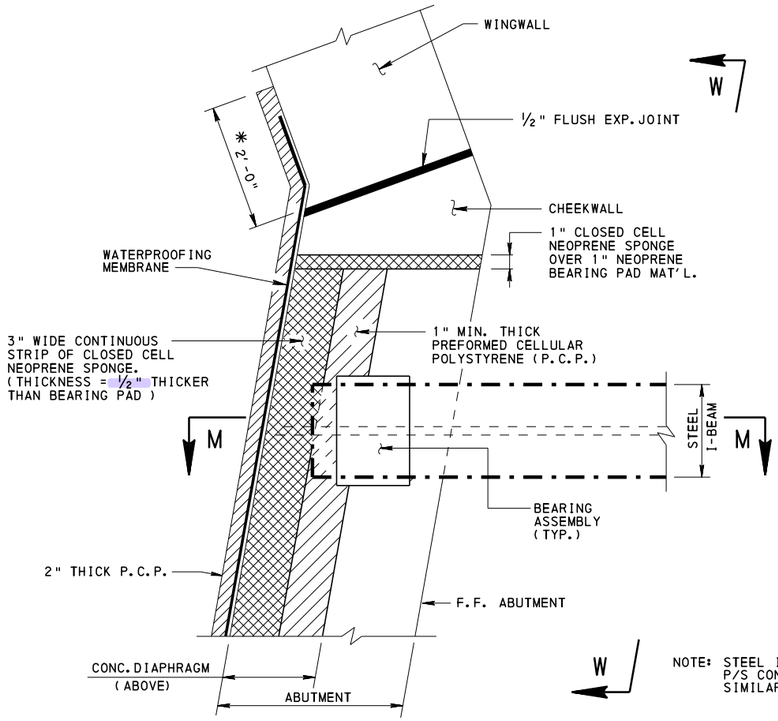
✳ SEE WATERPROOFING MEMBRANE DETAIL ON SHEET 12



SECTION V-V
BOX BEAMS



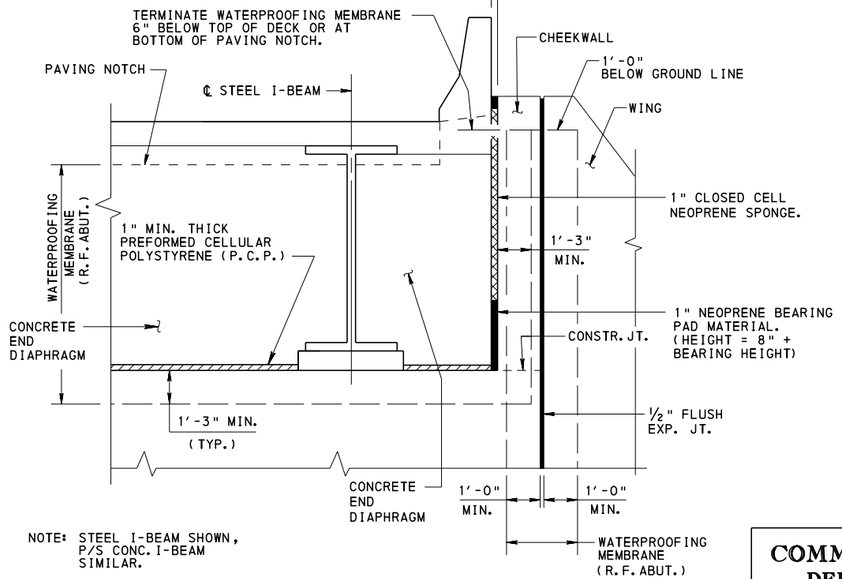
SECTION-ABUTMENT WITH BACKWALL
PRESTRESSED AND STEEL I-BEAM



NOTE: STEEL I-BEAM SHOWN, P/S CONC. I-BEAM SIMILAR.

PRESTRESSED AND STEEL I-BEAM WITHOUT BACKWALL

✳ SEE WATERPROOFING MEMBRANE DETAIL ON SHEET 12



NOTE: STEEL I-BEAM SHOWN, P/S CONC. I-BEAM SIMILAR.

SECTION W-W

STEEL I-BEAM AND P/S I-BEAM

USE THIS DETAIL FOR U-WINGS ALSO

NOTES:

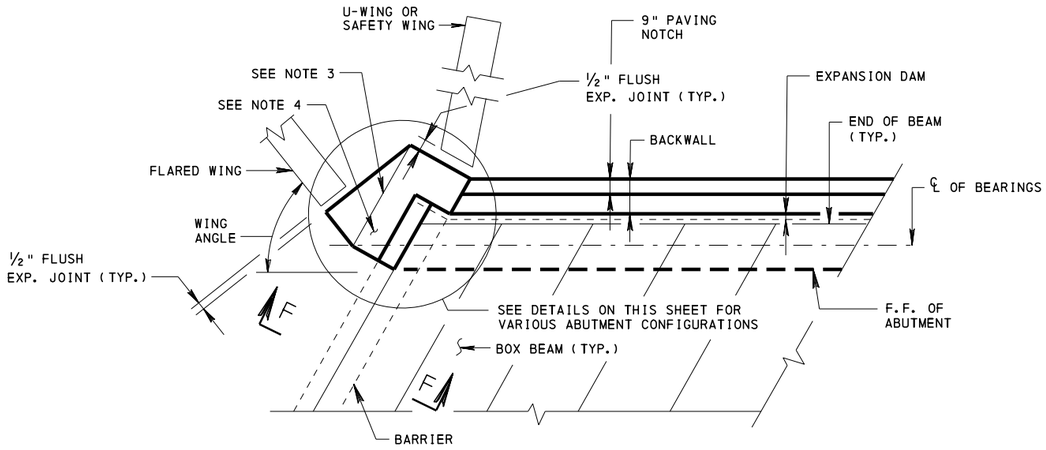
1. FOR ADDITIONAL NOTES, SEE SHEET 1.
2. FOR SECTION H-H, SEE SHEET 2.
3. FOR SECTION M-M, SEE SHEET 3.

WINGWALL ABUTMENT - FULL DEPTH END DIAPHRAGM

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

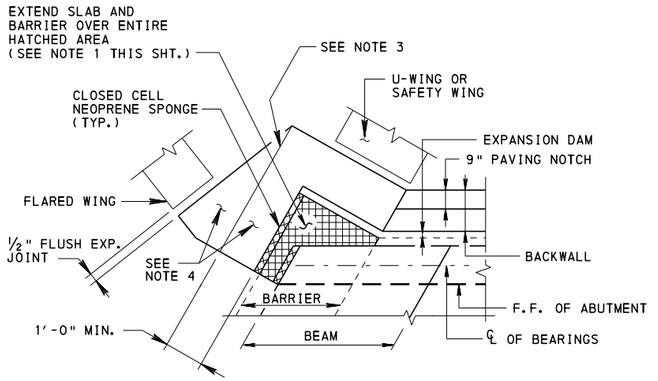
STANDARD
TYPICAL WATERPROOFING AND EXPANSION DETAILS - ABUTMENT

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 5 OF 12
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-788M

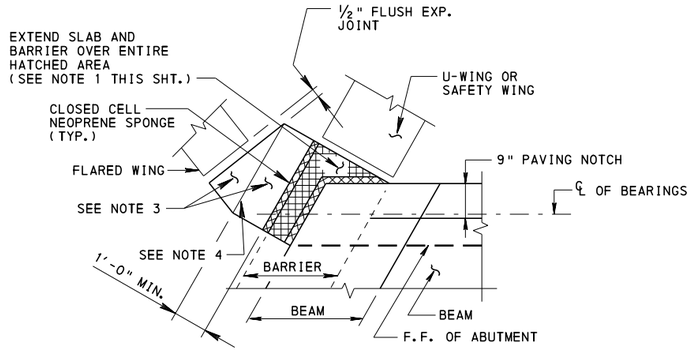


ADJACENT BOX BEAMS (SKEWED)

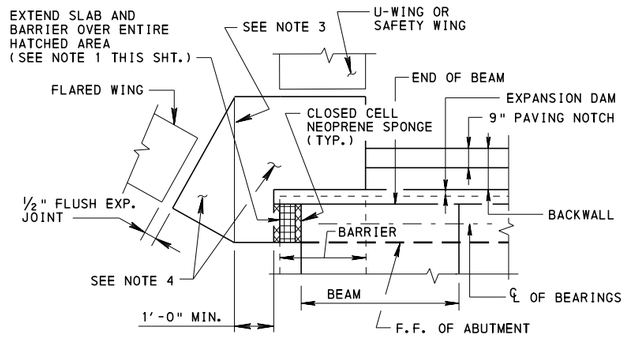
GENERAL SCHEMATIC
ABUTMENT PLAN WITH BACKWALL
FLARED AND U-WINGS



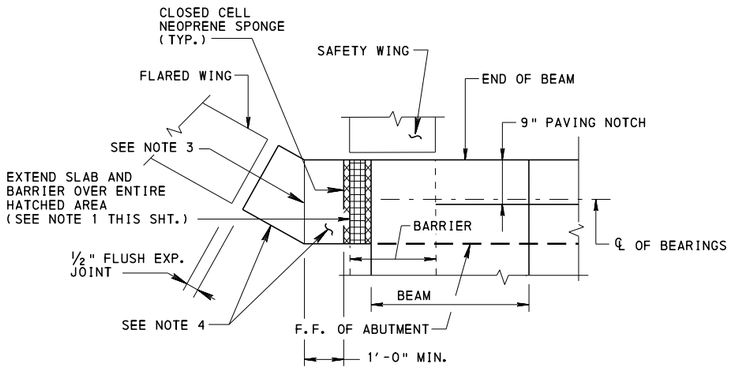
DETAIL FOR SKEWED ABUTMENT
WITH BACKWALL
FLARED AND U-WINGS



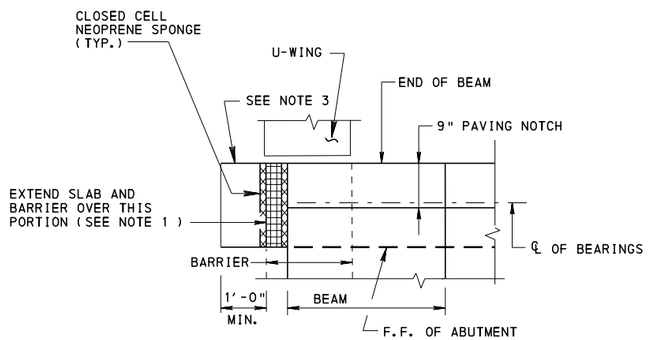
DETAIL FOR SKEWED ABUTMENT
WITHOUT BACKWALL
FLARED AND U-WINGS



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

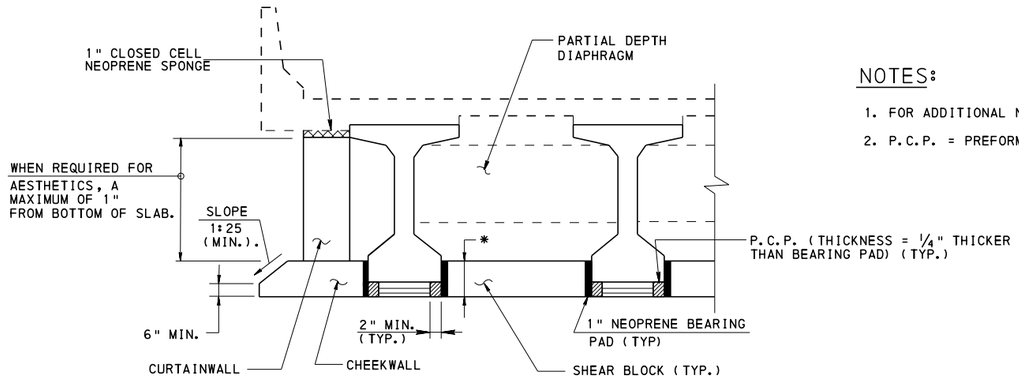
DETAIL NOTES:

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
BUREAU OF PROJECT DELIVERY

STANDARD
TYPICAL WATERPROOFING AND EXPANSION DETAILS - ABUTMENT

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 6 OF 12
Thomas P Macioce CHIEF BRIDGE ENGINEER	Bureau Director DIRECTOR, BUR. OF PROJECT DELIVERY	BC-788M

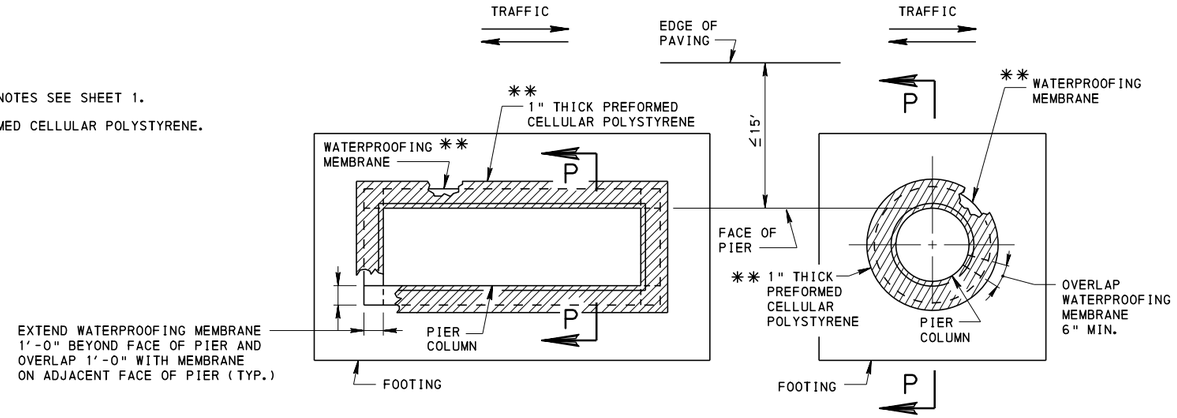


* BEARING PAD THICKNESS + FLANGE THICKNESS - 1" FOR CHEEKWALLS AND SHEAR BLOCKS

PRESTRESSED I-BEAM SECTION AT PIER

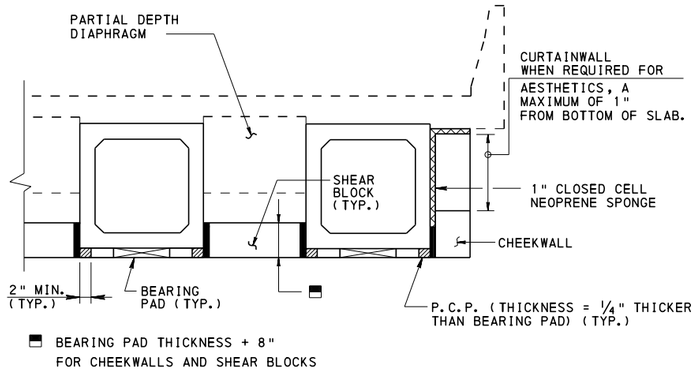
NOTES:

1. FOR ADDITIONAL NOTES SEE SHEET 1.
2. P.C.P. = PREFORMED CELLULAR POLYSTYRENE.



PLAN - RECTANGULAR COLUMN

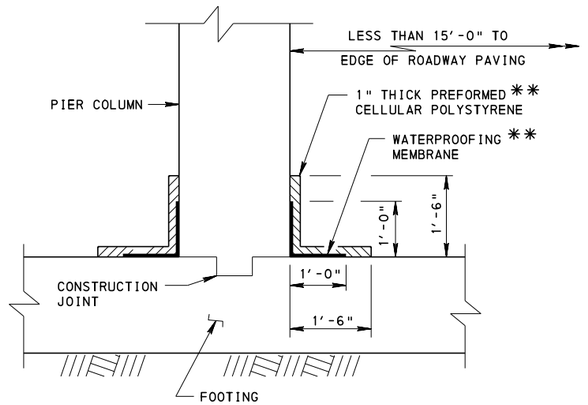
PLAN - ROUND COLUMN



▬ BEARING PAD THICKNESS + 8" FOR CHEEKWALLS AND SHEAR BLOCKS

BOX BEAM SECTION AT PIER

CHEEKWALL CONDITION FOR BOX BEAMS SIMILAR

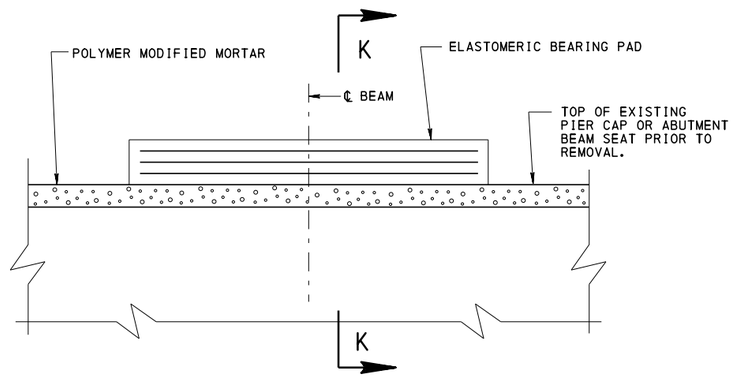


SECTION P-P

PIER WATERPROOFING DETAILS

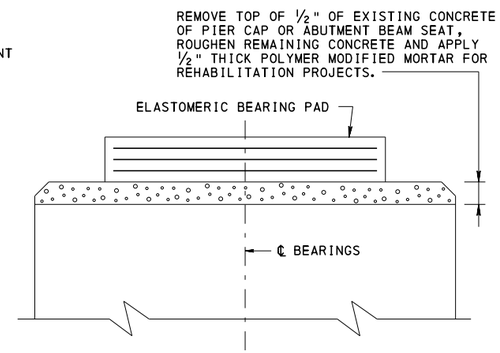
** WATERPROOFING MEMBRANE AND 1" THICK PREFORMED CELLULAR POLYSTYRENE TO BE USED AROUND THE PIER COLUMNS WHEN THE DISTANCE FROM EDGE OF PAVING TO THE PIER COLUMN FACE IS ≤ 15 FEET. ALSO PROVIDE WATERPROOFING WHENEVER PIER FOOTING IS SUBJECT TO HIGH GROUND WATER LEVEL SUCH AS IN OR NEAR A WATERWAY.

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.



TYPICAL PIER AND ABUTMENT EXPANSION BEARING

STEEL OR PRESTRESSED REHABILITATION SLOPED TO DRAIN



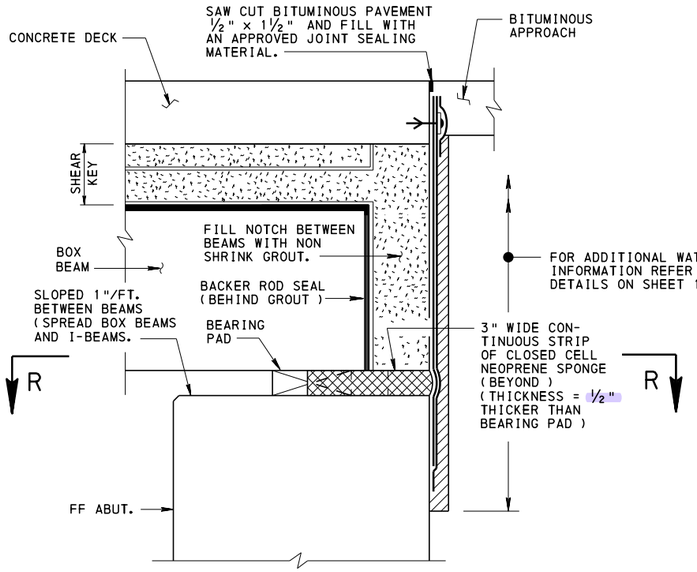
SECTION K-K

SLOPED TO DRAIN

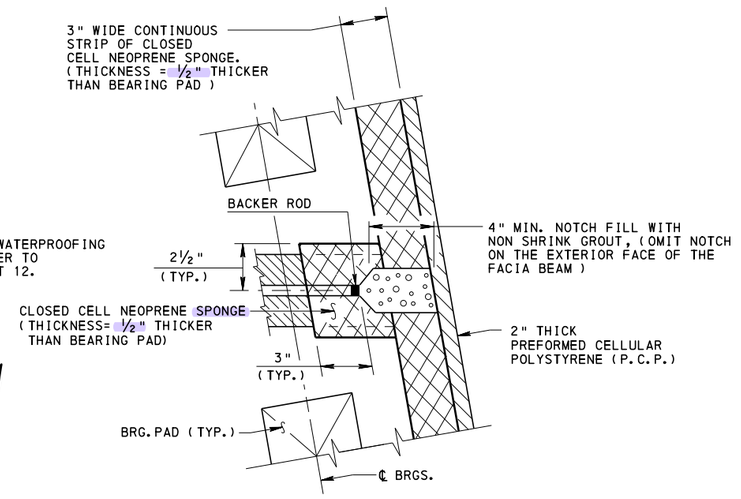
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD TYPICAL WATERPROOFING AND EXPANSION DETAILS - PIER PRESTRESSED CONCRETE I-BEAM AND BOX BEAM BRIDGES

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 7 OF 12
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brian D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-788M

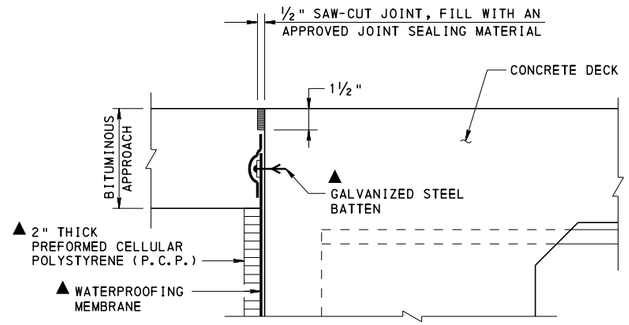


SECTION G-G



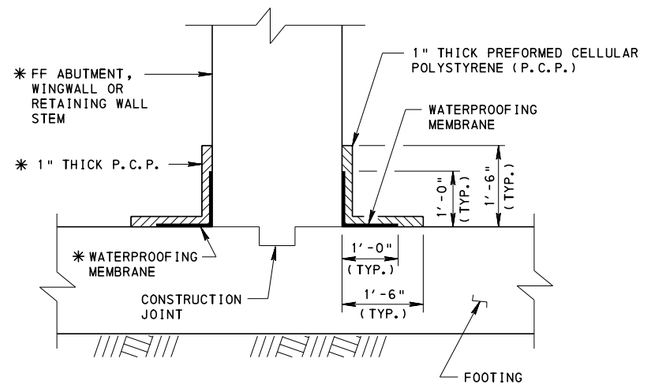
SECTION R-R

(ADJACENT BOX BEAMS)



BITUMINOUS APPROACH AT STRUCTURE

▲ FOR ADDITIONAL INFORMATION REFER TO DETAILS ON SHEET 12.

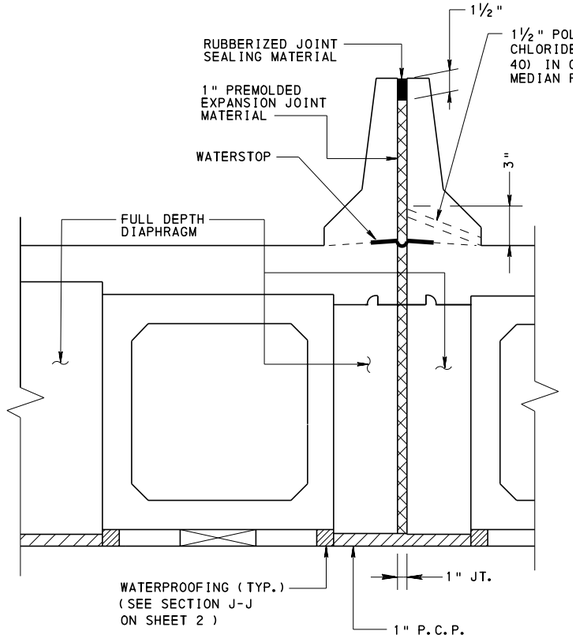


SECTION

ABUTMENT, WINGWALL OR RETAINING WALL WATERPROOFING DETAIL

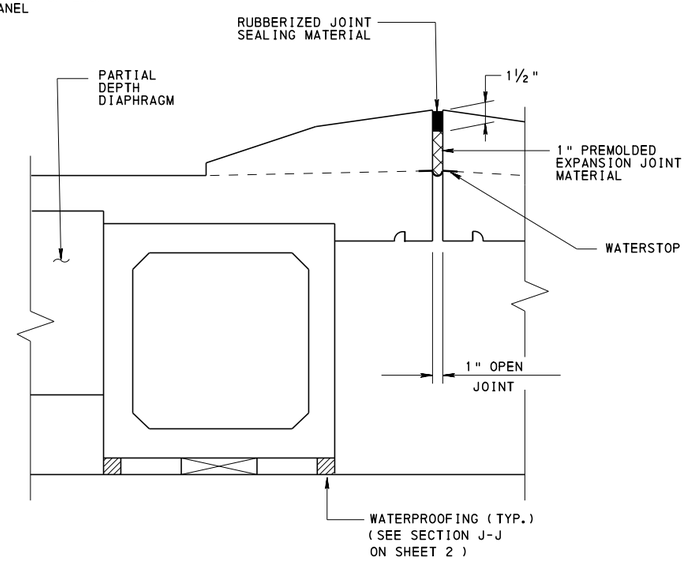
✳ WATERPROOFING MEMBRANE AND 1" THICK PREFORMED CELLULAR POLYSTYRENE TO BE USED ON FRONT FACE OF ABUTMENT, WINGWALL OR RETAINING WALL STEM ONLY WHERE THE DISTANCE FROM EDGE OF PAVING TO THE FRONT FACE OF THE RESPECTIVE STEM IS ≦ 5 FEET. ALSO PROVIDE WATERPROOFING WHENEVER FOOTING IS SUBJECT TO HIGH GROUND 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

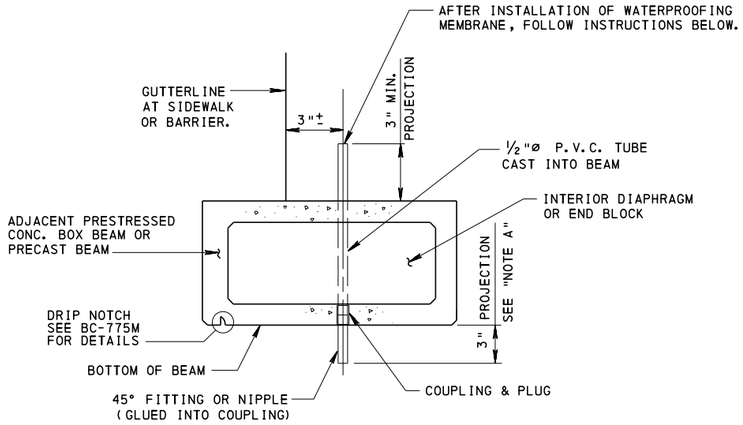
NOTES:

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
BUREAU OF PROJECT DELIVERY

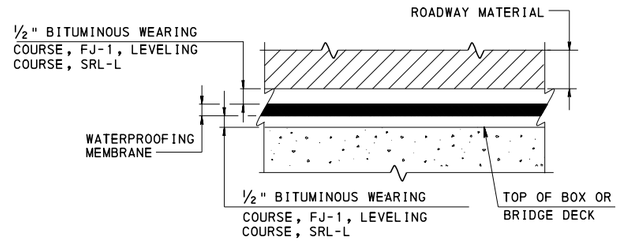
STANDARD TYPICAL WATERPROOFING AND EXPANSION DETAILS - MISCELLANOUS P/S CONCRETE I-BEAM AND BOX BEAM BRIDGES

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 8 OF 12
Thomas P Macioce	Brent D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-788M



TYPICAL DRAIN DETAIL

PRESTRESSED CONCRETE BEAM SHOWN, PRECAST BEAM SIMILAR



MEMBRANE WATERPROOFING DETAIL

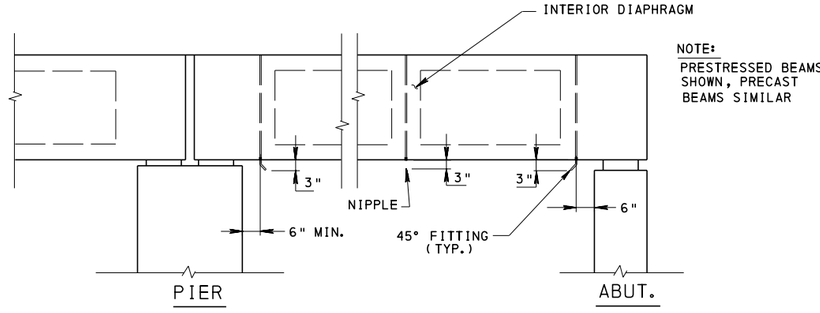
BOX BEAM OR BRIDGE DECK

NOTES:

1. DETAILS SHOWN TO BE USED FOR PRESERVATION PROJECTS ONLY.
2. SPACE ½" 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(a) 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.



NOTE: PRESTRESSED BEAMS SHOWN, PRECAST BEAMS SIMILAR

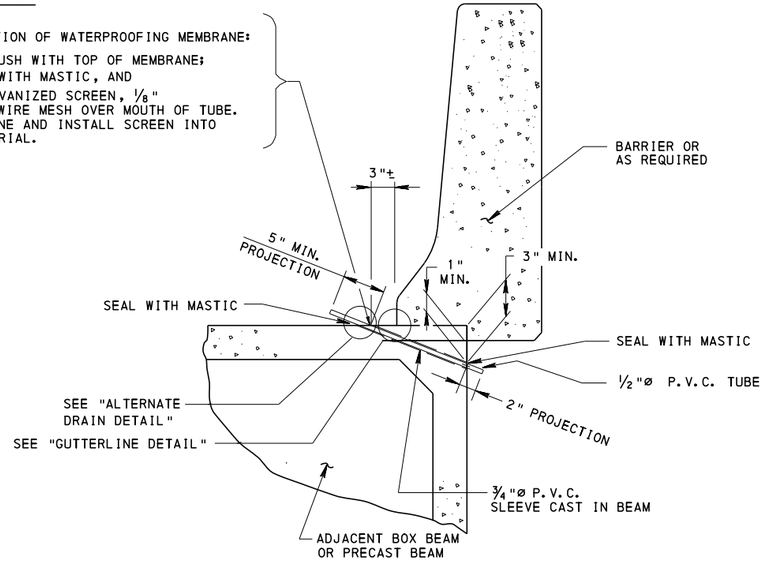
TYPICAL LONGITUDINAL SECTION

ALTERNATE DRAINS

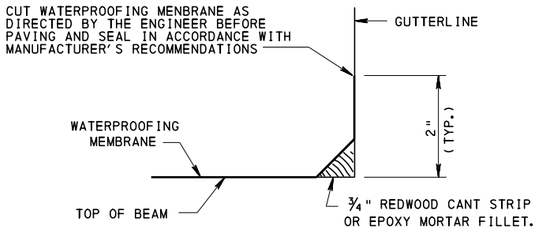
INSTRUCTIONS:

AFTER INSTALLATION OF WATERPROOFING MEMBRANE:

1. CUT TUBE FLUSH WITH TOP OF MEMBRANE;
2. SEAL EDGES WITH MASTIC, AND
3. PROVIDE GALVANIZED SCREEN, ⅛" GALVANIZED WIRE MESH OVER MOUTH OF TUBE. HEAT MEMBRANE AND INSTALL SCREEN INTO MELTED MATERIAL.



MEMBRANE DRAIN DETAIL AT CURB



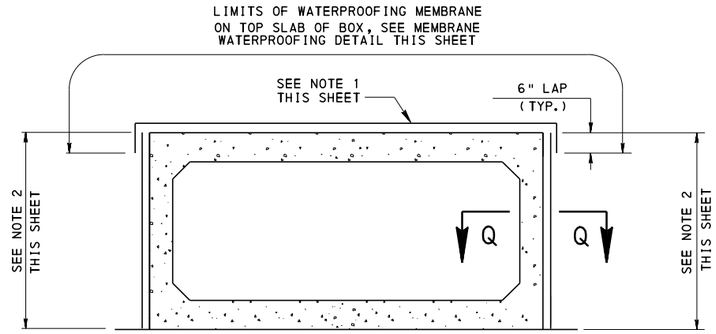
GUTTERLINE DETAIL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

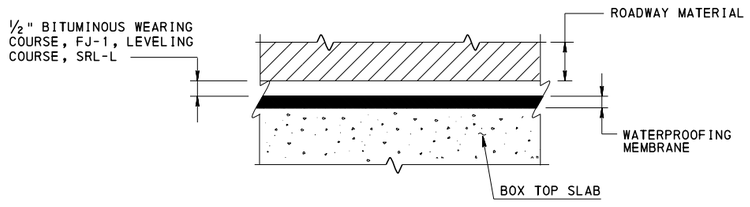
TYPICAL WATERPROOFING AND EXPANSION DETAILS-MISCELLANEOUS PRESTRESSED OR PRECAST BRIDGE

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 9 OF 12
Thomas P. Macioce	Brent D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-788M



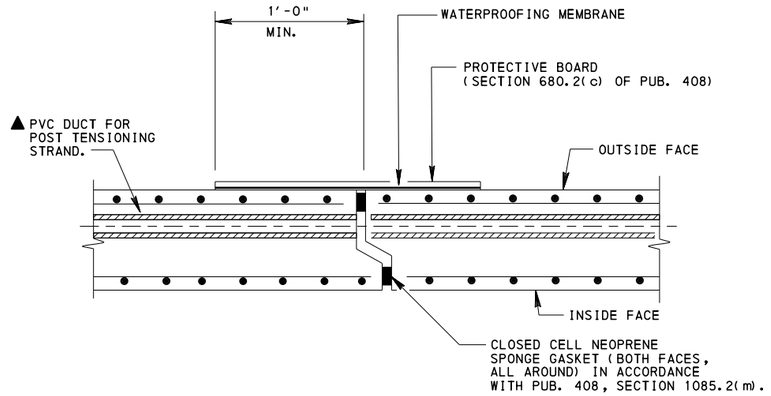
TYP. PRECAST BOX SECTION

NO SCALE



MEMBRANE WATERPROOFING DETAIL

PRECAST BOX CULVERT



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.

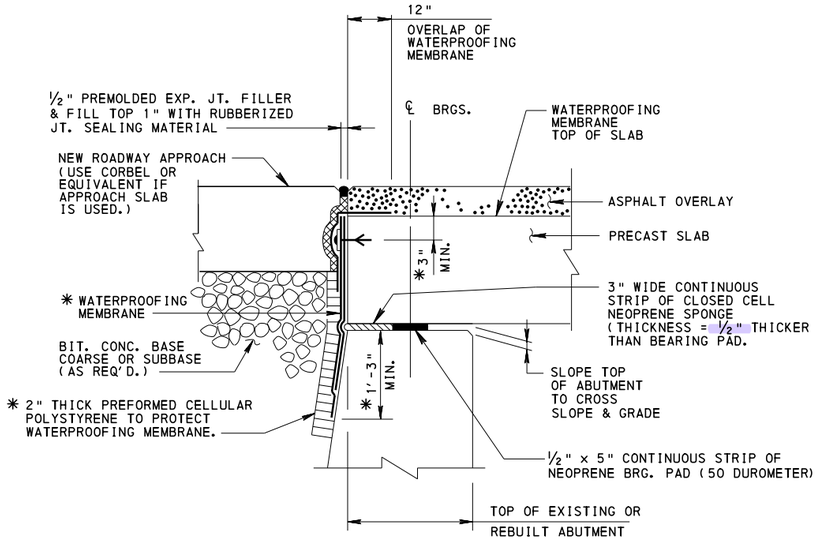
NOTES:

1. PROVIDE APPROVED WATERPROOFING MEMBRANE FOR THE ENTIRE TOP WIDTH AND LENGTH OF THE BOX AND 2'-0" WIDTH ± ALONG THE SIDE JOINTS FOR FILLS ≤ 2'-0". FOR FILLS > 2'-0" PROVIDE 2'-0" WIDTH ± ON THE TOP AND SIDE JOINTS.
2. LIMITS OF WATERPROOFING AT SIDE OF PRECAST BOX SECTION JOINTS 2'-0" WIDTH ± . PLACE THIS BEFORE THE TOP SLAB WATERPROOFING.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

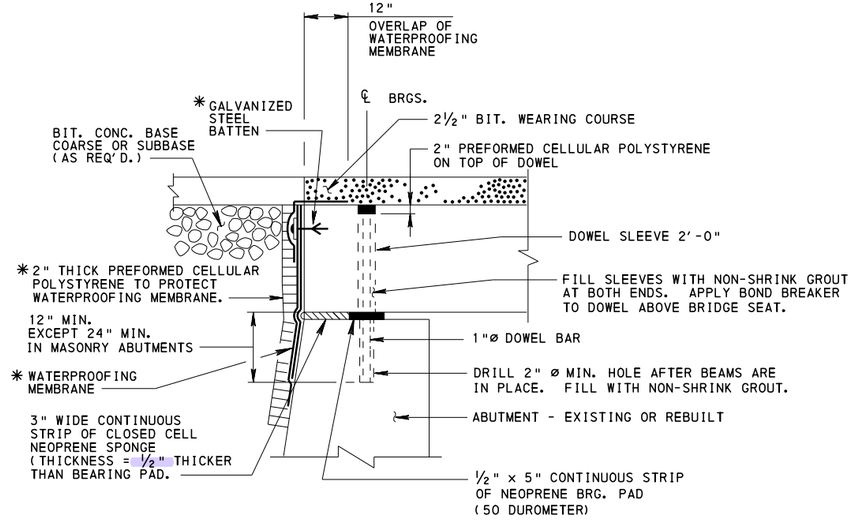
STANDARD
TYPICAL WATERPROOFING AND EXPANSION DETAILS PRECAST R.C. BOX CULVERTS

RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian S. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 10 OF 12 BC-788M



SECTION AT ABUTMENT (TYP.)

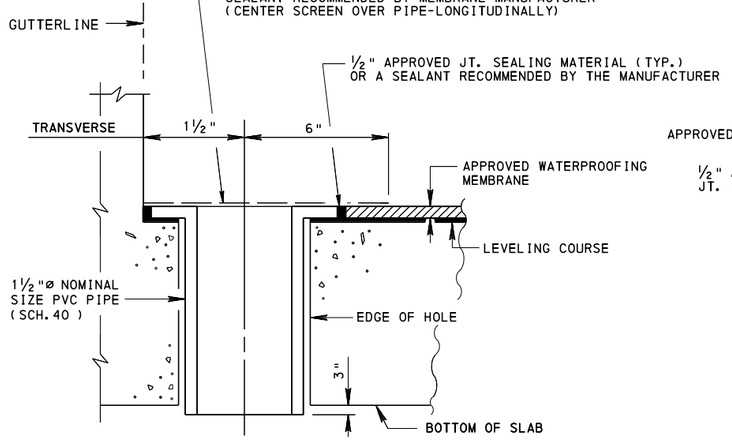
FOR PRECAST R.C. SLAB BRIDGE SPAN LENGTHS > 12'-0"
REHABILITATION PROJECTS ONLY



PANEL ANCHOR DETAIL

FOR PRECAST R.C. SLAB BRIDGE SPAN LENGTHS ≤ 12'-0"
REHABILITATION PROJECTS ONLY

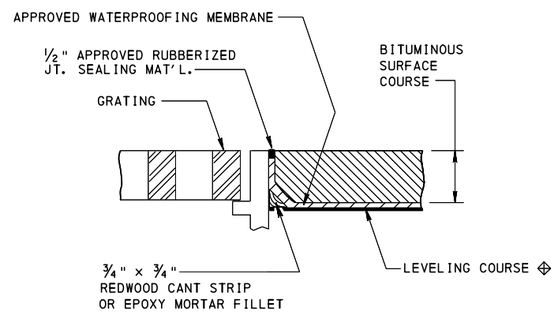
* NOTE:
FOR ADDITIONAL INFORMATION REFER TO DETAILS ON SHEET 12.



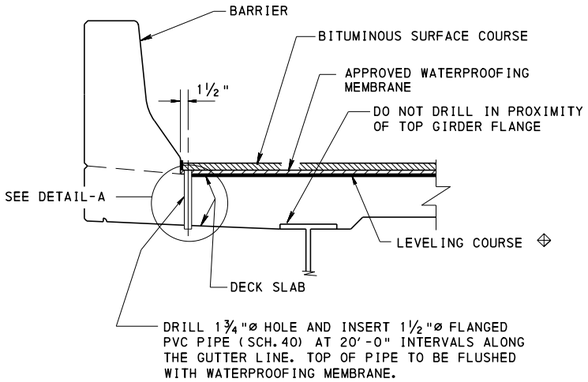
DRAIN PIPE THROUGH DECK SLAB

⊕ (SAME DETAIL @ CURB & MEDIAN BARRIER, IF APPLICABLE)

DETAIL-A



WATERPROOFING MEMBRANE AT SCUPPER



BARRIER SECTION

(SAME DETAIL AT CURB)

BITUMINOUS OVERLAY AND WATERPROOFING MEMBRANE DETAILS AT DECK DRAINS

REHABILITATION PROJECTS ONLY

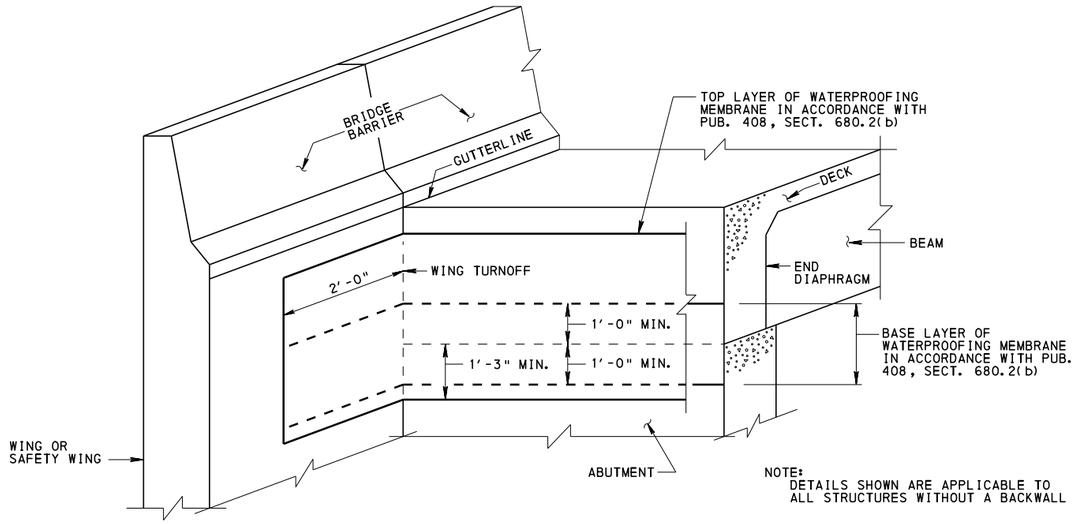
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
TYPICAL WATERPROOFING AND EXPANSION DETAILS
R.C. BRIDGE DECK

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

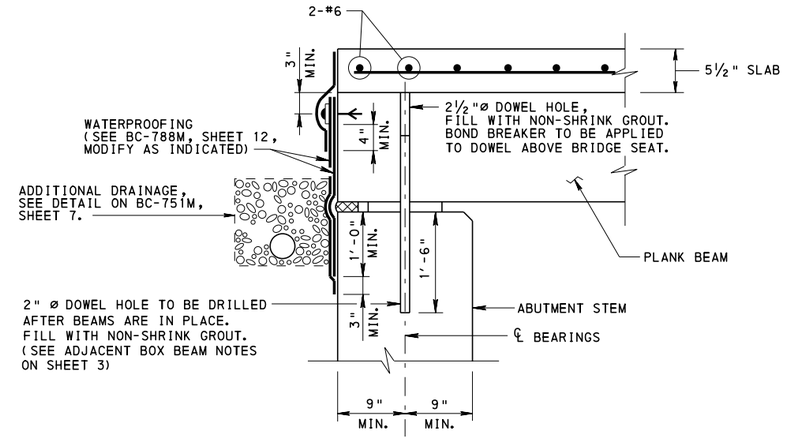
RECOMMENDED SEPT. 30, 2016
Brent B Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-788M

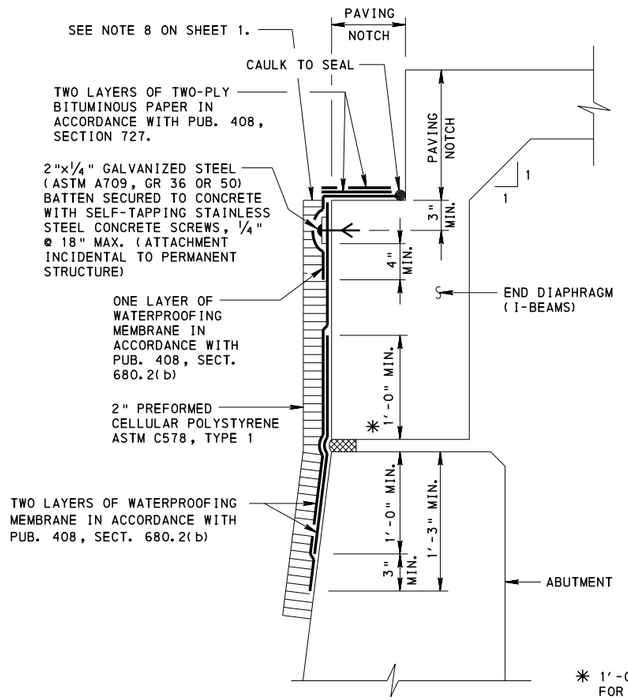


MEMBRANE WATERPROOFING DETAIL

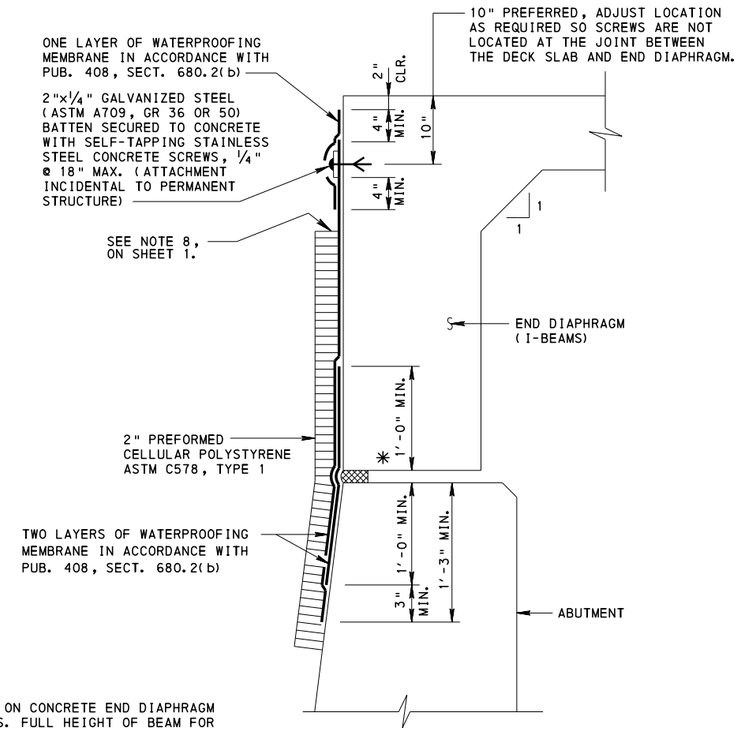
BATTEN AND BATTEN WATERPROOFING NOT SHOWN



TYPICAL LONGITUDINAL SECTION FOR PLANK BEAMS



WITH PAVING NOTCH



WITHOUT PAVING NOTCH

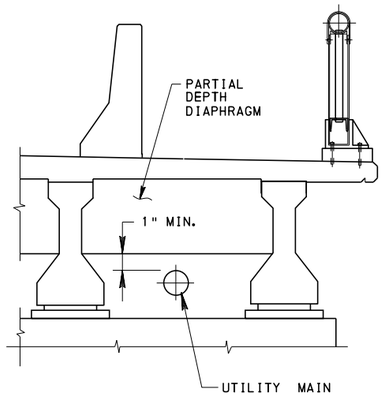
✳ 1'-0" MIN. ON CONCRETE END DIAPHRAGM FOR I-BEAMS. FULL HEIGHT OF BEAM FOR EXPOSED BOX BEAMS.

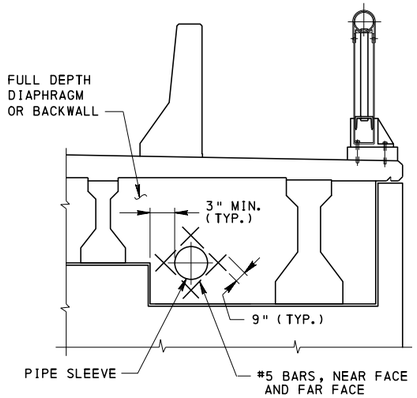
WATERPROOFING DETAIL AT ABUTMENT WITHOUT BACKWALL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

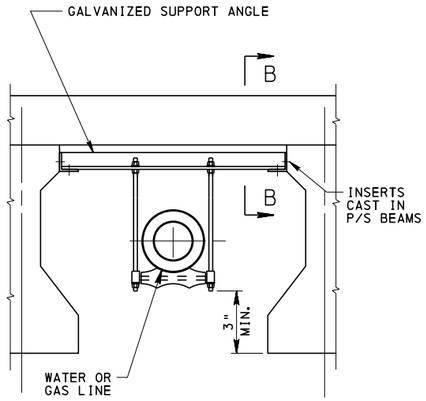
STANDARD MISCELLANEOUS WATERPROOFING DETAILS

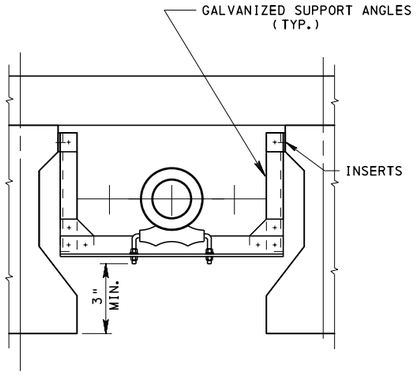
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 12 OF 12
Thomas P Macioce	Brent D Thompson	BC-788M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

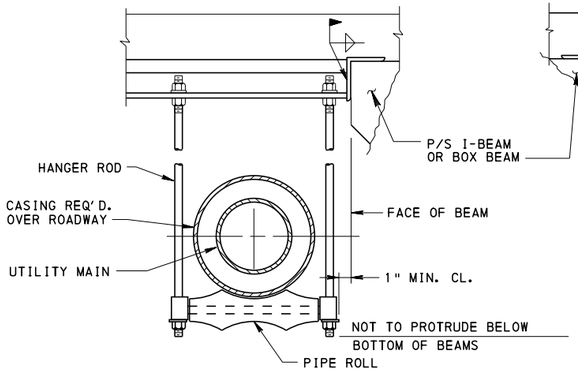


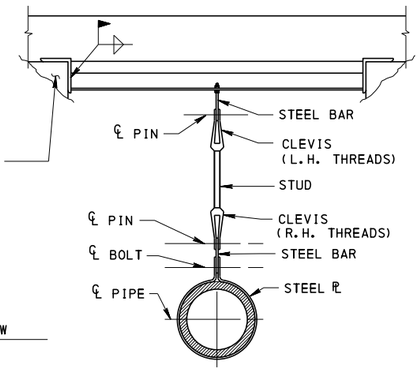


LOCATION OF SLEEVES OR CASINGS



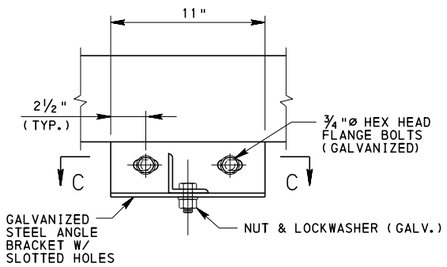




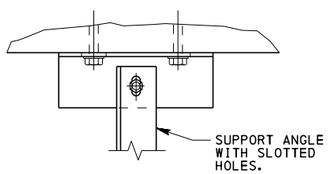


UTILITIES SUPPORTED BY I-BEAMS

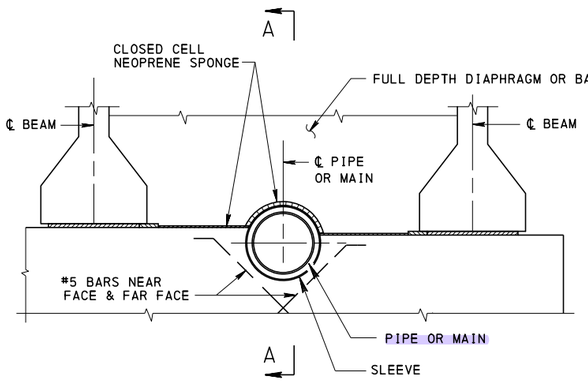
- SPREAD BOX BEAMS ARE SIMILAR.
- INSERTS ARE NOT PERMITTED FOR CONNECTION TO FLANGES OF BULB-TEE BEAMS.



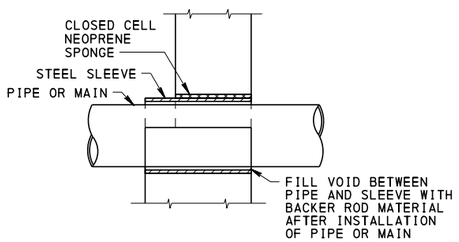
SECTION B-B



SECTION C-C



AT ABUTMENTS



SECTION A-A

CASINGS AND SLEEVES

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.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

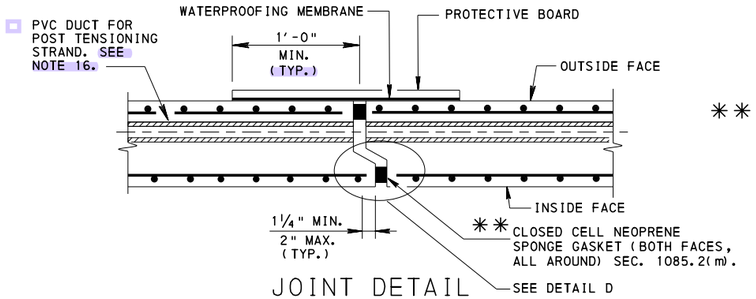
STANDARD UTILITY ATTACHMENT & SUPPORT DETAILS PRESTRESSED BRIDGES

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

RECOMMENDED SEPT. 30, 2016
Bruce A Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

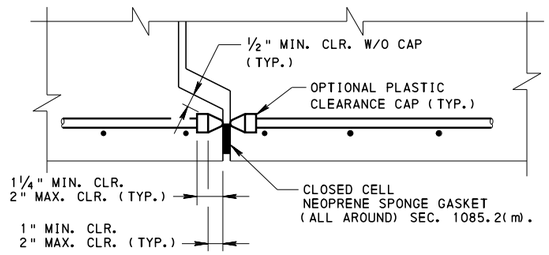
SHEET 1 OF 1

BC-794M



JOINT DETAIL

SEAL AROUND EACH DUCT JOINT WITH A NEOPRENE SPONGE DONUT.

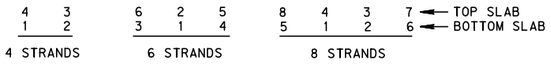


DETAIL D

** 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.

REQUIRED TOTAL NEOPRENE WIDTH		
WALL SIZE IN	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"

POST TENSIONING SEQUENCE:



NOTES:

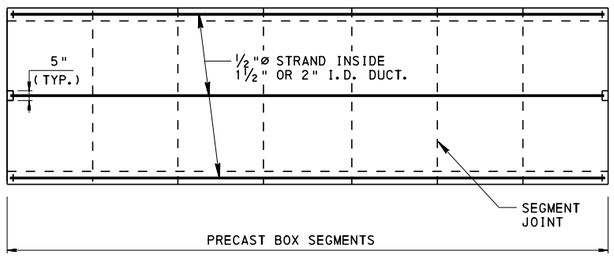
1. COMPLETE TENSIONING IN THREE PASSES: 1/3, 1/2 AND FULL POST TENSIONING FORCE.
2. FIRST AND SECOND TENSIONINGS MAY BE ALTERED AS REQUIRED TO MAINTAIN PROPER ALIGNMENT OF THE CULVERT.
3. WHERE MORE THAN EIGHT STRANDS ARE REQUIRED, TENSION ADDITIONAL STRANDS SIMILARLY AROUND THE CENTRAL AXIS.

INSTRUCTIONS FOR POST-TENSIONING

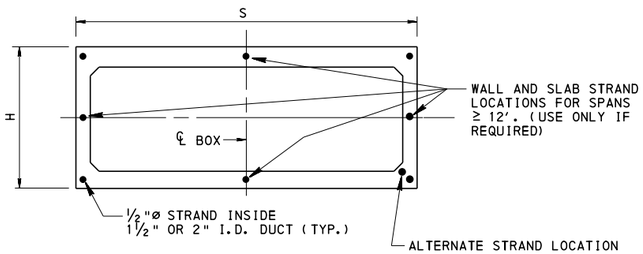
1. ALWAYS USE POST-TENSIONING WHEN END WALLS ARE NOT USED. USE THIS DETAIL WITH PRECAST OR CAST-IN-PLACE END WALLS AS PER DESIGN DRAWINGS.
2. SHOW ALL DETAILS ON SHOP DRAWINGS.
3. PROVIDE ½" DIAMETER POLY STRANDS OR APPROVED EQUAL HAVING A YIELD STRENGTH OF 270 KSI.
4. SNUG FIT ALL JOINTS BEFORE POST-TENSIONING.
5. 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.
6. AFTER STRESSING, GROUT ALL STRAND DUCTS. REFER TO PUB.408 SEC.1085 FOR TIME LIMITATIONS ASSOCIATED WITH GROUTING.
7. PLACE GROUT MIX INTO TUBING USING PRESSURE GROUT.
8. PROVIDE POST TENSIONING OPERATIONS AND MATERIALS IN ACCORDANCE WITH PUBLICATION 408, SECTION 1108. SHOP DRAWINGS ARE REQUIRED.
9. SUBMIT POST TENSIONING COMPUTATIONS WITH SHOP DRAWINGS SHOWING THE STRAND PATTERN AND REQUIRED POST-TENSIONING FORCE. BASE DESIGN UPON THE FOLLOWING CRITERIA:
   a. 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.
   b. MAXIMUM TOTAL POST TENSION FORCE SHOULD NOT CREATE A PRESSURE GREATER THAN 100 PSI OVER THE CROSS SECTION OF ANY SEGMENT.
   C. MINIMUM TOTAL POST TENSION FORCE IS 100 KIPS.
   d. MAXIMUM LOAD ON A ½" DIAMETER STRAND IS 29 KIP. USE 0.6" DIAMETER STRAND WITH HIGHER LOAD WHEN PERMITTED.
   e. USE A COFFICIENT OF SOIL FRICTION OF 0.6.
   f. PLACE STRANDS SYMMETRICALLY ABOUT BOTH AXES OF THE CULVERT CROSS SECTION.
   g. USE A MINIMUM OF 4 STRANDS.
   h. MAXIMUM STRAND SPACING IS 8'-0", EXCEPT FOR CULVERTS LESS THAN 12'-0" SPAN.
   i. MINIMUM STRAND SPACING IS 2'-0".
   j. PLACE CORNER STRANDS AT THE LOCATION OF CENTERLINES BETWEEN WALL AND SLAB OR AT A MAXIMUM DISTANCE OF 2'-0" FROM THIS LOCATION.
   k. LOCATE STRANDS SO AS TO NOT INTERFERE WITH REINFORCEMENT DETAILS.
10. PROVIDE SEALS OR GASKETS AROUND THE DUCTS AT THE JOINTS TO MAKE THE JOINTS GROUT TIGHT.
11. ALL POST-TENSIONING MUST BE WITNESSED AND APPROVED BY THE ENGINEER.
12. AFTER POST-TENSIONING IS APPROVED, CUT STRANDS TO PROVIDE A MINIMUM OF 2½" 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.
13. POST-TENSION AND GROUT BEFORE BACKFILLING AND PLACING TRAFFIC OVER THE BOX. AFTER GROUTING, WAIT AT LEAST TWO (2) DAYS BEFORE BACKFILLING.
14. 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.
15. KEEP JOINT CLEAN AT POST-TENSIONING STAGE.
16. 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.
17. REMOVE A MINIMAL AMOUNT OF POLYSTRAND TO ACCOMODATE INTERMEDIATE SPLICES AT BOX ENDS.

DUCT NOTES:

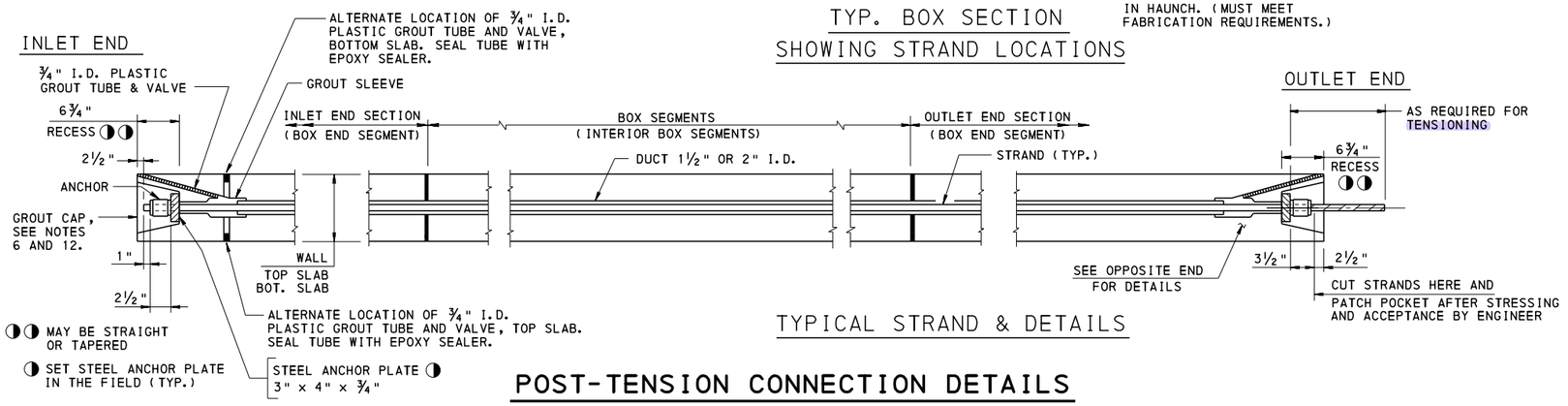
- PRECISE ALIGNMENT OF DUCTS AT JOINTS IS CRITICAL.
- ALL DUCTS (SHEATHING) TO BE 1½" OR 2" INSIDE DIAMETER.
- GROUT TUBES & VENTS TO BE ¾" INSIDE DIAMETER.



PLAN VIEW



TYP. BOX SECTION SHOWING STRAND LOCATIONS



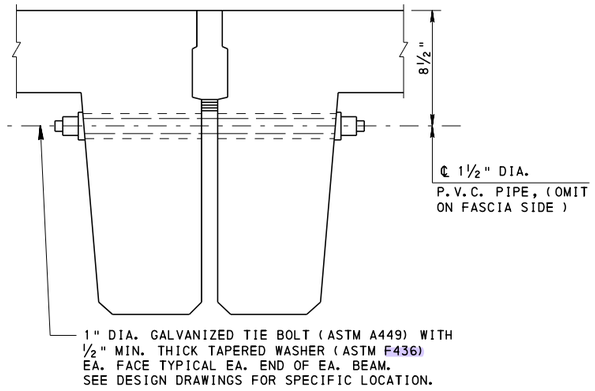
TYPICAL STRAND & DETAILS

POST-TENSION CONNECTION DETAILS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
MECHANICAL CONNECTION DETAILS
PRECAST BOX CULVERT

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 1 OF 3
Thomas P Macioce	Bruce D Thompson	BC-798M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

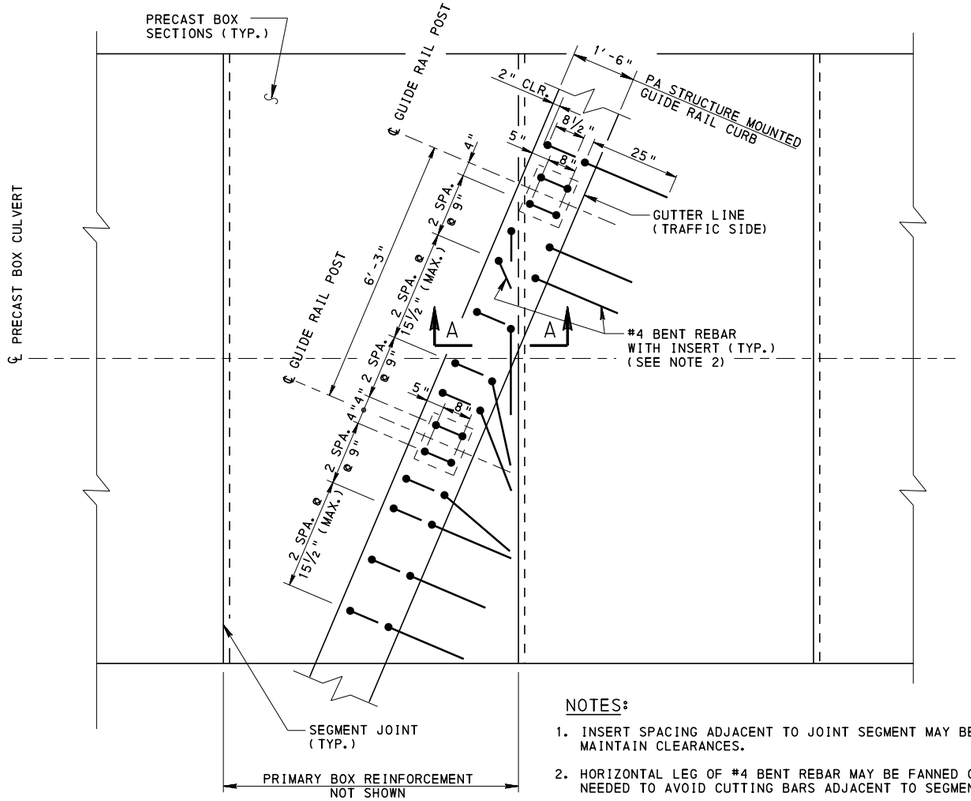


TIE BOLT DETAIL - PRECAST CHANNEL BEAM

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
MECHANICAL CONNECTION DETAILS
PRECAST SLAB AND
PRECAST CHANNEL BEAM

RECOMMENDED SEPT. 30, 2016 Thomas P Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Bruce B Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 2 OF 3 BC-798M

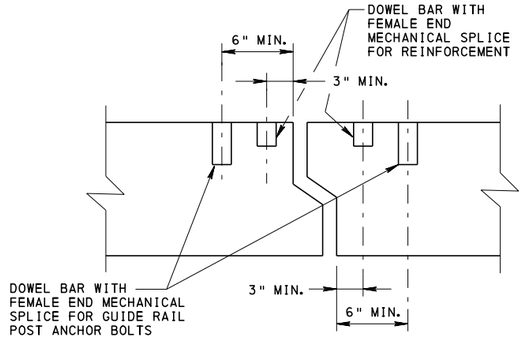


NOTES:

1. INSERT SPACING ADJACENT TO JOINT SEGMENT MAY BE ADJUSTED ±1" TO MAINTAIN CLEARANCES.
2. HORIZONTAL LEG OF #4 BENT REBAR MAY BE FANNED OR ROTATED AS NEEDED TO AVOID CUTTING BARS ADJACENT TO SEGMENT JOINT.

PLAN VIEW - GUIDE RAIL CURB REINFORCEMENT AT SEGMENT JOINT

GUIDE RAIL NOT SHOWN FOR CLARITY

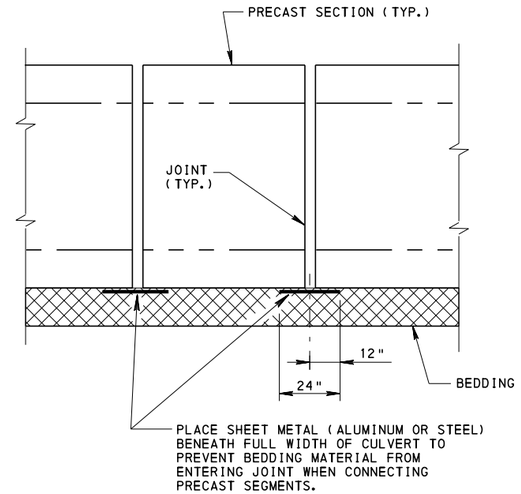


SECTION A-A

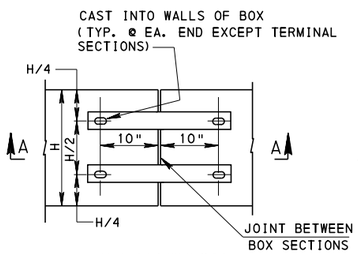
(SEGMENT JOINT)

SKEWED CURB LAYOUT GUIDELINES:

1. MAINTAIN THE GUIDE RAIL POST SPACING AT 6'-3" AND MOVE THE GUIDE RAIL POSTS AS A GROUP TO AVOID CONFLICTS WITH THE CULVERT JOINTS.
2. ADJUST SEGMENT LENGTHS WHEN POSSIBLE TO AVOID CONFLICTS WITH GUIDE RAIL POSTS.
3. MAINTAIN THE MINIMUM EDGE DISTANCES SHOWN ON SECTION A-A.
4. ONE (1) OF THE FOUR (4) BOLTS FOR THE GUIDE RAIL POST 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 1½" MIN. CONCRETE COVER. DO NOT SHORTEN TAILS OF THE DOWEL BARS.
6. S7 BARS ARE NOT REQUIRED IF GUIDE RAIL IS NOT ADJACENT TO THE EXTERIOR EDGE OF THE BOX CULVERT.



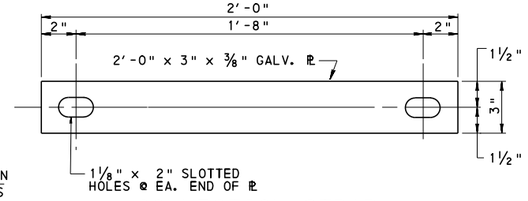
ELEVATION VIEW AT PRECAST SEGMENT JOINTS



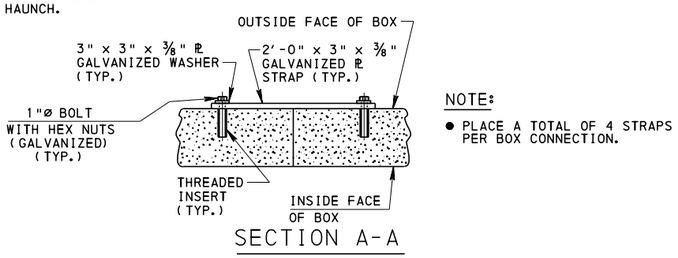
ELEVATION

NOTE:

- H INDICATES WALL HEIGHT EXCLUDING HAUNCH.



CONNECTION STRAP



SECTION A-A

NOTE:

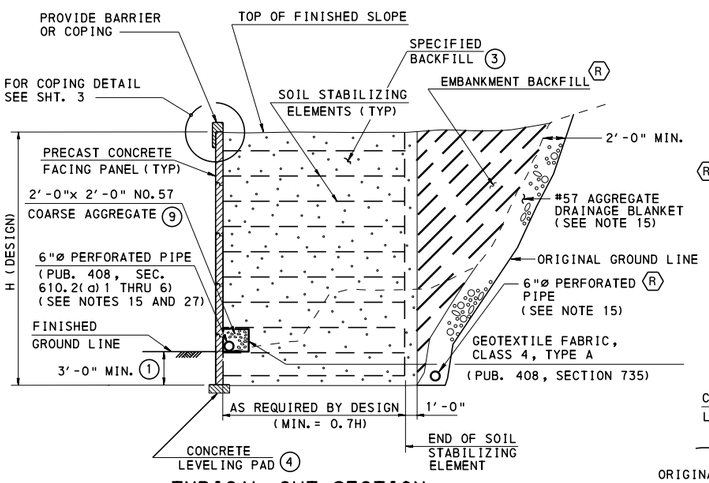
- PLACE A TOTAL OF 4 STRAPS PER BOX CONNECTION.

GALVANIZED STRAP CONNECTION DETAIL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

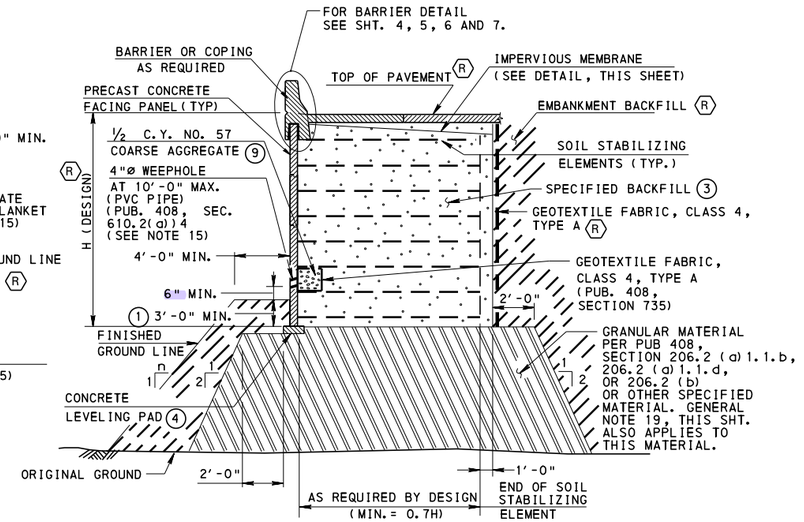
STANDARD MECHANICAL CONNECTION DETAILS PRECAST R.C. BOX CULVERT

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 3
Thomas P. Macioce	Brian D. Thompson	BC-798M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



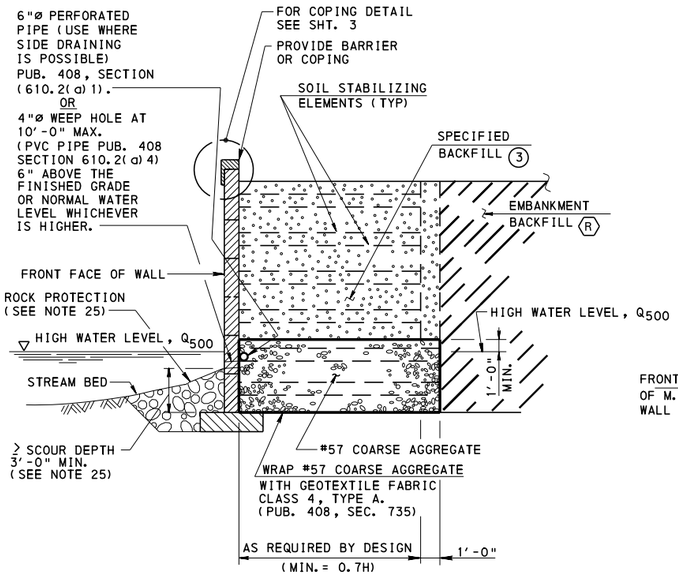
TYPICAL CUT SECTION

DETAIL TO BE USED WHERE SIDE DRAINAGE IS POSSIBLE



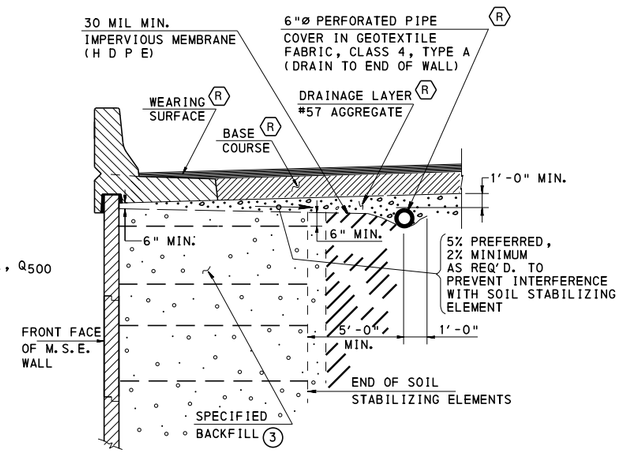
TYPICAL FILL SECTION

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.

GENERAL NOTES:

1. FOR LEGEND OF ◯ NOTES AND SYMBOLS, SEE SHEET 2.
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 PUB. 408 SPECIFICATIONS.
3. 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.
4. 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.
5. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408, AND CONTRACT SPECIAL PROVISIONS.
6. DESIGN SPECIFICATIONS:
   - CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND COMMENTARY AS AMENDED BY DESIGN MANUAL PART 4, VOLUME 1, PUB. 15M.
7. CHAMFER EXPOSED CONCRETE EDGES ¾" x ¾", EXCEPT AS NOTED OTHERWISE.
8. FOR CONCRETE STRENGTH FOR PANELS, REFER TO SPECIAL PROVISIONS.
9. USE CLASS A CEMENT CONCRETE, f'c = 3.0 ksi, FOR FOOTINGS, LEVELING PADS, STEP DETAILS AND CRASH WALLS.
10. USE CLASS AA, f'c = 3.5 ksi, CEMENT CONCRETE FOR CURBS, BARRIERS, CONCRETE LEVELING FILLS, MOMENT SLABS, BACKWALLS AND COPINGS.
11. 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.
12. PROVIDE EPOXY COATED REINFORCEMENT STEEL FOR COPINGS, BARRIERS AND SHOULDER SLABS, AND BACKWALLS. PROVIDE EPOXY COATED REINFORCEMENT STEEL FOR PANELS AS INDICATED.
13. THE DIFFERENCE BETWEEN SPECIFIED BACKFILL AND EMBANKMENT BACKFILL ELEVATIONS IS NOT TO BE MORE THAN 2'-0" AT ANY TIME DURING BACKFILLING.
14. WHERE P.C.P. IS INDICATED, USE PREFORMED CELLULAR POLYSTYRENE ASTM C 578, TYPE 1, EXCEPT LIMIT THE WATER ABSORPTION TO 2% BY VOLUME.
15. 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.
16. PROVIDE SHOP DRAWINGS AS PER PUB. 408.
17. FOR PREFABRICATED WALLS ALONG RAILROADS, REFER TO DW-4 FOR CRASH WALL REQUIREMENTS AND THE TYPICAL DETAIL ON SHEET 3.
18. GALVANIZE ALL SOIL STABILIZING ELEMENTS AND HARDWARE AS SPECIFIED.
19. 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.
20. BACKFILL MATERIALS (DESIGN PROPERTIES):
    EMBANKMENT BACKFILL ϕ = 30°
    SPECIFIED BACKFILL ϕ = 34°
    #57 COARSE AGGREGATE USE ϕ = 34°
    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.
21. 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: "ALL DESIGN ASSUMPTIONS ARE VALIDATED THROUGH NOTES OR DETAILS ON THESE DRAWINGS"
22. SOME OF THE TECHNICAL DETAILS WERE PROVIDED BY REINFORCED EARTH COMPANY AND RETAINED EARTH (FOSTER GEOTECHNICAL) COMPANY. FOR PROPRIETARY RIGHTS CONTACT APPROPRIATE PROPRIETOR.
23. DO NOT CUT REINFORCEMENT STRIPS OR MESH. BEND OR SKEW ONLY AS SHOWN IN DETAIL OR NOTES ON SHEETS 2, 8 & 11.
24. 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.
25. PROVIDE ROCK PROTECTION AS REQUIRED BY SCOUR CALCULATIONS.
26. 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.
27. METAL PIPES IN ACCORDANCE WITH PUB. 408, SECTIONS 610.2(a) 7 AND 8 ARE NOT PERMITTED.
28. REFER TO SHEET 8 FOR HORIZONTAL DRAINAGE PIPES WHICH ARE INSTALLED WITHIN SPECIFIED BACKFILL AREA.

INDEX OF SHEETS

REFERENCE DRAWINGS

BC-735M	WALL CONSTR. & EXP. JOINTS DETAILS
BC-736M	REINFORCEMENT BAR FABRICATION DETAILS
BC-739M	BRIDGE BARRIER TO GUIDE RAIL TRANSITION
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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

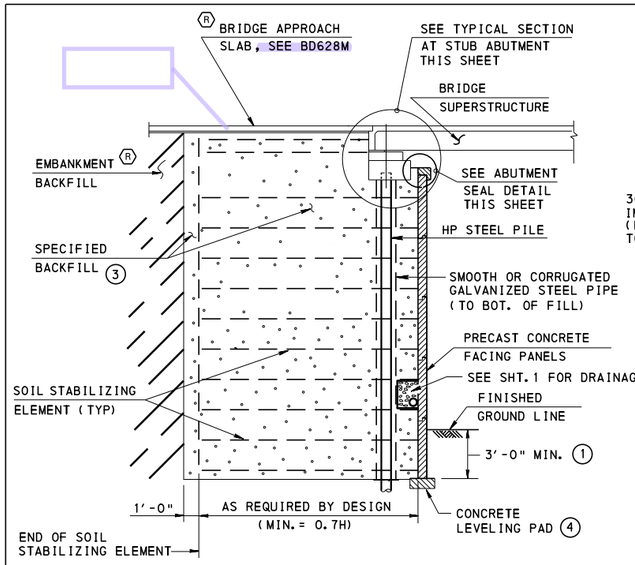
STANDARD
MECHANICALLY STABILIZED EARTH RETAINING WALLS
DETAILS AND GENERAL NOTES

RECOMMENDED SEPT. 30, 2016
Thomas P Macioce
CHIEF BRIDGE ENGINEER

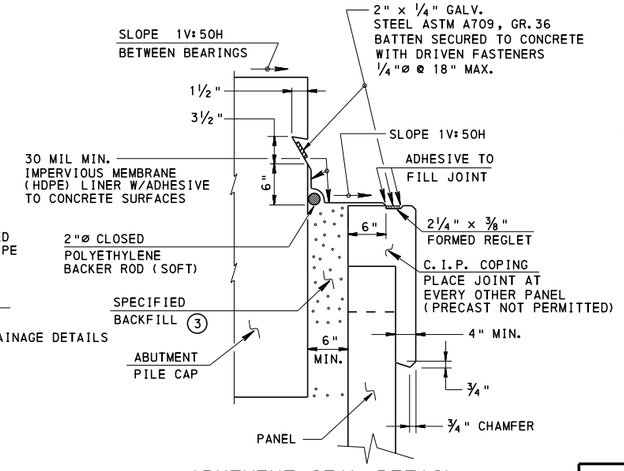
RECOMMENDED SEPT. 30, 2016
Brent B Thompson
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 1 OF 13

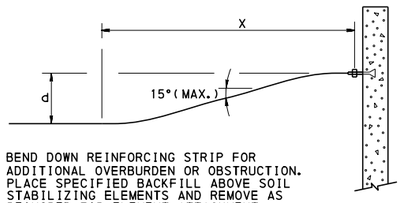
BC-799M



BRIDGE ABUTMENT



ABUTMENT SEAL DETAIL



BEND DOWN REINFORCING STRIP FOR ADDITIONAL OVERBURDEN OR OBSTRUCTION. PLACE SPECIFIED BACKFILL ABOVE SOIL STABILIZING ELEMENTS AND REMOVE AS REQUIRED FOR ELEMENT ATTACHMENT.

REINFORCING STRIP OR MESH BEND DETAIL

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"

L E G E N D

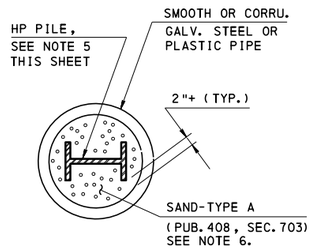
(1) OR PREVAILING FROST DEPTH OR AS REQUIRED BY DESIGN AND SLOPE STABILITY ANALYSIS.
(2) AS REQUIRED BY DESIGN. (EXCLUSIVE OF ANY AESTHETIC DETAILS.)
(3) REFER TO SPECIAL PROVISIONS FOR GRANULAR FILL MATERIALS.
(4) 12" WIDE x 6" THICK MIN. UNREINFORCED CONCRETE, EXCEPT FOR CRASHWALL CONDITION.
(5) MIN. 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

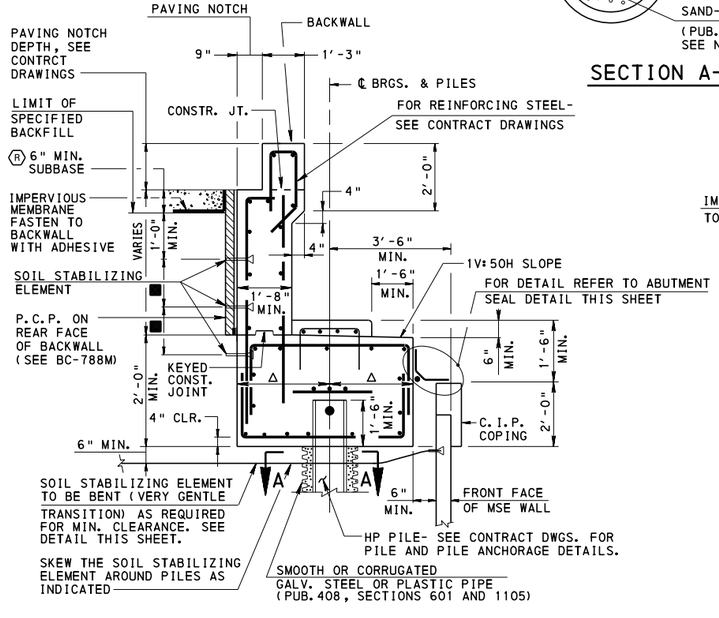
H D P E = HIGH DENSITY POLYETHELENE
C.I.P. = CAST IN PLACE
M.S.E. = MECHANICALLY STABILIZED EARTH
C.C.N.S. = CLOSED CELL NEOPRENE SPONGE
SCGS = SMOOTH OR CORRUGATED GALVANIZED STEEL PIPE
R.S. = REINFORCING STRIP
P.C.P. = PREFORMED CELLULAR POLYSTYRENE

PILE INSTALLATION SEQUENCE NOTES

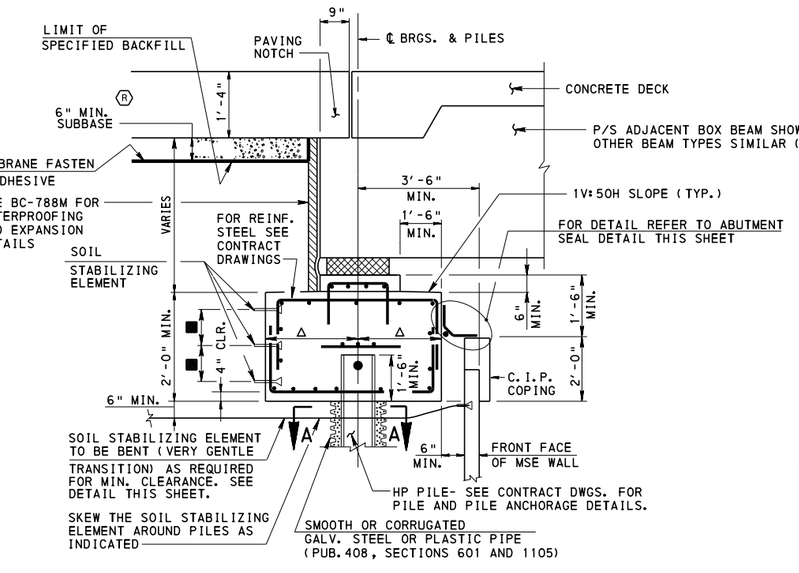
1. DRIVE ALL PILES PRIOR TO MSE WALL INSTALLATION. PREDRILL AS INDICATED.
2. PLACE OVER EACH PILE, A SMOOTH WALL OR CORRUGATED GALVANIZED STEEL (SCGS) OR PLASTIC PIPE OF SUFFICIENT THICKNESS OR AS SPECIFIED, TO PREVENT BUCKLING OR DISTORTION DURING THE PLACEMENT AND COMPACTION OF THE BACKFILL.
3. PLACE 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.



SECTION A-A



TYPICAL SECTION AT STUB ABUTMENT WITH BACKWALL



TYPICAL SECTION AT STUB ABUTMENT WITHOUT BACKWALL

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.

■ 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

COMMONWEALTH OF PENNSYLVANIA
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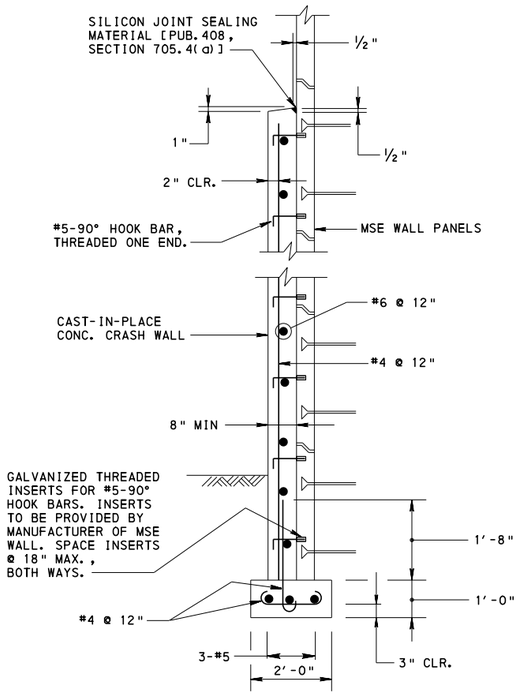
STANDARD
MECHANICALLY STABILIZED EARTH RETAINING WALLS
ABUTMENT

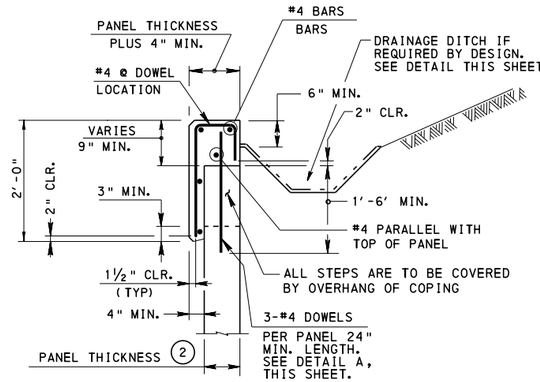
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 2 OF 13
Thomas P Macioce	Bruce B Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-799M



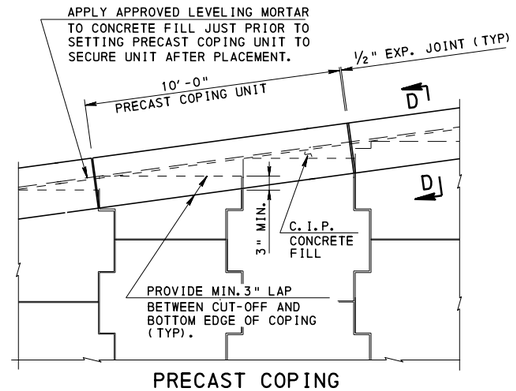
CRASH WALL TYPICAL SECTION

CRASH WALL REQUIREMENTS FOR BRIDGES OVER 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.



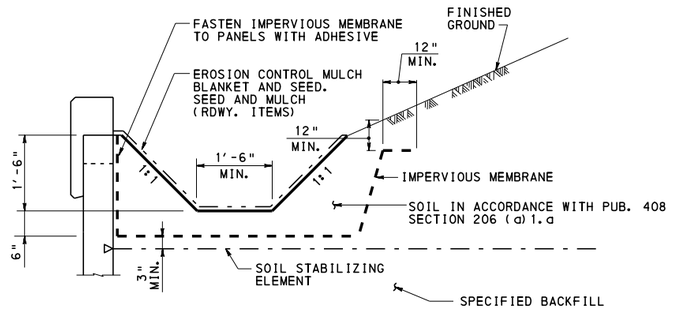
C.I.P. CONCRETE COPING DETAIL



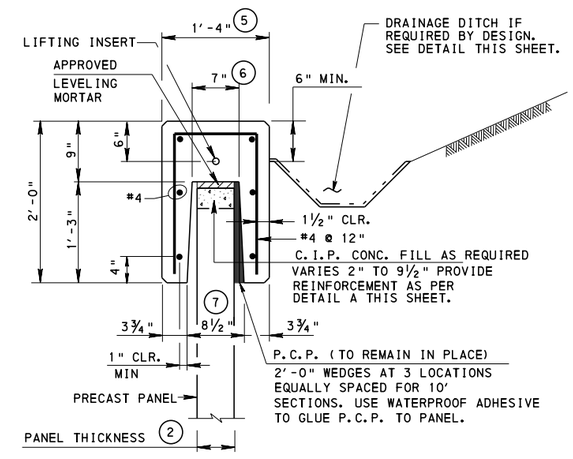
PRECAST COPING PARTIAL ELEVATION

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.

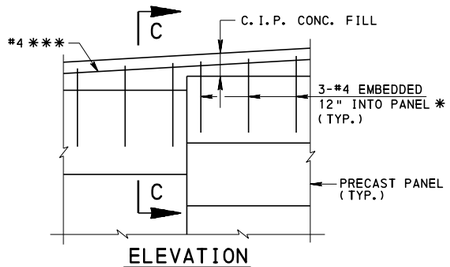


DRAINAGE DITCH DETAIL

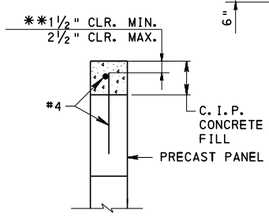


SECTION D-D PRECAST COPING DETAIL

NOTE:
FOR LEGEND OF ◯ NOTES, ABBREVIATIONS AND SYMBOLS, SEE SHEET 2.



ELEVATION



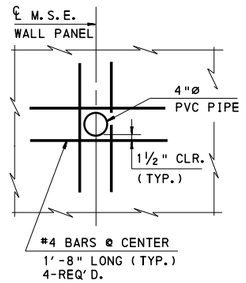
SECTION C-C

DETAIL A

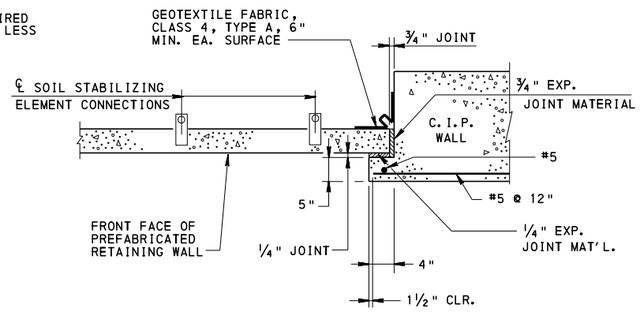
* FOR RECTANGULAR DOUBLE WIDTH PANELS, USE 6-#4 BARS.

** BARS MAY BE SAWCUT IN FIELD TO ALLOW FOR STANDARD DETAILING OF DOWELS. TORCH CUTTING IS NOT PERMITTED. COAT CUT ENDS WITH EPOXY PAINT.

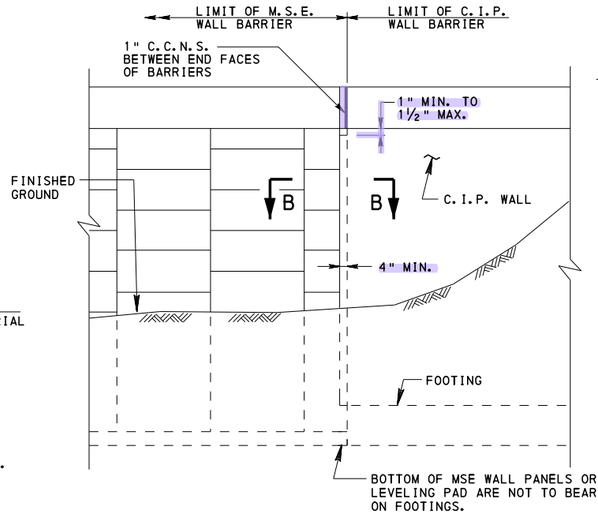
*** LONGITUDINAL REINFORCEMENT NOT REQUIRED IF DEPTH OF C.I.P. CONCRETE FILL IS LESS THAN 4".



WEEPHOLE REINFORCEMENT



SECTION B-B



ELEVATION - M.S.E. WALL JUNCTION WITH C.I.P. WALL

COMMONWEALTH OF PENNSYLVANIA
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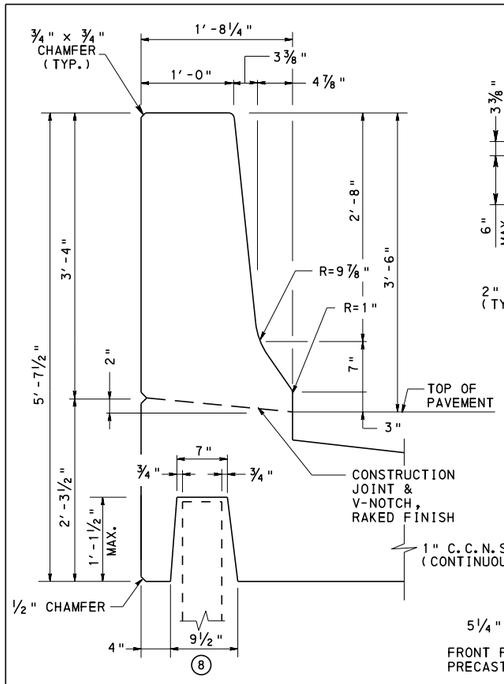
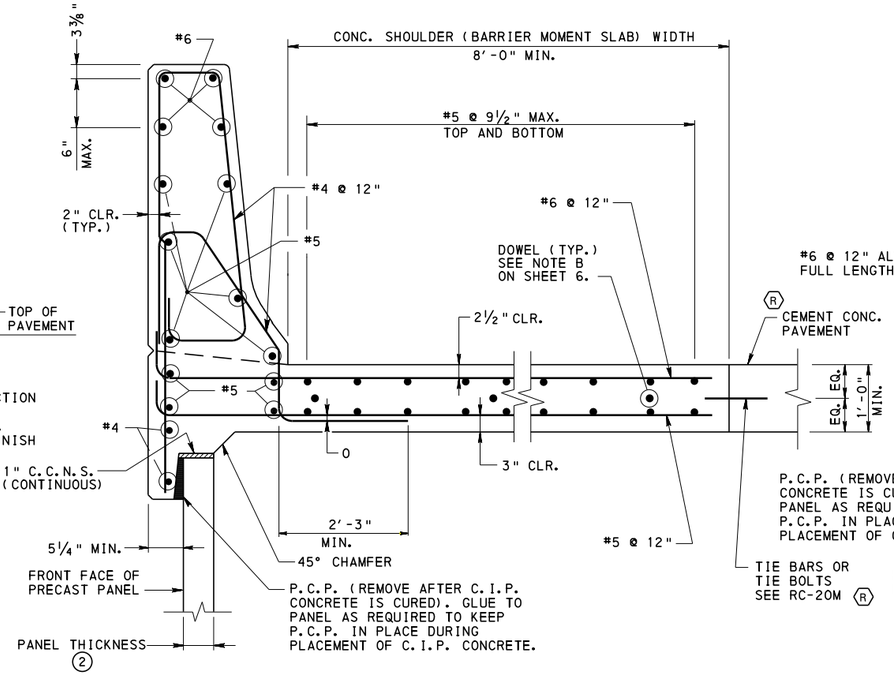
BUREAU OF PROJECT DELIVERY

STANDARD MECHANICALLY STABILIZED EARTH RETAINING WALLS CRASH WALL AND MISCELLANEOUS WALL DETAILS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 3 OF 13
Thomas P. Macioce	Brent D. Thompson	BC-799M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	

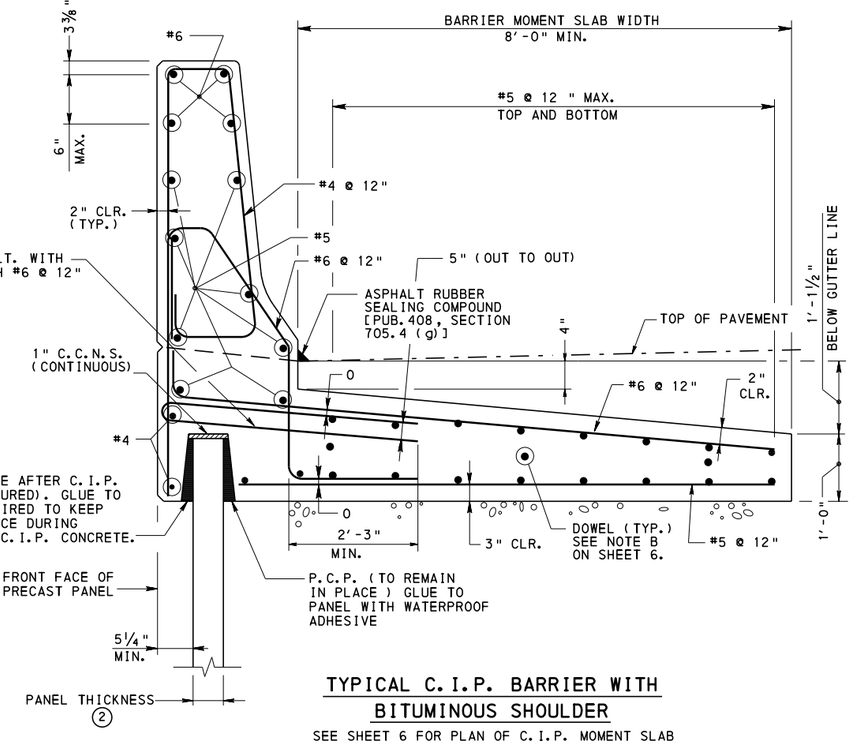


TYPICAL CAST-IN -PLACE BARRIER DIMENSIONS



TYPICAL C.I.P. BARRIER WITH CEMENT CONCRETE SHOULDER

SEE SHEET 6 FOR PLAN OF C.I.P. MOMENT SLAB



TYPICAL C.I.P. BARRIER WITH BITUMINOUS SHOULDER

SEE SHEET 6 FOR PLAN OF C.I.P. MOMENT SLAB

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 SHT. 7.

NOTE:

1. FOR LEGEND OF ◯ NOTES, ABBREVIATIONS AND SYMBOLS, SEE SHEET 2.

COMMONWEALTH OF PENNSYLVANIA
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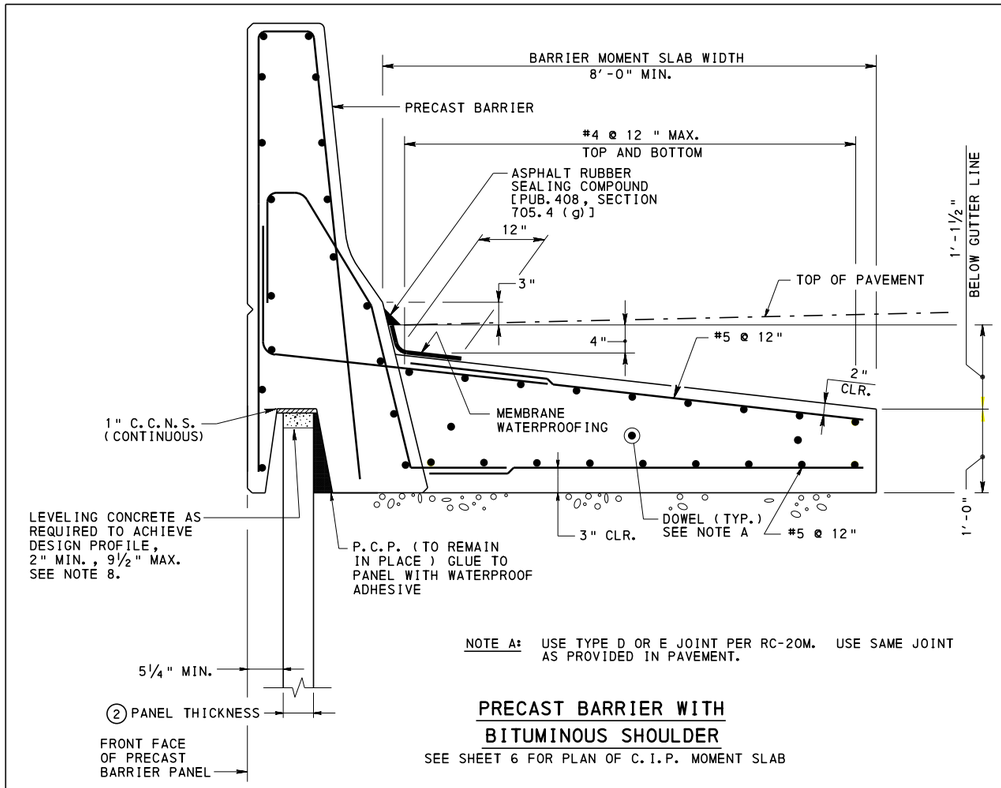
STANDARD MECHANICALLY STABILIZED EARTH RETAINING WALLS C.I.P. TRAFFIC BARRIER

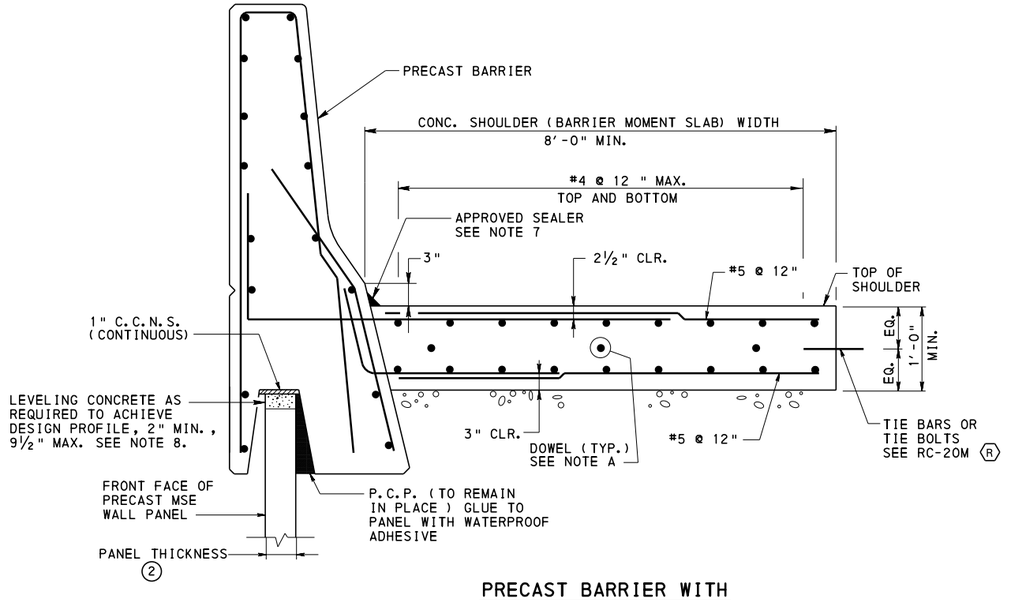
RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 4 OF 13 BC-799M



NOTE A: USE TYPE D OR E JOINT PER RC-20M. USE SAME JOINT AS PROVIDED IN PAVEMENT.

PRECAST BARRIER WITH BITUMINOUS SHOULDER

SEE SHEET 6 FOR PLAN OF C.I.P. MOMENT SLAB



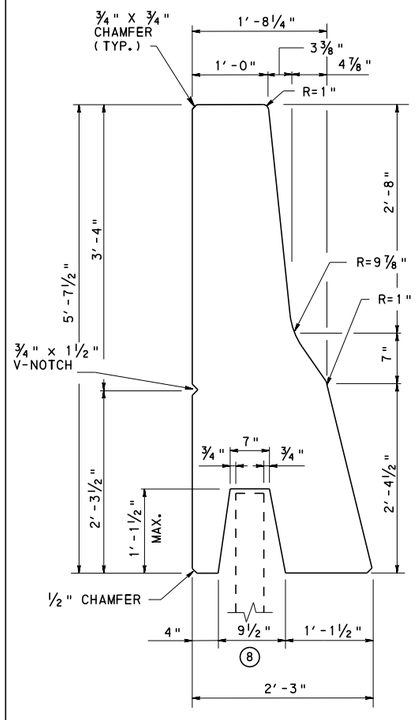
PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER

SEE SHEET 6 FOR PLAN OF C.I.P. MOMENT SLAB

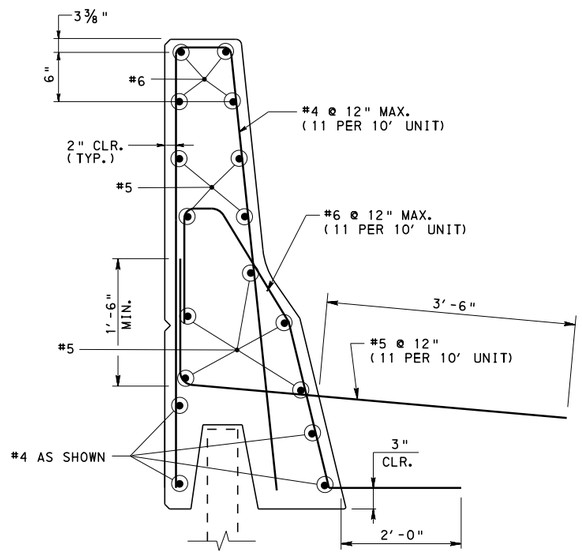
TRAFFIC BARRIER AND MOMENT SLAB NOTES:

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 SHT. 7.
6. APPLY BONDING COMPOUND BETWEEN PRECAST BARRIER AND C.I.P. MOMENT SLAB.
7. USE SILICONE JOINT SEALING MATERIAL AS PER PUB. 408, SECTION 705.4 (a).
8. PROVIDE REINFORCEMENT AS PER DETAIL A ON SHEET 3.

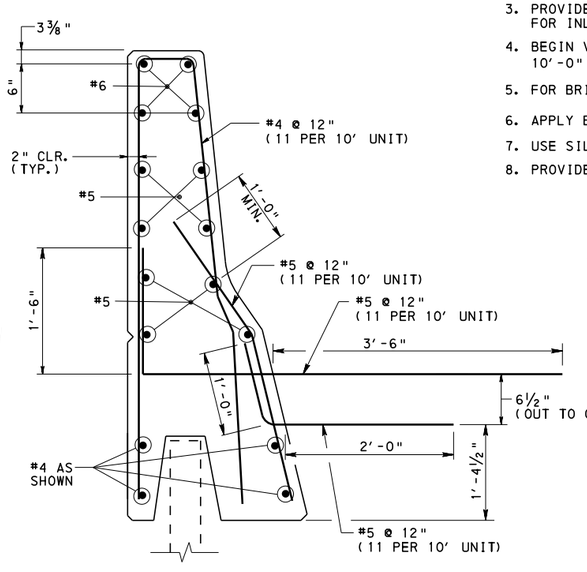
NOTE:
FOR LEGEND OF ◯ NOTES, ABBREVIATIONS AND SYMBOLS, SEE SHEET 2.



DIMENSIONS



REINFORCEMENT FOR BARRIER WITH BITUMINOUS SHOULDER



REINFORCEMENT FOR BARRIER WITH CEMENT CONCRETE SHOULDER

TYPICAL PRECAST BARRIER DETAILS

COMMONWEALTH OF PENNSYLVANIA
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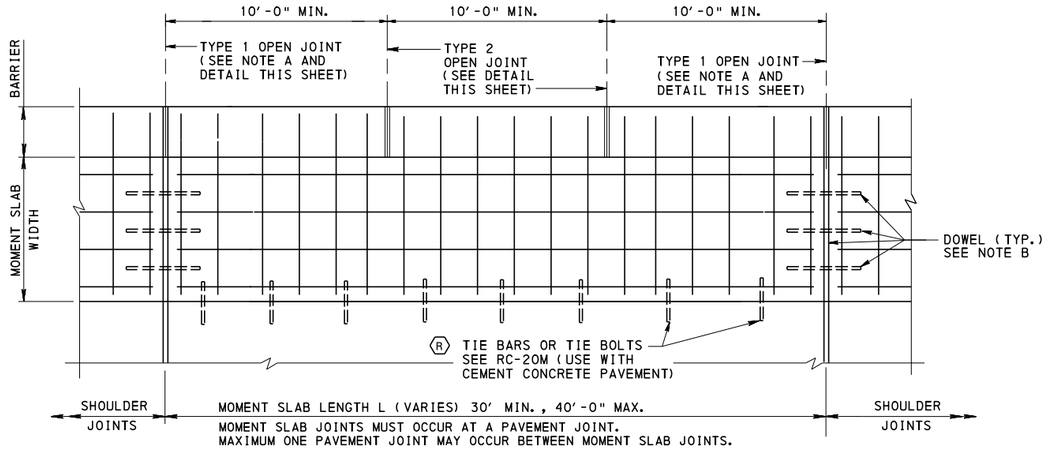
STANDARD MECHANICALLY STABILIZED EARTH RETAINING WALLS PRECAST TRAFFIC BARRIER

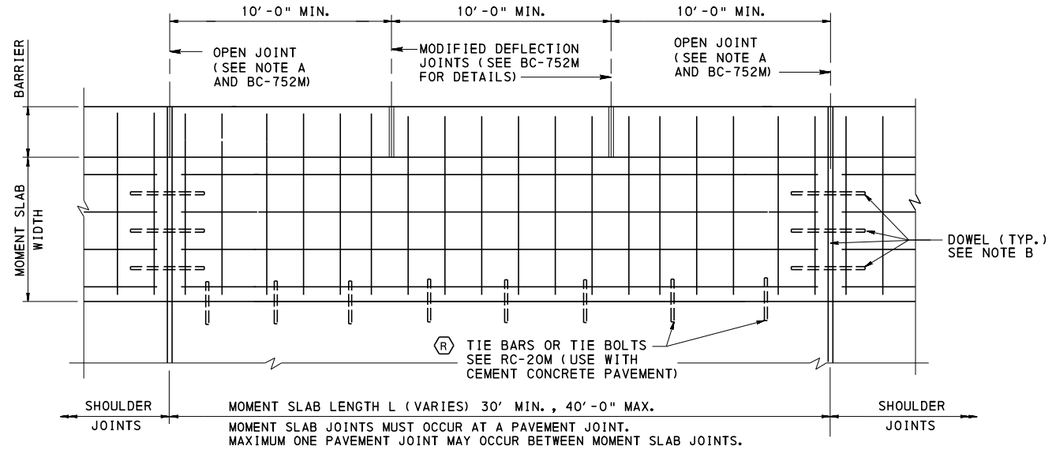
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 5 OF 13
Thomas P. Macioce	Brent D. Thompson	BC-799M
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	



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-20M. 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-20M. USE SAME JOINT AS PROVIDED IN PAVEMENT.

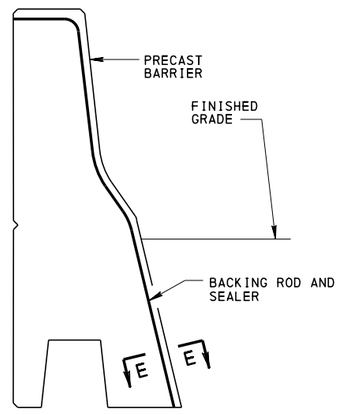
PLAN - BARRIER MOMENT SLAB
(C.I.P. BARRIER)

BARRIER MOMENT SLAB NOTES:

1. ALL OPEN JOINTS IN THE BARRIER MUST BE FILLED WITH BACKING ROD AND SEALED WITH SILICONE JOINT SEALING MATERIAL AS PER PUBLICATION 408, SEC. 705.4 (a).
2. EXPOSED JOINTS @ BARRIER MAY VARY FROM ½" TO 1" WIDTH FOR TYPE 1 OPEN JOINT AND ¼" TO ¾" WIDTH FOR TYPE 2 OPEN JOINT, TO ALLOW FOR HORIZONTAL AND/OR VERTICAL CURVATURE IN WALL.

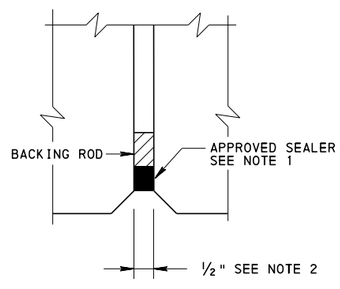
NOTE:

FOR LEGEND OF SYMBOLS, SEE SHEET 2.



SECTION

TYPE 1 AND TYPE 2 OPEN JOINT IN PRECAST BARRIER



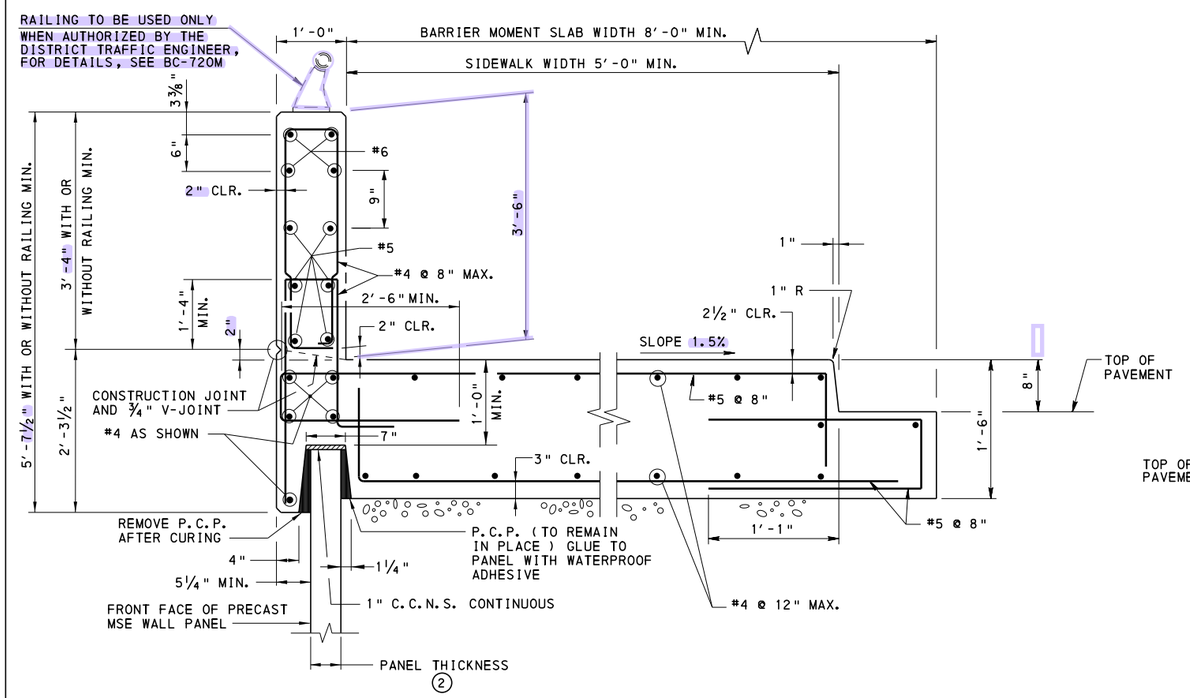
SECTION E-E

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD MECHANICALLY STABILIZED EARTH RETAINING WALLS MOMENT SLAB AND BARRIER JOINT

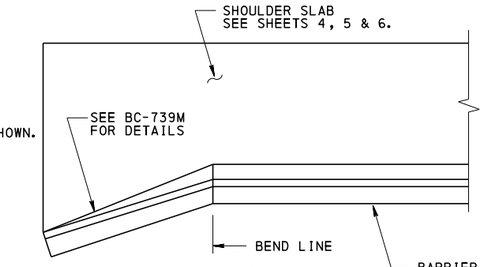
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 6 OF 13
Thomas P. Macioce	Brent D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-799M

RAILING TO BE USED ONLY WHEN AUTHORIZED BY THE DISTRICT TRAFFIC ENGINEER, FOR DETAILS, SEE BC-720M

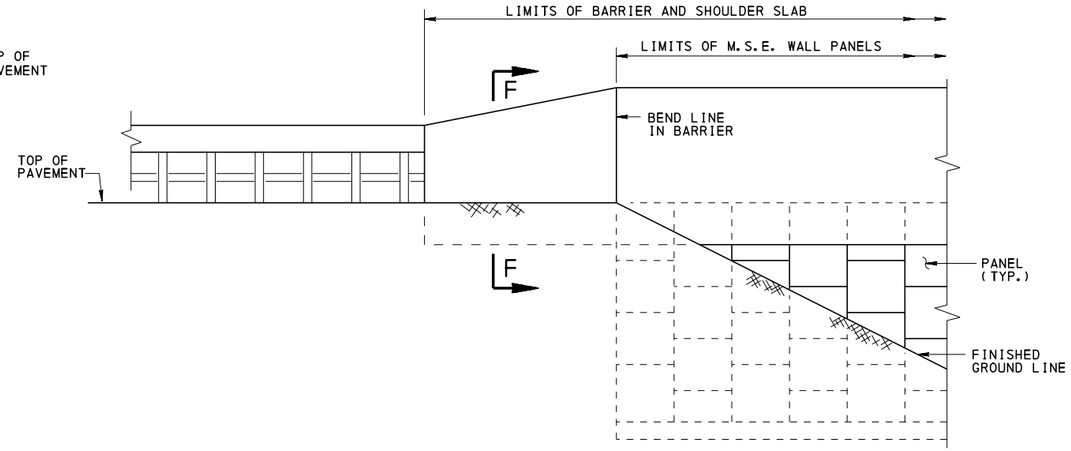


SIDEWALK BARRIER SECTION
(C.I.P.)

NOTE:
GUIDE RAIL AND INLET (AS APPLICABLE) NOT SHOWN.

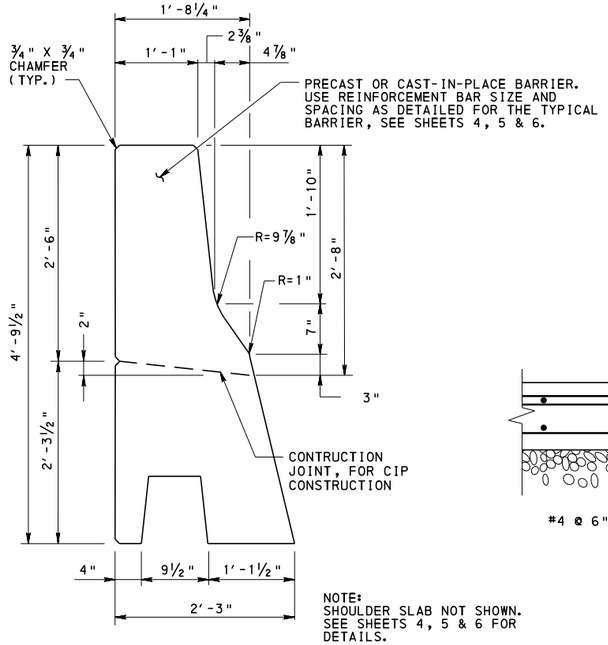


PLAN



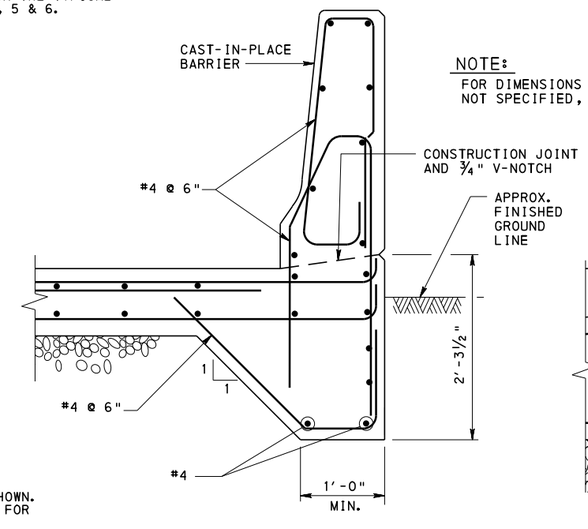
ELEVATION

BARRIER TO GUIDE RAIL TRANSITION



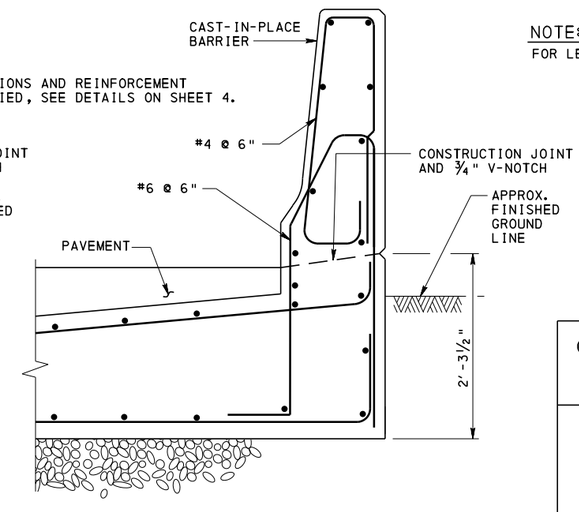
NOTE:
SHOULDER SLAB NOT SHOWN. SEE SHEETS 4, 5 & 6 FOR DETAILS.

ALTERNATE TRAFFIC BARRIER
TO BE USED ONLY IF AUTHORIZED BY CHIEF BRIDGE ENGINEER



NOTE:
FOR DIMENSIONS AND REINFORCEMENT NOT SPECIFIED, SEE DETAILS ON SHEET 4.

BARRIER WITH CEMENT CONCRETE SHOULDER
(C.I.P.)



BARRIER WITH BITUMINOUS SHOULDER
(C.I.P.)

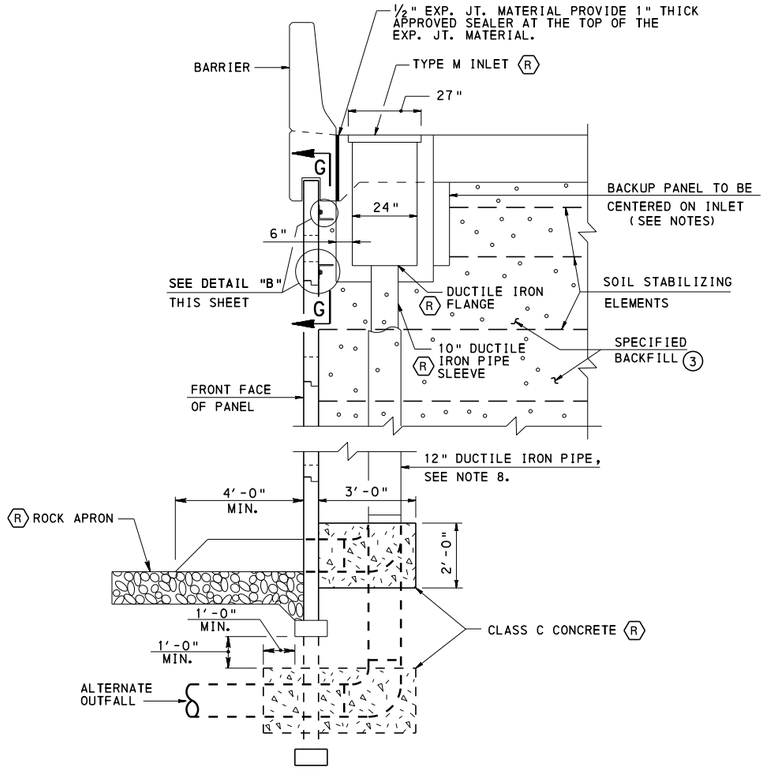
NOTE:
FOR LEGEND OF ◯ NOTES, ABBREVIATIONS AND SYMBOLS, SEE SHEET 2.

SECTION F-F

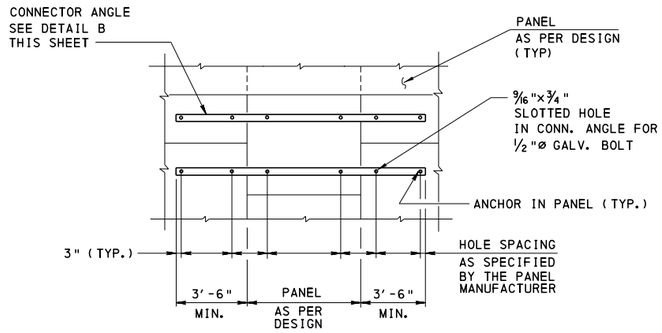
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD MECHANICALLY STABILIZED EARTH RETAINING WALLS SIDEWALK AND ALTERNATE BARRIER AND GUIDE RAIL TRANSITION

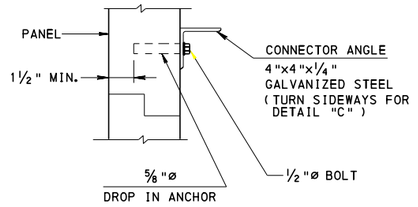
RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brian D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 7 OF 13 BC-799M



TYPICAL SECTION



SECTION G-G

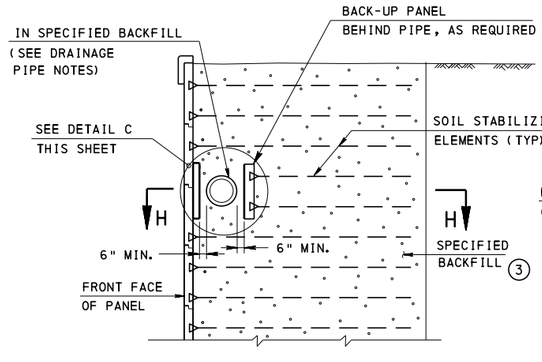


DETAIL B

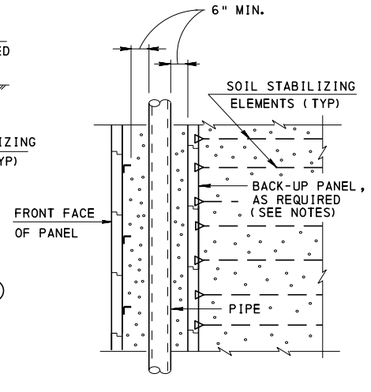
DRAINAGE PIPE NOTES :

1. FOR HORIZONTAL DRAIN PIPES, PROVIDE NONFERROUS PIPE WITH A 100-YEAR DESIGN LIFE AND WATERTIGHT JOINTS. PROVIDE POLYETHYLENE PIPES MEETING REQUIREMENTS OF PUB.408, SECTION 601.2(a)6.g (SOL 431-10-04, DATED MARCH 17, 2010) 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.

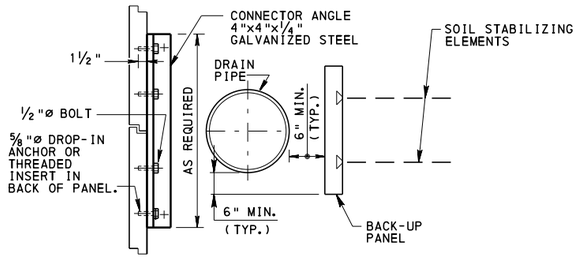
INLET BEHIND WALL



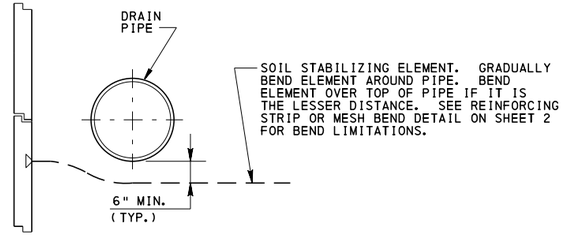
TYPICAL SECTION



SECTION H-H



DETAIL C - WITH BACKUP PANEL



DETAIL C - WITHOUT BACKUP PANEL

NOTE:
FOR LEGEND OF ◯ NOTES, ABBREVIATIONS AND SYMBOLS, SEE SHEET 2.

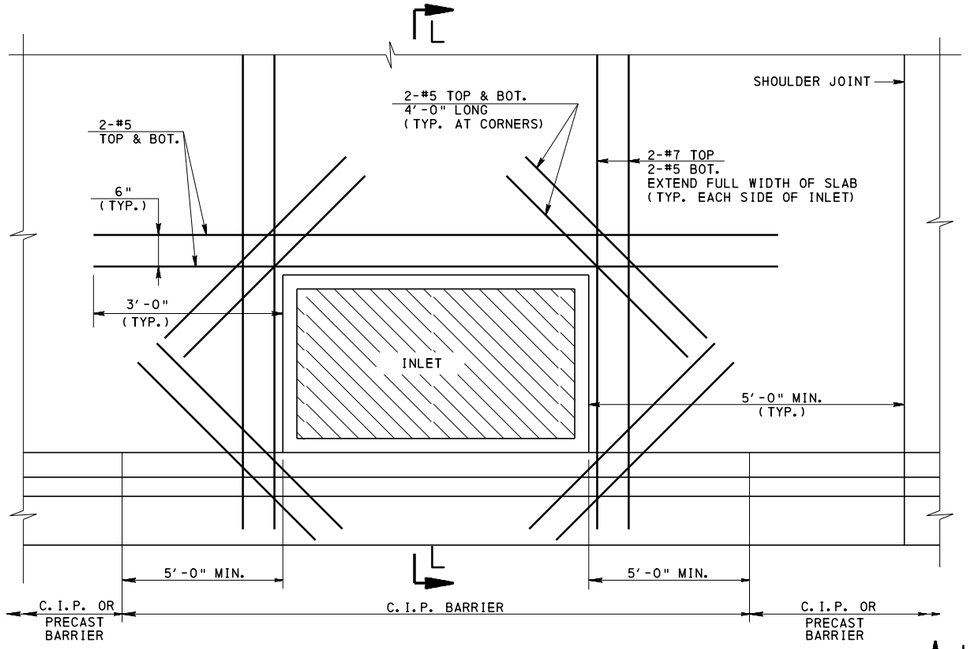
DRAINAGE PIPE BEHIND WALL

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.

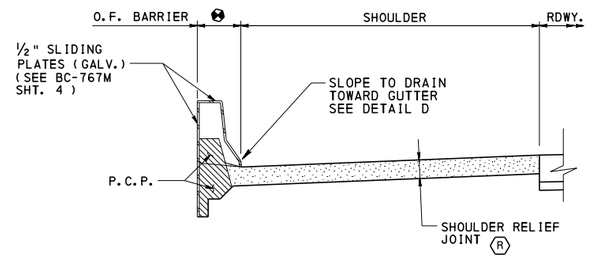
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD MECHANICALLY STABILIZED EARTH RETAINING WALLS DRAINAGE INSTALLATIONS

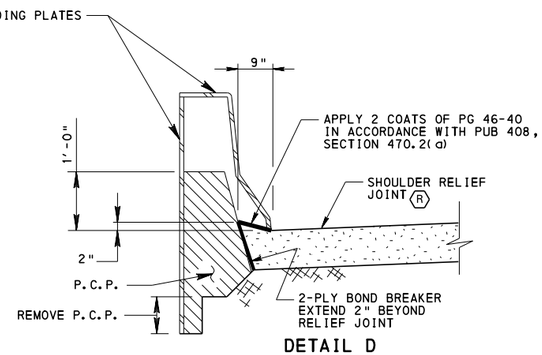
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 8 OF 13
Thomas P Macioce	Bruce B Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-799M



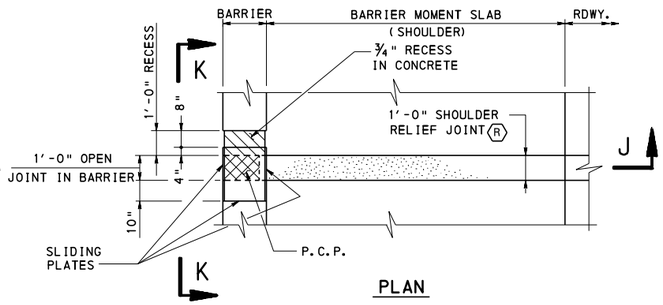
PLAN - SHOULDER DETAILS AT INLET



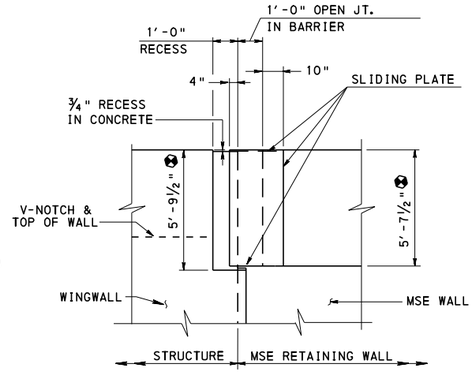
SECTION J-J



DETAIL D



PLAN

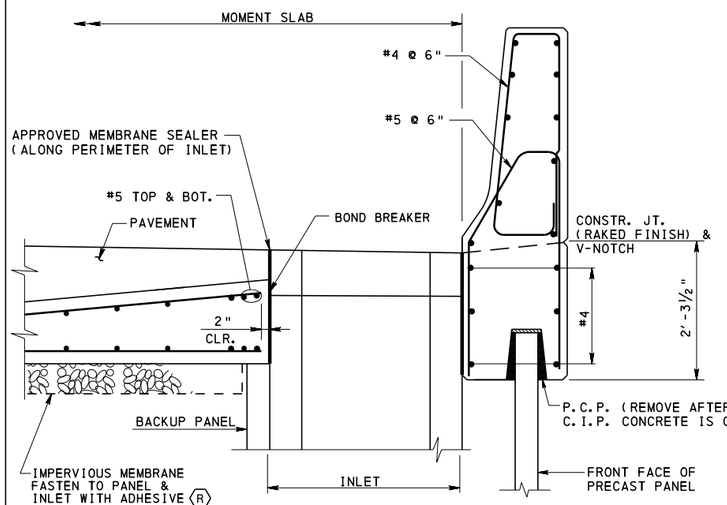


SECTION K-K

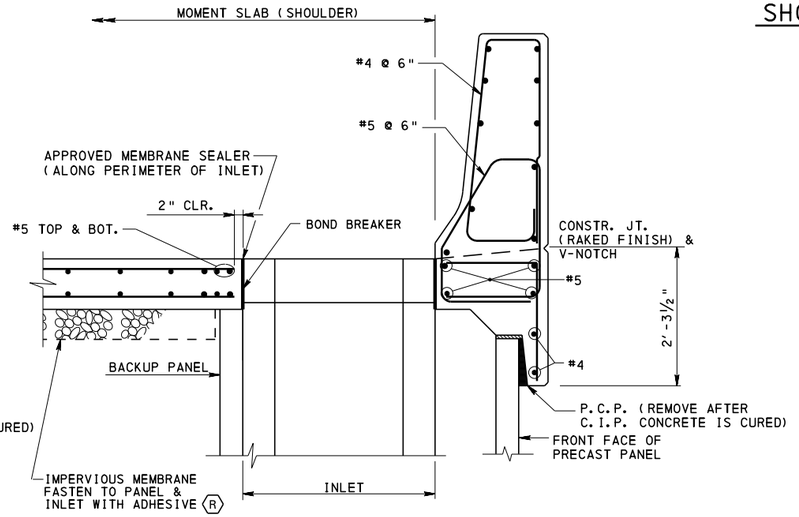
(R) ADJUST FOR SIDEWALK AND ALTERNATE BARRIER

SHOULDER RELIEF JOINT

NOT TO SCALE



BARRIER WITH BITUMINOUS SHOULDER
(C.I.P.)



BARRIER WITH CEMENT CONCRETE SHOULDER
(C.I.P.)

SECTION L-L

NOT TO SCALE

NOTE:
FOR LEGEND OF ABBREVIATIONS AND SYMBOLS, SEE SHEET 2.

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
BUREAU OF PROJECT DELIVERY

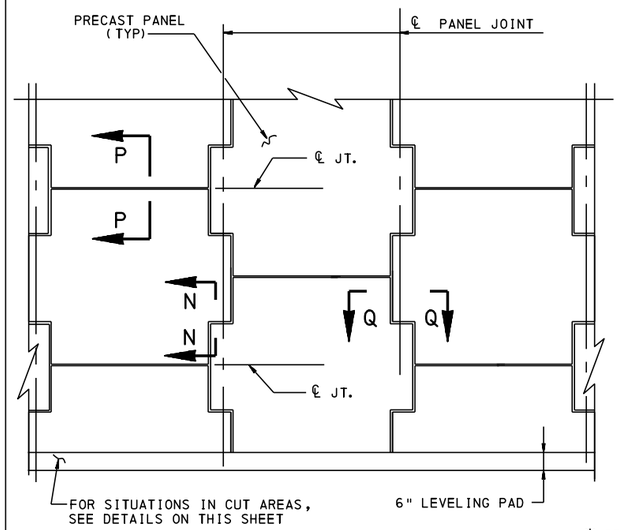
STANDARD
MECHANICALLY STABILIZED EARTH RETAINING WALLS
SHOULDER RELIEF JOINT AND INLET INSTALLATION

RECOMMENDED SEPT. 30, 2016
Thomas P Maciora
CHIEF BRIDGE ENGINEER

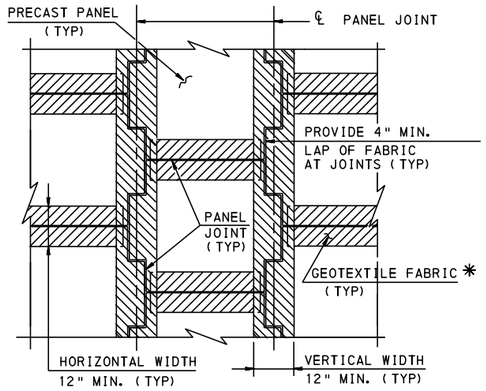
RECOMMENDED SEPT. 30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY

SHEET 9 OF 13

BC-799M

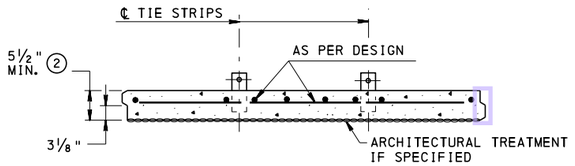


TYPICAL PANEL LAYOUT
PARTIAL ELEVATION - FRONT FACE

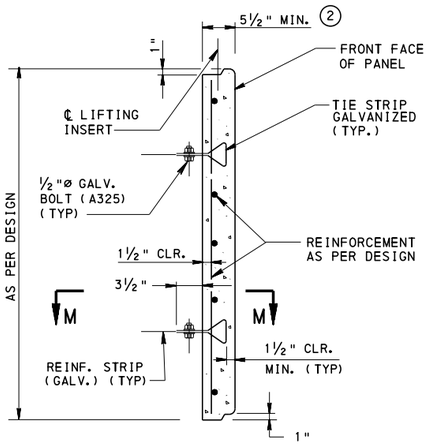


GEOTEXTILE FABRIC PLACEMENT DETAIL
PARTIAL ELEVATION - REAR FACE

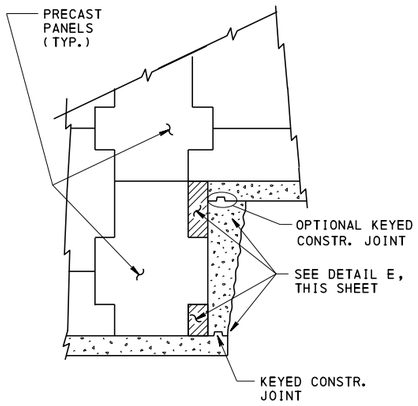
✱ COVER ALL JOINTS BETWEEN PANELS ON BACK SIDE OF THE WALL WITH GEOTEXTILE FABRIC CLASS 4, TYPE A. APPLY ADHESIVE COATING ON PANELS ONLY AND NOT ON GEOTEXTILE FABRIC. DO NOT APPLY ADHESIVE WITHIN 2" OF THE JOINT. DO NOT PLACE FOAM STRIP FILLER IN HORIZONTAL JOINTS.

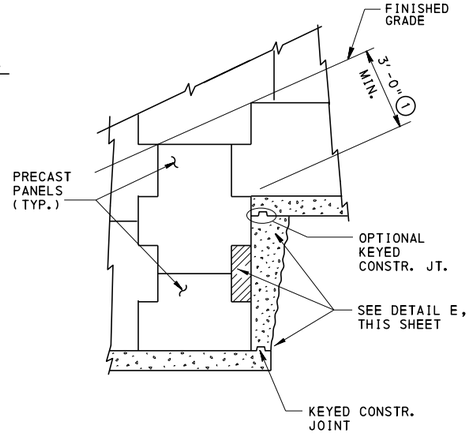


SECTION M-M



TIE STRIP LOCATION



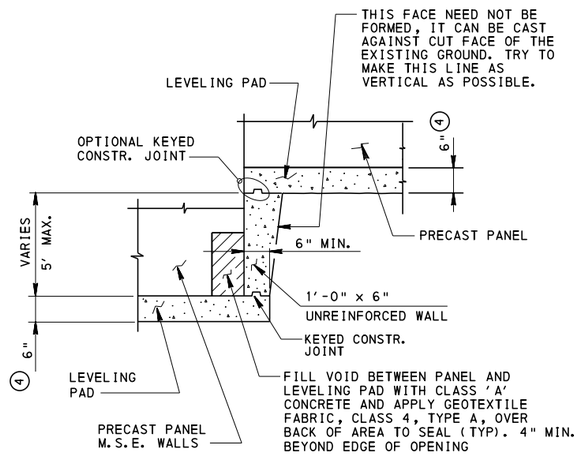


ELEVATIONS - FRONT FACE

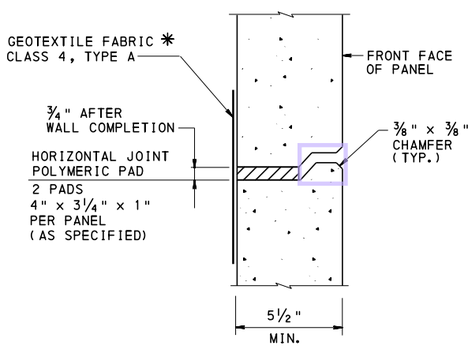
(LEVELING PAD STEP DETAILS FOR MOST COMMON ARRANGEMENT OF PANELS)

NOTES:

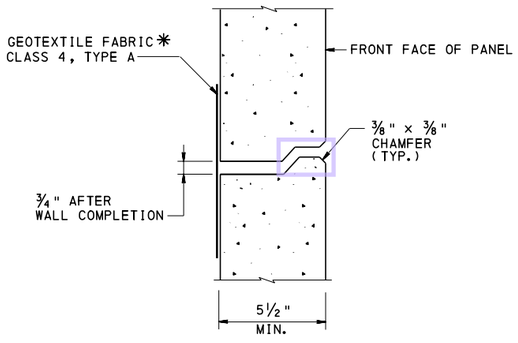
1. ALL REINFORCEMENT BARS ARE EPOXY COATED AND A 615 GRADE 60 AS INDICATED. SEE BC-736M FOR REINFORCEMENT BAR REQUIREMENTS.
2. PROVIDE A ⅜" x ⅜" CHAMFER ON ALL EXPOSED EDGES OF PANELS (FRONT FACE ONLY).
3. ALL PANEL TYPES AND OTHER RELATED ELEMENTS WILL BE DETAILED ON SHOP DRAWINGS. INCLUDE LAYOUT (PLAN 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.
4. ALL PANELS SHALL HAVE TWO LIFTING INSERTS OF 2 TON CAPACITY EACH. GALVANIZE IN ACCORDANCE WITH PUBLICATION 408 SECTION 1105.02 (s).
5. PANEL DESIGN THICKNESS IS 5½". THICKNESS OF CONCRETE MUST INCREASE TO ACCOMMODATE ANY ARCHITECTURAL SURFACE FINISH THAT MAY BE SPECIFIED.
6. GALVANIZE ALL REINFORCING STRIPS, CONNECTION APPURTENANCES AND LIFTING HARDWARE.
7. 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.
8. 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.
9. FOR LEGEND OF ◯ NOTES AND SYMBOLS, SEE SHEET 2.



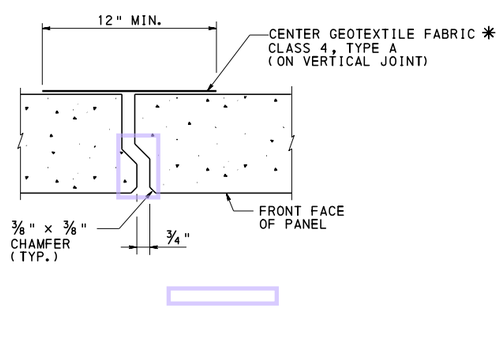
DETAIL E



SECTION P-P



SECTION N-N

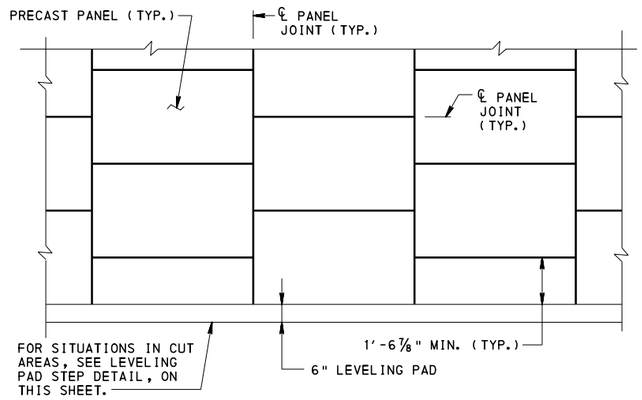


SECTION Q-Q

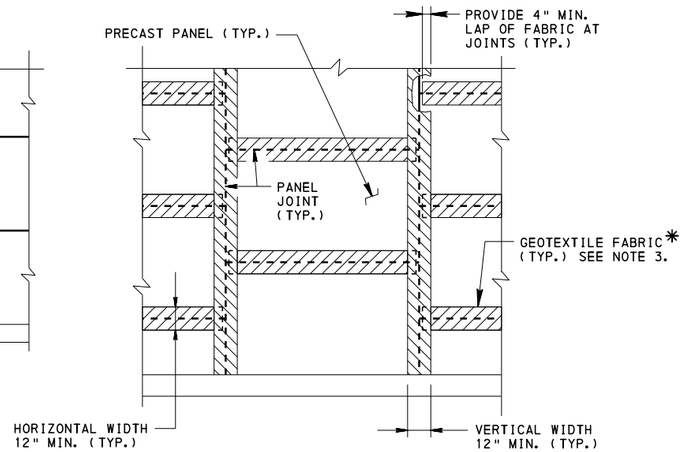
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
MECHANICALLY STABILIZED EARTH RETAINING WALLS
REINFORCED EARTH WALL PANELS

RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 10 OF 13
Thomas P. Macioce	Brent D. Thompson	
CHIEF BRIDGE ENGINEER	DIRECTOR, BUR. OF PROJECT DELIVERY	BC-799M

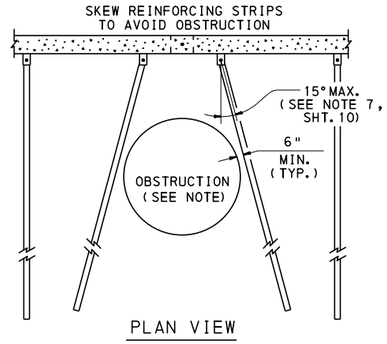


TYPICAL PANEL LAYOUT
PARTIAL ELEVATION - FRONT FACE



GEOTEXTILE FABRIC PLACEMENT DETAIL
PARTIAL ELEVATION - REAR FACE

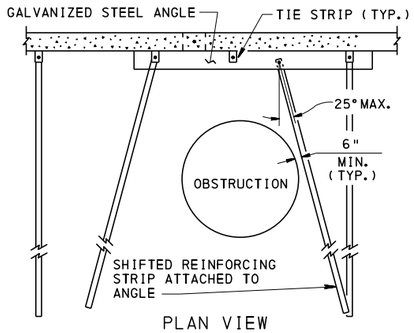
✱ COVER ALL JOINTS BETWEEN PANELS ON BACK SIDE OF THE WALL WITH GEOTEXTILE FABRIC CLASS 4, TYPE A. APPLY ADHESIVE COATING ON PANELS ONLY AND NOT ON GEOTEXTILE FABRIC. DO NOT APPLY ADHESIVE WITHIN 2" OF THE JOINT. DO NOT PLACE FOAM STRIP FILLER IN HORIZONTAL JOINTS.



PLAN VIEW

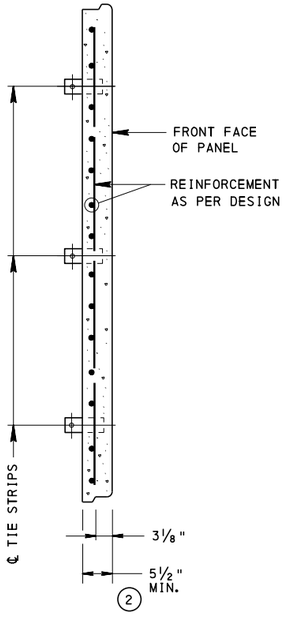
REINFORCING STRIP
SKEW DETAIL

NOTE: SIZE OF OBSTRUCTION LIMITED BY THE MIN. CLEARANCE AND STRIP INCLINATION LIMITS SHOWN.

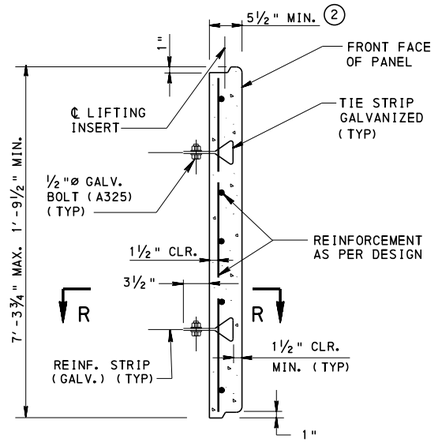


PLAN VIEW

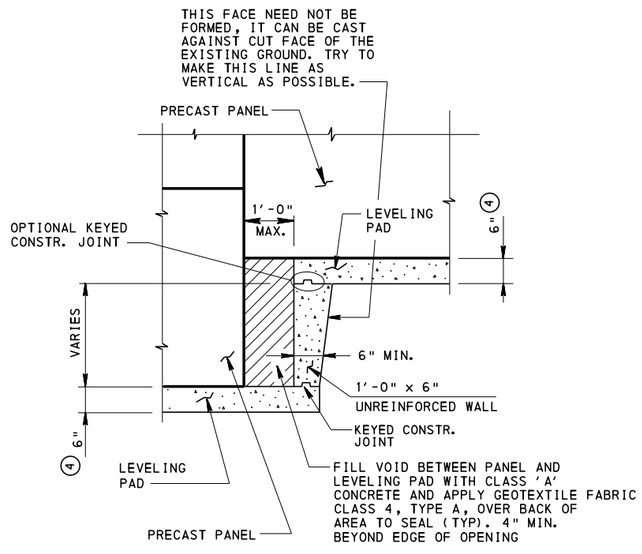
ALTERNATE REINFORCING STRIP
SKEW DETAIL



SECTION R-R



TIE STRIP LOCATION



LEVELING PAD STEP DETAIL

NOTES:

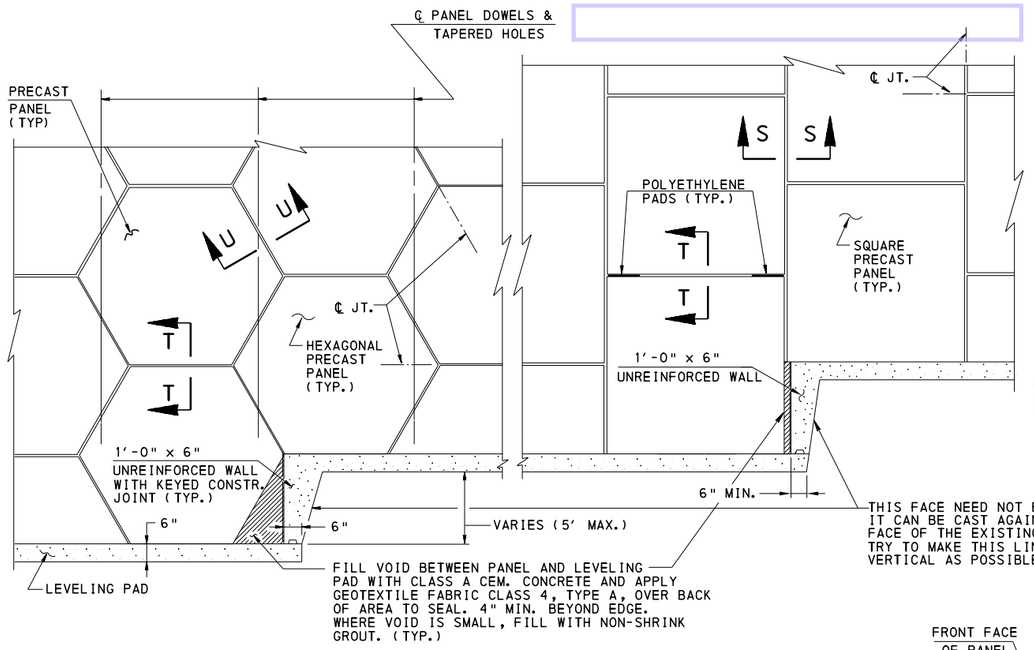
1. FOR ADDITIONAL NOTES SEE SHEET 10.
2. ALL PANELS SHALL HAVE TWO LIFTING INSERTS OF 2 TON CAPACITY EACH.
3. STAGGERED HORIZONTAL PANEL JOINTS, MINIMUM DISTANCE 2′-5½".
4. FOR LEGEND OF ◯ NOTES AND SYMBOLS, SEE SHEET 2.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

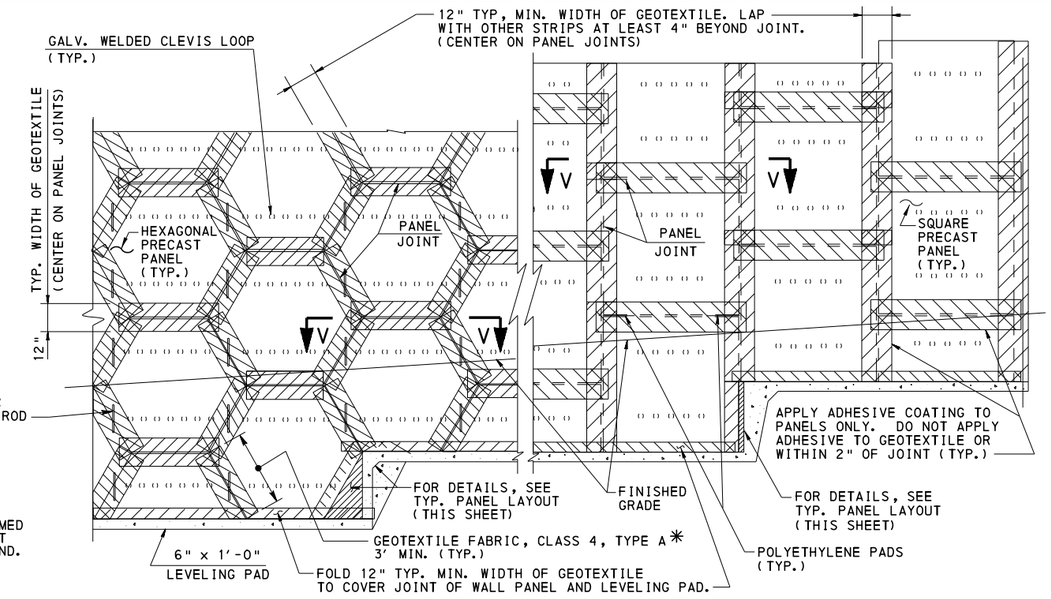
STANDARD

MECHANICALLY STABILIZED EARTH RETAINING WALLS
REINFORCED EARTH WALL PANELS

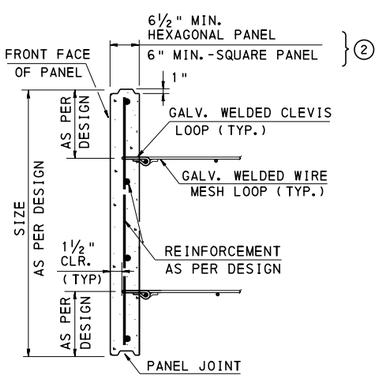
RECOMMENDED SEPT. 30, 2016	RECOMMENDED SEPT. 30, 2016	SHEET 11 OF 13
Thomas P. Macioce CHIEF BRIDGE ENGINEER	Brian D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	BC-799M



TYPICAL PANEL LAYOUT
PARTIAL ELEVATION - FRONT FACE



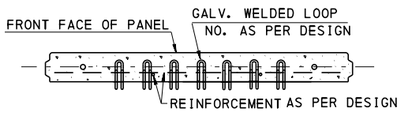
GEOTEXTILE FABRIC DETAIL
PARTIAL ELEVATION - REAR FACE



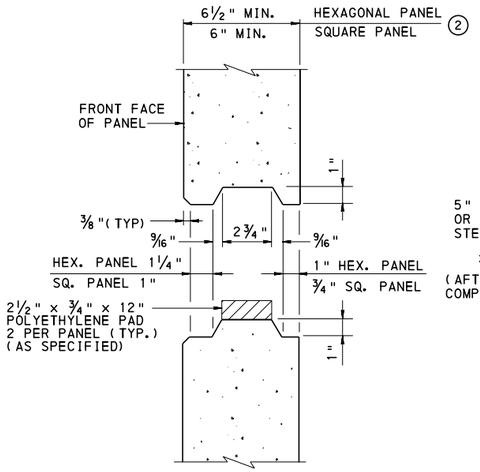
MESH CONNECTOR LOCATION
EXCLUSIVE OF ANY AESTHETIC ENHANCEMENTS

NOTES:

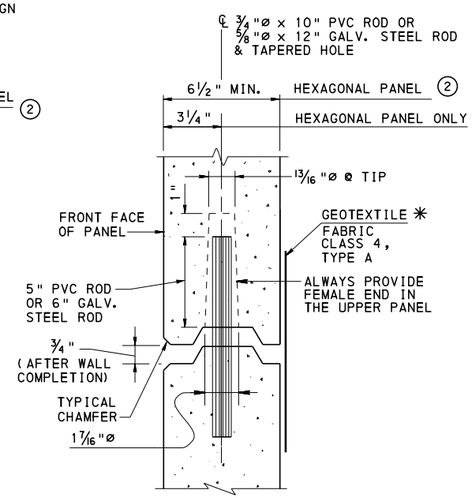
1. ALL CONNECTORS MUST ALIGN WITHIN ⅛" OF ALIGNMENT.
2. ALL PANELS SHALL HAVE A MINIMUM OF 2 LIFTING INSERTS OF 2 TON CAPACITY EACH. GALVANIZE IN ACCORDANCE WITH PUBLICATION 408 SECTION 1105.02(s).
3. NUMBER OF LOOP MESH CONNECTORS VARIES ACCORDING TO MESH CONFIGURATION.
4. REINFORCING MESH MAY BE SKEWED 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. ⅜" x ⅜" 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 ¾"ø x 10" PVC ROD OR ⅝"ø 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.



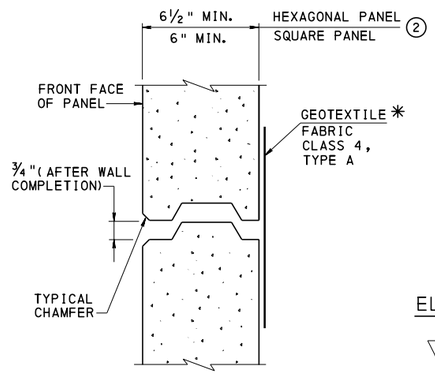
SECTION V-V



SECTION T-T

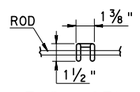


SECTION U-U

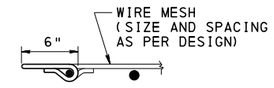


SECTION S-S

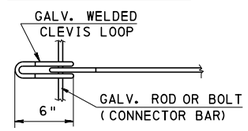
✳ COVER ALL JOINTS BETWEEN PANELS ON BACK SIDE OF THE WALL WITH GEOTEXTILE FABRIC CLASS 4, TYPE A. APPLY ADHESIVE COATING ON PANELS ONLY AND NOT ON GEOTEXTILE FABRIC. DO NOT APPLY ADHESIVE WITHIN 2" OF THE JOINT. DO NOT PLACE FOAM STRIP FILLER IN HORIZONTAL JOINTS.



END VIEW



ELEVATION VIEW



PLAN VIEW
CLEVIS LOOP DETAIL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

MECHANICALLY STABILIZED EARTH RETAINING WALLS
RETAINED EARTH WALL PANELS

RECOMMENDED SEPT. 30, 2016 Thomas P. Macioce CHIEF BRIDGE ENGINEER	RECOMMENDED SEPT. 30, 2016 Brent D. Thompson DIRECTOR, BUR. OF PROJECT DELIVERY	SHEET 12 OF 13 BC-799M

PANEL LOOP AND WIRE MESH LOOP TOLERANCES

1. 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.

2. 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
   - A. METHOD OF POSITIONING/MAINTAINING THE CLEVIS LOOPS IN THE PANEL DURING CONCRETE PLACEMENT, VIBRATION AND FINISHING.
   - B. PROPOSED FINAL FABRICATION TOLERANCES OF THE CLEVIS WITH RESPECT TO EMBEDMENT AND ALIGNMENT.
   - C. MEASUREMENT METHOD (INCLUDING TOOLS) USED TO VERIFY FABRICATION TOLERANCES.
   - D. METHOD OF HANDLING, STORING AND SHIPPING THE PANELS TO AVOID CONTACT WITH AND/OR CHANGE IN POSITION OF THE CLEVIS LOOPS.

   PART II : ERECTION
   - A. PROPOSED TOLERANCES FOR ALIGNMENT OF THE WIRE MESH LOOPS.
   - B. MEASUREMENT METHOD (INCLUDING TOOLS) USED TO VERIFY WIRE MESH LOOP ALIGNMENT AND FINAL CONNECTION TOLERANCES.

   SUBMIT THE QUALITY CONTROL PLAN TO 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.

3. 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/OR THE DISTRICT STRUCTURAL CONTROL ENGINEER, COMPLY WITH THE FOLLOWING:
   - A. 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.
   - B. 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.
   - C. 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.

4. BENDING OR REPOSITIONING PANEL LOOPS AFTER PANEL FABRICATION WILL NOT BE ACCEPTED AS MEANS OF ACHIEVING PROPER TOLERANCES.

5. REFER TO THE MECHANICALLY STABILIZED EARTH RETAINING WALL SYSTEMS SPECIAL PROVISION FOR ADDITIONAL WIRE MESH TOLERANCES.

METHOD FOR ESTABLISHING ACCEPTANCE OF WIRE MESH CONNECTION DURING CONSTRUCTION

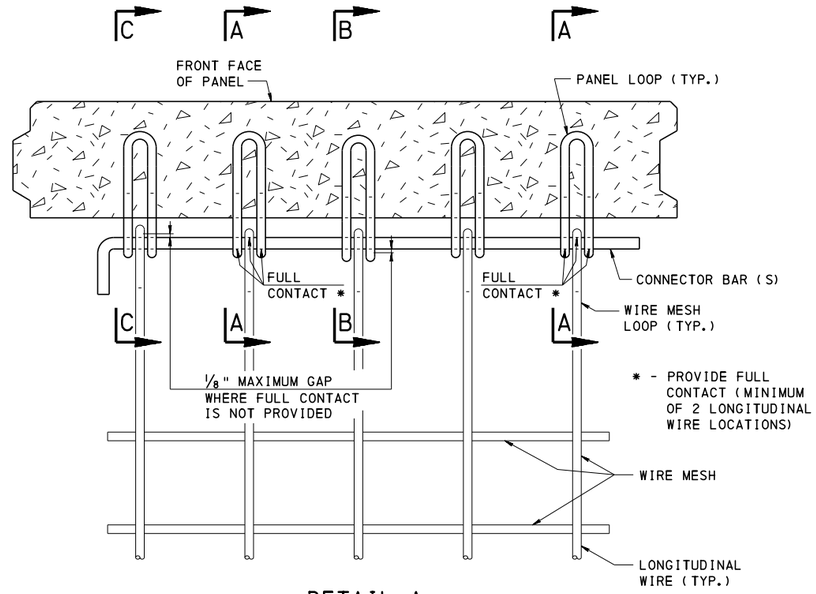
1. CONNECT WIRE MESH TO PANEL WITH CONNECTING BAR(S).

2. 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.

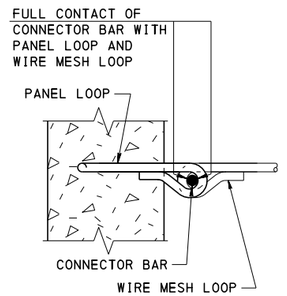
3. MEASURE THE GAPS, IF ANY, BETWEEN THE CONNECTOR BAR(S) AND THE PANEL LOOPS, AND BETWEEN THE CONNECTOR BAR(S) AND THE WIRE MESH LOOPS. REFER TO DETAIL A.

4. THE MAXIMUM ACCEPTABLE GAP BETWEEN THE CONNECTOR BAR(S) AND THE PANEL AND WIRE MESH LOOPS IS 1/8".

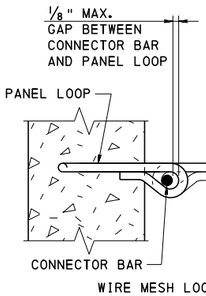
5. THE USE OF WOODEN WEDGES DRIVEN BETWEEN THE PANEL AND CONNECTOR BAR(S) TO ASSIST IN ENGAGING THE CONNECTOR BAR(S) WITH THE LOOPS TO ACHIEVE THE 1/8" MAXIMUM GAP WILL NOT BE PERMITTED. THE USE OF WOODEN WEDGES TO STABILIZE THE MESH FROM MOVEMENT DURING BACKFILL OPERATIONS WILL BE PERMITTED, BUT THE WEDGES MUST BE DRIVEN AT LOCATIONS OF FULL CONTACT ONLY OR AT ANY LOCATION AFTER GAPS ARE MEASURED AND FOUND TO BE WITHIN TOLERANCE.



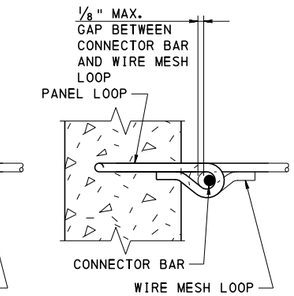
DETAIL A
(WIRE MESH CONNECTION)



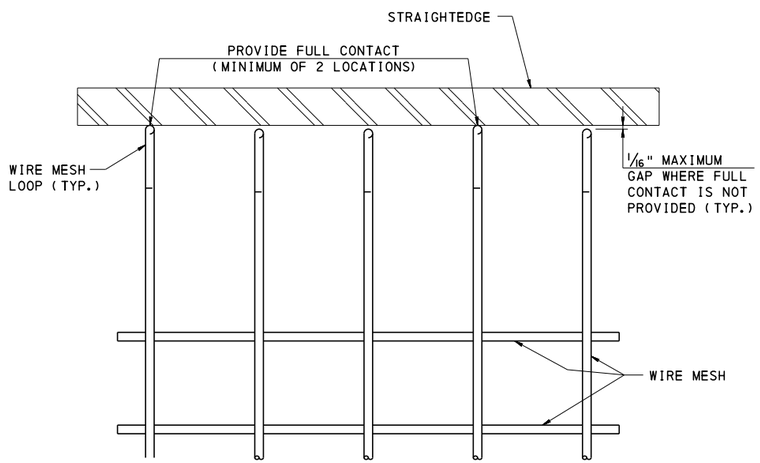
SECTION A-A
(FULL CONTACT)



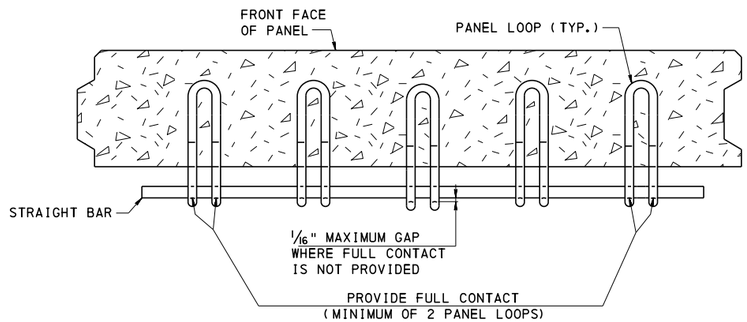
SECTION B-B
(1/8" MAXIMUM GAP)



SECTION C-C
(1/8" MAXIMUM GAP)



DETAIL B **
(WIRE MESH)



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
BUREAU OF PROJECT DELIVERY

STANDARD MECHANICALLY STABILIZED EARTH RETAINING WALLS RETAINED EARTH WALL PANEL AND WIRE MESH TOLERANCES

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